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RadCom

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1116

November 2016 ◆ Volume 92 ◆ Number 11 ◆ £4.95

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WSDRX-1-MK3

Ultra wide-band coverage SOR receiver with full coverage reception from 100KHz/2GHz. It has independent antenna inputs for HF and VHF/UHF.

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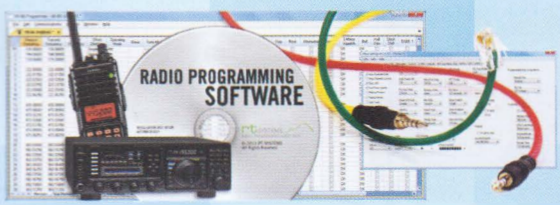

High quality, easy to use radio programming software and cables for most radios.

WCS-D5100-USB Icom ID-5100 Programming Software **£46.95**
ADMS-4AU Yaesu FT-817 Programming Software **£46.95**
KRS-V71 Kenwood TM-V71 Programming Software **£46.95**

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OFFICIAL IMPORTER

SUNSDR2 PRO

Designed for advanced HF/6m, 20W output, and 2m, 8W output, operation. Even the most experienced operator will be surprised by its capabilities.

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New generation of amateur radio. Get 100W output on HF/6m and 8W on 2m with this transceiver that combines a classic design and the most advanced DUC/DDC SDR technologies (No ATU).

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NEW

FLEX RADIO

CALL ABOUT FLEX TRADE UP PROGRAM

BEST SELLER

FLEX-6300

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

£2199.95

Flex-6500

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

£3949.95

Flex Maestro

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

£1299.95

Flex-6700

FLEX-6700 for the most demanding amateur needs. Capable of displaying up to six slice receivers and two antennas at any one time on HF and 50MHz.

£6599.95

Flex-6700R

An SOR receiver for the most demanding of Amateur's needs on HF/VHF wideband receiver.

£5299.95

Flex-Control

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

£120.95

Maestro Accessories

Tilt - Stand for Maestro gives variable tilt.

£98.95

Battery - Make the Maestro more portable with this battery.

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APACHE LABS

SOLE IMPORTER

ANAN-100BE

2 slice Rx 100 watt HF and 6m software defined radio multi-mode transceiver. The receiver is Direct Down Conversion, providing continuous, uninterrupted, receive coverage from 10KHz to 55MHz. Can also support up to two receivers (sharing the same antenna) each at the same time.

£1749.95

PiHPSDR Controller

The PiHPSDR Controller is a stand-alone interface for the ANAN/OpenHPSDR Hermes SDRs, it is ideal for mobile applications and for users who prefer physical knobs and buttons, and it eliminates the need for a Computer to run the ANAN/OpenHPSDR Hermes based radio transceivers.

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Anan-100E

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Anan 200DE

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TIGERTRONICS

SL-USB

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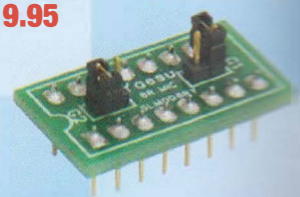
£119.95



SL-MOD

Pre-configured jumper modules for use with SL-USB to match your radio. Models available for different rigs.

£9.95

WEST MOUNTAIN RADIO

RIGBLASTER ADVANTAGE

Sound card and Rig control interface eliminated the need to reconfigure your sound card for digital mode.

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RIGRUNNER 12-WAY

80 Amp 12V distribution board complete with 2m cable and 24 connectors

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RIGBLASTER NOMIC

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

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STEPPIR 3 ELEMENT 20-6M

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18ft 20m-6m vertical with the ability to adjust the element length allows the antenna to be mounted nearly anywhere and still provide a good match to your transceiver.

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ELECRAFT - SOLE IMPORTER

KX2

Smallest full featured HF radio on the planet thanks to its state of the art construction. Measures only 5.8" x 2.8" x 1.5" and weighs 368 grams for ultra-portability which can be extended with an internal battery capable of 8 hours operation on a single charge. Another great add-on to the already great 10W transceiver is the option for an automatic antenna tuner (KXAT2) to tune a random wire, dipole or whip on multiple bands.

KX2 £859.95

KX3

Covering 160m-6m the KX3 operates in all modes and also comes with DSP based features usually only found in larger radios. Its small size allows you to use it anywhere with the added extra of fold out rear tilt feet letting you place it down at the perfect angle. Available in Kit and Ready Built.

Kit: £999.95
Full: £1079.95

K3S

Options available:

- Elecraft K3S/100-Kit (100W)
- Elecraft K3S/100-Built (100W)
- Elecraft K3S/10-Kit (10W)
- Elecraft K3S/10-Built (10W)

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.

Features:

- Accurate, high-speed CW transmit.
- Ultra low-noise synthesizer.
- KXV3A board now replaced with KXV3B board which will now be included as standard.
- Redesigned AF output circuitry for outstanding speaker audio.
- USB port which eliminates need for PC sound card and line-level audio cables.

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

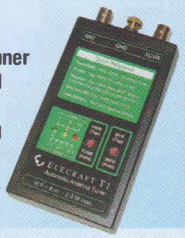
ELECRAFT ACCESSORIES - SOLE IMPORTER

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

T1A



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

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KXPA100

100W power amplifier for KX3 but suitable for most QRP radios including FT-817 offering quiet and reliable operation.

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XG3

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

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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

KAT500

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

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200W (HX) 100W (SAT) with a DC 13.8V supply perfect for base station use with the separating control panel and a built in ATU.

Call for best prices

TS-590SG

Be witness to the evolution of KENWDDD's pride and joy - the TS-590SG 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.

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NEW IN STOCK

TS-990S

The TS-990 is designed from the ground up, providing you with unique features. The receiver has been created with advanced techniques that have only recently become available to the radio market. Find out more at www.wsplc.com.

Call for best prices

NEW

TH-D74

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

£599

ICOM DEALS

OFFICIAL RE-SELLER

NEW STOCK ARRIVED

IC-7300

Icom's first offering of its very own SDR transceiver with HF – 4m operation and a 60m or 11m option available at Waters and Stanton. With a built-in integrated wide-frequency Automatic Antenna Tuner making ideal for field operation.

NEW

The radio provides 100 watts output power on HF/50MHz bands and 50 watts on 70MHz. Available for Demo on contest grade antennas at Europe's Ham Store.

£1049.95

IC-7100

The IC-7100 is a HF 6m compact transceiver with touch screen ability and up to 50MHz frequency. Not only is it D-STAR ready, but you don't need an SD card either!

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YAESU DEALS

OFFICIAL RE-SELLER

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Rugged yet compact C4FM/FM 65W mobile transceiver of solid RF power. Loud and Crystal Clear Front Panel Speaker with 3W of Audio Output. Instantly recognises digital or analogue transmission and adjusts automatically for flawless co existence of both digital and analogue users.

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FT-991

The Yaesu FT-991 is the next generation in all band HF to UHF transceivers which includes Yaesu's own System Fusion Digital FM capability. It has more traditional modes too which include CW, AM, FM, SSB.

Call for latest price

FT-1XDE

Take the FT-1DE dual band handheld transceiver anywhere with its rugged case, IPX7 water protection rating and up to 8 hour battery life with the optional FNB-102LI battery. Enjoy 2m and 70cm operation on digital and analogue with four communication modes: V/D, Voice FR, Data FR and Analogue FM.

Call for latest 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 providing loads of information through an easily navigation.

£294.95

FT-DX1200

The FT DX 1200 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 latest price

NEW

FTM-100DE

The FTM-100DE incorporates a wide range of System Fusion and analogue features with the Single Feature Design equipped with a Dot-Matrix Display. Order yours today.

Call for latest 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 latest 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 latest price

FTM-400XDE

The FTM-400DE is the first mobile introduced to be a fully compatible radio partner for use on the YAESU System Fusion Dual Mode system.

£419.95

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We have free parking, a cafe opposite and a pub nearby 'pay us a visit'

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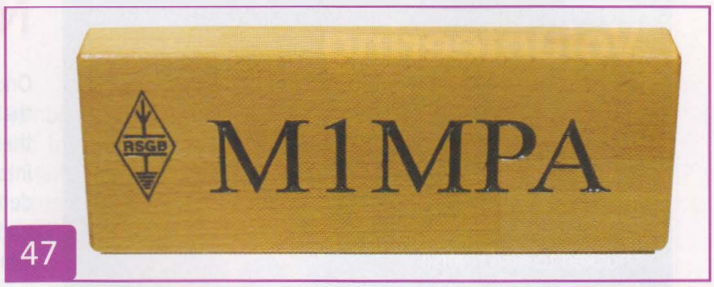

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Technical Features

Features

Special Offer

Cover image: John, G4BAO working via satellite as GB16NH at the National Hamfest. Photo by Giles, G1MFG.

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

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RadCom is published by the Radio Society of Great Britain as its official journal and is sent free and post paid to all Members of the Society. **The December edition of *RadCom* is expected to arrive with most Members by 24 November, 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/
Technical supplement *RadCom Plus* is available to RSGB Members online at www.rsgb.org/radcom-plus
RadCom Basics for Members new to the hobby can be found at www.rsgb.org/radcom-basics

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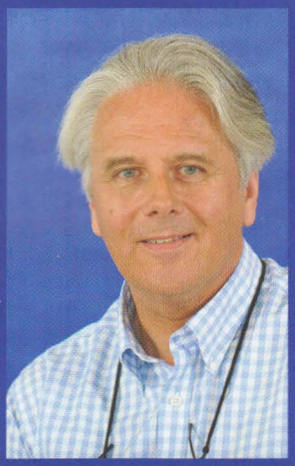
Volunteering



As I write this I have just completed three years as a Director and five months as Board Chair. I was somewhat shocked to also realise that I have been volunteering in one RSGB role or another for over a quarter of a century now; how time flies when you are having fun!

Throughout that time I have never ceased to be amazed at the work that is done by our dedicated volunteers. As a Director I have seen lots of excellent work across a wide range of topics that is invisible to the membership as a whole. We have tried to shine a light on some of these volunteers with short features in *RadCom*. I would like to take this opportunity to state very clearly that we really value the work done by all of our volunteers; we certainly could not do it without you!

Indeed, we currently have gaps in some key positions and if we cannot fill them either the services they provide will have to cease or costs will increase if have to buy-in help. We would rather avoid buying in expertise as it would inevitably lead to an increase in subscriptions, something we have been fending off for a while now.

So, we need more of you to get involved and we would like to see more new people come forward to join our regional team, our committees and the Board. Over 10,000 new amateurs have been licensed in the last 6 years and it would be great to see more of those newcomers join the ranks of our volunteers.

Who can help? There is a perception that the RSGB is run by the same 'old boys club'. Whilst it is true that most current volunteers tend to be 'old' and 'boys', we do have female and young Members who volunteer. The idea that all volunteers come from some kind of 'inner circle' is really quite odd; we are regularly getting new volunteers stepping forward and most of the current Board did not even know each other until they joined the Board.

How do you know what vacancies exist? The volunteer webpage has details of current vacancies and we are still looking for another nominated Board member, preferably someone with promotion/marketing skills relevant to a membership-based organisation.

Take a look at the RSGB 'Volunteer' webpage at www.rsgb.org/volunteers – it also includes a great video showing some of our volunteers explaining what they get out of it. I recommend you take a look and if you cannot volunteer yourself, maybe show it to someone you think might be suitable for one of our vacancies to help convince them that volunteering is both rewarding and good fun.

Steve Hartley, G0FUW, RSGB Board Chair

National Club of the Year

Once again, the RSGB is indebted to Waters and Stanton for their generous sponsorship of this competition. The 2015 theme was Promoting Amateur Radio, and the judges took into consideration the special events that a club has run and details of other outreach activity and initiatives that they have undertaken to promote our hobby when choosing the Regional winners and the clubs put forward for the national title.

The National Club of the Year awards were made at the National Hamfest for both the large and small club categories.

Congratulations to all.

Large Club category national winners

1st place – Norfolk Amateur Radio Club

2nd place – Hilderstone Radio and Electronics Club

3rd place – Telford & District Amateur Radio Society

YOTA UK 2017

The RSGB is committed to encouraging its young Members and attracting more youngsters into amateur radio. Since 2014 we have been a very active participant in the International Amateur Radio Union's Youngsters On The Air (YOTA) programme. We have hosted Special Event Stations during YOTA month (December) and we have sent UK teams to the summer camps in Finland, Italy and Austria. The work that we did with ARISS in support of Tim Peake's Principia mission has also increased interest in amateur radio in schools so we expect to have even more youngsters taking part in YOTA month this December.

Looking further ahead, we are extremely proud that the UK has been selected to host the 2017 YOTA summer camp. Members of the RSGB Youth Committee, ably assisted by Gervald Frykman, G0GNF, the 2014 YOTA Team Leader, put together a bid that was selected by the IARU Region 1.

Sara McGarvey, 2I0SSW, the 2016 Team Leader, is now helping Mike Jones, 2E0MLJ, and the rest of the Project Team to turn the broad plan in the bid document into a reality for teams from across Europe and Africa. There has also been interest from Japan!

The date has been set as 5-12 August and the venue has been booked; YOTA 2017 will be held at the home of the UK Scout movement, Gilwell Park – 108 acres of woodland located on the edge of Epping Forest with a permanent amateur radio shack complete with antenna towers, etc.

Activities already in the plan include Amateur Radio Direction Finding, a BIG Special Event Station, in the Radio Scouting UK shack and the Camb-Hams Flossie vehicle, the ever-popular intercultural evening where all countries share examples of their food and drink, trips to Bletchley Park, the National Radio Centre and the British Science Museum, UK Foundation exams, a SOTA activation and a radio construction Buildathon; it will certainly be a busy week! Several affiliated clubs and RSGB Committees have been signed up to provide volunteer help during the week.

We are keen that YOTA UK is not solely about the camp at Gilwell Park and we are working on ideas that will allow all young radio amateurs in the UK to join in the fun. Could your club host a local YOTA event during the same week? Maybe we have an event in each Region? Whatever we do, our aim is to get Youngsters On the Air!

Get a supporters pin by helping YOTA 2017

The RSGB is seeking supporters for this youth event in 2017. If you donate £15 or more we will be pleased to send you a YOTA 2017 supporters pin to reflect your support of youth activity in the UK. This handsome pin is 25mm with a butterfly fixing making ideal for affixing to jacket lapels or many other applications. The YOTA 2017 logo is surrounded by a gold effect band and the word supporter is picked out in stylish raised lettering. A clear epoxy finish will ensure the badge stays pristine for years to come. Supporters will also be acknowledged publicly on the RSGB website and we will welcome support from any in the amateur radio community who wish to be associated with this prestigious youth event.

Help Youth activity in the UK by being a supporter of YOTA 2017

100% of all donations will be used for YOTA 2017

Weblinks:
IARU YOTA: www.ham-yota.com/
Radio Scouting UK: www.radio-scouting.org.uk/
Gilwell Park: www.scoutactivitycentres.org.uk/locations/gilwellpark/
YOTA 2017: http://rsgb.org/main/about-us/yota-2017/

Small Club category national winners

1st place – Greenisland Electronics Amateur Radio Society

2nd place – Leiston Amateur Radio Club

3rd place – South Kesteven Amateur Radio Society

RSGB Website

In response to feedback about the RSGB website, we're trialling the first phase of a new navigation layout. Take a look, use it over the next few months and let us know if you like it – you can share your thoughts via web.feedback@rsgb.org.uk For example, is information easier to find? Do the new groupings work well? One of our aims is to showcase the breadth of RSGB services more effectively – is there anything we could do to improve that further? We'll use your views as part of a fuller review of the website next year. Please note that improving the search function will be part of this later review. If you encounter problems, please raise a ticket with the IT and Web helpdesk via www.rsgb.org/helpdesk

Training & Education – Disabilities

The Training and Education Committee created a new role earlier this year, to help support amateurs with disabilities. This followed discussions with the RAIBC and the role will include liaising between our two organisations, giving consideration to disabilities more widely, from time to time making recommendations in this area to the TEC Chair and helping formulate responses to RSGB Board requests made to TEC in this area.

If you are interested in this role, please contact Philip Willis via tec.chair@rsgb.org.uk

Congratulations

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

60 years		50 years			
Mr P C Cole	G3JFS	Mr G Suggate	G3NPI	Mr R Vale	G3YHI
Mr C H Noden	G3JPB	Mr R L Pickles	G3VCA	Mr M Baker	G3ZBP
Mr D Webber	G3LHJ	Mr D Prout	G3VCV	Mr D Gardiner	G8BAS
Dr M J Underhill	G3LHZ	Mr J A Arscott	G3VSL	Mr J P Reeve	G8ROD
Mr V W Stewart	GM3OWU	Mr R S West	G3VSQ	Mr C W Tran	GM3WOJ
		Mr R Hutchinson	G3XHF	Barry ARS	GW3VKL
		Mr B L Whittle	G3YBU	Mr S A Spencer	RS28095

DRM 136 wanted

Region 13 is looking for a Deputy Regional Manager for the Nottingham/Derbyshire area, which is District 136. If you are an RSGB Member and think this role would suit you, contact the Regional Manager, Jim Stevens, G0EJQ by email to rm13@rsgb.org.uk

Correction

In last month's article by VE7DXW (p26-33) the direction of the August 2017 USA solar eclipse shadow was stated incorrectly. We are grateful to Peter, G3PLX for pointing out that it will start on the West Coast and then move in a south easterly direction towards South Carolina, and not as originally stated.

NEW

P&P FROM FREE
(Over £30 See Page 78 For Details)

ONLY £5.99

The RSGB Vintage Rig Guide

Edited by Steve White, G3ZVW

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

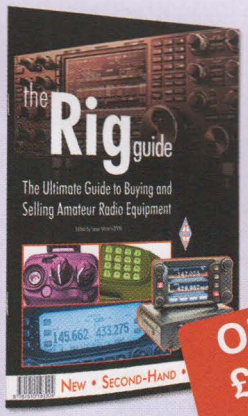
Covering the mid-1960s to 1990s the *RSGB Vintage Rig Guide* covers the equipment from manufacturers that were never in the standard *RSGB Rig Guide* along with the items that have been discontinued from the listings in early editions of that publication. So manufacturers such as Drake, Heathkit and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

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

Size 210x297mm 80pages, ISBN 9781 9101 9330 3

Price: £5.99 post free (UK only)

SPECIAL OFFER
Buy both for only £9.99



ONLY £5.99

The Rig Guide

Edited by Steve White, G3ZVW

What should you pay for a second hand radio?

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

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

Price: £5.99 post free (UK only)

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

RSGB SHOP

Radio Society of Great Britain www.rsgbshop.org
3 Abbey Court, Priory Business Park, Bedford, MK44 3WH. Tel: 01234 832 700 Fax: 01234 831 496

Terry Barnes, GI3USS, SK

Former RSGB President Terry Barnes, GI3USS passed away on 18 September 2016.

Terry served as RSGB President in 1992. He was the first GI to hold the position for some 25 years (the last being Barney Patterson, GI3KYP, in 1967). Terry had been a volunteer for the Society for some years before his election to President, and put this experience to good use during his term of office. In his first leader article for *RadCom* he wrote of EMC problems, 'black box' operating and ways that the RSGB could be modernised.

He was also the President of the Radio Amateur Old Timers' Association from 1994 until 1998.

His successor, Peter Chadwick, G3RZP reminisces: "Terry was President in 1992. His inauguration was held in Bangor in Northern Ireland where he worked for the Northern Ireland police as a radio technician. Terry was the Zonal Council member for Northern Ireland before becoming President.

Terry Barnes, GI3USS, second from right, worked tirelessly for amateur radio.

"I was the RSGB Executive Vice President in that year, and he and I made the first RSGB foray to the Dayton Hamvention, running a small booth selling RSGB books and memberships. This proved profitable enough for the process to be worth repeating. Terry spent a lot of time at Potters Bar: he signed every membership certificate himself – no rubber stamp signature! – and often stayed in the 'flat' there, which was nowhere near the plush apartment that some members imagined!

"Terry, Frank Hall (GM8BZX, President in 1991) and myself generally went for a pizza and a bottle of Piesporter after RSGB Council meetings, which allowed us to set the world to rights. I well remember his excitement at one of these meals when he told us about the Labgear LG300 AM and CW transmitter he had just acquired and his problems in getting it back home.

"As President, he travelled widely through the UK in support of regional activities, and stayed with me a few times when we were representing RSGB at various activities within Zone D, for which I was the Zonal Council Member. He was a member of RAOTA as well as RSGB."

Waldemar Sznajder, 3Z6AEF, President of the Polish Amateur Radio Union, wrote, "I would like to convey our deepest condolences having regard for the recent passing away of our friend Terry Barnes, GI3USS. We will always remember the entirety of Terry's achievements – bearing in mind his significant and versatile contribution in the development of amateur radio movement in Europe as well as all over the world.

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 P Reynolds, G1IGK
Mr R Nelson, G1NGE
Mr M Ellison-Taylor, G1OZT
Mr R Lea, G3DEN
Mr H H Barker, G3SYB
Mr S Middleton, G7VYY
Mr C Hagan, GI6IES
Mr R Mawhinney, GI8GZM
Mr W Steele, GM0WUP
Mr G Steele, GM0WUR
Mr E Kover, HA0IM
Mr A Wammer, LA3SPA
Mr J Green, M0ACN
Mr M SLON, M0GZR
Mr C Lycett, M0HCZ
Mr M Burton, M0LHA
Mr B Roberts, M0MRA
Mr A Fishwick, M1CGI
Mr Z ul Haq, M3ZIA
Mr A Bell, M6GUM
Mr F Cross, M6HKH
Mr D Smith, M6HOZ
Mr K Kimura, M6HQW
Mr T McCarthy, M6IES
Mr G Kirk, M6KVK
Mr A Allgood, M6LYY
Mr M Dalziel, M6MXD
Mr N Griffiths, M6NGR
Mr O Nurse, M6OJW
Mr S Macmurray, M6SQO
Mr S De Bank, M6UXP
Mr A Cairns, M6VBS
Mr J Archer, M6XJA
Mrs H Cropp, M6YTI
Mr Z Addison, M6ZBK
Mr A Elliott, MD6SNV
Mr R Campbell, MM6HQG
Mr G Blakeslee, N1GB
Mr J Paine, RS180587
Mr G Graham, RS309399
Mr B Caligari, RS309863
Mr D Seymour, RS309899
Mr P Brotheridge, RS309916
Mr S Plummer, RS309917
Mr M Bowerman, RS309922
Mr S Hunter, RS309935
Mr S Whitelaw-Kirk, RS309936
Miss J Graham, RS309969
Dr J Wilson, RS309981
Mrs V Randle, RS309995
Mr N Butler, RS310004
Mr T Tilbrook, RS310010
Mr R W Johnson, RS310027
Mr W Bews, RS310047
Mr G Sneddon, RS310048
Mr R Hubbard, RS310060
Mr A Thorne, RS310086
Mr S Johansson, SM7FVT
Mr A Downie, VK4QG
Mr J Howell, W4LNI
Mr C Davis, WA3UTC

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

Mr P Staerck, 2E1SKY
Mr A Brandao, CT2GGD
Mr R Jasper, G0CIR
Mr R L Moriarty, G0IFN
Mr A J Spry, G0KDY
Mr M D Fordham, G0LQV
Mr J M Jenner, G0PEG
Mr B Jopson, G0UKP
Mrs S A Kirkwood, G1LAT
Mr D Harding, G1PMA
Mr JGM Scott, G1UDR
Coventry ARS, G2ASF
Mr A F Bower, G3MKU
Mr R Dodson, G4RNK
Mr J C Sartin, G4SSE
Mr R Satterthwaite, G6BMY
Mr R Holyhead, G6FGA
Ms C J Williamson, G6WRW
Mr C Holloway, G7FKJ
Mr D G McFerran, GM0OPX
Mr D Hulin, GM6HGF
Mr K M Crossman, M0BYZ
Mr S Knight, M0UNC
Mr I R Bush, M1IRB
Mr T Salo, OH6MO
Mr K Lowry, RS185287

Continued on page 18

New addition at Moonraker

Chris Taylor, G0WTZ has joined the Moonraker team and can be found in the new showroom where he will head the retail side of the business. Justin Godfrey, Sales Director at Moonraker, said "I have known Chris since I was four years old when he came to our house as a BT engineer in Borehamwood to fix our home telephone line! Since then he has worked for over 33 years in the radio communications business, working for the well-known establishments of Truck King, ML&S, Kinetic and his own Taylor Made business." You can contact Chris by phone on 01908 281 705 or by email to Chris@moonraker.eu

Digital Radio Users

The UKFM Group (Western) is holding a further Digital Radio User Guidelines session on Saturday 12 November at the Warrington Amateur Radio Club, Bellhouse Lane, Grappenhall WA4 2SG. The event starts at 10am and will include user friendly advice and 'hands on equipment' sessions as well as question and answers on all matters D-Star, DMR, Fusion and the like. To reserve a place, contact the group's Membership Secretary, Kath Wilson, M1CNY on 01270 761 608 or by email to dwilson@btinternet.com

Train the Trainers

Leicester Radio Society is pleased to host an RSGB Train the Trainers event on Saturday 19 November for RSGB Members. If you are you a trainer or would like to be one, this event may be for you. It has a maximum of 25 places so it is first come first booked. It will start at 9am and finish at 5pm with a break halfway for lunch, tea/coffee is provided but you will need to bring your own packed lunch. To reserve your place, please contact John, G0IJM by email to john.g0ijm@btinternet.com

Special event stations

GB4MTR: The anniversary of the amateur allocation in the 4m band is on 9 November (the Gazette notice was 9 November 1956) and a station will be run by Selim, MOXTA with Harlow & District ARS. The station will be operating from 1 to 28 November (mostly Tuesday and Friday evenings, weekends and some other intermittent weekday evenings using 80m to 70cm and all modes. QSL via the bureau to MOXTA or direct to G6UT (the postal address can be found at www.g6ut.com or via G6UT on QRZ.com) or by eQSL. A QSL card will be sent via the bureau to any station worked, if requested.

San Francisco Radio Club is celebrating its centennial year and the final special event is on 12 November. **W6PW/100** will operate from 1600 to 2300UTC on 28.300, 24.945, 21.275, 18.150, 14.225 and 7.178MHz (SSB). A special QSL card will be available for all QSOs, see QRZ.com/w6pw

Two special event stations will be on the air to commemorate an historic broadcast made in 1914 from the Eifel Tower, by Frank Wright, the founder of Northampton Club to pupils in Bugbrooke School. A listening station, run by Northampton Radio club, will be at Bugbrooke County Primary School led by G4CZB, 2E0MOR and G0GGU. **F5KTR** will transmit from Paris, operated by GRAC Radio Club. A message, in Morse, will be sent on 40m saying 'Frank Wright is here' as close to 2pm on the 17th as possible; phone will be used before and after. The special call **GB0WFX** will be in use other than on the 17th and it is hoped that they will get plenty of QSOs.

Repeaters on Lincoln cathedral

The antennas for two voice repeaters GB3LM and GB3LS as well as GB3VL (23cm repeater) and GB3LX (10GHz repeater) are situated at the top of Lincoln cathedral. Recently, the repeater keeper, Bob Fisk, G7AVU, gave a talk to RAF Waddington ARS about repeaters and the need for support from the local amateur radio community. More information about the group's four repeaters can be found at http://lincolnrepeaters.co.uk/

Open on 6 November

Martin Lynch & Sons are not attending the Kempton Rally on 6 November. They are, however, opening their store from 8am until 2.30pm. Since they are only a 15-minute drive from the rally you are invited to call in before you go to Kempton or after you've had a wander around, pop in after. Masses of free parking and free coffee and nibbles.

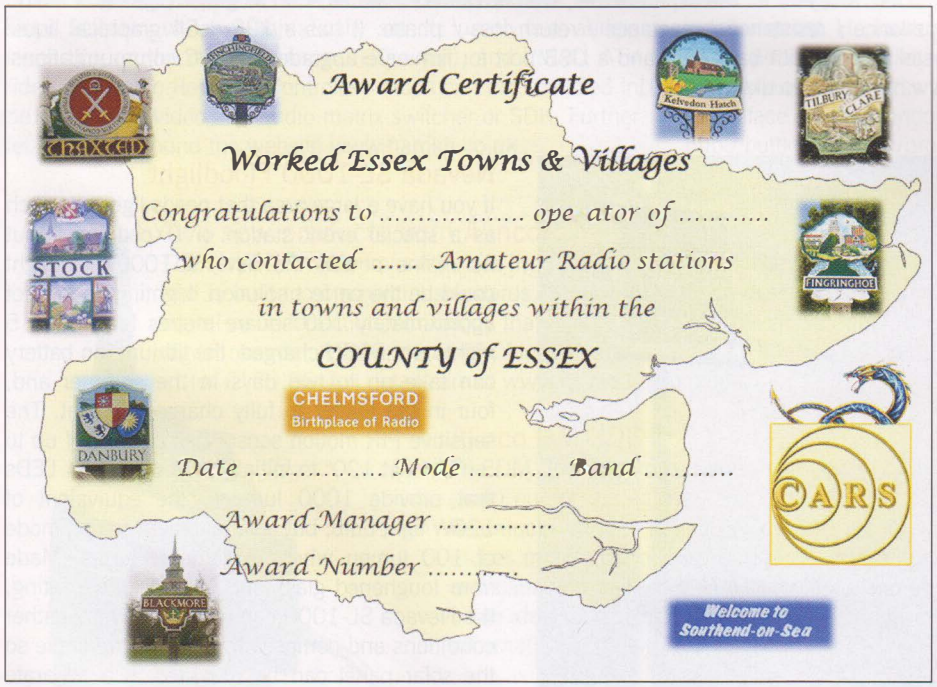
Advancing the Art of CW award

The yearly CWops award for advancing the art of CW recognises individuals, groups or organisations that have made the greatest contribution(s) toward advancing the art or practice of radio communications by Morse code. The 2016 recipients of the award are: Rob Brownstein, K6RB for creating, organising, marketing and actively participating in the operation of CW Academy. Carlo Consoli, IK0YGJ for writing the book *Zen and the Art of Radiotelegraphy*. Chuck Adams, K7QO for writing and publishing a CW training course manual and CDs that he distributes at no cost to students.

Vintage & Military ARS AGM

On Saturday 17 September, around 40 members of the Vintage & Military Amateur Radio Society (VMARS) gathered at the Midland Air Museum for its annual general meeting, which was followed by lunch. After lunch there was an excellent lecture on the humble beginnings of the museum and that of Sir Frank Whittle by Barry James, the General Manager at MAM. The talk was well received, and for those who have never been to the Museum, it is well worth a visit (www.midlandairmuseum.co.uk/). Thanks go to retiring committee member Peter Jones, G8CDC for organising the whole event. Following the AGM, the Hon. Secretary is now Peter Chadwick, G3RZP, Three Oaks, Braydon, Swindon SN5 0AD honsec@vmars.org.uk

Members of VMARS can be seen here in front of one of the many outside exhibits, a Fairey Gannet currently under restoration.



Essex Towns and Villages Award

Chelmsford Amateur Radio Society (CARS) has introduced a new award that aims to encourage contacts between radio amateurs living both inside and outside Essex and to support Essex Air Ambulance.

The Essex Towns and Villages Award has two classes, Silver for contacting five and Gold for contacting ten different towns or villages. A wild card is a contact with GX0MWT, the club call of CARS: it is worth two towns. This wild card is not available to members of CARS, either past or present.

Contacts from 1 January 2016 are valid and the rules can be downloaded from www.g0mwt.org.uk/award/

Wild Atlantic Way

During 2017, Irish amateurs will be operating nine special event stations EI11WAW to EI99WAW to celebrate the 'Wild Atlantic Way' or 'Slí an Atlantaigh Fhiáin'. This is a tourist route around the west coast of Ireland that runs for 2,500km passing through nine Counties and three provinces. Stretching from County Donegal in the North to County Cork in the south and running through Leitrim, Sligo, Mayo, Galway. Clare, Limerick and Kerry – all on the rugged west coast of Ireland overlooking the Atlantic Ocean. There will be a certificate for working all 9 stations (one per county) and special QSLs will be issued. Check out EI11WAW on QRZ.com

Radio exhibition in Portugal

On 27 November, the largest amateur radio event in Portugal will take place in Instituto Português do Desporto e Juventude, Rua de Moscavide 71, 1990-100 Lisboa, Portugal. You need to be able to speak Portuguese to learn more from the ARVM website, but if you are holidaying in the area, it could be worth checking out. www.arvm.org/fr16.htm

DXpedition

The 6V1IS team will be active from 7 to 19 November from Dakar. They will be operating /P from Ngor and Goree Islands (a lighthouse and UNESCO site), IOTA AF-45, on all HF bands, including WARC and 6m using all modes (SSB, CW, PSK31-63-125, RTTY, maybe also SSTV 14.230MHz). In addition, they will be participating in contests taking place during the DXpedition using PSK, RTTY, CW. This will also be a humanitarian expedition and sponsors or donations for Save the Children – Senegal would be most welcome. More information can be found at www.qrz.com/db/6v1is/

DXpedition donation

CDXC is pleased to announce that it has made its largest ever donation to a DXpedition with a $3,000 pledge to the 3Y0Z Bouvet Island DXpedition. The DXpedition is scheduled for early 2018, sometime between 20 January and 28 February. Bouvet Island (3Y0) is known as 'The Most Isolated Island on Earth', and is currently ranked #2 on Club Log's 'most wanted' list. Many more details are on the website www.bouvetdx.org CDXC has now pledged over $50,000 to DXpeditions over the last 5 years. www.cdxc.org.uk

radcom@rsgb.org.uk

New Products

Batteries for portable use

An RSGB Member has told us about a UK firm, Batterymasters, who has introduced a 12V 12Ah Lithium phosphate battery (LiFePO4) plus charger. This package has been specifically aimed at use with amateur radio transceivers with maximum output powers of 100 watts and the battery itself only weighs 1.65kg. Dimensions are 150mm wide, 100mm high, 100mm wide. The maximum fully charged voltage of these batteries is 14.4 volts, well within the specified operating voltage range of most amateur radio transceivers. Typical operating time with a radio like the FT-897 or IC-7300 running 100 watts SSB or CW is around 5 hours. The photo shows the setup used with a Yaesu FT-897 transceiver for portable operation. www.batterymasters.co.uk

MyDel T101

Martin Lynch & Sons has introduced a new VHF/UHF analyser, the MyDel T101. It's a new VHF/UHF analyser for the experimenter, with advanced features such as graph plotting of SWR / impedance / resistance / reactance / return loss / phase. It has a 128 x 64 graphical liquid crystal display with back light and a USB port for firmware upgrades and PC communications. www.hamradio.co.uk/mydelt101

Nevada SL-1000 Floodlight

If you have a large area that needs lighting– such as a special event station or DXpedition – but no mains power, the new SL-1000 Floodlight could be the perfect solution. Lighting an area of approximately 100 square metres for around 5 nights when fully charged, the lithium-ion battery can take up to two days in the summer and, four in the winter to fully charge from flat. The sensitive PIR motion sensor has a range of up to 5 metres at 120° to initially light up the 44 LEDs that provide 1000 lumens, the equivalent of 120W light bulb, but reverts to light saving mode of 100 lumen when movement ceases. Made from toughened glass and with an IP65 rating, the Nevada SL-1000 can withstand wet weather conditions and comes with a 3.5 metre cable so the solar panel can be mounted in a separate location to the floodlight. Priced at £79.95, go to www.nevadaradio.co.uk for more information.

Linear amplifier

An automatic linear amplifier, the OM2000A+, from ML&S, is designed for all short wave amateur bands from 1.8 to 29MHz (including the WARC bands) + 50MHz. It is also suitable for all modes. It is equipped with a ceramic tetrode FU-728F. The drive power needed is 40 to 60W for full output power. More information at www.hamradio.co.uk/om2000a+

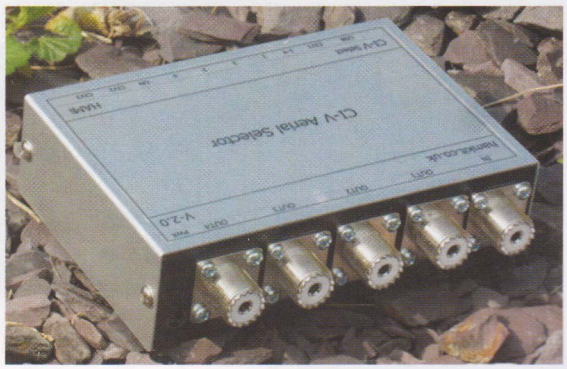
radcom@rsgb.org.uk

Mag mount mobile antenna

MOCVO Antennas is now selling the new Duo-Band Mini magnetic mount mobile antenna for 145 and 433MHz. These are priced at just £17.95 and come with a choice of BNC or SMA connector. They are now also able to supply custom patch leads with various connectors – SMA, BNC or PL259 – on either RG58 or RG174 coaxial cable. These patch leads start from just £3.95 and full details can be found on the website. www.m0cvoantennas.com

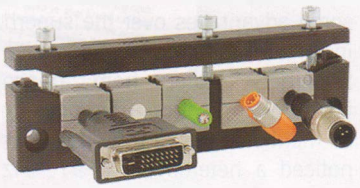
SharkRF Openspot

SharkRF Openspot is a standalone digital radio IP gateway designed mainly for amateur radio, available from ML&S. You can reach DMR, D-Star and C4FM/System Fusion networks by using an openSPOT, internet access, and your DMR/D-STAR/C4FM radio. For more information go to www.hamradio.co.uk/sharkrf



HAMKit Kits

A new range of amateur radio and television kits and projects are being launched on the HAMKIT website. The construction kits are suitable for home enthusiasts, clubs and groups, so great for the looming winter months! Initial products include a CI-V Aerial Selector, which automatically selects up to four aerials depending on the dial frequency (160m-4m), and VMAC, ATV Video and Audio Repeater Controller, which can also be used in the shack as a video and audio matrix switcher or SDK. Further details maybe found the website www.hamkit.co.uk



Routing of cables

An RSGB Member brought another new product to our attention. He says he was recently faced with what must be a common problem for a lot of radio amateurs – to re-route coax and other RF cables through a new PVC window sub frame. The job had to be done tidily and, of course, be absolutely weather proof. He found this product, which consists of a demountable frame housing a variety of single grommets. These can be tailored to suit various cable sizes and shapes. The frame is surface fixed to the outer face of the window frame using a self-adhesive gasket. Go to http://buttkereit.co.uk/products/kel-cable-entry-frame to find out more.

Two new products from Alinco

The first DMR radio from Alinco is the DJ-MD-40E, a UHF transceiver that covers both analogue FM and DMR digital modes and is built to commercial standards, being both rugged, dust and splash proof (to IP54 standard). The sound quality uses digital error-correction technology that rejects noise and static. The radio is full featured with amongst other things a built in digital recorder, 1,000 memories, four RF output levels, DTMF and various scanning options. The Alinco DJ-MD-40 will sell for £179.95. full details are at www.nevadaradio.co.uk

Alinco DM-30E

The DM-30E is compact switching power supply delivering 9 to 15V at 20A continuous (30A peak) output. Using the Alinco patented noise offset control you can move a spur should you be unlucky enough to find one on a frequency of interest. A highly visible digital volt/amp meter makes monitoring of output voltage and current easy. The unit has both Anderson Power pole and banana terminals (on the back) for a choice of connections. Weighing just 1.6kg this could be an ideal travel companion for DXpeditions or holiday operations and will sell for £89.95. More information at www.nevada.co.uk

The TRF receiver

There is a reason the superhet has reigned supreme for all kinds of reception from VLF through microwaves. The intermediate frequency (IF) amplifier provides a fixed passband that can be transferred to any frequency in the RF spectrum. Various IF filters can be selected for bandwidth control and signal processing.

PHOTO 1: My homebrew TRF receiver based on an ex-Navy 'RAS' receiver and HRO coil packs.

An alternative to the superhet is the Tuned Radio Frequency receiver (TRF), which has certain deficiencies but also some advantages over the superhet. For instance, it has no spurious responses. Superhets suffer from images, IF feedthrough, and harmonic mixing, to mention a few. You may even have noticed a heterodyne at 910kHz on your AM broadcast radio. This is caused by the second detector, which generates a second harmonic of the 455kHz intermediate frequency – right in the middle of the broadcast band.

None of these problems occur with a TRF. But with only 3 or 4 tuned circuits ahead of the detector it can't compete with a superhet's selectivity. And because of finite coil Q, the TRF bandwidth becomes very broad at the higher frequencies.

Nevertheless, the TRF makes a useable standby receiver and also can be used as a tunable RF microvoltmeter. And, unlike the superhet, you can always believe you are tuned to the real signal, not a spurious signal. With a Q multiplier it can be made as sharp as an AM superhet, even at 28MHz. Of course, that's nose selectivity (6dB down, not 60dB). Skirt steepness will be inferior to a superhet.

I happened to have an old US Navy receiver known as an RAS. This was similar to the HRO but had an IF of 175kHz. I wanted to see how it could be made to perform as a TRF. I owned an HRO superhet and had complete coil sets that I could use on the RAS. I did not want to modify these so I used only the first three tuned circuits. Four tuned circuits would certainly have been better but I would have had to make the coil sets unusable in the HRO.

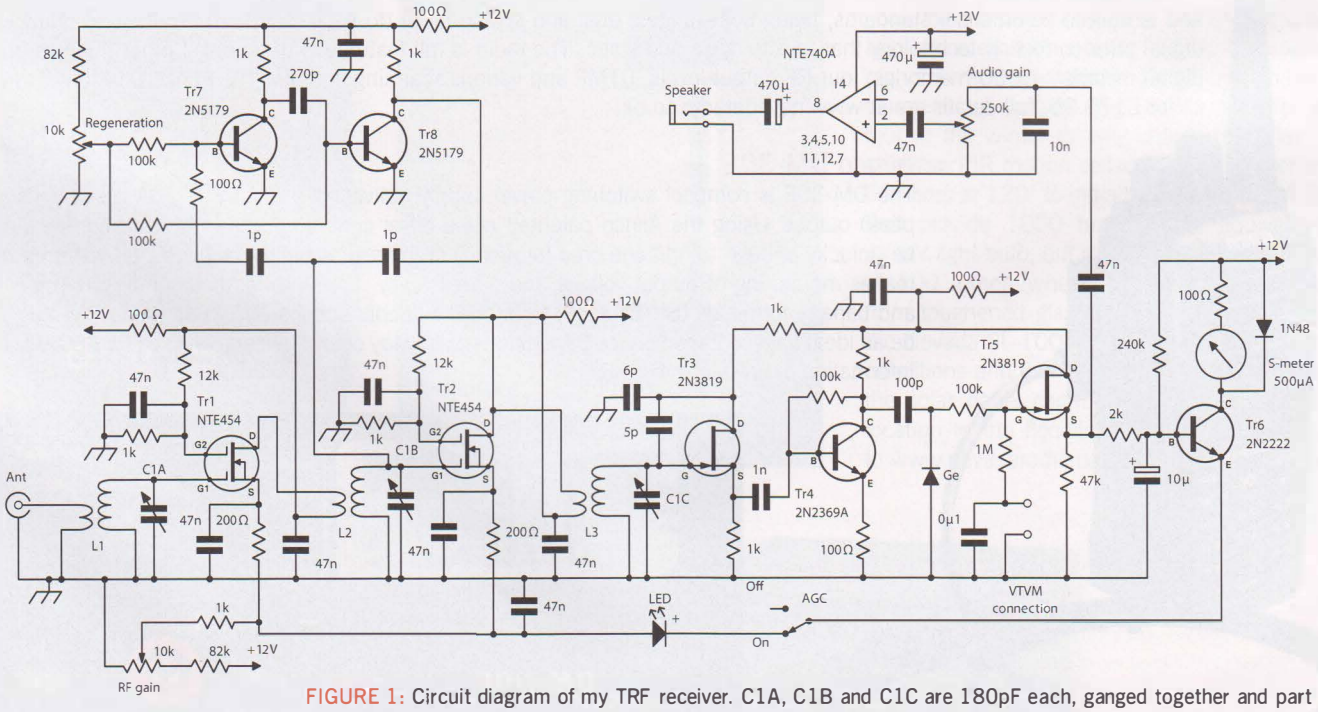


FIGURE 1: Circuit diagram of my TRF receiver. C1A, C1B and C1C are 180pF each, ganged together and part of the original RAS receiver. L1, L2 and L3 are part of standard HRO coil sets, which have built-in trimmer capacitors, not shown in the diagram. Any common audio amplifier (eg LM386) could be substituted for the NE704A stage.

NEW

P&P FREE (Over £30 See Page 78 For Details)

ONLY £7.64 RSGB Members' Price

Restoring Old Radio Sets

By Philip Lawson, G4FCL

For many there is nothing more charming than an old broadcast receiver glowing away in a substantial wooden or Bakelite case. However these are now a rarity and it is much more likely that old radio sets will be non-working curios found at car boot sale in a dusty, unloved condition. *Restoring Old Radio Set* is a book that sets out to provide a step-by-step guide to bringing an old set back to life, getting it working properly and restoring its looks.

Restoring Old Radio Sets is a practical guide that explains what you need to do and how to do it when bringing an old radio back to life. You will find topics that include cleaning methods for electrical and mechanical parts, making typical electrical repairs and the process for performing live tests. There are sections on fault-finding methods and alignment & calibration of the working set. There are even useful guides to one of the major keys to completing a successful restoration - knowing how to treat the cabinet, be that - wood, Bakelite, or plastic. The tools, materials and techniques needed for your restoration are all discussed along with the care and maintenance of the finished item. Safety issues are not forgotten and the hazards inherent in such a restoration are discussed and what can be done minimise them, are covered in depth.

Restoring Old Radio Sets provides a fascinating insight into the world of the radio set restoration, usually the preserve of dedicated enthusiasts and specialist restorers. This book is one of the few available on this topic that is aimed at someone with a basic knowledge of electronics but wishes restore an old set. The author Philip Lawson, G4FCL gives you the benefit of his knowledge, skills, and experience to help you undertake the job within a safe environment. Armed with this book, the reader should be able to tackle an old set, get it working safely and finish-up with a really attractive piece of domestic furniture.

