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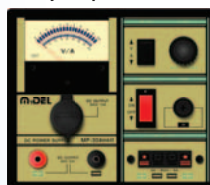
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Main cover image
by Kevin Williams, M6CYB

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

Managing Editor: Elaine Richards, G4LFM, elaine.richards@rsgb.org.uk

Technical Editor: Giles Read, G1MFG, giles.read@rsgb.org.uk

Layout and Design: Kevin Williams, M6CYB, kevin.williams@rsgb.org.uk

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

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RadCom Basics for Members new to the hobby can be found at www.rsgb.org/radcom-basics/
Abbreviations and acronyms we use are listed at <http://tinyurl.com/RC-acronyms>



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Strategy in action



This time of year is always particularly busy for us at the RSGB with some great opportunities to meet radio amateurs across the country and, indeed, from around the world. That was enhanced this year with YOTA 2017 in August when some of us had the privilege of spending a week with 80 enthusiastic, fun and

knowledgeable youngsters from 26 countries.

In September our President, Nick Henwood, G3RWF, attended the IARU R1 Conference with a number of other expert RSGB volunteers. On behalf of the UK, the Society contributed a record 26 papers out of a total of over 140 on the agenda – more than any other country. The RSGB team represented the needs of all radio amateurs in areas such as HF, VHF-Microwave, EMC and Youth & Growth. Our video *The future of amateur radio* sparked discussions by sharing the visions of young radio amateurs for developing amateur radio, not only as a hobby but with links to the professional worlds of electronics and wireless communications.

Closer to home, our Electromagnetic Compatibility Committee (EMCC) has been gathering data from radio amateurs about VDSL interference to present to Ofcom and the results have been significant. You can read more about the results in this *RadCom* issue and the January edition.

The National Hamfest and the RSGB Convention are two annual events where radio amateurs can meet and chat to RSGB staff and volunteers about a variety of topics. The breadth of expert lectures at each Convention is notable and inspires radio amateurs not only to try something new or develop their current interests but also to hear of cutting-edge changes in the technologies that are used. This year there were three presentations that linked with the RSGB's strategy for 2022:

- Board Director Steve Hartley, GOFUW explained more about the Strategy itself
- President Nick Henwood, G3RWF gave a progress report on the Breaking the mould - clubs and groups for the 21st Century project
- Youth Committee Deputy Chair Milo Noblet, MOILO provided a summary of the successful YOTA 2017 event and a brief look at how we will be building on it

“We take every opportunity to engage with members, representing them nationally and internationally”

Communicating what we do is always a challenge but the success of YOTA 2017 was also mirrored in the extensive reach of our communications. Across social media, videos and video blogs (vlogs), print and online news in both amateur radio and mainstream outlets our potential reach was 4.6 million. We also created a new web page bringing together live news and social media updates to make it easier for people to see everything in one place.

All of these things are linked closely with our eight strategic priorities and our overarching goal “To have an active and thriving radio amateur community supported by a strong, representative and influential RSGB”.

At Hamfest, the President, Chairman, General Manager and Communications Manager explored some of these issues further in a short film made by TX Factor. The film also explains in more detail how we are working hard to improve our communication with Members and to explain amateur radio more effectively to the wider public: www.rsgb.org/strategy-videos

As a Society we take every opportunity to engage with Members, represent them nationally and internationally, as well as communicate with them in more effective ways. You can find out more about the Strategy on our website: www.rsgb.org/strategy

Steve Thomas, M1ACB, RSGB General Manager and
Heather Parsons, Communications Manager



BBC Director General Opens G8BBC

Lord (Tony) Hall, Director General of the BBC today officially opened the new amateur radio shack at the historic Broadcasting House in central London, headquarters of the BBC. After cutting the ribbon at the door to the new radio room housing club station G8BBC, Lord Hall passed a greetings message over the air on the 40m band to GB2RN on board *HMS Belfast*. The event was well attended, with RSGB Board Member Steve Hartley, GOFUW, TX Factor, ICQ podcast and *Practical Wireless* present.

Christmas Message



As we come to the end of 2017, I offer the Society's warmest greetings of the season to all its Members. Thank you for your continued support of the RSGB that means so much for the future of the amateur radio service in the UK. Of course, it is possible to be a radio amateur without being an RSGB Member but it is our Members who ensure that views are heard where it matters. A sincere thank you to you all.

2017 has been a busy and particularly important year. There was an International Amateur Radio Union Conference in Germany that was well-attended by our expert volunteers. Crucial issues such as spectrum management and rising levels of interference were discussed. We all know the importance of such matters to our enjoyment and satisfaction as radio amateurs.

In fact, we have just published results of our VDSL interference survey that has produced important new evidence for use in discussions with Ofcom about the broadband noise problems we face in the UK. Thanks to all those who took part.

This year will also be remembered for the International Youngsters on the Air (YOTA) camp at Gilwell Park. Generously supported by many people, it was a great success and gave a big boost to our profile nationally and internationally. Both the National Hamfest at Newark and the record-breaking RSGB Convention also went well and they were both great opportunities to meet and chat to large numbers of radio amateurs. Among much else that has happened this year, I should mention further progress in the development of contests and the introduction of online examinations.

The Society is very active and next year we shall continue to implement our five-year plan for the future – our Strategy 2022.

Thank you for all you have done and enjoy a happy and joyful festive season.

Nick Henwood, G3RWF
RSGB President

RSGB Construction Competition

The RSGB Construction Competition 2017, sponsored by Martin Lynch and Sons, was judged at the RSGB Convention by Alwyn Seeds, G8DOH, Bob Beebe, GU4YOX and Ian White, GM3SEK. Congratulations to all the category winners:

Judges Merit went to Dean Brice, GOUIL, from RAIBC for the RAIBC Talking Shack Manager. **Beginner** went to Peter Barnes, MOSWN, for the Time Difference of Arrival Direction Finder. **Construction** went to Dr Heather Lomond, MOHMO, for the Digital Power and VSWR Meter. **Innovation** and overall winner of the Pat Hawker G3VA trophy went to David Crump, G8GKQ, for the Portsdown Integrated ATV Transceiver



Raffle winners at Hamfest

Thanks to the generosity of bhi Ltd, Kenwood Communications, Yaesu UK, Sandpiper Aerials, KMK UK Ltd, Continental Compliance Ltd and Moonraker several visitors went home with raffle prizes. These prizes included a Yaesu FT-65, Moonraker MT-270, Kenwood TH-20E, vouchers and antennas. Congratulations to all the winners and grateful thanks to the companies that donated the prizes. The dates for next year's National Hamfest are 28 and 29 September.

Region 5 DRM wanted

Martyn Vincent, G3UKV, Regional Manager for West Midlands (Region 5) is on the lookout for a new Deputy Regional Manager to cover the northern (Staffordshire) and eastern (Warwickshire) sides of the region. The volunteer must be an enthusiastic radio amateur, willing to promote our unique hobby and the RSGB, through occasional visits to a modest number of local radio clubs (currently about 8 in number), taking ideas and opinions of individuals and groups back to the Regional Manager, as well as offering guidance or relevant information where appropriate. A brief quarterly report to the RM is expected by the person taking up this appointment. Training and support will be available to the appointee, together with reasonable expenses. For further information, or just a chat about what the appointment entails, contact Martyn by email to rm5@rsgb.org.uk or phone 01952 255 416.

GB17YOTA on the air

After the huge success of YOTA 2017 (Youngsters On The Air) hosted by the RSGB in August, YOTA Month is December and clubs from all over the UK will be hosting GB17YOTA keeping the YOTA energy alive. YOTA Month aims to bring new young people in to amateur radio by hosting a special event station and allowing young people to send greeting messages so they experience first-hand what amateur radio is like. At the time of writing, we are still receiving applications, so check the website to see if there have been more names added to the clubs participating in YOTA Month. The current clubs and dates hosting GB17YOTA are:

Dec 1: Sandringham School radio club
 Dec 2: RSGB Region 7 Youth Committee Rep, Will Davies
 Dec 3: Wessex Contest Group
 Dec 5: Carrickfergus ARG
 Dec 6: Southampton University Wireless Society
 Dec 7: Chertsey Radio Club
 Dec 8: Hilderstone Radio Club
 Dec 9: Worksop ARS
 Dec 10: Mid-Ulster ARC
 Dec 12: Worcester Radio Amateurs Association
 Dec 13: Aberystwyth & District ARS
 Dec 14: Swansea Radio Society
 Dec 15: Silcoates School
 Dec 16/17: Durham & District ARS
 Dec 20-22: Castle Rushen High School
 Dec 23/24: Mid-Ulster ARC
 Dec 28: Leicester RS
 Dec 29: Telford & DARS
 Dec 30/31: National Radio Centre



George, now MOUKK, operating GB16YOTA from the National Radio Centre last year.

If you are on the air then make contact with these stations, you can get a special YOTA Month QSL card and YOTA are also running the YOTA Month Award. More information about YOTA month can be found on the RSGB website at www.rsgb.org/yota-month Information on the IARU YOTA programme can be found at www.ham-yota.com

Could you host a Train the Trainers event?

The RSGB is looking for enquiries from clubs interested in hosting Train the Trainers during 2018. There are currently four slots available spread over the year.

We would be particularly interested in hearing from clubs in areas not yet served by an event, eg North Wales/Flint (Flint-Wrexham-Chester area); Midlands – 30 mile radius of Birmingham; North West (Penrith-Carlisle-Dumfries): Southwest (Bath-Swindon-Salisbury area)

You will need a large room capable of comfortably seating 20 delegates available on a Saturday between 9am and 5pm; projector, screen and white board; tea and coffee available all day and somewhere nearby delegates can buy lunch. 4G coverage at the venue is essential if we bring a hot-spot or broadband Wi-Fi.

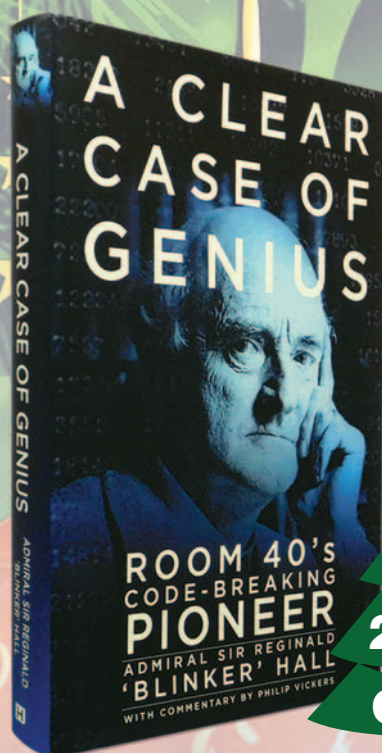
We ask that a representative from your club co-ordinates bookings and publicises the course among your own and nearby clubs. (Your local RM and DRM should be able to support you with this). We need

between 20 and 25 delegates to attend to make the course viable. Train the Trainers is free to RSGB Members. RSGB make no charge for the course. Hosting clubs provide the venue but may make a non-profit charge to delegates to recover the cost of room hire and refreshments.

For more information please contact David Evans, GOEVA, RSGB TEC Train the Trainers Lead, by email to g0eva@aol.co.uk



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TITLES**



A Clear Case of Genius *Room 40's Code-breaking Pioneer*

By Admiral Sir Reginald 'Blinker' Hall

In 1933, the Admiralty banned 'Blinker' Hall from publishing his autobiography and for those that know the story of Room 40 code breaking, a fore runner to Bletchley Park, this is not a surprise, but here, for the first time, *A Clear Case of Genius* presents his story in his own words.

From the chapters that have survived from his autobiography you can now read what the renowned spymaster had to say about the British Naval Intelligence - the pinnacle of the world's secret intelligence services. He explores the function of secret intelligence in wartime, censorship and subterfuge. He even writes about the significance of Churchill in the disastrous Dardanelles (Gallipoli) campaign. There is much about the famous Zimmermann Telegram and its perhaps pivotal role in the USA's entry to the First World War. 'Blinker' Hall was clearly at the centre of the code breaking in WWI and *A Clear Case of Genius* portrays the inner workings and successes of Room 40.

A Clear Case of Genius is not only the original autobiography but has extensive supporting explanatory text and images from well-known author Philip Vickers. Renowned author and expert, Nigel West also provides a foreword that sets the book in its true historical context.

Presented in a hardback format *A Clear Case of Genius* provides a unique insight into the thinking of one of Britain's pioneering intelligence leaders and a fascinating insight into code breaking before Bletchley Park came into existence.

Size 164x242mm, 224 pages

ISBN: 9780750982658

Non Members' £20.00

RSGB Members' £14.99 (25% off)



Lorenz *Breaking Hitler's Top Secret Code at Bletchley Park*

By Jerry Roberts

Many know the story of Bletchley Park and the breaking of the Enigma machine codes in WWII. Few however know the story of the breaking of another German cipher machine, used by Hitler himself to convey messages to his top generals in the field. A machine more complex and secure than Enigma - a machine called 'Lorenz', that the Germans believed could never be broken.

For sixty years, no one knew about Lorenz or 'Tunny', or the determined group of men who finally broke the code and thus changed the course of the war. During the war Bletchley Park broke around 64,000 Lorenz encoded messages. It is true that the information in these was used to alter the course of WWII. Information for example was passed to the Russians warning of the German offensive at Kursk that allowed a Russian build up that completely altered the potential outcome of the Battle of Kursk. During the D-Day landings, decrypts also showed the Germans had fallen for the Par-de-Calais ruse that kept vital reinforcements from being sent to Normandy. Here, for the first time, senior codebreaker Captain Jerry Roberts tells the complete story of this extraordinary feat of intellect and of his struggle to get his wartime colleagues the recognition they deserve. The work carried out at Bletchley Park to partially automate the process of breaking Lorenz, was ground breaking and is recognised as having kick-started the modern computer age.

Lorenz provides an insight into perhaps one of the most important parts of the codebreaking carried out at Bletchley Park and is thoroughly recommended reading.

Size: 164x242mm, 240 pages

ISBN: 9780750978859

Non Members' £20.00

RSGB Members' £11.99 (40% off)



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

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

QSL Matters

With summer behind us, QSL cards are again arriving at the bureau in larger numbers. By the end of the year, QSL sub-managers will see larger quantities to be sorted and put into your envelopes, so please make sure you have sufficient, correctly identified stamped addressed envelopes lodged with the correct sub-manager. If you are unsure about sending collection envelopes, see the *Receiving Cards from the Bureau* page by following links from the *Operating* section of the RSGB website, or in the *2018 RSGB Yearbook*.

We are now in the 5th year of the RSGB's Responsible QSLing agenda and evidence shows that Members using standard size, 140 x 90mm, cards is making a real difference against rising shipping costs. Something that's really helping – thank you. Large/heavy cards, estimated at 36% per outgoing box in 2012, are now down to 20% and I'm sure we can get that lower still. With next year no doubt bringing another price rise in shipping costs, we need all Members to help bring that percentage down again. It's not just about cost. Experience proves standard cards definitely travel and arrive in much better condition, as we seen from damaged cards returned from overseas. Larger cards are often more difficult to keep or display and many contain no more information than smaller cards. There are many specialist QSL card makers, some excellent ones here in the UK and abroad. Just look at the adverts in *RadCom* or use your favourite Search Engine to see excellent examples of suitable QSL cards.

Finally, for those QSLing direct to overseas bureau, the OE bureau has a new address: OeSV QSL Bureau. Industriezentrum No-sud Strasse 14, Objekt 31, A-2351 Wr Neudorf, Austria.

BEM Investiture



Bob Glasgow BEM, GM4UYZ was officially invested having been awarded the British Empire Medal in the Queen's June Honours List, partly for his work in amateur radio.

Congratulations

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

70 years		50 years	
Mr G Cripps	G3DWW	Mr G N Bath	G3NMZ
Mr D J Durran	G3MUI	Mr L Thompson	G3VYZ
Mr J Hayes	GW3FPH	Mr J Matthews	G3WZT
		Ian Sneap	G3ZYC
60 years		Mr M E Costello	G3YPP
Mr M Williams	GW3LCQ	Mr D Dalton	G3ZLJ
		Mr M Crofts	G4DYW
		Mr PT Gaskin	G8AYY
		Mr T N Hordley	G8BXQ
		Mr E M Jakins	G8HKP
		Dr L C Waring	GI3WUO
		Dr W M Arnold	ZL2YET

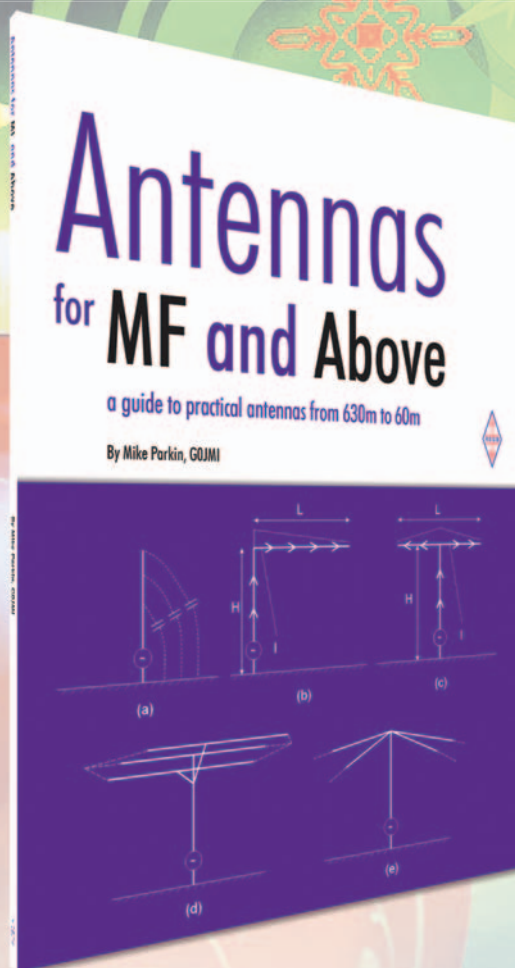
The RSGB would like to welcome to the RSGB family the following new Members who have joined their voice to ours and are helping to keep the RSGB strong.

Mr D Darling, 2E0LDD	Mr M Gosztyla, M0ADM	Mr M Corcoran, M6OPQ	Mr M Cowperthwaite, RS314399	Mr A Page, RS314557
Mr L McGaughey, 2E0CJA	Mr G Craioveanu, MOHZF	Mr P Curtis, M6PTU	Mr R M Clay, RS314400	Mr E Bews, RS314560
Mr P Brown, 2E0KPY	Mr J Mowlam, M3WJU	Mr A Tyrrell, M6TXL	Mr G Turner, RS314401	Mr S Vellaichamy, RS314561
Mr D Baker, 2E0MFV	Mr J Speakman, M6EZJ	Mr A Tomlinson, M6UYP	Master B Attwood, RS314403	Mr T Palmer, RS314594
Mr P Chapman, 2E0PGY	Mr J Webb, M6HMQ	Mr W Andrews, M6WMX	Miss T Jarvis-Surgeon, RS314405	Mr R Froggatt, RS314631
Mr R Back, 2E0RIQ	Mr J Hobbs, M6HQD	Mr M Graves, M6YDZ	Mr D Cunningham, RS314406	Mr K Kabir, RS314653
Miss R Devos, 2E0SHH	Mr A Pyatt, M6HYG	Mr G McLeman, MM3AWA	Mr R McDonnell, RS314407	Mr A Altounyan, RS314665
Mr S Probert, 2E0SWP	Mr T Baker, M6IPU	Mr D Cowe, MM6KMU	Mr W Fellows, RS314416	Mr N Stevenson, RS314669
Mr B Ely, G3TGB	Mr L Bailey, M6JUV	Mr P Toner, MM6RPN	Mr S Rawles, RS314417	Mr S J Proverbs, RS314686
Mr S K N Edwards, G6IPT	Mr J Heng, M6KLI	Dr J Moore, MW0IJE	Mr S Parfitt, RS314429	Mr S Dawes, RS314699
Mr R Johnston, G7MHF	Mr C Sharp, M6KQX	Mr J Williams, MW6JZJ	Mr P I Ralph, RS314433	Mr S Martin, RS314700
Mr R Brown, G6IVJ	Mr H Klettke, M6KQC	Mr M Locke, MW6OTT	Mr B Wood, RS314446	Mr R Marshall, RS314701
Mr G Zanon, IW2JJS	Mr L Barlow, M6KQP	Mr M Ouseley, MW6URI	Mr G Ramsey, RS314460	Mr C Ward, RS314709
Mr G De Filippo, IZ7QSS	Mr S Mercer, M6KTB	Mr J Tschirren, N0PP	Mr G Wheeler, RS314498	Mr C Lofgren, W6JJZ
Mr K Zutavern, K4ZUT	Mr C Elliott, M6KUC	Mr P Thompson, N3EVL	Mr A Fraley, RS314525	Mr K Murphy, W8VOS
Mr J Carr, K5AJ	Mr A Michael, M6KUG	Mr G Lewis, N5XO	Dr C Oxley, RS314531	
Mr W Eareckson, KDONPT	Dr D Roberts, M6LLK	Mr C Frearson, RS300835	Mr B Clark, RS314536	
Mr G Kwitka, KE0DMC	Mrs D Andrews, M6NCW	Mr D Munn, RS308621	Mr B Jako, RS314542	
Mr J P Fernandez Silva, LU5ARC	Mr M Broum, M6OKQ	Mr G L Jones, RS313524		
	Mr P Ellis, M600A	Mr N Wood, RS314186		

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

Mr E Lamote, ON4AEY	Mr P Travers, G1HEW	Mr J B Abbisshaw, G6CQH	Mr R W Brooks, GW1JFV	Mr D M Peck, M6AOC
Mr S Watson, 2E0ADR	Mr M R Guthrie, G1NOX	Mr L Hagger, G6HSW	Mr S R Major, M0AKT	Mr C J Howell, M6KXE
Mr S C Preston, 2E0BHY	Mr G Tierney, G1NVQ	Mr I T Webb, G6TNW	Mr M Jukes, M0JMJ	Mr I Hyde, M6LBI
Mr A Booth, 2E0ZXV	Mr A C L Peek, G1WQX	Mr D De Silva, G7AGI	Mr N Kimber, M0KBH	Mr S P Lycett, M6SPL
Mr W T Pitt, 2E1SKA	Mr S J Fox, G4FAB	Mr K R Cowdell, G8BDZ	Mr M C Robins, M0MCR	Mr S Poyser, MW0GSR
Mr P J Watts, G0FQB	Mr D Roberts, G4FDR	Mr R W S Whitby, G8ENB	Miss L Hendry, M0OCL	Mr C Burke, MW0USK
Mr P S Taylor, G0ILO	Mr G Dennick, G4MFK	Mr P M Jessop, G8KGV	Mr G Temple, M1CDU	Mr E R Vos, PA3GVQ
Dr W S Barker, G0MVV	Mr P Evans, G4RUJ	Mr E Brown, G8LUV	Mr F J H Bate, M1FJH	Mr A Smith, RS185607
Mr M Jones, G0OQT	Mr C A Baverstock, G4WCK	Mr W E Hay, G14RXT	Ms S Elliott, M1SJE	
Mr K A Green, G0SEW	Mr P S Rogers, G4ZBA	Mr D A Smillie, GM4FKD	Mr M R Dance, M3HUA	
Mr J T Stockwell, G0XBJ	Mr T Stocks, G4ZGE	Mr D A Wallace, GM7LWC	Mr R Dewes, M3RDV	
Mr T Worthington, G1GUT	Mr J Pell, G6CMX	Mr K J Brazier, GW0FOL	Mr D Rolfe, M3YFY	

NEW
TITLE



Antennas for MF and Above

A guide to practical antennas from 630m to 60m

By Mike Parkin, G0JMI

Written by *RadCom* antenna guru Mike Parkin, this is a book that provides exactly what is says on the cover. *Antennas for MF and Above* is a practical guide to antennas for the relatively new 630m band, 160m, 80m and equally new 60m band.

This book is aimed at the constructor, or those who are curious to understand in further detail the theoretical aspects of the antenna techniques used on these bands. Rather than concentrating on single bands, Mike shows how you can often use the same approach or even the same antenna to work two or more bands. There are examples of how a 160m antenna can be pressed into service on 630m or even 80m ones that can be made to work on 160 and 60m. There are also specialised chapters covering, for example, antennas for 630m.

You will find examples of single band and multi-band working designs for both vertical and horizontally polarised antennas. There are explanations of the operation of antennas with radiation pattern diagrams used to help with understanding the concepts introduced. You will also find practical techniques for matching the antenna to the transmission line, which are covered using examples of baluns, transformers and ATUs to illustrate these methods.

If you are interested in experimenting with the bands below 40m, you are sure to find much to interest you in this book. *Antennas for MF and Above* is without doubt one of amateur radio's standard reference works and THE practical guide for everyone interested in antennas for the amateur bands from 630m to 60m.

Size 174x240mm, 112 pages
ISBN: 9781 9101 9346 4
Non Members' £11.99
RSGB Members' £10.19

Also available on

amazonkindle



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

CWops Award

CWops has announced the 2017 recipients of the CWops Award for Advancing the Art of CW.

Roger Cooke, G3LDI (right) is a recipient in recognition of his many years of successful efforts in advancing the art of CW including being the GB2CW Coordinator for the RSGB, on-the-air code practice, teaching Morse code, and his book *Morse Code for Radio Amateurs*, currently in its 12th edition.

Boy Scouts of America received an award in recognition of its outstanding programmes over the years that advance the art of communicating with Morse code.



TX Factor

The next episode of TX Factor is released on 17 November and is packed with interesting features on all aspects of amateur radio. For this show, the team attended both days of the National Hamfest at Newark and bring you the inside track on the latest products from the big manufacturers and the smaller independent companies. The team looks at Yaesu's new System Fusion 2 repeaters, the long-awaited Icom IC-7610 HF transceiver and gets a sneak preview of an exciting high-spec receiver, the IC-R8600. If you weren't able to attend Hamfest this year, episode 19 brings you the best of the UK's biggest amateur radio event.

It's a couple of years since TX Factor interviewed Don Field, G3XTT the Editor of *Practical Wireless*. Pete Sipple, MOPSX caught up with him at Hamfest to find out more about Warners Group Publications' acquisition of *Practical Wireless* and *RadioUser* and brings you an exclusive first interview with Publisher Rob McDonnell on future plans for these two popular magazines.

Once again the BBC has an active amateur radio club at New Broadcasting House in London and the TX Factor team was there for the official opening of their new shack by BBC Director General, Tony Hall. G8BBC has an illustrious past, including bringing the world the first news of the Argentinian invasion of The Falkland Islands. Bob McCreadie, G0FGX talks to those behind the new club, and looks at its history and exciting future.

As always there's a chance to win a great prize in a free-to-enter draw. Courtesy of Martin Lynch and Sons there is a VGC VR-P25D power amplifier for handheld radios to be won. Not sure what it does? Then watch the show and find out. You may even become its proud owner!

The latest TX Factor and all the previous shows are available at www.txfactor.co.uk and can be watched on all platforms and smart TVs. The TX Factor team also provides a weekly podcast of the GB2RS news from the RSGB.

TX Factor is a project sponsored by the Radio Society of Great Britain and Martin Lynch & Sons.



Gloucestershire RAYNET

A dozen members of Gloucestershire RAYNET provided safety cover for the Cheltenham Challenge in June, a half marathon event taking in the 1000 foot incline of Cleeve Hill, in temperatures of up to 36°C. Some 1700 runners took part, with the team providing two communication nets for both water stations and marshals at the racecourse control centre, and mobile coverage for on course support, recovery and medical vehicles. With some 2500 litres of water needing to be juggled between checkpoints, the race staff were extremely grateful for the situational overview RAYNET could provide, on both voice and data, with vehicles and the 'tail runners' tracked via APRS and displayed in control, one of these being Michelle, M6MIF, who ran the whole course and collected signs (see photo).

The temperatures had nearly caused the event to be abandoned, but only one serious incident occurred, with a runner collapsing near the finish. Swift response by those on the net meant immediate medical attention and hospitalisation; the runner remained in care for four days, but made a full recovery.

The group is now firmly embedded within the planning structure of the race, and other local events are looking to similar provision, including the Gloucester Marathon and a triathlon in the Forest of Dean.