Size 174x240mm, 80 pages
ISBN: 9781 9101 9322 8
Non Members' Price: £8.99
RSGB Members' Price: £7.64

Also available on amazonkindle

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

RSGB SHOP

Radio Society of Great Britain www.rsgbshop.org
3 Abbey Court, Priory Business Park, Bedford, MK44 3WH. Tel: 01234 832 700 Fax: 01234 831 496

Please understand you do *not* need a defunct HRO to make a TRF receiver! Any old communications receiver with a 3 or 4 gang tuning capacitor will do, or you can homebrew your own. If you use all four tuned circuits of a two-RF-stage superhet you will need to increase the inductance of the local oscillator coils to exactly equal the inductance of the other coils on each range.

Circuit and construction

Figure 1 shows the circuit I developed. Two dual-gate FET RF stages, Tr1 and Tr2 are used. Tr3 is a source follower that drives Tr4, a broadband amplifier with a gain of about 20dB. With three RF stages Tr4 would not be needed. The signal from the collector of Tr4 goes to the diode detector and audio plus DC goes to another source follower, Tr5, which delivers audio to the IC audio output stage. Tr5 is also coupled to Tr6, which provides AGC and actuates the S-meter. Tr7 and Tr8 comprise the Q multiplier, which is usable on all frequencies above 3MHz.

Tr6 connects to the source resistors of Tr1 and Tr2 through a LED, which is used as a 1.75V Zener diode. AGC works over a 50dB range and the manual gain control provides another 60dB. The 100Ω resistor and 1N48 germanium diode protect the S-meter from over-deflection.

The drain resistor on Tr3 and the 5pF capacitor were needed to neutralise and stabilize the source follower. It is easy to understand that a source follower with a capacitive load and a tuned circuit on the gate will form a Colpitts oscillator because of the gate to source capacity.

For the detector I used a germanium diode with a back resistance of about 300k. I haven't tried a higher back resistance diode; you may need to shunt your diode with a high value resistor (try 1MΩ to 330kΩ) if its back resistance is too high.

If the regeneration control is advanced far enough SSB reception is possible but this is not a very practical SSB receiver. If you want SSB or CW reception I would recommend a signal generator or VFO loosely coupled to the detector.

In aligning the receiver, it is best to have the regeneration control set near maximum gain and the signal peaked at that frequency before peaking the other two tuned circuits because the setting of the regeneration control slightly affects the resonant frequency of L2-C1B.

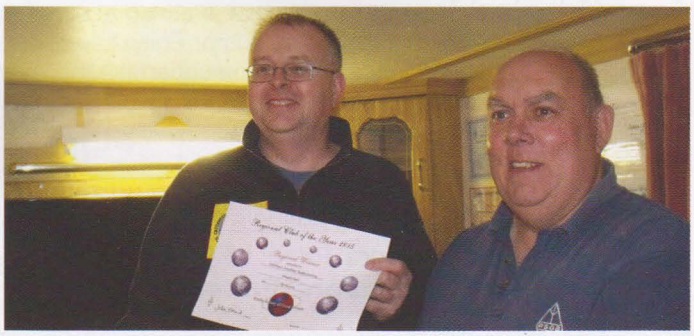
Fred Brown, W6HPH
w6hph@yahoo.es

Continued from page 10

Regional Club of the Year

Region 13 Manager Jim Stevenson, G0EJQ (centre right) presents the Region 13 Small Club of the Year Award to South Kesteven Amateur Radio Society. They went on to come 3rd in the National Club of the Year contest, sponsored by Waters and Stanton.

Region 13 Large Club of the Year winner for 2015 was Worksop ARS. Regional Manager Jim Stevenson, G0EJQ (right) presented them with their trophy.



Region 2 Manager Denny Morrison, GM1BAN (right) presented the Regional Small Club winners Caithness Amateur Radio Society with their certificate. It was received by Alastair Ross, 2M0WRN.

Railways on the Air 2016

Railways on the air (ROTA) takes place on the weekend closest to 27 September, which celebrates the anniversary of the first steam-powered passenger train in 1825. Bishop Auckland Amateur Radio Club coordinates this event.

GB2HSC, with Dave, G4VKC operating. Photo courtesy Dave, G1MAL.

GB1NNR

Norfolk Amateur Radio Club (NARC) operated a special event station at Sheringham Station on the North Norfolk Railway on 24/25 September. Railways on the Air is an opportunity for the club to promote the UK's rail heritage to like-minded enthusiasts both here and across the globe.

The club set up an amateur radio station on the North Norfolk Railway (also known as the 'Poppy Line') to make as many contacts as possible across the two days.

NARC set up their HF and VHF station, callsign GB1NNR, on the platform at picturesque Sheringham station on the North Norfolk coast, concentrating mainly on 40m and 20m to make as many contacts as possible. Voice and CW contacts were made with stations around the UK and Europe, including other special Railways on the Air radio stations in the UK. The longest distance contact was with a station in Canada. Special colourful QSL cards were available to confirm the contacts.

The original railway was built by William Marriott in 1887 and it ran until 1924. It was part of the Midland & Great Northern Joint Railway (M&GN) and was intended to become part of the Midland & Northern rail network, but gradually fell into disuse as a result of increased use of road transport. The M&GN Joint Railway Preservation Society was formed in 1959 and a light railway order for Sheringham – Weybourne was granted in 1973. The order was transferred to North Norfolk Railway in 1976 and public services began. The extension to Holt was opened in 1989.

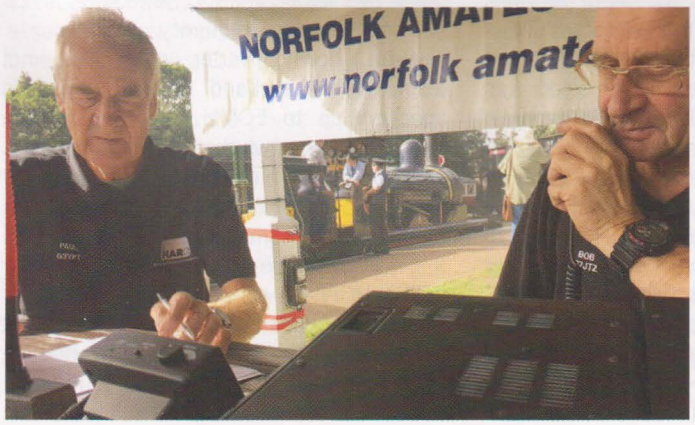
GB2RAI

Recent events for Angel of the North ARC include a Railways on the Air (ROTA) special event at The Bowes Railway on Saturday 24 September using callsign GB2RAI. The Bowes Railway, built by George Stephenson in 1826, is the world's only operational preserved standard gauge cable railway system. It was built to transport coal from pits in Durham to boats on the River Tyne. To celebrate the anniversary of the first steam powered passenger railway, Angel of the North ARC set up in the Guard's Van on the platform as part of the guided tour with balloons carrying the aerial.

GB2HSC

Over the weekend of 24/25 September, the Tooth Radio Group operated GB2HSC at the Hollycombe Steam Collection near Liphook for Railways on the Air – the ninth year of operation. Using mainly the 40m band, they had many contacts throughout the UK and Europe with lots of interesting contacts. Using a FT-450, a FT-991and FlexRadio into windom antenna, it proved to be a very interesting weekend, with many visitors and several non active amateurs asking about the station. During Saturday evening someone was spotted reading the licence. This turned out to be the man from Ofcom – so you never know who is about!

Elaine Richards, G4LFM
radcom@rsgb.org.uk



Paul, G3VPT and Bob, G7JTZ operating GB1NNR at Sheringham Station.

Steve, G7SPN in full voice from The Bowes Railway.

Design Notes

Tuneable measurement receiver

For some time I've hankered after an RF measurement tool that can be used to accurately measure the power of signals received off-air. I wanted a narrow band tuneable design with a properly calibrated power level detector (S-meter) and wide dynamic range (approaching 100dB). I did not want to have to rely on a PC as the indicator; it had to have its own (digital) display of input power level in dBm and also provide that value in serial form *and* as an analogue voltage and / or bargraph for peaking and tuning. I mostly just needed 144MHz band coverage as that is the IF adopted for most microwave transverters, but it would be useful if it could also accept a 432MHz input, for transverters that use that IF.

The power detector itself was the easy bit – a log power detector chip. Log power detectors were described in the May 2015 issue. The AD8310 device used here is an improved version of the well-established AD8307, one that has appeared in countless amateur power meter designs in the last few years. The AD8310 gives a slightly higher dynamic range – a little over 80dB in practice – although the data sheet claims 90dB. It generates a DC output proportional to the log of the input power, or proportional to the input power expressed in dB. The device works over the frequency range DC to 400MHz.

Direct conversion was a possibility but as I wanted a bandwidth of a few kHz for typical modulated signals, processing the baseband IF would be difficult without complex DSP chips or a PC. So the next option was to use a normal IF filter. Traditionally 10.7MHz has been adopted as the IF in amateur receiver designs, but in professional FM radios, especially for UHF, a 21.4MHz centre frequency is more common. Small 21.4MHz FM filters are readily available, especially at low cost on the surplus market (and as I had a few in the junk box), one of these was an obvious choice. **Photo 1** shows the filter selected. It is a type labelled 21S08DZ; several were salvaged from UHF telemetry modules obtained at a rally. No details relating to this specific type number of this could be located on the web, but filters with type numbers differing by one or two characters were found, suggesting bandwidth and termination impedance differences. So it was possible to get some idea of characteristics that could be verified by measurement. I wasn't worried about getting any exact bandwidth, provided it was a 'few' kHz. A bit of experimenting with a signal generator, scope and a few preset resistors showed it gave minimum ripple when working with source and load impedances of around 1 to 2k ohms. Not perfectly flat, but good enough.

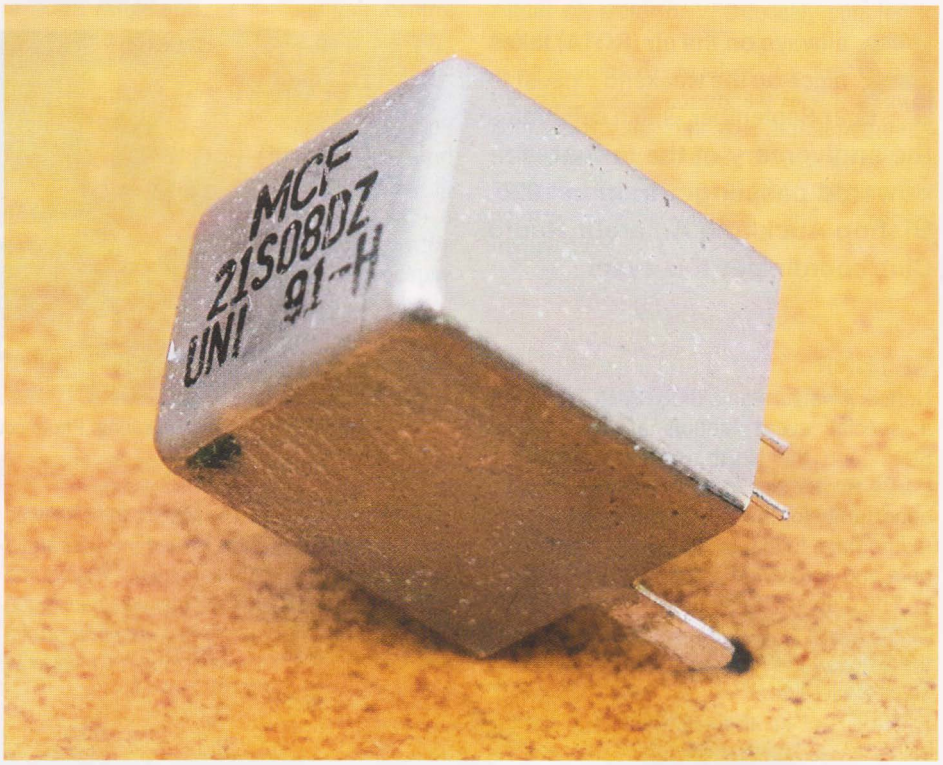


PHOTO 1: Surplus 21.4MHz IF filter.

The input impedance of the AD8310 detector chip is around 1kΩ so filter output termination could be near-enough a direct connection to the chip. **Figure 1** shows the circuit diagram of the filter detector module. A MAR-2 modamp on the input provides some additional gain, the 50Ω output of this being matched to the filter via an L-match network. The amplifier-filter-detector was tested and shown to deliver a useful dynamic range extending from around -85dBm to just over -5dBm with a bandwidth at 21.4MHz centre frequency of 8kHz. For testing and to provide a 21.4MHz output to an SDR for optional demodulation, a buffer amplifier delivers a sample of the filtered IF to an auxiliary output port. Due to the use of a high side local oscillator, this buffered output appears with sideband inversion – something that has to be remembered if demodulation is required!

Quadrature downconverters again

Now what about the downconverter? Back in March 2012 we looked at single chip quadrature downconverters and showed how they could convert an RF input directly to two I/Q channels of baseband, allowing the mixer image to be cancelled in the following signal processing stages. The AD8348 device operates over the range 50 to 1000MHz, covering my 144 and 432MHz requirements perfectly. It has 44dB of gain control, set with an input voltage, which is guaranteed to be linear with respect to dB attenuation and stable over temperature. Drive requires an LO of twice the centre frequency.

Such downconverter chips are not restricted to baseband. The IF output is specified up to 50MHz so they can be used in more conventional receiver designs with 'proper' intermediate frequencies and filtering, by combining the I/Q outputs via an RF phasing network. For narrowband IFs a very simple I/Q network can suffice as it only has to work over a few kHz either side of 21.4MHz. Provided the output impedance of the I/Q source is low, nothing more than a single C-R network is required to generate the necessary 90° relative phase shift between the two channels. A resistor

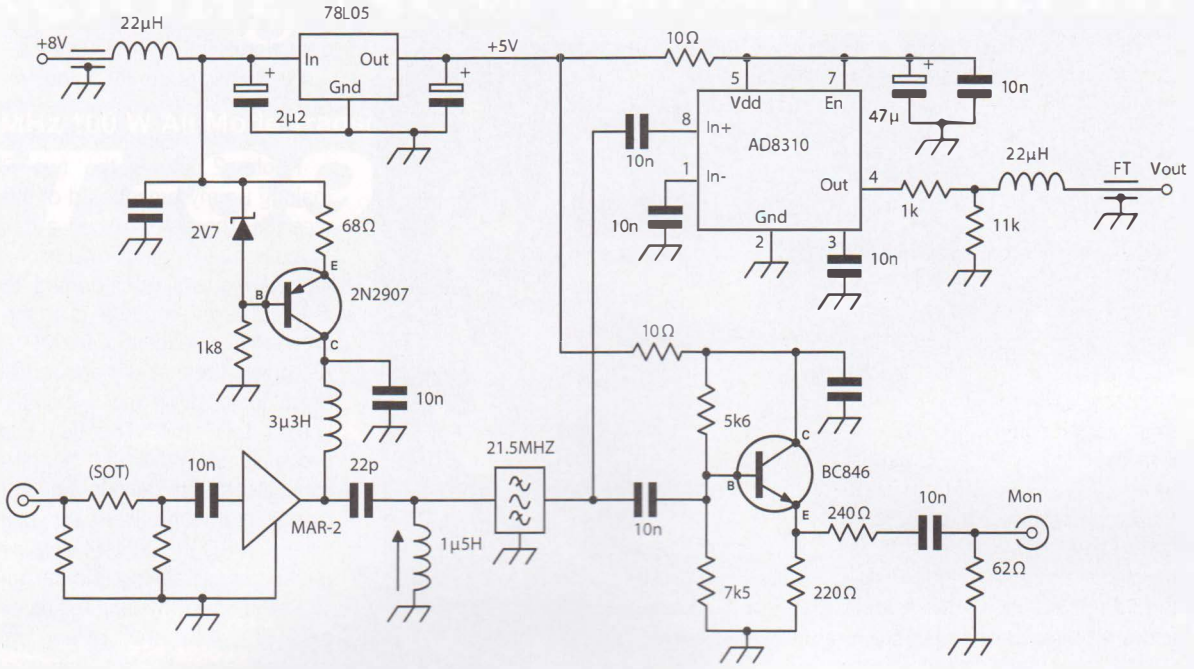


FIGURE 1: The AD8310 filter-detector module.

from the I channel output, and a capacitor whose reactance is equal to the resistance at the centre frequency from the Q output is all that is needed. The R and C are summed and the beauty of this simple arrangement is that it doesn't matter what impedance the CR network is then terminated with – the 90° phase shift will always be maintained at the centre frequency with equal amplitudes. It will always generate the correct phase shift and image cancellation of the mixer products.

The specification for the output IF amplifiers in the AD8348 is of an opamp type voltage source (meaning low output impedance) that has to drive into a load of 1000Ω or more. So, by making the R of the phase shifter 1kΩ and a capacitor of 7.4pF on the other channel (Xc = 1000Ω at 21.4MHz), the two IF outputs can be summed correctly with the requisite phase shifts. There is insignificant residual resistance in series with the C to upset the phase shift by virtue of the chip's low output impedance, and each channel is seeing a suitable high impedance load. A parallel tuned circuit with a Q of around 14 provides a bit of wideband filtering, and presents a high impedance to the phase shift network to avoid excessive signal attenuation. It also forms part of a matching network to convert the high Z source to the 50Ω input of a MAR-6 buffer amplifier. At maximum gain setting of the AD8348 chip, an overall conversion gain of a little over 50dB is seen for the whole module. **Figure 2** shows the complete circuit diagram of the converter module.

The modamps in each stage have their operating conditions defined by current sources to keep the biasing conditions, and hence the gain, more constant over temperature than a conventional resistive dropper would allow. A bulk-regulated stabilised 8V supply is fed to all the modules to allow the receiver to operate reliably and maintain calibration over a wide range of input voltages, typically provided from a 12V battery or PSU.

Local oscillator

The LO has to provide a signal of twice the wanted signal plus or minus the 21.4MHz IF. At 144MHz the LO can be either 245.2 or 330.8MHz. A low side LO gives an image frequency of 100 to 103MHz, which at 20km line of sight to a Classic FM transmitter is not a good idea as the image cancellation obtained is only around 40dB. With high side injection the image falls at 186.4MHz where the probability of strong spurious signals is a lot lower.

A fractional-N synthesiser is ideal for the role here and I originally intended using an LMX2541 module [1], of which I had several already made up. However, contributors to various Yahoo Groups were discussing the low cost ADF4351 fractional-N synthesiser modules available from eBay from several different suppliers. This chip has an output divider and octave coverage internal VCO with the capability of generating any frequency from 35MHz to 4.4GHz. The fract-N grid spacing was lower than the LMX2541, but it was still possible to get 100Hz tuning steps at 144MHz. So I ordered a couple of these modules from two different suppliers to compare their products. They come without any controller; you have to supply serial SPI commands from a suitable processor. The register set is nearly identical that of the ADF4150 fract-N synthesiser chip I had used previously, so for initial testing an existing PIC based converter for text based commands sent on an RS232 interface could be used with no changes to the PIC firmware.

Caveat emptor

One eBay module worked perfectly – responding to my commands to set any frequency in its specified range. Details of that unit can be found at [2]. The other one, whose details will not be given here, did not. Although the chip was correctly labelled ADF4351, it proved impossible to select output divider settings of 32 or 64, making the lowest frequency that could be generated a rather high 137MHz. This caused a certain amount of puzzlement as some contributors to the Groups claimed their modules from the same supplier did appear to work properly; others had the same problem as me. It is impossible to know why the two highest divider setting failed to program-up, but bit of a giveaway is that the earlier ADF4350 chip is nearly identical but does only have an output divider going to 16. Could the chips have been mislabelled and samples of the faulty batch ended up in the eBay chain? Will we ever know?

For my purposes, generating at 300MHz,

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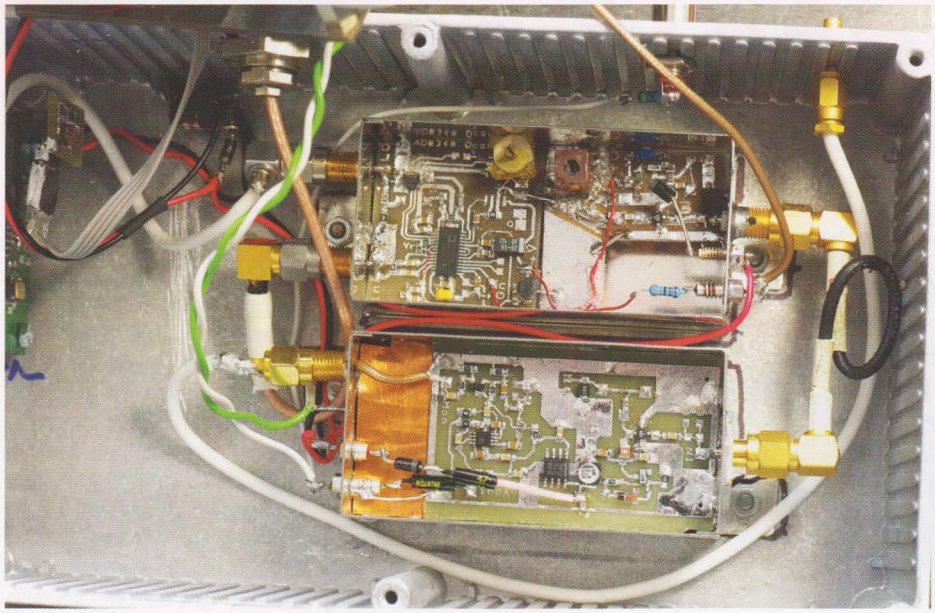

PHOTO 2: The two RF modules making up the measurement receiver.

the faulty module would suffice so I didn't bother fighting for a functional replacement or my money back. But beware: when a product seems to be too good to be true, it probably is! You get what you pay for. Raw ADF4351 chips are relatively cheap, so it's not beyond the bounds of impossibility, using an SMD rework station, to remove the faulty chip and replace with a proper one, keeping the PCB and all the rest of the components.

Controller and the final project

A PIC controller was added to 'manage' the receiver; setting the frequency via a rotary encoder and LCD, and digitising, processing and displaying the input power in dBm on the display. Input attenuation settings of 0 / 20 / 40dB were provided, with push button selection via the PIC. Two control lines define potential divider settings to deliver the three voltages needed for the gain setting on the AD8348, switched by 2N7002 MOSFETs. The voltage is derived from the high stability 2.5V reference used for the A/D converter. Two multi-turn presets are adjusted at test for the 20 and 40dB gain reduction setting. By setting the gain via the controller the attenuation can be included in the dBm calculation, allowing an unambiguous display and auto overload detection.

No details of the PIC code are provided as constructors will probably want to use other solutions, like Arduinos, Raspberry Pi etc.

Photo 2 shows the two RF modules making up my breadboard of this measuring receiver. The detector had a dedicated PCB manufactured – the IF filter is on the opposite ground plane side, mounted through-hole. The converter module is a bit more of a breadboard. Readers of the 2012 article will recognise the hacked-about PCB originally used for testing the baseband converter use of this chip. The two modules were mounted in individual tinplate boxes for screening, with decoupling of signal lines using feedthrough filters. A dynamic range in excess of 100dB at 144MHz calls for good attention to screening and decoupling.

At the time of writing the receiver is nearly finished, with the power measurement working properly, but frequency coverage is only at VHF so far. New PIC code will be needed for wide band tuning. Testing using two different switchable attenuators to check calibration, the power level indication appears to track within 0.5dB over an input signal power of -110 to -10dBm, with degraded linearity up to 5dB either side of this range. Result!

Websearch

[1] LMX2541 fractional-N synthesiser – www.g4jnt.com/LMX2541_Synth_Module.pdf

[2] ADF4351 synthesiser module – www.ebay.co.uk/itm/172296557171 (this may suffer rapid 'link rot')

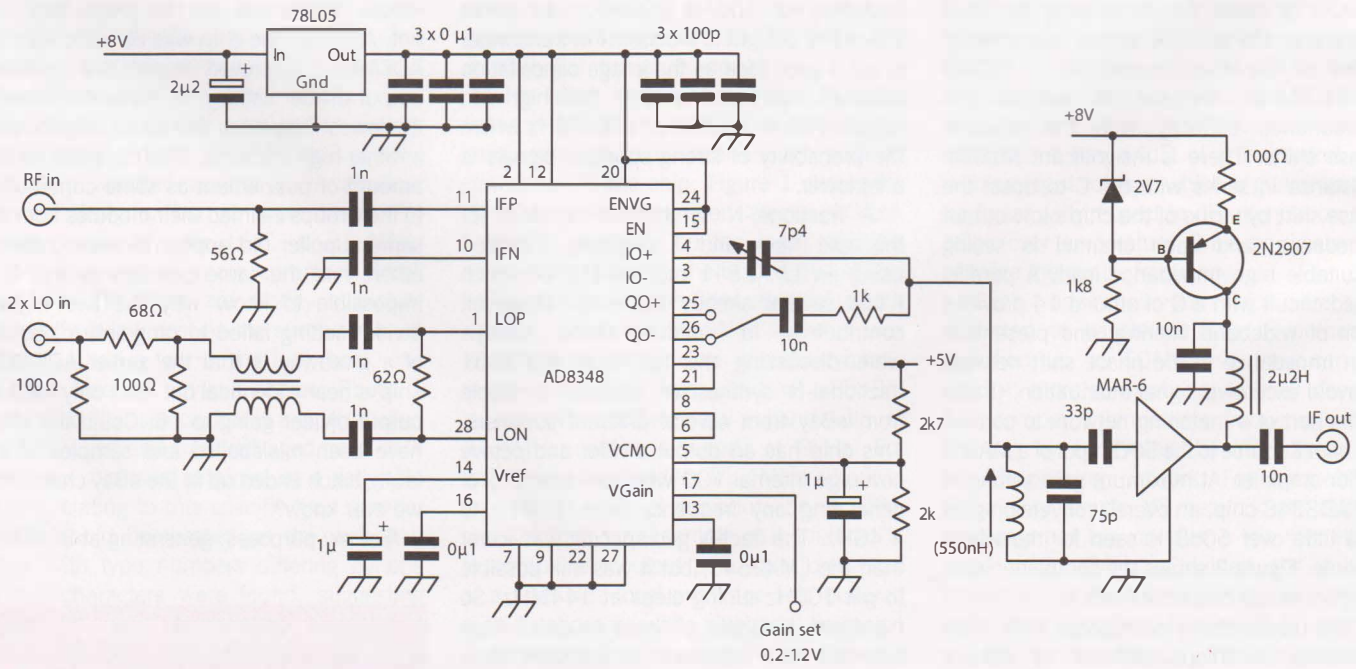

FIGURE 2: AD8348 IQ downconverter and IF quadrature phasing network.

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Celebrating an historic contact

One hundred and fifty eight years ago there was an historic message passed between the US and UK. It was the first transatlantic telegraph message between heads of state.

During his time in office, US President James Buchanan used the Bedford Springs Resort as his 'Summer White House'. In 1858, Buchanan made international history when he received and sent the first transatlantic telegraph message between heads of state. Queen Victoria sent greetings from Buckingham Palace and Buchanan responded from the Bedford resort. A special telegraph circuit was installed for the purpose.

This new transatlantic cable reduced the communication time between the US and Europe from ten days (the time it took to deliver a message by ship) to just a few hours.

On 16 August 1858, when the cable was complete, Queen Victoria sent a telegram of congratulations to President Buchanan. It said, *"The Queen desires to congratulate the President upon the successful completion of this great international work, in which the Queen has taken the deepest interest.*

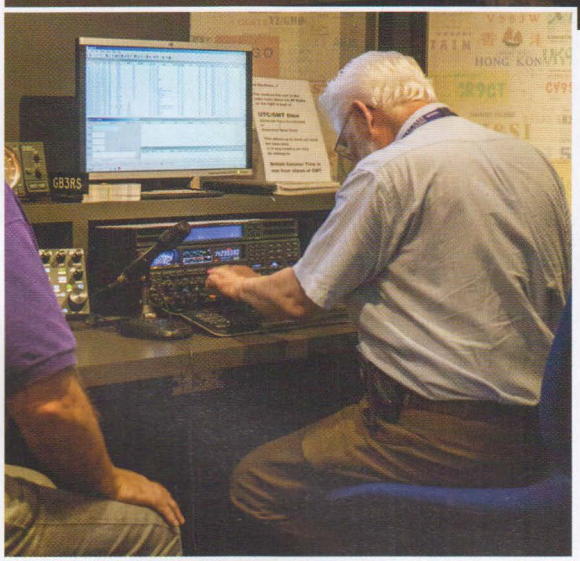
"The Queen is convinced that the President will join her in fervently hoping the electric cable, which now connects Great Britain with the United States, will prove an additional link between the nations, whose friendship is founded on their common interest and reciprocal esteem.

"The Queen has much pleasure in thus communicating with the President, and renewing to him her wishes for the prosperity of the United States."

Sending and receiving this telegram correctly took 13 hours.

President Buchan replied, *"The President cordially reciprocates the congratulations of her majesty the Queen on the success of the international enterprise accomplished by the science skill, and indomitable energy of the two countries. It is a triumph more glorious, because far more useful to mankind, than was ever won by conqueror on the field of battle.*

Trevor, G4WKJ was the CW operator for the UK end of the historic contact.



The bands were noisy and everything needed careful tuning.

"May the Atlantic telegraph, under the blessing of Heaven, prove to be a bond of perpetual peace and friendship between the kindred nations, and an instrument destined by Divine Providence to diffuse religion, civilization, liberty, and law throughout the world..."

At the time, people were very excited about this new development in communications and the next morning there was a 100 gun salute in New York City, the streets were decorated with flags and the bells of the churches were rung!

Sadly, the success of the first cable was short-lived and it wasn't until 1866 that a more reliable system was installed.

More modern communications

Bedford County Amateur Radio Society (BCARS) in the US marked this moment in history with a Special Event Station, N3B running from 13 to 16 August. They operated from the front lawn of the Omni Bedford Springs Resort and Spa. For those stations that made contact with N3B, a certificate was made available.

The ARRL prepared a radiogram to be sent via amateur radio on 16 August to the permanent special event station at the National Radio Centre, Bletchley Park,

GB3RS. The RSGB would then pass on the radiogram to Queen Elizabeth II to commemorated the anniversary of the exchange of telegrams 158 years earlier between Queen Victoria and US President James Buchanan.

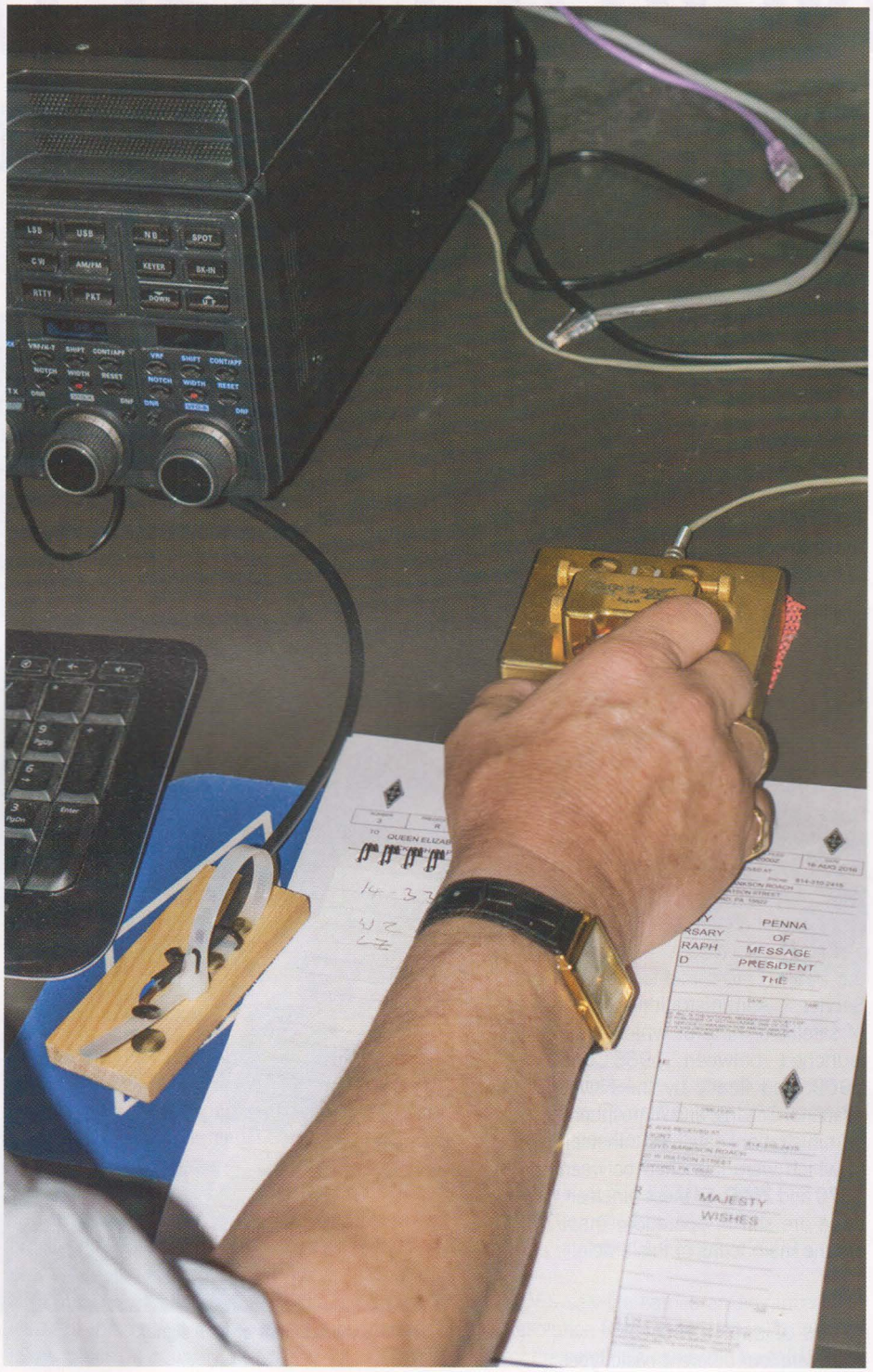
The text of the radiogram read, "*Greetings from Bedford County Penna. on the 158th anniversary of the first transatlantic telegraph message between Queen Victoria and President Buchanan in 1858. The county commissioners wish Her Majesty and Prince Philip best wishes.*" Whilst much smaller than the original telegrams exchanged it still presented problems of its own.

The message to the UK was transmitted via CW on the 20m band (14.030MHz) and started at 2000UTC. The management of Bletchley Park had granted permission for the National Radio Centre to stay open that day, well beyond the closing time of the Park and the RSGB would like to thank them for their part in making this contact possible.

Lloyd, K3QNT and Bernie, W3DRW started ending the message to Trevor, G4WKJ who had volunteered to receive and acknowledge the contact. Signals were marginal, with very high man-made noise (QRM) and very deep fading. But all parties stuck with it, exchanging signal reports of 348 at the end.

At the NRC, General Manager Steve Thomas, M1ACB had started the evening with a couple of quick contacts making sure everything was working correctly. Using the Yaesu FTDx5000 he worked EI2AR, DK2RZ/M and SA7RST within a short space of time on the 7MHz band. Unfortunately, the higher bands were suffering with noise and fading. Trevor, G4WKJ started listening for N3B at around 1940UTC and you could just make out a signal under the noise but nothing was clear. As the greyline gradually worked its way across the globe the signals did pick up slightly and the station in the US was fading in and out.

Trevor's initial CQ messages were sent on one of the homemade keys he makes to demonstrate Morse to visitors at the NRC – a sounder, battery, drawing pins and a cable tie! As the possibility of a contact became more realistic he switched to the iambic key that is part of the station.



Trevor, G4WKJ using the iambic keyer for the contact – the key made from cable ties is on the left. These Morse keys, made by Trevor, G4WKJ, are a talking point with many young visitors to the National Radio Centre.

Results

Over in the United States, the organisers found that the N3B special event station was a huge hit at the resort. Guests from the hotel visited the van and observed the operations and the special event received wide media coverage from a local newspaper and two TV stations.

Participants at the Bedford Springs end, in addition to Frank and Roach, included Steve, KA3UDR; Jay, K3SCM; John, KB3DFZ; Mark, KC3CMF; Gary, KC3HKZ; Kenny, WB3JEK and Robin, KC3EXR. In the UK, joining Trevor and Steve, were Graham, G7OSR and Andy, MOGYK.

In total, N3B made 348 contacts. Looking at the breakdown of these, it shows how difficult propagation was on some of the higher bands. There was 1 contact on 10m, 167 on 20m – including the one at the NRC – and 180 contacts on the 7MHz band. There were 341 SSB contacts and 7 CW.

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Getting started with NOAA polar orbiting environmental satellites

If you are running a demonstration station for the public, there's nothing like weather images to get a conversation started.

Earth imaging satellites have played a key role in meteorology for over half a century. The very first images of Earth from a satellite were obtained on 14 August 1959 by the US satellite *Explorer* 6. These images were very crude by today's standards. The first weather satellite considered to be a success was TIROS-1 (Television Infrared Observation Satellite). This was launched on 1 April 1960, and was operational for 78 days. In total, ten TIROS satellites were launched between 1960 and 1965. These were succeeded by the ESSA (Environmental Science Services Administration) series of satellites, nine of which were launched between 1966 and 1969, and finally by the NOAA (National Oceanic and Atmospheric Administration) satellites, nineteen of which were launched between 1970 and 2009. Of these nineteen, three are still in operation: these are the main focus of this article.

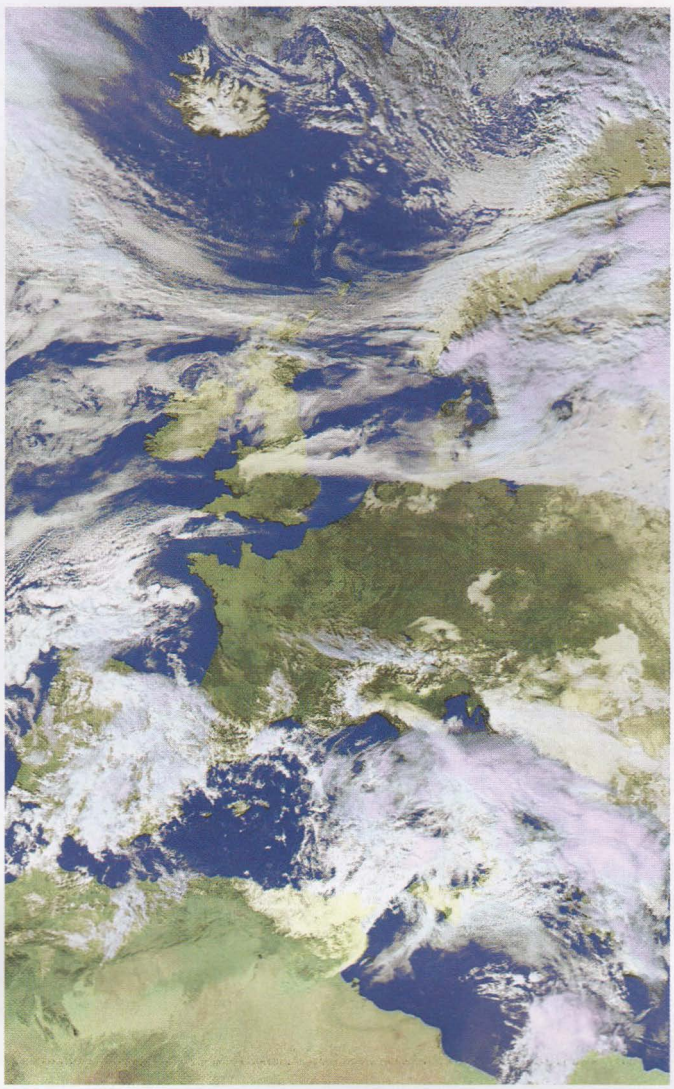

FIGURE 1: HVCT enhancement of APT signal.

Types of satellite orbit

There are four different basic types of satellite orbit around the earth classified according to altitude. Satellites in low earth orbit (LEO) typically have an altitude of between 100 miles and 1000 miles. Their orbital periods range between roughly 90 minutes and 120 minutes, and increase with increasing altitude. The TIROS satellites and their successors have all been LEO satellites. Satellites in medium earth orbit (MEO) typically have an altitude of between 1000 miles and 22,000 miles. Their orbital periods range between roughly 2 hours and 24 hours. Satellites in high earth orbit (HEO) have an altitude greater than 22,000 miles, and orbital periods greater than one day. At the boundary between MEO and HEO, at an altitude of 22,236 miles, the orbital period is precisely one day. Since the orbit of the satellite synchronises precisely with the rotation of the Earth there is no apparent movement of the satellite. Such an orbit is called a geostationary orbit.

Each of these types or orbit has advantages and disadvantages. Geostationary orbits are useful because once the antenna, typically a dish, has been accurately aimed at the satellite then no further adjustment is required. Satellites carrying domestic television services are in geostationary orbits. Signals from geostationary orbit and HEO are relatively weak and a high gain antenna is required in order to achieve reliable reception. The images from a given geostationary satellite only cover roughly one third of the Earth's surface, and the signals from such a satellite may only be received from a similarly limited proportion of the Earth's surface.

Low earth orbits are useful because the signals from these satellites are relatively strong. Even if the output power of the transmitter is only a few watts, reception is possible with a quite modest antenna and receiver. As the position of the satellite is always changing relative to the ground, it may serve most of the Earth's surface. From the point of view of Earth imaging, images from LEO satellites have a much greater resolution than those from higher altitude satellites. For this reason, many weather satellites are in LEO.

Weather satellites

In Europe, EUMETSAT (European Organisation for the Exploitation of Meteorological Satellites) operate the Meteosat series of satellites in geostationary orbit, and the LEO satellites Metop-A and Metop-B. It was originally intended that the Metop satellites would transmit a low rate information transmission (LRPT) on 137MHz, but this was abandoned due to interference with other instrumentation. Meteosat-9 and -10 are located over Africa at longitude 9.5° east and 0° respectively, and provide imaging of Africa and Europe. At the time of writing, Meteosat-8 is in the process of being relocated from over Africa to over the Indian Ocean, where it will take over from the decommissioned Meteosat-7.

Near real-time reduced resolution imagery from the Meteosat satellites and the Metop satellites is available via the EUMETSAT website. Images from the Meteosat and Metop

FIGURE 2: Screen capture of *WXtoImg* recording APT transmission from NOAA-19.

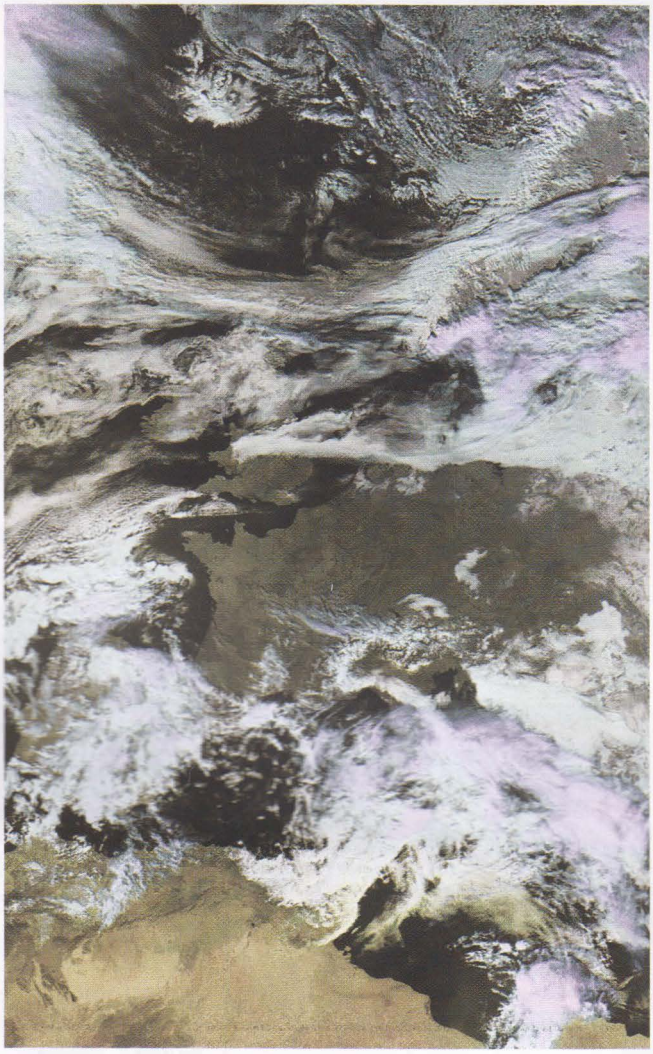

FIGURE 3: HVC enhancement of APT signal.

satellites are relayed at full resolution via a system called EUMETCast. The origin of this system was the failure of the 1.7GHz power amplifier on Meteosat-8. This failure made direct reception from the satellite infeasible without a very large dish antenna. Instead, images were relayed via a geostationary domestic television satellite. Today EUMETCast is relayed via EUTELSAT-10A on a frequency of 11263MHz in the *Ku*-band, with a footprint covering the UK and continental Europe. EUMETCast uses a format called DVB-S2 (Digital Video Broadcasting – Satellite, second generation). Reception requires only an 85cm dish, and a DVB-S2 receiver, both of which are widely available at affordable prices. The data is encrypted, and to obtain the decryption key one needs a licence issued by EUMETSAT to receive EUMETCast products. Happily, these are available at no charge to amateur weather satellite enthusiasts.

Coverage of North and South America is provided by the GOES (Geostationary Operational Environmental Satellites) operated by the National Environmental Satellite, Data, and Information Service (NESDIS). GOES-13 (also known as GOES-East) is positioned at longitude 75° west, whilst GOES-15 (also known as GOES-West) is positioned at longitude 135° west. GOES imagery may be received direct from the satellite on 1.7GHz, but following the example set by EUMETCast is also relayed via GEONETCast using the television satellite New Skies NSS-806 in the *C*-band.

NOAA Polar Orbiting Environmental Satellites

In this article we are concerned with the NOAA Polar Orbiting Environmental Satellites (POES), which are in a very specific type of LEO. These orbit at a mean altitude of around 525 miles and have an orbital period of 104 minutes. The orbits are Sun synchronous, meaning that the plane in which each satellite orbits remains fixed relative to the position of the Sun. The result of this is that each pass of the satellite takes place at roughly the same local time relative to the longitude of the pass. There are currently three Polar Orbiting Environmental Satellites in operation:

NOAA-15: launched 13 May 1998
NOAA-18: launched 20 May 2005
NOAA-19: launched 6 February 2009

Each POES satellite carries an Advanced Very High Resolution Radiometer (AVHRR), which is in effect the satellite's camera. The AVHRR has sensors that measure electromagnetic radiation reflected from the Earth in six spectral bands, or 'channels'. These are as in Table 1.