Field day on the air

Essex Ham invited local radio station BBC Essex along to a recent field day. Each Sunday, the BBC local radio station broadcasts the "BBC Essex Quest", where clues relating to locations around Essex are read out over the radio, and the mobile team has to reach those locations in the allotted time. One of the show's clues was supplied to the BBC team courtesy of Dorothy, MOLMR, and whilst listeners worked to solve the clue, Essex Ham members had the chance to promote amateur radio.

Several listeners took the opportunity to find out more and visit the special event station, or to make contact using social media. You can listen to an extract of the radio show at www.sxham.uk/quest17



GB17HCC

Hull is the UK's City of Culture, active throughout 2017. Amongst the many events that have taken place there have been the Radio 1 Big Weekend, concerts (pop to classical), art exhibitions and installations (including a 75 metre long turbine blade placed horizontally in the city centre!), the presentation of the Turner Prize and plays performed both in theatres and open air. In conjunction with the City of Culture, Hull & District Amateur Radio Society has had the special event callsign GB17HCC on the air regularly. Over 500 QSOs have been made so far. QSLs received via the RSGB Bureau will be replied to once all QSLs have been received.

WACRAL 60th AGM and conference

The World Association of Christian Amateurs and Listeners (WACRAL) held its AGM and Conference at the Elim Conference Centre in September. On the Friday evening Roger, G4BVY gave an interesting review of the CQ WWW DX contest PZ5K DXpedition to Suriname. He pointed out that not many people knew where it was let alone travel thousands of miles to operate a radio station! Listening to some of the short video clips, the skill demonstrated by the operators was quite outstanding.

On Saturday morning the AGM was completed relatively quickly and the names of elected officers can be found on the WACRAL website www.wacral.org

RSGB President Nick Henwood, G3RWF gave an interesting presentation entitled *Where is ham radio going today*. The message to take away from the presentation was clearly to listen to the younger generation of operators and look closely at what their needs and aspirations are.

Further information about the history of WACRAL and the work of association can be found at www.wacral.org.



European Collins Collector Association

This group has a new net taking place on Thursday evenings at 9pm Paris local time (that's UTC plus 1 hour in the winter and UTC plus 2 hours in the summer). The frequency is 7.165MHz and / or 14.263MHz. TM6CR is on air operated generally by F6HOY from Montpellier with a KWM2, 30L1, dipole and cobweb. More information at www.ccae.info

RAOTA AGM

Attendance at the Radio Amateurs Old Timers Association AGM was up substantially compared with last year. At the end of business both the committee and subs are unchanged. You can read more about the AGM at www.g4ean.talktalk.net/RAOTA/RAOTA%20PR.html. You can also find out more about the group's Diamond Jubilee award planned for 2018 when RAOTA reaches its 60th anniversary.

GB90GKZ

Eagle Radio Group is operating GB90GKZ on 9 December from 8am to 4pm to commemorate 90 years of Humber Radio. Humber Radio started operations on 7 December 1927, monitoring shipping along the coastline up to the River Humber to the North. The callsign for Humber Radio was GKZ. Many amateur radio operators took, and passed, their Morse tests at this facility and Humber Radio played a vital role in the floods of 1953 until it finally succumbed to the floods and was taken out of action. The club will be using the HF bands and D-Star via REF001C and DCS005B, QSY to a free reflector. Please listen out for GB90GKZ, QSL via EQSL.

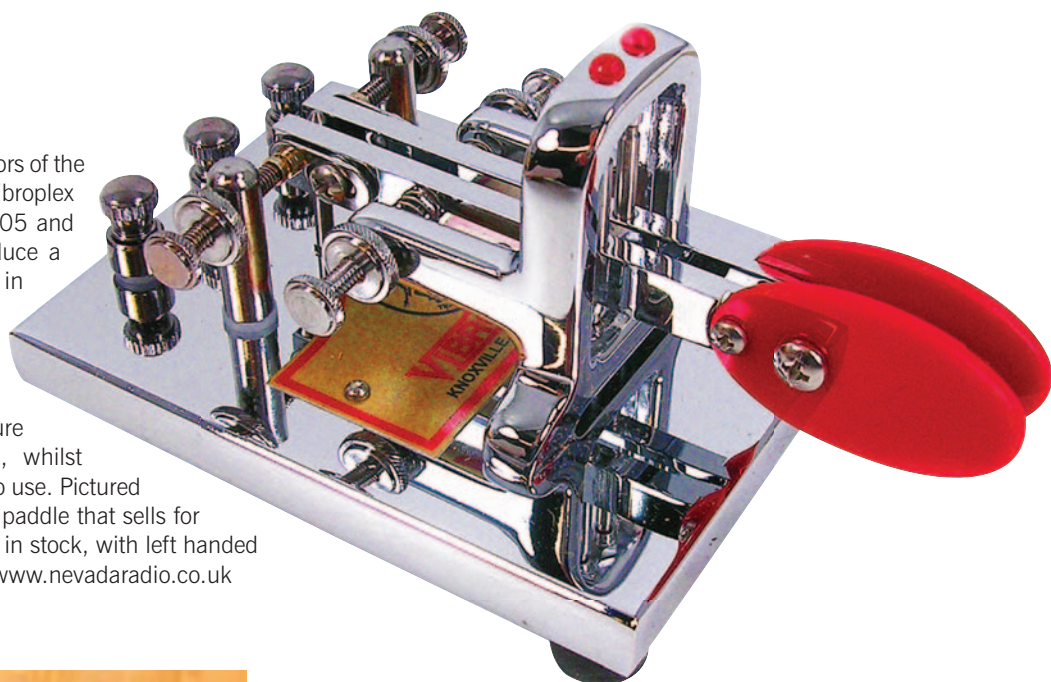
Patrick J A Gowen, G3IOR, SK

Amateur radio satellite pioneer Pat Gowen, G3IOR, of Norwich, died on 17 August after a lengthy illness. He was 85. Pat was a co-founder of AMSAT-UK and a member of its Board of Directors in 1974. He wrote the satellite column for *Practical Wireless* for many years and was a frequent contributor to the *AMSAT Journal* and *OSCAR News*. He was the first radio amateur to work DXCC via low-Earth-orbit (LEO) satellites, although his award is #4, since he had to wait for QSLs to arrive. Fluent in Russian, he enjoyed conversing with the cosmonauts aboard the now-defunct Russian Mir space station and the ISS. Pat was the first to discover the resurrection of the long-dormant AO-7. He also was a prominent HF operator and DXer and a member of the First-Class CW Operators Club.

New Products

Vibroplex keyers

Nevada has been appointed as distributors of the Vibroplex range of keyers. The first Vibroplex key was released 112 years ago in 1905 and since then they have gone on to produce a range of prestigious keys made solely in the USA. Despite the advent of the new digital modes, CW is still very much in use and so is the popularity of the Vibroplex keys. They are viewed as pieces of high quality shack furniture with their chrome and gold finishes, whilst being beautifully engineered and a joy to use. Pictured is the Vibroplex lambic Chrome double paddle that sells for £229.95. Nevada carries the full range in stock, with left handed models also available to special order. www.nevadaradio.co.uk



Klingenfuss books

Published on 10 December, Klingenfuss is updating three titles in its range: the *2018 Shortwave Frequency Guide*, *2018 Super Frequency List on CD* and *2018 Frequency Database for the Perseus LF-HF Software-Defined Receiver*. The Supplement January 2018 to the *2017/2018 Guide to Utility Radio Stations* will also be available. Details at www.klingenfuss.org

Rig dust covers

ML&S have just taken stock of the superb Prism Embroidery DX Covers. Shown at the National Hamfest in Newark, these British, hand-made covers are individually crafted for each radio and have the manufacturers' logo embroidered on the front. They are soft lined so they don't mark your radio or amplifier cabinet. Priced from £35, for more information click hamradio.co.uk/dxcovers

New Icom receiver for 10kHz to 3GHz

The IC-R8600 is a new, advanced communication receiver with the capability of covering from 10kHz to 3GHz as well as having the ability to decode selected digital signals including D-Star, NXDN, dPMR and P25. The IC-R8600 incorporates the latest software demodulation technology incorporated on Icom's latest HF amateur radios. With the optional RS-R8600 remote control software for a Windows PC, received audio and spectrum scope data can be transferred through an IP network for monitoring from remote locations.

The IC-R8600 features a large 4.3-inch colour touch screen display and a high-resolution, real-time spectrum scope with a waterfall screen. Other features include an SD card slot for received log, decode log and voice recording and a screen capture function allows you to save screenshot images in PNG or BMP format.

The IC-R8600 communications receiver is now available from authorised Icom amateur radio dealers with a suggested retail price of £2499.99 inc.VAT.





New WSPRlite Flexi antenna tester

Following on the success of the WSPRlite Classic, SOTABEAMS has launched the WSPRlite Flexi. The Flexi covers all bands from 6m down to 630m and can be programmed using Windows or Android. As each band requires the use of an external low-pass filter, SOTABEAMS will be stocking a range of suitable filters for the Flexi. The Classic version will continue to be produced as, with its internal filtering for 20m and 30m, it remains an all-in-one pocket size WSPR transmitter. See www.sotabeams.co.uk for full details.

New SDR receiver from SDRplay

SDRplay Limited has launched the RSP1A as a major upgrade to the popular RSP1 software defined radio receiver. The RSP1A is a full featured 14-bit SDR covering from 1kHz to 2GHz. Additional features include an enhanced RF pre-selection providing greater filter selectivity plus four additional sub-bands for reduced levels of spurious responses; improved intermodulation performance; selectable broadcast AM/FM/DAB notch filters and improved frequency stability incorporating a 0.5ppm TCXO (software trimmable to 0.01ppm). The RSP1A can be used together with SDRplay's SDRUno software, and SDRplay has also worked with developers of the popular HDSDR, SDR-Console and Cubic SDR software packages to ensure compatibility. The RSP1A retails at £91.20, visit www.sdrplay.com for more information.



News continued from page 13

80th Commonwealth Contest draw winners

The 80th Commonwealth Contest prize draw winners were IARU Region 1: G3LIK; Region 2: V31PS (DK6SP) and Region 3: AT5M. Mick, G3LIK wins the Vail Key donated by Martin Lynch & Sons and Kent Engineering. Philipp, V31PS and Madhu, AT5M win RSGB Millennium keys donated by the RSGB.

South Lancs ARC Winter Rally

This will be held on Saturday 2 December at Bickershaw Village Community Club, Bickershaw Lane, Bickershaw, Wigan WN2 5TE. There are a limited number of pitches available. Stall holders have access from 7.30am, the public from 9am, entry is £2.50.

To book call Jason, G0IZR on 01942 735 828.

Blackwood Rally prize winner

Dave, GW0WRJ won the star prize at the Blackwood Rally in October. This prize was donated by Martin Lynch & Sons. Region 7 DRM Ken, MWOYAC (right) presented the prize to Dave, along with Glyn, GWOANA, Region 7 Regional Manager.



Homebrew

The last major building blocks for the 160m transceiver are the transmit amplifier stages.

We will need to build low-level, driver and power amplifier (PA) stages. As the transmitter will be used at relatively low frequencies, it should be relatively easy to find suitable transistors for each stage. Standard HF/VHF bipolar transistors like the MPSH10 are ideal for the low level stages. My requirements are for an RF output of around 10W, as this will be more than sufficient to drive my 200W PA (February 2012) to full output. Pre-packaged PA modules are common at VHF/UHF, but rarely used at lower frequencies. Most MF/HF power amplifiers are based on discrete bipolar or MOSFET transistors.

Bipolar devices perform well in 12V, low-to-medium power linear amplifiers. MOSFETs are ideal for high power amplifiers, particularly when used with a relatively high DC supply voltage of 28-50VDC. At our proposed 10W output level and 13.8V supply, bipolar and MOSFET devices are equally suitable. Transistors designed for CB and HF radio applications are cheap and readily available.

Popular devices include the 2SC1945, 2SC1307, 2SC1969, etc... The newer generation of MOSFET devices like the Mitsubishi RD** series also offer excellent performance when used with a 12V supply.

Low level amplifiers

RF output from the mixer unit will be less than 1mW. To bring this up to the required level of 10W, the transmit amplifier chain will need to have a power gain of more than 40dB. This is reasonably easy to achieve using three amplifier stages. The first stage will have a gain of 20dB; the driver and PA stages will have gain of 10-13dB for each stage. The low-level stages will be operated in class A for best linearity.

My first prototype used a single MPSH10 transistor in the first stage. This arrangement worked well, but power dissipation was close to the maximum rating [1] and the transistor got quite hot after a few minutes. This problem can be resolved by using a clip-on heatsink, using a transistor with a higher power rating or by simply using a parallel pair of transistors. As I have a good stock of MPSH10 transistors, I decided to use a pair in parallel. The transistors are wired collector-to-collector and base-to-base. Separate degenerative feedback resistors are used in the emitter circuit of each transistor.

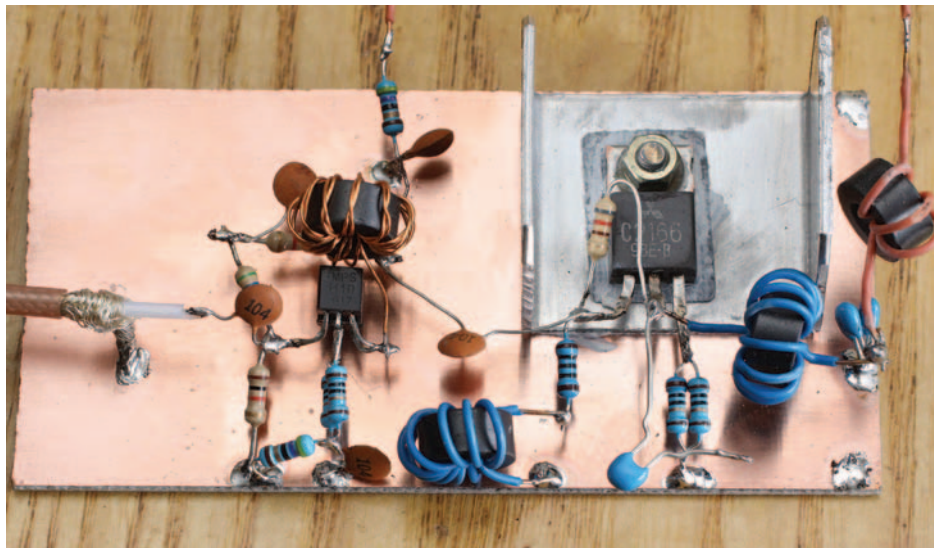


PHOTO 1: Prototype bipolar RF driver amplifier.

This guarantees equal current sharing between the two devices, plus the standard benefits of increased bandwidth and improved linearity.

The second stage also presented some thermal design problems. Transistors in a TO-39 package like the 2N5109 are limited to about 1W dissipation unless a very large heatsink is used. Large heatsinks are difficult to find and inconvenient in use because the metal can and heatsink are internally connected to the collector circuit. I was left with a choice of using

two devices in parallel or using a transistor in a larger TO-220 or similar package. I went for the latter option and used a 2SC2166. This is a 6W transistor designed for use in "RF power amplifiers in HF band mobile applications" [2]. The amplifier schematic is shown in Figure 1.

Construction

The amplifier is built on a strip of PCB laminate. Construction is not particularly difficult. Keep all

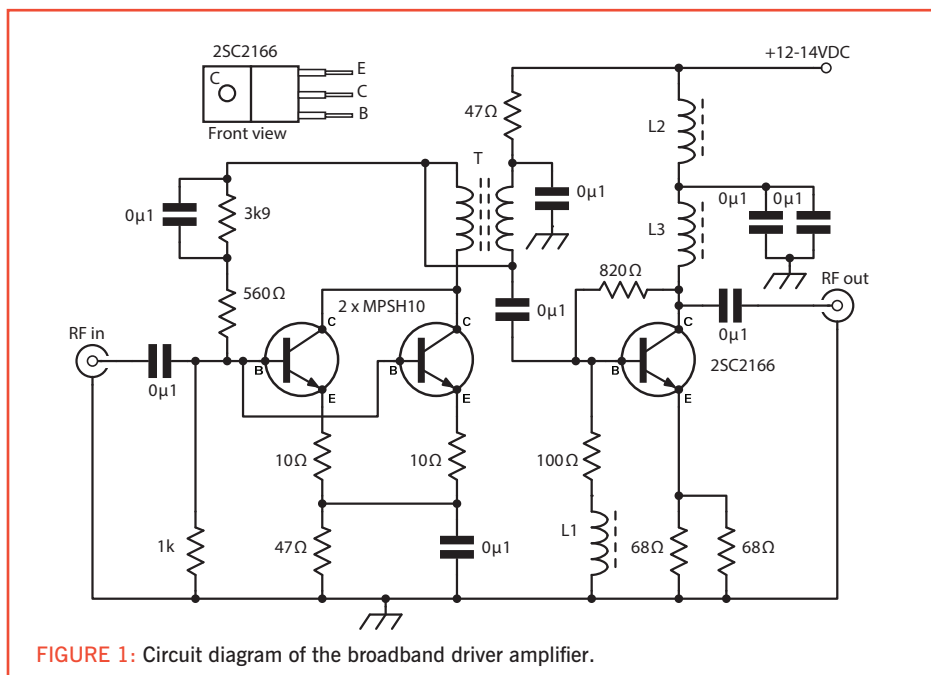


FIGURE 1: Circuit diagram of the broadband driver amplifier.

RF connections reasonably short and straight. All ground connections are soldered directly to the copper foil. Take particular care with the 100nF capacitors used for DC supply decoupling. A 10Ω resistor should be soldered in series with the emitter (centre) lead of each transistor. The transformer T is 10 turns of enamelled 0.375mm (not critical) wire, bifilar wound on an FT37-43 or similar ferrite toroid. Inductor L1 and L3 are each 10 turns of insulated wire on an FT37-42 with an inductance of about 35μH. L2 is 4 turns of the same wire on another FT37-43 (5.6μH). Wire stripped from standard 4-core telephone cable is ideal for this purpose. The 2SC2166 must be mounted on a heatsink. I used a small strip of 1.2mm aluminium sheet. I drilled a 3.5mm hole for the transistor mounting screw and the bent the strip into a U shape. The strip was 28mm x 68mm before bending. As an alternative, you may prefer to use a ready-made TO-220 heatsink. I used a thin film of heatsink compound between the heatsink and the copper foil underneath. As the transistor collector is internally connected to the heatsink tab, it will be necessary to use a TO-220 insulated mounting kit (thermal washer and plastic insulator). **Photo 1** shows the assembled amplifier unit. The emitter resistor for the 2SC2166 can be a parallel pair of 6.8Ω resistors (~3.4Ω) or three parallel connected 10Ω resistors if this is more convenient.

Testing

The amplifier was tested using a signal generator, oscilloscope and 50Ω dummy load. Power gain is greater than 30dB across the HF range, with -1dB points at below 1MHz and above 21MHz. The -3dB frequency is above 30MHz. This is ideal for our LF application. (The first prototype, with a 2N5109 in the second stage, showed a flat frequency response up to 100MHz).

MOSFET power amplifier

The PA is based on a pair of RD16HHF1 MOSFETs in a broadband push-pull configuration. The design is based on a previous project, described in April 2011. The RD16HHF1 is specified for "HF power amplifier applications" [3]. $P_{out} > 16W$, $G_p > 16dB$ @ $V_{dd} = 12.5V$, $f = 30MHz$. For improved linearity and reliability, my amplifier will normally be run at 10W or less and specified for an absolute maximum of 16W.

The previous version of this amplifier had a flat frequency response from 1.8MHz to well over 100MHz (suitable for 160m to 4m). This design still stands as my most successful attempt at building a 13.8V broadband PA. This wide bandwidth is due to the excellent performance of the MOSFETs and the use of low resistance values across the FET input (gate). Another important feature is the very

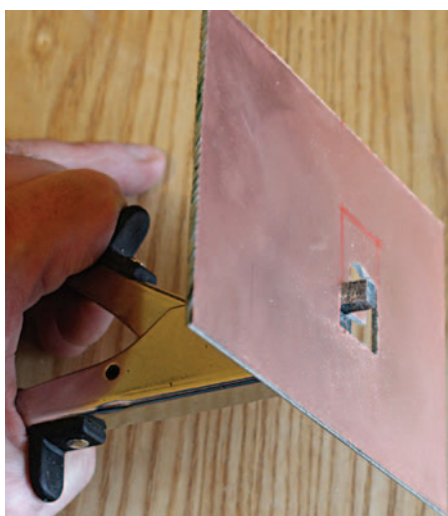


PHOTO 2: Using a nibbler tool to cut out apertures for the power transistors (see text).

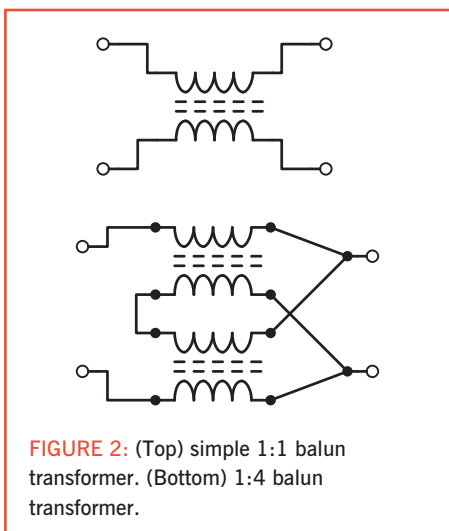


FIGURE 2: (Top) simple 1:1 balun transformer. (Bottom) 1:4 balun transformer.

wide bandwidth of the input and output transformers. Both transformers are of similar design. **Figure 2** (top) shows a simple 1:1 balun consisting of a transmission line wound on a magnetic core. In a typical example, the TL will be a length of coax cable or a twisted-pair of wires and the core will be a ferrite toroid. The bottom of **Figure 2** shows how a pair of these baluns can be combined to make a 1:4 (or 4:1) balun transformer. On the low impedance side (left), the two inputs are wired in parallel. The high impedance side (right) is wired in series. This arrangement results in a 1:2 voltage ratio.

Construction

As the current project doesn't require good performance at VHF, the input and output transformers have been redesigned for optimum performance at LF. The input transformer T1 is a pair of FT50-43 toroid cores, with 20 turns of enamelled copper wire, bifilar wound on each core. As usual, I used 0.375mm copper

(Maplin YN86T or similar). Use the schematic as a guide for connecting the wires. Unlike the simple 1:1 version, it *does* make a difference if you get it wrong. The amplifier schematic is shown in **Figure 3**. The RD16HHF1 pinout is 1-gate, 2-source, 3-drain. The heatsink tab is internally connected to the source terminal. This unusual configuration is very convenient for applications where the source is grounded, because it allows the transistor to be bolted directly to a grounded heatsink so that no insulating washer is required. Metal-to-metal contact will have a lower thermal resistance than a silicone or ceramic insulator.

I used a sheet metal nibbling tool to cut rectangular holes in the PCB laminate so that the MOSFETs can be bolted directly to the heatsink (see **Photo 2**). Unfortunately, the local electronics shops no longer stock large heatsinks, so I had to use one from the junkbox. This was drilled and tapped M3 for the MOSFET and PCB mounting screws. A thin film of heatsink compound was used between the FET and heatsink. The Maplin heatsink used in my previous PA projects was rated at 1.8°C/W; this unit is about the same size and surface area. A smaller heatsink may need a cooling fan, particularly for modes with longer transmission periods and duty cycles (SSTV, data etc).

T2 in the FET drain circuit is 15T, 0.375mm, bifilar wound on another FT50-43 toroid. All capacitors are 100nF ceramic types. Resistors are standard 0.25W metal film. RFC in the drain supply is 4 turns of insulated wire threaded through a ferrite sleeve type HEM3021 (Maplin N98AB). 6 turns on an FT37-43 would make a good alternative.

Gate bias voltage for the FETs is provided by an 8V regulator followed by a simple resistor network, as shown in **Figure 4**. Simplicity of the bias network and immunity to thermal runaway is one of the major advantages of MOSFETs over the bipolar transistor for Class A or AB linear amplifier service.

The output transformer T3 is similar to the one on the input side. The main differences are larger core size and thicker enamelled wire. The transformer is made from a pair of HEM3011 (Maplin N88AB) toroids, with 15 turns of 1mm enamelled copper, bifilar wound on each core. The assembled PA is shown in **Photo 3**.

Testing

Before applying power to the amplifier, set both pots in the bias network for maximum resistance (minimum current). Use a current regulated supply or temporarily fit a 1-2A fuse in the positive supply. You should find current

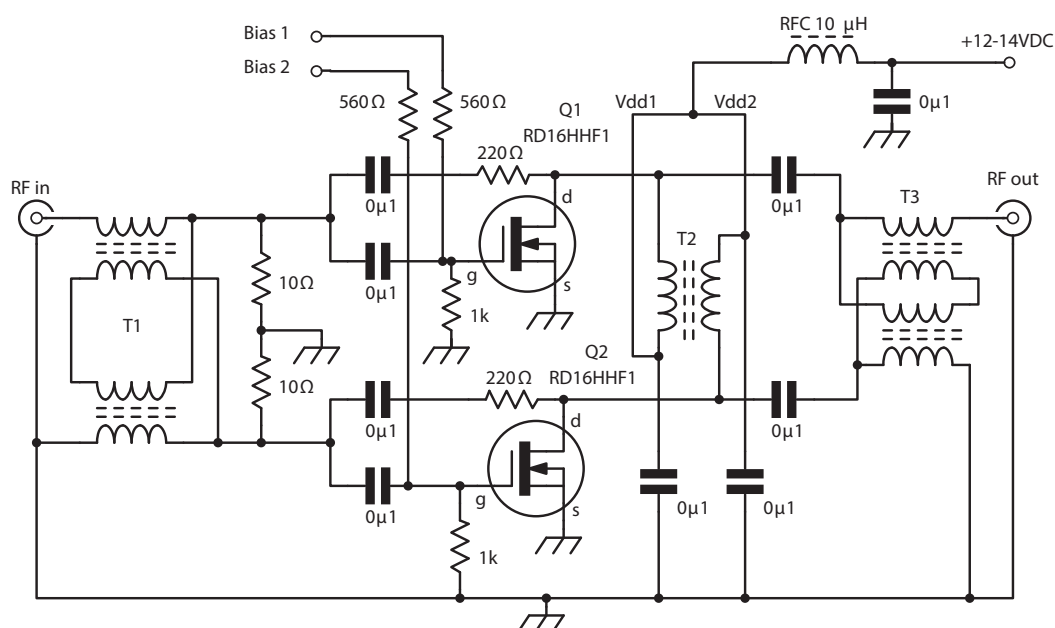


FIGURE 3: Circuit diagram of the MOSFET power amplifier.

drawn from the supply is close to zero in this configuration. Adjust Bias_1 until 500mA is drawn from the supply. Adjust Bias_2 until supply current increases to 1A. You can check current balance by alternately grounding the gate pin of each FET with a small screwdriver and checking that current drawn from the supply drops back to 500mA. I used the 20A range of a digital multimeter for these tests. In this configuration, the amplifier operates in Class A at lower outputs up to 4-5W and Class AB at higher power levels of 10W or more. Assuming a 13.8V supply and maximum drain swing of 10V, the absolute maximum output is limited to 16W. Saturated output, around 25W, is only suitable for non-linear service (FM) and will probably call for forced air cooling or a large heatsink. Pushing the amplifier this hard may also degrade its intermodulation and harmonic distortion performance.

Gain is just over 12dB. The 1dB bandwidth extends from below 1MHz to 30MHz. The -3dB points are at 350kHz and 60MHz. Around 6 octaves of usable bandwidth is comparable to the 2011 design. The entire frequency span is shifted lower, which is ideal for this particular application. The amplifier produces a clean SSB signal when tested with the other modules from the 160m transceiver. I have only tested it on 160m, but it should also perform well on the other HF bands.

Fake transistors

I have seen a number of comments about 'fake', counterfeit, faulty or out-of-spec RF power transistors on amateur radio forums. These comments usually apply to bulk purchases that were made at very cheap prices – perhaps

supiciously cheap – from sources other than the main established suppliers.