Data from two channels of the AVHRR is transmitted using a system known as automatic picture transmission (APT). The two channels that are used varies. Whilst the satellite is in sunlight, NOAA-15 and NOAA-19 usually carry channels 2 and 4, and NOAA-18 usually carries

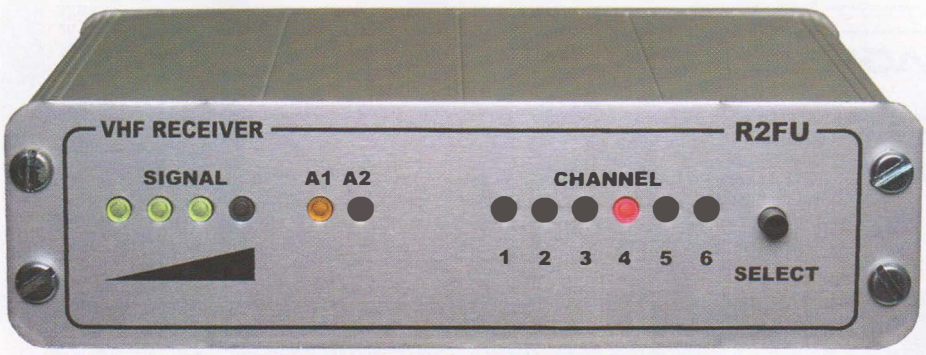

PHOTO 1: The R2FU receiver for APT on 137MHz, successor of the R2ZX.

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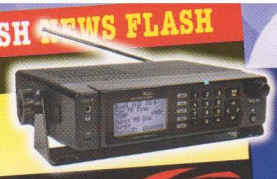

WHISTLER

Chris

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PHOTO 2: FT-2000, Pakratt PK-232 tnc, R2ZX receiver and Davis Vantage VUE weather console.

channels 1 and 4. Whilst in darkness, all three satellites carry channels 3 and 4. The data is transmitted as a horizontal line scan at a rate of two lines per second. Each line is 2080 pixels long, and hence the data rate is 4160 Baud. The raw data received may be decoded using suitable software, and appears as monochrome images from the two channels side by side. The satellites also provide high-resolution picture transmission (HRPT) in the 1.7GHz band. The HRPT service carries all of the channels from the AVHRR. Reception of HRPT requires a steerable antenna and is beyond the scope of this article. The frequencies currently in use (as of October 2016) for APT and HRPT from NOAA-15, 18 and 19 are:

	APT	HRPT
NOAA-15	137.6200MHz	1702.5MHz
NOAA-18	137.9125MHz	1707.0MHz
NOAA-19	137.1000MHz	1698.0MHz

Of these three, NOAA-19 consistently gives the best images. From any given location the APT transmission from each satellite may be received for three passes each day during the daytime and a further three passes during the night.

Hardware

Reception of APT from the NOAA satellites requires a suitable receiver and antenna. A general coverage receiver or scanner covering the 137MHz band will give fair results, but a purpose-built receiver will perform much better. Ideally, the receiver should feature automatic frequency control, enabling the receiver to compensate for the shift in frequency during the satellite pass that arises from the Doppler effect. Also, the bandwidth of APT is around 30kHz, which is a little too wide for most scanners, resulting in clipping of the signal. The author uses the R2ZX receiver (**Photos 1** and **2**), which was the standard receiver recommended and sold by the Group for Earth Observation (GEO) for several years. This receiver is no longer being manufactured, but the APT-06 receiver (of similar specification) is available from WRAASE Electronic in Germany. Running software to process data from the satellites requires only a PC or laptop of modest specification with a sound card. The audio signal from the receiver is fed into the microphone input socket on the laptop. The audio volume of the receiver and the gain of the microphone preamp need to be carefully set to maximise signal whilst avoiding distortion. The author uses a ten year old laptop running Windows XP as a machine dedicated to running weather satellite software and weather station software. As an alternative to the receivers mentioned above, reception of APT may be achieved using a software defined radio dongle, such as the Newsky RTL2832U/R820T2, with suitable software.

The APT signals are transmitted with right-hand circular polarisation. Whilst fair reception can be obtained using a vertical antenna for the 144MHz band, the results are much improved if an antenna designed for circular polarisation at 137MHz is used. The author uses a crossed dipole (or turnstile) antenna mounted on a short mast on the chimney stack and this gives excellent results. An alternative to the crossed dipole is the quadrifilar helix (QFH) antenna, but these are considerably more expensive. As with any antenna, good quality coaxial cable should be used to connect the antenna to the receiver.

Software

There are several programs available for decoding APT data and processing this to give informative and aesthetically pleasing images. One of the most popular is *WXtoImg* (Weather to Image), and this is the program used by the author. **Figure 2** is a screen capture of *WXtoImg* in the process of recording a pass of NOAA-19.

FIGURE 4: MSA (multi-spectral analysis) enhancement of APT signal.

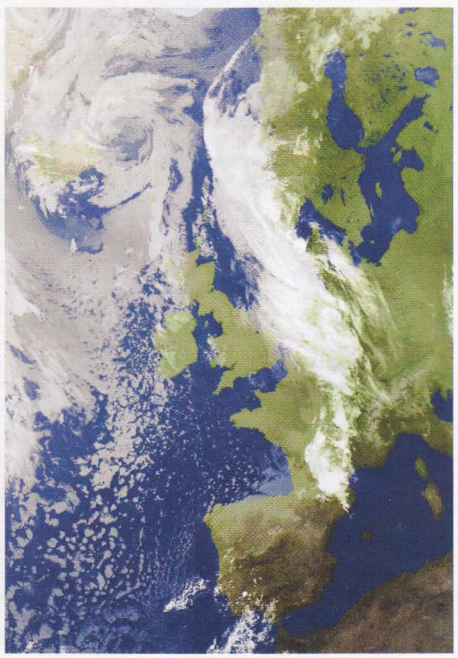

FIGURE 5: MCIR (map coloured infrared) enhancement of APT signal.

The software combines the two AVHRR images to give a single, artificially coloured image. The basic freeware version of *WXtoImg* features five different enhancement options for producing an image. HVC is the most basic, and gives a coloured tint to clouds that varies according to their temperature. HVCT and MSA (multi spectral analysis) both make use of a map overlay to distinguish land from sea, allowing a more naturally coloured image to be produced, with blue for sea regions and green/brown for land regions. MCIR (map coloured infrared) is used to produce colour images whilst the satellite is in darkness. The 'thermal' option gives an image that is artificially coloured according to temperature. **Figure 1** and **3 through 6** are examples of each of these processing options. The copyright of these images belongs to NOAA and these are reproduced with their kind permission.

The Standard and Professional editions of *WXtoImg* provide several further enhancement options, including enhancements that show precipitation. There are many other additional features, including the facility to produce composite images from two or more consecutive passes of a satellite. Upgrading to the Standard or Professional editions requires an upgrade key, which used to be available for a one-off fee. However, in February 2016 the upgrade keys became available free of charge.

Satellite software uses a set of parameters known as Keplers (or, more formally, Keplerian elements) to accurately predict the times and durations of satellite passes. These also enable accurate positioning of map overlays on the received images. The Keplers must be updated from time to time from the internet, typically every two days or so. Updating the Keplers does not require any understanding of the numerical parameters on the part of the user, and is achieved by a single click in the file menu of *WXtoImg*. The software may be set to automatically record and process data from satellite passes, and so may be left unattended. The software will also drive a USB or serial interface to set a suitably equipped receiver to the correct frequency for each satellite during its pass. The R2ZX receiver used by the author has a serial interface. Its successor, the R2FU, and the WRASSE electronic APT-06 have USB interfaces. The software may be set to only record when a specified minimum elevation above the horizon is reached, and to ignore satellite passes that fail to reach a specified threshold at maximum elevation. Careful adjustment of these parameter avoids recording and attempting to process noisy signals that will produce only grainy images.

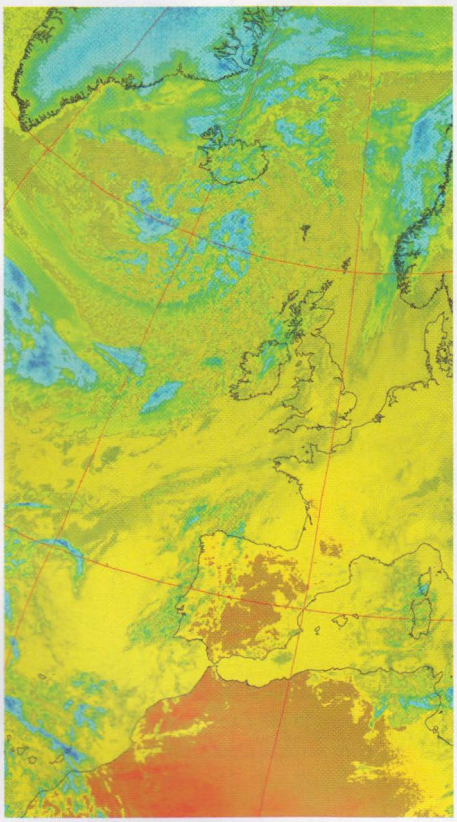

FIGURE 6: Thermal enhancement of APT signal.

Further information

The analogue APT format discussed in this article is being phased out, and future NOAA polar orbiting satellites will transmit digital low rate picture transmission (LRPT) on 137MHz. There are already two Russian LEO satellites in operation that provide LRPT, Meteor M N1 and Meteor M N2. Unfortunately, Meteor M N1 is now incapable of imaging the Earth due to an attitude loss on 20 March 2016, which left its sensors pointing towards the Sun. However, Meteor M N2 remains operational, transmitting LRPT on a frequency of 137.9MHz. The bandwidth used by LRPT is 150kHz, much wider than used by APT. Because of this, reception of LRPT requires new hardware (for example, the Newsky SDR dongle mentioned earlier) and suitable software. Details appear in Websearch.

There are many useful web resources for the NOAA POES satellites, and some of these are given in the Websearch section. For anyone who has more than a passing interest in weather satellites and Earth imaging more generally, membership of the Group for Earth Observation (GEO) is highly recommended. GEO produce a high quality full colour members' journal, which is currently published electronically four times a year, with the fourth issue of each year also mailed to members as hard copy. The GEO Shop stocks specialised items of hardware for APT, LRPT and EUMETCast reception, with discounts for members. The Newsky dongle for APT reception is available for £20, complete with patch lead and adapters. The Ayecka SR1 Advanced DVB-S2 Receiver for EUMETCast reception is £375. The GEO website features a wealth of useful information and detailed guidance on receiving APT, LRPT and HRPT from polar orbiting satellites and on how to subscribe to and receive EUMETCast for the Meteosat and Metop satellites. Membership of GEO is currently priced at £15 for two years subscription, which represents excellent value for money.

Despite their being a wealth of near real-time satellite images available on the web, there is still excitement and a sense of achievement in receiving images direct from the satellites. It is hoped that this article will inspire more amateurs to become involved in this fascinating aspect of the hobby.

TABLE 1: POES satellite AVHRR channel and wavelength explanation

Channel	Wavelength (μm)	Description	Typical Use
1	0.58 - 0.68	Visible	Daytime cloud and surface mapping
2	0.725 - 1.00	Visible	Land-water boundaries
3A	1.58 - 1.64		Snow and ice detection
3B	3.55 - 3.93		Night cloud mapping
4	10.30 - 11.30	Infrared	Night cloud mapping
5	11.50 - 12.50	Infrared	Sea surface temperature

Websearch

Group for Earth Observation (GEO): http://geo-web.org.uk/index.php

WXtoImg (Weather to Image) software: www.wxtoimg.com/

National Oceanic and Atmospheric Administration (NOAA): www.noaa.gov/

NOAA POES Operational Status: www.ospo.noaa.gov/Operations/POES/status.html

Polar orbiting satellite and geostationary satellite weekly status: http://phqfh.co.uk/status.htm

EUMETSAT near real-time images: www.eumetsat.int/website/home/Images/RealTimeImages/index.html

WRAASE electronic (hardware): www.wraase.de/shop.html

LRPT Tutorial: www.rtl-sdr.com/rtl-sdr-tutorial-receiving-meteor-m-n2-lrpt-weather-satellite-images-rtl-sdr/

Further reading

An article titled 'Earth Observation for the Radio Amateur' by David Taylor, GM8ARV, appeared in the November 2010 edition of *RadCom*. This article covers some of the same ground and brings readers up to date with more recent developments.

The author is a Senior Lecturer in Mathematics in the School of Engineering, University of Bolton.

Coastwatch on the Air – a new annual event?

The National Coastwatch Institution (NCI) is a voluntary organisation set up in 1994 to provide a visual watch along UK shores, following the closure of many Coastguard stations. The opening of the first station was prompted by the loss of two Cornish fishermen within sight of a recently closed Coastguard lookout.

Looking across to the East Runton NCI lookout with Cromer pier in the background – Phil, G4PQP and the 20m vertical dipole can be seen between.

Today, NCI watchkeepers man some fifty stations around the coast, keeping a visual lookout as well as monitoring radio channels.

Fund-raising day

There are several NCI stations along the Norfolk coast and it was one of these at the cliff top village of Mundesley that invited the Norfolk Coast ARS to set up a special event station at their fund raising day on a Saturday in August. NCARS also decided to set up a second station, alongside the NCI lookout on the cliff top in the village of East Runton, just west of Cromer. The thinking was that this could be the start of an annual event and two could become twenty two next year.

'Coastwatch on the Air' would not only publicise the vital work of the NCI, but would give clubs and individual amateurs the opportunity to operate from great coastal locations, with interesting propagation over seawater.

Mundesley station – looking out to sea.

The stations

For antennas, NCARS chose to use vertical dipoles at both locations – these were supported by roach poles strapped to the cliff top railings and with the wire bottom section simply weighted and thrown over the cliff. They gave excellent performance, particularly on 20m and 15m; unfortunately, propagation on 40m was not especially good on this day.

NCARS had applied in good time for the special calls GB2MCW and GB2RCW but unfortunately this coincided with Ofcom's work on its computer system and so the calls never did arrive. The club call MXONCA proved equally effective.

Contest participation

In the planning stage, NCARS had lost sight of the fact that this was the weekend of the IOTA Contest and that at 1300 the bands would become full of contest stations, with no space for rag chewing with Mundesley. So, at 1300, the two stations at Mundesley (20m CW and 15m SSB) and the East Runton station, participated in the IOTA contest. This proved to be very popular, both with the club members and the visitors – who watched as the country tally rose very quickly.

Public activities

As well as seeing the two stations at Mundesley, visitors were able to read RSGB posters about amateur radio, as well as earn a certificate for sending their name in Morse code.

NCARS will definitely be back at Mundesley and East Runton next year and it is hoped that others will take the opportunity to set up stations alongside Coastwatch lookouts around the country. To find your nearest NCI station go to www.nci.org.uk and to register interest in next year's event go to www.norfolkcoastamateurs.co.uk

Steve Appleyard, G3PND
sfappleyard@btinternet.com

Antennas

We return to the theme of compact antennas this month with an overview of the HF magnetic loop antenna and a summary of the loop made by John, G8CQX.

Magnetic loop overview

If the space at your location is restricted or a wire HF antenna is undesirably conspicuous, this can make it difficult to install a suitable aerial. Possibly, a magnetic loop antenna may be a potential solution.

The RSGB *Radio Communication Handbook* [1], *HF Antennas for Everyone* [2] and *Antenna File* [3] provide detailed guidance on how to build magnetic loop antennas and the following is provided as an overview.

A magnetic loop antenna comprises a conductive loop, a series tuning capacitor and an arrangement to couple the antenna to the transceiver. The loop's circumference should be between 0.125λ to 0.25λ and this is brought to resonance using the tuning capacitor giving an operating range ratio of typically 1:2 (eg 3.5 to 7MHz, 7 to 14MHz or 14 to 28MHz). The length of the loop is important because if it is longer than 0.25λ it tends to behave as an electric field antenna rather than as a magnetic field antenna. Loop lengths under 0.25λ can make it difficult to accurately tune the loop because the bandwidth becomes small.

The radiation resistance is a function of the area enclosed by the loop and is a maximum for a circular loop. To achieve a good radiation efficiency it is important to minimise the ratio between RF ohmic losses and the radiation resistance. The RF ohmic losses comprise the resistance of the loop and that of the tuning capacitor, although the latter tends to be much lower.

Skin effect [4] causes the RF current to flow on the outer surface of the loop. Therefore, to minimise the loop's RF ohmic losses, a large diameter copper conductor (eg 20mm diameter or larger) should be used to attain a highly-conductive surface area. The magnetic loop antenna has a high Q-factor and so the RF voltage across the tuning capacitor is high, even when using low transmit powers, and is directly proportional to the power. Therefore, a good quality transmitting-type capacitor should be used that is able to cope with the high RF voltages involved. Good practice is to use a split-stator type capacitor of about 120pF per section. Each section is connected in series, to eliminate rotor contact losses associated with conventional capacitors. The general concept of a magnetic loop is shown in **Figure 1**.

Several arrangements can be used to couple the transceiver to the magnetic loop, as shown in **Figure 2**. However, the usual technique is to use a Faraday loop constructed from a length of coaxial cable (eg RG58) as shown in Figure 2e. The diameter of the coupling loop is about one-eighth of the main loop.

When in transmit mode, it is good practice for the operator to be situated at a suitable distance from the antenna due to the strong radiated field strengths involved. Therefore, usually several metres of coaxial cable are necessary to connect the antenna to the transceiver.

G8CQX magnetic loop

John Hawes, G8CQX, has passed me details of the magnetic loop he has recently made that is able to handle transmit powers up to 100W. John, a keen HF bands operator, needed an inconspicuous antenna for use at his alternative QTH. Therefore, his thoughts turned to building a magnetic loop able to handle higher transmit powers.

John's father, G8DIS had once made an aluminium tube magnetic loop for 40m and 20m using an ordinary receiver type of tuning capacitor. John first tried this design to find out its transmit RF power capabilities and found this was in the order of 5W before voltage breakdown occurred across the capacitor.

John wondered if it would be possible to construct a capacitor able to withstand

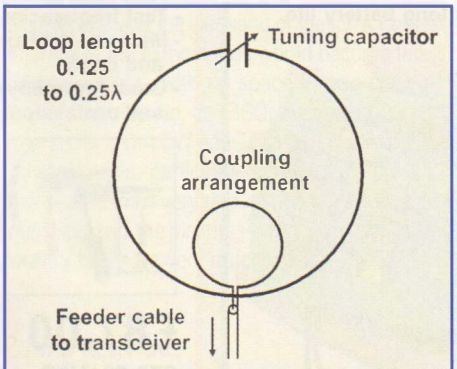

FIGURE 1: Concept of a magnetic loop antenna.

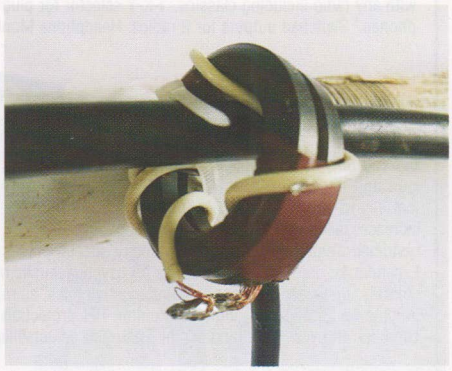

PHOTO 1: Loop feeder coupling arrangement.

higher RF voltages using parts obtained from a local hardware store. He was daunted by the prospect of fabricating numerous capacitor plates, so he had the idea of using a 'telescopic' approach for the tuning capacitor rather than using parallel plates.

He decided to try making a capacitor using 250mm lengths of 15mm and 22mm diameter copper pipe. The 15mm diameter pipe was first insulated using three layers of white plastic sleeving (this is sold as central heating pipe covering). This arrangement gave a snug fit when it was slid inside the 22mm diameter pipe, forming a capacitor. John was not sure of the dielectric properties of the plastic sleeving used. So the capacitance of the 'telescopic' arrangement was measured using a multimeter, giving about 15pF to 70pF when the inner pipe was moved in and out.

A split-stator capacitor was made up using eight 'telescopic' capacitors. Four 'telescopic' capacitors with their stationary sections commonly connected formed each section of the split-stator and the eight sliding inner pipes were commonly connected. This arrangement is shown in **Figure 3**. The loop was connected to the capacitor's stationary sections with the arrangement tuned by sliding the inner pipes up and down. This allowed the capacitance to vary from under 15pF to more than 150pF (as measured with the multimeter). Essentially, the capacitor required two 2m lengths of copper pipe to make it.

To hold the capacitor in position a frame was made using plastic water pipe. This was drilled to hold the static 22mm pipes in place, which were then hot glued into position. The capacitor's inner sliding 15mm pipes were held in position using a similar arrangement. Dowels were pushed into the

pipe ends and then these fixed into a suitably drilled plastic pipe. These pipes were then connected together by soldering braid to form a common low-resistance connection to accommodate higher RF currents. A 100W soldering iron was necessary for this.

Using more plastic water pipe, some useful pipe fittings and a thick polystyrene sheet, the frame for the loop antenna was completed by gluing it together. A length of surplus URM67 coaxial cable, with its centre and braid conductors shorted at each end, formed the loop and this was connected to the capacitor's fixed stator sections. The loop's length was trimmed to resonate the antenna from 40m to 17m.

The feed coupling (**Photo 1**) was made using two ferrite rings of about 25mm diameter taped together and slipped over the loop. A reasonable match was found when 4 turns were wound around the ferrite cores. The antenna matched almost perfectly at the lowest frequency and it was still a reasonable match at the highest frequency, with an SWR of about 2:1.

Finally, a motor was glued to the frame, driving an M3 threaded shaft. This engaged with a M3 nut attached to the capacitor's moving stator. A couple of limit-of-travel microswitches were added in series with the motor to prevent excessive movement. Three wires were brought back from this arrangement to enable the moving stator to be remotely moved up and down to tune the antenna using a double-pole double-throw toggle switch from the operating position. **Photo 2** illustrates the finished antenna.

John found that the magnetic loop antenna could comfortably handle a 100W transmit signal. As expected the tuning was sharp, however the reduction formed by the M3 shaft arrangement made it possible to carefully peak the antenna remotely, with the transition from maximum to minimum capacitance taking about 40 seconds. There were no problems from overrunning, with the end limit switches suitably stopping the motor. As a comparison, John tested the magnetic loop against his 120 foot long sky wire (about 40 feet up) and found the loop about 10dB down. The loop has some directivity and it did exhibit a null (as expected), so it would need to be lined up as desired when in use.

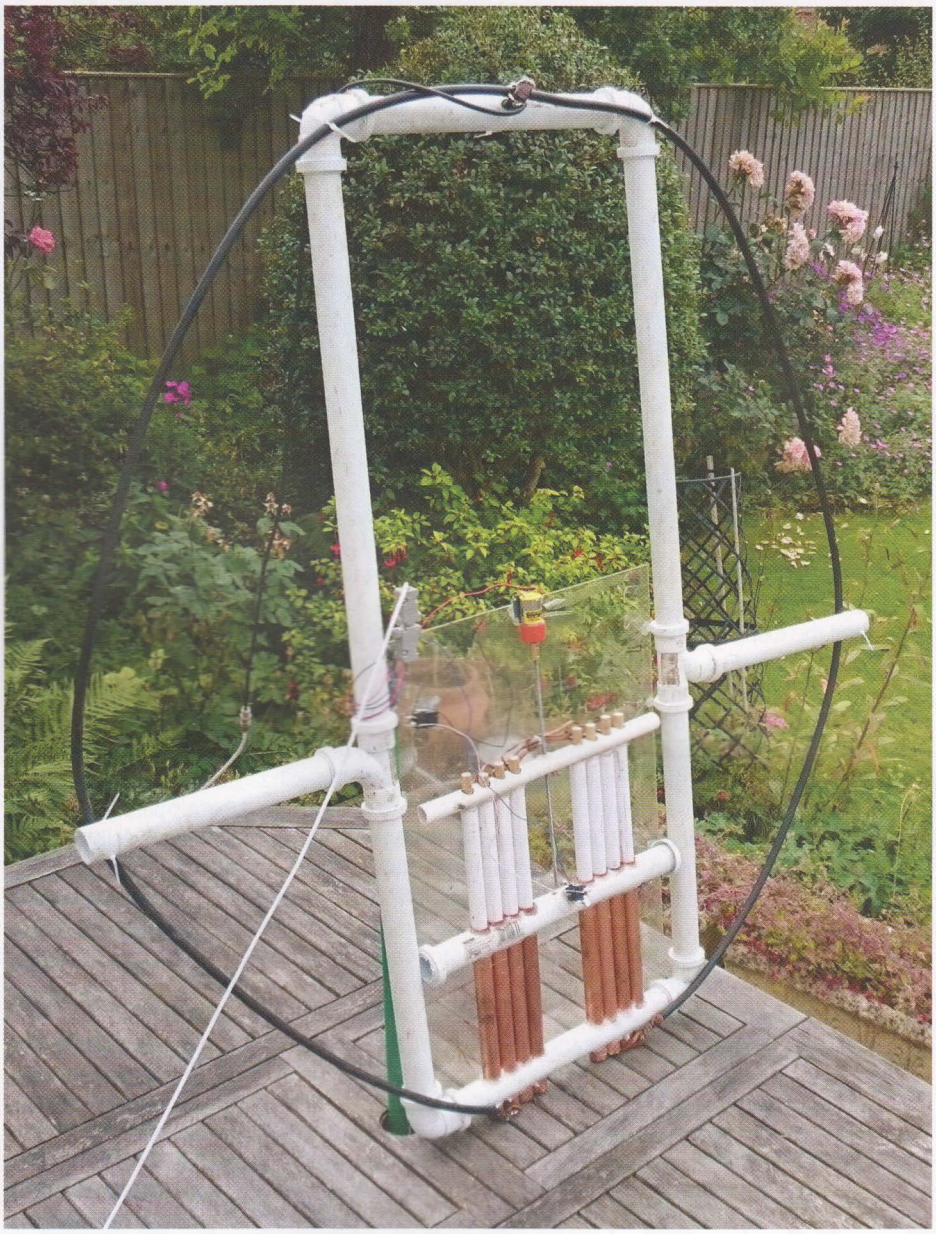

PHOTO 2: The G8CQX magnetic loop.

Mike Parkin, G0JMI
email2mikeparkin@gmail.com

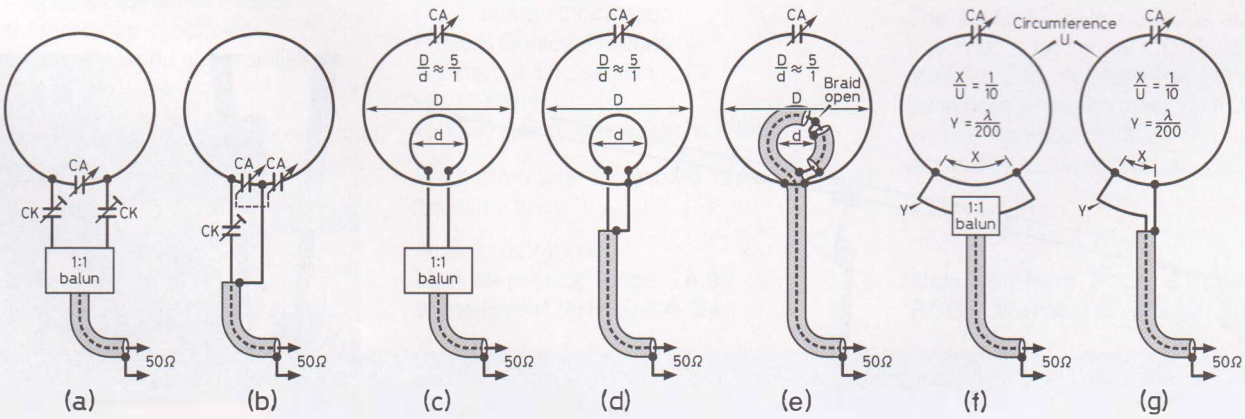

FIGURE 2: Techniques to match a magnetic loop antenna to a coaxial cable.

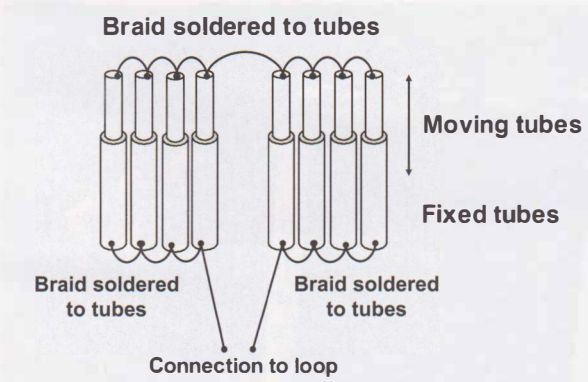

FIGURE 3: Concept of tuning capacitor constructed using copper pipes and sleeving.

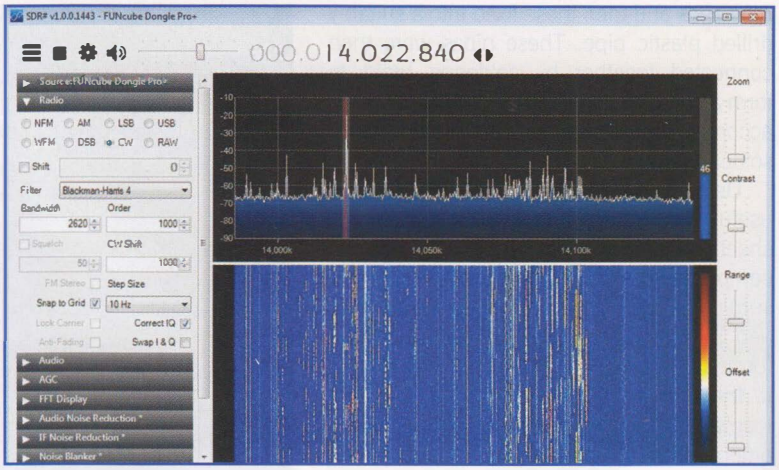

FIGURE 4: Screenshot of the RX activity on 20m using the loop.

As a general receive test, one Saturday when the conditions on 20m were not good, John used the loop with his SDR receiver and took a screenshot (**Figure 4**) whilst a contest was taking place. The strongest station seen was more than +60dB up compared to the system noise floor. Most of the stations were around S5, so they could have been workable using CW.

It is worth considering the RF voltage generated across the ends of the loop, especially when operating with a transmit power level of 100W. When the loop is at resonance, the circuit's Q-factor means that the RF voltage across the capacitor can be of the order of several kilovolts. An advantage from using a split-stator arrangement (compared to a conventional capacitor) is that each section shares the RF voltage, reducing the likelihood of voltage breakdown between the plates. Such high RF voltages need to be taken seriously from a safety aspect. With this in mind, John keeps people, the dog and other stray animals well away from the antenna when transmitting.

John concludes that this has been a remarkably successful and practical experiment. The magnetic loop antenna has provided him with a means to operate at his alternative premises using an inconspicuous antenna that can be readily taken to pieces enabling it to be transported fairly easily.

This kind of magnetic loop antenna is something to think about if you have only limited space to set up on HF.

Reader feedback

The April Antennas column introduced the open sleeve dipole where operation on two separate bands, or more, is possible. Peter, G4NKX wrote to me summarising the 6m/4m open sleeve dipole he built based on April's column. Peter used a telescopic technique to vary the element lengths to tune the antenna, shown in **Photo 3** and **Photo 4**. He reports he has been working stations on both 6m and 4m using the antenna including ES, HA, IK, OK, HA, UT, GM and G stations. Roy, G3FYX has also installed a 6m/4m open sleeve dipole in his loft and wrote to me to say that he has worked across Europe on both 6m and 4m including OH, ES and SP using the antenna using a mix of CW/SSB. Using the prototype design has enabled me to make contacts across Europe on 6m and 4m including from TF3 to 9H3.

One reader complimented me on my antenna photographs and asked how these were taken. Basically, I use a 14.2 megapixel digital camera with an x5 zoom for all the pictures. Before taking the pictures, if possible, I wait for a bright day with a blue sky. The camera is set to 'Standard' picture mode and sometimes I will use the zoom to get the best picture.

As for the antennas themselves, I make sure they are nice and shiny by polishing them using a little metal polish and then usually orient the antennas to get the Sun to illuminate them. Often you get a nice reflection of sunlight off the elements, which makes the antenna look good against a blue sky. Making sure the Sun is behind me, I take about 20 pictures of the antenna, usually from slightly different positions. Then I select the best in-focus image for use and delete the rest. Hope this is of use/help in taking your own antenna photos.

References

[1] *Radio Communication Handbook*, 12th edition, edited by Mike Deninison, G3XDV, and Mike Browne, G3DIH: Section 15, Practical HF Antennas, pages 15.24 to 15.28

[2] *HF Antennas for Everyone*, edited by Giles Read, G1MFG: Chapter 3, Loop Antennas, pages 219 to 279

[3] *Antenna File*, compiled and edited by Steve Telenius-Lowe, 9M6DXX: pages 44 to 61

[4] *Radio Communication Handbook*, 12th edition: Section 1, Principles, page 1.17.

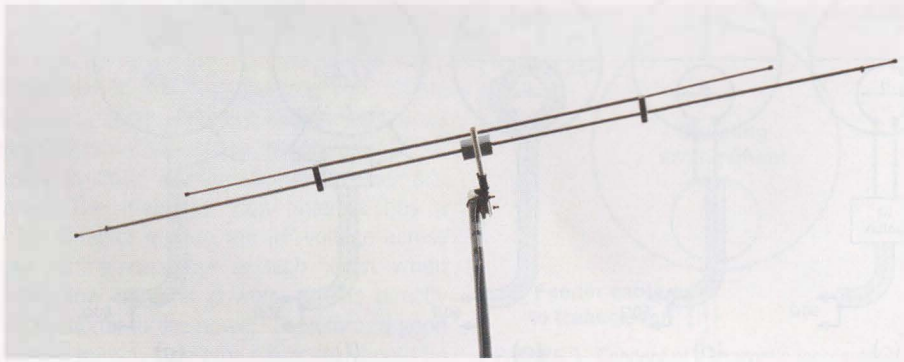

PHOTO 3: Open sleeve dipole antenna by Peter, G3NKX. Photo: G3NKX.

PHOTO 4: G3NKX antenna feed arrangement.

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Edited by Mike Browne, G3DIH

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SOTABEAMS LASERBEAM-DUAL

CW filter

Advances in digital signal processing over the past few years have been staggering and we have been enjoying the benefits through the proliferation of attractively priced SDR rigs as well as DSP (Digital Signal Processing) units that have become the norm for just about all analogue rigs.

Whilst many of these systems rely on very fast and expensive analogue to digital converters (ADCs) and other specialist devices, DSP has also been spreading into less exotic devices. One such range is the dsPIC microcontrollers produced by Microchip. In this range, Microchip has combined a 16-bit microcontroller with DSP facilities to create what they are calling Digital Signal Controllers (DSC). These controllers have been optimised for DSP work and include ADCs and digital to analogue converters (DACs) so they can accept an analogue signal, convert it to the digital domain, process it, and then create a processed analogue audio output. SOTAbeams have been quick to recognise the potential of these devices and have developed their range LASERBEAM add-on digital filters using Microchip DSCs.

LASERBEAM-DUAL CW filter

For the review I'm using the LASERBEAM-DUAL CW filter that comes as a fully populated PCB but with no case or connectors. The idea being that this filter could be built into your existing system. As you can see from **Photo 1**, the LASERBEAM-DUAL is supplied as a tiny, (36 x 36 x 5mm) PCB with connection points along both edges. In the CW version, only one set of connections are used; the others are reserved to control future designs.

The LASERBEAM-DUAL has an on-board regulator so can handle a usefully wide supply voltage range of +5 to +14V DC and only draws 30mA, so is ideal for battery powered use. The CW filter has two selectable bandwidths comprising: 300Hz to 1300Hz (wide) and 550Hz to 850Hz (narrow). In its default state, the LASERBEAM-DUAL CW has unity gain but this can be set to a small voltage gain of 4x (12dB) if necessary.

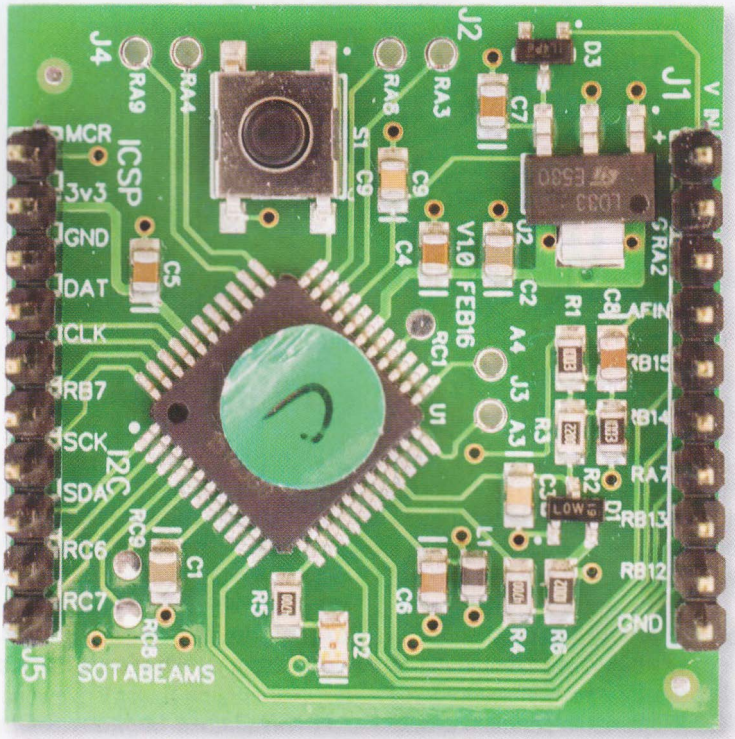

PHOTO 1: The Laserbeam CW with header pins attached.

Connecting the CW filter

For the review, I fitted the PCB with header pins so I could mount it on a breadboard for testing. However, you can also solder your connections directly to the PCB pads. The audio input to the filter is single-ended and AC coupled with overload protection so can be wired direct to your audio source. The maximum signal level is 1V p-p and there was an on-board LED to warn of overload. This LED pin was also brought out to the connections, so I could easily add an external overload LED.

Particularly useful for CW use was the signal LED that switched on when a signal was detected in the passband. The voltage gain of the filter could be set to 4x by grounding the appropriate control pin, whilst leaving this open-circuit set the gain at its default level of 1x. Selection of the wide/narrow filter width was also done by grounding the bandwidth pin. With this pin

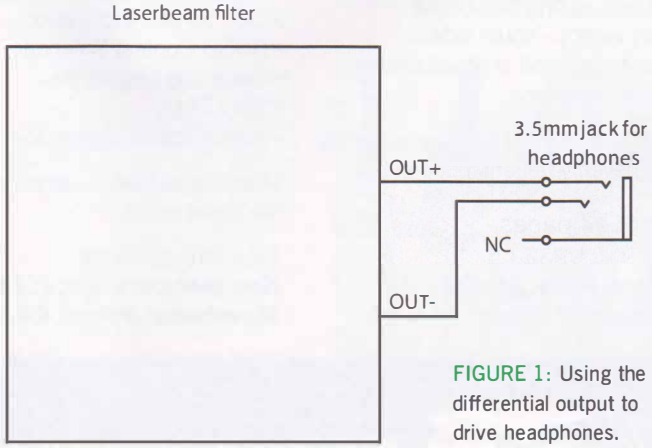

FIGURE 1: Using the differential output to drive headphones.

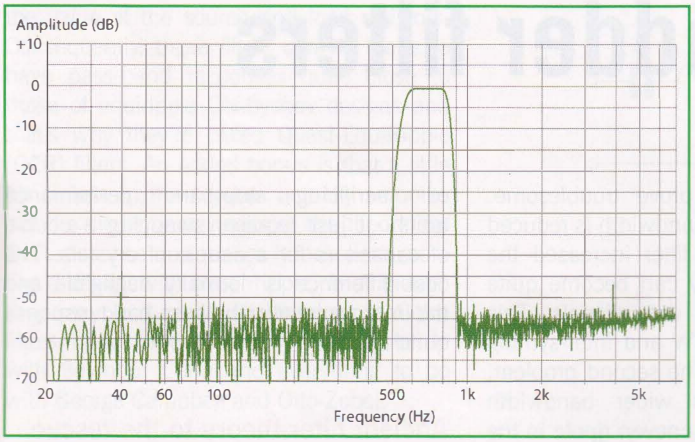

FIGURE 2: LASERBEAM-DUAL CW narrow filter response.

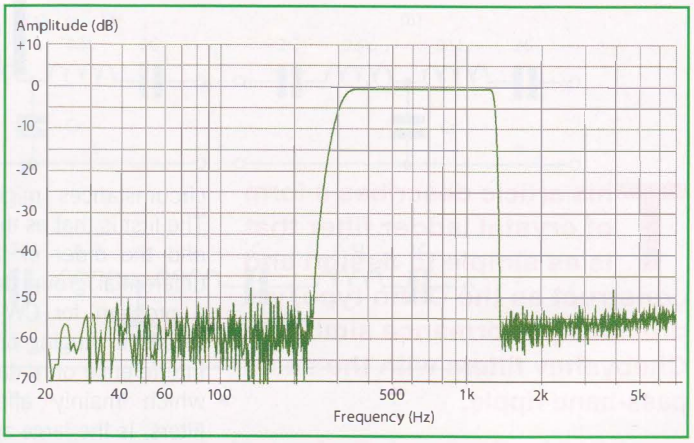

FIGURE 3: LASERBEAM-DUAL CW wide filter response.

open-circuit the wide filter was selected and grounding the pin switched in the narrow filter.

The processed audio output from the filter used a DC coupled, differential, output that's ideal for connection to many popular IC audio amplifiers such as the LM386. This output could also be connected directly to some sensitive headsets by connecting one output to the left channel and the other to the right but leaving the ground floating, as shown in Figure 1. I tried this and there was just about enough output to drive my Sennheiser HD-480s. You can reduce the output to a more conventional, single-ended, output by using just one of the output pins and adding a coupling capacitor to block the DC component. In its simplest form you can reduce the connection down to just input, output, power supply and bandwidth switch.

On the air

Performance of the filter was very good, as you would expect from a modern DSP unit. I've shown my measurements of the filter in Figure 2 and Figure 3. The measurement was taken using HOLMImpulse software by Holm Acoustics (www.holmacoustics.com). As you can see, both filters have very steep sides and flat pass-bands, something that would be very difficult (and expensive) to achieve with analogue techniques. The filter also did very well in listening tests and there were no signs of ringing when using the narrow setting. I found that the narrowest setting was often a little too narrow for tuning around as it was so sharp. The best technique was to tune using the wider setting and then switch in the narrow filter. The switch to narrow filtering made a significant reduction in the background noise so will be a boon for contest or DX operation.

Summary

The LASERBEAM-DUAL CW filter from SOTABEAMS is a very cost effective and simple way to improve the performance of a CW station. The LASERBEAM-DUAL range features filters for all types of signals including a variable filter so is well worth a look. The LASERBEAM-DUAL CW reviewed here costs £29.95 inclusive of VAT at 20%.

My thanks to SOTABEAMS for supplying the review model (www.sotabeams.co.uk).

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QER crystal ladder filters

This article describes a form of crystal ladder filter that is as simple to design and construct as the Cohn type, yet provides performance similar to Chebyshev filters with the same pass-band ripple.

The Cohn type of crystal ladder filter has become increasingly popular with home constructors around the world ever since it was first described by Wes Hayward, W7ZOI, back in 1987 [1].

Of course, crystal ladder filters have an inherently simple network structure anyway but when designed for a Cohn response, where all coupling and tuning capacitors have exactly the same value, they become even easier and more convenient to implement than any other type. The Cohn design also has excellent stop-band performance, but for many that's probably only a secondary consideration. As most modern mass-produced crystals tend to be quite tightly bunched around their target frequency, they're ideally suited for use in ladder filters. And, since the Cohn type has the same coupling coefficient throughout, this greatly reduces the task of calculating component values and neatly avoids the complication of extra capacitors being required for tuning the innermost filter crystals.

The simplicity of the Cohn crystal ladder filter also offers those who prefer an entirely empirical approach a much better chance of success, since any design in which all the capacitors have the same value and all the crystals are identical is far more likely to achieve acceptable results just because fewer variables are involved. All the experimenter has to do is to establish the best termination resistance for the value of coupling capacitor chosen and possibly switch around a few crystals if they aren't quite matched well enough. Then, if the bandwidth is not close enough to the desired value when a reasonable pass band has been achieved, a single iteration is usually enough to produce what's required. Given these advantages, it's hardly surprising that the Cohn crystal ladder filter has become quite as popular as it has with those who still prefer to make their own simple portable or low-power equipment.

But, as all disciples of Murphy will know, nothing is ever quite as perfect as it seems and the Cohn design is no exception. It does have a couple of drawbacks, which in certain circumstances might prove troublesome. The first is that as the bandwidth is reduced and the order of the filter increased the differential group delay can become quite a problem for CW or data signals. This results in ringing on CW and inter-symbol interference on data. The second problem, which mainly affects wider bandwidth filters, is the large and uneven ripple in the pass band. Usually, with Cohn CW filters of a relatively low order, loss in the quartz crystals reduces the coupling and rounds the pass band sufficiently to completely smooth out any ripple that would otherwise occur if crystals had infinite Q. It also modifies the group delay and lessens the effect of ringing, making these simple ladder filters eminently suitable for CW providing they are not made too narrow.

However, this rounding and smoothing is much reduced in wider filters and the true nature of the Cohn pass band emerges and becomes more and more evident as the bandwidth and the number of crystals is increased. When it's moderately well pronounced, as in **Figure 1**, it can start to have a detrimental effect on the transmitted audio spectrum, reducing the level of the highs and lows while leaving the mid-range frequencies largely unaffected. Whether this actually causes a problem is down to individual voice characteristics, of course, and serendipity. It hasn't been widely publicised, but this aspect of the Cohn filter is actually relatively easy to fix without increasing the component count or sacrificing stop-band performance much. It just requires swapping a couple of capacitors for a couple of crystals. The cost difference is normally negligible and the improvement in the pass-band response quite amazing.

Ancient filter theory to the rescue

In the days before modern filter theory, the usual way to design a filter was to use a technique first proposed by George Campbell in 1910 and much extended in later years by Otto Zobel. This became known as the *Image Parameter Theory* and the two slightly different building blocks used to construct these filters were dubbed *m-derived* and *constant k* sections by Otto Zobel. The inductor and capacitor values are calculated using simple equations involving just the cut-off frequency, the termination resistance and very few constants. Increased attenuation beyond the cut-off frequency is achieved by cascading several identical sections.

One advantage of their technique is that it can be used to design band-pass filters with identical crystals and coupling capacitors, similar to the Cohn circuit, but with an inherently better pass-band response. The natural shape of an image parameter pass band is quite good anyway, but can be improved still further in an extremely simple way. This is because the positions of two of the poles of a high-order image parameter filter can be moved around symmetrically within the pass band just by changing

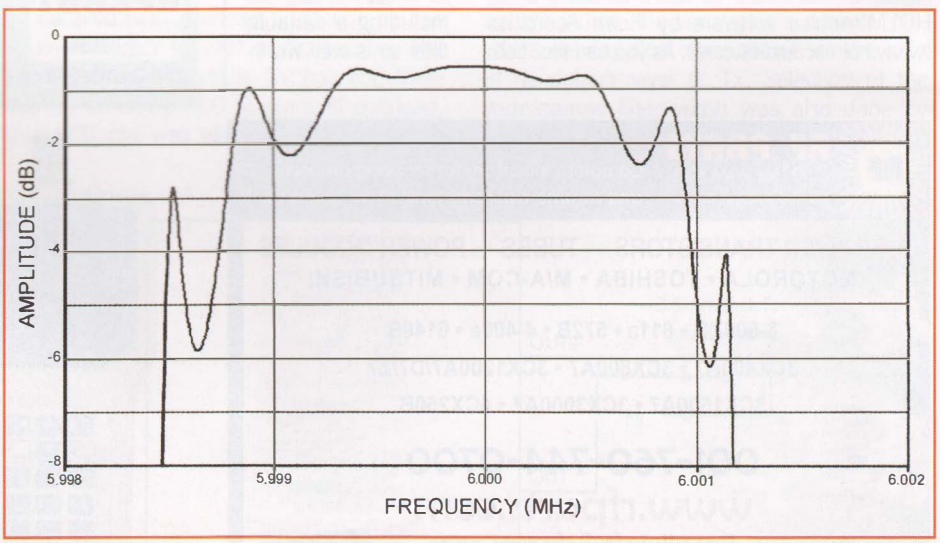

FIGURE 1: Pass-band response of an 8-pole Cohn SSB ladder filter using 6MHz crystals and 68pF coupling capacitors (R_T = 390Ω).

the value of the source and load resistors. Consequently, these filters can be made to have pass-band responses quite close to those of equiripple Chebyshev designs and that's why they're called Quasi-EquiRipple (QER) filters. An added bonus is that a little bit of loss in the crystals actually smooths out the slight unevenness of the theoretical QER response and makes it look even more like a design with equal ripple. And, though they may look similar in topology to Cohn filters, they have absolutely nothing to do with Seymour Cohn and everything to do with George Campbell and Otto Zobel.

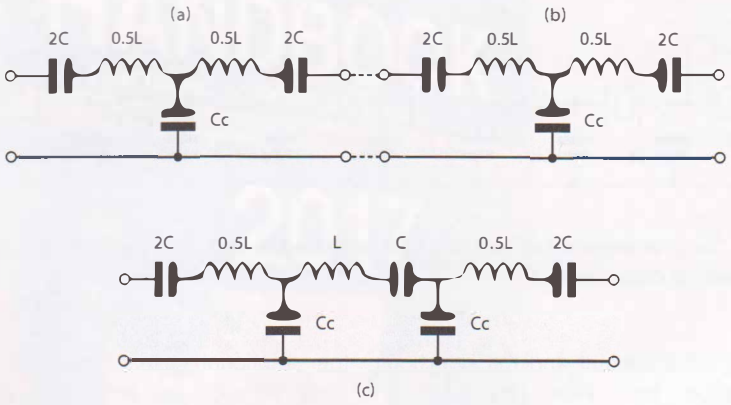

FIGURE 2: Illustration of how combining two critically coupled series-tuned T sections (a) and (b) results in an image parameter band-pass filter in (c) with a 2:1 capacitance ratio between end and inner resonators.

Zobel filters anyone?

Probably the best way to demonstrate how QER crystal ladder filters were first developed is to start with just two T sections, each comprised of a pair of identical coupled tuned circuits as shown in **Figures 2(a)** and **2(b)**, and then combine them together as illustrated in **Figure 2(c)**. This reveals the fact that the first and last resonators end up with half the inductance and twice the capacitance of the inner resonators when identical T sections are cascaded. Now, if many T sections like this are combined to form a high-order filter, it makes practical sense to use single crystals for the inner resonators and parallel pairs for the end ones to achieve the right ratio of motional capacitance and inductance. So, if we want to produce an 8-pole QER ladder filter, we just combine seven T sections like the one illustrated in Figure 2(a) and after substituting crystals for the tuned circuits we end up with the arrangement shown in **Figure 3**.

The response of this filter can be varied from something resembling equal ripple right through to one similar to a Cohn, just by changing the value of the load and source resistors. Below the optimum value, a major dip occurs in the middle of the pass band and as the termination resistance is increased this reduces in depth until it equals the troughs of ripple at the edges of the pass band. If the resistance is increased beyond this point the central dip eventually disappears completely and the middle of the pass band turns into a broad peak as the response approaches something resembling that of a Cohn filter. The QER design is quite tolerant as far as its terminations are concerned and reasonable pass-band responses can be obtained over a moderately wide range of resistance values. This and some of its other attributes, such as perfect mesh tracking, make it highly suitable for use as a variable bandwidth crystal filter, which is what prompted the initial investigation of low-order QER designs some years ago.

The pass-band response of the 8-pole QER ladder filter shown in **Figure 4** was produced using the same 6MHz crystals that produced the Cohn response in Figure 1, plus a couple of extra identical crystals for the parallel end pairs, of course. Notice how the response comes up cleanly to within about 1dB of the peak level at the edges and dips by about 0.5dB in the middle. Theoretically, the maximum ripple for this order of QER filter should be around 0.3dB and the number of peaks ought to be two less than the order of the filter, but in this case the termination resistance has been reduced to illustrate that the pass band still looks quite reasonable 10% below the optimum value. Also, the outer peaks have been smoothed out by loss in the crystals leaving only four prominent ones despite the ratio of crystal Q to filter Q being around 100. The -6dB bandwidth for this QER filter is around 2.76kHz compared to about 2.66kHz for the Cohn filter shown in Figure 1 (C_c = 68pF in both cases).

The QER design always gives a slightly wider bandwidth than the Cohn for the same value of coupling capacitor, but has a slightly inferior 6/60dB shape factor. The 8-pole QER design achieves a shape factor of around 1.7 compared to about 1.6 for the Cohn and, theoretically, its ultimate attenuation is about 9dB worse at the 190dB level, so the difference is hardly likely to be noticed in practice. The maximum theoretical pass-band ripple of a QER ladder filter increases with order, starting with 0.002dB for a 4-pole and steadily rising through 0.09dB for a 6-pole right up to 0.9dB for a 12-pole design. Component tolerances, crystal variations and loss will alter these theoretical ripple figures in practice, of course, just as they do for all other types of filter to some degree or other. The QER design is no different in this respect and is offered here as an alternative to the Cohn filter for wider bandwidth applications, such as AM and SSB, where simplicity and a good pass-band response are the main requirements.

Designing QER crystal filters

QER ladder filters can be designed in exactly the same way as any other form of crystal ladder filter using normalised **k** and **q** values [2], but Horst Steder, DJ6EV has written some software that makes the whole task of working out the component values very much simpler. His program, *Dishal*, can be used to design filters with any of the standard responses as well as the Cohn and QER ones. It takes care of the corrections needed to compensate for the effect of crystal parallel capacitance, which can be a major source of error for wider bandwidth filters if not addressed [3] and also includes a subroutine, *Xtal*, to help with crystal motional parameter calculations. Version 2.0.5.2 of the program can be found on DK7JB's website [4] along with articles on some of Horst's other filter work. However, if you just want to download *Dishal*, that's available directly from elsewhere on DK7JB's website [5]. The download comes as a zipped file and should be unzipped to a separate directory on your hard drive and not the Program Files or Documents and Settings directories. The eDishalHelp file within the unzipped directory describes the essential features and explains in English how to use *Dishal*. If you wish, you can also refer to an article by Horst and Jack Hardcastle, G3JIR, about an earlier version of *Dishal* that appeared in *QEX* back in 2009 [6].

The QER termination resistance predicted by theory should be regarded as a starting point. It's a theoretical value based on identical crystals with no loss and perfectly matched coupling capacitors, which doesn't take any account of component tolerances. The QER design

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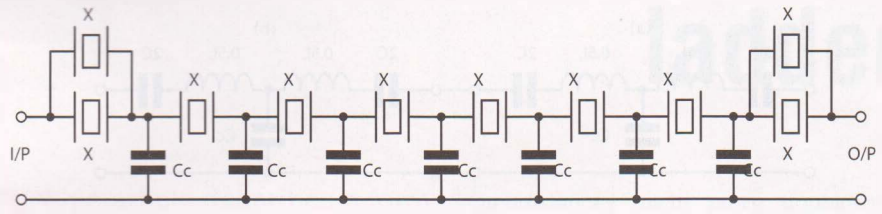

FIGURE 3: Circuit arrangement of an 8-pole QER crystal ladder filter using identical crystals (X) and identical coupling capacitors (C_c).

is actually quite tolerant and the selection of a suitable termination resistance is often a matter of personal preference. In practice crystal loss and frequency spread can have a significant bearing on that final choice and values other than the theoretical optimum can sometimes produce a better looking response. Stray capacitance at the terminations can also affect the pass-band response if it becomes too great, but since the termination resistance of a QER filter is less than that of either a Cohn or a Chebyshev design of the same bandwidth this is not often so much of a problem. Generally, when the reactance of any stray capacitance at the terminations is more than seven times the resistance there is minimal effect on the pass band, but it's noticeable when the reactance drops to five times, or less.

If the stray capacitance at the terminations is too high, the best approach is to tune it out with some parallel inductance. Sometimes this can be turned to advantage by converting the parallel end pairs into single crystal half-lattice sections with balanced transformers and phasing capacitors feeding anti-phase signals to their respective coupling capacitors. A crystal can be made to look as if it has half the motional inductance and twice the motional capacitance by feeding more through the anti-phase path than required just to compensate the crystal static capacitance. This removes the need for parallel crystals at either end and also introduces a couple of notches on the low side of the pass band, making the filter stop band a bit more symmetrical. However, in this case both end coupling capacitors have to be reduced in value to allow for the effect of the phasing capacitors and the convenience of having them all the same value is lost. Obviously, this is much more involved than a simple ladder filter, but a hybrid QER filter of this type is sometimes worth considering [7].

Concluding comments

The perfection, or otherwise, of the pass-band response of a finished filter is usually a good indication of how carefully the component parts have been characterised and selected. The QER design will give excellent results if a bit of care is taken, particularly in the selection of suitable crystals. Just like the other types of Dishal crystal ladder filter, it requires crystals with closely matched motional inductance to give the best pass-band response. This is quite easily achieved with the switched-capacitor (frequency-shift) oscillator method of measuring motional capacitance [8], [9], [10] and [11] since all crystals with the same marked frequency and equal shift have pretty much the same motional inductance. Therefore, crystals can be sorted according to the amount they shift in frequency and the largest group used for making the final selection based on frequency and loss. Ideally, their frequencies should be matched to within one-twentieth of the bandwidth of the filter and their motional inductances to better than 5%.

This is not always possible, of course, and with a limited number of crystals we just have to make the best of the hand we've been dealt. Remember that the QER pass-band response can be changed, and often improved, by varying the value of the termination resistance. So, if you haven't got an ideal set of crystals and are unhappy with the response, try experimenting. The optimum value predicted for the source and load resistance is only the best value for perfectly matched crystals and if that's not what you've got then some other value may well give better results.

The switched-capacitor oscillator I devised for measuring crystal motional capacitance some years ago was first used when there were only very primitive personal computers and although it included a meter to monitor crystal activity, the best that could be achieved with this arrangement was ranking crystals according to their relative loss. Although this identified the best crystals to use in CW filters, it didn't provide any information about their actual Q values. The version widely promoted by Wes Hayward, W7ZOI, in EMRFD [8] and *QST* [9] had no crystal activity meter and a greatly simplified equation for the motional capacitance, which limited its accuracy and use to a certain extent. It was ideal for beginners, but now that most amateurs have their own computers and circuit simulation software there's a need to know the crystal Q, or the series loss resistance, as well as a demand for improved accuracy so that more realistic simulations can be performed prior to constructing anything.

The lack of a Q or loss measurement with my method of crystal characterisation was highlighted by Nick Kennedy, WA5BDU, in a talk he gave about making crystal filters at OzarkCon in 2008 [12]. As a result of correspondence with Nick, I discovered that my simple method of crystal motional capacitance measurement had come out quite well compared with more elaborate professional techniques in some round-robin crystal tests he'd conducted. So, it seemed to

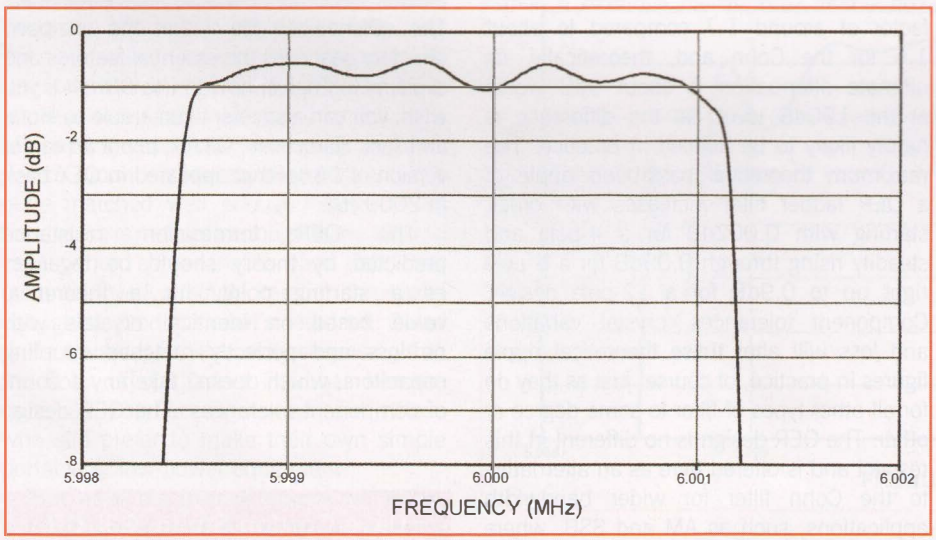

FIGURE 4: Pass-band plot of an 8-pole QER SSB crystal ladder filter using 6MHz crystals and 68pF coupling capacitors (R_T = 270Ω).

Continued on page 74

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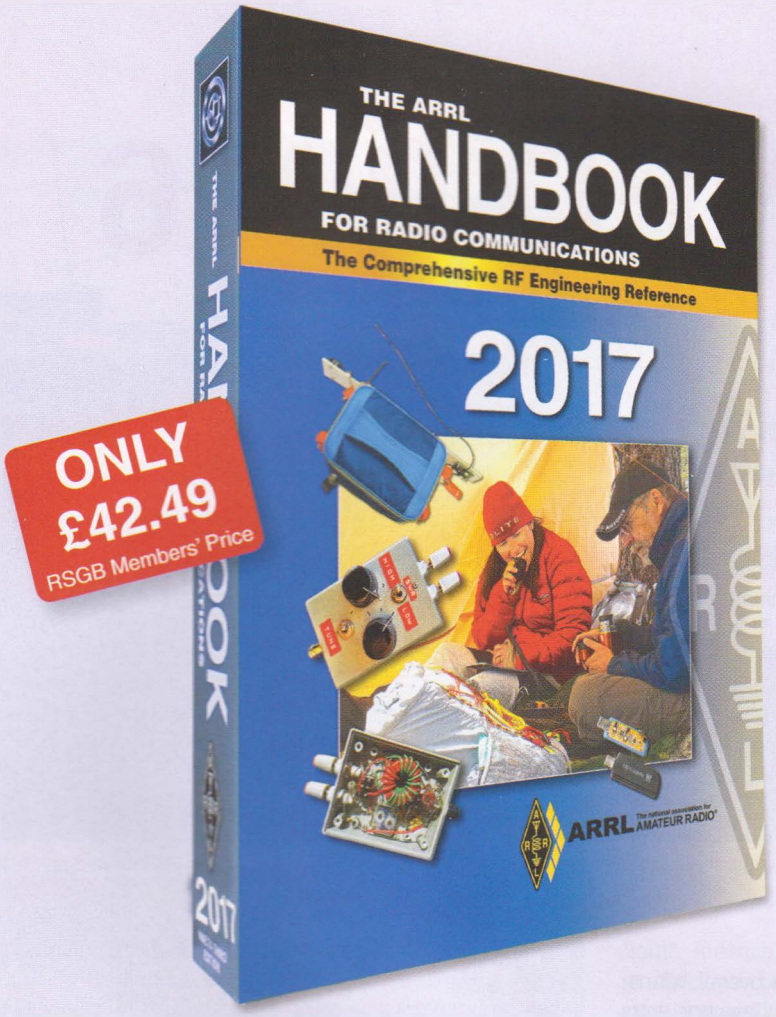

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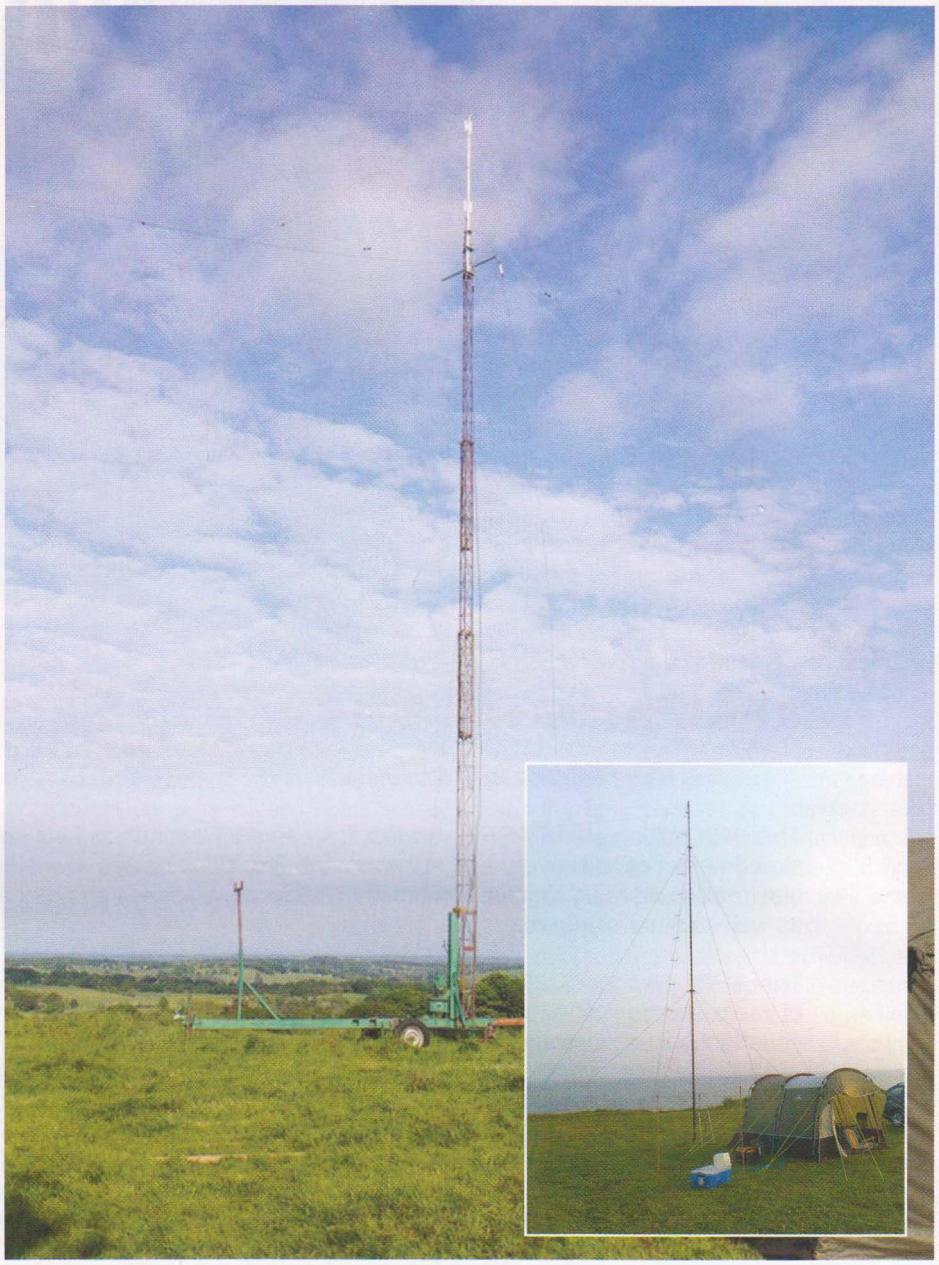
HF NFD 2016

Summarised in one sentence, opinion on NFD 2016 is perhaps best expressed as "enjoyable weekend, great weather, shame about the conditions".



Main photo, the overall winner G6MC/P. Inset: G4ALE/P overlooking the sea.

There were 42 entries in National Field Day (NFD) this year, 5 up on 2015. It is pleasing to note that three of these were new entrants or groups who have not entered for several years. All but one of these entered the Restricted-Simple category. Apart from these, the balance of entrants between sections/categories (Open: 9 entrants, Restricted-Complex: 5, Restricted-Simple: 17, QRP: 11) has not changed significantly.

The winners

So, on to the leaders... The overall winner was the Restricted-Complex Category entry from Brimham CG (G6MC/P) for the second year running, who again take the National Field Day Trophy. The Open Section leader was Stockport RS (G3LX/P), also for the second year running, who take the Bristol Trophy, with De Montfort University ARS (G3SDC/P) second (up from 5th last year) taking the G6ZR Memorial Trophy. In the Restricted Section, as mentioned, the leading station was G6MC/P, followed by North of Scotland RS (GM2MP/P), up from third place last year, who take the Gravesend and Scottish Trophies. And, last but not least, in the QRP Section for the second consecutive year and taking the Reading Trophy, the leader was Horsham ARC, operating this year as G3LET/P – a single operator entry by Peter, G3LET. The remaining trophy, the Frank Hoosen, G3YF Trophy, awarded for the leading 20m entry, was fought over this year by three contenders – G3KLH/P, GU4YOX/P and GW0AAA/P. In the end, Three As CG (GW0AAA/P) pipped Castel CG (GU4YOX/P) to the post for the third year running – this time by a margin of a mere 23 points – that is seriously close! Special congratulations to all the winners, but congratulations and thanks too to all those groups who were able to get a station on the air.

Conditions

Although the total number of NFD contacts made by UK entrants this year was up by 16% (from 27,756 to 32,137), the decline in HF conditions was apparent again. The instinctive feel from entrants at the time, as reflected in their soapbox comments, is confirmed by post event analysis. 10m suffered particularly badly: the percentage of total NFD contacts made on the band, which had declined from 11.4% in 2014 to 3.8% in 2015, further declined to 1.1% this year, with only 364 contacts made by UK entrants. 15m was also badly affected. Conversely, percentages on 160m, 80m and 40m were significantly up. 20m, between the two extremes, was almost unchanged. So let's look at each of the bands individually.

Activity on 160m picked up rapidly from around 2045UTC (all stated times are in UTC) and continued at a high level, peaking in the hour after 2145, then tailed off gradually from around 0215 with last contacts (apart from a handful of 'gap fillers' later in the contest) by 0345. With the exception of a single W1, all contacts made by UK entrants were with stations in 26 European countries (or more accurately

G3VPW and G3KLH operating at 20m single-bander G3KLH/P.

DXCC entities), the majority being with the UK (36%) and Germany (42%).

80m, another night time band, followed a similar pattern but over a longer period and with a less intense peak of activity, contacts being made with 36 countries. A rapid build-up of contacts from around 1945 led to a peak between 0145 and 0245 followed by an extended tailing off from around 0300 with last contacts (apart, again, from 'gap fillers') around 0515. Many groups chose to change band fairly frequently between 160m and 80m, with occasional trips onto 20m, to optimise their overnight contact rate. 40% of the 80m contacts made by UK entrants on the band were with Germany, and the bulk of the rest were with other parts of Europe (including the UK). However 13 Asiatic Russians and 45 North Americans (all but 2 East Coast) also appeared in the logs.

40m carried traffic for the full 24 hours and, as usual, behaved rather like a reservoir capacitor. Entrants tended to seek contacts there when the other bands were not performing well. The major dips in contact rate between 2100 and 0300, and again between 0700 and 1000, reported last year were again apparent. The night time dip, this year between 2300 and 0100, was deep: however the morning dip (between 0800 and 1000) was shallower because 15m and 10m were less productive than in 2015. Despite contacts with 51 countries being made, nearly 96% of the contacts were intra-Europe. However, in addition, around 250 North Americans (all US call areas except 6), 127 Asiatic Russians and a sprinkling of other Asian, South American and Oceania stations (totalling around 50) also appeared in UK entrants' logs.

Once again **20m** was the band on which the most contacts were made (37% of the total), in 78 countries – 6 up on last year – in all continents except Antarctica. The band seemed much less affected by the poor HF conditions than 15m and 10m, with contacts being made throughout the 24 hours although there were significant dips in contact rate between 2300 and 0000, and again between 0200 and 0400. Although the majority of the overnight contacts were made by the three 20m single band entrants, there was still enough activity to justify other entrants going on the band from time to time, resulting in 272 contacts between 2300 and 0400. Again, over 80% of the contacts were within Europe, the most frequently worked country being European Russia. After Europe, the most prevalent continent was North America (over 1200 contacts) including all US call areas and all Canadian provinces except VE4 & VE8. This was followed by Asia with over 850 contacts (mostly Asiatic Russians). South America, Africa and Oceania together yielded over 50 contacts, including 5H, 9M2, JA, PY, LU, VK, VP8, YV and ZL.

Conditions on **15m** were well down, with only 50% of 2015's contact numbers being made this year. Nevertheless 55 countries appear in the logs, only five less than 2015. 75% of these were within Europe, Germany being the most common, followed closely by European Russia. Outside Europe, North America provided 105 contacts (including US call areas 1-5) but only 15 stations in South America, Africa and Oceania appear in the logs. Some of the more interesting countries worked were 5H, 9M2, 9V, FR, HS, JA, PY, VR2, VU, YB and ZP. There was activity at a fairly low level on the band from the start, ceasing quite abruptly at around 1915. It recommenced just after 0500, and was quite brisk between about 0700 and 1300, peaking (at a rate not far short of that on 20m at the time) around 0900.

As would be expected, **10m** suffered most of all the NFD bands from the turndown in conditions. The number of contacts this year was only 34% of that in 2015, and the number of countries worked was 24, again well down on last year's 35. Only 7 contacts outside Europe were recorded, the nearest thing to DX being five contacts with PY around 1440 and two with UA9 around 0800. There was very limited activity (less than 50 contacts) between the start and 1930. Activity got going again around 0725 and, apart from a significant peak between 0830 and 0900, continued at a very low level until the close at 1500.

Equipment and antennas

Once again, in equipment terms, the Elecraft K2 / K3 / KX3 series was dominant, with 29 in use. The only other rigs with more than one appearing were FT-5000 (four), FT-1000 series (three) and IC-756 (three). It

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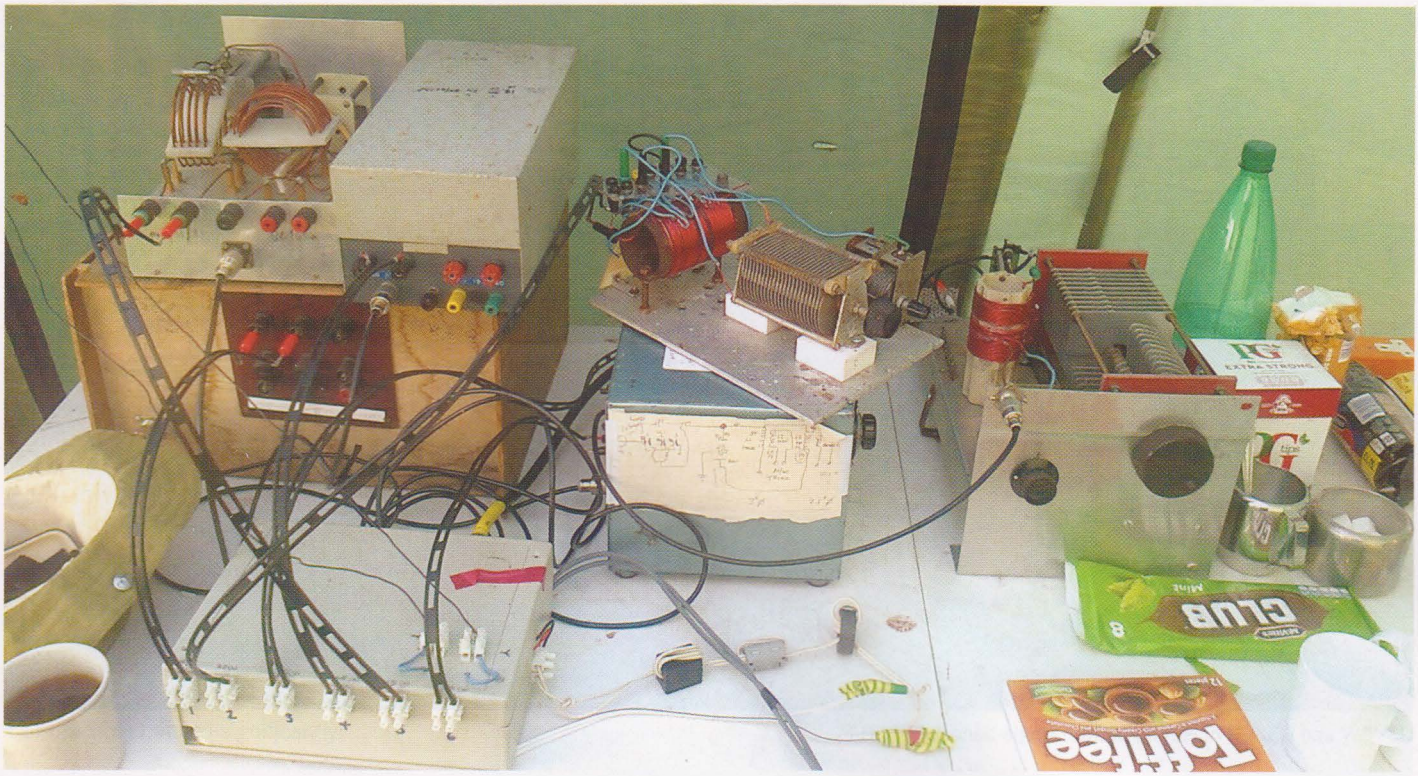


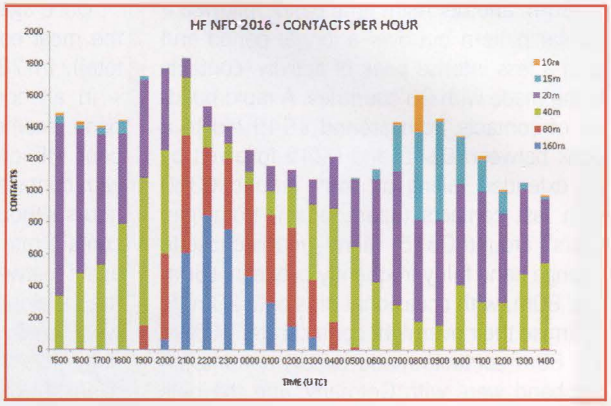
Tea and T-match: antenna tuning at G4ALE/P.

is interesting to speculate what will become the next dominant NFD rig, and when. With the arrival of the IC-7300 from Icom it seems probable that it will be SDR architecture based – but we shall see!

Antennas followed the usual pattern, with beams for the HF bands and dipoles for the LF bands generally in use in the Open Section. The Restricted and QRP Sections generally used single doublets (flat or inverted V) except for the Restricted-Complex Category where a degree of innovation was apparent (as intended!).

Adjudication and administration

As usual, the adjudication process picked up errors in entrants' logs. Error rates varied from zero to approaching 20%, which is about normal for NFD. However, this year accuracy was not helped by the appearance of some unusual calls, including 9A1TESLA, YL60TESLA, DK0WRTC/P and DP65HSC. The last proved an interesting test of CW reading ability, as it includes 17 consecutive dots, the trick being to work out where the gaps between the characters were! UK entrants' logs included no fewer than 15 different variants of that call. On the theme of reading calls correctly, the adjudication software identifies all apparent 'uniques' (ie calls that appear in only a single log). Genuine uniques do happen (how would the winners get to be winners without working stations that others don't?) but sadly a very significant proportion of apparent uniques turn out to be errors in reading callsigns. This year, out of 457 apparent uniques it was possible to trace 114 of these (32%) as call errors back to the correct call. Finally, two station inspections were carried out and all was found to be in order.



Showing the contacts per hour during the 2016 HF NFD.

Here and there

Starting off on a solemn note, it is sad to report the death of Barry Crook, G4AZN following a massive stroke a few days after this year's NFD in which he had actively participated with G5LO/P as always. He had been a stalwart member of Oxford & District ARS, of which he was a former President, for many years. I'm sure we all offer Barry's family and friends our condolences.

There was a surprising level of unanimity in this year's soapbox comments. Nearly everybody agreed that conditions were poor, but that the weather was excellent (although one station complained that it was cold overnight) and that a good time was had by all. Perhaps it was the resulting *bonhomie* that means that 'Schadenfreude corner' is rather sparse this year. Apart from one report of a rig dying close to the end of the contest, and several reports of PC problems (including one station losing two hours of operating time), there were only two significant hiccups – neither of which have been reported before. One report (submitted with a checklog) was that the shack was infested by ants and another that is best described in the entrants' own words... "When we were all packed up and ready to leave the site, we realised that none of us had the key of the locked gate. Finally we found it in the tent that was neatly folded up in John's van!"

Book now for 2017

Following activity by the HFCC related to rationalisation of the rules for CW NFD and SSB FD, including issue of a questionnaire and analysis of the responses, the rules for NFD next year will be significantly different. The date for next year's NFD is 3 / 4 June 2017 – why not put it in your diary now?

Wooden callsign block and coasters

New from Lap Gifts a high quality supply of custom-made, personalised callsign display plaques and drinks coasters.

The carefully crafted and precisely engraved wooden callsign plaque makes an elegant statement of who you are. It sits neatly on any radio or on a shelf, in the shack or elsewhere, quietly informing all who see it that you are a *real* radio amateur, here to stay.

If you are running a Field Day or special event station, this is a far more stylish way of displaying your callsign to the public than just scrawling it on a piece of paper. A conversation piece for the uninitiated, it could be the key inspiration that gets a newcomer into our great hobby for the first time.

The Callsign Plaque is made from oak or beech, and is engraved with your callsign. Perfect as a treat for yourself, a gift, or as a permanent reminder of the club callsign.

Also available custom-made is the pack of four personalised drinks coasters. Again made from wood, the hard-wearing surface bears your callsign. On the underside you will find four soft feet that not only provide scratch protection to your table top or bench, but also provide a measure of thermal isolation to avoid any kind of heat damage. Plus, of course, any condensation that forms on the outside of a nice, ice-cold drink will also collect on the wipe-clean coaster rather than a more precious surface.

The RSGB has negotiated a special deal with Lap Gifts (see below) or you can contact them at www.lap-gifts.co.uk.

RSGB Members' only Special Offer

In a special deal with Lap Gifts, the RSGB is able to bring you two superb personally engraved items that are exclusive to RSGB Members. Saving £5.00 on the usual retail price we are offering either a handsome hardwood plaque or four hardwood coasters engraved with the RSGB Diamond logo and your callsign.

The plaques are made from either Beech or Oak and measure 200mm long and a chunky 25mm deep. The plaque is deeply engraved with black letters and finished in a satin varnish. The plaque is protected with a natural cork base, making this feel like the luxury item it is. The coasters are 100mm square and a satisfying 5mm think with four soft plastic feet. They are also hand washable in case of spillages.

If you are looking for something to enhance your shack then these items look great and make the perfect gift for any radio amateur for a birthday or Christmas.

Each plaque or 4 Coasters costs £19.99, saving £5.00 on the usual price. (plus £3.50 p&p)

Please note that these items are engraved to order so will take a few days to arrive direct from the manufacturer. They are also non-returnable except in cases of error or defect.

Winning Ways

The CW leg of the CQ WorldWide DX series of contests takes place this month and there are opportunities galore for UK stations to take part and do well. Setting a record high score will be more difficult though, especially if you live in England.

Be realistic

The first thing that needs to be said is that if you've never taken part in a CW contest before, CQWW is probably not the place to start. The bands will be crowded and the Morse will be fast. 30WPM is typical, so you need to be a competent operator (or use a *good* decoder).

For single operator stations there are entry categories for QRP, Low and High power, single band or all bands, assisted and non-assisted. Before choosing which category you might like to enter, think about how much time you can allocate and what time (or times) of day you like to operate. If you're a night-owl, choose an LF band. If you like your sleep, choose an HF band.

Think about antennas and polarisation. In CQWW you want to work as many multipliers (DXCC entities) as you can, which means striving for low angle radiation. As long as it has a good grounding/earthing system, an 80m vertical should work better than the average 80m dipole. The same applies to 160m, although for 160m an inverted-L with good grounding/earthing is about as good as a DXing antenna gets for most of us.

40m is open to somewhere pretty much all the time, so if you like to operate day and night this might be a suitable band for your attention. A horizontal dipole or doublet should be capable of working lots of entities, although a ¼-wave vertical or a vertical dipole *might be* better.

Solar activity has declined rapidly this past year and I don't expect the upper HF bands will be in good shape. Entries and comments made about the SSB leg of the contest at the end of October will give us some indication. Geomagnetic disturbances could make conditions even worse. Ironically, if you decide to target 10m or 15m, it might be easier to come top in your DXCC entity than it has been for a while, by virtue of the fact that everyone else doing a single band entry has moved elsewhere. 20m is traditionally the most active HF band during low parts of the Sunspot Cycle and I think that's how it's going to be for at least the next five years.

The kind of certificate you can receive for a CQWW contest entry.

Gearing-up

If you have a simple station, say a 100W transceiver and a multi-band doublet antenna, a casual multi-band entry in the CQWW CW contest could easily result in hundreds of QSOs. A serious entry could result in over 1000 QSOs. Aim to call CQ part of the time and hunt multipliers part of the time. Multi hunting is crucial if you want to build a good core. If you enter a QRP category you will have to spend the vast majority of the time tuning around and calling people, because you won't be able to hold a frequency on which to call CQ. It can be tempting for high power stations to simply call CQ and work everyone who replies, but you're less likely to win your category if you do because many DXpeditions to rare entities will be calling CQ and you'll need to find and work them for the multiplier.

Software is important. The vast majority of entrants use PCs for keying and logging, *N1MM+* and *SD* being two of the most popular software packages. The vast majority of operators use their brain for reception, although there's no ban on decoders, *CWGet* being popular. As regards filtering, most modern radios have narrow filters. You'll need a narrow filter in CQWW CW.

At the end of the contest, however many (or few) QSOs you make, please upload an entry.

Setting a record

CQ magazine publishes an online list of all the record scores. The web page to check out is www.cqww.com/records.htm

You might think a UK station has no chance at all of ever setting a record score for his/her own DXCC entity, but think again. In England just about every category has been the target of a serious entry in the past, but that's not the case for all parts of the UK. Jersey and Guernsey are entities where lots of opportunities exist to set what I'll call default record scores, by virtue of the fact that nobody has ever entered many of the categories. The opportunities are less in Wales, Scotland, Northern Ireland and the Isle of Man, but there certainly are some, especially in the QRP categories.

Setting a European or worldwide record score is another matter!

For all the latest RSGB contest information and results, visit www.rsgbcc.org

Steve White, G3ZVW
steve.g3zvw@gmail.com

We are **NOT** attending the **KEMPTON RALLY** on Sunday the 6th of November

But our store is open from 8am until 2:30pm! Since we are only a 15-minute drive from the rally, pop in before or after. No entrance fee and FREE Coffee & Nibbles. Can't be bad.

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HF-70cm with ATU Built-In

Want Touch Screen Display with 160m through 70cm?

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

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

We love this compact base station radio. Beautiful touch-screen display & 160-70cm coverage.

'A' version with enhanced features available soon.

YAESU FTdx3000

HF/6m Base Station

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

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

YAESU FTdx1200

HF/6m Base - Sister Rig to FTdx3000

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

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

HF/6m Base/Mobile

YAESU FT-891

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

Available end of September.

NEW! Yaesu announce new M-1 Reference Microphone

- 9 Band Graphic Equaliser
- Two microphone inserts
- Treble Boost Cowling
- Recording & Playback facility
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Available shortly £595.00

FT-450D WITH MyDEL MP-30SW FOR ONLY £549.95!

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

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

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

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Four modes of transmission. Large colour touch screen display.

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

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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!

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

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Micro Handie 2/70 with scanner.

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YAESU VR-160 Miniature communications receiver.

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G-450C	SEE WEB
G-1000DXC	
G-5500	
G-2800DXC	
GS-065 Mast bearing	
GC-038 Lower clamps	
Rotator cable 25m	SEE WEB
Rotator cable 40m	SEE WEB
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NEW! MyDEL RADIO DUST COVERS
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ML&S introduce a new range of Shack-Cams. Protect the contents of your Shack with these simple easy to install "Shack-Cams".

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

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MLS PRICE IS ONLY £149.99

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NEW! ADMS SOFTWARE FROM RT SYSTEMS

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

ML&S now stock the most popular range in stock for Yaesu, Icom & Kenwood products.

See:
www.hamradio.co.uk/rtsystems

NEW MYDEL MAGNUM Pi

A standard Raspberry Pi kit, fully assembled and flashed with the relevant firmware when connected to a DV5Mini for DMR operation when connected to your DMR Handie or Mobile. You no longer have to tie your main PC or laptop to the DV4Mini dongle to use it, instead a very compact and lightweight Magnum + DV4. Gary Spiers MOTIG has even produced a video at ML&S showing users how simple it is to set up. The Magnum-Pi is just £79.95 alone or you can buy both ready configured for £169.95.

See
HamRadio.uk/magnum
To view the video see:
www.MLandS.tv

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Two-year warranty on all MyDEL PSUs

NEW! MyDEL-DYNA 1D MICRO-HANDIES

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

MyDEL MP-30SW1V £89.95

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

MyDEL MP-50SW111

50 Amp DC power supply **£125.00**

Probably one of the lightest 50Amp DC power supplies available today, the new MP-50SW111 weighs in at only 2.2Kilos (4.85lbs). Unbelievably compact, measuring a mere 195mm wide, including chunky rear terminals and front panel knobs.

MyDEL MP-304MKII £99.95 Heavy Duty LINEAR 30Amp

For those of you that prefer old style non-switching technology in your power supply we think this new 30 Amper from MyDEL is the one. Switchable Volts/Amps with large precise metering (analogue of course!) variable Voltage, Cigar socket output for all your accessories, twin front panel outlets for up to 6Amps and two large binding post terminals for up to 30Amps. Remember, all MyDEL PSU's come with a two year no quibble guarantee.

MyDEL CG-3000R ANTENNA TUNER

NOW ONLY £249.95

The best value remote wire antenna tuner now with remote control included.

NEW ALINCO DM-330FX

NEW PRODUCT

Superb 30Amp PSU with twin 5V 2Amp outputs, Twin 5Amp 13.8V, 10Amp Cigar (for Handies). Variable Voltage & Noise Offset control. V&A Metering.

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DIAMOND GSV-3000

* Output voltage 1 - 15V DC & 13.8V Fixed * Output current 25A continuous (CE protocol) * Built-in cooling fan
* Supply 230VAC 50Hz * Size 250 x 150 x 240mm * Weight 9.5kg

RRP £209.95 **ML&S £209.95**

HELITRON DV4MINI USB STICK FOR D-STAR AND DMR

DV4mini is a tiny but powerful USB stick that can change any PC into a HOTSPOT for the modes D-Star and DMR (C4FM Fusion is being prepared). It contains a powerful 32-bit micro controller as well as a complete 70cm transceiver and modulator/demodulator for GMSK and 4FSK (including raised cosine) as well as a USB interface.

AVAILABLE FROM THE SOLE UK DISTRIBUTOR, ML&S LTD. ONLY £104.95.

see www.MLandS.co.uk/dv4mini

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X1P Ultimate DMR Handie, GPS & Bluetooth.
Price from £599.95

NEW PRODUCT

PD-685G 70cm, Small, lightweight & slim this version has GPS fitted. **£399.95**

Hytera

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MD-785G
Base or mobile with GPS. **£395.95**

MD-390 DMR HANDIE FROM TyT NEW MODEL

An updated version of the UK's best-selling DMR Handie, the NEW MD-390. Better ergonomics, better water resilience, improved menu system, option GPS. Free programming lead & software.

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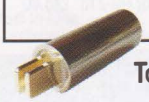

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ML&S are the UK Distributor for this product. Available from stock: £209.95 see HamRadio.co.uk/openspot

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1.8-460MHz with 1.3M Whip!.....£129.95
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Wonderwand Antennas U.K.

The UK's favourite rig-mounted antenna system!