I have bought a good few RF transistors from both European and Asian sellers on eBay in recent years. So far, I haven't encountered any problems. All appear to be genuine marked / branded devices and have performed as expected. Maybe I'm just lucky and haven't been caught out yet? As always, buy from a trusted source or check feedback from other buyers before purchasing.

References

- [1] MPSH10 data sheet, Fairchild, 1998
- [2] 2SC2166 data sheet, Mitsubishi, 1997
- [3] RD16HHF1 data sheet, Mitsubishi, 2011

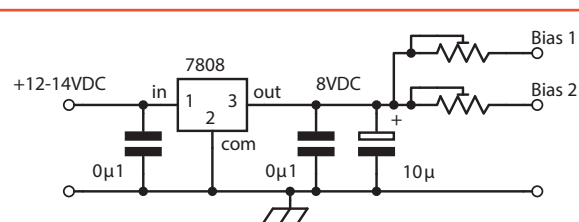


FIGURE 4: Gate bias network for the MOSFETs.

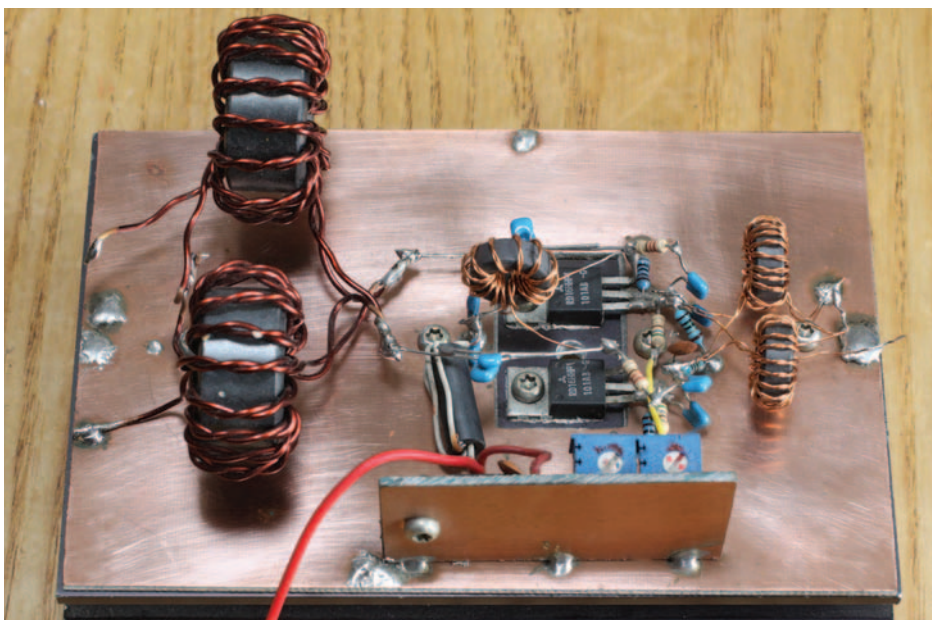


PHOTO 3: Completed power amplifier. The small board contains the bias components seen in Figure 4.

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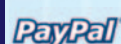
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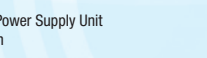
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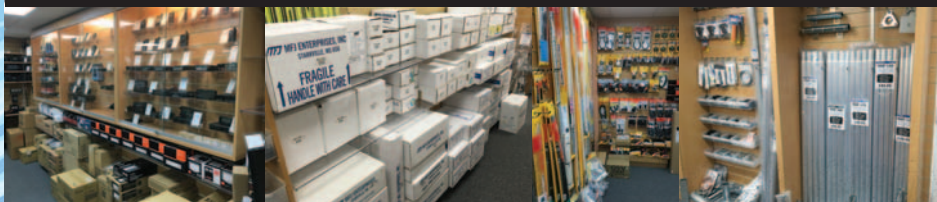
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The 2017 RSGB Convention



The RSGB Convention took place on 13 to 15 October at Kents Hill Conference Centre in Milton Keynes.

The 2017 Convention was bigger than ever with more delegates staying the weekend and day visitors than ever before. There was well over 40 hours of lectures, over 4 hours of presentation and forums and, of course, the RSGB DX Fund raffle. Outside the main lecture streams there were UK and US exam sessions, a Training and Education/Exam open forum and the annual construction competition. Visitors could also enjoy a coffee with friends or visit the special interest groups, RSGB bookstall or the Martin Lynch & Sons display (thanks to ML&S, the principal sponsor, for another successful year).

AMSAT-UK held their Colloquium at the Convention bringing an interesting range of lectures too.

Special Presentation

The weekend started at the opening ceremony when the RSGB President, Nick Henwood, G3RWF, welcomed everyone to the Convention. The RSGB, Martin Lynch & Sons and Icom UK then made a special presentation. George Radulescu, MOUKK is the youngest successful candidate for the Advanced exam at 9 years old when he took the exam at the Ham Radio Training Academy at ML&S on 14 March 2017. He was accompanied by his parents Remus, MOUKL and Mihaela and younger brother Nicholas. He received a certificate, *RSGB Handbook* and an Icom IC-7300. The photo shows George and his family with Martin Lynch, G4HKS (ML&S) and Dave Stockley, G4ELP (Icom UK chairman).

Lectures

A number of the lectures were filmed and some of those will be appearing on the RSGB Members' portal over the coming months. We are very fortunate that some lecturers have kindly offered to write up their talks for



George, MOUKK with his parents, Remus, MOUKL and Mihaela, his younger brother Nicolas, alongside Martin Lynch, G4HKS (ML&S) and Dave Stockley, G4ELP (Icom UK chairman).

future articles in *RadCom* and *RadCom Plus*. We can't tell you about every one of the 55 lectures, but here is a flavour of the talks on offer over the weekend (and if you want to put the 2018 Convention in your diary it is 12 to 14 October 2018). Many thanks to those who wrote about the lectures they attended.

Cezar Trifu, VE3LYC gave an entertaining talk about his operation from rare IOTA Pukapuka Atoll in the North Cooks. This was a challenging location to reach and to operate from, not least because of the heat and humidity and the bugs (as a graphic photograph of the damage they inflicted on his legs made clear!). Weight limitations on the aircraft meant that he couldn't plan to take a linear amplifier so working Europe was tough (just 27 G stations in the log from there, for example) but he did a great job in the circumstances.

Professor Alwyn Seeds, G8DOH took his audience through a very practical lecture on Measuring Spectrum Pollution at VHF. Quoting Lord Kelvin; "*When you can measure what you are speaking about, and express it in numbers, you know something about it; If you cannot measure it, you cannot improve it.*" Alwyn described and demonstrated how every amateur can perform simple, well calibrated noise measurements. VHF noise pollution is a topic that impacts most amateurs and the material from Alwyn's talk will be included in a *RadCom* article (January 2018 issue) and will form part of a future RSGB project.

Wouter Weggelaar, PA3WEG who is a founder member of AMSAT-NL gave a very interesting and informative talk about FUNcube. The first part of his talk gave many details of FUNcube-1 satellite, the first in the series launched almost four years ago. He included not only operating techniques, but statistics about the amount of telemetry data collect at the 'Warehouse'. For example 85% of all the Whole Orbit Data ever transmitted by the satellite has been recovered and forwarded to the warehouse by the world wide network of volunteer receiving stations. He went on to describe other FUNcube payloads, either in orbit now, and those that are planned, including NAYIF-1 (Dubai) launched Feb 2017 and JY1Sat (Jordan), due for launch in 2018.

Ian Pawson, G0FCT and Nick Totterdell, G4FAL certainly enlightened the audience as to how the contest adjudication process worked and what are the key things to watch. Valuable tips on what frequencies to avoid and what to use were also mentioned for the 80m Club Championships. The importance of getting the time and mode logged correctly was also stressed. The accuracy of leading stations was shown and the benefit of having a band strategy for the Commonwealth Contest highlighted.

Jim Bacon, G3YLA gave one of his archetypal professional presentations on the subject of how data from the global network of ionosondes can be used in understanding HF propagation. In particular, he used data



There was plenty of equipment for visitors to try out in the coffee lounge.



Special interest groups were able to meet delegates.

that is readily available from the internet to show how an individual or club could use such data to, for example, plan the best time(s) and frequencies for a club net or anticipate what band selection(s) might be best for a contest operation. He also explained that much of this data will be available in an integrated graphical format later this year from a website being developed by him and some colleagues. Watch this space.

Alan Birch, G4NXG gave a comprehensive talk on the basics of DXing with an emphasis on what it means for mobile operators wanting to catch DX operations. Mobile operation allows a choice of great locations (hilltops, sea shore) and the ability to avoid city noise sources but his recommendation was to operate only once parked up, to use a leisure battery rather than the car battery (so you can still start the car later!), to be patient because you will never be as loud as

the home stations with big Yagis and linear amplifiers and to listen, listen, listen in order to spot the best moment to call. He was also careful to warn about the susceptibility of modern car electronics to RF (and to check whether the use of radio transmitters from the car could invalidate the warranty).

Phil Crump, MODNY gave an insight into Southampton University's project to build and launch a cubesat. Some of the hardware modules are now complete, and assembly has been started. Phil described the difficulties of undergraduate students working on the project, as they have limited time, and soon leave the University on completion of their courses. Negotiations have started with the UK Space Agency about licensing and insuring the satellite.

Mark Haynes, MODXR an experienced contester explained the ins and outs of single operator two radio (SO2R). He started with the

history of the technique and showed practical implementations. The talk demonstrated the impact on QSO rate and overall score that can be achieved by working two bands near simultaneously (although it violates the rules if more than one signal is transmitted at any given time). Mark emphasised the need to 'practice, practice, practice' and suggested computer simulators to help with this. The talk concluded with two videos showing how top operators use SO2R to great effect.

Peter Guelzow, President of AMSAT-DL gave an update on the current status of the transponder payload that will be flown on board the Es'hail-2 Geostationary Amateur Satellite. Es'hail 2 will carry two 'Phase 4' non-inverting amateur radio transponders operating in the 2.4GHz and 10.45GHz bands. A 250kHz bandwidth linear transponder intended for conventional analogue operation, and an 8MHz bandwidth transponder is designed for experimental digital modulation schemes and DVB amateur television.

Dave Lawley, G4BUO has been involved in World Radiosport Team Championship (WRTC) since the first ever in 1990 both as a participant and a referee. He gave an insight into how it was organised and set up and how it has changed with regard to equalising conditions for all participants particularly the choice of locations. He highlighted the amount of work involved in organising and setting up, both manpower and cost wise and the structure of judging/refereeing.

Monica Grady, Professor in Planetary Sciences at the nearby Open University gave a fascinating insight into the development and operation of the Rosetta probe and Philae lander, which recently completed their missions at Comet 67P/Churyumov-Gerasimenko. She also described how the mission had been so successful in attracting interest from the public in general and young



Rob Coleman from TT Electronics who spoke about the manufacture of MOSFET power transistors at the company's base in Lutterworth.

Elaine Richards, G4LFM
radcom@rsgb.org.uk

people in particular. The lecture room was packed for this talk.

A fascinating insight by an innovative, yet practical, experimenter and builder, James Patterson, M1DST, described his flexible hardware control add-on for your K3. He dealt with several of his projects from a monitor for a commercial GPS standard, through 12V distribution boards for Power Poles, a digital RF wattmeter, a simple handheld PTT button, to challenging just what was involved in a separate rotary tuning knob for certain rigs – particularly financially. Hence he designed his own device, M1N-the-middle, from the bottom up that included using a 3D printer for the box and control knob. See www.m1dst.co.uk for details.

The two lectures on VHF propagation by members of the RSGB Propagation Studies Committee again resulted in a packed lecture theatre, clearly showing the enormous

interest in the subject. Tim Fern, G8LOH talked about how a better understanding of coupled mode propagation may lead to more extreme range DX contacts. Then the 'old hands' Chris Deacon, G4IFX and Jim Bacon, G3YLA performed a double-act giving an update on the latest research into Sporadic-E propagation.

The 6Gs DXpeditioners have put on three successful DXpeditions. That success is due in no small part to the careful selection of antennas. Each of the three DXpeditions, all to Pacific Islands, had used different antennas for HF. In each case Mike Chamberlain, G3WPH shared the results of computer analysis to demonstrate how the proximity to the sea, the required take-off angle and directivity requirements defined the choice. This is one of the best antenna lectures we have had at the Convention for many a year.

Dr Chris Bridges of Surrey Space Centre

and several members of AMSAT-UK have been involved with the development of the FUNcube payload on the ESA European Student Earth Orbiter. The payload will transmit telemetry on 2m at 1200bps for educational outreach in a similar way to the FUNcube-1 satellite (AO-73). Additionally, in the event of a failure of the main 2.2GHz S-Band transmitter, the payload will act as a redundant communications system for transmitting science data. To achieve this, the payload can increase its transmission rate to 4800bps. He described the mechanical structure, RF design and software development that has been undertaken to implement payload. This includes vibration and thermal vacuum tests that the payload has to undergo for flight approval.

Continued on page 95

Construction Competition

The RSGB Construction Competition 2017, sponsored by Martin Lynch and Sons, was judged at the RSGB Convention by Prof Alwyn Seeds, G8DOH, Bob Beebe, GU4YOX and Ian White, GM3SEK. Congratulations to all the category winners:

Judges Merit went to Dean Brice, G0UIL, from RAIBC for the RAIBC Talking Shack Manager (winning an RSGB book prize). **Beginner** went to Peter Barnes, M0SWN, for the Time Difference of Arrival Direction Finder (winning a £50 ML&S voucher). **Construction** went to Heather Lomond,

MOHMO, for the Digital Power and VSWR Meter (winning a £50 ML&S voucher). **Innovation** and overall winner of the Pat Hawker G3VA trophy went to David Crump, G8GKQ, for the Portsdown Integrated ATV Transceiver (winning a £100 ML&S voucher). Well done to all.



Overall Construction competition winner of the Pat Hawker G3VA trophy David Crump, G8GKQ, for the Portsdown Integrated ATV Transceiver.



Construction competition winner Dean Brice, G0UIL, from RAIBC for the RAIBC Talking Shack Manager.



Construction competition winner Peter Barnes, M0SWN, for the Time Difference of Arrival Direction Finder.



Construction competition winner Heather Lomond, MOHMO, for the Digital Power and VSWR Meter.



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Hilberling HPA-8000B

linear amplifier



The Hilberling HPA-8000B is a linear amplifier capable of producing up to 1kW output on the 160 to 4m bands (excluding 60m).

The Hilberling HPA-8000B is a linear amplifier capable of producing up to 1kW output on all the amateur bands from 160 to 4m (not 60m). It is the companion amplifier to the Hilberling PT-8000A transceiver that was reviewed in the November 2013 *RadCom*.

The Hilberling company manufactures a range of aerospace and military equipment and, as might be expected, manufactures its radio amateur products to similar very high professional standards. Indeed, high quality was the first impression I had when I opened the shipping box and made a preliminary visual inspection.

Overview

The HPA-8000B is contained in a matching enclosure to the PT-8000A transceiver and has the same display. It weighs about 19.8kg and measures 43cm (w) x 47cm (d) x 15cm (h), with an adjustable bail to allow an optimum viewing angle. The amplifier is based around a pair of LDMOSFETs, each

capable of over 1kW output on CW/SSB/AM/FM and it covers all amateur bands from 1.8 to 70MHz, except 5.5MHz.

It can be driven to full output with as little as 100mW up to more normal inputs of 20-30W depending on the settings of the input circuitry. Two transceiver inputs are provided and these can be routed through an antenna switch to four different antennas. Two independent CAT control systems are provided, one for each of the two possible driving transceivers. Fully automatic control of antenna selection from either transceiver is possible. In addition, there is an antenna tuning unit that can match up to about 3:1 SWR. Control of the amplifier can be either automatic, driven by an attached transceiver, or manual by using buttons on the front panel. Protective circuits guard against excess input power, output power, over current, high SWR and heatsink temperature. The internal power supply is for 200-260V AC and is capable of providing 50V/45A for the PA and 12V/8A for auxiliaries. A 58 page manual is supplied on paper and on a CD, which also contains updating software.

Front panel

The front panel carries a colour display, the main power switch and four groups of

buttons. The display itself is angled similarly to that in the PT-8000A and is bright, clear and easy to read.

The default display screen gives a status overview of the amplifier. This includes showing the active transceiver with current band and transmission frequency, a bargraph display of input and output power and PA current, SWR and internal temperatures. The configuration of the active antenna connections is shown.

The groups of buttons are clustered by function, which makes use very straightforward. One cluster contains

TABLE 1: Measurements for 2nd and 3rd harmonic.

Frequency (MHz)	Harmonic 2nd	Harmonic 3rd	Comment
1.9	-57	-55	
3.6	-63	-76	
7	-54	-67	
10.1	-46	-51	
14	-46/48	-57	
18.1	-46	-56	Driver limited
21	-52	-70	
24.9	-46	-53	
28	-44	-60	
50	-59	-65	Driver limited

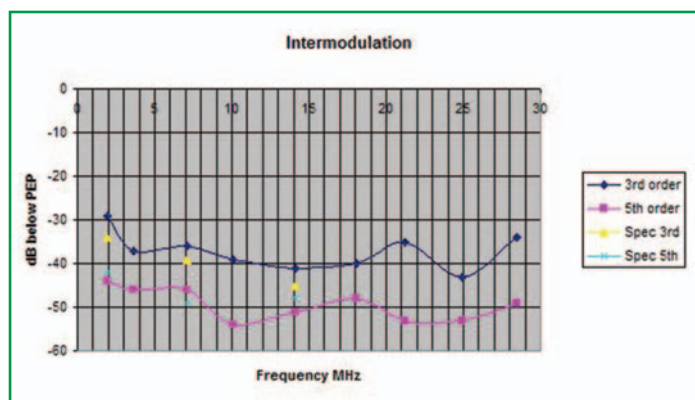
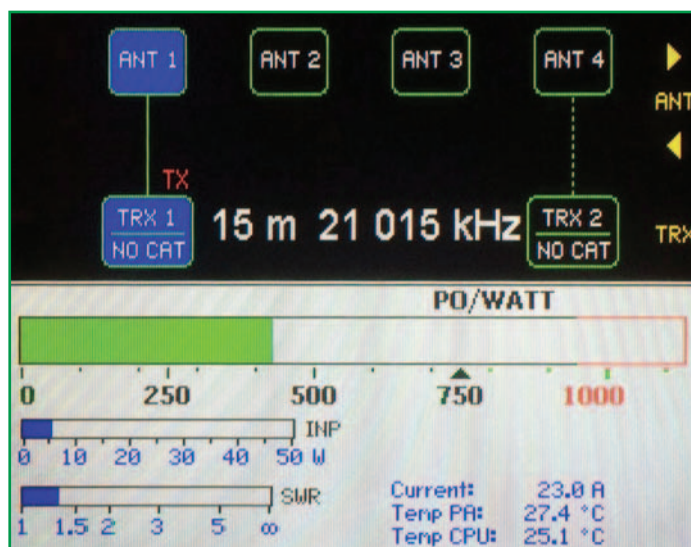


FIGURE 1: Summary of the intermodulation test results.

The display (shown right) is angled similarly to that in the PT-8000A transceiver and is bright, clear and easy to read.



Remote, Menu and Operate. The Remote illuminates when a successful control link has been made with any transceiver, the Menu brings up soft buttons on the right side of the display and the Operate toggles between bypass and in line. A second cluster is a set of nine manual LF/HF band select buttons and a separate VHF cluster covers 50 and 70MHz. The final cluster controls the ATU either to initiate the auto tune routines or to allow manual tuning of the L and C values.

The six soft buttons are used to set up the amplifier antenna connections, to activate either transceiver and to change some basic parameters.

Rear panel

The rear panel has four output antenna connectors and four input connectors, all N type. These latter four are in two pairs: one pair is dedicated to PT-8000A transceivers and the other pair can be used with any suitable transceiver. In addition, there are two sets of control inputs: DB9 sockets carry Tx/Rx switching and the DB25 sockets carry CAT data in most of the common formats, eg Yaesu 4-bit, RS232 such as Kenwood and Elecraft and Icom CIV. An RCA socket is used for PTT for changeover. There is a USB B socket for software updating. A -60dB level output is provided on an SMA socket for pre-distortion feedback to a suitable transceiver such as several of the SDR-based radios now becoming available.

Two built-in fans keep the enclosure temperature under control. The larger one, for the PA heatsink, draws air through the front panel to the right of the display. This fan runs at low speed continuously and speeds up in two steps as the heatsink warms up.

Setting up

Before use the amplifier has to be set up correctly. The Menu button brings up six soft buttons that display various sub-menus that are used either to monitor the system level parameters of the amplifier such as software version, IARU Region etc, or for initial set up.

Another sub-menu is used to set up the types of transceiver being used for CAT control. One of these is Hilberling but most other makes are included, Yaesu, Kenwood, ICOM, FlexRadio, Elecraft, Orion, Reuters, General RS232 and No CAT. For each transceiver model the format of control can also be set if needed, eg the three different types of Yaesu control or the baud rate for RS232 based CAT. If the transceiver CAT is connected into the amplifier correctly the Remote button light illuminates and the manual band selection button cluster is inhibited. There is protection against a malfunction in CAT since if the HPA-8000B expects CAT control and cannot connect, then transmitting is inhibited.

The default input power range is 50W but inputs of 5W and 100mW can also be selected.

Antenna and transceiver routing is set up on the display. Either transceiver can be connected to any of the four antenna sockets, even both to the same one it seems. Only one transceiver can be active at any time and transmitting can be inhibited remotely. It was not immediately clear if the amplifier can support SO2R since the inactive transceiver is disconnected from its antenna even when that is a different antenna to that selected by the other transceiver.

ATU

The HPA-8000B is equipped with an internal antenna tuning unit to ensure the amplifier sees a 50Ω load. This ATU has

limits: SWR over 3:1 will exceed its capacity. The intention of the ATU is to take account of small mismatches such as when a resonant antenna is operated near band limits and slightly mismatched.

The ATU, an LC type, can be operated automatically or manually. An output power of between 60-100W is needed to operate the auto tune. Hilberling recommends that auto mode is used for an initial match and manual control be used to get a final match. In my case, a good match was obtained without any final manual tuning. Each of the amateur bands is divided into a series of sub-bands. The matching values of L and C are stored in a memory for each sub-band for each of the four antenna connectors if necessary. This allows for rapid retrieval and ATU setting in operation. My 80m dipole antenna does not cover the CW and SSB portions without SWR creeping above 2:1 at band edges. The ATU handled this mismatch very easily.

When the HPA-8000B is operated under control of an attached transceiver in the Remote setting, the ATU will be automatically set to the right settings if some have been stored earlier.

It is not possible to use or tune the ATU when the HPA-8000B is in Bypass mode.

Some measurements

Input power level. There are three input power levels that can be selected in the set up screen. The direct input level to this amplifier is the 5W setting. A 10dB attenuator is switched in for the 50W setting (default) and

Bob Whelan, G3PJT
bob@g3pjt.com

The rear panel has four output antenna connectors and four input connectors, all N type. Two fans keep the enclosure temperature under control and vary their speeds as circumstances demand.

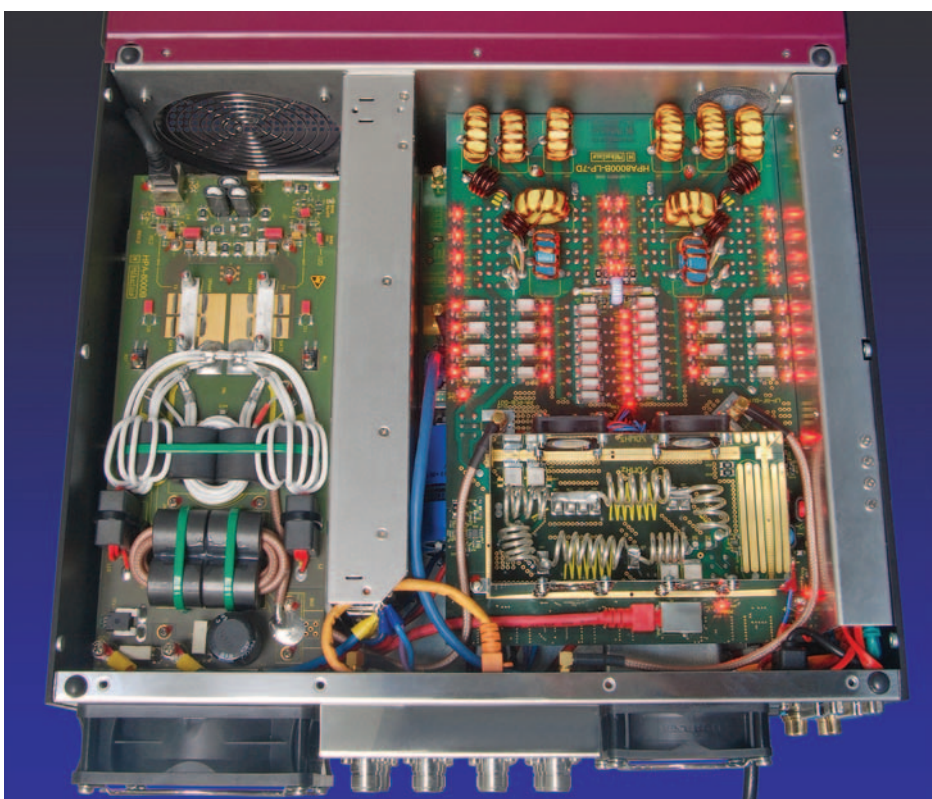


for the 100mW input a 23dB preamplifier is inserted in line. The bargraph power displays for input and output are reasonably accurate.

This amplifier has quite high gain. For example, one might expect that with a stated input of 50W as the default maximum input setting, that 50W of drive would give an output of just over 1kW. In fact 50W will grossly overdrive this amplifier and cause an excess power output trip. The gain of the amplifier was therefore measured to determine the likely drive levels for 400W output.

The measured HF power gain was between 17-19dB on the default 50W input setting.

Based on these results, 5-10W is all that is needed to reach 400W output. Hilberling do mention in the documentation that 20-30W should give 1kW output. In order to avoid overdrive, ALC should be used and the HPA-8000B provides adjustable ALC outputs suitable for most transceivers with either positive or negative going ALC voltages. ALC needs to be carefully set up if distortion is to be avoided. Alternatively some transceivers, such as the Elecraft K3, have a facility to control output power on a per-band basis and this was the method used during this review.



Inside the Hilberling HPA-8000B amplifier.

Output filtering

Each amateur band is filtered by a three section low pass filter (LPF). Using my Elecraft K3 as a source and driving the HPA-8000B to at least 750W output with a single tone the measurements for 2nd and 3rd harmonic were recorded and are shown in Table 1.

These seem to be satisfactory in general but the results seem to be more variable on 2nd harmonic than I might have expected.

Intermodulation

Intermodulation was measured on each of the HF amateur bands. Signals from two HF transceivers were combined whilst taking precautions to avoid their self-

intermodulation. This gave a pair of RF signals spaced by 10kHz which had better than -60dB third order intermodulation. This was attenuated to give a level which could drive the HPA-8000B on its most sensitive drive setting of 100mW. The experimental error was measured to be at the ± 2 dB level.

The graph in Figure 1 summarises the results and includes data gleaned from the Hilberling brochure (all relative to PEP). There is reasonable agreement between the levels of intermodulation distortion. The HPA-8000B is a 'clean' amplifier.

No further measurements were undertaken due to an intermittent problem I had with the main power supply switch. No intermodulation measurements were taken on 50 or 70MHz.

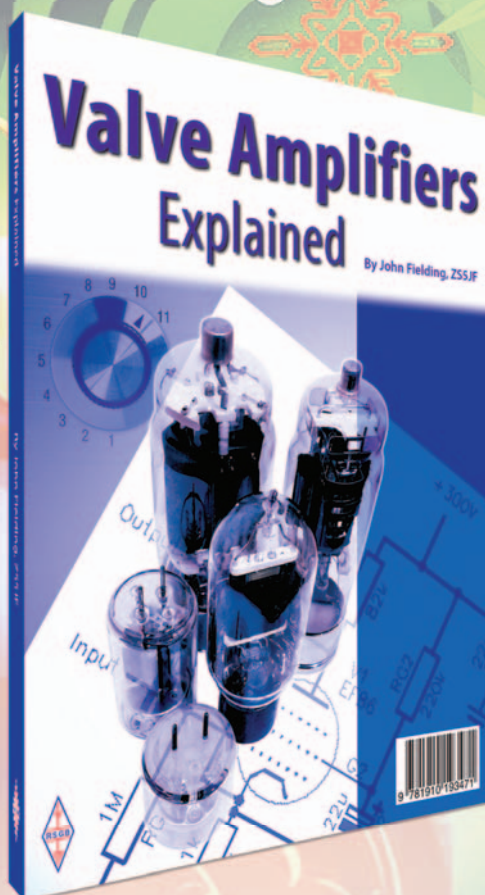
In use, or the operator's view

The amplifier was operated on CW and SSB using an Elecraft K3, between 6-10W of drive was all that was needed to reach 400W out. Setting the drive level has to be done with care due to the relatively high gain of the amplifier. The default 50W drive setting was used mostly. It would seem to be more logical if the maximum drive setting to get 1kW out was 50W, the maximum of the default input. The other input settings were only used for test and measurement purposes.

The HPA-8000B uses a relay for Tx/Rx changeover. This is quite noisy on CW. With headphones on there was no detectable electronic switching noise, which would make

Continued on page 56

NEW
TITLE



Valve Amplifiers Explained

By John Fielding, ZS5JF

This new book by John Fielding, ZS5JF, is for everyone who uses – or is considering using – an HF or VHF linear amplifier. While some amateurs may be of the opinion that valves are an obsolete technology and semiconductors are a better way, John Fielding very definitely thinks otherwise! After reading this book you will be under no illusions that, in his opinion, valves are far superior to semiconductor devices for most linear amplifier applications. As he says, “When you need real power and very good linearity, a valve is very hard to beat.”

Essential reading for anyone building a valve linear amplifier, the author guides the reader through the choice of valves for various purposes. *Valve Amplifiers Explained* starts with a chapter on basic valve theory and explains how to interpret valve characteristic curves. The various classes of operation of amplifiers – Class A, Class B, Class AB1, Class AB2 and Class C – are all covered in detail. The relative merits of grounded cathode and grounded grid amplifiers are discussed and a chapter is devoted to the causes of distortion in valve amplifiers – and how to avoid such distortion. The author explains that linearity is primarily a function of the power dissipation of the device and the supply voltage and he devotes a whole chapter to good power supply design. The various protection circuits that an amplifier should have are also covered. While the book is equally relevant to HF and VHF enthusiasts, a chapter is devoted specifically to the design of VHF RF power amplifiers. Another chapter even discusses liquid cooling of valve amplifiers.

There is advice too for those who, instead of building an amplifier, are considering purchasing a commercially-made linear. Those who use commercial linear amplifiers and want to understand more about how they work will not be disappointed.

As John says, “There is a certain aura about valve equipment. The glowing filaments and the gentle buzz of a high voltage power supply are a sort of magic few have had the pleasure of knowing.” After reading *Valve Amplifiers Explained* you will want to join that elite few!

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Design Notes

Active antennas

These are small receive-only antennas used from very low frequencies (ULF) up to HF. The most popular type consists of a small probe or whip connected to a high impedance buffer amplifier that, as it responds primarily to the electric field of a radio wave, is popularly referred to as an E-field probe. In the modern suburban environment a lot of the locally generated noise tends to be predominantly electric fields, thus E-probes are particularly vulnerable to this sort of pickup. Considerable care needs to be taken over grounding and elimination of common-mode coupling if these antennas are to perform well. A comprehensive overview of E-field antennas appeared in the July 2012 Design Notes.

An alternative active antenna is the broadband loop, or 'mag loop', which responds primarily to the magnetic field part of a radio wave. Locally generated and conducted interference is rarely magnetic in nature, so a wideband loop should have appreciably lower noise pickup than an E-probe receive antenna.

Broadband loops

Whereas the E-probe presents a high capacitive impedance and needs a hi-Z amplifier with low input capacitance for maximum signal transfer from probe to amplifier, a small loop presents a very low and inductive impedance. The radiation resistance of a small loop is proportional to the square of the loop's area and also to the square of the frequency. At low frequencies the radiation resistance is swamped by the loss resistance of the loop, but as frequency rises the increasing inductive reactance then dominates the total impedance. At very low frequencies, therefore, the small loop will have a considerable inherent loss; just as does a small active probe at low frequencies. But this doesn't matter too much – if we use a decent low noise amplifier the background noise, at its highest at the bottom end of the RF spectrum (and even when natural and non-man-made) should dominate over the noise due to antenna loss and amplifier noise figure.

Faraday's Law gives the voltage output that will be obtained for a single turn loop of a given area, in free space, perpendicular to a magnetic field, as: $V_{RMS} = 2\pi \cdot A \cdot F \cdot H_{RMS} \cdot \mu_0$ where A is the loop area, F is frequency, H is the field strength of the magnetic component of the RF signal in amps per metre [1] and μ_0 is the permittivity of free space, $4\pi \cdot 10^{-7}$.

There are two ways to terminate a loop antenna. One is to connect the two ends of the loop to a high input impedance differential



PHOTO 1: Broadband active loop antenna, useful from 400kHz to 30MHz.

amplifier. Doing this, the output voltage of the loop will be unattenuated by the amplifier input impedance and given accurately by the equation above. The voltage for a given field strength rises proportional to frequency, so the loop is insensitive at the low end and over-sensitive at the top end of the spectrum. This rising frequency response is generally not at all helpful or wanted.

The alternative is to terminate the loop into an amplifier with a very low input impedance – as low as possible. Now, to see what we get to feed into the amplifier, we need to take into account all the series loss resistance terms and the reactance of the inductive component of the loop. If we can ensure

the inductive reactance is significantly higher than the sum of all the resistive terms, we get a very convenient flattening of the frequency response. It works like this: as the frequency rises the voltage output of the loop rises proportionately. But the reactance of the loop's inductance, $X_L = 2\pi F \cdot L$ also rises with frequency. So if we ignore the real resistive terms for now, the current being fed into the amplifier is given by $I_{LOOP} = V_{LOOP} / X_L$. As both these terms are proportional to frequency, the current delivered into the amplifier for a constant field no longer depends on frequency as the terms on top and bottom of the equation cancel. At some low frequency the resistive loss terms do become significant as X_L has dropped sufficiently, so sensitivity starts to roll off. But for practical dimensions the flat response can be made to cover a wide band. A worked example illustrates things.

Assume a one metre diameter loop made from 15mm diameter copper tube. Feed this into an amplifier with an input impedance of 4Ω. From the spreadsheet at [2] this loop has an inductance of 2.7μH. At 3.5MHz that means a reactance of 59Ω, with a loss resistance of around 0.03Ω. At 137kHz the loss resistance is 0.006Ω, with 2.3Ω reactance. At 25MHz there's still a mere 0.09Ω loss and 422Ω reactive impedance. In all cases the amplifier's 4Ω completely dominates the loss resistance. Reactance becomes numerically equal to this at a frequency of around 236kHz, giving 3dB additional loss. We consider this to be the lower cut-off. Above this frequency, up to some upper limit determined by amplifier capability and also when the loop circumference becomes a significant part (say 10%) of a wavelength, the output from the amplifier will be essentially independent of

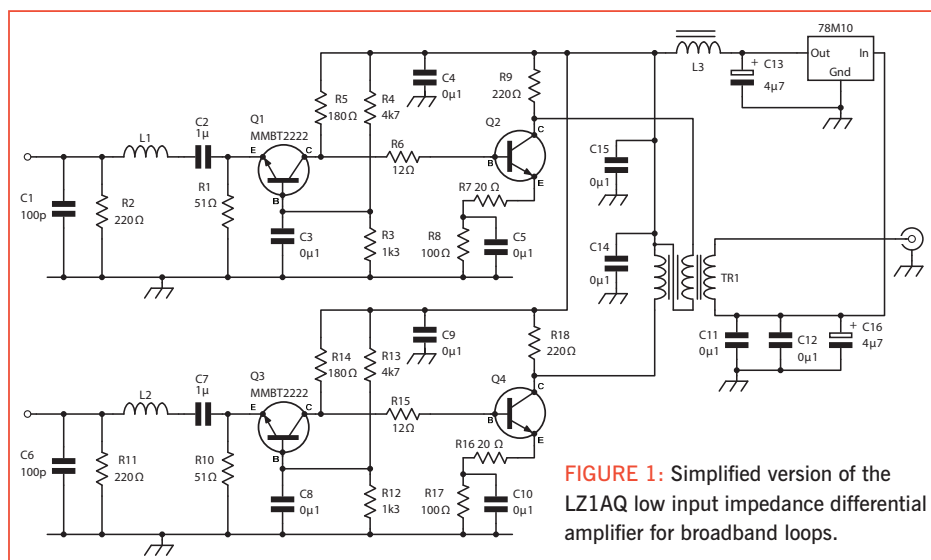


FIGURE 1: Simplified version of the LZ1AQ low input impedance differential amplifier for broadband loops.

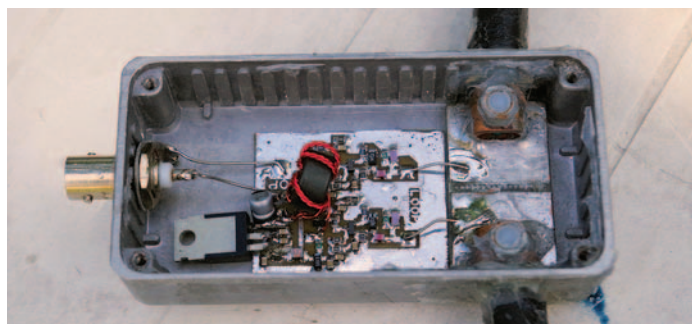


PHOTO 2: The amplifier PCB and loop termination. Waterproofing and insulation is by heatshrink tubing and silicone compound.



PHOTO 3: Alternative loop termination using a plastic conduit box.

frequency. Even below this lower cut-off the loop will still be useful, as real background noise is high down there and the reducing sensitivity still allows useful reception. So we now have a broadband active receive antenna that is substantially flat from LF to the middle of the HF band. It is clear that for maximum sensitivity we want as large a loop as is practical as V_{LOOP} increases faster with frequency than does the corresponding increase in X_L . But we also want to minimise the inductance to get the highest current into the amplifier. Inductance drops when the conductor diameter is increased. So the golden rule, for maximum sensitivity at the low end of the spectrum, is a large diameter loop with a large diameter conductor. For low HF operation up to, say, 10MHz ($\lambda=30\text{m}$), the loop diameter should be not much more than 1m. Note also that the loop is directional, with maximum pickup in the plane of the loop and a null broadside on. It has the same radiation pattern as a dipole except that polarisation is vertical.

Amplifiers

For a low input impedance two types of amplifier technology are available. The opamp virtual earth arrangement has a theoretically zero input impedance due to its 100% negative feedback. However, opamps are tricky to use at high frequencies, can have stability issues and are often quite expensive devices. We won't consider them here (although they are frequently used for loops specifically for ultra-LF to LF receiving). The other contender is a bipolar transistor operated in common base (CB). A bipolar in CB with a few tens of mA collector current will have an input resistance of a couple of ohms. In fact, if the internal bond wires of the transistor were lossless, the CB input resistance is given by $1/40I_c$, where I_c is the collector current in amps. So 25mA gives 1Ω. In practice, the bond wire resistance increases this. (As a complete aside, look what happens to the CB input impedance when $I_c = 500\mu\text{A}$).

One important area is balance. If the two ends of the loop each terminate in a different impedance to earth when they enter the amplifier (such as a single-ended CB stage) then the whole loop will have a component that acts as a single vertical probe antenna – it will be unbalanced. This will undo all the good work of making it respond only

to H fields. So a differential amplifier is essential, with equal impedance to ground on each side so common mode E-field pickup is cancelled.

A practical amplifier design

Chavdar Levkov, LZ1AQ has done a fair amount of work on loops and amplifiers [3] and has come up with a good, repeatable design for a balanced amplifier for broadband magnetic receiving loop antennas in the 0.6 to 1m diameter range. Two identical common base stages feed into common emitter gain blocks. After combining their outputs with 180° phase shift, the result is a differential amplifier, minimising common mode pickup. The outputs from the two identical stages are combined in a centre tapped transmission-line transformer and the input impedance between the two emitters is around 4Ω. **Figure 1** shows a slightly simplified version of LZ1AQ's design, built onto the PCB shown in **Photo 2**. The capacitors and inductor on the input are a low pass filter to prevent overload from strong 88 – 108MHz broadcast signals.

The Itchen Valley Amateur Radio Club has taken this on as a club project and a proper silk-screened and solder resist coated PCB is to be developed and kits of parts provided. As well as providing an amplifier for members' loops, the PCB will also serve as an introduction to and practice in SMT construction techniques. DC is fed to the amplifier through the coax via a DC bias tee at the shack end, which will also be part of the project.

Photos 1 and **2** show my first version of a 0.6m diameter loop using 10mm copper tube. **Photo 3** shows how Glyn, MOXGT has waterproofed the loop ends of his breadboard as they enter a plastic conduit box. By some pure fluke (and a failure of Murphy's Law), my PCB fits perfectly into his box!

Toroidal cores

The toroidal output transformer is important for combining the output from each side of the two identical front end amplifiers. It is a transmission line (TL) design making use of a trifilar winding; two of the conductors forming the centre tapped primary, the third wire the secondary. A TL transformer is not dependent on the characteristics of the core material as the tight winding of the twisted wires gives the signal coupling. The

purpose of the ferrite core is merely to give enough impedance between the two ends of each winding to make them independent by having a very high resulting shunt reactance. For applications like this, the best core material is one designed for low frequency use as it has the highest specific inductance. Switch mode PSU designs have made a huge range of ferrite cores available to us. Paul, M1CNK identified a suitable 10mm diameter core made from N30 material [4]. Tests using a few turns of bifilar winding as a 1:1 50Ω transformer suggested a TL design that is essentially flat and substantially lossless over at least 400kHz to several tens of MHz. The lower frequency limit is set by the number of turns sufficient to give enough inductance to decouple the ends from each other. The upper limit is where the length of wire is no longer 'short' when compared with a wavelength.

One club member expressed reservations about passing DC through the secondary winding – which is needed in the circuit shown to extract the DC supply from the coax. He wondered about saturation of the core and any resulting non-linearity. A few experiments on a test transformer suggested there was a small amount of degradation and the inductance changed, but at a level that would almost certainly go unnoticed for practical purposes at the 120mA supply current here. But this clearly could be an issue for more critical applications and needs some evaluation.

Websearch


- [1] RF field strengths are more usually specified in terms of their electric component E, in V/m. For a radiative wave this is directly related, via Ohms law, to the magnetic field H via the impedance of free space, 120π , or about 377Ω. So $H = E / 377$. In the 'near field', typical of local QRM situations, this relationship does not hold.
- [2] www.g4jnt.com/Download/Magloop.xls
- [3] tinyurl.com/DN-12-17-B or www.lz1aq.signacor.com/docs/wsm/wideband-active-sm-loop-antenna.htm
- [4] tinyurl.com/DN-12-17-B or <http://uk.farnell.com/epcos/b64290138x830/ferrite-core-toroid-n30/dp/1422735>

Andy Talbot, G4JNT
andy.g4jnt@gmail.com

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We came across this diagram at <http://xkcd.com/730/> and immediately realised it was for a Thing of Purpose – but unfortunately there were no clues as to precisely *what* that purpose actually was.

So here's the challenge. Examine the diagram and use your imagination to decide what the intended function might be. Perhaps it's a plot map of a particularly exciting novel? Maybe an automatic contest pile-up buster? Or could it possibly represent the processes we use to create the Contents page of *RadCom*? Let your creativity and ingenuity run wild!

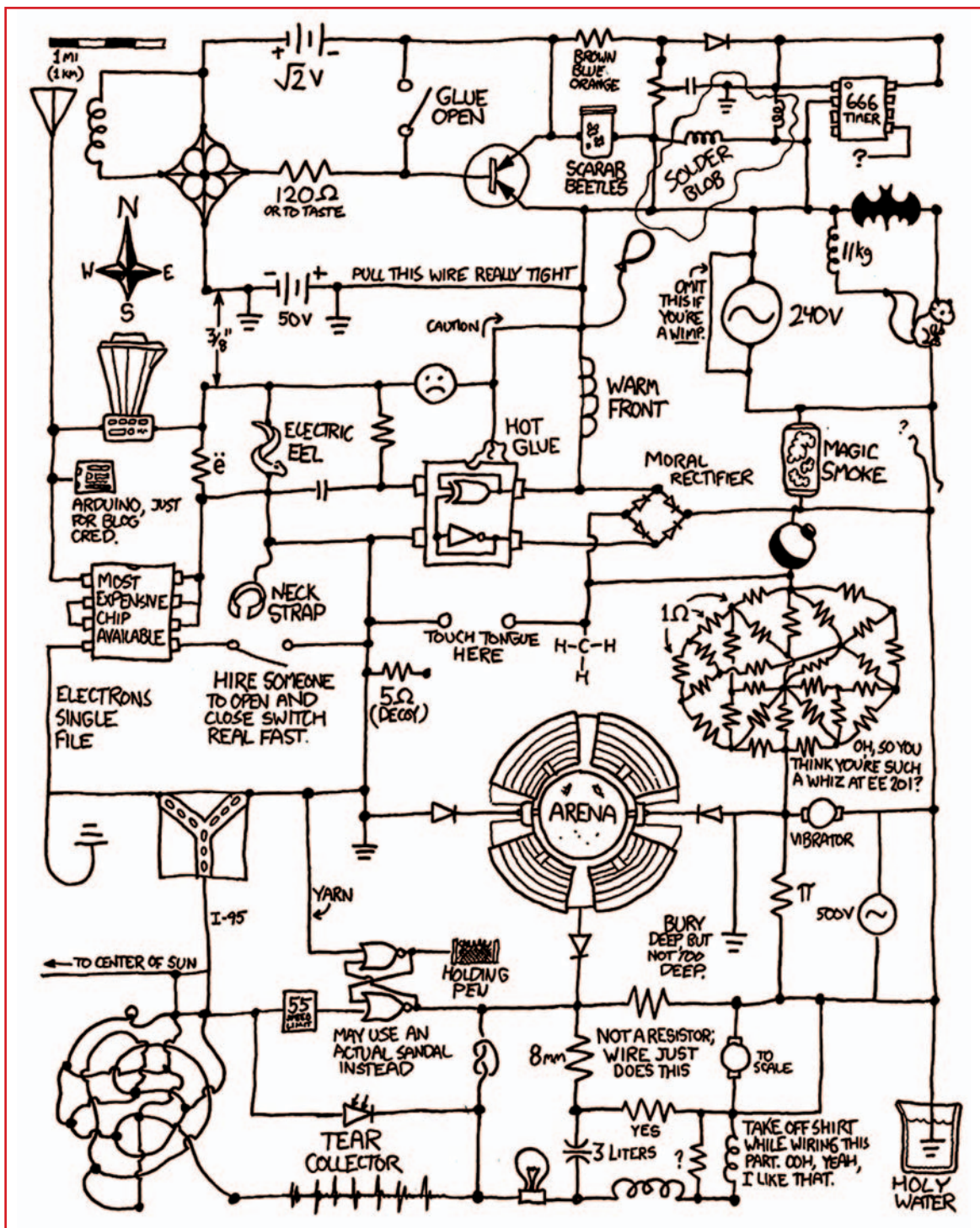


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We would like to thank xkcd.com for their generous licencing terms that let us use this image.

Finally, although it isn't part of the competition, if you can work out the effective value of the 1Ω resistor network on the right we'd like to hear what you come up with. Best estimates so far are between 0.6Ω and 0.9Ω .



What does this do? Come up with an entertaining answer and you could win £25 in RSGB Book Vouchers!

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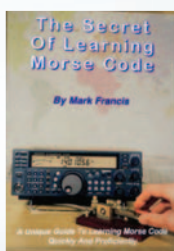
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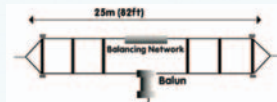
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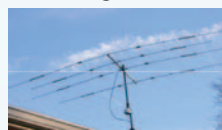
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EMC

This month's EMC focuses on international EMC work by IARU and EMC standards for new apparatus that uses high power Integrated Gate Bipolar Transistors (IGBT) switching hundreds or thousands of amps.

IARU Region 1 Conference

The 2017 International Amateur Radio Union (IARU) Region 1 General Conference is held every three years and, in 2017, it was hosted by the German National Society (DARC) in Landshut, Germany. IARU Region 1 has had an EMC Working Group for many years but in 2016, they introduced a Permanent EMC Committee (C7). This is a specialist technical body of IARU that deals with electromagnetic compatibility issues related specifically to the EU's Electromagnetic Compatibility (EMC) and Radio Equipment Directives in various international standards organisations, CISPR, IEC, ICNIRP, CENELEC, ETSI and other Region 1 entities of a similar nature. The work of C7 includes monitoring and researching developments that potentially impact the Amateur Service and Amateur-Satellite Service and participating in EMC standards work.

Papers were presented in categories including C3 (General), C4 (HF), C5 VHF/Microwave and C7 (EMC) [1]. I presented a paper on behalf of RSGB on Radiated RF emissions from wind farms (see later).

The Norwegian Radio Relay League, NRRL, presented a paper on a proposal for a background noise measurement campaign. The Conference made a recommendation to start a simple noise measuring campaign amongst Region 1 Member Societies, hence enabling IARU to be able to have an independent opinion on the noise situation in the bands and the trends over time. A data collection and processing system will be developed. The input data will be provided by the members. Brendan, EI6IZ was appointed as chairman of the Noise Measuring Campaign Sub-Working Group.

The Belgian National Society, UBA, presented two papers. One was an information paper about interference to amateur radio due to 'electronic ballasts' for metal-halide high intensity discharge (HID) lamps in street lighting. The other was a proposal for a database to share information about interference-causing devices. For the latter, IARU Region 1 Conference recommended that the IARU works to create a system to store relevant interference observations done by the Member Societies. The 'system' is to have a well-controlled

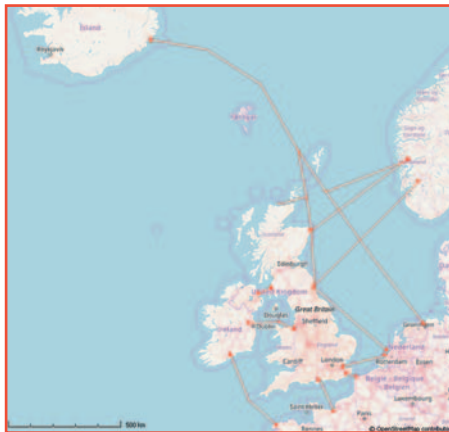


FIGURE 1: Some existing and proposed electricity interconnectors between the UK and neighbouring countries. Map data © OpenStreetMap contributors.

access system limiting both read- and write-access as decided by IARU. The IARU EMC Committee (C7) is entitled to work out the access policies on behalf of the IARU.

Markus, HB9HVG presented the paper written by HB9AZO on EMC problems due to solar photovoltaic (SPV) plants. It was reported that a SPV installation 75m away from amateur radio station HB9AZO was raising the noise floor by approximately 40dB from 3.5 to 52MHz. This was reported to the Swiss Regulator Ofcom CH, who carried out tests. The source of disturbance was found to be the power optimisers for the SPV panels. These use power line communications via the DC power wires and could therefore be regarded as a telecommunication network. The manufacturer was helpful; they changed the software, then they changed the optimisers, fitted three ferrite filters to each optimiser and twisted the wires. This gave an improvement of 20dB but was still 12dB over the level for telecommunication networks given in CEPT ECC Rec (09)02. The manufacturer has promised to replace the optimisers again when an improved type is available.

Informal discussions with EMC representatives of other IARU Member Societies showed that most EMC issues affecting amateur radio are international and a lot of useful information was exchanged about how to tackle these issues. One that appears to be far more significant in the UK than elsewhere is interference radiated by VDSL2 networks, detailed elsewhere in this issue.

International interconnectors

The 1000MW (1GW) IFA2 (Interconnexion France-Angleterre) is a €350M project that is under construction. It will provide a second link

between the electricity grids of France and the UK and it uses high voltage DC (HVDC) transmission. The current can flow in either direction, depending on which country is importing electricity.

There are other interconnectors in operation or planned. These include Norway to Scotland, Norway to England, Norway to Germany, England to The Netherlands, England to Northern Ireland, England to the Republic of Ireland and France to Ireland (see **Figure 1**). A plan to link Iceland to Scotland, Norway, The Netherlands and Germany is being considered, although the UK connection may be delayed due to Brexit.

There are a number of offshore wind farms in the North Sea (see **Photo 2**) that bring electricity ashore to UK, Germany, The Netherlands and other countries. In Germany, electricity from wind farms needs to be transported from the North of Germany to the South of Germany for industrial users. This capacity in the German electricity grid needs to be increased and there are plans to use HVDC transmission onshore in Germany.

HVDC interconnectors have an HVDC converter station at each end to allow them to connect to 50Hz AC electricity grids. National Grid has published a fact sheet, *High Voltage Direct Current Electricity – technical information* [2].

Designers of electricity sub-stations are using some proposed EMC limits from CIGRÉ, the Council for Large Electrical Systems (*Conseil International des Grands Réseaux Électriques*). CIGRÉ Report 391 is a *Guide for Measurement of Radio Frequency Interference from HV and MV Substations*. These cover the frequency range 9kHz–30MHz using a magnetic field loop antenna and 30MHz–1000MHz using an electric field antenna. The measurement distance is up to 200m from the nearest active part of the sub-station. There are three sets of CIGRÉ proposed limits for sub-stations, depending on their voltage.

The designers of one HVDC converter station have stated that they aim to reduce the electromagnetic disturbance levels to below the existing background disturbance level already present at the site. That should be adequate if it can be achieved but it depends on the meaning of "the existing background disturbance level already present at the site" and how it is measured. A typical CISPR 16 active loop measuring antenna is not capable of measuring the existing background disturbance levels already present at most sites, because the overall measuring system noise floor is determined by the preamp noise of the active loop antenna. This is much higher than the background noise level at a typical amateur radio station using a wire dipole antenna and it is also well above the ITU-R P372.13 residential noise levels.



PHOTO 1: IARU EMC Committee (C7) working group at Landshut.



PHOTO 2: Sheringham Shoal Wind Farm, one of many such installations in the North Sea. Image courtesy of NHD-INFO.

RSGB's EMC Committee is studying the various CIGRÉ limits to find how much protection they provide for amateur reception and at what distance.

Wireless power transfer

Wireless Power Transfer (WPT) technology is currently being used to charge mobile phones, laptops, hearing aids and implantable medical devices. WPT uses inductive coupling over a short distance at low power (eg up to 3-5W). WPT will be used in future for electric vehicle charging at up to 22kW in residential areas. It is predicted that 40 million WPT units will be in use in Europe by 2025.

The frequency range being discussed for this type of WPT is 79-90kHz; there are potential problems from harmonics and other spurious emissions in amateur bands. In an urban environment there could be many such WPT charging points per hectare, so the separation distance from an amateur radio antenna may be quite small (eg less than 10m). Chargers are likely to run for long periods day or night, increasing the probability of interference.

WPT may use communications on the carrier so it would be classified as a comms system rather than an Industrial Scientific and Medical (ISM) system. The issue is being discussed in CEPT (Spectrum Engineering) SE24 and ITU-R. Proposed limits are high but the IARU is trying to ensure that the Amateur Radio Service is protected as far as possible.

Wind turbines

The RSGB paper on Radiated RF emissions from wind farms presented at the Region 1 Conference can be downloaded from [1]. The Conference recommended that Member Societies (MS) should influence their national standards organisations towards covering disturbance issues of large structures such as wind turbines in the future. MS are also requested to report such disturbance issues to the IARU EMC Committee (C7).

Interference from wind turbines has also been observed in Norway and Sweden. In Germany. They are tested to CISPR 11 standards at ground level at a distance of 30m from the tower. This is not considered to be a suitable

measurement distance however as the source of RF disturbance appears to be the generator at the top of the tower, which may be up to 150m high. Other measurement distances are under consideration and an IARU is represented on the relevant working group in the European standards organisation CENELEC.