New! WonderLoop 4010. 40m -10m

If you are an avid FT-817 or KX-3 operator and enjoy nothing more than heading for the hills on a weekend to active those rare WAB squares. Take a look at the all new WonderWand WonderLoop Antenna. Incorporating their easy to use tuning circuit, which offers frequency coverage from 40m-10m and handling 10W of RF power, you can be on the air in seconds. The tuning unit is enclosed within a lightweight ABS case, no larger than a pack of cards. This means you will no longer need to carry around all those additional extras needed to string up a wire in the field. There is also no need to worry about running a counterpoise with this efficient loop design. So how does it perform? As we had sunshine this afternoon, we popped out into the car park here at ML&S and attached the loop to our demo FT-817. Within minutes we had tuned to the 20m band worked into EA, I and 9A. Not bad for 5W and the 'shack' in our hand.

ML&S PRICE ONLY £99.95
For full info & video see: www.HamRadio.co.uk/wonderloop

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A professional range of End Fed Wire antennas from the Netherlands. Each antenna is hand made, individually tested for resonance and SWR. All you have to do is take it out of the box and string the antenna up in the air, add a coax feed back to you radio.

HEF/3Band	40/20/10m 200W, 11.85m Long	£134.95
HEF/5Band	80/40/20/15/10m 200W, 23m Long	£149.95
HEF/40m-QRO	40m Mono Bander, 2kW Only 20m Long	£219.95
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For the full range see www.HamRadio.co.uk/hyendfed

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A complete portable antenna packaged based around the world's best selling SuperStick

MP1DLR Package includes:

- MP1B antenna (SuperSlider Coil, SW1 SuperWhip, 2 extension rods and nut)
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- GB1 Go Bag
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Super Antenna Features:

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X-30	2/70, 3/5.5dB, 1.3m Long
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X-300N	2/70, 6.5/9dB, 3.1m Long
VX-1000	6/2/70 2.15/6.2/8.4DB 1.42M Long
X-510N	2/70 Fibre glass 8.3/11.7dB gain. 5.2m long "N"
V-2000	6/2/70, 2.15/6.2/8.4dB, 2.5m Long
X-7000	144/430/1200MHz (2m/70cm/23cm) 8.3dBi (144MHz), 11.7dBi (430MHz), 13.7dBi (1200MHz) 5M Long

Mobile Antennas

NR-770RSP	100W, 2/70, 3/5.5dB, 98m Long, spring loaded
NR-7900	2/70, 3.2/6.4dB, 1.46m Long
AZ-504FXH	Extremely compact dualband antenna for 144 & 430MHz 15.5" long
MR-77	Magnet mount/antenna combination. Includes 13' RG58 coaxial cable with BNC or SMA connector
SG-7500	2m/70cm, GAIN 3.5/6.0, 41" long
SG-7700	1/2wave C-Load radialless(144MHz), 2x5/8wave radialless(430MHz), 3.5dB(144MHz),6.0dB(430MHz). 1.06m long
SG-7900	

See Web for prices

Duplexers/Triplexers

MX-72N	1.6-150/400-460MHz Duplexer
MX-62M	1.6-56/140-470MHz Duplexer
MX-610	HF/6+2+70 (for FT-8900)
MX-2000	6/2/70 Triplexer
MX-3000N	2/70/23 Triplexer

See Web for prices

Switches

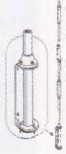
CX-210A	2-way, SO-239 Die Cast
CX-210N	2-way, N-Type, Die Cast
CX-310A	3-way, SO-239, Die Cast
CX-310N	3-way, N-Type, Die Cast

See Web for prices

Hustler Antennas

HUSTLER

Hustler are one of America's oldest manufacturers of Ham Radio antennas. The famous "White Whips" have been seen on many cars operating HF mobile. Their HF base range of 4, 5 or 6-BTV antennas are probably the easiest to assemble and get going and of course are ground mounted, operating with just an earth spike mounted close to the base.



See web for full listing!

Base Station Range
Free standing, max 7.3m tall, 1kW

4-BTV	40/20/15/10m	£189.95
5-BTV	80/40/20/15/10m.	£229.95
6-BTV	80/40/30/20/15/10m.	£269.95

The full mobile and base range and accessories available from stock, including the high power 1kW mobile range.

COAX CABLE STRIPPERS

DXE-UT-8213
ONLY £44.95!

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

DXE-15035 ONLY £23.95

Great for everything from RG-58 up to Ultraflex 10! Designed for stripping RG-8, RG-213, 400MAX, and similar size cable. Simple to operate, they are preset.

Messi & Paoloni

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

NEW PRODUCT!
M&P ULTRAFLEX 13 "MOON INTERCEPTOR" COAX CABLE

Straight from their factory in Italy comes the new very high grade low loss coaxial-cable specifically designed for HF/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. From £169.95 for 50m. Further information see: **www.hamradio.co.uk/ultraflex13**

M&P ULTRAFLEX 7
7.3 LowLoss cable, 50 Ohm, double shielded. £28.75 for 25m.

M&P ULTRAFLEX 10
10.3mm LowLoss cable, 50 Ohm, "alternative for RG-213" £45.00 for 25m.

M&P BroadPro50 double jacket
12.4mm LowLoss cable, 50 Ohm, double jacket. £49.75 for 25m.

Any of our cables can be ordered in any length you require. There is a 10% discount for 100m+. If you require specific lengths then please call.

mRS MiniVNA Antenna Analysers

Perfect for checking antennas and RF circuits for hams and commercial users.

MiniVNA Pro with Bluetooth	100kHz-200MHz	£329.95
MiniVNA Extender	For Pro only, extends range to 1500MHz	£299.94
NEW MODEL! MiniVNA Tiny	Huge coverage, 1MHz-3GHz, Android controllable.	ONLY £379.95

MyDel-Sark110 Vector Impedance Antenna

The SARK-110 Antenna Analyser is a pocket size instrument providing fast and accurate measurement of the vector impedance, VSWR, vector reflection coefficient, return loss, and R-L-C (as series or parallel equivalent circuits). Typical applications include checking and tuning antennas, impedance matching, component test, cable fault location, measuring coaxial cable losses, and cutting coaxial cables to precise electrical lengths. The SARK-110 has full vector measurement capability and accurately resolves the resistive, capacitive and inductive components of a load. The measurement reference plane is automatic adjusted via the Open/Short/Load calibration standard to enable the accurate impedance measurements at the end of an intermediate coaxial cable. **ONLY £359.95**

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MFJ-974	as above but without 160m
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MFJ-901B	Manual Mini ATU 1.8-30MHz, 200W
MFJ-971	Manual ATU metered, 1.8-30MHz, 200W
MFJ-904H	Manual ATU, metered, inc balanced, 1.8-30MHz 150W
MFJ-969	Manual Roller ATU Metered 1.8-54MHz, 300W
MFJ-993B	Auto ATU Metered 1.8-30MHz, 300W
MFJ-1786X	Magnetic Loop 10-30MHz, 150W re-built & re-aligned by ML&S
MFJ-1788X	Magnetic Loop 7-22MHz, 150W re-built & re-aligned by ML&S
MFJ-259C	Antenna Analyser 530kHz-230MHz
MFJ-266	V/U Portable Antenna Analyser 1.5-185MHz + 300-490MHz
MFJ-269C	530KHz-230MHz, 415-470MHz Analyser
MFJ-260C	Dummy Load 300W SO-239

See Web for prices

DX Accessories are available at ML&S

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VSWR & RF Power Meters.

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Lab & Field Grade Impedance Analyser.

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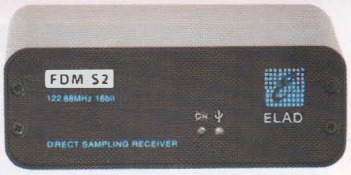
ELAD FDM-S2

Direct sampling receiver based on 122.88MHz 16bit single channel ADC converter covering HF 6m and offering the possibility to exploiting the under-sampling mode. **£449.95**



ELAD FDM-DUO

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Up until now the RF enthusiast have had to limit themselves to cheap "RF Power Detector/ Frequency counter" devices. But these are limited to display data for a single point of maximum power, and traditionally power metrics are too unreliable, in the order of 20dB or even 30dB inaccuracy. In contrast, a spectrum analyser like RF Explorer will display full frequency spectrum in the band, including carrier and modulated shape. it will display Spread Spectrum activity, if that exists, and will show bandwidth to monitor collisions, frequency deviation from expected tone, etc.

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PERSEUS is a VLF-LF-HF receiver based on an outstanding direct sampling digital architecture.

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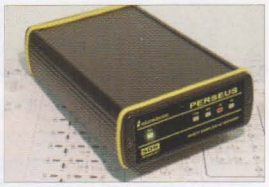

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EXPERT ELECTRONICS

- 10KHz-65MHz RX
- 95-148MHz RX
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- Separate independent RX path based on Direct Down Conversion principle (DDC)
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"For a New Direction in Ham Radio"

This 100W DDS SDR base station transceiver is powered by an internal core i5 3GHz processor running W10. It has so many advanced and leading edge features its technical specification sheet would fill 3 pages of this magazine.

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see HamRadio.co.uk/MB1

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Available HF/6m SDR with iQ Streaming & built-in Internet Server.

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WIDEBAND COMMUNICATIONS RECEIVER

Covers 100kHz to 1300MHz in traditional analogue modes (SSB, CW, AM, FM, S-FM, W-FM) as well as various digital modes. In fact, we know of no other radio in this category that can decode Icom's D-STAR mode, Yaesu's new C4FM mode, Alinco's digital mode, NXDN (note: 6.25kHz only), P25 Phase 1, etc. Interesting features include: 2,000 Memories (in 40 banks of 50), Memory Scan, AM Synchronous Detection, Noise Reduction, Notch, Digital Data Display, Clock, Calendar, Alarm, Timer. The SD/SDHC jack supports logging functions. Plus much more!

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See web for full specification.

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MYDEL CO-201N 2-WAY COAX SWITCH. N-TYPE SOCKETS. 500W MAX	SPECIAL OFFER £21.95
MYDEL CO-201AM 2-WAY DELUXE HEAVY DUTY COAX SWITCH SO-239 1KW	SPECIAL OFFER £32.95
MYDEL CO-201AN 2-WAY DELUXE HEAVY DUTY COAX SWITCH N-TYPE 1KW	SPECIAL OFFER £33.95
MYDEL CO-301M 2-WAY DELUXE HEAVY DUTY COAX SWITCH 1KW	SPECIAL OFFER £39.95
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- Tuner PLL Steps from memory
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Amplified DSP Noise Cancelling Speaker

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- 5W input & 2.7W audio
- Headphone socket
- 8 filter levels
- Rotary filter select knob

DSPKR - 10W DSP Speaker

Easy to use - Sleep mode

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Dual Channel DSP noise eliminating module

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- Ideal for DXing, special event stations and field day events
- New improved noise cancelling!

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- Size: 121 x70x33mm

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We are **NOT** attending the **KEMPTON RALLY** on Sunday the 6th of November

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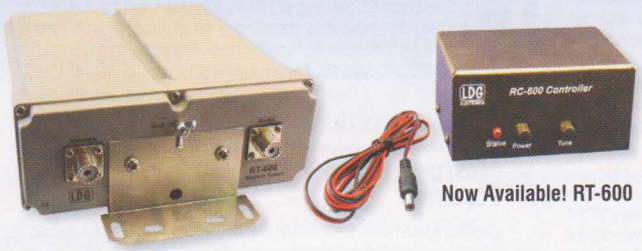
LDG



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.**

RT-100	100W Weather proof remote Auto ATU
RC-100	Remote control for RC-100, + DC power over coax
AT-1000pro11	1kw Flagship Auto ATU. Separate external head-up large format meter
M-1000	Large Analogue meter for the new AT-1000Pro11
M-600	Optional 4.5" meter for the AT-600Pro11
YT-1200	(formally AT-450) for ALL Yaesu HF Transceivers
YT-847	Want a really good Auto ATU for your FT-847? Here it is!
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AT-200pro11	Designed for new generation of rigs
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IT-100	New version of the AT-7000
YT-100	AUTO ATU for FT-897/857 or FT-100 with additional Cat Port Control
Z-817	Ultimate autotuner for QRP radios, including the Yaesu FT-817D
Z-100Plus	Ultimate autotuner for Yaesu FT-817D
Z-11ProII	Portable compact & tunes 100mW to 125W
RCA-14	4-way DC Breakout Box
KT-100	Dedicated tuner for Kenwood radios
RBA-1:1	Probably the best 1:1 balun out there
RBA 4:1	Probably the best 4:1 balun out there
FT-Meter	Neat Analogue back-lit Meter for FT-897/857. S-meter, TX Pwr, ALC Etc
FTL- Meter	Jumbo version of the famous FT-Meter

See Web for prices

Palstar

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AT-2K	2000W PEP Antenna Tuner
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AT-4K	2.5kW PEP Antenna Tuner
AT-5K	3.5kW PEP Antenna Tuner
BT-1500A	Balanced Antenna Tuner
PM-2000AM	Power/SWR Meter
New! SP-30H Communications Speaker	

See Web for prices

PALSTAR DUMMY LOADS
DL-1500 (1.5KW
DL-2K (2kW)
DL-5K (5kW)
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The Famous EAntenna Range from Spain

LFA Antennas built to a high specification re-engineered using quality materials

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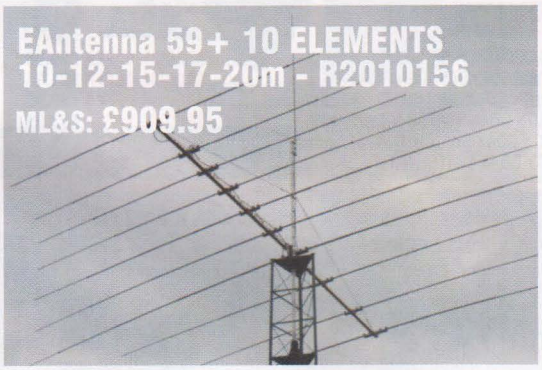
The new EAntenna 59+ is a 5 band, 10 element beam antenna with superb performance for a boom length of only 5.75 metres. Computer optimized design to attain the best performance from an antenna of this size. Start chasing DX now!



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R2010139	432LFA15 15 ele bea	£113.95
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R2010253	ea642zb7 2+2+3 ele 6m/4m/2m beam	£94.95
V/U Verticals		
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R2010048	ea1015204080dxs 5 band HF dipole	£101.95
R2010904	5 band cobweb 500w antenna	£279.95
R2010904.3	5 band cobweb 3kw antenna	£349.95
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In Two Sizes. Baby Loop & Midi Loop.

An Italian manufacturer **Ciro Mazzoni** has perfected the design and is able to offer two versions covering the entire 80m-10m range built to ultra-professional standards.

Now with totally new controller!

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6.6MHz-29.8MHz with Mk2 Controller **£1249.95**
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305MHz-14.5MHz with Mk2 Controller **£1349.95**
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RS232 Control your new Ciro Baby or Midi Loop via either a Yaesu or Icom transceiver. As you change bands the loops follows automatically, no need to enter the frequency used via the keypad. **£69.95**

ML&S are the sole distributors of Ciro Mazzoni Loops for UK & Ireland.

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- SO-239 Connectors

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NEW! MyDEL SWR-006

- Dual input
- 5W/20W/200W Range
- 1.8-160MHz & 140-525MHz
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- SO-239 Connectors

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From our used section comes this masterpiece of RF engineering from Japan's leading RF equipment manufacturer. Supplied by us new, this one owner HF receiver covering 90kHz to 29.9990MHz is offered in TOTALLY BRAND NEW condition, with its original packaging. The receiver has the optional metal enclosure that added a staggering £1000 to the original purchase price.

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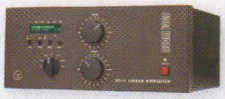
Acom 2000A. Fully automatic 2kW 160-10m HF Amplifier with built-in Auto-ATU. **£4699.00**



Acom 1500. 160-6m 1.5kW Amplifier using 4CX1000A/8168. Easy to use bar graph tuning display. **£2899.95**

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NEW OM2000A+

2kW Fully Automatic HF+6m Amplifier. Compact and powerful without the worry of solid state PA's. **£4499.95**

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Solid state amplifier for 144MHz VHF band

The OM Power model OM1002+ is a single band, solid state amplifier, designed for duty operation on 2 meter's amateur band with all modes and no time limit. It is equipped with a new Freescale high rugged N-channel double MOSFET. This amplifier is characterized by compact design, small size and a low weight. **£2129.95**

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The linear amplifier OM2000+ is designed for all short wave amateur bands from 1.8 to 29MHz (including WARC – bands) + 50 MHz and all modes. It is equipped with a ceramic tetrode FU-728F. **£2929.95**

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The OM Power model OM4000A is an automatic power amplifier, designed for use on all short wave amateur bands from 1.8 to 29.7MHz (including WARC bands) and all modes. It is equipped with a two pieces of ceramic tetrode FU728F. **£6299.95**

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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.

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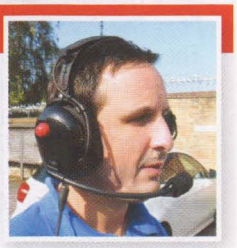
PTT-FS-RCA Foot switch with 7ft cable with phono plug	**£44.95**
PPT-HS-RCA Hand PTT Switch, 7 foot cable with phono plug	**£44.95**



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?

HF

September conditions were better than August but not by as much as people had hoped.

MOINN, MOBLF and MOZXA operating from the Scout HQ on the Westman Islands, Iceland.

The month began badly with several days of magnetic storms over the SSB Field Day weekend that effectively closed the bands above 18MHz to DX from the UK. The following weekend with the Worked All Europe SSB Contest was better and there were times when the Far East was workable on 21MHz.

Later in the month there were a number of 24MHz openings around 1700UTC to VP6AH on Pitcairn; at least for those with beams or good locations. The Pitcairn area of the Pacific (which sometimes includes Tahiti and Easter Island) is a propagation 'sweet spot' from the UK as the westerly short path does not get too close to the auroral zones. Conditions reverted to terrible at the end of the month when the coronal hole responsible for the SSB Field Day wipe-out came round again.

The CDXC HF Challenge for 21-50MHz was due to finish after the deadline for this column but with a few days to go Martin, M0BCT, was in the lead with 170 DXCC entities, pursued by G5LP, 5B4AIF and G3LDI. The details on Club Log of what they worked are quite interesting. M0BCT managed to find many Pacific entities including Ogasawara, New Caledonia, Guam, Brunei, Hong Kong, Australia and Pitcairn but was missing New Zealand, which G3LDI found. None of the UK participants found Hawaii and no-one at all worked Alaska.

Spanish stations using callsigns in the form AN400x were very prominently commemorating the 400th anniversary of the death of Cervantes, the author of *Don Quixote*. Various awards were available for contacting the stations on multiple bands and the pile-ups were huge at times.

DX

Jose, EA1ACP, Carlos, EA1DVY, Gen, EA5HPX, Francisco, EA7FTR, David, EB7DX and Oleg, US7UX will be active as 3W2R from Vietnam on 20-28 October on all modes, 160-6m. And Mike, N0ODK, will be active again as 3W2DK from 15 October to 5 November, including the CQWW SSB Contest. Apparently Mike is a QSL collector so would like to receive your card even if you do not need one back.

Take, JG8NQJ/JD1 had to leave Minami Torishima (OC-073) on 31 August; earlier than expected. The current operator is Kakutani, who uses the Japan Meteorological Agency club callsign JD1YAA and expects to remain on the island until mid-November. So far he has been QRV on 17 and 12 metres SSB. QSL via the bureau.

Nobu, JA0JHQ will be active as CE0Y/JA0JHQ from Easter Island (SA-001) until 17 October and will operate mainly CW.

Aaron, VA1AXC is back as CY0/VA1AXC from Sable Island (NA-063) until early November. In his (limited) spare time he operates SSB only, mainly on 20 metres.

Patrick, FO5QS has been active from Huahine (OC-067) in French Polynesia for seventeen years but he is now moving to the Marquesas Islands (OC-027), and will remain there for several years.

A group of German ops will be active from Anguilla (NA-022) from 25 October to 7 November. They will operate CW, SSB, RTTY and PSK31 on 160-10m with two stations. Further information is at www.dl7df.com.

Christian, IS0BWM will be active as 9Q0HQ/3 while working in the Democratic Republic of the Congo from 21 November to 24 December.

Jacek, SP5APW will be active holiday style as H84JK from Isla Colon in the Bocas del Toro archipelago (NA-088) on 13-18 October. He will operate SSB and some digital modes on 20-10m. Updates will be posted to http://na-088.blogspot.com.

A German team will be active as S9YY from Sao Tome (AF-023) on 8-23 October. They plan to operate CW, SSB and digital modes on the HF bands and 2m EME.

Keith, GM4YXI and Chris, GM3WOJ will again be active as V6Z from Chuuk (OC-011), Micronesia from 17 October to 1 November. They will operate CW, SSB and RTTY on 160-10 metres with two stations; activity will include participation in the UK/EI DX SSB Contest (22-23 October, www.ukeicc.com) and the CQ WW DX SSB Contest as a Multi-2 entry. Check www.v6z2016.com for info.

The YX0V DXpedition to Aves Island has been put on hold by the Venezuelan Navy for reasons beyond the operating team's control. They were hoping to meet the Navy personnel in charge of transportation to the island to get a new schedule for departure.

The T31T team should have arrived on Kanton Island by now so good luck to those who need this tricky over-the-pole entity.

IOTA

The new IOTA Management Team is still some way short of its £25,000 target for new software development so if you enjoy chasing IOTAs please consider becoming a Friend of IOTA. Information about this scheme, and a PayPal 'Donate' button, can now be found on the homepage at rsgbiota.org.

Bruce, KD6WW and Mike, K9AJ had a successful trip to the King George Islands (NA-159) in August making 4,400 QSOs. They also stayed overnight at Sanikiluaq in the Belcher Islands (NA-196) from where they made 780 QSOs.

Members of the Nara DX Association (JK3ZXK) are planning to be active as V6J from rare IOTA groups in Micronesia during the autumn. They expect their first activity to take place from Mwokil (OC-226), and they are waiting for the ship schedule so that they can finalize their itinerary. Updates are expected to be posted on the V6J page on QRZ.com.

Col, MM0NDX and George, EA2TA (MM0IBO) will be active from Great Cumbrae Island EU-123 as MS0INT from 18-20 November on 40-10m, SSB/digimodes.

JA1NLX and JI1CNA plan to be active from the Mamanuca island group in Fiji (OC-121) from 21-25 October on 80-10m.

The Myanmar IOTA DXpedition by Derek, G3KHZ, Hans, SM6CVX, Nils, SM6CAS, Ulrika, SM7WYN, Eddy, K5WQG and Steve, G4EDG was postponed because of national elections but the team now hopes to be active

in February 2017 if the various permits come through. There are 6 IOTA groups around the coast of Myanmar. Three appear to be unactivated and two are in very high demand so the team should get some big pileups

Members of the Amateur Radio Association of Senegal will be active as 6V1A from Goree Island (AF-045) from 16-18 December.

Correspondence

Richard, GI4DOH enjoyed the CQWW RTTY contest and substantially increased his data score for the year.

Ken, CT7AGZ managed to find some propagation on 10 and 12m, probably helped by his southern EU location. He also sent in a DXCC comparison of 2015 with 2016 so far, see **Table 1**.

The table illustrates quite well the fall off in HF conditions this year. Back on the bands Ken found: 10m – CX7CO, V5/DK1CE; 12m – PJ4/PA3BWK, V5/DK1CE, HP1BF, D66D; 15m – OA7DL7RMC, PJ4/PA3BWK, V5/DK1CE, D66D; 17m – HT7AAA, LU7YS, JAs, S01WS, A92GE, T6EU, SU9VB, ZD7BG, ZA/ZA1P, V26K, V5/DK1CE, 5A1AL, V44KAI, 5T0JL, D66D; 20m – VU2PHD,V44KAI, V26K, CP4BT, TO5FP, HP3/VY2SS, V5/DK1CE, TZ4AM, D66D; 30m – TZ4AM, UK/R1ZY, NP4R, OX3XR, TF/M0WUT, NP2X, TO5FP, 5A1AL; 40m – V5/DK1CW.

Peter, G4XEX has fixed his linear but the antenna is still only 2m above ground. His tower planning application has been submitted so he is hopeful of better signals soon. Meanwhile he managed to work: on 15m – RI1AND, 9J2BO, YB71RI/4, TO5FP, ZP6CW, VP8LP, JE1LFX, E21YDP, FM/DD5ZZ; 17m – SU9VB, 3B8CF, VP8LP, YB71RI/1; 20m – HS3XVP, VU2PHD, SU9VB, JT1DBS/3, VR2XAN, YB71RI/5, JT5LZ, JH1EAQ, KP2M, FM5AN, PJ4DX, V85TL, 3DA0NJ, ZS6WR.

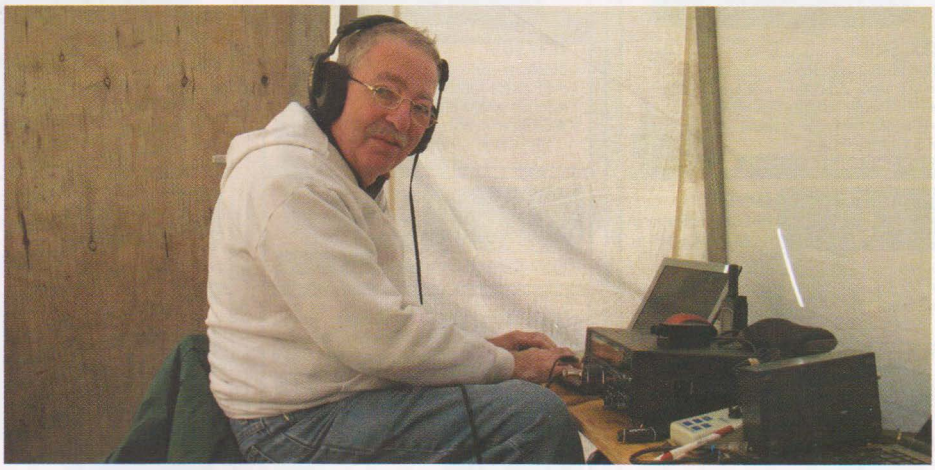
Fred, G3SVK focussed on the middle HF bands: 17m – 7Y9LI, YB71RI/1, E21EJC, HS3XVP, HS0ZLM, 5A1AL, V5/DK1CE, 4S7VG; 20m – 9M2ROL, CO8CY, KP4/KB7Q, VK2GR, V25Z, V85TL, BG4GOV, YB7RI/1, JW/LB5WB, V44KAI, V5/DK1CE; 30m – 9M2CNC, ZP6CW, TF3JB, 4K9X, TF/G3ZAY, A93JA, A65BG, TO5TP, VK7BO, V5/DK1CE, A61Q, VK7CW; 40m – VU2GSM, DU7ET, YB71RI/1, YB71RI/6, VK8HW, CY9C, LU1YT, HK1MW, RI1AND, OY/ON6NB, V44KAI, OH2X, V44KAO, ZL2AGY, VE7SV, TI2OW, V5/DK1CE, D66D, ZP6CW, OX3XR.

Gordon, G3PXT was busy chasing the Cervantes stations and building up his JT65 score. He reports in with: 15m – 3B8CW, 9J2HN, 9M2ROL, CEs, CP6CL, CXs, E21SNN, KG6DX, KP2M, LUs, OD5PY, P49X, PYs, RI1AND, XW4XR, YD2YIZ, YY5OAO, ZP5YN, and ZSs; 17m – A45XO, FR4PG, JA9FAI, OJ0JR, PJ4/PA3BNK, UN3M, WP3C; 20m – 3DA0AY, 9M59MD, A71AE, EA9BO, JAs, JT5LZ, NP3RE, TO5FP, UN1O, VU3PRW, YC4KRZ, ZS6UB, NL7S, and Ws; 40m – A47RS, OY/ON6NB.

Peter, G3HQT found: 12m – 5T0JL; 15m – D66D; 17m – 5A1AL; 20m – V85TL, DU7ET, 9J2HN, TO5FP; 30m – E51Q.

Chris, G8APB wrote in to say he had received his very nice Gold Indonesian Independence Certificate (one of the first issued) for working all the YB71RI stations during the first 18 days of August. As a BARTG committee member he was mainly active on RTTY and found (on a range of modes): 15m – TO5FP, E2X; 17m – P29LL, HT7AAA, PZ5RA, A5A, TZ4AM; 20m – TO5FP, TR8CA, SU9VB, V53DX, A5A, VR2XAN, E51Q, E51AND, 7Y9LI; 30m – VP6J.

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



Mike McGirr, K9AJ operating on King George Island, NA-159.

TABLE 1: Comparison of 2015 and 2016 DXCCs by CT7AGZ.

DXCCs on	10m	12m	15m	17m	20m	30m	40m	80m
2015	90	89	129	124	117	100	84	48
2016	16	32	94	125	129	94	79	35.

TABLE 2:2016 Worked DXCC entities (ranked by All). Showing top 3 from RSGB Members table in Club Log plus submitted scores or Club Log scores of recent correspondents where available.

Call	CW	SSB	Data	All
G4PTJ	203	134		263
M0NKR	158	230	69	261
G5LP	248	76	193	256
G1XOW		234		234
G4IDL	198		70	202
GI4DOH	197	32	74	201
G3SVK	200			200
G0RPM	127	54	129	194
CT7AGZ	184	1	2	184
G3HQT	181		70	182
G4XEX	93	108	97	157
G3PXT	65	97	137	148
G4CCZ	104	58	43	129
G3YMC (QRP)	100			100

TABLE 3: Forthcoming activity.

Until 23 Oct	S9YY
Until 24 Oct	T30COW by KC0W
Until 2 Nov	F0/DF1YP
Until 5 Nov	7P8VA
Until 25 Nov	VP6AH (OC-044)
Early Oct - Nov	T31T
Until 29 Oct	7P8AO
Until 5 Nov	3W2DK
17 Oct – 1 Nov	V6Z
18-21 Oct	H44GC
19-26 Oct	9G5AM
20-28 Oct	3W2R
21-25 Oct	3D2YA
25 Oct – 7 Nov	VP2E by DL ops
25 Oct – 26 Nov	H44COW by KC0W
27 Oct – 10 Nov	ZL7 by 6Gs
29 Oct – 4 Nov	FM by US ops
4-14 Nov	XU7MDC
6-16 Nov	V63AJ
7-19 Nov	6V1IS
10-22 Nov	TL8AO
17-20 Nov	KH2/DF8AN
18-20 Nov	MS0INT (EU-123)
mid Nov	AF-020 by Is
19-28 Nov	5H1WW
20 Nov – 3 Dec	8Q7SP
21 Nov – 24 Dec	9Q0HQ/3

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GP95 .....145/433MHz+23cms lgth 2.42m....£119.95

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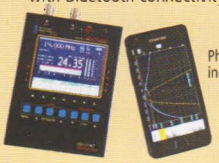
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PL259 connector (part: 7390).....£2.65
N type connector (part: 7392) £5.25
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VHF/UHF

The 'convoy' involved in the EI9E/P expedition to IO44WD in August 2016. They made over 900 QSOs.

Warm weather and high pressure bring tropospheric propagation to the Canary Islands on 2m.

As previously anticipated, the first week of September saw some quite excellent tropo propagation down to EA8 (Canary Islands) on 2m. An extended high pressure system developed from EA8 across coastal Spain, the Bay of Biscay up to the UK and as has been the case on many occasions favoured the west coast of England, Scotland, Northern Ireland and Isle of Man.

Sadly it didn't really produce super DX for the IARU/RSGB 2m Trophy Contest on the weekend of 2-3 September. Good DX was worked from the UK on the 'first hop' to Spain, with EA1MX being in good demand. With this being an all EU contest as well, activity across the continent was very high with 24 hour continuous operation by many well sited high power / multi antenna system stations.

The exceptional tropo to the south west started to build a few days after the weekend contest with a peak on Tuesday, 6 September. Ian, GM3SEK posted on the VHF/UHF Yahoo group that he was working EA8TX on Tenerife from his QTH in IO74. The distance between their respective locators – IO74SR and IL18QI – is 3092km (1921 miles) at a bearing of 203°. That is really excellent DX. Under these conditions there is clear classic tropo path down the Irish Sea that has produced many similar openings in the past right up to 23cm.

Stations on the air during the 2m UK Activity Contest took advantage of the conditions. The ducting appeared to change slightly in favour of more centrally located stations in the UK, with EA8TX being worked at circa 3000km. The tropo extended in the opposite direction too with Denmark (OZ) being worked by stations located on the east coast of the UK, albeit with more modest distances of 700-900km.

A brief aurora during the 2m Trophy Contest enabled some stations to work Clive, GM4VVX, who is probably many people's first sign of aurora. It was a fleeting opening but something different and not normally worked in a contest. Good conditions continued into the following week on 70cm and during the UKAC SK7MW (JO65) was great demand from the east coast of UK.

For EME enthusiasts, the autumn section of the Italian ARI EME contest took place over the weekend of 24/25 September on the bands 2m up to 3cm. All modes are possible, encouraging CW/SSB transmission and also digital JT65B operation.

Activity and marathons

Low in the VHF spectrum, the UK Six Metre Group summer marathon results have been published. The marathon ran from 7 May starting at 0000UTC until 7 August at 2359UTC. The objective was to work as many 4 digit grid squares as possible between these dates and the results are quite remarkable. The winner, by a considerable margin, was Tom, EI4DQ with a score of 462 individual squares with a best DX of 9779km. The top five also included IS0BSR (423 points), KP4EIT 383 points, IZ5ILA 382 points (very close) and, in 5th place, IZ5EME with 368 points. This is a truly global affair with logs entered from Europe, North America Japan and The Caribbean.

From the UK, Mike, GM3PPE was the highest classified station closely followed by GM3WUX, M0WLF, M5BXB and

G3PXT in the top 20. The full results can be viewed on the UKSMG website [1]. The Winter Marathon begins on 1 December at 0000UTC until 31 January 2017 at 2359UTC and has the same scoring system. The lack of Sporadic-E propagation, except some very isolated winter Es, will give an excellent opportunity to take advantage of digital modes to work meteor scatter [2].

The 2m and 70cm bands

Last year and running into 2016, Lyn, GW8JLY devised a series of activity sessions to try and promote SSB activity on 2m and, in turn, the 70cm activity periods were also well supported. During the summer months activity on both bands has been lower probably due to holidays etc. As autumn and winter approach there is a great opportunity to re-establish these activity sessions and try and develop QSOs across the UK and Ireland. To hear both bands full from end to end on a Tuesday UK Activity Night is astounding, so the plan is try and spread this activity out to other days of the week. Each period gives the possibility to QSY to higher or lower bands.

The original schedules are proposed to be reintroduced with the 2m activity sessions taking place on Monday and Friday evenings between 8pm and 10pm (local time) and Wednesday mornings 10am to 12 noon (again local time).

On 70cm, the original schedule of Wednesday evening 7 to 9pm and Sunday 9am to 12 noon seemed to be reasonably successful, with Wednesday being much more popular. The reason for Sunday morning slot was to try and coordinate the times with the last few hours of the excellent REF French Radio Society contests that are always well supported with strong signals even from mid France reaching well into the middle of the UK [3]. Please join us if you can and try to get more SSB activity on the bands. A big thanks to Lyn, GW8JLY who has been promoting the sessions on various media/forums.

Band reports on 6m

Gordon, G3PXT (JO02) was very pleased with the results of the UKSMG Summer Marathon. He finished with 247 points (grids), which gave him an excellent 13th place in Europe and 16th in the world. Continuing from the event, Gordon has now worked 250 Locators this year and 53 DXCC entities. Best DX so far is A45XR located in Oman and the sought after OJ0DX expedition on Market Reef. Gordon also completed a number of QSOs via meteor scatter using JT6M, logging 10 new DXCCs with the best DX as UX3UA in KO50. Gordon is hoping for better things next year with some serious station developments including an Expert 1.3K power amplifier and running the new version of WSJT-X V1.7.0.

Late August proved good for Mike, GM3PPE (IO85) as he continued with his 6m operations. There was an auroral opening to coincide with the 6m UK Activity Contest on 23 August and he worked, among others, LA8AJA (JP50), EI3KD (IO51) on CW and G8BCG (IO70) on SSB. Since then there have been short Es openings to Italy and France on the 27/28th and a short but strong opening to Scandinavia and the Baltic States that included YL3IQ (KO17) and YL3CW (KO36) on 29 August. As August turned into September, apart from the odd fleeting appearance of the occasional beacon, the band has been devoid of any stations. Mike was placed 7th overall in Europe (10th world) in the UKSMG Summer marathon and the highest placed UK station, closely followed by Terry, GM3WUX.

Beware the cable tie

This year has been very much an antenna reconfiguration project at my QTH. With the abandonment of 6 and 4m due the awful local electro smog/hash that has infested both bands by a whole plethora of 'CE' marked electronic gadgets, my attention has changed to 2m, 70cm and, eventually, 23cm. Having dismantled the system for a complete change, the degradation of some of the coaxial cables was quite a surprise. It is clear that the newer 'flex' type cables that has good performance at higher frequencies need more thought during installation to keep the performance and structural integrity intact.

In the late 70s UR67 and then RG213 was the only reasonable cable available to a 'student'. Along came the Pope H100 that had a solid centre conductor and foil/braid sheath and importantly a harder outer covering than the UR67. The problem with this good cable was it was difficult to bend. Looking fine in a straight run, once it had to bend around, say, a rotator cage, there were problems with keeping the cable outside its lowest bending radius. Coupled to this was the use of cable or zip ties to secure the cable to structures or to other cables. The hard outer covering made it easy with very little damage.

The last 10 years or so has seen a growth in the 'flex' type cables giving excellent increase in performance but, to deliver the flex idea, the inner conductors have returned to a stranded format and the outer jackets are considerably softer. Using cable ties on these cables should be approached with caution and you will need to provide some kind of protection. The force on the cable from an over tightened cable tie can be immense – in fact crushing the outer jacket and the braid in the process. There are two problems here: potential of the jacket being punctured and possible water ingress into your expensive cable plus possible impedance bumps on the cable as it is crushed under the force.

It was clear on investigation that this combination of and the need to bend it around the rotator cage, was a recipe for disaster and the cable had suffered significant water ingress. A ready solution was closer to hand than I first thought. If anyone offers you a length of garden hose pipe, accept it with open arms. Most standard garden hoses are perfect to cut open and wrap around 10.3 / 15mm cables. With this protection, the cable ties can then be deployed. Short lengths enable one or two ties to be used or longer lengths can support and protect constantly bending cable.

Over the years I have considered these ties to be a relatively cheap and easy solution, however they need to be treated with caution. Cutting off the surplus tails also can be a danger. Even close cutting with good quality snips can leave a very sharp protrusion so very careful trimming is need to make it fully flush. As always take every safety precaution when dealing with sharps and cutters.

Last month's expedition focus

Unfortunately, there was a production error in last month's column. The picture shown was in fact of the SF3NR expedition to JP92 showing the wonderful 6 x 15 element Cue Dee array. This month shows the 'convoy' involved in the EI9E/P expedition to IO44. It amazes me how the logistics and planning come together and indeed the amount of kit involved to put on a top class expedition such as this. Congratulations to all involved as the results showed attention to detail is a must.

Sign off

As autumn and winter draw in, it would great to create an emphasis on activity on all VHF/UHF bands. It is clear to see how most activity comes from Contests and Activity Periods – understandable in the fast paced modern age where time is at a premium. If you can be on the air whenever possible, it's surprising what a CQ call can develop into. Please send your reports to g4hgi@live.com

Websearch

[1] http://uksmg.org
[2] http://physics.princeton.edu/pulsar/k1jt/
[3] http://concours.r-e-f.org/calendrier/calendrier.php

Richard Staples, G4HGI
g4hgi@live.com

GHz Bands

The European Common frequency allocation table allocates 3400-3410MHz to the Amateur Service on a Secondary basis under footnote EU17, and other ITU Regions also have Amateur and Amateur Satellite allocations in this section.

The UK 9cm band is one of the many GHz bands under Ofcom's spotlight. It was reduced in size to 3400–3410MHz in the recent Public Sector spectrum release [1] but with careful system design, we can ensure we don't get any interference from our new neighbours, who will be above our 3410MHz limit.

As well as narrowband SSB/CW and digimodes, 3.4GHz has growing ATV activity. GB3NV, a 9cm TV repeater for central Norwich [2] has a digital output on 3406MHz, with 437MHz input. Getting started on 3.4GHz TV receive is easy and cheap, using the Titanium C1W PLL LNB from Amazon or eBay [3]. I'd be very interested to hear from anyone who's used these LNBs for narrow band SSB/CW reception, as good results have been had on 10GHz with similar technology. There is growing EME activity on 3.4GHz and it is quite possible with a small dish (<2m) to make EME QSOs with around 50W on JT and also CW with the larger stations.

Here on the Fen Edge I spent some time in the summer reinstating my 3.4GHz terrestrial system. I've now combined three bands (3.4, 10 and 24GHz) on a single 60cm offset dish. I simply added extra lengths of FSJ4-50 for transmit and LMR100 for RX plus a G4DDK VLNA9 masthead preamp and relay. Inspired by multi-satellite-LNBs, I added an offset EIA dual dipole 3.4GHz feed [4] to my dish. I also took the opportunity to rebuild my Ionica-based transverter [5] in an excellent and inexpensive enclosure from eBay seller 'earthgazer' [6]. Like my 10GHz system, the transverter and PA are in the loft so I trade off the loss of 6m of cable for much less weight on the pole and easy access. On 3.4GHz I can copy all the currently operational English beacons [7] plus PI7RTD (JO21fv) with varying levels of reliability via tropo, rain scatter and aircraft scatter. A few years back, the late G4PBP did a series of comparative tests with G4DDK over a 240km path. 3.4GHz always gave better results than 2.3GHz despite very similar ERPs. I would also agree that 9cm is better from my previous experience on the band. My ODX was SM7ECM (JO65nq) at 924km.

Neil, G4DBN (IO93nr) emailed me to say that he should be on 9cm shortly, He has 16W plus a DDK VLNA9 at a 90cm offset dish and is completing a DB6NT Mk2 transverter kit that he's modified to use a synthesised LO, and take drive from separate Rx/Tx IF ports. Mike, G8CUL (IO91jo) is also QRV with a DB6NT transverter, a G4DDK VLNA9 preamp and a PA supplied by G0MJW (who is also QRV on 9cm). **Photo 1** shows Mike's PA and preamp, soon to go up the mast with his RFHam design dish [8]. Even with 18m of coax he can hear the Martlesham beacon most of the time. When the unit goes up the mast, it should give an improvement of 3dB on Tx and something similar to the Rx noise figure. There is, then, activity in the UK on 3.4GHz, notably in the UKACs but I'd like to see a lot more, so how about making 2017 'the year of 9cm'?

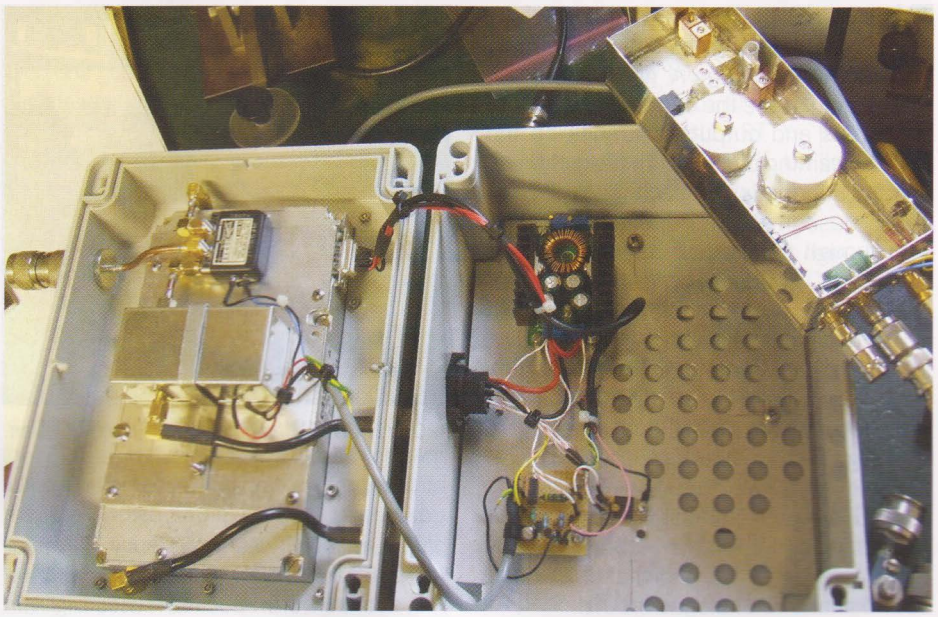

PHOTO 1: G8CUL's mast mounted 9cm transverter/PA. Photo: G8CUL.

Beacon news

GB3PKT, the 10 and 24GHz beacon near Clacton (JO01mt) has been beset with co-existence problems with the co-sited 10MHz WSPR beacon, but thanks to sterling work by beacon keeper Tony, G0MBA, most issues seem to have been resolved by increasing the height of the 10MHz dipole. Sam, G4DDK informs me that the 24GHz beacon at Martlesham GB3MHZ (JO02pb) should return to service early next year as part of the UKuG-supported overhaul of all the beacons. 24GHz will be RDDS locked and share an indoor unit with a new 47GHz beacon.

According to [9] there are a number of GHz beacons in the planning stage in Belgium. It's good news for GHz bands enthusiasts in south-east England and for tropo and rain scatter to the rest of the country. ON0EME (JO21jg) is already on the air and has been heard on 10368.875MHz by G3XDY (JO02ob) and F6DKW (JN18cs) for an ODX of 334km. Ronald, ON7FLY told me in one of our regular 23cm QSOs that he's also planning further 10 and 24GHz beacons in Belgium, so plenty of activity from the Low Countries.

Finally

Please keep reports and technical snippets coming in to me by email, and join the conversation on Twitter @g4bao and @ukghz using the hashtag #GHz_bands.

Websearch

[1] http://bit.ly/2cKkM2W
[2] http://gb3nb.org.uk/wp/gb3nv/
[3] C1W-PLL C-band LNB – http://amzn.to/2cjIG8c
[4] ARRL *UHF/Microwave Experimenters Manual* p9-34
[5] www.g4bao.com/page3.htm
[6] Low cost equipment boxes (eBay) http://ebay.eu/2coHqik
[7] http://bit.ly/2cXuYZn
[8] http://bit.ly/2cTJpMk
[9] http://bit.ly/2dabTiV

Dr John Worsnop, G4BAO
john@g4bao.com

ATV

TV repeaters

Our TV repeater details are almost constantly changing. A good source of information to see the current state of both the inputs and outputs is to look on the BATC streaming page [1]. The text channel and the information on each repeater page can be useful. Many repeaters have an activity nigh that can also be interesting.