CQ 6Hz?

EMC standards tend to lag behind new developments in technology such as Doubly Fed Induction Generators (DFIG) for wind turbines. A DFIG is a type of 3-phase AC generator that is a bit like a giant car alternator but instead of feeding the rotor with DC, it is fed with a variable frequency AC drive at up to 6Hz. This improves efficiency by allowing the generator to run faster or slower than the speed required to synchronise with the 50Hz grid. For much of the time in conditions of low wind, the generators run 12% slower and the rotor is fed with 6Hz.

For a typical 2MW wind turbine, the variable speed AC drive to the rotor has a power of over 200kW and a rotor current of over 600A. This is likely to be a pulse-width modulated variable frequency AC drive using high power integrated gate bipolar transistors. When housed in a fibreglass casing at the top of a tall mast and connected to large (and conductive) rotor blades, there is a potential for radiating detectable levels of RF interference. This interference is broadband with amplitude modulation at 100Hz and there may also be AM at around 6Hz. I would be interested to receive any reports of interference with 6Hz modulation, especially on the 160m or 80m bands or on quiet MW broadcast frequencies.

VHF PLT

After many years of debate in standards organisations about EMC standards for Powerline (Tele)communications (PLT/PLC) devices, the EN50561 series of standards was produced. These standards allow PLC devices to produce relatively high levels of radio interference over much of the HF and low VHF radio spectrum and the only consolation for radio amateurs is that 'notches' are specified for amateur bands. These make a substantial reduction in interference levels in amateur radio bands [3].

A paper was presented to the EMC EUROPE, 2016 International Symposium on Electromagnetic Compatibility with the title, *EN50561-3: Not an EMC standard, but an unacceptable licence to cause interference*. The paper expresses the view that the EN 50561-3 power line communication standard allows very high interference levels and is neglecting the allocation of the VHF band 30MHz-87.5MHz, which is mainly assigned to military communication. They state that these communication systems are severely degraded and that a reduction of performance of 44dB was measured. They also show test results for a VHF PLC device that exceeds the EN50561-3 limits and does not include the required 'notches' at 50-52MHz and 70-70.5MHz to protect amateur bands. The paper claims that EN 50561-3 and the power line communication systems do not meet the Essential Requirements of the European EMC Directive.

MIMO PLT

In order to achieve ever higher data rates over PLC links, manufacturers are not only using VHF frequencies above 30MHz but also Multiple Input Multiple Output (MIMO) techniques. MIMO involves driving additional RF signals between phase and protective earth (PE) and between neutral and PE. It can be shown that signals driven against PE radiate more than signals driven phase to neutral so the limits for MIMO PLC devices should be reduced compared to Single Input Single Output (SISO). This matter is currently under discussion in standards organisations and IARU is involved.

Websearch

- [1] www.iaru-r1.org/index.php/general-conference
- [2] <http://www2.nationalgrid.com/WorkArea/DownloadAsset.aspx?id=13784>
- [3] www.iaru-r1.org/index.php/emc/1485-new-standard-for-in-house-plc-above-30-mhz

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

Antennas

Revisiting the doublet

The doublet antenna, a simple dipole, continues to find popularity with stations and it is often encountered on the HF bands.

Design concept

The doublet comprises a wire span fed at its centre with a balanced two-wire feeder cable. Ideally, the length of the wire span should be an electrical half wavelength ($\lambda/2$) at the lowest frequency of operation and this can be calculated using the antenna equation $\text{Length (m)} = 150 \times (n - 0.05) / f$ (1) where n is the number of complete half-waves in the wire span ($n=1$ in this case) and f is the lowest frequency of operation in MHz [1].

However, the wire span's length can be reduced to three-eighths of an electrical wavelength ($3\lambda/8$) without significantly compromising the performance of the antenna [2]. This $3\lambda/8$ version of the doublet radiates with an effectiveness of approximately 98% relative to a $\lambda/2$ dipole. This gives the doublet a distinct advantage over other antenna designs if the space to install the antenna at your location is limited.

The balanced two-wire feeder cable used could be either open-wire or ladder-line and either type gives a lower loss compared to coaxial cable. If ladder-line is used, this can be either the 300 Ω or 450 Ω impedance varieties. The length of the balanced feeder cable can be cut to suit the requirements where the antenna is to be installed and the concept of this arrangement is shown in **Figure 1**. However, a reasonable match can be obtained when the total combined length of half the wire span ($L1$) and the feeder cable ($L2$) are a multiple (N) of an odd number of electrical quarter wavelengths ($N\lambda/4$) at the desired operating frequency. A reasonable estimate of the combined length in metres is $(L1 \times Vs) + (L2 \times VL) = N \times \lambda/4$ (2) where Vs is the wire span's velocity factor, VL is the feeder cable's velocity factor and N is 3, 5, 7, 9 and so on.

Using this arrangement allows the impedance presented at the bottom of the feeder cable (Zin) to be low and primarily resistive, enabling a good match to be made with a 50 Ω coax cable run from the radio equipment. However, when connecting an unbalanced coax cable to a balanced feeder cable a balanced-to-unbalanced (balun) transition should be connected between the two cables. This is necessary to minimise the undesirable effects that are associated with

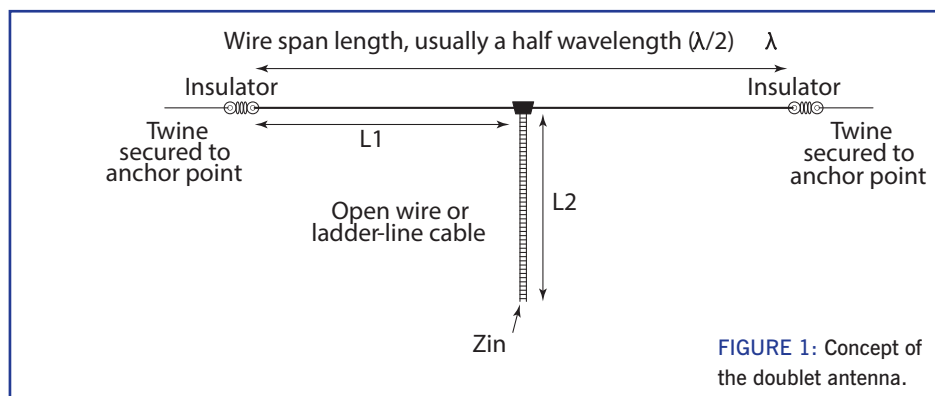


FIGURE 1: Concept of the doublet antenna.

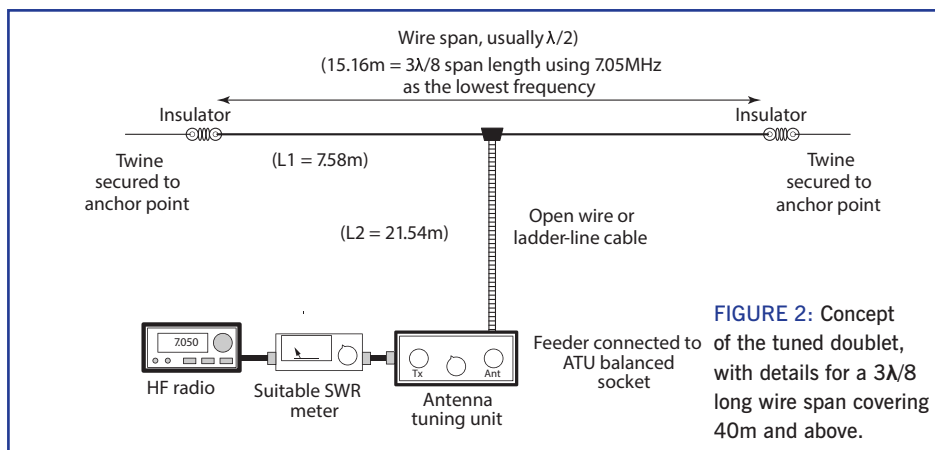


FIGURE 2: Concept of the tuned doublet, with details for a $3\lambda/8$ long wire span covering 40m and above.

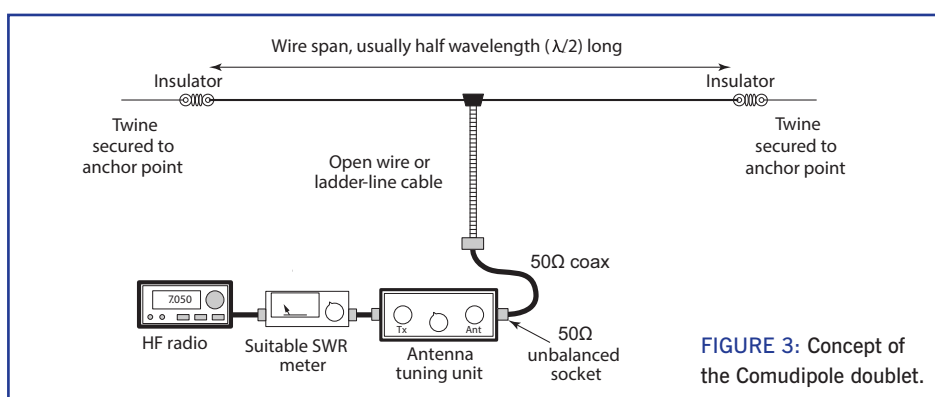


FIGURE 3: Concept of the Comudipole doublet.

common mode currents that can flow along the outer surface of the coaxial cable's shield conductor. Guidance on how to construct a suitable balun was provided in the September 2016 Antennas column and in [2].

Worked examples

Let's look at a doublet for 40m using a $3\lambda/8$ long wire span. Using the lowest frequency of operation as 7.05MHz, this equates to a free space wavelength of 42.553m.

In this example, the combined electrical length of half the $3\lambda/8$ wire span's length ($L1$) and the balanced feeder cable's length ($L2$) has been taken as $3\lambda/4$ (ie $N = 3$).

If 300 Ω ladder-line is used as the feeder, it can be expected to have a velocity factor (VL) of about 0.9, while the velocity factor of the wire span has been taken as 0.95 (Vs). Lengths $L1$ and $L2$ can then be determined: $L1 = (3/16 \times 42.553) \times 0.95 = 7.58\text{m}$ $L2 = (9/16 \times 42.553) \times 0.9 = 21.54\text{m}$ Note: $(3/16 + 9/16) \times \lambda = 3\lambda/4$. Therefore,

the combined electrical length of L1 and L2 is 29.12m (see **Figure 2**).

Reworking this for 15m and 21.15MHz, with the dimensions from above, the free space wavelength equates to 14.184m. Using the same velocity factors, then with L1 = 7.58m this now equals 9/16 of a wavelength. With length L2 = 21.54m, this now equals 27/16 wavelengths. The total of L1 and L2 now comes to nine multiples of a $\lambda/4$ at 21.15MHz (ie N = 9). Consequently, this arrangement should provide a good match at on both the 15m and 40m bands.

However, when using the antenna on any other bands, it tends to present a high, complex impedance at the bottom of the feeder cable, necessitating the use of an ATU to maximise the performance of the antenna.

A good practice when constructing a doublet antenna is to cut the wire span as described here, but the balanced feeder about 5% longer than calculated. This gives a margin to help tune the antenna by allowing it to be trimmed as necessary to minimise the SWR at the lowest frequency of operation.

Matching

The doublet is a balanced antenna and so needs to be brought to resonance using an antenna tuning unit (ATU) that has a balanced input to maximise its performance. As outlined earlier, the end of the feeder cable can present a wide variation of impedance and the ATU used needs to be capable handling this wide range. Figure 2 illustrates the concept of a doublet antenna directly connected to the balanced input of the ATU and this arrangement is often referred to as the *tuned doublet* or *random-length dipole*.

It is possible to further reduce the doublet's length to an electrical quarter wavelength ($\lambda/4$) at the lowest frequency of operation, where it radiates with an effectiveness of approximately 95% relative to a $\lambda/2$ dipole. However, care is needed because the antenna can present high SWRs. For example, when using 450 Ω feeder cable this can result in SWR values of around 300:1, which can be outside of the matching capabilities of the many commercial ATUs.

Coax fed multi-band dipole

When the balanced feeder cable passes over a metal surface (eg window frame, metal downpipe, domestic wiring, or similar) this may cause an imbalance in the currents. This current imbalance can cause common mode problems that may degrade the performance of the antenna. A method to avoid this problem is to run a coaxial cable from the ATU's 50 Ω unbalanced connection to the antenna and use a balun to connect the coaxial cable to the balanced feeder. The self-screening properties of coax allow it to be run in close proximity to metal surfaces without common mode problems being incurred. However, the length of the coaxial cable used should be as short as possible to keep the losses to a minimum. The impedance presented at the feeder cable's end depends upon its length. Therefore, the balun used may need to be a 4:1 impedance ratio type, rather than a 1:1 impedance ratio type. This version of the doublet antenna is sometimes referred to as a *coaxial cable fed multi-band dipole* (Comudipole) [3]. **Figure 3** illustrates the concept of the doublet antenna fed using this arrangement.

Predicted radiation patterns

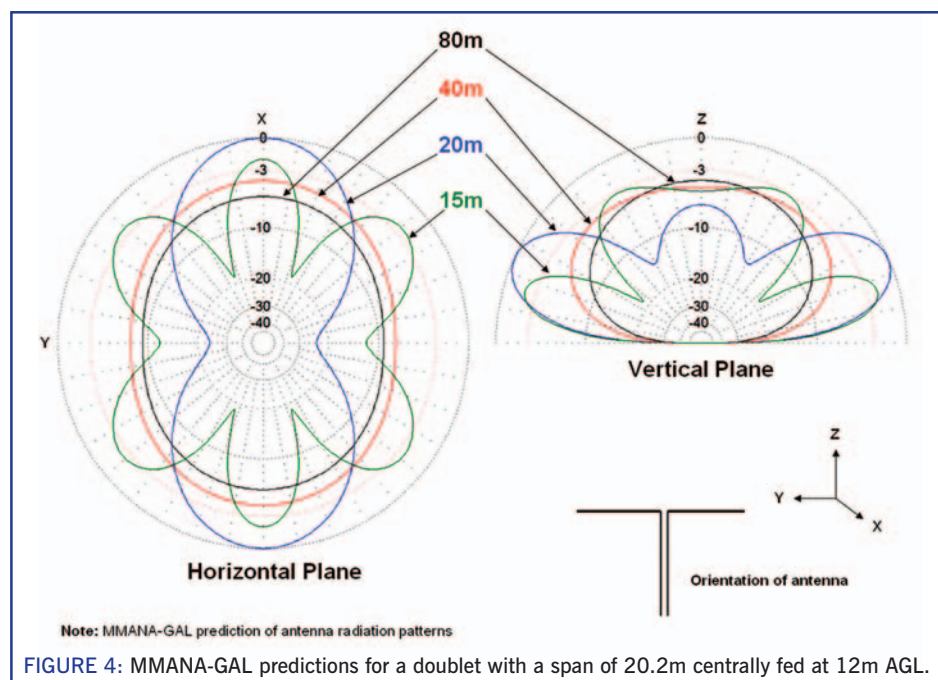
The performance was predicted using MMANA-GAL for a doublet with an electrical $\lambda/2$ wire span for 7.05MHz (20.2m) installed at 12m above ground level (AGL). The model's feeder cable was 11m run vertically downwards from the centre. **Figure 4** shows the predicted radiation patterns in the horizontal and vertical planes. This antenna was originally modelled as a $3\lambda/2$ long doublet. Using equations (1) and (2) along with the previous velocity factors gave a feeder length of 19.15m, indicating it would need to be installed at around 20m AGL. However, 12m AGL is more practical at most locations, with the remaining 8.15m of feeder cable run clear of the ground horizontally.

The model was run at 3.65MHz, 7.05MHz, 14.15MHz and 21.2MHz. For 80m and 40m, the vertical and horizontal patterns are very similar and indicate close to omnidirectional radiation. The vertical patterns show significant radiation upwards, so the antenna should work well for shorter-skip contacts on both bands. As expected on 80m, the wire span's $\lambda/4$ effective length means the radiation performance is slightly lower compared to the higher bands. The horizontal pattern on 20m shows the radiation has become significantly directed away from either side of the wire span, giving directivity similar to a $\lambda/2$ dipole. The vertical radiation pattern shows a lobe towards the horizon either side of the span, indicating its suitability for medium-skip contacts. Occasionally, more distant longer-skip stations should be able to be worked, given suitable propagation. On 15m the horizontal pattern shows three significant lobes directed away either side of the wire span with nulls between them. Stations in the direction of a lobe may be worked at reasonable levels, but those in nulls will be more difficult. The vertical pattern shows a lobe directed towards the horizon at a low angle of radiation either side of the wire span. This indicates the antenna's suitability for longer-skip stations to be worked when the propagation conditions are suitable. The sizable lobe directed skywards above the antenna indicates that medium-skip contacts should also be possible when conditions allow.

References

- From the *RSGB Radio Communication Handbook*, 13th edition edited by Mike Browne, G3DIH:
- [1] Sect 13, Antenna Basics & Construction, P13.2
 - [2] Sect 14, Transmission Lines, P14.12-14.15
 - [3] Sect 15, Practical HF Antennas, P15.9-15.11

Mike Parkin, G0JMI
email2mikeparkin@gmail.com



Sport Radio

December is a quiet month for RSGB contests and, on HF, it's particularly quiet because there aren't any.

On VHF we start with 144MHz AFS (see **Photo 1**), which is the third event in this season's Super League series. It runs for six hours on Sunday 3rd. Then we have a lot of Activity Contests; the 2m FMAC and UKAC on Tuesday 5th, the 70cm FMAC and UKAC on Tuesday 12th, the 23cm UKAC on Tuesday 19th and the 4m FMAC and UKAC on Tuesday 21st. After the 21st there are no more UKACs because of the Christmas holidays, but starting on Boxing Day we have the Christmas Cumulatives. In this series there are four sessions on successive days. All four bands (6m-70cm) are used each day, so to do well you need to be agile and keep band hopping.

The UK Six Metre Group's Winter Marathon starts on Friday 1st and runs continuously for two months. There are no set operating times, just work as many Locator squares as you can. You can upload your log as many times as you like, while you build your score. It might not be the main season for 6m DXing, but last year the winning station worked 100 Locator squares. Starting at 2200 on Friday 1st, the ARRL 160m Contest runs for 42 hours. Work the USA, US Territories, Mexico and Canada only. Being a 160m contest, it will need to be dark at both ends of the QSO for there to be transatlantic propagation. The first North American stations (Eastern Canada and North-



The G3MEH Trophy, awarded for winning the 144MHz AFS contest.

East USA) should be heard in Britain from about 2200Z, propagation extending westwards as the sun sets across North America. Expect the Americans and Canadians to fade out at about sunrise time in the UK. The ARRL 10m Contest runs for 48 hours on 9-10th. In this event everyone can work everyone. Both ARRL events have so many sections it isn't practical to list them in this column, so please visit the ARRL.org website for detailed information. The DARC (German) Christmas Contest takes place on Boxing Day morning on 80m and 40m.

For UK stations the band that will carry the bulk of the traffic will be 40m. The Worked All Britain Christmas Party runs for six days, starting on Boxing Day. The Stew Perry Top Band Distance Challenge – known as 'The Big Stew' – runs for 24 hours starting 3pm on Saturday 30th. Entrants are limited to fourteen hours operating which, considering the band is closed when it is daylight, seems about right for Middle America. In the UK the band is open for a little longer, depending on how far north you live. This is a contest where working long distance is important, so an antenna with a low takeoff angle is needed to do well on transmit. On receive an antenna to pick weak stations out of the noise will also help. Traditionally the receive antenna of choice would have been a Beverage, but these days there are compact alternatives such as the K9AY loop.

Now, a look forward. The Super League continues in January. In 2018 things are going to change in the series, but what's in store is more evolutionary than revolutionary. A datamodes AFS contest on 80/40m is being introduced, which will be held seven days after SSB AFS. With personal computers and modern software it really is easy to get going on data these days, so I expect a good turnout. That said, propagation isn't likely to be fantastic for any of the 80/40m AFS events.

Steve White, G3ZVW
steve.g3zvww@gmail.com

RSGB VHF Events

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange
Sun 3 Dec	144MHz AFS §	1000-1600	All	144	RS(T) + SN + Locator
Tue 5 Dec	144MHz UKAC	1900-2000	FM	144	RS(T) + SN + Locator
Tue 5 Dec	144MHz UKAC	2000-2230	All	144	RS(T) + SN + Locator
Tues 12 Dec	432MHz UKAC	1900-2000	FM	432	RS(T) + SN + Locator
Tues 12 Dec	432MHz UKAC	2000-2230	All	432	RS(T) + SN + Locator
Tue 19 Dec	1.3GHz UKAC	2000-2230	All	1.3G	RS(T) + SN + Locator
Tue 21 Dec	70MHz UKAC	1900-2000	FM	70	RS(T) + SN + Locator
Tue 21 Dec	70MHz UKAC	2000-2230	All	70	RS(T) + SN + Locator
Tue-Fri 26-29 Dec	Christmas Cumulatives	1400-1600	All	50-432	RS(T) + SN + Locator

Best of the Rest Events

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange/info
1-31 Dec	UKSMG Winter Marathon	All	All	50	RS(T) + Locator
Fri-Sun 1-3 Dec	ARRL 160m	2200-1600	CW	1.8	RST (Ws & VEs also send ARRL/RAC section)
Sat-Sun 9-10 Dec	ARRL 10m	0000-2359	CW, phone	28	RS(T) + SN (Ws, VEs & XEs send State/Province code)
Tue 26 Dec	DARC Christmas Contest	0830-1100	CW, SSB	3.5-7	RS(T) + SN (DLs send DOK or 'NM')
26-31 Dec	WAB Christmas Party	All	All	All	WAB Book number
Sat-Sun 30-31 Dec	Stew Perry Top Band Challenge	1500-1500	CW	1.8	4-character Locator (Grid) square

Italics indicate that only provisional information was available. *HF Championship event. +VHF Championship event. §Super League event. For all the latest RSGB contest information and results, visit www.rsgbcc.org

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A DIY variable capacitor

I enjoy the construction side of the hobby and at various times have built several small and large loop antennas. These of course always require a decent variable capacitor.

Over the years I have accumulated a number of secondhand variable capacitors, but none have ever been ideal for any particular project. A compromise always had to be made, be that physical attributes, minimum or maximum capacitance or voltage rating.

For automation I have tried most common methods for positioning the vanes but never achieved entirely satisfactory results in terms of performance or ease and repeatability of build. These have included stepper motors and DC motors with optical encoders. As neither of these provide absolute positioning it was necessary to determine either the limits of movement, or arrange a 'home' position. Lever micro switches at each extreme of movement is one option but I found an optical interrupter that allowed free movement through the home position to be easier, but this also presented a problem where the state change was at a slightly different position depending on motor direction. I therefore reached the conclusion that accurate absolute positioning was required, as anything less was subject to mis-positioning, frequent visits to the home position and generally sub-optimal performance.

For absolute positioning a high quality 10k potentiometer proved to be the best option. This is basically a servo motor arrangement and it may be possible to source a suitable servo but I preferred to be in control of the feedback positioning rather than use a servo motor driver. Variable capacitors of the larger variety usually rotate freely, so the control was complicated by having to ensure that the capacitor could only ever rotate forwards and backwards on a 180° arc to avoid destroying the potentiometer – and, yes I destroyed one fairly comprehensively during development!

Mechanically, this arrangement also meant that two couplings were required, one each for the motor and the potentiometer. I had a split-stator variable with a shaft at both ends that made this relatively easy to achieve. With only a single shaft, complicated gearing would have been required. A further requirement was that the couplings needed to be electrically insulating so as not to couple the shaft to the motor or potentiometer housing.

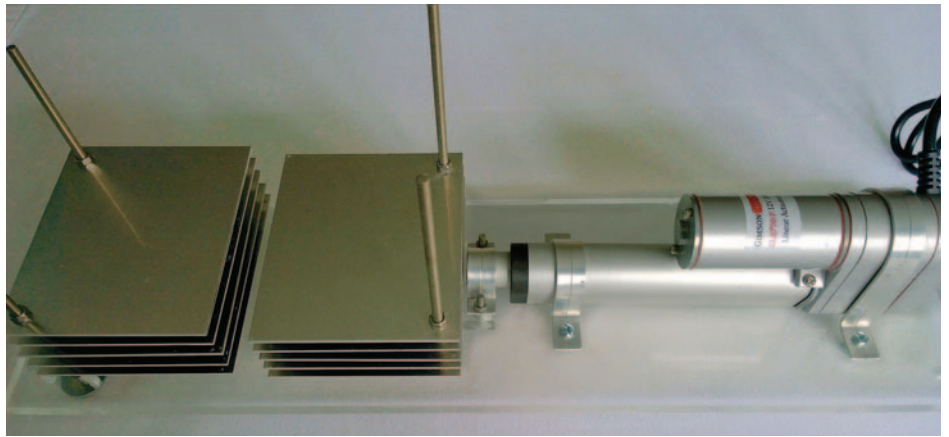


PHOTO 1: Completed linear actuator based DIY variable capacitor.

For a long time I toyed with the idea of using linear rather than rotary motion and recently noticed this being used on a commercial product. A web search turned up a number of suitable linear actuators. I chose one that had a 100mm stroke at a maximum speed of 10mm per second. It also had built-in limit switches and a convenient 10k feedback pot. The actuator was well over-rated for my intended usage. It would probably make a good attempt at lifting a small car! However, it was the total package I needed, all in one convenient unit [1].

I came up with the concept of a DIY variable capacitor utilising a linear actuator to move stacked aluminium plates. The design enables minimum and maximum capacitance to be easily adjusted over a wide range and also facilitates different control options from manual to fully automatic. **Photo 1** shows the result.

Simplicity of construction was essential. I have only a bench with a vice, the usual suspects for hand tools and a small pillar drill. The latter is not essential, but helps accurate drilling of the plates.

Detailed build instructions are not given as construction depends on the characteristics and stroke of the actuator you choose, the size of the plates and the materials employed. However, it is quite straightforward and should be practical for most constructors.

The prototype build

Some form of base plate was required to make the assembly portable so it could be used on different projects, rather than building into a specific project enclosure. I had some 10mm Perspex left over from a previous project and this proved ideal. It is easy to cut with a fine-toothed hand wood saw and drills quite cleanly (hint – drill a small pilot hole then drill in from both sides).

The capacitor assemblies are made from simple aluminium squares. I chose 2mm plate for rigidity. The dimensions for the prototype were 120mm x 100mm, which seemed appropriate for a 100mm stroke. As with the Perspex, drilling from both sides will reduce the amount of burr to clean up.

The first step is to fix the linear actuator to one end of the base plate. Most actuators available (including the one I purchased) seem to have a bolt hole at the back for a pivot bracket and a hole through the arm. Neither of these are particularly useful for this application. I therefore made 3 simple clamps from aluminium strip, two to hold the actuator to the base plate (see **Photo 2**) and one to connect the arm to the moving plates.

At the other end of the base plate to the actuator is the fixed set of plates, as seen in **Photo 3**. The plates are assembled using two lengths of M5 stainless steel threaded rod with 8mm spacers between the plates.



FIGURE 1: Arrangement of the actuator motor and limit switches.

M5 nuts clamp the assembly together and to the baseplate. It is obviously important that the holes line up to make a neat finish. I made a simple jig from two pieces of wood bolted at right angles to the drilling platform on my pillar drill. Pushing each aluminium plate up against the jig made sure the holes were accurately placed.

In the middle of the base is a movable set of plates attached to the actuator arm such that as the actuator is extended they interleave with the fixed set, see **Photo 4**. Obviously good alignment is required so some fiddling is needed to set the fixed plates at the appropriate height depending on the exact fixing point of the movable plates, such that they interleave smoothly and maintain constant spacing. Again these are fixed together with 2 lengths of M5 threaded rod, spaces and nuts but in this case they are only bolted together as they need to be fixed to the arm.