GB3YT (Mirfield, West Yorkshire, IO93DP) is now fully operational with both analogue and digital receive on 1276MHz. Digital is 4MS/s auto FEC. This is a fairly new repeater and it would be good to see more activity now that both inputs are working. The repeater is operated by Kay, G8NZR.

GB3TZ, near Dunstable, has recently started streaming on the web [1]. This is a 13cm repeater with a digital output and both digital and analogue inputs.

You can find a list of new TV repeater applications on the ETCC site [2]. These include GB3AT (10GHz, Isle of Wight), GB3ET (23cm, Banbury), GB3EY (23cm, South Cave), GB3FT (23cm, Blackpool), GB3IF (6cm, Birkenhead), GB3IV (6cm, Cosham, change of location). We look forward to opening up these new areas of the country.

Activity

Vic, G3SDQ lives in a fairly low location in East London. He has recently been experimenting with reduced bandwidth digital ATV (RB-TV) on 4m using a DATV-Express module at 71MHz feeding an amplifier producing 7W into a homemade cubical quad antenna. The receiver uses a 4m to UHF up-converter feeding an existing SUP2400 module plus a NIM tuner together with *MiniTioune* software on a Windows PC. There's not much activity on 4m ATV. This may be because a special research permit is required from Ofcom in order to be able to use the extended band. Vic uses 333kS/s with an FEC of 7/8. He is very keen for more contacts, so if you are interested please email him via vic@nbtv.org

Dave, G8GKQ, and Noel, G8GTZ have been testing RBTV on the 10GHz band (333kS 7/8 H264). The original tests were over a 32km path and on 3 July 2016 over a 93km path. The tests were very successful, with received MERs in the range 6-12dB with fading over the almost-LOS path. G8GTZ/P was at Walbury Hill, near Newbury and G8GKQ/P was on Povington Hill, near Lulworth. G8GKQ/P used DigiThin into G3WDG transverter with Qualcomm PA giving 250mW out, *MiniTiouner* RX and 60cm dish. G8GTZ/P used DATV Express into a DB6NT transverter with 3W out, *MiniTiouner* RX and 60cm dish. Their next steps are to make some equipment improvements, and then try a longer path.

Petrie Owen, GW4WVO in West Cardiff, IO81IL, is transmitting DATV on 437MHz, mostly beaming ESE so towards Bristol and beyond. It's great to see some activity from Cardiff. Further reports are most welcome.

PHOTO 1: G8CKN reading GB2RS news in vision.

GB2RS news

Previously I mentioned that Roy, G8CKN, who has read the news every Sunday since 1995 in sound and more recently also in vision (**Photo 1**) is retiring from this role. His last transmission was at the end of September. Alison, G8ROG is taking over in speech via the GB3BN 70cm repeater, and in vision via the GB3HV ATV repeater as well as by internet streaming [1]. This will be slightly earlier on Sunday morning, at 9am. We wish Alison good luck in her new role.

Australian news stream

The weekly news from Australia is also available via BATC streaming [1]. Due to the time difference this starts at midnight on Saturdays. Click on Members Streams and select VK7AX. This is an interesting compilation by various readers and usually lasts for about 90 minutes. This is in addition to the Australian members' personal news streamed on Monday and Tuesday mornings at 10am UK time.

Distance records

With the use of the lower VHF bands long distances are now possible for DATV. Currently the longest distance for RB-TV on the 2m band is 182km. This record will probably be broken by the time you read this. A good source of information about DX on ATV is Facebook, look at the British Amateur Television Club group and also look at the BATC Forum [3].

DATV on the HF bands

FreeDV+Video is a system developed for showing DATV on the HF bands using frequency division multiple access (FDMA). This mode uses 66 sub-carriers, with 49 sub-carriers for video and 17 sub-carriers for digital voice (*FreeDV* '1600' mode) and may be used with a fully digitally synthesised HF transceiver. Full details and free software download are at [4]. Recordings of the results can be found on YouTube, search for FreeDV+ Video TX. Please let us know if you have any contacts.

Es'hail 2 satellite update

The launch of this geosynchronous satellite that includes an ATV transponder, as previously reported, is now estimated to be in the 3rd quarter of 2017. It will be positioned at 25.5° east. More info later.

Next ATV activity weekend

The next ATV activity weekend is from 1200UTC on Saturday 10 December to 1800UTC on the Sunday.

Websearch

[1] www.batc.tv
[2] www.ukrepeater.net/repeaterlist5.htm
[3] www.batc.org.uk/forum/
[4] www.qsl.net/wa6nut/FreeDVplusVideo

Dave Mann, G8ADM
g8adm@gb3bh.com

Sport Radio

This month we have a new HF contest, one that has undergone a change and notice of 'The End' for a third.

The final International Sprint of the year takes place for four hours on the 5th. It's the fourth leg of the International Sprints, which were reintroduced this year to pick up where the EU Sprints left off (two in the spring, two in the autumn). The International Sprints that took place back in the spring had a low turnout, so they are unlikely be continued next year. Next, the 80m Club Sprint on the 9th. It's the final SSB leg of the year. The second event in this season's Super League series – Club Calls Contest – is on the 12th and if there is one single contest in the calendar that is good to introduce someone to contesting, this is it. Lots of clubs put a club station on the air and invite their members to share in the operation of it. If you just intend coming on to air your club's callsign, please note that club prefixes (eg GS for Scotland) are welcome in this event. Club stations attract callers because they are worth more points, so call CQ for at least part of the time and expect a stream of replies. In the first part of the contest teach first-timers what to say and later, when activity is less frenetic, put them on the mic and help them to log their contacts. At the end, before everyone goes home, make sure you ask the newbies to have a go in their next contest from home – and then make sure they do! The Second 1.8MHz Contest on the 19th has been shortened this year to four hours and the very last 80m Club Sprint of the year is the CW leg on the 24th.

The first UKAC of November is 2m on the 1st. The Marconi CW Contest takes place on the first weekend of the month, 5th-6th. In it there are 6-hour and 24-hour sections for Open and Single-operator Fixed stations. This is the final VHF CW Championship event of the year. If you enter this contest your log will be automatically forwarded for you into the coordinated IARU contest, unless you request it not to be. The remainder of the month is the preserve of the UKACs, with 70cm on the 8th, 23cm on the 15th, 6m plus microwave on the 22nd and – because it's a 5-Tuesday month – 4m on the 29th.

The UKEICC 80m series continues, with an SSB leg on the 2nd. Now, a new contest. The IRTS (Irish) 80m Evening Counties contest takes place for one hour on the 8th. Irish stations (EI and GI) are the only ones that count for points. Stations outside of Ireland send a report and serial number, while Irish stations send report, serial number and a 3-letter county code (eg DUB for Dublin). The 32 Irish counties act as multipliers. This is the CW leg of the contest. The SSB leg will take place in February. The last of this year's WAE DX contests – RTTY – takes place for 48 hours on the 12-13th. Unlike the CW and SSB WAE contests (held in August and September), on RTTY everyone can work everyone. In WAE events QTCs (reports of a previously conducted contest QSOs) can add significantly to your total score, so before the event it's well worth reading the rules on the DARC website to understand how they work. There's a UKuG Low Band contest on the 13th. Please note that it ends sooner than the other events in the series, so that portables can pack away and get down from the hills in the daylight. The CQWW DX CW Contest that takes place for the entire 48 hours of the weekend 26-27th will undoubtedly keep the HF bands busy, although declining solar activity will probably mean patchy and short-lived propagation on 10m. We end the month with a CW leg of the UKEICC 80m series of contests on Wednesday 30th.

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RSGB HF Events

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange
Nov 5	International Autumn Sprint	1700-2100	SSB	3.5-14	Both calls + SN + name
Nov 9	80m Club Sprint	2000-2100	SSB	3.5	SN + name
Nov 12	Club Calls (160m AFS) §	2000-2300	SSB	1.8	RS + SN + Club info
Nov 19	2nd 1.8MHz *	1900-2300	CW	1.8	RST + SN + District code
Nov 24	80m Club Sprint	2000-2100	CW	3.5	SN + name

RSGB VHF Events

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange
Nov 1	144MHz UKAC	2000-2230	All	144	RS(T) + SN + Locator
Nov 5-6	Marconi CW Δ	1400-1400	CW	144	RST + SN + Locator
Nov 8	432MHz UKAC	2000-2230	All	432	RS(T) + SN + Locator
Nov 15	1.3GHz UKAC	2000-2230	All	1.3G	RS(T) + SN + Locator
Nov 22	50MHz UKAC	2000-2230	All	50	RS(T) + SN + Locator
Nov 22	SHF UKAC	2000-2230 ~	All	2.3-10G	RS(T) + SN + Locator
Nov 29	70MHz UKAC	2000-2230	All	70	RS(T) + SN + Locator

Best of the Rest Events

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange/info
Nov 2	UKEICC 80m	2000-2100	SSB	3.5	4-character Locator (Grid) square
Nov 8	IRTS Evening Counties	2000-2100	CW	3.5	RST + SN (EI/GI also send county)
Nov 12-13	WAE DX RTTY	0000-2359	RTTY	3.5-28	RST + SN
Nov 13	UKuG Low Band	1000-1400	All	1.3-3.4G	RS(T) + SN + Locator
Nov 26-27	CQWW DX CW	0000-2359	CW	1.8-28	RST + CQ Zone (UK=14)
Nov 30	UKEICC 80m	2000-2100	CW	3.5	4-character Locator (Grid) square

In the case of differences between this calendar and the Contest Committee web site, the website takes precedence.
* HF Championship event. Δ VHF CW Championship event. § Super League event. ~ Different bands at different times
For all the latest RSGB contest information and results, visit www.rsgbcc.org

A 200cm square helically-wound frame loop balanced aerial

A loop aerial is a closed circuit and may take any one of a variety of shapes, forms and sizes, for example vertical, angled or horizontal; one wavelength or larger; less than a wavelength; multi-turn; single turn, and so on.

Electrically, one can consider a *large* loop (greater than half a wavelength perimeter/circumference) to have different phases and signal amplitude all around the loop. Its operational characteristics will therefore be quite different to those of a *small* loop (suggested to be less than 0.1 wavelength), which will behave more like a large coil with its current distribution having the same phase and amplitude throughout the loop.

We know that the smaller the loop, the lower its efficiency [1] and this particular project loop is dimensionally in-between a technically-defined small loop and a half wave loop (which is normally considered to be the smallest size for a large loop). So, do we implement a new category, that of *medium* loops?

Rx or Tx

Receiving loops are quite different from transmitting loops, in that efficiency arising from engineering design and best construction practice are not a primary concern for operation: they are not to be ignored, but the requirements are much less stringent than if transmission is to take place. A balanced receiving loop such as this *does* need to be symmetrical and in balance for rejection of local disturbing E-field noise. According to [1], "The better the electrical balance, the deeper the loop null and the sharper the maxima" – and that becomes critical for direction finding processes. In any event, the loop will also require impedance matching to the receiver input. With these thoughts in place, an incoming signal will induce a pickup loop voltage to be magnified by the resonant Q (which is high in this case) and fed through the impedance matching (aerial couplers in this particular setting) to the receiver.

PHOTO 1: Finished antenna, with the author for scale.

As an example, I elected to construct a large square plastic frame from waste water pipe upon which I would wind approximately 26m (84ft) of previously-used 4mm

PHOTO 2: Silicone sealant coated aluminium wire joint (one of four).

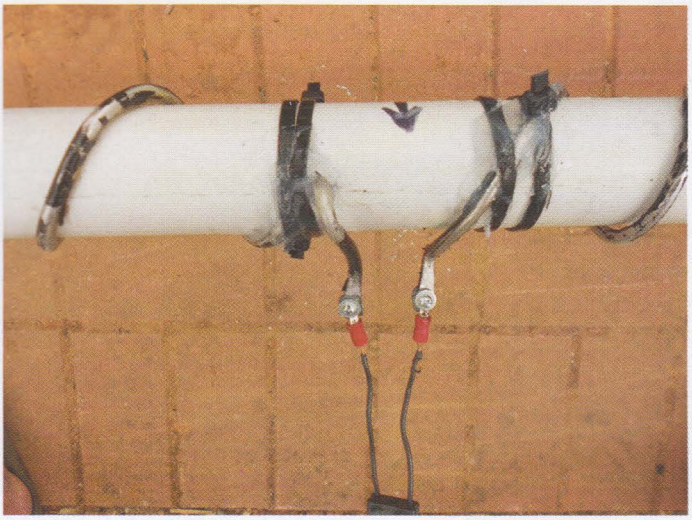

PHOTO 3: Helically-wound loop open-wire line feedpoint before silicone sealant was applied to the stainless steel hardware electrical connections.

aluminium wire. The design featured very wide-spaced turns, each one consuming approximately 18cm (7in) of the wire. The aerial type is a Frame Loop in a balanced feed configuration. It was envisaged and intended for use here as a potential signal-to-noise improver option for both/either 630m and 160m: certainly the latter. Hopefully, it would also be an effective 'extra set of ears' on 40m and, hope-of-hopes, could function as a transmit-receive aerial on 10m. The latter hope was based on the calculation that its conductor length plus that of the balanced feedline to the aerial coupler would be three wavelengths at 28,060kHz, a preferred CW frequency. I could not find very much literature at all directly related to wide-spaced, helically-wound MF receiving loop aerials, but even Wikipedia in its treatment of balanced loops indicates that with up to and including three to five wavelengths, directivity is enhanced. **Photo 1** shows my prototype, with me for scale.

A wide-spaced, helically-wound, single wire frame loop aerial has a figure of 8 receive pattern and thus may be rotated to receive from any bearing with only 90° of change being required, thus facilitating any advantage of directionality. There is online reported anecdotal evidence at least, that such aerials out-perform other low height aerials commonly found in suburban areas due to their enhanced directional properties and horizontally polarised noise rejection potentials. This notion is supported by Carr: "Loop antennas also tend to work better close to the ground than other forms of antenna. The radiation pattern and feedpoint impedance of a half wavelength horizontal dipole antenna vary considerably with height above the ground. Such antennas have to be several wavelengths above ground before such effects disappear." ([2] page 3).

There are other anticipated benefits to using wide-spaced, helically-wound loops, such as their ability to provide as much as 50dB null action to an arcing power line when broadside to it. These loops also have potential to provide low- and multi-angle radiation pattern advantages over both vertical and dipole aerials when at similar heights and locations.

Construction

I used 40mm PVC waste pipe and 90° elbows for the 2m x 2m frame and also purchased blister packs of 12mm x ⅛ inch (that's what the packet says!) stainless steel bolts, washers and nuts with plenty left over for the junkbox. On hand I had several 6m (20ft) lengths of 4mm aluminium wire previously used for a prototype 28MHz EDZ-loop and other large helical vertical aerial projects: 26m (~84ft) in all. Almost any other durable and workable wire would suffice for this project. Very little is critical, given that it is for reception only and mainly for 40-630m.

Each side of the square was wound separately and all eight wire ends flattened for about 20mm. Each end was then drilled in two places with a 3mm bit to accept a pair of 12mm x ⅛ inch stainless bolts at each wire junction. All flattened surfaces were cleaned shiny with a file, smeared with conductive graphite paste, overlapped and bolted securely together. Finally, each joint was liberally covered with silicone sealant to prevent moisture ingress, as seen in **Photo 2**. UV-stabilised cable ties were used to hold everything together and allow for 24 hours of silicone sealant curing time. Only stainless steel flat washers were used as all bolts were fully cinched and protected by the silicone sealant and cable ties, which contribute to a shock absorbing effect.

PHOTO 4: Frame Loop aerial raised & leaning against trellis during silicone sealant curing period.

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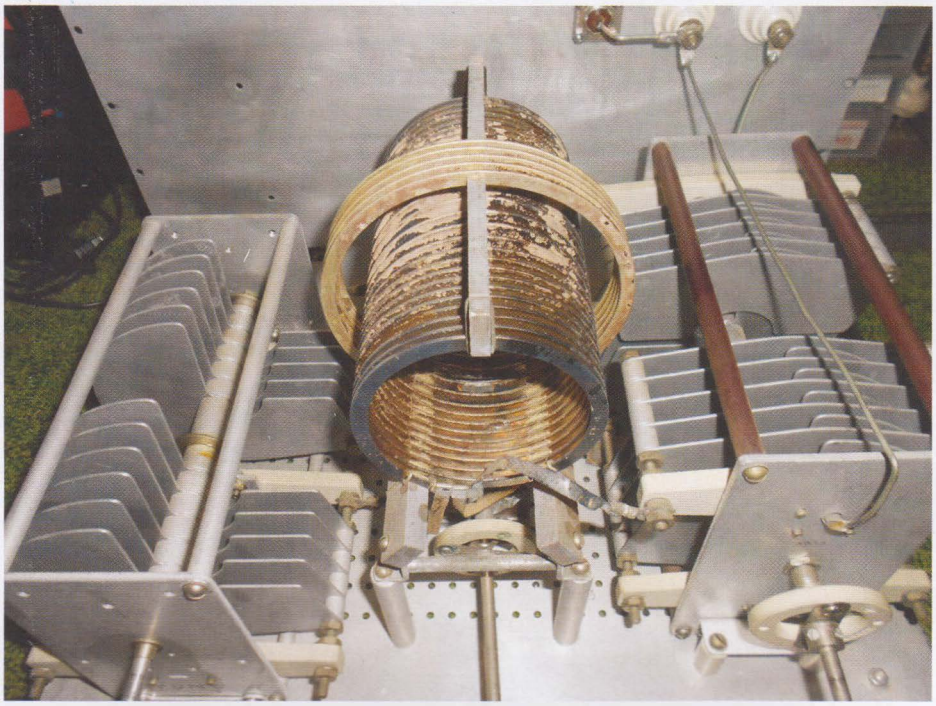

PHOTO 5: Johnson Kilowatt Matchbox HF aerial coupler.

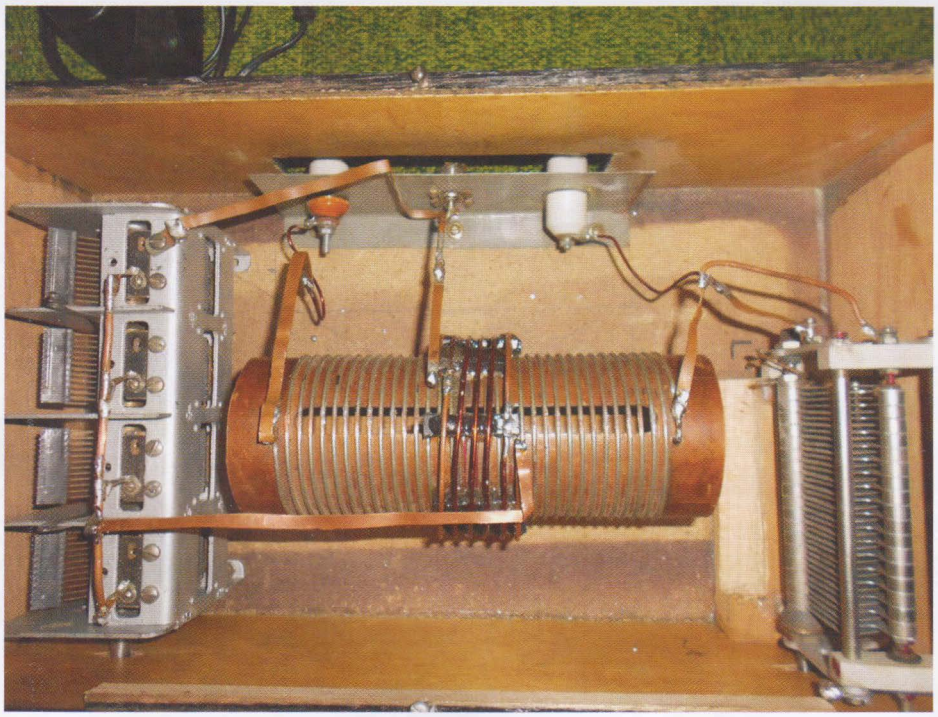

PHOTO 6: A homebrew 160m link coupler.

Lego-like, the helically wound sides were assembled to become a square frame, then secured with two stainless screws through each PVC elbow and the inserted side pieces. The PVC tubing junctions could also be glued but in this case there has been no need because the loop construction is supported by the windings on each side being pulled together at their joints, plus the stainless steel screws in each corner, and the entire array has withstood 120kph (75mph) winds to date. One by one I joined each side to the next by way of the elbows as previously described. The aluminium wire turns occupied the entire frame perimeter in the form of 146 turns, wide-spaced about 50mm (2in) apart. I marked the top side centre point and counted down the number of turns from it on both the left and right sides, to ensure that the feedpoint would be bottom centre for cutting: 73 turns in each direction from the marked centre point. The number of turns isn't critical – but 73 is a *nice* number!

After 24 hours curing time, I raised the frame loop onto a pair of fold-up camping stools for ease of working, then secured all windings with six cable ties per side. Each end of the cut feedpoint was flattened by resting it on a metal mallet head and striking with a hammer: a very easy four-blow process with aluminium. The flattened feedpoint ends were filed shiny, smeared with conductive graphite paste and connected to a pre-prepared length of 450Ω 'dog bone' open wire ladder line, as seen in **Photo 3**.

After covering the feedpoint joints and crimped/soldered ladder line connectors with silicone sealant, everything was left on the camping stools and remained undisturbed for another 48 hours curing time.

At that stage, even without properly mounting or even raising the completed helically-wound frame loop aerial, it was ready for reception. **Photo 4** shows the aerial leaning against a garden trellis during the 48-hour curing process.

Location, location, location

Receive-only aerials for low bands can work well for trials in very non-conforming situations, eg resting on wheelie bins, a 'snake aerial' on the ground, propped up on garden furniture, hanging by cord from a pergola, raised on plastic compost bins, pegged to a plastic covered wire clothesline, supported by a ladder, on wooden carpentry trestles, on an insulated car or caravan roof rack or, like this one, up on two stools against a garden trellis. I have used all these examples for testing and tuning cubical quad, vertical and frame aerials many times before.

Coupling

The loop's open-wire feedline was connected to a ceramic DPDT knife switch at the operating position, one side being interfaced with the balanced terminals of a homebrew 160m link coupler, and the other side connected to a Johnson HF Matchbox. Having both coupling units allows for a range of situation-dependent coupling/tuning options. The Johnson Kilowatt Matchbox HF aerial coupler, shown with cabinet cover removed **(Photo 5)** also has an Annecke-style series connected dual gang broadcast capacitor in line and sited on top of the coupler cabinet. This capacitor works as an impedance range extender and more information is obtainable from **[3]**.

The outboard dual gang series capacitor to add impedance matching ability for the coupler in Photo 5 was clip lead-connected to enable simple switching of the station MF equipment from my 630-160m MF Inverted-L **[4]** to this Frame Loop, and it is possible for 40m and

PHOTO 7: Completed loop on top of its timber mast.

other bands to also be connected with either of those aerials as well, enabling many different tuning options to be configured as required. Fixed capacitors of appropriate values were also available to alter the tuning range of the variable capacitors, as was another four-gang broadcast capacitor in case it was required for 630m applications to improve input impedance matching possibilities. As it transpired, none of these were required as everything tuned wonderfully well on all bands for both aerials.

For reception on 40m and below I am not really fussed about using a manual knife switch instead of electronic switching: there are negligible RF volts to worry about, it works, it makes firm switching contacts and I am not yet too lazy to reach up to throw a switch every now and then! Having said that, and with some six months of operation use under its belt, the frame loop will be receiving the benefit of a voltage variable capacitance (varactor) diode switch to facilitate remotely tuned multiband listening on 2200, 630 and 160m as my bands of interest. Theoretical and construction information for varactor installations can be found at [5] page 6 and [1] pages 53-54, among many other possible reference sources.

This particular project loop brings a low cost advantage with it as a bonus. Copper strap, tubing, Heliax or coaxial cable were not required as there is simply no necessity for any skin effect advantage at 630/160m or even 40m for reception-only purposes. The loop is mounted on a timber mast and fitted with a 90° manual rotating handle. I gave the antenna a 'camouflage' paint job to reduce its visual impact, as can be seen in Photo 1. Photo 7 shows the finished installation.

In use

Initial on-air tests were very encouraging, with rotation enabling 20dB of noise attenuation in the null to virtually eliminate the stray 11kV power-line leakage that visits my location from time to time. Until now, that has been the only man-made noise (QRM) source with which I have had to intermittently contend, having the good fortune of being surrounded on three sides by neighbours' tennis courts and the roadway on the fourth side: convenient RF buffer spaces indeed! The aerial tunes to 1:1 on each of the specified bands, sharp but it gets there!

Six months of on-air use revealed that the CW and AM signal null ability of the loop is approximately 50dB compared to the inverted-L, which is much greater than I had hoped for when designing it. This completely removes any 11kV power line leakage that is known to creep during our very dry Adelaide weather. Of course, the loop only needs to be rotated 90°, given its closed loop bi-directional characteristic. The key is its balanced configuration and I am very much looking forward to enhancing the loop's operation once the varactor tuning is installed. I also purchased one each of David, G0MRF's 136kHz and 472kHz preamplifier boards for supplementary tests and trials. As with all LF-MF operation, absolute signal strength is not the essential goal, just relative signal strength – improving the signal to noise ratio (SNR).

Although I operate a dedicated LF-MF station only on 2200m, 630m and 160m and this loop was intended as a receiving aerial option for those bands, it was interesting to find that because its physical dimensions relate mathematically to both 40m and 10m, there was potential for benefit on both. Current winter propagation for 28MHz has been elusive and I do not have 80-10m station equipment, but a borrowed HTX-100 28MHz transceiver did show that all was well when using the Frame Loop for QRP (5W) and QRO (25W) testing on that band. I simply coax-connected the transceiver into the Johnson HF coupler line and tuned for resonance. Someone who has capacity and interest for activity on 80-10m might wish to undertake some tests to determine just what frequency bands this antenna can in fact cover from 2200m-10m.

References

[1] *ARRL Antenna Handbook*, 1991, p 14.3
[2] *Joe Carr's Loop Antenna Handbook*, 1st ed (1999), J Carr, K4IPV, Reynoldsburg, OH: Universal Radio Research, ISBN 978-1882123285
[3] www.dj0ip.de/antenna-matchboxes/symmetrical-matchboxes/viking-vs-annecke/
[4] *RadCom* Oct/Nov 2015
[5] *The Low And Medium Frequency Radio Scrap Book*, 10th ed (1996), K Cornell, W2IMB, Pt Pleasant Beach, NJ

Getting started in opamps

This article follows on from Volts & Ladders in the July *RadCom* [1] and explores operational amplifiers (opamps).

An amplifier makes something bigger. A voltage amplifier, for example, increases a voltage. It multiplies the size of the voltage by a pre-determined amount and this increase is called gain. If an amplifier triples a voltage, it has a voltage gain of 3. For example, 1V connected to the amplifier's input results in 3V appearing at the output and 2.5V in gives 7.5V out.

Amplifiers

The circuit symbol for a simple voltage amplifier is shown in **Figure 1**. It's simply a triangle with an input and an output. An 'operational amplifier', as in **Figure 2**, doesn't seem to conform to the simple rules that apply to Figure 1. For a start, it has got two input terminals. Then, to really put it beyond the reach of the budding electronic enthusiast, the terminals are confusingly marked + and -, which is unfortunate. They are not plus and minus, nor are they positive and negative. They're actually non-inverting and inverting inputs respectively. I'm going to refer to them here as NON and INV. Perhaps I'll start a trend.

This amplifier runs a constant competition to see which of the two inputs has the higher voltage. Whichever is higher is the winner at that moment. If the NON terminal has a higher voltage than the INV terminal, it wins and the output voltage is an amplified version of the difference between the input voltages. If the gain was 10 and NON is 0.5 volts higher than INV, the output would be 5V.

In another case, the INV input might have a voltage higher than the NON input. INV wins the competition at this moment. Again, the difference in voltages is amplified but there is more to it than that. If the INV terminal is 0.25V higher than the NON terminal and gain is still 10, the output goes to -2.5V. Because the winning terminal is the inverting input, the output voltage isn't just the amplified difference but is the *negative* amplified difference.

Look back to [1]. With identical voltages on the inputs, the output stays at zero (equivalent to ground level in Figure 1 of my previous article). If NON wins, the output goes positive, its volts have climbed the ladder above ground level. On the other hand, INV winning makes the output negative where its volts have descended the ladder towards the valley floor.

Simple example

If all that's needed is a definite decision as to which input is subject to the higher voltage then the basic opamp is the answer. Because the amplifier has enormous gain, the output will be near +V or –V, according to which of the NON and INV terminals has the higher voltage. Thanks to the high gain, this works even if the voltage difference between the NON and INV terminals is very small.

There are plenty of other ways to configure an opamp, each doing its own useful job. Look at **Figure 3**, for example. It appears simple enough. This amplifier is wired to have unity (x1) gain. Multiply something by 1 and all you get in return is that same something, no change. The unity gain buffer does that. First, the voltage to be sensed is applied to the NON input. The inputs of an opamp hardly need to draw any current, so it's like the example in [1] of blocking the end of the kitchen tap with your finger. Turning on the tap allows the fingertip to feel the pressure of the water, but the finger is obstructing any flow so no current of water actually comes out of the tap. It's pressure-(voltage) sensing without drawing water (current).

This amplifier, that seems to take in some voltage only to give out that same voltage, actually has an advantage. If the voltage being sensed was from some delicate, sensitive circuit that couldn't supply much current, then this amplifier can be attached without disturbing the circuit. Yet, at the output of the amplifier, lots of current is available for the asking. Perhaps an analogue moving-pointer voltmeter is wanted, but you dare not wire it into the circuit because it would draw too much power in order to make its pointer swing. It's a case of look but don't touch. Instead, attach the amplifier to the circuit and power the meter from the amplifier. The circuit can't tell that the meter is even there because no power is demanded. The meter can take all necessary power from the amplifier and will faithfully reproduce the circuit's output voltage. This is buffering, whatever's on the output can't influence the input and yet receives the same voltage signal that is present on the input.

A real-world example is the electrocardiogram (ECG) heart tracing often seen on TV medical dramas. There is a tiny voltage across the chest from the heart's activity, but you know yourself that if you grasp the probes of a voltmeter, one in each hand, you don't see the pointer flick back and forth in time to your heartbeat. It takes an amplifier to sense the delicate voltage on your chest and power the meter's movement in sympathy.

Here's how it works

When the signal appears at the NON input, the output could be anything. What if the output is higher than the signal? As the output is connected directly to the INV input, it's this input that wins the competition. This has the effect of starting to pull the output voltage very rapidly lower and lower, attempting to get it down to -V. It never gets there. At some stage, the output voltage will drop to become the same as the NON input voltage. Any lower and the NON terminal wins the competition and tries to get the output volts to go up again. A steady balance is achieved, the output stays at the same voltage that appears on the NON terminal because even the slightest movement away would cause one or other terminal to win the competition and force the output voltage back to the balanced state. Of course, this all happens extremely quickly, you couldn't observe this mechanism in action with simple test equipment.

I haven't yet explained that you don't get something for nothing. The power going in to the buffer is minuscule, so where does all that output power come from? Not shown on circuit diagrams such as Figure 3 is that the amplifier chip has its own direct connections to the power supply. This is seen in **Figure 4**, the pin-out for typical amplifiers such as TL071. Pin 4 goes to the -V (negative) side of the power supply and pin 7 to the positive +V side. There is no direct connection to any middle (ground) voltage. This ground voltage is theoretically mid-way between -V and +V and hence referred to as zero volts (like the ground floor level of a building that also has a basement and a first floor). Zero exists, sometimes the output of the opamp will be at this zero level. Just as you could get in the

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lift on the first floor and get out again in the basement after passing ground level without noticing it, the opamp's output voltage can swing from +V through zero and right down to -V. (In practice, the swing is from *nearly* +V to *nearly* –V).

Non-inverting amplifier

A development of the buffer allows amplification, that's to say the output voltage is the result of multiplying the input voltage by a fixed number called gain. If the input is positive, that's to say above zero/ground volts, then the output will be as well because there is no inversion with this amplifier. Likewise, an input voltage that's negative (below ground) will cause a negative output. The circuit of **Figure 5** does this.

It's usual to think of an amplifier as increasing the voltage. If the output is three times the input voltage then the gain is three. An opamp is just as capable of reducing the voltage by a fixed factor, so a 3V input on an amplifier that has a 0.5 gain will cause 3 times 0.5 = 1.5V to appear at the output. Strictly speaking, this is called an attenuator, but the circuit is just the same. All that changes are the actual values of the resistors (in ohms).

Those resistors R1 and R2 are simply a two-section ladder with the bottom end rooted in the earth at zero volts. Where the sections join, part-way up the ladder, is where the INV input is connected. The top of the ladder gets the full force of the output voltage.

That means, at any given moment, the INV terminal is sensing a fixed portion of the output. Remember that the amplifier isn't in a steady state until the INV and NON terminals have the same voltage on them. Just as we've already seen with the buffer, any difference in the two input voltages will be amplified at the output. By feeding a proportion of this difference voltage back to an input, it's possible to get to the steady state.

What we're going to do is to fool the amplifier into this steady state, even though the output settles at some voltage that's different to the input voltage. It's no longer possible to connect the output to the INV input, because that's a buffer and the output will be equal to the NON input. Instead, only a portion of the output volts goes to INV and it's R1 and R2 that pick off the needed portion.

Let's start with an amplifier that triples the input. Only a third of the output voltage is needed on INV in order to match what's coming in on NON. This is achieved by setting up the sizes of the two sections of the ladder.

That ladder is three units high in all. Of the two sections, R1 is only 1 unit high. That leaves R2 to make up the total, so R2 is 2 units high. Starting at ground and climbing the whole ladder all the way up to the output requires a climb of three units in height/resistance/voltage.

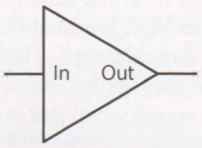

FIGURE 1: Simple voltage amplifier circuit symbol.

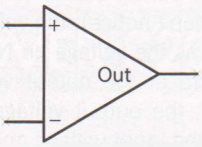

FIGURE 2: Opamp circuit symbol.

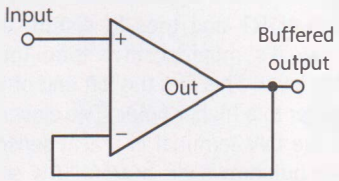

FIGURE 3: Opamp configured as unity-gain non-inverting buffer.

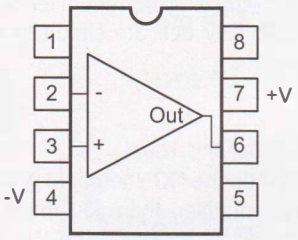

FIGURE 4: Pin connections for common opamps.

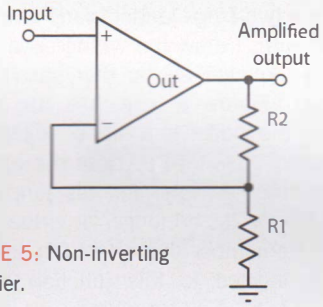

FIGURE 5: Non-inverting amplifier.

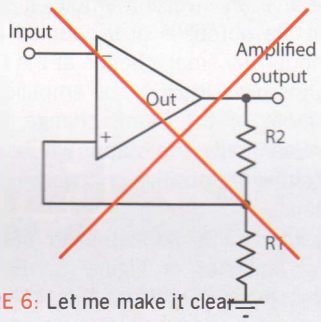

FIGURE 6: Let me make it clear to you, this is what I'll never do (WS Gilbert, *The Mikado,* Act I).

If we stop the climb and to take a rest at the top of R1, we've only ascended by one of the three total units. That's why the voltage at this point is only one part out of a total of three parts. It's one-third the total output voltage. If I were cutting a cake (and if you're greedy) I could chop off a third of the whole cake (and give it to you) by looking at the position of the cut, even if I don't know how much the cake weighs. The top of R1 will always have a third of the total output voltage, without knowing how much the voltage is.

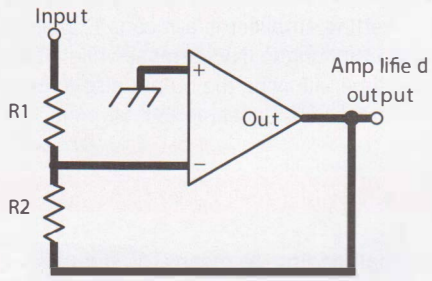

FIGURE 7: Inverting amplifier.

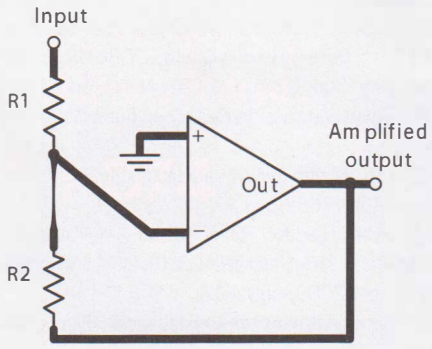

FIGURE 8: Fanciful concept of resistor being pulled upwards.

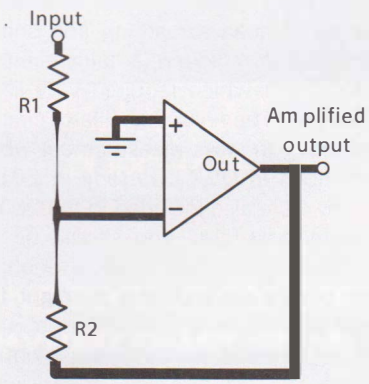

FIGURE 9: Same fancy as Figure 8, other resistor pulled downwards to compensate.

When the circuit settles (which it does so fast you don't notice), the voltage on INV is the same as the voltage on NON and it's also one-third of the output voltage. This dictates that the output voltage has to be three times the input voltage and that's why the circuit amplifies (has a gain of 3).

Like the buffer, this amplifier senses the input voltage on the NON terminal while not really drawing any current. Hence it does not disturb any delicate circuit to which it is attached.

Inverting amplifier

If an input on the NON terminal gives a non-inverting amplifier, then you might already suspect that an input on the INV terminal gives an inverting amplifier instead. Why is **Figure 6** crossed out? All I did was exchange the NON and INV terminals. Disappointingly, it didn't give an inverting amplifier. This is because the output is now coupled to the NON input. Any small change at the output will couple back to NON, be amplified and cause more of the same change at the output. Eventually, the output will be stuck hard at either the positive or negative supply rail voltage.

Why didn't this happen with the non-inverting amplifier of Figure 5? Because the output was coupled to the INV input. If things got out of hand, the output could exert its influence to invert the sense of the error by manipulating the INV terminal. It could counteract any tendency to swing the wrong way. What we need in the case of an inverting amplifier is a means to put the signal input on the INV terminal while, at the same time, allowing the output also to exert its influence on that same INV terminal.

The correct inverting amplifier is seen in **Figure 7**. The NON terminal is anchored to earth, a point of reference. This means that the amplifier only settles into a stable state (both inputs equal) when INV is also at earth potential. INV has no direct connection to earth and so is actually the virtual earth that I explained in [1].

Along comes a signal on the input at the left end of R1 and tries to disturb things. Let's say it's more positive than the pre-existing level. This lifts the left end of R1 up the ladder to a higher point. The clever thing about the INV terminal is that it senses the voltage but draws no current. It's sensing pressure while preventing flow in the same way as the fingertip jammed into the spout of the tap.

I've re-drawn this situation as **Figure 8**, it's the same electronically as Figure 7 but hints at the fanciful idea of the resistors forming a two-stage ladder made of elastic. To start with, I drew the wiring extra thick, a bit like knicker elastic that hasn't been stretched. **Figure 8** stretches the signal input up the ladder to a higher voltage, R1 gets pulled up with it as does the junction between the resistors. As this junction is pulled higher, it's no longer at virtual earth voltage (remember that the NON terminal stays connected to this junction all the time).

To restore balance and get the centre of the ladder back to virtual earth voltage, the other end of the ladder, R2, has to be pulled back down until the centre-point is at its original level. The amplified output has to drop in voltage so as to make this happen, stretching R2 downwards and balancing the junction back to its starting place as in **Figure 9**. As the input went up and the output has gone down, inversion has taken place.

If instead the input had gone down, the output would have had to go up in order to compensate, an inversion once again.

Just as in the non-inverting amplifier, the resistors get in the way of the output's attempts to influence the inputs. So, even if only a small re-balancing is needed, the output has to work hard and make a large voltage change so as to overcome the resistors. That's why it amplifies. The exact calculation of the amount of amplification depends on the ratio of the resistors, but I'm not going to show the maths as this is a beginner's article.

That's all

I'm pleased that you stopped by to read this second article and didn't give up at the end of my previous article [1]. Hopefully, those mysterious triangles that are common in modern circuits are no longer working as if by magic but actually functioning according to the pre-ordained, rather mundane but predictable mechanism that I've now explained. Again, the experts among you will have jargon such as input impedance and slew rate entering their heads almost as a reflex when they read my explanation. They're right, of course, but again I avoided these more advanced terms so that beginners could grasp the essential concepts.

Reference

[1] *RadCom* July 2016, pages 30 to 32, Volts & Ladders, Godfrey Manning, G4GLM

Continued from page 42

me that adding a means of quantifying crystal loss might be a very worthwhile improvement, providing it could be done in keeping with the original design and the KISS principle that followed. After a bit of head scratching and some experimentation, I found a fairly simple way of doing it which required very little extra circuitry. The revised oscillator circuit and details of the loss measurement were first described in *QRP Quarterly* in 2010 [10]. They were also included in the 2014 *ARRL Handbook* [11] and should be in later editions as well. If there's enough interest, and space permits, it might be possible to include a description of the revised circuit and how loss assessment is accomplished in a future issue of *RadCom*, since this hasn't appeared in any British publications so far.

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[11] *The ARRL Handbook 2014*, 91st Edition, H Ward Silver, NOAX, ARRL, Crystal Characterization, Chapter 11, Section 11.6.3

[12] Crystal Characterization and Crystal Filter Design, Nick Kennedy, WA5BDU, OzarkCon QRP Conference, Joplin, Missouri, April 2008

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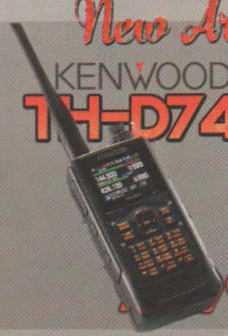

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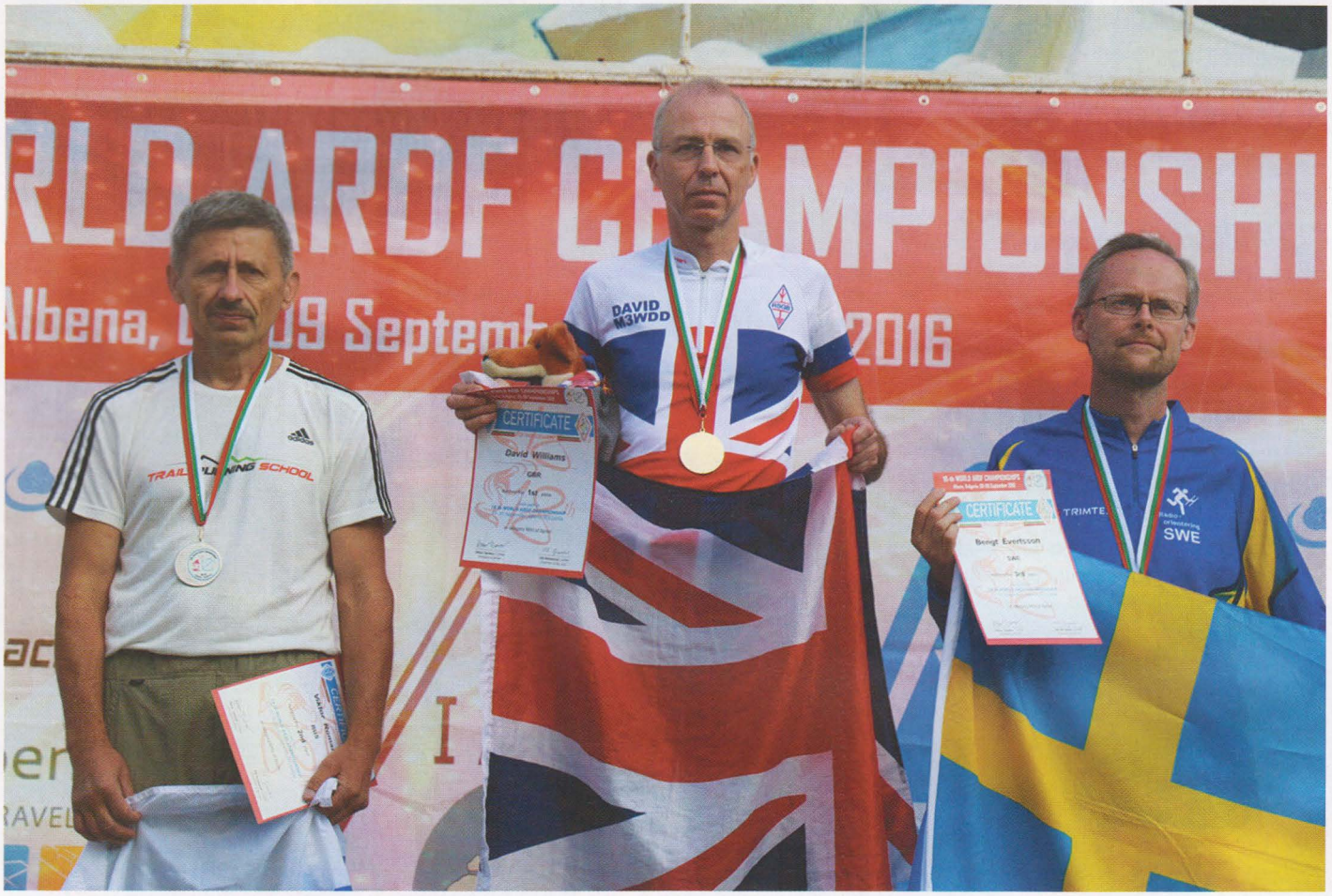

PHOTO 1: David Williams, M3WDD on the podium after winning gold in the M50 Sprint race at the ARDF World Championships.