Fixing the movable plates to the arm was the most challenging part of the project. In the end I decided that a carrier sliding over the base plate would be the best approach as it would prevent any tendency for the moving plates to tilt or droop as the extension increased. This arrangement is shown in **Photo 5**, taken from the underside of the base plate. The carrier, which is another piece of 10mm Perspex is secured to the arm by one of the home-made clamps and to the bottom plate by two small bolts. These were countersunk into the Perspex to make a smooth surface for the carrier to run over the base plate. The bolts were also countersunk into the bottom plate to ensure there was no protrusion into the inter-plate space. Total build time was about 12 hours over two days.

Design advantages

The voltage rating of the assembly can be changed by using larger or smaller spacers. The smaller the spaces, of course, the greater the capacitance for a given number of plates but the more accurate the alignment needs to be. If you go for a smaller spacing it may be worth fixing some dielectric material to one surface of each plate to avoid any possibility of metal to metal contact. For high power it is sensible to round off sharp corners to reduce the chances of corona discharge or arcing.

Almost any reasonable capacity range can be accommodated. To change the minimum capacity, adjust the gap/overlap at minimum extension. To change the maximum capacity, add or remove plates to/from both assemblies. Notice that in my prototype I left the threaded rods long so that more plates can be added as required for different projects. No disassembly will be required except the removal and replacement of four nuts.



PHOTO 2: How the actuator is clamped to the Perspex base plate using homebrew straps.

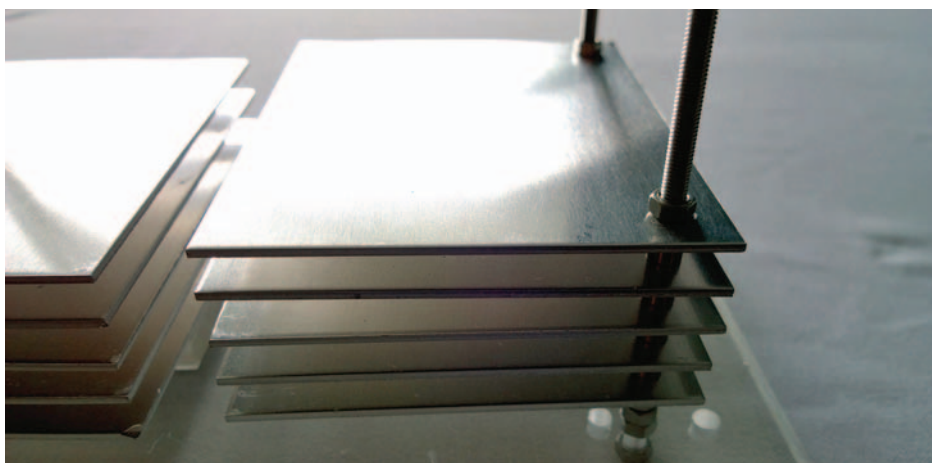


PHOTO 3: Fixed plates. The studs were left long so extra plates could be added.

It should even be possible to introduce a fixed capacitor by extending the fixed plates to the other side of the base plate and introducing a further set of fixed plates on the underside. I have not tried this, but mechanically it looks quite straightforward to do, although the base plate would then have to be mounted on its edge or above the fixing points using (for example) threaded rod.

There are no shaft couplers to worry about and the actuator arm is insulated from the moving plates by the (small) air gap, which can be seen in Photo 5 between the square plates on the left and the strap (with two screw heads) near the centre.

Design disadvantages

The only disadvantage I have found with this design so far is that the moving plates ... well ... move, meaning that the link from the moving plates to whatever the capacitor is tuning needs to be flexible. So for a small transmitting loop (STL) a good, substantial, flexible connection would need to be made. Thick flexible wire or thick plain copper braid are two possibilities that spring to mind.

Testing

It is recommended that basic testing is performed with just a variable voltage power supply so speed can be easily controlled and motion can be stopped quickly should there be a problem – if things collide, damage could occur quickly. Remember what I said about the actuator lifting a small car?

A capacitance meter is obviously useful to check and adjust the assembly for the required capacitance range. Essentially this is all the testing that is required as the unit can be operated with just a power supply and a reversing switch. If the actuator has a feedback potentiometer then check that the resistance varies smoothly and note which connection is which at minimum extension. It makes sense to have the minimum resistance at minimum extension, thus (logically) having the minimum analogue value reported to any automation setup.

Bob Cowdery, G3UKB
bob@bobcowdery.plus.com

Remote control

Automation, whilst never trivial, is much easier to manage with the actuator intrinsically cutting its own drive at each end of travel – this provides a fail-safe arrangement. Like most linear actuators of this type, mine has built-in limit switches and steering diodes that mean the motor stops when it reaches the extremes of its travel and can only be re-started in the opposite direction. **Figure 1** shows how it's all arranged internally.

If full automated use is the aim then some compute power and software is required. A good starting point would be to use my software as a testing platform and a basis for developing your own. This software has been written for full control of multiple loop antennas. However, the extra functions do not inhibit its use for simple positioning control.

The software is hosted on GitHub [2]. At this time there is no external documentation but the software is well commented. Please refer to `arduino/sketch_actuator_control /sketch_actuator_control.ino` for documentation on the hardware required, connecting up and things to be aware of.

Results from the prototype unit

The complete assembly in its cabinet together with the electronics is shown in **Photo 6**. A detailed description is beyond the scope of this article but I thought it worthwhile to show the unit in an operating context.

The cabinet lives at the end of my garden on one of two 5.5m posts. At present the posts support a 160m and an 80m $\frac{1}{4}$ wave loop, with a 40m loop planned. The actuator is driven by an Arduino Mega-2560 in the middle ABS box, which also houses a SOTAbeams SWR bridge. Above the ABS box is a home built relay switching unit for the loops. At top left is a Raspberry Pi 2. The RPi is accessible over the network and provides an upload/debug capability for the Arduino as well as a camera that gives an inside view of the cabinet. There is also an LED to illuminate the interior.

A screenshot of the software main window is shown in **Figure 2**, together with the view from inside the cabinet. The RPi was extremely useful; before that I was dragging a laptop to the cabinet every time I wanted to make a change to the firmware or debug some strange behaviour – not much fun during the winter! The camera module has been helpful in observing correct operation when testing.

My five plate (per side) arrangement give a capacitance range of approximately 11pF to 290pF. **Figure 3** shows how the capacitance increases slowly until the plates start to mesh and then follows a linear increase up to 100% extension. This characteristic

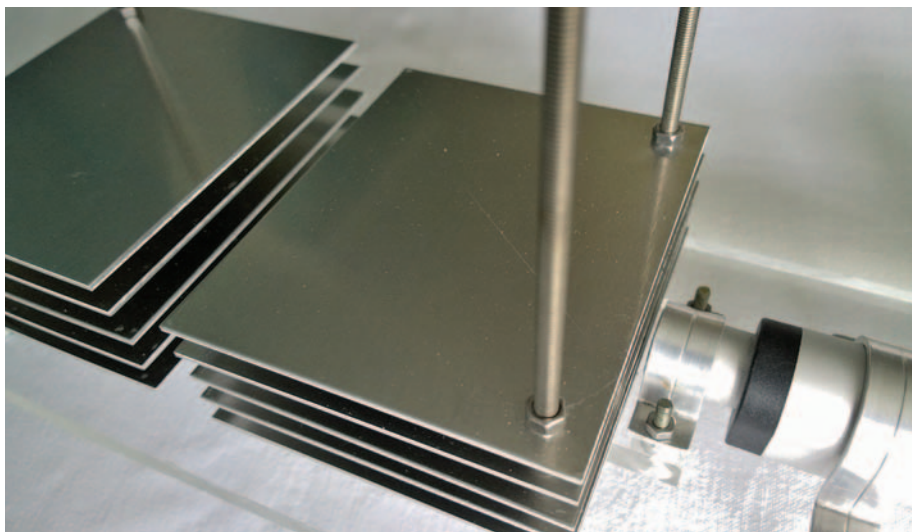


PHOTO 4: Arrangement of moving plates and actuator arm.

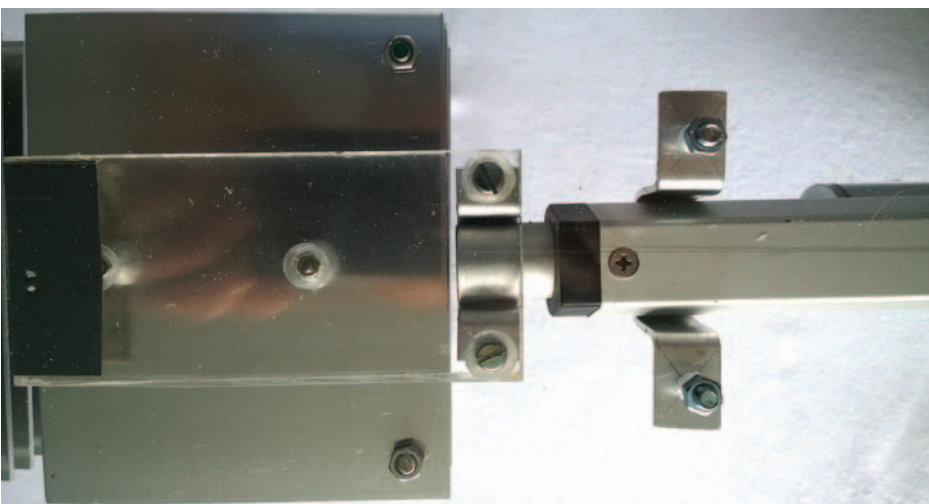


PHOTO 5: Underside view of the sliding assembly.

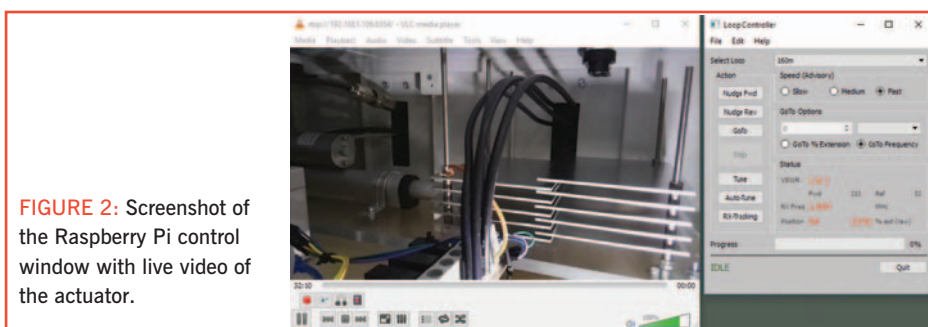


FIGURE 2: Screenshot of the Raspberry Pi control window with live video of the actuator.

should be useful for most requirements. Extrapolating from the prototype results, it should be possible, with the current 8mm spacers, to achieve a maximum capacitance of around 600pF before the stack becomes too high to be stable. By reducing the spacers to 6.2mm (the next common size), 1000pF should be achievable, but

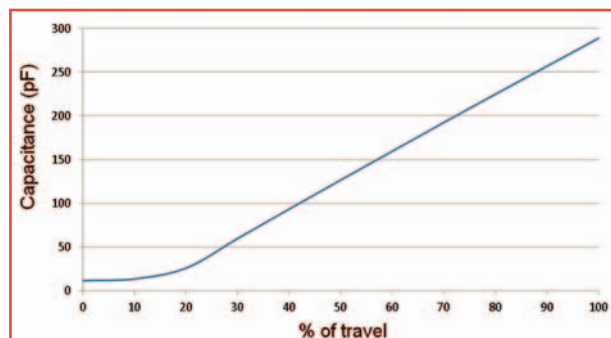


FIGURE 3: Graph of capacitance against extension.

with a lower maximum voltage. Combining this with fixed capacitance in parallel should provide enough flexibility for most projects.

The actuator motor appears to be well suppressed and generates very little RFI. In the past I have found stepper motors to be almost impossible to suppress and DC motors usually required some attention.

Cost comparison

The overall cost of the capacitor components is small compared to a commercial unit. A good actuator with limit switches and feedback costs around £60-£120, comparable to that of a conventional assembly of motor, encoder, limit and/or home switch(es), high grade potentiometer and insulating couplers. Many of the necessary items can be bought on eBay; the aluminium squares can be cut from a sheet to save the cost of commercial cutting (although the latter can be very reasonable, but do shop around: prices vary).

Bearing in mind that the assembly can be modified many times over for different projects, an up-market actuator should be a good investment.

Conclusion

The prototype construction was fairly straightforward and, being relatively simple, I would expect good repeatability.

In use it soon became evident that very accurate positioning was necessary. This was particularly so when using an automated WSPR system that would retune when switching loops. Sometimes there would be a large number of spots and at other time almost none. On investigation I found the loop tuning was extremely critical, particularly on 80m. An accuracy of $\pm 1\%$ was simply not sufficient. To address this the following changes were made.

- The capacitor section was reduced to six plates as this was still adequate to accommodate the 160 and 80m positions and gave more bandwidth, so reducing the criticality a little.
- Using the GUI, the setpoints would take me to $\pm 1\%$ of the required position. The nudge forwards and backwards functions were then modified to give a very incremental change, allowing the SWR to be easily minimised.
- Secondly, for automated use I added a function to position using the analogue value at the potentiometer wiper. This covers a maximum range of 0 to 1023, thanks to the 10-bit analogue to digital converter, although I have the upper and lower limits set to 100 to 900 to avoid the actuator hitting the end stops. This allows positioning to within ± 2 counts of the analogue value ($\pm 0.25\%$, or roughly $\pm 0.7\text{pF}$), which is significantly better than the earlier ± 8 counts, or $\pm 1\%$. I also added the capability to GoTo an analogue value in the GUI, mainly for testing.

With these improvements in the positioning accuracy I was getting a good SWR on both loops and settings were very repeatable. However, occasional recalibration was necessary as these are wire loops – and wires stretch and take a slightly different shape depending on weather conditions. All in all the loops have been a really good positioning test and have forced improvements in the algorithms, which will no doubt continue to improve in the future.

Addendum

After completing the unit, information about a motorised linear resistor [3] dropped into my inbox and my immediate thought was would this be powerful enough for a smaller lightweight QRP version of the capacitor.



PHOTO 6: Installed with ancillary equipment to drive two loops.

The device is primarily intended for a mixing desk type of application. It consists of a small DC motor with belt drive to a tee piece moving along a track and two linear 10k potentiometers. One pot could be used for position feedback and the other for controlling some aspect of the mixer.

Having obtained one of these, a few experiments confirmed that there was more than adequate torque to move a *lightweight* plate assembly. Speed would have to be closely controlled, as drive was almost direct.

The result is shown in **Photo 7**. The arrangement is very similar to its big brother except the plates are made from single sided PCB. Because of the mechanical arrangement with the plates adjacent to the device, the unit could be made quite compact. The control software speed settings were kept to low values although it was found the plates could be moved relatively quickly (and still stop very close to the required setting) as there was very little inertia. The assembly works extremely well and the cost is very reasonable. I have it earmarked to try on a lightweight 30m STL.

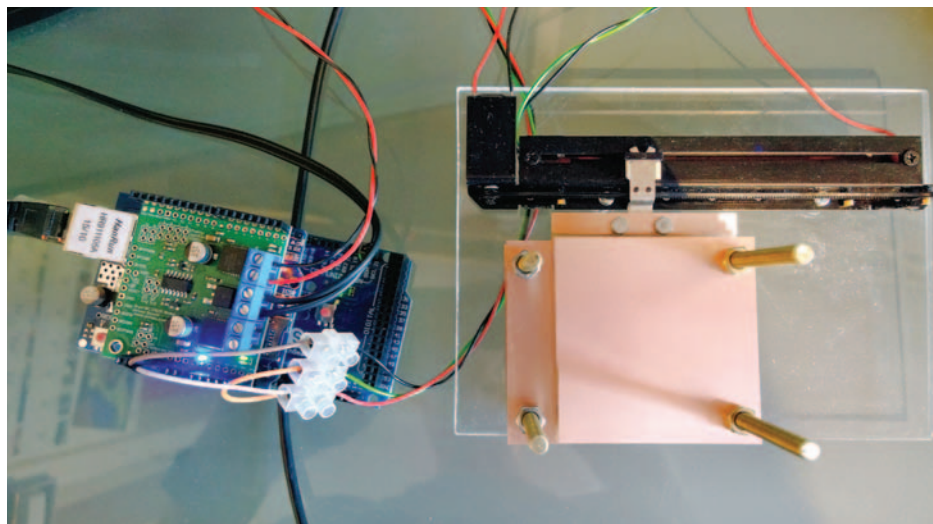


PHOTO 7: Lightweight QRP version of the capacitor made using a motorised potentiometer (see text).

Websearch

- [1] GLA750-P DC linear actuator with position feedback (100mm stroke) – <https://gimsonrobotics.co.uk>
- [2] <https://github.com/G3UKB/LoopControlSystem>
- [3] <https://www.proto-pic.co.uk/slide-pot-motorized-10k-linear-taper.html>

Survey

to measure levels of RF Interference (RFI) from VDSL

Over the last two years, 150 amateurs have reported problems caused by RFI from VDSL broadband connections (FTTC). These problems have been investigated by the EMC Committee and a report has been submitted to Ofcom & Openreach, requesting action. We needed more reports to make any impact.

To support our case, we set up a survey (September 2017), which asked amateurs to measure VDSL RFI and background noise levels, to find the true extent of this problem. We received 1200 responses in five weeks: many thanks to all of you who replied. Half of the respondents showed evidence of VDSL RFI.

What was the survey designed to determine?

VDSL RFI can be recognised by its 'signature', which is a change in level at VDSL upstream/downstream transition frequencies – the level normally drops at the transition (or guard-band where no tones are activated) and rises on either side (see Figure 1).

This can be measured with an S-meter, or by using spectra or waterfalls with a 1 or 2 second average to show mean level of VDSL RFI noise. We then calculate the difference in levels to determine the noise step. As these frequencies are only 100kHz apart, this eliminates any variation between the respondents' receivers, antennas and S-meters.

What was found?

More than 50% of respondents found steps of more than 6dB in noise level at VDSL band transitions. Of these more than 25% found steps of more than 12dB. Histograms for each of the VDSL bands are shown in Figure 2.

The percentages for each band are shown separately for overhead and underground feeds in Table 1 (on page 61). This shows more problems with RFI from upstream than downstream. Actual RFI Levels found for underground feeds were higher than expected, at only 5 to 10dB below overhead dropwires. Levels reported at 8.6MHz bottom of upstream 2 for overhead and underground feeds are shown in Figure 3 (also on page 61), note the two peaks at S7 and S9.

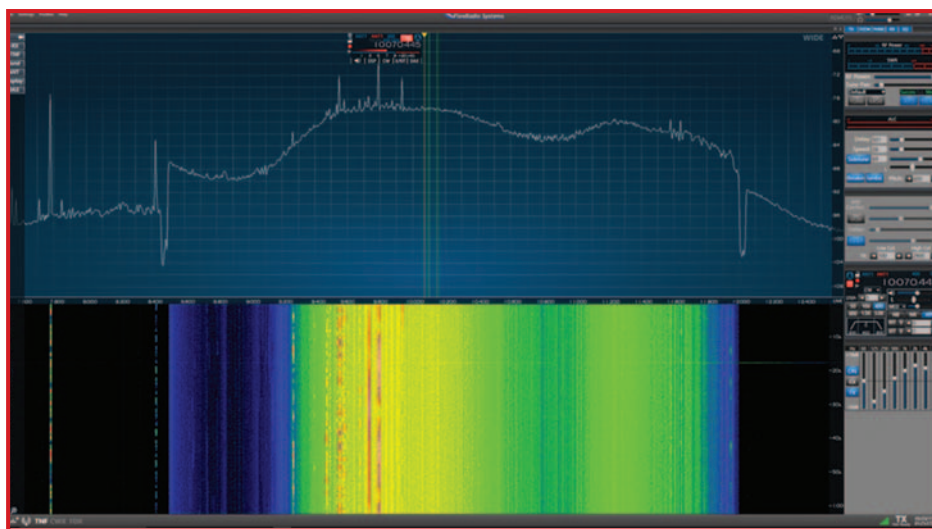


FIGURE 1: Spectra showing VDSL band transitions (18dB) at 8.45 and 12.05MHz (Upstream 2), with waterfall showing VDSL pattern.

Training carriers (a comb of tones at 4kHz intervals) were reported by 13% respondents, many on more than one band; these persisted from under a minute to several hours and for some they never stopped.

Conclusions drawn

More than 50% of survey respondents are suffering from degraded signals because of VDSL.

Downstream is strongest near to the cabinet – as it is the sum of many VDSL connections emanating from the cabinet, whereas further from the cabinet it is only the sum of nearby neighbours' lines.

Upstream is strongest further from the cabinet as the modems use higher signal strength to overcome line losses in longer lines.

Overhead dropwires act as resonant antennas and the RFI level depends on their length and their proximity to an amateur antenna.

In-house extension wiring also acts as a resonant antenna and causes RFI, particularly near dense housing – flats or townhouses.

Sky Q has a third antenna, the mains wiring connection for PLT.

RFI is worst if the antenna is in the near field of overhead wires or extensions.

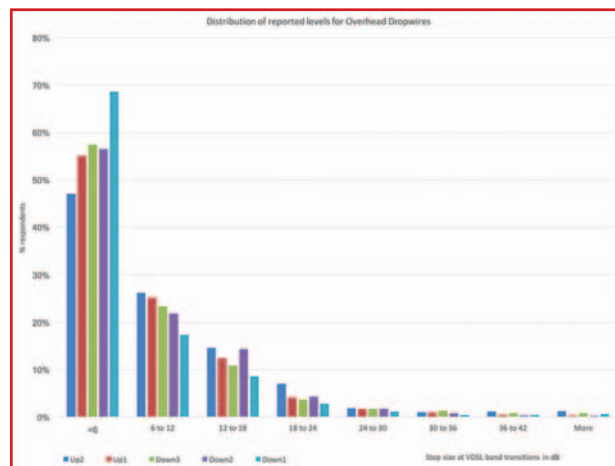


FIGURE 2: Histogram of RFI steps from VDSL showing numbers suffering RFI for each VDSL band, first cluster is no impact.

What is the impact of VDSL on amateur radio?

VDSL2 superfast broadband is present 24 hours a day, 7 days a week – it is pink noise that degrades radio reception up to 17.7MHz by obstructing

Continued on page 61

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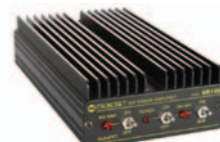
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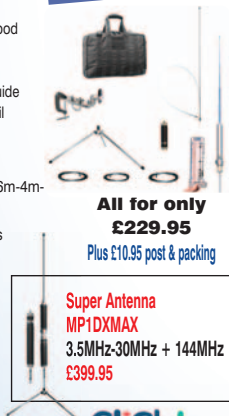
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An end-connected 'Windom'

The HF bands of 80/40/20/10m are harmonically related. 30m/15m are almost harmonically related.

We should use this to our advantage!

This design covers multiple bands with no tuner and is physically fed from the end. This is far easier than with a dipole configuration, which has to support the coax in the centre (or near the centre for a traditional Windom) in addition to the two ends. Supporting an antenna in three places is rarely easy for portable setups and can be a challenge in a domestic environment.

A quick history lesson

Loren Windom, W8GZ (Photo 1) didn't invent the antenna that bears his name. Arguably, John Byrne, W8DKZ was the inventor because he documented the design first, but publishing his paper was delayed, letting Windom's QST article appear first. But, whatever the history, their 1929 design is far from what we recognise as a Windom today. Note that I use the name Windom rather than off-centre fed dipole (OCFD) because it's preferred by modern day experimenters.

The original Windom aerial had a single wire feed against ground. This was later replaced by coax cable. The problem with coax is it radiates by common mode current. So a common mode choke (balun) was added, making the antenna far more predictable.

Versions for 80m up and 40m up were developed. Various amateurs latterly used antenna simulation to investigate the effect of different 'splits' (feed point positions). They found that the conventional 33/66% split is not the only useful ratio. In May 1996, QST published a design of 18/82% split with an overall length of 20.6m that covers 40/20/15/10m, which is the basis of the design shown here.

In 2010 the so-called 'City Windom'



PHOTO 1: Major General Loren G Windom, W8GZ in the early 1960s (image courtesy of Ohio Army National Guard Historical Collections).

appeared. This moves the common mode choke from the split point to the mechanical end of the antenna. It combines end-connection with discoveries about split ratios and better ways of making baluns, bringing us up to date.

I don't claim to have invented anything here, but simply want to publicise a useful design that can doubtless help some amateurs. I see too many people struggling with heavy fan dipoles and traps, technology that in my opinion should be obsolete in portable antennas!

Antenna construction

The components list comprises:

- Long leg of single core wire – any kind of wire you choose
- 4:1 (200 to 50 ohm) Ruthroff transformer – I designed a PCB for easy construction (see later)

- Short leg of radiating cable – RG316 coax
- Guanella 1:1 common mode choke – wrap the RG316 through FT140-43 ferrites
- Coaxial download – RG316, then use a connector to RG58 or whatever you prefer.

The traditional Windom design uses a 4:1 balun at the feed point. Splitting the balun into a 4:1 Ruthroff and 1:1 Guanella, as seen in Figure 1, makes the coax above the 1:1 balun radiate. I tested the same lengths with standard feed and end-connected. The SWR response was near identical.

Explaining the terms 'Guanella' and 'Ruthroff': these are names of academics who wrote about line transformers. A Guanella type forces current balance and so is called a balun or common mode choke. A Ruthroff is a voltage transformer with no common mode blocking or balancing. Characteristics of both are used in the end-connected Windom.

Photo 2 shows a Ruthroff transformer made of RG316 coax cable wrapped round a ferrite rod. The PCB connects the coax and single wire, as seen in Photo 3.

The circuit of the Ruthroff transformer is shown in Figure 2. It may appear baffling to have two wires in at J1 and one wire out at J2, but the current flows along the *inside* of the coax to the Ruthroff transformer, then on the *outside* of the coax back down to the common mode Guanella choke (see Figure 1). The outside of the coax forms the second current path out of the transformer. The 17.65m leg with capacitor connects to J2. T1 is the coax on the ferrite rod.

The 3.65m section seen in Figure 1 is made of RG316 PTFE mini-coax and, combined with the small Ruthroff transformer, does not weigh the wire down much. Cheaper RG174 is unsuitable because it is weaker – and soldering makes the PVC melt.

The Guanella 1:1 choke is made by wrapping the RG316 through ferrites. This presents high impedance to common mode current flowing on the outside, stopping

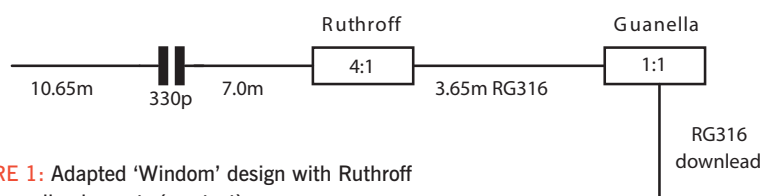


FIGURE 1: Adapted 'Windom' design with Ruthroff and Guanella elements (see text).

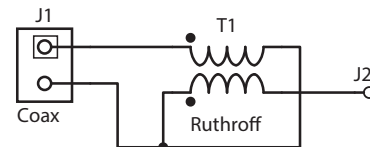


FIGURE 2: Circuit of the Ruthroff transformer.

it abruptly. The 1:1 choke must have high impedance at the lowest frequency the antenna has to operate on, otherwise common mode current can flow back beyond the choke, distorting the SWR response.

I recommend eight turns of RG316 through at least three FT140-43 toroids. Four or more toroids are better. The effectiveness of the 1:1 choke is shown by how little common mode current there is on the rest of the feed line. If moving the feed line affects SWR at all, the common mode impedance must be increased by adding more toroids.

RG316 is ideal because it is thinner than RG58, but still able to carry fairly high RF power at low loss. Sourcing RG316 can be difficult. I recommend you treat with caution the many Chinese suppliers on eBay. There are a few UK suppliers of Wi-Fi equipment that will sell a reasonable length like 10m.

The amount of ferrite in the transformers determines power handling. Versions shown were successfully tested with 100W CW for 2 minutes and I would rate it for higher power on SSB.

I recommend coating all transformers with weather sealant. The cheapest is the 'solvent cement' used to weld plastic pipes. A 250ml bottle with brush is available from several DIY chains in the UK for about £5.60. 'Liquid electrical tape' is ideal but more expensive.

Figure 3 shows the measured SWR curve of the finished antenna, tested from 5MHz to 30MHz at 5m above ground level (AGL). Markers 1-4 show the lowest SWR frequencies.

Raising the antenna higher makes the SWR between resonances increase. This shows the antenna has low losses, because the ground is making much of the loss in between resonances.

Tuning these antennas for low SWR at appropriate frequencies is much easier with a network analyser. Using an SWR meter will take more trial and error and *lots* of individual measurements. The 17.65/3.65m dimensions shown may tune up a bit low; they are given as starting points. It is best to fold back the ends rather than cut when tuning, because adding wire is more difficult than cutting back.

The single 'long leg' of wire can be any type you like. Some types of antenna wire are more difficult to solder, such as Kevlar reinforced types.

Other split points

There is no 'golden rule' that a Windom must be split at any particular point. The trade-off is number of bands vs lowest SWR. Discussion of the many split points possible would take a separate article.

I made a shorter variant with 33% split for

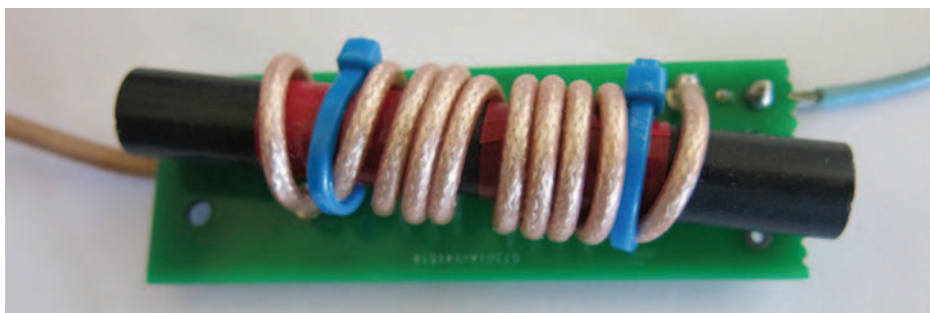


PHOTO 2: A Ruthroff transformer made of RG316 coax cable wrapped round a ferrite rod.

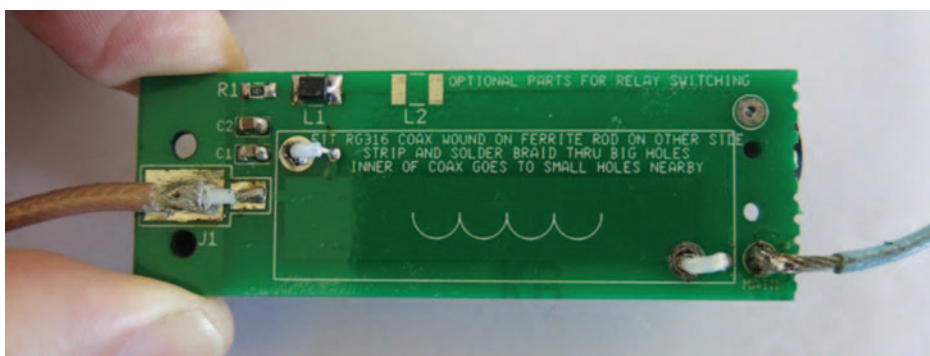


PHOTO 3: Rear view of the Ruthroff transformer PCB.

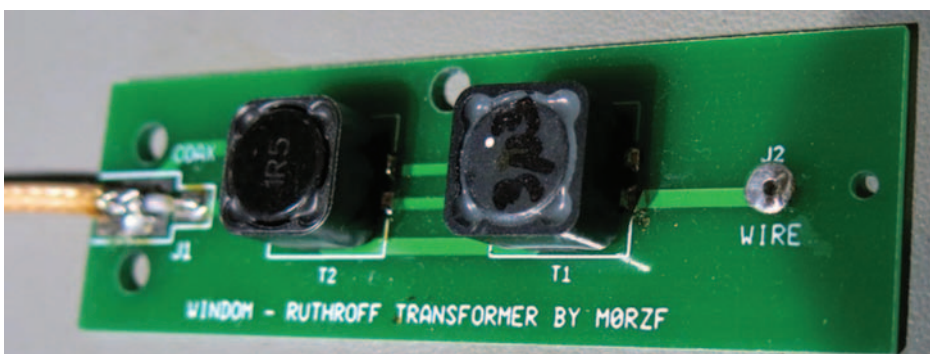


PHOTO 4: Prototype Ruthroff transformer using PCB-mount coils in place of the ferrite rod and coax arrangement seen in Photo 2.

20/10m and used it as a vertical. Winding the 20/10m helically onto a 10m high pole is possible, where it can be secured for portable operation using a car wheel base (see for example [1]). Another variant I made is twice as long, 41m, to cover 80/40/20/15/10m. It can be erected as an inverted-L, with the short leg of coax entirely on a support pole, and the long leg strung up to any kind of support, such as a tree.

Further options

By chance, the short leg length, at 3.65m, is the same as a 30/15m Windom with a 33/66% split point. So we could put a relay in the long leg for 30m coverage and to get an alternative radiation pattern on 15m. This means feeding power up the coax with bias-T and having a DC break at the Ruthroff transformer. I have yet to construct

the antenna with a relay, but did prove the concept with a toggle switch in the long leg. The SMD components visible in Photo 3 relate to these experiments.

The lowest VSWR of the fundamental band falls below 7.0MHz, resulting in an SWR >3:1 at 7.2MHz. Figure 1 notably shows a capacitor in the physical centre of the long leg. Use a 1kV or greater surface mount COG capacitor on a small piece of PCB. 470pF shifts the optimum tuning up ~200kHz, with 2.0:1 VSWR in the middle of the 40m band. If you need more shift, 330pF is a better value. Harmonic resonances are little affected by the capacitor.

Robert Brown, M0RZF
rob@m0rzf.co.uk

It's possible, by careful adjustment, to get an SWR dip near the bottom of 6m (50.5MHz), and thus cover an extra band.

Quicker Ruthroff

Winding the Ruthroff transformer with coax or twisted wire on ferrite is rather labour intensive. A quicker way (but only for QRP or medium power) is using coupled inductors designed for switching power supplies. The 1210 size (12.5mm square, 10mm high) in smaller inductance values can handle sufficient power and is a ready made PCB mounted part. A suitable type is SRF-1280A-4R7 from Bourns. **Photo 4** shows my prototype coupled inductor Ruthroff transformer.

It's worth adding more ferrite chokes on the coax to further reduce common mode current problems. A discussion of suitable chokes and techniques by GM3SEK is at [2].

Conclusion

The end-connected Windom is a good single wire antenna for fixed or portable use. The feeding principle is novel, practical, and deserves a wider audience, hence this article.

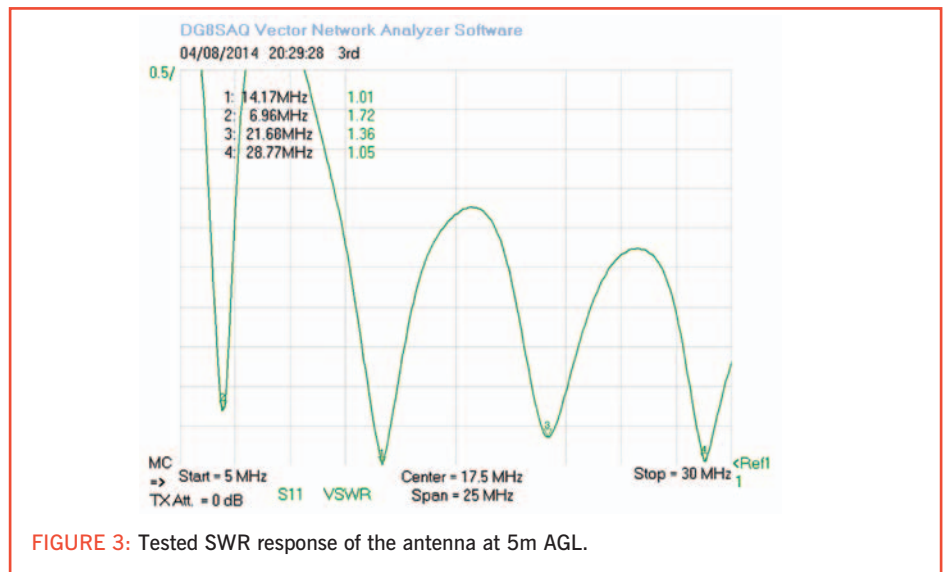


FIGURE 3: Tested SWR response of the antenna at 5m AGL.

Finally, can I please make an appeal to people to stop designing antennas entirely with simulation software and to use your imagination instead? This antenna came from understanding of common mode current and measuring ferrite chokes, not from a computer program!

Websearch

- [1] Practical Notes on the UKAC Contests, John Wilkinson, G4HGT, *RadCom* October 2017 p22
- [2] Cost effective ferrite chokes and baluns by Ian White, GM3SEK, *RadCom* May 2010. A much-expanded version of that article is at www.ifwtech.co.uk/g3sek/in-prac/inpr1005_ext_v2.pdf

Review – continued from page 28

the amplifier very good for QSK providing you could stand the chattering of the relay. A fully electronic changeover switch would be so much better.

The fan runs quietly at the low setting but after a few minutes operation it steps up a notch and then goes to high setting. It is quite audible on the high setting.

The ATU needs about 60-100W to go through its autotune sequence. This is high compared with other auto ATUs, which seem to need 5W or so. A 60-100W signal will be quite noticeable and might upset other band

users. Due to the high gain of this amplifier the 5W or so from many transceivers when in Tune mode will generate a 300W output, which is even too high for the internal tuner and will certainly cause adverse comment! It would be better if the ATU could be used when the amplifier is in bypass mode, especially if it would function with say 5W input.

Summary

The HPA-8000B is a high quality unit capable of giving many years of satisfactory

performance especially when paired with the Hilberling PT-8000A transceiver. It would then provide a seamless system that should meet many of the needs of both HF and low VHF operators. Although the price tag might look rather high, remember that, in effect, with its 6 and 4m coverage it will enhance any low VHF station too. The Hilberling website at www.hilberling.de carries more information. The current price for the amplifier is €5980, shipping from the factory to UK is additional. My thanks to Hilberling for providing the review model.



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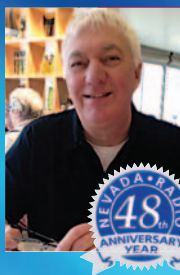
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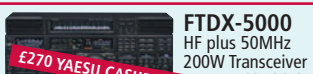
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ALINCO



DX-SR9

- Easy to use HF transceiver with SDR capability
- TX: 1.8-30MHz
- RX: 150kHz-30MHz
- 100W SSB/CW 40W FM
- Front mounted speaker
- 3 Ceramic Filters fitted
- Built-in CW Keyer

WINTER PROMOTION
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DJ-V57
• IPX7 waterproof
• Computer programmable
• Tough case
• Fully featured

£129.95



DX-R8E
• 150kHz-34.999MHz
• AM/FM/LW/MW/CW
LSB/USB

Top selling desktop HF
communications receiver

£469.95



DJ-G7E
Tri-band Radio, die-cast chassis
• 2m/70cms/23cms
• 1000 memory channels
• Full duplex

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DM-30E
Lightweight 30A
Switch Mode Digital
Volt/Amp meter

£89.95



DM-330MW MkII
30A Deluxe Supply
variable voltage, low noise,
extra filtering

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Twin Band Mobile 'Rainbow'
display, VHF/UHF transceiver
• Extended RX 108-174MHz,
400-479MHz

• Power 50/20/5W output **£299.95**

More Alinco

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DR-185H.....VHF/FM TX 136-174MHz.....£169.95
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DM-330FXE.....30A standard switch mode supply.....£119.95
DJ-175E.....2m 5W Rugged handheld.....£499.95

DJ-500E.....Dual Band SW H/Held Li-Ion Battery.....£129.95
DJ-AXD1.....VHF DMR Digital Handheld.....£149.95
DJ-AXD2.....UHF DMR Digital Handheld.....£149.95
DJ-MD40.....UHF commercial grade DMR H/Held.....£159.95
DJA-446.....PMR446 Licence free Handheld.....£79.95

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Collector's item with luxurious crystal
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Also receive a Kenwood Tour Jacket
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call sign plate

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160- 6M Transceiver
with ATU. Cracking
performance for the
money!

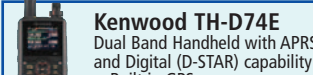
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100W Mobile/
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Still as popular as ever!
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Dual watch,
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Built in Echo
Link/APRS/TNC/GPS
50W output, 1,000
memories

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MC60A.....Classic desktop microphone.....£122.95
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Large stocks of Elecraft accessories - call!



K3S HF+6m transceiver
Latest version with many improvements Available in kit form or fully built 10W or 100W versions - your choice.

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World class SDR Transceivers
Factory appointed dealer

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Flex 6400M

FLEX-6400M features include:

- TX: 160-6m Amateur Bands
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- Panadapter BW: 7MHz
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- Plus, lots more!

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ACOM ATU-04AT 1.5kW Remote ATU
Covers 1.8-54MHz, weatherproof, 4-way antenna switch.
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- 1.2kW solid state amp
- Covers 1.8-54MHz

£2795

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- 600W solid state amp
- Covers 1.8-54MHz
- Weighs just 12kg

£2289



NEW

Top of the range
HF & 6m 200W SDR Transceiver
RRP **£4199.95** **£3999.95**

As reviewed in November RADCOM



NEW ANAN 8000DLE

- Modes: CW, SSB, NFM, AM, Digital
- PureSignal for outstanding IMD
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Radcom Review sample available - for **£3799!**



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Dual Band solid state amplifier
• Covers 50MHz & 70MHz
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• Power: 20/200/2kW
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• Freq: 1.8-150MHz
• Power: 15/150/1.5kW
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Palstar AT-2K

Our TOP selling Manual Tuner

- Covers 6-160m
- Output: 2000W PEP
- Optional 4:1 Balun for Balanced Wire Feeders



Matches dipoles, doublets, Verticals,
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AT-500
• HF bands: 6-160m
• Output: 600W PEP
SSB, 500W CW
• 6 position mode switch
£529.95 **£499.95**

600W
Differential
Manual Tuner



PL-880

- FM, SW, MW, LW, AM
- Bandwidth selectable
- 3050 memories, 25 storage pages



Flagship SSB radio

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Iambic Code Warrior Junior Black.....£169.95
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Vibrokey Standard single lever Black.....£189.95
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MFJ-550.....Basic Hand Key.....£17.95

Cables & Wires



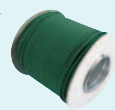
Ecoflex 15
per metre.....£5.99 price per 102m drum.....£539
PL259 connector (Part: 7350).....£8.95
N type connector (Part: 7395).....£9.95
Ecoflex 10
per metre.....£2.89 price per 102m drum.....£289
PL259 connector (part: 7378).....£5.95
N type connector (part: 7367).....£6.50
BNC type connector (part: 7379).....£6.50
Aircell 7
per metre.....£1.99 price per 102m drum.....£179
PL259 connector (part: 7390).....£2.65
N type connector (part: 7392).....£5.25
BNC type connector (part: 7391).....£5.25
Aircell 5
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N type connector (part: 7700).....£3.95
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RG-Mini 8.....Super XX.....£59.95
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300 Ohm.....Twin feeder.....£76.50
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Nevada Antenna Wire

Military style, low visibility,
antenna wire, uses central
fibres of Aramid (Kevlar) for
incredible strength.
Chrome Green Finish



Nevada 28.....2.8mm 2kW.....per metre.....£0.99
Nevada 28D.....2.8mm 2kW.....100m Drum.....£89.95
Nevada 32.....3.2mm 5kW.....per metre.....£1.20
Nevada 32D.....3.2mm 5kW.....100m Drum.....£99.95

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MetroVna DELUXE
with Bluetooth connectivity
• Covers up to 250 MHz
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COMET



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Rotary Dipole covers: 7, 14, 21, 28MHz
1kw PEP, 10.3m (straight), 7.4m (Vee)

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CHA-250BXII Wideband Vertical Antenna

Latest version - ideal for small gardens. Works with or without radials, (depending on mounting). High quality construction (beware cheap imitations)

- TX: 3.5-57MHz
- RX: 2-90 MHz
- Power: 250W (max) SSB
- Length: 7.13m

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Quality Cross Needle Meter
• Reads: AVG & PEP power
• Range: 1-200MHz
• Power: 3/300/3kW

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CAT-300
HF+6m Antenna Tuner
• Frequency: 1.8-60MHz
• Power: 30W/300W
• Reads: AVG & PEP power
• Cross needle

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CBL-2500 Hi-power 1:1 Balun
• Power: 2.5kW (PEP)
• Freq: 1.8-56MHz
• Imp: 50 Ohm
• Ratio: 1:1
• SO239 Socket

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CAT-273
VHF/UHF Antenna Tuner
• Covers: 120-150MHz VHF
340-450MHz UHF
• Reads: AVG & PEP power
• Two antenna inputs

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UHV-6.....Whip 7/12/28/50/144/430MHz.....99.95
L-18.....18MHz Coil for CA-UHV/UHV-6.....25.95

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CA-285.....50/144 MHz, 1.32m 300W.....25.95
CSB7900.....144/430MHz, 5.17/7.7dBi 1.5m 150W.....69.95
SB-15.....50/144/430MHz 2.15/4.57dBi 1.53m 120W.....49.95
SBB-2.....144/430MHz, 2.15/3.8dBi 0.46m 60W.....29.95
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M-24M.....144/430MHz Magnetic Mount c/w Coax.....36.95

ANTENNA TUNERS

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CAT-273.....144/430MHz, 250W (PEP).....169.95
CAT-300.....1.8-56MHz, 300W (PEP).....199.95

BALUNS

CBL-1000.....1.7-30MHz, 1kW/CW.....34.95
CBL-2500.....1.8-56MHz, 2.5kW/CW.....39.95

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CF-50MR.....1.8 - 57MHz, 1kW/CW.....99.95

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CF-4161A.....1.3-170/350-540MHz SO239 + 2x PL259 leads.....39.95

CF-416B.....SO239 + 1 x PL259/N leads.....39.95
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CF-530C.....1.3-90/125-470MHz, SO239 2 x PL259 lead.....49.95
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CSW-201G.....2 Way Coax switch DC-600MHz.....29.95
D-21M.....Dummy Load 100W DC - 600MHz.....39.95

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3D4MB.....4m Jap. 3DQEV Coax with SO239 socket.....19.95
3K054M.....4m RG188A Coax with SO239 socket.....26.95
HM10 BNC.....1m of Jap. 1.5DQEV Coax with BNC socket.....12.95

ANTENNA MOUNTS

CM-5M.....Mag. Mount + 5m of RG-58, & PL259 plug.....24.00
CMB-GH.....Pole mounting bracket.....25.95
CTD-50M.....Thru Window cable mount SO239-PL259.....39.95
LD-5M.....Trunk/Hatch back Mount w/ 5m of cable.....36.95

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RS9.....Roof Rack mount (adjustable).....23.95
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LDG



Z11-Pro2
(160-6m) 125W
£167.95

IT-100.....For Icom IC-7100, IC-7000.....£209.95
KT-100.....For Kenwood 125W HF+6m.....£209.95
YT-100.....For Yaesu 125W HF+6m.....£199.95
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AT-100 Pro II.....125W HF+6m.....£244.95
AT-200 Pro II.....200W HF+6m.....£259.95
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5W QRP Transceiver

Superb receiver and DSP features including - direct conversion, razor-sharp-adjustable filters, noise reduction, noise blanker, audio equalizer and even a built-in bandscope. Built in speech processor, audio equalizer and even comes with a hand mic at no extra cost.

SKY-ONE SDR

- Modes: LSB, USB, CW, AM, FM, DIGI
- Covers: 160m-6m (including 60m)
- 7 Low Pass Filters and 7 Bandpass Filters
- CW: Built in Electronic key
- Size: 147 x 60 x 107mm
- Weight: 580g

£699

NEW



DJ-AXD4: UHF Version
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• DMR Tier I and Tier II
• RF output 1W to 5W
• IP67 dust & waterproof
• Heavy Duty - feature rich!

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• RF output 1W to 5W
• 1000 channels in 16ch/zone
• Text messages
• IP54 dust & waterproof
• Voice recorder

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5 Band Cobweb Antenna
£239.95

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- 269C.....HF/VHF Digital Analyser.....£369.95
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- 407D.....Deluxe CW Keyer.....£99.95
- 461.....Morse Reader-pocket sized.....£99.95
- 492-X.....CW Memory Keyer.....£164.95
- 550.....Popular Morse code practice key.....£19.95
- 557.....Morse code key with oscillator.....£46.95
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- 923.....2m Tuner & SWR/Power.....£249.95
- 931.....Artificial ground unit.....£114.95
- 934.....300W Tuner + artificial ground.....£219.95
- 941E.....300 Watts max Versa Tuner II.....£164.95
- 945E.....1.8-60MHz 300W manual tuner.....£149.95
- 948.....300W PEP reading antenna tuner.....£174.95
- 949E.....300W tuner + Dummy load.....£199.95
- 959C.....Receive antenna tuner + pre-amp.....£145.95
- 969.....300W tuner 160-6m.....£229.95
- 971.....Portable Ant. tuner 1.8-30MHz.....£139.95
- 986.....1.5kW HF tuner.....£369.95
- 989D.....1.5kW HF tuner.....£399.95
- 993B.....Auto Tuner 150W/300W.....£309.95
- 994BRT.....600W remote Auto Tuner.....£409.95
- 998.....1.5kW Auto Tuner 1.8-30MHz.....£719.95
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The most desolate and remote IOTA on the globe: Bouvet Island, AN-002

January 2018 will mark the tenth anniversary of the last DX activation of Bouvet Island, AN-002 by ZS6GCM operating as 3Y0E. Presently, Club Log shows Bouvet as the #2 Most Wanted.

Bouvet Island is 54.33° south, 3.28° east. The IOTA Directory lists the island as one of the Norway-Antarctica group – AN-002. As a sub-Antarctic entity in the Atlantic Ocean, it is 2,700 miles from the southernmost tip of South America and 1,000 miles from Antarctica. The uninhabited island is 97% ice covered. Temperatures can range from -25°C to -65°C, with wind chill possibilities. Summer occurs in late January and early February. Temperatures then are typically between 0 and 4°C. Politically, Bouvet Island is a Norwegian dependency. It serves as a nature preserve with one operating weather station.

The 3Y0 IOTA history is interesting. Over the last half century, there have been six operations on the island. The earliest history on the island recorded by IOTA Ltd is Gus Browning, W4ECI (SK) in 1962. The most recent by Petrus, ZS6GCM, operating as 3Y0E in 2008. Dr Chuck Brady, N4BQW (SK) went to Bouvet Island in 2000. Others include 3Y5X (LA1EE & others) in 1990; 3Y1VC (LA1VC) 1979; 3Y5DQ (Thore, LA5DQ) 1978.

The team

Planning and administering a DXpedition to such a place requires seasoned and tested DXers. Therefore, it is no surprise that this undertaking, 3Y0Z, is headed up by Bob Allphin, K4UEE, Ralph Fedor, KOIR and Erling Johan Wiig, LA6VM, the same leadership as for the Peter 1 DXpedition of 2006. Ralph and Bob were on Navassa and Amsterdam Island as well as the HKONA, Maplele Island DXpedition in recent years.

This event will take place around the last week of January 2018 into mid-February.

The team will sail from King George Island for a 10 – 12 day voyage to Bouvet Island. The plan is to remain active and on the air on the Island for between 14 to 16 days.

The team consists of 20 seasoned and experienced operators recruited from around the world. Twelve are from the USA, two from



3Y0Z, is headed up by Bob Allphin, K4UEE, Ralph Fedor, KOIR and Erling Johan Wiig, LA6VM.

Asia, one from Canada and five from Europe. Additionally, there are five pilot stations and other support people, in areas of IT and web; fundraising; propagation prediction (Stu, K6TU) and, of course, the QSL manager (Bob, N200).

The operators are Nodir, EY8MM; Pista, HA5AO; Hal, JR4OZR; Ralph, KOIR; Bob, K4UEE; Craig, K9CT; Erling, LA6VM; Just, LA9DL; George, N4GRN; Arnie, N6HC; Jim, N9TK; Jeff, NM1Y; Michael, PA5M; Hawk, SM5AQD; Keith, VE7KW; Glenn, W0GJ; Gregg, W6IZT; Paul, W7IV; Hal, W8HC and Jerry, WB9Z.

Travel

Travelling from around the world, the group will come together in Santiago, Chile. They will then take a 3½ hour flight to Punta Arenas, followed by a flight across Drake Passage to King George Island. Finally, a week and a half boat ride to Bouvet Island. A vessel owned by Chilean firm Aerovias DAP, carrying two helicopters, will be used for the voyage. The helicopters will scout out the best radio station site, then transport equipment and supplies onto the island. DAP was the firm used for Peter 1 some years earlier. To reach the island, they will need to anchor off-shore. The operators will be lifted onto the island by helicopter.

Planning

This activity began in 2007, when team leadership first secured the operating licence and landing permit. Training took place the week of 9 September 2017 in Atlanta, GA. Topics included discussions of frequencies to use; splits and limits of split; DQRM practices; numbers of hours per shift; best folks for each band and mode; housekeeping duties; sleeping quarters; food supplies. They practiced with the EME equipment, ran the generators, took inventory and packed shipping containers. Additionally, they got to know each other, and for many, the new folk.

Propagation

Propagation prediction videos were created, based upon the work of Stu, K6TU for the eight HF bands plus 60m. The predictions were based upon US National Oceanographic and Atmospheric Administration sunspot estimates for January 2018 timeframes. These videos are currently operational on the 3Y0Z website under the Propagation bullet.

The operating site on the island will be on

Dr Jeff Cantor, K1ZN
jacantor9@gmail.com

the NE side of the glacier at around 600ft. The Norwegian Polar Institute assisted the 3Y0Z team in identifying three possible sites to build the camp and station.

Funding

This DXpedition is expected to be the costliest operation in the hobby's history. At the time of this writing, the estimates are around \$750,000. Around half of the cost, \$400K, is coming from the team themselves. Then, foundations sponsoring the hobby such as the Northern California DX Foundation and INDEXA have been generous. NCDXF, in fact, recently gave \$100,000 to the effort. Other groups have also made significant

contributions, including smaller DX clubs such as the Southeastern DX Club in the USA, which, to date, has contributed \$5250. Over the last half decade, with the advent of new technology, DXpeditions have been able to partially 'reverse fund' their operations. Club Log and PayPal, in combination, when used to verify QSOs and order QSLs can provide a good source of funding and additional donations. The team expects to see a good return in this matter – please contribute. The team has souvenirs for sale on its website.

Outfitting

The major equipment, including transceivers and amplifiers are loaned by manufacturers. Flex Radio Systems is providing Flex 6500 and 6700 SDR transceivers and Maestros. ACOM Amplifiers is providing their new 1500W amplifiers. DX Engineering designed some antennas and provided materials and ancillary, but essential peripherals including coax. Disc-O-Bed donated cot systems for sleeping arrangements. Equipment is being wrapped and packed into water resistant cases at the Atlanta Georgia staging area for transport abroad, assisted by the SEDXC.

Those HF beams that performed well on Amsterdam Island (FT5ZM) will also be used on Bouvet. They intend to locate them on a

line NE to SW. This will keep the antennas from beaming into each other when aimed at Europe, Japan, and North America. Verticals for 160, 80, 60, 40 and 30m will be located to minimise interaction.

See www.bouvetdx.org for frequency details as the DXpedition begins. The team will make decisions about splits based upon their operating preferences, but will honour limited splits of 10kHz for CW and 20kHz for SSB. They will also operate RTTY and EME on 6 and 2m. There will be 12 HF stations and two EME stations operating during their peak times, sunset to midnight.

The team will be doing log uploads to Club Log every two to five minutes, satellites permitting, thus allowing for verification of the QSOs. QSL card requests can then be done via Club Log, or direct to N200. The logs will be uploaded to Logbook of the World within 6 months of their going QRT.