The 18th ARDF World Championships took place in Bulgaria and there was some success amongst the RSGB team.

David Williams, M3WDD won gold for the RSGB in the 18th ARDF World Championships held at Albena, Bulgaria in early September. This was only the second gold medal ever to be won by an RSGB member at World level.

His success came in the M50 category (men aged 50-59) of the Sprint race. This format has twelve transmitters deployed in the terrain with just two of them (beacons) in locations marked on a map provided to each competitor. The remaining ten transmitters are at hidden locations.

The format uses a very short transmission, of 12 seconds duration, from each hidden transmitter. In that time the competitor has to sense the direction to the target transmitter and act accordingly. One of the RSGB team observed, "this 12 seconds gets longer every time I go out". What he meant was that by practising the technique of using an 80m DF receiver to sense the direction to the transmitter and resolve the 180 degree ambiguity, it takes less and less time, so that it becomes easy to complete this in the 12 seconds available.

Immediately on leaving the start there are a set of five slow keyed transmitters to be found on 3510kHz (the frequencies quoted here are those normally used in international competitions and not those used in domestic competition in the UK). The transmitters send sequentially, 12 seconds each, making a full cycle of 1 minute duration.

It can be seen from Figure 1 that the competitor now visits the 'spectator' beacon (location marked on the map) before racing off into the forest for a second time to locate five more transmitters on 3570kHz, which are fast keyed. Once these are found the

PHOTO 2: David gives it everything on the short climb from the finish beacon to the actual finish.

finish beacon on 3600kHz (also marked on the map) is visited and, shortly afterwards, the finish itself is punched.

The whole event was fast and furious, with the leading competitors 'bagging' their 12 transmitters in less than 20 minutes. David, M3WDD came in with a time of 17min 38 seconds, just 15 seconds ahead of the Russian runner and 39 seconds ahead of the third-placed Swede. The M50 category is highly competitive and it is a real achievement to win at World level. David had travelled out to Bulgaria a week prior to the start of the World Championships in order to take part in a 'warm up' competition called the ARDF World Cup. He had won the Sprint race in this competition and was thoroughly acclimatised to the local terrain as well as having a very recent Sprint competition experience prior to the start of WC2016.

A podium place eluded the rest of the eight-strong RSGB team but there were several creditable performances on this World stage. As is usually the case, the individual and team results were dominated by the Czech Republic, Russia and the Ukraine. In many of the old Soviet block countries, and indeed in one or two western European nations, competitors have their entry fees and expenses paid by their National Society and as a result they are able to field numerically strong teams.

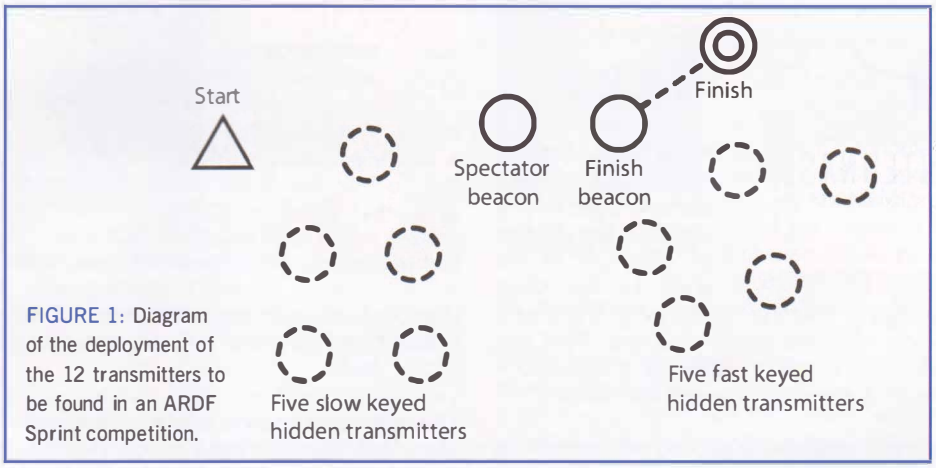

FIGURE 1: Diagram of the deployment of the 12 transmitters to be found in an ARDF Sprint competition.

Bob Titterington, G3ORY
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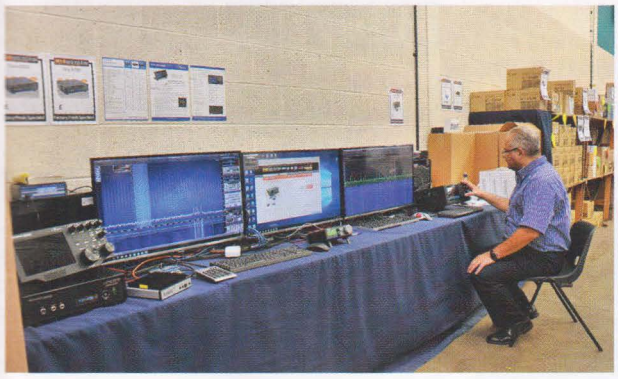
National Hamfest 2016

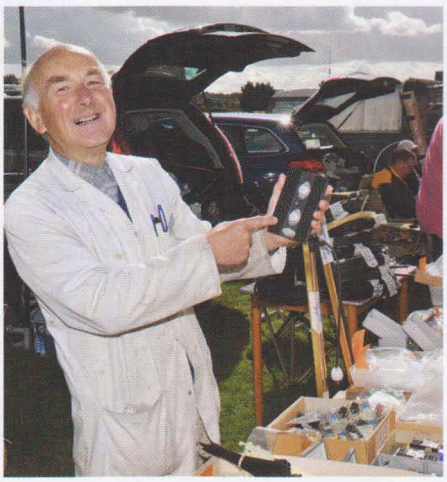


Major distributors had hands-on demos of the latest equipment

The RSGB bookstall was very busy and the limited edition special rucksacks quickly disappeared

Many people joined – or re-joined – the RSGB at Hamfest

Sheffield ARC membership secretary Carol, 2EOCJH with the Radio Communications Vehicle



The outdor flea market had its usual share of bargains and interesting characters

A wide variety of goodies were also on offer on the many inside stands

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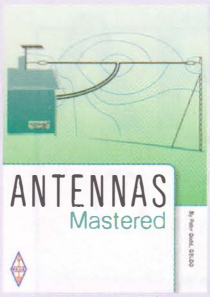

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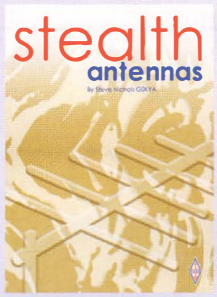

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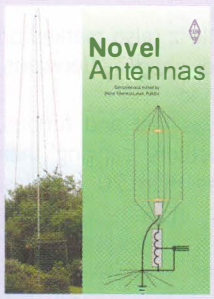

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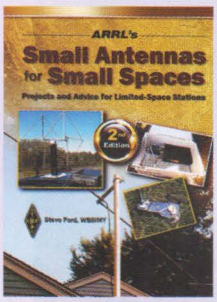

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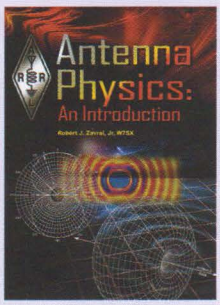

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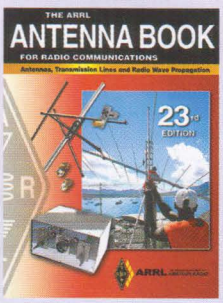

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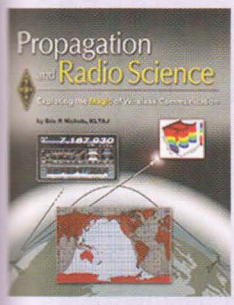
& Propagation



ARRL Propagation and Radio Science

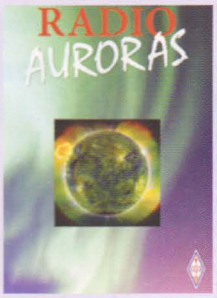
By: Eric P. Nichols, KL7AJ

There are countless ways for radio signals to travel from transmitter to receiver, understanding how radio waves interact with their environment is an important factor in radio communications. While amateurs can maximize station performance and reliability with the right equipment, knowledge and skill, we cannot control propagation. We can improve our understanding of propagation and how it affects radio signals. *ARRL Propagation and Radio Science* sets out to demystify the subject.

This book is packed with information and readers will find chapters covering polarization, gain, and other antenna matters, the ground wave, the anomalous ionosphere, neutral propagation, NVIS modes & methods, the reflection process and much more.

ARRL Propagation and Radio Science explains the phenomena we observe on the amateur bands and invites you to embark on the journey through the still-unknown radio propagation universe.

Size 184x226mm, 256 pages,
ISBN: 9781 6259 5027 7
Non Members' Price £27.99
RSGB Members' Price £23.79

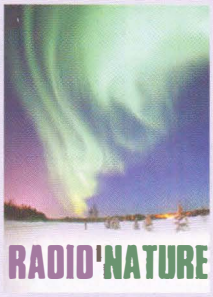


Radio Auroras

Radio amateurs know that sunspots affect VHF as well as HF propagation, and the solar cycle has a direct bearing on the prevalence of radio auroras. The extent and usefulness of this mode of propagation is perhaps still not widely known, though. *Radio Auroras* sets out to explain this phenomenon.

Radio Auroras tells the fascinating story of the radio amateurs who discovered this mode of propagation and how they made use of it. Through the following pages there are descriptions of how auroras are caused, how they can be forecast and perhaps most importantly how best to use them to work DX. Whilst auroras are often thought to be a VHF effect, this book also describes radio auroras at 28MHz as well as outlining the effects of auroras on the other HF bands. Occurrences of Sporadic E can also accompany auroras to provide Auroral E propagation and this too is covered in *Radio Auroras*. If you are interested in radio propagation *Radio Auroras* is a unique guide to this topic, but for those studying and experimenting, or those keen to work DX on VHF, it is a real 'must have' book.

Size 174x240mm 64 Pages
ISBN: 9781 9050 8681 8
Non Members' Price £6.99
RSGB Members' Price £5.94



Radio Nature

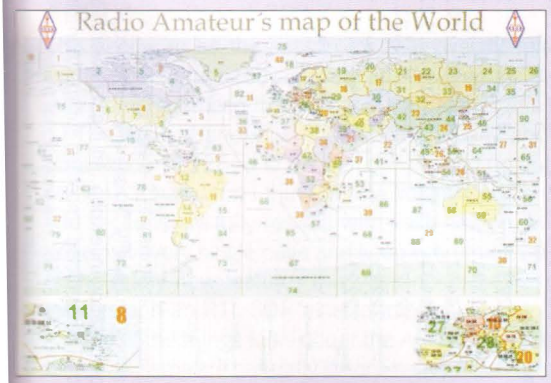
by Renato Romero, IK1QFK

Radio signals are not,recent phenomena. Nature has spoken through radio signals since the origins of the Universe. *Radio Nature* is fascinating look at these signals, a guide to receiving and analysing.

Radio Nature describes these strange signals coming from our own planet and beyond. There is information about tweeks, insects, whistlers, choruses and even flying saucers (nothing to do with spaceships). Readers are provided with details of artificial and false signals that can confuse the natural radio listener. For the more committed there are designs for simple receiving equipment and antennas along with guides to how you can use simple receiving equipment to hear natural radio. The book also explains how to try to predict storms and even earthquakes using the signals that can be captured.

Radio Nature is truly a book for all. If you are a beginner the book opens up a fascinating area for you. For the more committed this provides a comprehensive guide to natural radio and useful reference work.

Size 174x240mm, 256 pages,
ISBN: 9781 9050 8637 5
Non Members' Price £16.99
RSGB Members' Price £14.44

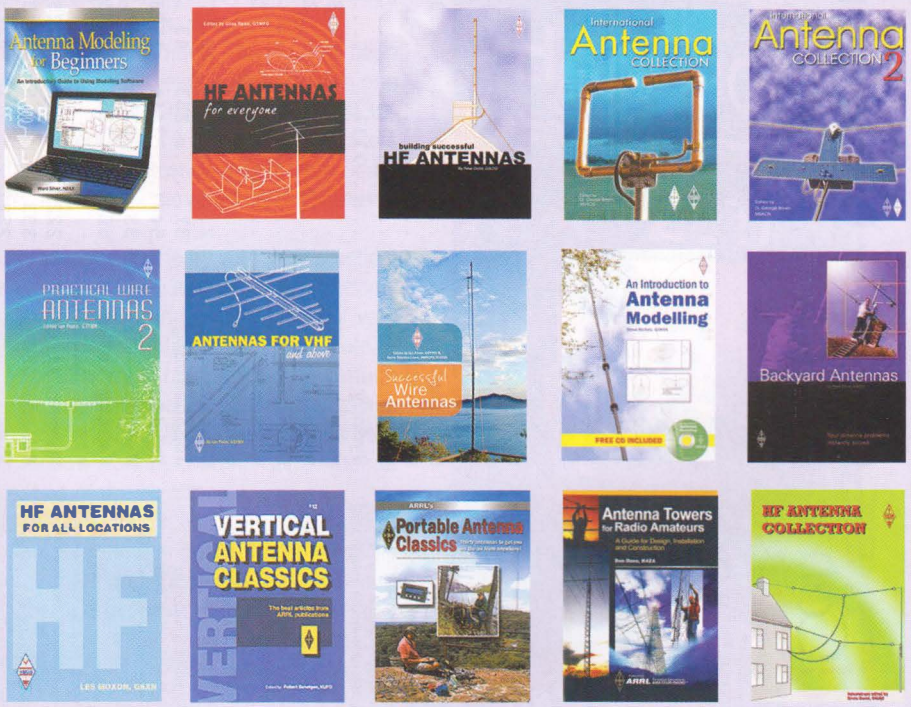


RSGB World Prefix Map - Radio Amateur's Map of the World

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

980mm wide by 680mm tall (approx 38.5"x 27")
1: 42,000,000 scale.
Non Members' Price £6.99
RSGB Members' Price £5.94

Even more choice online www.rsgbshop.org



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

RadCom

HF F-Layer Propagation Predictions for November 2016

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	6651...25666	636422345566	1.6544453111	..155555....	...55552....	...35541....	...2332.....	...1221.....
*** Asia								
Yakutsk	32.....13333	3..11...33.4	...2........	...1........	.....	.....	.....	.....
Tokyo	......22222.	...32233322.	...321221...	...21.......	.....	.....	.....	.....
Singapore	.......2222.	343222	.....2441...	.....342....	....122.....	....121.....	.....	.....
Hyderabad	2......13333	3.....234333	......342...	...11233....	...1223.....	...1221.....	....11......	.....
Tel Aviv	551.....5555	5551...35555	2.5322353112	..344445....	...44441....	...3432.....	...111......	.....
*** Oceania								
Wellington	....2122....	...355552...	...355542...	...14543....	....233.....	....121.....	.....	.....
Well (ZL) (LP)	.....	.....	.....	.....	.....	.....	.....	.....
Perth	.......1111.	......34322.	......442...	.....233....	.....221....	.....21.....	.....1......	.....
Sydney	......1111..	.....34432..	....24541...	....3442....	....333.....	....221.....	....1.......	.....
Melbourne (LP)	.....	...3........	...32.......	...22.......	....2.......	....1.......	.....	.....
Honolulu	..12...2....	...32224....	...11213....	.....	.....	.....	.....	.....
Honolulu (LP)	.....	.....	.....	.....	.....	.....	.....	.....
W. Samoa	...11..1....	...34334....	...14443....	....233.....	.....21.....	.....1......	.....	.....
*** Africa								
Mauritius	2.......2222	3......34333	1......431.1	......13....	......11....	......1.....	.....	.....
Johanesburg	31.......233	43......3444	31.....23322	.......32...	...11112....	....1112....	....111.....	.....
Ibadan	5441....3444	55531..14555	525421125533	...4323451..	...443341...	...54444....	...14222....	....211.....
Nairobi	33......3333	442....14444	2.3....24211	...2..131...	...32233....	...31231....	......1.....	.....
Canary Isles	6664....2566	666531125666	663643345664	211654445311	...6555541..	...322552...	...211541...	...1..33....
*** S. America								
Buenos Aires	2223.......2	3325......23	11.4......11	...3........	....1.......	....1.......	.....	.....
Rio de Janeiro	333.......13	4433.....233	2213.....222	...3....11..	...11..1....	....1.11....	....1.......	.....
Lima	2222.......1	3213......12	...1........	.....	.....1......	.....	.....	.....
Caracas	3333......23	33142....133	...13....1..	....12111...	.....222....	.....222....	.....	.....
*** N. America								
Guatemala	2223.......1	32.32.....12	...21.......	.....1......	......11....	......1.....	.....	.....
New Orleans	32331......2	31.32.....13	...1.1......	......211...	......21....	......2.....	.....	.....
Washington	44442.....23	44.432..1233	.....21122..	.....3222...	.....2331...	......33....	......11....	.....
Quebec	34431....133	32.12...1233	.....21121..	.....2233...	......33....	......31....	.....	.....
Anchorage	1232........	1...1..121.1	........2...	.....	.....	.....	.....	.....
Vancouver	22221......1	2..21......1	.......11...	.....	.....	.....	.....	.....
San Francisco	22221.......	32.32......2	......1.....	.......1....	.......1....	.....	.....	.....
San Fran (LP)	.....	.....	.....	.......1....	.......2....	.......1....	.....	.....

Key: The figures represent approximate S-meter readings, whilst the colours represent expected circuit reliability. **Black** equals low to very low probability, **Blue** equals good probability and **Red** equals a strong probability. No signal is expected when a '.' is shown. The RSGB Propagation Studies Committee provides propagation predictions on the internet at **www.rsgb.org.uk/propagation/index.php**. An input power of 100W and a dipole aerial has been used in the preparation of these predictions; therefore a better equipped station should expect better results. The predicted smoothed sunspot numbers for November, December & January 2017 are respectively (SIDC classical method – Waldmeier's standard) 29, 28 & 26 and (combined method) 46, 47 & 46. The provisional mean sunspot number for August was 44.7. The daily maximum / minimum numbers were 79 on 12 September and 12 on 30 September.

Book Review

RSGB Vintage Rig Guide

by Steve White, G3ZVW

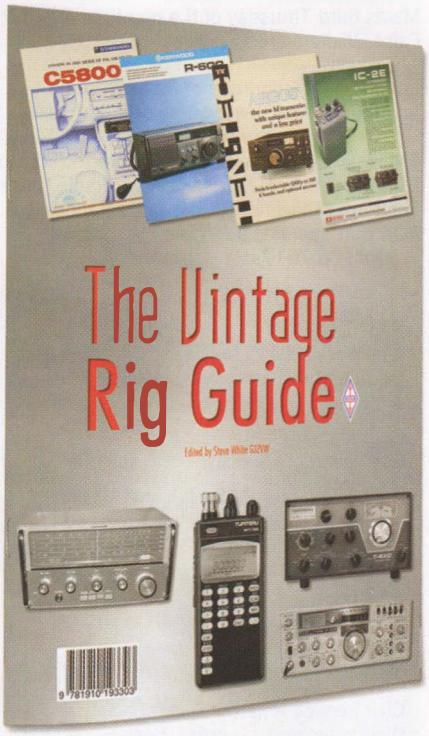
At the National Hamfest recently I was pleased to see a lot of older equipment on offer at temptingly low prices. I even bought a piece of kit that's at least 45 years old. But if that's older than your granny, how do you sort the wheat from the chaff? Building on the success of the much-loved *Rig Guide*, the new *RSGB Vintage Rig Guide* is the perfect answer.

What is 'vintage'? As far as this book is concerned, handhelds over 15 years old and anything else over 25 years old. That means that radios like the FT-1000 and TS-450S are now considered 'vintage' – yes, they really did appear that long ago. Time flies!

Many of the transceivers and receivers in the *RSGB Vintage Rig Guide* have previously been included in the *Rig Guide*, but have dropped out due to their age. Details of many have also been sourced from original glossy brochures from the 70s and 80s loaned by collectors, meaning that many radios in the *RSGB Vintage Rig Guide* were never listed in the *Rig Guide*.

The main equipment list is presented in tabular form, just like the *Rig Guide*, but there is a lot of supplementary information as well, like hints and tips on repairing vintage kit, plus a list of *RadCom* equipment reviews filling in coverage from 1965 to the start of the *Rig Guide*. Why start in 1965? Because before that there were very few equipment reviews. To illustrate how different things were back then the book includes a sample *Bulletin* review of the Codar A.T.5 from 1965.

If you have a nose for a bargain, or just want to check out the capabilities of a vintage radio listed in *RadCom* Members Ads, this book is a real treasure-trove of information.



ISBN 9781 9101 9330 3
80 pages, 210 x 297mm
Price £5.99 (inc p&p)

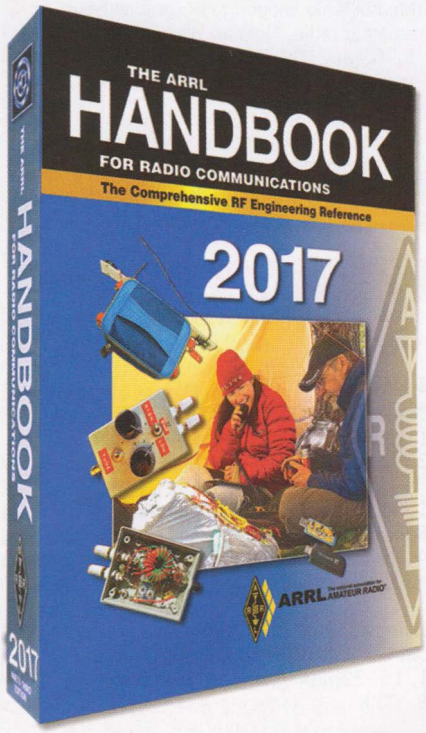
ARRL Handbook 2017

This seems to be the season for heavyweight reference books and the *ARRL Handbook* is, frankly, the granddaddy of them all. Weighing in at a hefty 1280 pages, it covers pretty much everything you need to know about amateur radio – from LF right up to microwaves.

The *ARRL Handbook* is updated annually and this is the 94th edition, having first been published in 1926. (I know that doesn't add up but, way back, some years had more than one edition). It has what I think of as a 'rolling update programme', in that not every one of its 30-odd sections are fully revised with each edition, but over the course of a few years the editors do revisit every single page and keep everything up to date with the latest developments. Some of the many new features this year include a Raspberry Pi network server/client for antenna rotators and an RTL SDR receiver project.

One of the things I like about the *ARRL Handbook* is that it blends theory with very practical material. Some are naturally theory-heavy (such as propagation) but you also get to see precisely how it affects us, as amateurs, as we work the world. You will also find a wide range of very practical projects, ranging from simple audio filters to high power amplifiers. As a side note, if you haven't seen a copy of the *ARRL Handbook* for a few years you'll be surprised how much it has changed. The range of circuits and projects is much wider and has embraced things like SDR, digital modes and even optical communications. This is a book that doesn't stand still! A bonus is the CD that accompanies the Handbook. It has even more content: supplemental articles, software, projects and even the full, searchable, text of the Handbook.

Although this is a relatively expensive volume I think it's well worth it. Even if it is beyond your own pocket, it is the sort of book that any club should seriously consider adding to its library for the benefit of its members. Whether you buy your own copy or share ownership with others, you will learn an enormous amount about our hobby – however much you *think* you know. Very highly recommended.



ISBN: 97816259 5062 8
Size 208x274mm, 1280 pages
Non-Members' price £49.99
Members' price £42.49

Giles Read, G1MFG
giles.read@rsgb.org.uk

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 print 'closed', 'TBA' or 'every Tuesday'-type entries. The deadline for the December edition is 20 October and for January it's 17 November. 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 third Thursday of the month at DTs Bar, Pafos. Visitors are always welcome.

International federation of Railway Radio Amateurs (FIRAC) www.firac.org.uk

The Radio Officers Association www.radioofficers.com
For former British Merchant Navy Radio Officers. The Radio Officers ARS is a subsidiary of the ROA that operates a CW net on Thursdays at 7.30pm on 7017kHz ± summer.

NATIONAL

Amateur Radio Caravan and Camping Club
membership@arcc.org.uk, www.arcc.org.uk

AMSAT-UK
http://amsat-uk.org/
Open net every Sunday, 10am, 3.780MHz (±)

British Amateur Radio Teledata Group
bartg@bartg.org.uk, www.bartg.org.uk
Membership open to those interested in datacoms. Contests and awards organised.

British Railways Amateur Radio Society
m0zaa@brars.info, www.brars.info
2016 is Golden Jubilee. Membership open to those interested in amateur radio and railways.

Civil Service Amateur Radio Society
Weekly net every Tuesday, 8pm, 3.763MHz.

Radio Amateur Old Timers' Association
MemSec@RAOTA.org, www.RAOTA.org
Membership is open to anyone active in amateur radio. Nets on Wed 3.763 at 1000, 1.963 at 2100, Thurs 7.163 at 1100, 3.763 at 1930 and Sun 3.763MHz at 1000.

Travelling Wave Contest Group
secretary@twcg.org.uk, www.twcg.org.uk
Friendly contest group for those who want to be involved with contesting.

REGION 1: SCOTLAND SOUTH & WESTERN ISLES

Regional Manager: Marcus Hazel-Mcgown, MM0ZIF, RM1@rsgb.org.uk

Ayr ARG
Charlie, MM0GNS, 01563 551 704
11 ILLW mini DXpedition, MM0GNS
25 Hexbeam antenna, John, 2M0JCG

Cockenzie & Port Seton ARC
Bob, GM4UYZ, 01875 811 723
4 Normal club night
13 On-air activity day

Livingston & District ARS
Cathie, 2M0DIB, 01506 433 846
1, 15, 22, 29 Training and operating
8 Talk

Lothians RS
Mike, MM0MLB, secretary@lothiansradiosociety.com
9 RAYNET FEEDNET, Charlie, GM6MUZ
12 GMRT at MoC, Burntisland
23 Valves, tubes & bottles, Malcolm, GM3TAL

REGION 2: SCOTLAND NORTH & NORTHERN ISLES

Regional Manager: RM2@rsgb.org.uk

Glenrothes & DRC
Tam, MM0TGB, 0775 3526 498
2 Antennas at your QTH
9 ATC radio to Foundation level
16 QRP valve day
23 Dielectrics/dialects
30 Club night

REGION 3: NORTH WEST

Regional Manager: Kath Wilson, M1CNY, RM3@rsgb.org.uk

Bolton Wireless Club
boltonwireless@gmail.com
14 Tests & measurements, Mark, M0UFC
28 Show & tell evening

Furness ARS
Chris, M0KPW, info@fars.org.uk
9, 23 Activity meeting
14, 28 Social – Farmers Arms, Newton
21 Committee meeting

Macclesfield & District RS
info@gx4mws.com
7 Shack on the air
14 Digimodes talk, M0PAI
21 Construction night
28 Film: DXpeditions

South Manchester R&CC
Ron, G3SVW, 01619 693 999
3 Aerial & propagation clinic, Ron, G3SVW
10 Vodka evening, Brian, M0XAG
17 Earthing, Ron Behan
24 How can a project go out of control? G8RSI

Stockport Radio Society
Heather, M6HNS, 07506 904 422
1 Society meeting
10 Club net 145.375MHz, 7.30pm
15 Radio night
22 Skills night
26-27 CQ WW CW, Peak Contest Group

Thornton Cleveleys ARS
John, G4FRK, 01253 862 810
7 Natter & practical night
14 Table top sale
21 Ron.Tech:Slides
28 Prog Radio Chirp

REGION 4: NORTH EAST

Regional Manager: Ian Douglas, G7MFN, RM4@rsgb.org.uk

Angel of the North ARC
Nancy, G7UUR, 01914 770 036,
7 Convention report, David, G0EVV
14, 28 On the air
21 Advanced Distance Learning, G0EVV

Colburn & Richmondshire District ARS
Colin, 01748 876 391, colin@colinlyne.com
3, 16 Club net, GB3IR, 7.30pm
10 The RTL R820T SDR, Martyn, G3RLV
24 Spring planning meeting

Denby Dale RC
Darran, G0BWB, 07974 423 227
30 Real Ale Night at The Star Inn, Lockwood

Otley ARS
David, M0HLL, 01423 522618
1, 8, 15, 29 Morse training
1 2m UKAC
2, 9, 15, 22 Foundation course
22 6m UKAC

Ripon & DARS
David, G3UNA, 01423 860 778
3, 10, 17, 24 Club night

Scarborough ARS
Jeremy, M0JLP, 0788 905 1696
7 CW and social; ATV and the BATA, Clive Reynolds
21 CW and social; astronomical photography, Steve Bowden

Sheffield & District Wireless Society
Krystyna, 2E0KSH, 07884 065 375
2 Beginners microwave, Peter, G3PHO
9 Training and social night
16 Computer decoding of digital modes, G7GHH
23 Technical evening
30 Meal out

Sheffield ARC
David, G6DCT, littlewood20@btinternet.com
7, 28 Club night
14 Raspberry Pi PSK transceiver revisited, G6DCT
21 Shack night operating MORCU

REGION 5: WEST MIDLANDS

Regional Manager: Martyn Vincent, G3UKV RM5@rsgb.org.uk

Bromsgrove & District ARC
Dave, M6DKT, 07584 025 156
4 PSK demo
11 VHF night
18 Logging
25 Data night

Central Radio Amateur Circle
Martin, G1TYV, 07948 027 994
1 UKAC 144MHz
3 Group meeting
5, 12, 19, 26 Shack On The Air, Group Meeting

Coventry ARS
John, G8SEQ, 07958 777 363
3, 10, 17, 24 Open net, 50.175MHz SSB, 8pm
7, 14, 21, 28 Open net 145.375MHz FM and or 7.16MHz ± QRM, 8pm

Dudley and District ARS
Carl, M0ZCR, secretary@dadars.com
1, 8, 15, 22, 29 Club night, 7pm

Gloucester AR&ES
Anne, 2E1GKY, 01242 699 595 daytime
2, 9, 16, 23, 30 Net, 7.30pm, 145.500 then 145.550MHz
3, 10, 17, 24 Net, 7.30pm, 145.550MHz then QSY
7 Operating portable from islands, Brian, G4CIB
14, 21, 28 Informal evening and general operating

Malvern Hills RAC
Dave, G4IDF, 01905 351 568
8 Remote operation, Dave, G4FRE

Midland ARS
Norman, G8BHE, 07808 078 003
2 Open meeting, training, on the air
9 Committee meeting, training classes
16 Xmas party discussion, ragchew, training
23 Open meeting, training classes
30 Social calendar planning, with training

Mid-Warwickshire ARS
Don, G4CYG, 01926 424 465
8 DVD afternoon
22 Club net, 145.275MHz

Rugby ATS
Steve, G8LYB, 01788 578 940
1, 8, 15, 22, 29 UKAC, radio and projects
5, 12, 26 Radio operation, training, practical
19 Committee meeting

Solihull ARS
Paul, G8AYY, 0121 628 7383
3, 10, 24 Net, 145.575MHz or GB3UI, 8pm
17 Surplus sale, 7.45pm, Shirley Centre

South Birmingham RS
Gemma, M6GKG,
gemmagordon.m6gkg@gmail.com
1, 8, 15, 22, 29 Coffee morning, 11am to 1pm
2 AGM, 8pm
4, 11, 28 Work in the shack
6 West London Radio and Electronics Show
14 Checking aerials
21 Discussion and date for the Christmas party

Stratford upon Avon & District RS
Clive, G0CHO, 01608 664 488
7, 21 Club net, 145.275MHz FM, 8pm
14 Satellites, Keith, G8FRS
28 Top Band to 198kHz, Jim, G4AEH

Sutton Coldfield ARS.
Robert Bird, spirit.guide@hotmail.co.uk
7, 21 Open net, 145.250MHz, 7.30pm
14, 28 Club meeting
15 Open net, 70.475MHz FM, 7.30pm
29 DMR open net, GB7FW slot/local2, 7.30pm

Telford & District ARS
John, M0JZH, 07824 737 716
2 Committee meeting, GX3ZME OTA
9 Surplus equipment sale
16 M6JAX
23 10 minute topics
30 Committee meeting

Wythall Radio Club
Chris, G0EYO, 07710 412 819
1, 8, 15, 22, 29 Morse Class, 7.30pm
1 Prep for Club Calls contest
4, 11, 18, 25 Nibbles night in the shack
5 Club and house Bonfire Night
6, 13, 20, 27 Net, 145.225MHz or GB3WL 8pm
7, 14, 21, 28 Advanced course
8 Committee meeting
15, 22, 29 Club night
28 Curry night

REGION 6: NORTH WALES

Regional Manager: Ceri Lloyd Jones, 2W0LJC
RM6@rsgb.org.uk

Dragon ARC
Stewart, GW0ETF, 07833 620 733
7 Construction competition
21 AGM

North Wales Radio Society
Liz, GW0ETU, 0776 019 0355
3 Programme planning for 2017
10 Technical topic
17 Pirate radio, Martin Doig
24 Night on the air

Wrexham ARS
Eifion Parry, mw6eyu@gmail.com
1 Losing weight, Andrew, MW3KMV
15 VHF/UHF tropo propagation, GW8NZN

REGION 7: SOUTH WALES

Regional Manager: Glyn Jones, GW0ANA,
RM7@rsgb.org.uk

Cleddau ARS
Heinz, MW0ECY, 0774 804 7008
3 Tenby Radio Repeater Group

Llanelli ARS
Craig, MW0MXT, 01269 845 773,
7 On the air
13 GB1BAF for Remembrance Day
14, 21 Social evening/ DVD night
28 Junk sale and on the air

Newport ARS
Margaret, GW4SUE, 01633 665 289
1, 8, 15, 22, 29 Club net, 145.425MHz, 8pm
4 Power distribution in the National grid, GW3NWS
6, 13, 20, 27 Club net, 3.704MHz, 10am
18 3D printing demo, MW0LGE and 2W0ODS

REGION 8: NORTHERN IRELAND

Regional Manager: Philip Hosey, MI0MSO
RM8@rsgb.org.uk

Bangor & District ARS
Norman, GI3YMY, norman.newell@yahoo.com
3 Annual surplus sale

REGION 9: LONDON & THAMES VALLEY

Regional Manager: Tom O'Reilly, G0NSY
RM9@rsgb.org.uk

Aylesbury Vale RS
avrs@rakewell.com
9 Inter-club quiz hosted by Chesham & DARS

Bracknell ARC
Andy, M0HAK, andy@m0hak.co.uk
3, 17,24 Open net 145.375MHz, 8pm
10 Tony Crake's life as a BBC Engineer (final part)

Burnham Beeches RC
Charles, G0SKA, 01753 647 101
7 Construction meeting (antennas)

Harwell ARS
John, G6LNU, 01235 223 250
10 Grimeton LW transmitter, Richard, G0REL

Newbury & District ARS
Rob, G4LMW, 01635 862 737
23 Ionosondes, eclipses and the ionosphere, Dr Ruth Bamford

Southgate ARC
Mr K Mendum, G8RPA, g8rpa@arrl.net
9 Autumn junk/surplus sale

Next deadlines are 20 October, 17 November & 22 December

REGION 10: SOUTH & SOUTH EAST

Regional Manager: Michael Senior, G4EFO
RM10@rsgb.org.uk

Brede Steam ARS
Martin, M0MJU, m0nuc.bsars@gmail.com
1, 5, 8, 15, 22, 29 Operating at the shack

Bromley & District ARS
Andy, G4WGZ, 01689 878 089
15 Toilet roll TRF construction

Coulsdon ATS
Mike, M1CCF, 020 8654 2582
14 ICQ Podcast, Martin, M1MRB/W9ICQ

Crawley ARC
John, G3VLH, 01342 714 402
23 HARC/CARC annual challenge

Cray Valley RS
Richard, G7GLW, 07831 715797
3 Short talks on WSPR, LoTW, M6T and Twitter
17 Antennas, Colin, G3SPJ

Crystal Palace R&EC
Bob, G3OOU, 01737 552 170
4 Arduino based frequency counter, G8NKM

Dorking & District RS
David, M6DJB, djb.abraxas@btinternet.com
22 AGM and RSGB film

Eastbourne E&RC
Events@ereclub.org.uk
14 Project/demo
28 Talk/meeting

Fort Purbrook ARC
Graham, M0CYX, 0785 040 0108
25 Getting on 4m

Hastings E&RC
Gordon, 01424 431 909
23 Digital 2m EME success, Peter, G4URT

Horndean & District ARC
Stuart, G0FYX, 02392 472 846
4 Natter night/social evening
18 EMC, Dave Williams, G8PUO

Horsham ARC
Alistair G3ZBU, 07855 268666
3 bhi noise cancelling, Graham Somerville
6 Fox Hunt
17 Social, The Five Bells

Itchen Valley ARC
Ray, G3HRH, 01962 712045
4, 18 Club net, 145.525MHz, 8pm
11 Equipment sale
25 Members' presentations

Mid-Sussex ARS
Stella, M6ZRJ, 01273 844 511
4 Surplus equipment sale
11 On the air
18 Radio night & table top sale
25 Smart phones, Chris, G4ZCS

Surrey Radio Contact Club
John, G3MCX, 020 8688 3322
3, 10, 17, 24 Net, 70.300MHz, 8pm
4, 11, 18, 25 Net, 145.350MHz, 8pm
6, 13, 20, 27 Net, 1905kHz, 9.30am
7 The GB3XP repeater project, Neil, M0ZEY
21 Chat and fix-it, John, G8MNY

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Sutton & Cheam RS
John, G0BWV, 0208 644 9945
17 Millimetric microwaves, Chris, G0FDZ

Swindon & District ARC
Jonathan, M0ZGB, m0zgb@sdarc.net
3 The Shetland Bus, John Winterburn
10, 24 Activity night
17 Film night

Worthing & District ARC
Al, M0OAL, information@wadarc.org.uk
2, 16, 30 Club evening
5 Intermediate training
6, 26 Sunday breakfast, 9am
9 Quiz night
23 Lecture by Bodie, 2E0VRM

REGION 11: SOUTH WEST & CHANNEL ISLES

Regional Manager: Pam Helliwell, G7SME
RM11@rsgb.org.uk

Appledore & District ARC
Alan, M6CCH, 01237 422 833
21 Bring & Buy night

Bristol RSGB Group
Robin, G3TKF, robin@g3tkf.co.uk
28 2020 and beyond, Prof Andrew Nix, Bristol Uni

Burnham on Sea ARC
Brian, G4RGY, 01278 683 645
2, 16 Club night

Callington ARS
John, G4PBN, 01822 835 834
2 Club night

Cornish Radio Amateur Club
Steve, G7VOH, 01209 844 939
2 Committee meeting
3 Main meeting
17 Club evening

Exeter ARS
Nick, MONRJ, 01363 775 756
1 Net, GB3EX, 7.45pm
8, 15, 22, 29 Net, GB3EW, 7.45pm
9 Tesla Coils, Alex, G8GON
23 Quiz night and planning for 2017

Exmouth ARC
Mike, G1GZG, 01395 274 172
2 SDR night, Dean, G0UIL
16 Operating night

Mid-Somerset ARC
David Edwards, G8BFV, 01749 670085,
davidedwa6@talktalk.net
8 Magnetic loop antenna build demo, G3ZXX

North Bristol ARC
Mat, G7FBD, g7fbd@gb3bs.com
4 Construction and testing for radio amateurs
5, 12, 19, 26 South-west DMR net, 7pm, Slot2 Talk Group 950
6, 13, 20, 27 Open net, GB3BS, 7pm
11, 25 Relax and chat + operating & training
18 Radio related video + relax and chat

Plymouth Radio Club
David, 2E0DTC, d.beck123@btinternet.com
8 club transmitters on the air
20 Plymouth Radio Rally

Poldhu ARC
Keith, G0WYS, 01326 574 441
8 St Erth WW2 DF station, Mike Griffiths

Riviera ARC
rivieraarc@gmail.com
3 Magnetic loops

South Bristol ARC
Andrew, G7KNA, 07838 695 471
3 The Secret War episode 5 of 6
10 Datamodes night
17 A look back at 2016 events
24 Open house and on the air

Torbay ARS
Dave, G6FSP, g6fsp@tars.org.uk
4, 18 Club night
11 Club night with business meeting
25 Totnes Image Bank

Weston Super Mare RS
Martin, G7UWI , 01934 613 094
7, 14, 28 Construction, operating & natter night
21 Four 15 minute mini lectures

Yeovil ARC
Rodney Edwards, MORGE, 01935 825 791,
rodney.edwards@uwclub.net
3 Mini talks
10 The evolution of amateur radio aerials, G3MYM
17 Morse practice, G3MYM
24 On the air and committee meeting

REGION 12: EAST & EAST ANGLIA

Regional Manager: Keith Haynes, G3WRO
RM12@rsgb.org.uk

Braintree & District ARS
Edwin, G0LPO, 01376 324 031
7 Surplus equipment sale

Cambridge & District ARC
Ian, M0HTA, publicity@cdarc.co.uk
2, 9, 16, 23, 30 Net, 8pm, 145.550MHz FM
6, 13, 20, 27 Nets: 144.180MHz USB, 8.30am; 7.0875MHz LSB or 3.620MHz LSB, 10.30am; 145.550MHz FM, 11.30am
11 Presentation useful hints & tips, Peter, M0DCV
25 Team Construction Challenge, David, G0LRD

Chelmsford ARS
secretary@g0mwt.org.uk
1 Three 25-minute talks

Colchester Radio Amateurs
Stefan, M0XLB, 07771 616 676
17 Club FR meter kit build

Felixstowe & District ARS
Paul, G4YQC, pjw@btinternet.com
21 Junk sale

Leiston ARC
m0iah2008@gmail.com, 01473 738 593
8 AGM at Quaker Hall

Loughton & Epping Forest ARS
Dave, M0MBD, 0798 016 5172
3, 10, 17, 24 Net, 144.725MHz, 8pm

Norfolk ARC
Chris, G0DWV, 01603 898 308
2 Weather Two, Jim, G3YLA
9 Getting Africa on the air, Nick, G3RWF
16 GB2RS propagation forecast, G0KYA
23 Images of the Universe, Paul Money
30 Informal, Bright Sparks, Morse / Contest

Next deadline is 20 October

Norfolk Coast ARS
Steve, G3PND,
info@norfolkcoastamateurs.co.uk
3 70cm Moonbounce
10 NCARS transceiver phase two
17 More on satellites
24 Reviewing forthcoming events

South Essex ARS
Terry Hwchen, G1FBW, 07986 070 040
8 AGM

Thames ARG
targradio@outlook.com
4 Club night
11, 25 Club net on GB3DA
18 Construction & Advanced tutoring (members only)

Thurrock Acorns ARC
Gordon, 2E0ELI, acorns@taarc.co.uk
3, 10, 17, 24 Open net, 2m FM, 7.30pm

REGION 13: EAST MIDLANDS

Regional Manager: Jim Stevenson, G0EJQ
RM13@rsgb.org.uk

Leicester RS
Alex, G8FCQ, 07531 201 640
7, 14, 21, 28 Morse class, 7pm; night on the air, 7.30pm
19 Train the Trainers day

Lincoln Short-Wave Club
Pam, G4STO, 01427 788 356
1, 8, 15, 22, 26 UK Club Contest
2 Practical evening
3 Club net via GB3LM, 8pm
5 Saturday Surgery & G6COL on the air
9 Nibbles and natter night
10, 17, 24 Club net, 145.375MHz, 8pm
12, 29 Shack Activities + G5FZ on the air
16 Curry night and quiz
19 Shack activities + G6COL on the air
21 Committee meeting
23 Formal meeting and construction contest
30 National Hamfest Debrief

Loughborough & DARC
Chris, G1ETZ, 01509 504 319
1 Andrew's Special Box, Andrew, G7SEG
8 Vintage Wireless Museum new video
15 Junk sale
22 Club history night, bring your photos
29 Practical evening

Melton Mowbray ARS
Phil, G4LWB, 01664 567 972
18 LDMOS HF amplifier

South Normanton Alfreton & District ARC
A Lawrence, 2E0BQS, 0115 930 7322
7 Talk
14, 28 Natter night
21 Junk sale

Welland Valley ARS
Peter, G4XEX, 01858 432 105
7 Club net, 145.275MHz FM
21 HF DXing, Pete, G4XEX

Worksop ARS
Paul, M0PJA, 07890 626 684
1, 8, 15, 22, 29 Club night & UKAC
3, 10, 17, 24 Technical night, construction / CW tuition / radio operation / data modes
6, 12, 13, 20, 27 Intermediate course
27 Bassetlaw Scouts Electronics Badge day

radcom@rsgb.org.uk

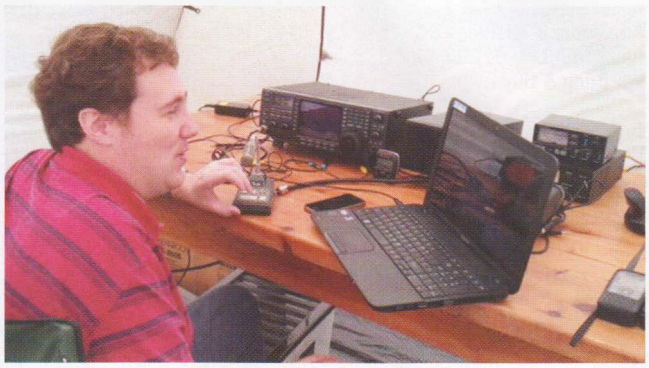
REGION 4: NORTH EAST

Bishop Auckland RAC member Paul Haygarth has successfully gained his new callsign 2E0HYG, congratulations from the tutors and all the club members. Training is provided by club members Tim, M0ACV, Bob, G0OCB. For any training enquiries or information, email g4ttf@yahoo.co.uk, or call Tim on 01388 832948.

In September, Youth committee member Oliver Wilson, M6EUB attended the Fog on the Tyne radio rally to talk about the work of the Youth Committee to visiting radio amateurs. He attended with Anthony Bonney, M0RHJ (DRM Region 4) and Nigel Ferguson, G0BPK. In all it was a good day for all who stopped for a chat about the Youth Committee and its work.

REGION 6: NORTH WALES

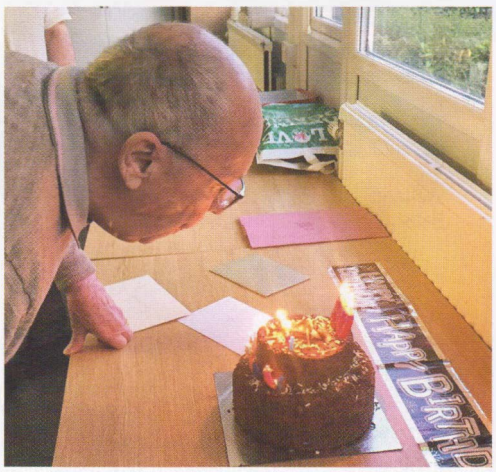
Wrexham ARS operated GW4WXM from Point of Ayr, Talacre for International Lighthouses and Lightships Weekend. On Saturday they set up the station with the Cushcraft HF vertical in the Dunes of Talacre, a few yards from the beach. As the day continued the weather got quite bad with heavy rain and gales forecast, so they battened down the hatches. Conditions weren't brilliant but a respectable list of contacts included Namibia, Maryland and all around the UK and Europe. The team was Eifion, MW6EYU, Mark, MW1MDH, Huw, MW0ARL, Dave, GW6NNB, Andrew, MW3KMV, Simon, MW6GXU and 10 year old Ethan, MW6AQF.



REGION 7: SOUTH WALES

Cleddau ARS has a new meeting venue at Manshed, Pembroke Dock Dockyard, SA72 6TH. New members and visitors are welcome.

Llanelli ARS took part in the International Lighthouse and Lightship Weekend from Burry Port Harbour Lighthouse using GB1BPL. During the weekend the members operated from 3 mobile stations. Very high winds made large antennas impractical so smaller mobile antennas were the order of the day. Nevertheless the team made contact with over 700 stations from all over the world, some notable ones being Tobago; St Lucia; Venezuela; Brazil; Iceland and Newfoundland. Participating stations included the Helwick lightship moored at Swansea Marina and The Hook lighthouse in Ireland. Despite the rough weather, the weekend proved to be a great success and our members would like to thank Carmarthenshire County Council, especially Bob Hockey (Burry Port Harbour Master) for their permission to stage the event.



Newport ARS celebrated the 80th birthday of John, GW8IQC (left). John is a founder member of the club and at 80 he still managed enough puff to blow out all the candles! The lovely chocolate cake was provided by Carol. Happy birthday John from fellow club members and many more of them.

REGION 8: NORTHERN IRELAND

Bangor & District ARS is holding the annual Surplus Sale on 3 November, it's one of the most popular meetings of the year. A small admission charge is levied but tables are free to all sellers. They took part in the National SSB Field Day last September at Drumawhey miniature railway. Peter, MI0HWG and Richard, GI4DOH were very busy, see photo above.

In September, Antrim & District ARC hosted a Skype-based tutorial run by Bath Distance Learning course for six NI students studying the Advanced Course. David Stansfield was the tutor for the day and it is believed that this is the first time that Skype has been used to facilitate distance learning between Northern Ireland and mainland GB. The technology worked perfectly and who knows this method may become the norm in the future.

REGION 10: SOUTH & SOUTH EAST

Cray Valley RS, as part of the South East Tutors group of clubs (http://goo.gl/AEV5GN), begins a three day fully inclusive Intermediate course (held over three consecutive Saturdays) on 5 November at the club HQ in Eltham, London SE9. For further details contact Kevin, MOKSJ at courses@cvrs.org

In August, Medway AR&TS had two weeks of radio fun at a Scout field near Bredgar, Kent using their club callsign G5MW/P. Members either stayed at the site or came and went as time permitted. The club had purchased a new tent for radio operation and this was quickly erected. Mains electricity together with toilet, showers and site lighting made life quite comfortable. The trailer mast was erected and, together with a number of supporting poles, nine antennas varying from beams, dipoles and a dish were established. Members operated using either their own gear or the club's Icom IC-7100. Some had a go at the 4m UKAC and points were given away in the SSB Field Day, the 2m Trophy and the All Asia competition that suffered from poor band conditions. Members all agreed they had a brilliant time and now look forward to repeating the visit next year.

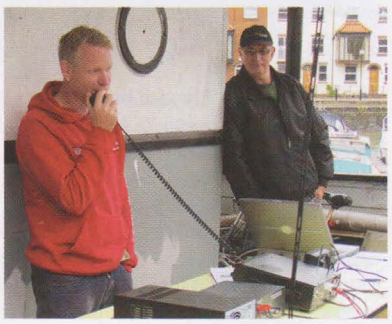
September saw the very popular 'Salute to the 40s' weekend at the Chatham Historic Dockyard in Kent. As part of the celebration, members of the Medway AR&TS, led by Brian, G0TAR, activated GB2CAV from the radio room on board *HMS Cavalier* (above). They used the ships donated FT-767 and transmitted through an inverted 'L' antenna that ran up the side of the main mast then aft to another mast. They used the 40m band as much possible but solar activity made conditions intermittent and band hopping was necessary. Over 6000 visitors attended the two days, and over a thousand of those came through the shack. They were fascinated with the ship's old radio equipment.

REGION 11: SOUTH WEST & CHANNEL ISLANDS

Riviera ARC will be celebrating its 5th birthday on 2 January 2017. The club has gone from strength to strength and now offers training and exams with 16 passes to date including 3 Advanced passes.

Callington Amateur Radio Society held an 'open equipment' evening. Equipment was displayed with covers off so that members could look inside the assortment of commercial and homebrew units including ATUs, power supplies, transceivers, mag loops and a RSGB Centenary Receiver. The event generated much discussion with all cover screws accounted for at the end of the evening.

The Severn bridge is 50 years old. To commemorate, **Thornbury and South Gloucestershire ARC** ran GB4SBB. Operating on HF and VHF they made over 50 contacts and had visits from passing amateurs, including a member from **Chepstow ARC** who drove across the Bridge specially. Thanks must go to Ron, M6EAT for supplying the generator, Stan, G0RYM for the big dome tent, and to all the club members who made it a day to remember. The club would also like to thank the site owners for hosting them.



Light Vessel 55 was commissioned by Trinity House in 1885. The Cabot Cruising Club acquired the vessel as a burnt out hulk in 1954 and since then they have restored and repaired the *John Sebastian* as they renamed the vessel to form a permanent Clubhouse. South Bristol ARC operated GB0CCC (Cabot Cruising Club) and this year saw them set up on the stern of the Lightship. The club's new FT-991 was set up with a manual ATU to provide a balun allowing connection to an 80m doublet suspended some 15m above the deck from the scaffold tower that was being used to restore the lantern housing. This allowed an inverted vee configuration with the ends of the doublet secured to the bow and stern. On Saturday the station was manned by Andy, G7KNA, Martin, M0JEA, Eddie, M0LJT, Mark M0SKV and Steve, M6LWR. On Sunday the station was operated by Gary, 2E0HCC, John, 2E0VTT, Andy, G7KNA, Mark, M0SKV and Nigel who is currently studying for his Foundation licence. There were some problems at the start of the day, as it proved impossible to get the system to match on either 80m or 40m. The 80m doublet was replaced with a 40m/20m fan dipole fed by coax via a balun using the internal tuner on the FT-991. There was a final tally of 109 contacts.

REGION 12: EAST & EAST ANGLIA

The Essex Wildlife Trust and the **Thurrock Acorns ARC** joined together to run a radio station at Thameside Nature Park. The station was set up in the visitors centre and attracted quite a few visitors. During the day the radio operators were kept busy talking to both local and overseas amateurs.

Over the Bank holiday, **Braintree and District ARS** held a field weekend; this was hosted by John, M5AJB and was attended by 20 members, partners and guests. Members' transceivers included a 320HF Clansman, Elecraft KX3 and Icom 7300, the latter being demonstrated by Howard G6LXK. Antennas were a 40m loop, centre fed and trap dipoles, 20m portable vertical and HF mobile vehicle mounted, and Dave, G0DEC was on hand to help tune these. Over 40 contacts were made with many Eastern European operators and UK special event stations, taking advantage of the QRM-free location of John's paddock.

This year is the 75th birthday of the Air Cadets and, as part of the celebration, 106 (Orsett Hundred) Squadron, Air Training Corps set up an amateur radio station to work 75 different stations. The station was set up at the Orsett show where the group were helping with the running of the Orsett show. The event started slowly yet despite all the challenges they hit the goal of 75 contacts right at the end of the day.

Norfolk Coast ARS took advantage of the fine late summer weather with a trip down to the beach to test a 40m quarter wave vertical antenna. The objective was to see how the sea water earth and the proximity to the sea affected performance compared with the same antenna set up 600m inland using a local ground earth. Simultaneous transmissions were made and the results from the Reverse Beacon Network monitored. The beach antenna raised a total of 21 beacons and for the most part the S/N reports favoured this antenna – but in two cases the inland antenna gave better results.

Bittern DX Group, attended the Village at War Weekend at Gressenhall Farm and Workhouse Museum in Norfolk activating GB5GFW. They put a special focus on attracting the interest of young people to amateur radio and, in particular, space related operations. At the beginning of August they emailed the FUNcube 1 (AO-73) operations team and asked if a Fitter Message could be put on board the satellite for the event and were delighted when Graham, G3VZV created "This is FUNcube 1 in space calling Gressenhall Farm Workhouse and the Bittern Dxers in Norfolk on Planet Earth. Greetings to all earthlings!" Despite the difficult surroundings and the high levels of local QRM, they were able to receive and decode telemetry and the Fitter Message on both days 'live' for visitors.

In September, Essex Ham held its most impromptu event yet. With good weather forecast, an early morning post was made on social media, and a few hours later, nine people met at Shoebury Beach for an afternoon of radio, experimentation and fun.

REGION 13: EAST MIDLANDS

Chas, M0XCR gave an excellent talk and presentation on Astrophotography and Astronomy to the members of **Spalding & DARS**. This was a follow on to the previous talks and the quality of the images that are obtainable with some modest equipment kept the audience captivated, with many questions throughout.

RAF Waddington ARS received a talk from Bob Fisk, G7AVU on repeaters and the need for support from the amateur community. He explained the work he does to keep the repeaters up and running on Lincoln Cathedral where the two voice and to ATV repeaters are kept.

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Business Cards

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The Tokyo Ham Fair

Most people are aware of the big annual radio gatherings in Dayton and Friedrichshafen but there is a third that may be less well known – the Tokyo Ham Fair.

Tokyo Big Sight, known as Tokyo International Exhibition Center, is the largest in the country.

The Tokyo Ham Fair takes place in late August or early September at the 'Big Sight' International Exhibition Centre in the Tokyo suburb of Ariake. Its format is similar to the US and European events with a huge exhibition hall containing stands from the major radio manufacturers and dealers, as well as a wide range of special interest groups representing almost every aspect of amateur radio. The only significant difference is the absence of a flea market element – though many of the stalls do sell components and equipment linked to their special interest.

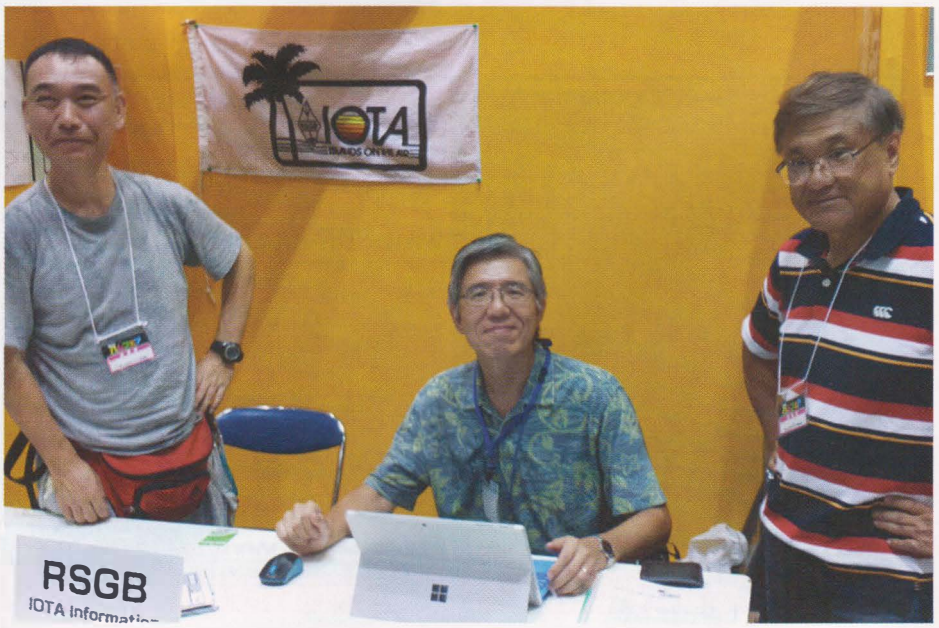
The Ariake area contains a large number of hotels and restaurants, which together with the upper floors of the Big Sight building, host all the associated lectures and meetings. This year the event was held on 20 and 21 August with 25,000 people attending on the first day and 12,000 on the second.

I was invited, along with Michael, G7VJR, by Yutaka, JQ2GYU and his wife Mihoko, JJ2VLY who joined us a few years ago for a DXpedition to Jersey. For me it was great to be back in Japan after a gap of 20 years. Yutaka and Mihoko arranged a full programme of invitations to events including the Tokyo Top Band meeting, the Japan International DX Meeting, the IOTA lunch and the Tokyo 610 DX Group Dinner. We were joined at several of these by Bob, MDOCCE, who had flown in especially for the Ham Fair.

Michael, G7VJR gave presentations on Club Log, both a general introduction and a more specialist analysis of LF propagation data, while I spoke about DXing from the UK's South Atlantic islands. Michael and I were then interviewed by the local Ham's Radio video team.

The Japanese IOTA checkpoint Jim, JA9IFF had a stand in the main hall and was assisted by Take, JI3DST in promoting the IOTA Award Programme, which has over 500 registered Japanese participants. YOTA featured prominently and there was a programme of events for high school students. I understand that there is increasing interest in Japanese participation in the IARU YOTA activities.

It is surprising to me that Japanese amateurs find space for antenna farms in the crowded urban environments in their country but somehow they do – though increasingly it seems they have a remotely controlled station out in the countryside.



Take, JI3DST is on the left of the booth; Jim, JA9IFF is in the middle with a customer on the right.

No trip to Tokyo would have been complete without a visit to the Akihabara area so Yutaka and Mihoko took us for a tour. There were the usual multi-floor consumer electronics emporia showing everything from vacuum cleaners to the latest ultra-HDTV systems but only two amateur radio stores remain. Sadly the prices were not very tempting when converted to sterling.

In 2017 it will be 2-3 September 2017.

Martin Atherton, G3ZAY
g3zay@btinternet.com

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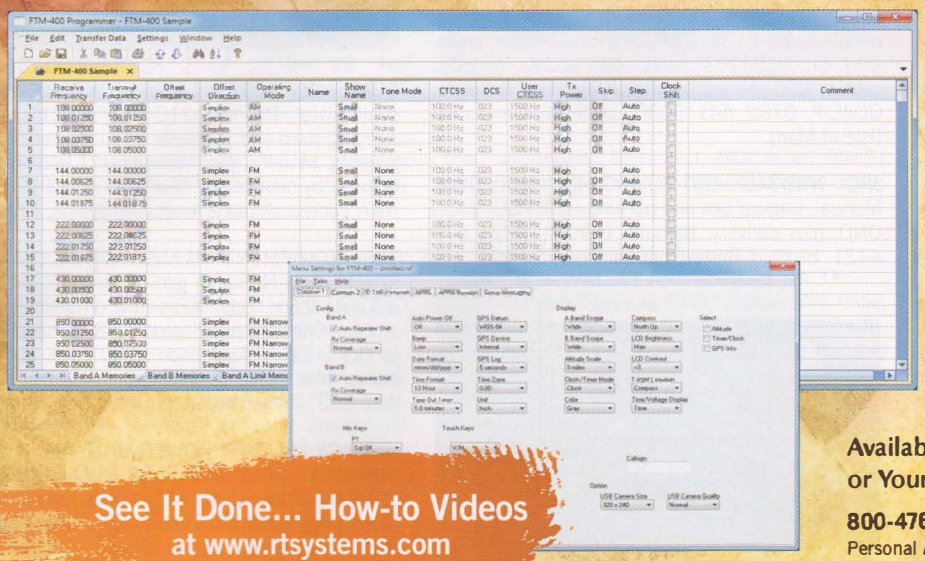

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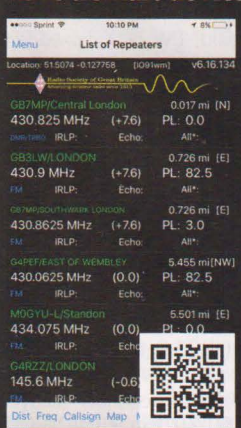

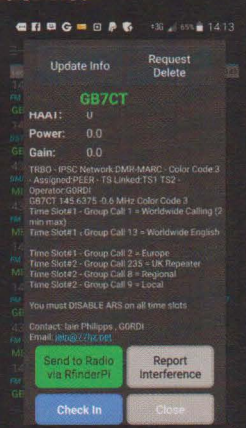

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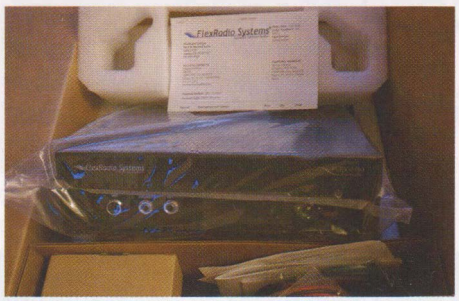
Email your Members' Ad to memads@rsgb.org.uk. You must include your name, callsign, phone number, email address and location (not counted in the 40 word limit). Optionally, attach your own photo of the item (min res 800 x 600, must be in focus and well lit). Max 1 ad per Member per month; other terms & conditions also apply (see tinyurl.com/MemAdsInfo).

FOR SALE

AMP UK DISCOVERY 2. 2m amp, 1200W output. GS35 triode with manual, £825 W F Gliddon, G4NGB, 0771 479 0507, sandy.gliddon@btinternet.com (Woolacombe, North Devon).

ATU MFJ 941E, immaculate, used for QRP. Free postage, £70. Also JIM M75 preamp, £50, post free. Geoff, M1EDF, 01827 830 644 (eves), Geoffrey.m3uxb@gmail.com (Tamworth).

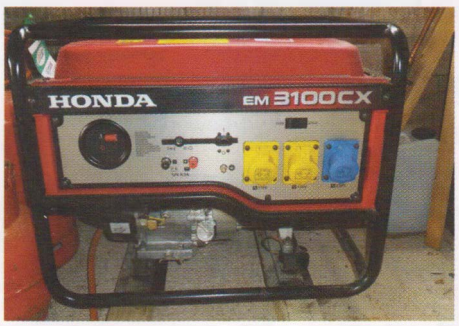
SDR FLEX-6500. Brand new. 2 years original warranty (less two months). Original box, documents still packed, cables, hand mic still packed. Only used a couple of hours Rx only. Same as new. All working as new. Signed delivery included, £3495. M Martin, M0HAO, 0779 891 5510, maxmartin3@yahoo.com (Reading).



FT-2000D with MD100 mic, in very good shape, little used. David, MI0BYR, 0282 954 1461, hrsdv3@aol.com (Coleraine, Northern Ireland).

FT-817ND plus tuning dongle, CAT USB lead, new Sept 2015, £320. Yaesu VR-5000 Rx, £240. FT-60 handy, £60. X1M QRP xcvr, £60. All collect or plus P&P. John, G1AWJ, 07836 244 584, drjmoyle@gmail.com (Shipston-on-Stour).

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. Half original price, £650. Buyer to collect. Ray, G3NKL, 01772 784 997, ray@rayjones.me.uk (Preston, Lancashire).



ICOM IC-706 HF, VHF transceiver, £390. Kenwood TS-50 HF transceiver with matching AT50 autotuner, £415. Both radios little used and very clean. Prefer buyer to check & collect, or pay £15 carriage. Robert, G4IHT, 01285 841 203, robert@riddington.me.uk (Tetbury).

ICOM IC-735 in good condition and fully working with DC lead, mic and handbook, £375 ono. Linear Amp UK SPC tuning unit, as new, £195, both plus carriage at cost or can be collected. Selling OBO GW3FPH. Howarth, GW3TMP, 01352 771 520, jhj43@btinternet.com (Mold, Flintshire).

ICOM IC-7600 mint, boxed, £1500. Yaesu FT-991 one year old, boxed, £700. Bencher chrome iambic paddle, £100. Vibroplex chrome iambic paddle, mint, £125. CT Ham iambic paddle, brass, £90. bhi NEIM1031 with latest update, includes cables, £90. All inc carriage. Colyn Baillie-Searle, GD4EIP, 0762 441 3036, gd4eip@wimanx.net (Isle of Man).

JRC NRD345 100–30,000kHz. Immaculate. Manual, original box and packing, 12V PSU, £330 ONO, plus delivery. Bernard, G8KVM, 0771 679 4431, bernard_rhead@hotmail.com (Staffs).

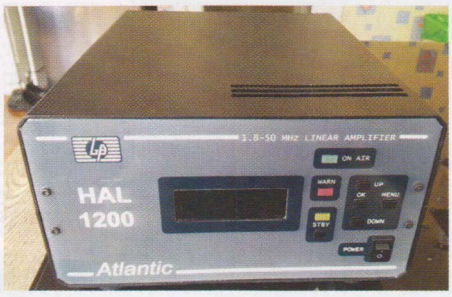
KENWOOD TS-870S, mint, £650 ovno. Icom IC-7000, remote lead, £650 ono. Yaesu FT-221R, muTek, £160 ono. Heathkit SB-102. PSU, spkr, desk mic, gwo, £200 ono. Kenwood TM-V7E, remote lead, gwo, £130 ono. Various test gear, Clansman Tx/Rxs, ancillaries – contact me. Eddy, M5PYE, 07849 615 828, etb@eddyboyd.plus.com (Haverhill, Suffolk).

PRO SIS TEL PST71D rotator & controller (Big Boy). In good working order and condition (small dent in lid of control box). Resent service not used since. Please check spec before you inquire, this is a BIG rotator. £1300 COC. John, M5JON, 0779 961 2065, m5jon@btinternet.com (Bristol).

RCA AR88 RX for free if you come and take it away. Assistance will be required. HEAVY! In GWO, plus headphones, manual, loudspeaker. James, GM3LRG, 01475 724 033 (Greenock).

SILENT KEY SALE. Versatower EP-45 45ft lattice tower, £200. Jaybeam TB3 3-element HF beam, £100. both dismantled, and, sorry, buyer collects. MFJ-962D QRO ATU, £200, carriage extra. Ken, M1SLH, 01235 531 935 (Abingdon, Oxon).

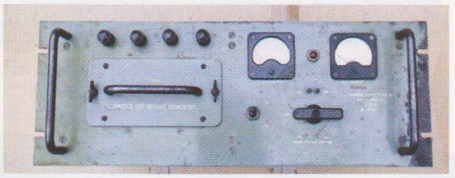
SOLID STATE HF AMPLIFIER 1.2kW HAL 1200 solid state amp, 50MHz to 1.8MHz, auto band switch, RF sense, 25W in, 400W out, SMPS, weight 9kg, 12months old, in VGC, post or collect, £1500 ONO. Dave, M0TAZ, 07506 035 599, m0taz@lefars.org.uk (London).



SONY ICF-2001D AIR/FM/LW/MW/SW PLL synthesised Rx inc 110/220V PSU, manual, carrying strap and 2 remote aerial connectors. Fully working in very good condition. £195 including delivery by courier. Nic Sears, G3YEG, 01983 718 487, Nicsears@talktalk.net (Bembridge, IOW).

TEST EQUIPMENT. Panasonic VP-8120A AM/FM 10kHz-280MHz signal gen. Fluke PM3082/004M 100kHz scope. Both items in good condition. Non smoker. Originally purchased from Stewart of Reading in Oct 2006. Asking price £150 each, collect (or deliver plus P&P). Bruce Hepburn, G8BGI, 01420 475 698, g8bgi@tiscali.co.uk (Bordon, Hants).

VINTAGE MILITARY POWER UNIT Type 3, AM ref 10K/11517, 200V 50mA, 6.3V, contains transformer 250V-0V-250V, VU39 (=MU12/14), two chokes, 3 block paper capacitors (one leaky, bypassed). 4U rack, 15kg, case rusted externally, £15 ono, buyer to transport. Mike, G1MDS, 01483 569 440, g1mds@btinternet.com (Guildford).



YAESU FP/FT-200 xcvr (all black version), £120. Yaesu FR-50B Rx, £65. Various electronic keyers, Kenpro/Katsumi/Daiwa. Yaesu FL-2100Z linear, £325. Yaesu FC-902 ATU, £100. Nigel, G4KZZ, 01723 890 786, nipro@btinternet.com (Filey).

YAESU FT-100 with 500Hz CW filter, SEC-1223 PSU, CW keyer/paddle and headphones. All neatly packaged into a PELI 1600 waterproof case. Total weight 12kg. £250. Gwyn Williams, G4FKH. 0798 407 3007, g4fkh@sky.com (Chelmsford, Essex).

YAESU FT1000 MP MK 5. This former Yaesu flagship, in mint condition, complete with dedicated power supply. Recently checked by local technical expert (named on request), for sale at £999. Prefer collection, or delivery at cost. Anthony Hoyte, 2E0THT, 01621 928 817, thehoytes@hotmail.com (Mayland, Essex).

YAESU FT-840, FM board, CW filter, boxed with mic and manual. Mint condition, £310. Yaesu FT-450 boxed, mic and manual, mint condition, £310. Yaesu switching PSU for FT-757GX. Boxed, mint condition, £40. Prefer buyer collects but can post at cost. Terry, G3VSK, 01709 916 568 (Rotherham).

YAESU FT-847 HF / 50MHz / 70MHz (mod by ML&S) / VHF / UHF, 100W, with manual, £550. Comet CAT-300 ATU with SWR / power meter, 300W, £150. Watson W-25AM PSU, £50. Avair AV-1000 SWR / power meter, £75. David Hepworth, G7ABT, 01427 874 905, dave@djhep.plus.com (Lincolnshire).

ZX MONO 20-2.20 metre monobander ready to sell £150 ono. Watson 50 2/70cm, £15. M0CVS, 01629 823 025 (Matlock, Derbyshire).

WANTED

DATONG MORSE KEYBOARD model MK. In good working order. Will pay reasonable price plus postage. Ernest, ZB2FK, zb2fk@yahoo.com (Gibraltar).

DOES ANYONE HAVE a MFJ 1026 noise cancelling unit for sale? I am being swamped by my neighbour's TV. John, G3EGC, 01204 301 502, jvhoban@gmail.com (Bolton).

DRAKE CONVERTER 2 LF for the 2B. Has anyone got one to offer? Harjo Schroeter, DK3VF, harjo.schroeter@ t-online.de (Hamburg).

Heathkit DX 100 or any 80-100W AM transmitter. Paul Cheshire, M0GMO, 01392 660 246, pchesh-29@hotmail.co.uk (Exeter).

HYGAIN 12AVQ ANTENNA in good condition with manual if possible. Required due to recent change of QTH. Mike, G3XLB, 0151 216 2210, mikegiddings1@yahoo.com (Liverpool).

ICOM AH-703 ANTENNA with instructions. Norman, G0MKP, 01952 822 186, normangrice49@gmail.com (Newport, Shropshire).

KENWOOD-TRIO TS-780 for spares or repair, a cheap worker would be acceptable, collect or courier. G0HZE, 0790 364 0189 (Peterborough).

LSB CRYSTAL 453.5kHz for KW 2000, Vespa or similar (they all used the same type). The original looks like a B7G valve, but any alternative type (or resonator) would also be welcome. Steve, G4HXD, 0778 948 0344, stephen.braund@hawkins.biz (Stone, Staffordshire).

OLD BROADCAST RADIO mains transformer, dropped through chassis type, 200-0-200V and 6.3V 3A, size 3⅞"x 3¼". Jack Braithwaite, G3PWK, 01423 887 560, jack.braithwaite626@btinternet.com (Harrogate).

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 is not listed here then TELL US ABOUT IT by email to radcom@rsgb.org.uk

6 NOVEMBER
56th VERON HAM RADIO CONVENTION
The Americahal, Apeldoorn, The Netherlands.
The Ham Radio Convention opens at 9.30am, parking is €4, admission €9 for non VERON members. Lectures on NVIS by Ben, PE5B; noise sources how to reduce noise by Jan, PA0JMG, André, PA3FIS, Anton, PA0AST and Koos, PA0KDF; Proud 2B PI4YLC, by Mariette, PA1ENG and Claudia, PD5AX; Proud 2B PI4YLC, by Mariette, PA1ENG and Claudia, PD5AX. There will be trophy presentations, trade stands, flea market, homebrew exhibition, young persons area. www.veron.nl

6 NOVEMBER
WEST LONDON RADIO & ELECTRONICS SHOW
Kempton Park Racecourse, Staines Road East, Sunbury on Thames, TW16 5AQ.
The venue has free car parking and disabled facilities. A talk-in station will be in operation. Doors open at 9.50/10am. There will be trade stands, a flea market, a Bring & buy, special interest groups and an RSGB bookstall. A raffle will take place during the day and a lecture stream will be available. There are catering outlets on site. More information from Paul, M0CJX on 08451 650 351 or by email to info@radiofairs.co.uk. [www.radiofairs.co.uk].

6 NOVEMBER
BUSHVALLEY ARC ANNUAL RALLY
United Services Club, 8 Roe Mill Road, Limavady, Co Londonderry BT49 9DF.
Doors open at 11am and the venue has disabled facilities. There will be a Bring & Buy, a talk-in station and trade stands. There will be catering on site and a raffle will be held on the day. More details from Jackie Doyle, MI0JPD on 0788 529 2545 or by email mn0gkl@gmail.com.

19 NOVEMBER
ROCHDALE & DARS TRADITIONAL RADIO RALLY
St Vincent de Paul's, Caldershaw Rd, off Edenfield Rd (A680), Norden, Rochdale OL12 7QR.
Talk-in will be on S22 (145.550MHz). Doors open from 10.30am with disabled visitors gaining access from 10.15am, the event usually finishes around 3pm. Set up is from 8am. The entry is £2.50 with under 12s free. Further details from Dave, G3RIK on 01706 633 400 or by email to rally@radars.me.uk. http://radars.me.uk/rally.htm

20 NOVEMBER
39th CATS RADIO & ELECTRONICS BAZAAR
Oasis Academy Coulsdon, Homefield Road, Old Coulsdon CR5 1ES.
This is a new venue. Pitches are £12.50 when paid in advance or £15 on the day. Trader access from 8am, doors open 10am-2pm. Admission is £1.50 and includes a tea or coffee. There will be traders, a Bring & Buy and a flea market. For more information or bookings, email enquiries@catsradio.org

20 NOVEMBER
PLYMOUTH RADIO RALLY 2016
Harewood House, Plympton, Plymouth, Devon PL7 2AS.
Doors open from 10am to 2pm and admittance is £2. There will be a Bring & Buy, an RSGB bookstall, Special Interest Groups and trade stands. Catering will be available on site. More information from Sheila Hart, 2E0YSH, 01752 668 907, email sheo@fsmail.net.

3 DECEMBER – **SOUTH LANCS WINTER RALLY**

4 DECEMBER – **BISHOP AUCKLAND RAC RALLY**

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. Operating details are provided in an abbreviated form as follows: T = 160m; L = 80 or 40m; H = HF bands (30 - 10m); V = 6 and/or 4m; 2 = 2m; 7 = 70cm; S = satellite and P = packet. Details published here were kindly provided by Ofcom on 22/09/2016.

Date	Callsign	Phonetics	Location	Keeper
01/11	GB4MTR	Great Britain Four Metres	Harlow	MOXTA
08/11	GB0PH	Pontefract Heritage	Carleton, Pontefract	GOBPK
17/11	GB2TAC	The Aeroplane Collection	Ellesmere Port	MONVJ

SILENT KEYS

We regret to record the passing of the following Members:

Mr J W Markwell, G1ABO	
Mr C N Wridgway, G3GGO	24/8/2016
Mr M G Rimmer, G3KDA	20/9/2016
Mr D F Emery, G3ZMF	14/9/2016
Mr J C Churchill, G7SVH	
Mr J T Barnes, GI3USS	18/9/2016
Mr J T C Bell, MOLLE	9/2016
Mr M Towle, M6MHT	9/2016
Mr R Folgate, EA7HGH	14/8/2016

15 JANUARY 2017 – **RED ROSE WINTER RALLY**

5 FEBRUARY 2017 – **32nd CANVEY RADIO AND ELECTRONICS RALLY**

19 FEBRUARY 2017 – **RADIOACTIVE FAIR AT NANTWICH**

26 FEBRUARY 2017 – **CENTRAL COAST AMATEUR RADIO CLUB RALLY**

26 FEBRUARY 2017 – **PENCOED AMATEUR RADIO CLUB TABLE TOP SALE**

4 MARCH 2017 – **LAGAN VALLEY ARS ANNUAL RALLY AND HAMFEST**

5 MARCH 2017 – **EXETER RADIO AND ELECTRONICS RALLY**

9 APRIL 2017 – **NORTHERN AMATEUR RADIO SOCIETIES ASSOCIATION EXHIBITION**

6 MAY 2017 – **SERF 2017**

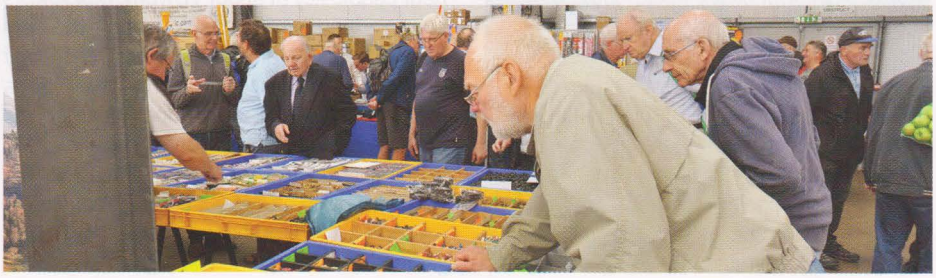
19-21 MAY 2017 – **DAYTON HAMVENTION®** (NEW VENUE see www.hamvention.org)

11 JUNE 2017 – **JUNCTION 28 AMATEUR RADIO RALLY**

25 JUNE 2017 – **WEST OF ENGLAND RADIO RALLY**

14-16 JULY 2017 – **HAM RADIO SHOW, FRIEDRICHSHAFEN**

13 AUGUST 2017 – **FLIGHT REFUELLING ARS HAMFEST**



MY DAY WAS MADE!

John Boaz (son of A E H Boaz)

I fulfilled a lifelong ambition this week – I visited Bletchley Park.

My father was a Voluntary Interceptor (VI) during WWII and I still remember the long evenings he spent with earphones plugged into a radio receiver that none of my friends had and being told to be quiet when I didn't want to be.

The highlight of my day was a visit to the National Radio Centre. My wife and I entered a room where radio amateurs were demonstrating their hobby. I saw a Morse key (attached to a buzzer of course) and started to send. My father had taught me Morse at the age of 10 and I have never forgotten it. The operators in the room stopped, listened and read what I had sent, gave me a certificate and a little Morse key. My day was made!

Thank you.

I'm really pleased that you enjoyed your visit, our volunteers do a fantastic job. Visitor numbers to the National Radio Centre have grown to almost 3000 a month and RSGB Members can, of course, gain free entry to both Bletchley Park and the National Radio Centre by printing the voucher on the RSGB website.

Steve Thomas, M1ACB
RSGB General Manager

COUNTERFEIT ELECTRONIC COMPONENTS

Dr David Kirkby, G8WRB

I read with interest the Homebrew article by EI9GA about making a voltage reference (*RadCom*, October 2016, page 16). The author points out that assembled AD584 voltage reference boards are available on eBay for about £3, which compares favourably with the £10 or more for the integrated circuit. A quick look on eBay shows one can buy a 2.5/5.0/7.5/10.0V voltage reference board using an AD548JH for £2.25 with free shipping from Hong Kong. A check of the Analog Devices website shows a budgetary price for the AD548JH is $8.44 in quantities of 1000+. The fact complete boards are available for considerably less than the 1000+ price of the integrated circuit leads me to suspect the boards are quite likely to be using a counterfeit AD548JH. Counterfeit components could quite likely have poorer performance than a genuine device. Unfortunately, there are a large number of counterfeit devices on eBay, with many originating from China or Hong Kong, where counterfeiting is part of the culture. I've heard of people buying high-capacity AA rechargeable batteries weighing less than the manufacturer gives on the data sheet. Testing revealed the capacity was considerably lower than marked on the battery. I myself bought a supposedly genuine Samsung battery for my mobile phone. The phone displayed all sorts of problems, which were immediately resolved when I inserted a battery I purchased from the Samsung website.

If you want to be *reasonably confident* that a component is not a counterfeit, then buy from a reputable dealer and avoid auction sites. I write reasonably confident, rather than *100% certain*, as even reputable dealers can inadvertently get counterfeit devices, despite all the measures they take to avoid this. I've been told that counterfeit components have even made it into military equipment.

Caveat emptor – let the buyer beware.

MORSE – WHAT'S THE POINT?

Bob, G4PVB

In response to John Fletcher, G4EDX's letter in October's *RadCom* on Morse, the best kept secret of amateur radio is the Czech Morse Key. Buy via Google or eBay, for example, from Slovakia for around £38.

Johnny J, G3LIV

I too enjoyed the input by GM0SIM on the CW situation in his article in the September *RadCom*. Some would say I was lucky, National Service in the RAF and 26 weeks of "you will learn it, laddy" – and I did.

In reply to the letter by G4EDX in October's *RadCom*. Yes, keys seem to be made of gold now don't they? They are a work of machining art, I have to admit.

I trained in the RAF with a straight key that was TYPE D. This is a big brown covered key but what a lovely movement! They go at various rallies for around £25, although some have cracked or no covers, which is a shame (it was joked that you could crack open walnuts under the contacts!). They do look a bit out of the Ark, but so am I now so who cares. If you don't like it, there is enough brass in it, if scrapped, to cover the purchase price.

I bought mine from eBay for around £15, although I admit I am a Vibroplex Bug or Iambic lover now.

Rod, M0KRP

Like John Fletcher, G4EXD October issue, I also enjoyed reading Ian Simpson, GM0SIM's article Morse... What's the point?

I learnt Morse code while studying for the Foundation Licence in 2007. Sam, G0SBI (now sadly SK) got me up to speed at 9wpm. These days, I use a WWII straight key and a Kent paddle key at about 18wpm. Morse keys are an expensive item as you say. I tried my hand at making an interface for CW for my old laptop to transceiver, using *CWTYPE* as the program, and it works fine, although my computer skills are almost non existent.

I thought it might be a good thing for the youngsters coming into our hobby as computers are used for SDR and data modes and it might get them into using and leaning CW.

May, GW3OMN

I enjoyed the letter from John Fletcher, G4EDX on Morse. There are plenty of cheap Morse keys on eBay, starting at £3.99. My own cost me about that in 1981 and still works well, though my Morse is rather rusty!

GERALD MARCUSE MEMORIAL

David Fill, G3UBB

On a recent visit to Bosham church in West Sussex I was interested to see the historical connections with Kings Harold and Canute and also with the Bayeux Tapestry – all of which I was already aware. What I came across unexpectedly, just outside the churchyard wall, was a bench with a plaque commemorating Gerald Marcuse, G2NM, President of the RSGB 1929 – 30 and founder of RAOTA. It occurred to me that this might be of interest to newer readers of *RadCom*.

For those that don't know, in 1927, Gerald Marcuse, G2NM, made successful contact with an amateur on the island of Bermuda. This trans-Atlantic communication grew into regular communication and the Bermudan radio operator often re-broadcast voice communications and sometimes radio programming from England to others in the Caribbean. From this, the concept of broadcasting on short wave to the British Empire grew. G2NM applied for a permit to broadcast regular programming and was granted to broadcast speech and music for two hours daily, on 23 and 33 meters with a power limit of 1kW for an experimental period of six months. On 11 September 1927 the first Empire Broadcast from G2NM took place – a concert program. His Empire Broadcasts were on the air almost daily for almost a year – five years before the BBC started its own Empire Service. His station was at Caterham in Surrey. In 1944, G2NM and his family moved to Tidewaters, Bosham.

WHY WE SHOULD BE MEMBERS

Howard Murray G3NBY

Ref the excellent letter from Brian Wallace, G7MVN in October *RadCom* on why we should be Members. I could not possibly agree more. Ofcom would be in there like an eagle given half a chance. Our defence is the RSGB.

However, it needs to be pointed out that in the UK amateur radio is not a privilege. We are subjects of Crown nation and have legal rights, not privileges.

JOIN THE SOCIETY!

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DO YOU RECOGNISE THIS?

John, G3XDY

You have probably had several replies already about the picture on P97 of this month's *RadCom* (October 2016), but just in case, it looks a lot like Geoff Stone, G3FZL as the operator of GB3RS/A.

Mike, G3JKX

The photo shows an ex-President of the RSGB (1964), named Geoff who was my boss for a time whilst in the RAF. His name and callsign have gone from this 80 year old brain but I am sure it is him though.

Thank you to those that recognised the operator in the photo. Geoff, G3FZL was also the VHF Committee chair in the 1970s and was involved in reporting back to the RSGB Council on the work being done by the Pye Telecommunications ARG on a new technology – a repeater station.

100th BIRTHDAY

John Tuke, GM3BST

Re the news item on a 100th birthday tribute in *RadCom* page 14 September 2016. Life in an oldies home is seldom filled with joy – but just look at that Tx in the picture. That is real radio – not these things you can lose down the back of the sofa!

GETTING SOFTWARE INSTALLED

Bernard John Park, G0AJZ

I have been upgrading my Flex 5000a to the Flex 6500, and I installed SDR 1.9. No problems with that and the rig worked seamlessly on all modes. So I decided to install 3rd party software (*FLdidgi, wsjt-x, Ham Radio Deluxe, dm780,* and *CW Skimmer*). Nothing I tried worked – and I tried everything. So I contacted Flex Support; who advised that Neil Campbell would help via Team Viewer and would take about four hours. After he tried without success we decided that my computer was just not up to the job anymore. So, armed with a new computer, I made a new appointment with Neil and everything went without a hitch – and on a Sunday too. Well worth everything involved.

QRZ AND HAMCALL

Fred, G3YJQ

Could I ask users of the excellent sites as QRZ.com and HamCall to think about their entries. If you prefer to use a shortened version of your name on the air, please use it on the site too. It helps keep contacts friendly.

If you have data on both data bases, please synchronise them. I have often discovered that the LOC (location) is different on HamCall and sometimes even the whole address. We are all in the game of communication, so please can we do it properly and make life easy for all of us.

DUTCH 70cm REPEATERS

John Ballantyne, G8AKF

For some time I have been wondering what is going on with Dutch 70cm repeaters.I think I have at last got to the bottom of it, CoVersity!

The Nederlanders have two common channel, wide area, 70cm repeaters. PI2NOS on 430.125 (national coverage) and PI2NON 430.275 (north-east Nederland). Until I began researching why these two repeaters often had 'flutter' or sometimes slow deep fades, I knew nothing of these techniques of covering wide areas with a single frequency, multiple Rx and Tx sites.

We are aware of this Dutch network that appears to employ an improvement on quasi sync techniques, which were used in the 1980s. We have no requirement at this time from any group or groups for such a system nor would we wish to sterilise valuable frequencies on a national basis.

John, GI4BWM

Chair, Emerging Technology Coordination Committee

TERRY BARNES, GI3USS SK

Stewart Mackay, GI4OCK

Terry Barnes, GI3USS, a former RSGB President, passed away on Sunday, 18 September 2016. He was 85.

Terry was a big man in every way – big in stature and big in spirit – and was a major influence in amateur radio, not only in Northern Ireland, but throughout the UK and further afield.

After getting his 'ticket' in the mid-1950s he was unable, through pressure of work, marriage and raising a young family, to devote as much time as he would have liked to his hobby, but within the next 10 years, along with a handful of like-minded enthusiasts, he helped form Bangor & District Amateur Radio Society in his home town. He became Treasurer and, until illness curtailed his activities a few years ago, held the position without a break ever since. The club he started in 1967 celebrates its 50th anniversary next year.

Not only a familiar figure at rallies throughout GI, Terry was instantly recognised wherever amateur radio was being discussed – even in the States. Installed as RSGB President in 1992, he and executive Vice-President Peter Chadwick, G3RZP, made the first RSGB foray to the Dayton Hamvention running a small booth selling books and memberships. So profitable was the venture that it has continued ever since. Terry managed to have his Presidential Installation in Bangor's prestigious Town Hall council chamber, surrounded by wood pannelling and chandeliers – a far cry from the RSGB HQ flat he used when visiting the offices that were then at Potters Bar.

Terry spent his working life in communications and had amassed a large and varied assortment of radio gear over the years. Peter recalls Terry's excitement at one of their meals when he told them about the Labgear LG300AM and CW transmitter he had just acquired and his problems in trying to get it all back home. He eventually did, of course.

Terry set up the very first RAYNET in Northern Ireland. In the mid-60s he provided HF communication for the Red Cross and later became the Controller of the Belfast and Down RAYNET Group.

BBC journalist Keith Burnside, GI4IYO, has fond memories of co-controlling the Ulster Grand Prix motorcycle races with Terry.

The main rig was a Pye Westminster and they then set up emergency links for Mourne Wall walk that entailed using a number of fixed and mobile stations and setting up a 4m (AM) link through the Mourne Mountains.

Terry Barnes, GI3USS, was one of only a handful of RSGB Presidents from Northern Ireland – among them Ian Kyle, GI8AYZ; Jeff Smith, MI0AEX; Barney Petterson, GI3KYP; and Willie McClintock G3VPK (not a GI callsign, but he was born in Ballymena).

Terry's beloved wife Yvonne pre-deceased him by about seven years and he is survived by a daughter and two sons.

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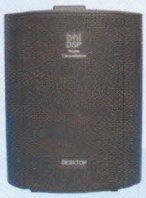

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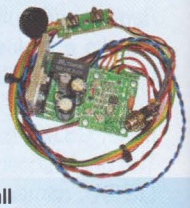

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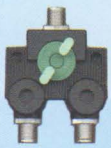

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