Thanks to Bob Allphin, K4UEE for his assistance with and proof reading of this article.

Dr Jeff Cantor, K1ZN, is an avid IOTA chaser and DXer. He is the author of *Adventures in DXing*. K1ZN is a Director of the IOTA Programme. He is also the Treasurer of the Southeastern DX Club, Atlanta Georgia USA. YL Ruth provided major editorial inputs.



Inside the partly filled container.

RF Interference (RFI) from VDSL (continued from page 48)

signals of levels lower than the received VDSL RFI level. For each 10dB increase in this VDSL level above the background noise level, over 80% of signals present are obscured. At some locations, only a few percent of the signals present (the strongest ones) can be received in the impacted bands, the rest are masked by the noise from VDSL.

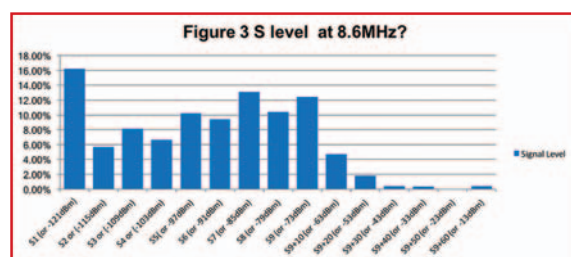
To persuade Openreach to take necessary action we need Ofcom to recognise the scale of the Harmful Interference. Ofcom will only act against actual Harmful Interference (degraded, obstructed or repeatedly interrupted communication signals). One way to show actual harm is to set up two receivers near to each other, one suffering from VDSL RFI and the other not. Then automatically log signals received at both and compare to find which are not received because of Harmful Interference – 'Here and There' testing.

universally notching 10.1 to 10.15MHz with guard-bands and by increasing the D1 to U1 guard-band to always protect 3.7 to 3.8MHz emergency frequencies.

- Selectively notch amateur bands in downstream (particularly 14MHz band) at affected premises.
- Reroute the overhead cables so they are further from the antennas when necessary.
- Provide FTTP instead of FTTC at problem locations.

So what are the next steps?

The RSGB will conduct more 'drive-by' surveys to measure the variation in VDSL RFI from a



moving vehicle and encourage members to do 'Here and There' testing to demonstrate Harmful Interference. Ofcom will hopefully visit some of the survey sites to witness the problems. Then we must campaign for Openreach to take action.

More information can be found on the EMCC pages of the website <http://rs.gb.org/main/files/2017/08/2017-RFI-Update-RSGB-Convention.pdf>

What can Openreach do to reduce RFI?

- Improve Line Balance where necessary – a mechanism is in place to request line balance on nearby lines. Request a form from the EMC Committee.
- Clean-up self-installs – difficult when a neighbouring property is the cause.
- Remove upstream band interference by

TABLE 1: RFI step sizes per VDSL band, comparing overhead with underground connections.

	>6dB Overhead	>12dB Overhead	>6dB Underground	>12dB Underground
Up 2	53%	27%	35%	16%
Up 1	45%	20%	33%	15%
Down 3	43%	19%	32%	13%
Down 2	42%	21%	33%	12%
Down 1	31%	14%	26%	12%

IOTA 2017 from the Island of Lundy EU-120

Twelve of us went to Lundy for a holiday, which just happened to cover the IOTA contest. It was inevitable, therefore, that we would take part in the contest.

Our party consisted Colin, G4GBP and his wife Judy; Brian, G0UKB and Liz, M0ACL; Tony, G4LDL and Glenys, G8KWD; Rhodri, M0RHO and Mo, M6MQD; Quintin, M1ENU and his wife Sonya; Andy, G4JNT; Raymond, 2E0DHG.

We arranged that we would all be staying in Bideford the night before our departure and met at The Rose Salterne for introductions. The *MS Oldenberg* sails from Bideford Quay at 9am and we all had to be there at least an hour beforehand to check-in and load our baggage into the special wooden crates.

Whilst our leaving the River Torridge was reasonably calm, once we got out into open waters the sea became very rough. It is probably not an exaggeration to say that most of the passengers on the *MS Oldenberg* suffered 'mal de mer' to some degree! Some more so than others. To many, the two hour crossing was two hours too long; personally, I enjoyed it.

Lundy gradually came in sight, then we were in the lee of Lundy Island as we docked and disembarked. As per usual, the 'mad keen' were well on their way up the hill before the rest of us had stepped ashore!

Our party, duly gathered, made our way up the hill to assemble outside the Marisco Tavern. Our accommodation properties were not ready for us to occupy as the cleaning team were still doing their stuff, so we explored. Once it was signalled that our properties were ready, we made our way to see what they were like. We were occupying the Bramble Villas East & West and The Quarters.

We arrived on Lundy on the Thursday, two days before the IOTA Contest. This gave us time to play with various aerials to cobble something together to get us on air. We operated from The Quarters as this had an enclosed back garden and a scrubby field next to it. This allowed us to erect our aerials safe in the knowledge that others



The Spiderpole with the 40m dipole and in the background, the 20m vertical in the back garden of The Quarters. Photo courtesy G4GBP.

would not be passing by on one of the many footpaths that criss-cross Lundy.

Brian brought his neatly packed iPro-Traveller and Raymond brought his Sigma Euro HF X-80 vertical. These were fairly quickly erected and tested. I brought my 12m Spiderpole, this was erected and held up a 40m (and 15m) dipole. We then went on to make a 20m vertical, using Rhodri's mast and some lengths of wire and coax cable. Tony used his SARK-110 to help tune the aerials to length. This had a couple of tuned radials.

Then the weather closed in!

We used the 'foul-weather' time to get all the radios set up and tested. The laptop was connected to the K3S and it worked straight away without any problems. N1MM+ was as happy as we were.

Raymond brought his FT-991 and this was connected to his own mini-computer system with N1MM+ already up and running. I took my own FT-897 with its 300Hz crystal just in case we were going to do any CW work.

For the purposes of signal isolation we used Dunestar filters in the aerial leads. This was definitely a great help and allowed us to use two stations throughout without break-through.

With all of us new to the K3S we all had a play to familiarise ourselves. We were about as ready as we could be.

The contest operation was fairly straightforward. I had registered us on the IOTA website as G0IVR/P – the Itchen Valley Radio Club callsign, as the greater number of us were members.

My ears would not settle into SSB so I operated only CW. The others were happy to work SSB. The K3S worked SSB on the 40m and 15m bands as and when each band was profitable. The FT-991 worked SSB on the other bands throughout. The K3S station setup was shared with the FT-897 for CW (as the laptop N1MM+ was happy with the FT-897).

Some statistics:

- A total of 415 QSOs with 352 uniques
- A total of 162 IOTA stations on 54 different islands
- QSOs by band: 40m – 140; 20m – 225; 15m – 030; 10m – 020; SSB – 234; CW – 181.

Conditions were not good. We actually operated for about 15½ hours of the 24. Lundy generates its own electrical power and this is normally turned off between midnight and 0600.

Colin North, G4GBP
colin@g4gbp.co.uk

We had no problems at all with the N1MM+ or the computers.

Interestingly, whilst 'running' the QSO rate went up (as expected) but the IOTA Island count was reduced to just about zero. We worked most of Europe plus US, Canada, Cuba, UA9, PY & LU.

On the Sunday afternoon, after the contest we continued to work, to give others the chance to work Lundy Island. We made contact with one or two of our Itchen Valley Club members. We had a pile-up! For the couple of hours that the SSB team worked, they made 63 contacts.

Taking the equipment down and packing away took very little time.

Throughout the whole time we were working in The Quarters we were looked after by the ladies of the group and I would like to pay particular thanks to Sonya who really looked after us by supplying endless teas and coffees. I am pleased to say that the dynamics of the group worked very well. Everyone played a part and (to my knowledge) everyone

thoroughly enjoyed themselves. We all loved Lundy and were all particularly impressed with the standard of accommodation that was supplied by The Landmark Trust.

Thanks go to all of you for being such a wonderful team!

Monday was (pretty much) a day without radio. This left us with time to walk around the island. Judy and I walked to the very northern tip of the island and had a look at the northern lighthouse where we saw more seals – and we met Rhodri & Mo. Andy walked just about every footpath on the island. We met Quintin and Sonya coming back from a walk – Sonya wouldn't go any further because of the 'horned cattle'. These certainly looked frightening but were very tame Highlanders.

On the Monday evening we all went as a group to the Marisco Tavern where we took over the mezzanine floor. Tuesday arrived and we had to vacate our rooms and put our cargo items ready for loading onto the *MS Oldenberg*. Luckily the crossing to Ilfracombe was a lot better than the outward passage and

nobody suffered any form of sea-sickness.

I did hear mutterings of 'Where are we going next time?'

More information and photographs at www.g4gbp.co.uk



The weather closed in. Photo courtesy G4JNT.



MORHO operating on of his Green Radios. Photo courtesy MOACL.



MORHO operating on of his Green Radios. Photo courtesy MOACL.



L-R MORHO logging for G0UKB and 2E0DHG logging for G4LDL. Photo courtesy G4GBP.



The last supper - clockwise from the bottom left: Mo, Rhodri, Andy, Raymond, Quintin, Sonya, Brian, Liz, Tony, Glenys, myself and Judy. Photo courtesy G4GBP.

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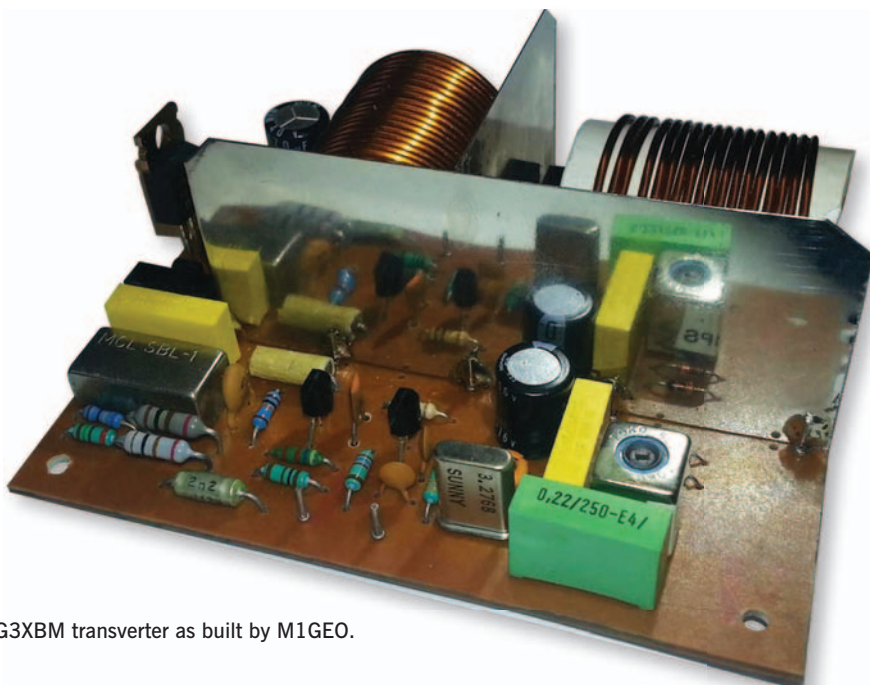
LF

It was way back in 1998 that the 136kHz band became available to European amateurs, whilst in the USA amateurs have had to wait until October 2017 before they had the option to use 136 and 472kHz without special experimental licences.

US amateurs do still have to register their intention to transmit on either band with the US Utilities Technology Council (UTC), who could block the application if they think that LF or MF operation might affect power line communication (PLT) systems in the near vicinity. The only time they should refuse an application is if the station is within 1km of a PLT-carrying power line. When I went to the UTC web-page "PLC Database Amateur Notification Process" I could get no further until I tried Microsoft's Edge browser; Firefox and Chrome just sat on the title page. One could be forgiven for thinking that the UTC was making it as difficult as possible to register! When you do get it to work they ask for the station's latitude and longitude, callsign and band of interest (136 or 472kHz). According to reports from some applicants, the form was initially very poor and allowed erroneous entries but it has since been improved. The regulations state that operations can commence 30 days after an application is received unless the UTC notifies the station that they are within a kilometre of a vulnerable power line. Early applicants received no response, which led to some doubt as to what the situation was, but requests now seem to be being handled quite quickly and applicants are receiving approval emails. I have not heard of any being refused. There is already an increase in activity and no doubt we will be seeing some new callsigns appearing on the bands, hopefully leading to more trans-Atlantic contacts over the winter.

No MF aerial?

Why not try a bit of WSPR on whatever piece of wire you can find? Roger, G3XBM recently made some WSPR transmissions using the feeder to his 2m aerial, which is about 10m up in the air, although the feeder was mostly only about 1m above ground. His Tx is a homebrew transverter with about 10W output and the ATU is just a coil wound on a ferrite rod. Not a recipe for success you might think, but Roger's signals reached LA3EQ at 769km as well as DL/PAOEHG, PA0RDT and PA7EY.



A G3XBM transverter as built by M1GEO.

Fast QSO mode

Joe Taylor, K1JT has recently included a new fast QSO mode in his WSJT-X package. The new mode is known as FT8, which uses 8 FSK carriers spaced at 6.25Hz and occupies a 50Hz bandwidth. Although it isn't specifically designed for use on LF/MF, it works well and several stations have tried it on 472kHz including G3KEV. With FT8's 15 second overs, QSOs are made very quickly so you should be able to complete a contact during a QSB peak, that's useful on 472 as the fades are often quite long and deep. WSJT-X also includes the slow QSO mode JT9 – which should be used for longer distance work – and the various flavours of WSPR. Just search for "WSJT-X download" and look for the version 1.8 file.

136 in Argentina

LU8YD in central Argentina has a 136kHz grabber that can be run when requested. Recently LU1DOW, who is almost 1000km north near Buenos Aires, made a QRSS test that was easily received on the grabber. Based on that result it looks as if Alejandro's grabber will be able to receive some even more distant stations over the coming months.

DX news

Luis, EA5DOM puts out a big signal on 472kHz so it's not surprising that his WSPR tests started to be received across the pond in mid-September. W1TAG reported signals as high as -15dB at a distance of 5,738km. Around the same time, W1TAG also spotted EA3AER, so there was a good path from Spain to Portland, Maine that night. Luis's WSPR signals also reached TF3HZ (3,189km), OH6JKN (3,199km) and RX3DHR (3,410km), so he certainly gets around.

Joe, VO1NA's 477.7kHz CW beacon has been successfully received by several stations this side of the Atlantic including PA0RDT who reported a good audible signal at sunrise. Many other stations around Europe have received Joe's QRSS10 transmissions on the same band.

VLF

DK7FC has been radiating regular test transmissions on 8.27kHz to enable people to set up their VLF receivers. Mike, G3XDV took advantage of one of these tests to optimise his VLF receiver and caught a good trace from Stefan. Mike says that this is his first VLF reception for several years and was pleased that Stefan announced the transmission well in advance so that he could get things ready. He used his 136kHz aerial fed into the PC sound card and Spectrum Laboratory software locked to GBZ on 19.58kHz.

The VLF experiments that are going on are really testing the limits of what is possible. Recently Paul Nicholson in Todmorden built a new VLF receiver hoping for improved results, but found that it was 0.13dB worse than his existing setup. Now you and I would probably be happy enough with that but, as Paul pointed out, when 0.1dB means the difference between an EbNaut decode and a fail you have to aim for the best possible performance in every part of the system.

The test that Paul was involved with at the time was on 4.47kHz with signals decoded from DK7FC in Heidelberg.

Later Stefan tried a test on 6.47kHz that, after some effort, was decoded by Alex RN3AUS near Moscow, more than 2000km away over a land path. 11 instances of the transmission were overlaid to decode the message "YELLOW SUBMARINE".

Back up on 8.27kHz, signals from VO1NA were also being decoded in Todmorden despite the fact that Joe's transmission is not yet GPS locked. The ultimate performance of this slowest of slow modes is improved greatly by ensuring phase stability so that many samples can be overlaid accurately. Paul said it was "not bad for 8μW ERP at a distance of 3,575km with an undisciplined OCXO".

Dave Pick, G3YXM
daveyxm@gmail.com



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HF

Propagation picked up at the end of October in time for the CQWW SSB contest.

Two small sunspots pushed the Solar Flux to 75, and K remained in the 1-2 range. Coupled with the usual seasonal improvement, this meant that 15m opened up in the mornings as far as Japan, Guam, Papua and Australia, and in the evenings to the west coast of the USA – though I don't think anyone managed Hawaii or Alaska. 10m was also in reasonable shape with people working as far as Cocos Keeling Island and Western Australia as well as nearer Asian countries. VK8NSB was worked on 10m on several days during the month, but not during the contest. On 40m, the JAs, KH2, KH0, JT, YBs etc were workable from around 1600 onwards – but audible for at least an hour before that.

The CDXC HF Challenge to work as many DXCC entities as possible, during September, on 21MHz to 52MHz is now over and the result is a dead heat between Roger, G3LDI, and Norman, 5B4AIF, who must have lived in their shacks for the entire month. They both managed 162 DXCCs, which was a good achievement given how poor the bands have been and is well above the 2009 sunspot minimum number of 103. In third place with a score of 152 (he took a short holiday!) was Lionel, G5LP. In most Septembers on 15m, even at sunspot minimum, I expect all of Africa and South America to be workable as long as there are stations active at the right times. Europe is fairly easy via F2, backscatter or Sporadic-E. The Caribbean is harder as the great circle path becomes more northerly, and many of the islands have no resident active amateurs especially after the recent weather disasters. The USA and Canada are usually workable on above average days as are the more equatorial parts of Asia but the real challenge is Oceania and the polar route to Alaska. Looking at the entities worked by G3LDI and G5LP from the UK, I see New Guinea, Taiwan, Philippines, Hong Kong, Australia, New Zealand, Vietnam and New Caledonia, but nothing from Fiji, Alaska, Hawaii, or Polynesia. Congratulations to Roger and Norman, and indeed all the participants, for their dedication to the CDXC HF Challenge.

December propagation will see the higher bands closing around 1800 or earlier, but



Norman, 5B4AIF, co-winner of the CDXC HF Challenge in his shack.

the lower bands opening up around an hour before sunset. Look for DX on 80m from 1600 onwards by the end of November.

Some recent DXpeditions have reignited the debate about how wide a listening split should be when there are hundreds or even thousands of stations calling. On CW it is quite easy for the DXpeditioner to think that the chosen listening range is completely full – because it seems to be the case. What happens is that the pile-up follows their last QSO – effectively being dragged around as the listening frequency slowly moves up or down the band. It may not be a popular view but it seems to me that there are times when a sudden jump to a new listening point may make life easier at the DX end and pileups narrower.

I was sorry to learn recently that Andy, E51AND and Kathy, E51CK who have hosted numerous visitors (including M1KTA) to their station in the Cook Islands will shortly be moving to New Brunswick in Canada. Apparently residence permits in the Cook Islands have become much harder to obtain than in the past and they are left with no option but to move.

There is bad news for DXers hoping to operate from Ascension Island. Not only has the date for resumption of the twice weekly Brize Norton flights slipped to 2020/21

but the only hotel and car hire business on the island has just had to close for lack of customers. It is now possible to fly once a month from Windhoek via St Helena but accommodation will be a little tricky and visitors may find themselves stuck in hot and dusty Georgetown. The lethargy and indifference of the government departments in charge of our overseas territories is quite breathtaking at times. In better news, the weekly passenger flights to St Helena (from Jo'burg via Windhoek) have now started. Bill, G0VDE was on the first flight last month and QRV as ZD7BR.

The Island Radio Expedition Foundation, Inc (IREF) recently announced that Charles, MOOXO, is now a member of the IREF Board of Directors. Charles fills the vacancy left by the resignation of Neville, G3NUG, who has been on the IREF Board since its inception. IREF would like to thank Neville for his work on the Board and wise counsel over the years. The IREF Board ultimately decides on IREF sponsorship of an IOTA Expedition and is an internationally diverse group. In addition to Charles, MOOXO, the Board consists of Jim, JA9IFF, Buzz, N5UR, Don, W9DC, Jose, CT1EEB, Mike, K9AJ and Buzz, NI5DX. The website is www.islandradio.org and contributions can be made by clicking on the "Join" tab.

DXpeditions

An Argentine team has announced plans to activate HC8LU from the Galapagos (SA-004) from 29 November to 8 December. They will be using a Hexbeam on 20-6m, verticals on 80 and 40m, and an inverted V on Top Band. Activity will be mostly SSB on 160-6m.

Olof, G0CKV will be active as 3B9HA from Rodrigues Island (AF-017) from 23 November to 12 December. He will operate CW, with main activity during the CQ WW DX CW Contest and a focus on the low bands outside the contest. QSL via LoTW and MOOXO's OQRS system.

The Kuala Lumpur DX Team will be active as 9M4IOTA from Langkawi Island (AS-058), West Malaysia on 2-4 December. They will operate CW, SSB and digital modes on 80-10 metres.

Alain, F5OZC, is active from Guinea until 1 December. Look for 3XY3D to operate mainly CW from Kassa Island (AF-051) until 1 December. Plans are to be QRV on 80-10m.

Tom, KC0W will be active as 3W9CW from Vietnam on 17-30 November. He will operate CW and FT8 on 80-10m.

Bob, GM4DLG will be active once again from Fonimagoodhoo Island, Maldives as 8Q7RB from 6-13 December. He will be on 20 and 40m, SSB/CW. This time he hopes to add an extra element to his vertical at the water's edge, to produce a parasitic array beamed at the UK.

Correspondence

Ken, CT7AGZ/G4RWD writes that, having initially been sceptical about FT8 he has now become rather addicted to it. He has been comparing antennas and watching openings come and go within the 2kHz window. October provided two ATNOs in the



ZD7CTO and ZD7VC outside ZD7VC's QTH at Half Tree Hollow on St Helena.

form of 3COL and VU7T. His haul included (FT8 first in italics, then CW): 10m – *PY's*, *YV5RED*, *TR8CA*, *HI8CSS*, *CX5RZ*, *YC6JRT*, *ZP5DVD*, *EK6RSC*, *TY2AC*, *3B8CW*, *VP8LP*, *ZD7BG*, *LUJIC*, *HK1MW*, *S01WS*; 12m – *CP6UA*, *9Z4GS*, *CE2SQE*, *HK3W*, *CO8LY*, *CU2AP*, *VU2LBW*, *A92GE*, *TF3ARI*, *FR4PG*, *ZS2ACP*, *9G1SD*, *XT2AW*, *S79KB*, *3COL*, *OJOJR*, *ZD7BG*; 15m – *LU8EKC*, *TG9ANF*, *XE2YWB*, *XE2I*, *9Y4/DL1QQ*, *P40EU*, *VU7T*, *D2EB*, *XT2AW*, *R1ANO*, *V26K*, *S9YY*; 17m – *4S7AB*, *V26RA*, *S79KB*, *9Y4/DL1QQ*, *3COL*, *ZP6CW*, *S9YY*, *XT2AW*; 20m – *JA's*, *VK4AQJ*, *A61QQ*, *9K2OF*, *D44KIT*, *V85T*, *TG9ADM*, *KH2L*, *5H3MG*, *S9YY*, *9Y4/*

DL1QQ, *3COL*; 30m – *JA's*; 40m – *ZL1PR*, *VK4CAG*, *ZL3XDJ*.

Peter, G4EX, was also experimenting with FT8 but says he still prefers SSB and CW. RI1F on 15m CW was an ATNO for him. Other QSOs included: 10m: *4Z5ML*, *PU2KMM*, *A71AE*, *5R8UI*; 17m – *VP8LP*; 15m – *V55A*, *XT2AW*, *S9YY*; 20m – *S9YY*, *P40EU*, *RI1ANO*, *EP2LMA*.

Another FT8 experimenter was Fred, G3SVK, who worked 55 countries in a week. On more traditional modes he found VU7T and 3COL, plus all the ElxxWAW (Wild Atlantic Way) and HG500 (Martin Luther) stations. He found on CW: 15m – *PZ5K*, *A41NX*; 17m – *OD5PY*, *5T5OK*, *T6/IZ1CCK*, *FR/F8FUA*, *A5A*, *YE72JB*, *S9YY*, *S01WS*, *XT2AW*, *3COL*, *8P9KZ*, *HP3SS*, *VP5/N2WKS*, *VU2GSM*; 20m – *9N7GE*, *E24NQN*, *A61Q*, *T6/IZ1CCK*, *9M2GET*, *YE72JB*, *V85T*, *V26K*, *VU7T*, *HS3NBR*, *9M2YDX*, *9M2ZAK*, *RI1ANO*, *5R8AL*, *CO2AME*, *KHO/OH1JD*; 30m – *9Q6BB*; 40m – *ZL2AGY*, *5T5OK*, *PYOPW*, *YV5ARV/8*, *RI1ANO*, *A41NN*, *HZ87ND*, *S9YY*, *VK9CI*, *VU7T*, *8P9RN*, *PJ4/K2NG*, *VP5/N2WKS*, *6Y4F*, *FT5WQ/MM*, *5T2AI*, *P40T*.

Peter, G3HQT found on his MA5 vertical: on 15m – *XT2AW*, *TI5/N3KS*; 17m – *3COL*, *S9YY*, *A25BI*; 20m – *A5A*, *V26K*, *FR/F8FUA*, *5T5OK*, *FP/DH5FS*, *YJOAT*; 40m – *VP5/N2WKS*.

Tom, G4IDL prefers CW but confessed to a "dalliance with the Dark Side (FT8 and JT65)". On CW he found: 10m – *RI1ANO*, *FY5KE*, *LU7YS*, *ZD7BG*, *CX7CO*; 12m – *S9YY*, *ZD7BG*; 15m – *S9YY*, *XT2AW*, *RI1ANO*, *D2EB*; 17m – *S9YY*; 20m – *S9YY*, *V73NS*, *3C1L*, *P40U*, and *VU7T* (an ATNO); 30m – *OX3XR*; 80m – *HK1MW*, *OY/RU7D*.

Gordon, G3PXT was busy as usual and worked the following stations: 10m – *PJ2T*, *CX7CO*, *AP2HA*, *CE2AWW*, *HZ1SK*, *LU8XAF*, *S01WS*, *TR8CA*, *V55JOTA*, *VK9VKL*, *XT2AW*, *ZS6AI*; 12m – *3COL*, *5A1AL*, *8P9SL*, *9G1SD*, *CE1OEB*, *CX8ABF*, *E44WE*, *HI8CSS*, *OA6Q*, *S01WS*, *VP8LP*, *XT2AW*, *ZS's*; 15m – *5A1AL*, *TR8CA*, *OA6Q*, *5T2AI*, *3COL*, *CO3LF*, *E44WE*, *S9YY*, *XW4XR*, *YDOSDO*, *ZS6ZP*; 17m – *9N1AA*, *HL2SFY*, *DU3LA*, *JAs*, *JT1BV*, *KG4HF*, *S01WS*, *S9YY*, *TZ4PR*, *VR2XYL*, *ZD7BR*, *ZS2I*; 20m – *A5A*, *D44KIT*, *E27EK*, *HI8CSS*, *WH7AA*, *OJOJR*, *S21ZDC*, *TI4DJ*, *V85T*; 30m – *4S7AB*, *J11SAM*, *RI1F*, *VK2AKB*; 40m – *HK5NLJ*, *ZL3ADD*.

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

TABLE 1: 2017 Worked DXCC entities (ranked by All), showing Top 4 from RSGB or British Isles table in Club Log plus submitted scores or Club Log scores of recent correspondents where available.

Call	CW	SSB	Data	All
G4TUK	194	176	188	263
MONKR	198	223	135	263
MOIKW	161	107	42	258
G4PTJ	211	103	0	254
G3SVD	184	192	81	252
G4IDL	200	0	51	209
G3PXT	117	120	142	202
G14DOH	197	29	73	200
CT7AGZ	186	-	99	193
G3HQT	187	0	0	187
G4EX	130	115	112	185
G3SVK	177	0	55	177
G8APB	72	57	64	107

TABLE 2: Forthcoming DX activity.

Until 25 Nov	AF-020
Until 1 Dec	3XY3D
12-29 Nov	5K0T (NA-033)
16-30 Nov	TO2SP St Barthelemy
21-29 Nov	9G5W
23 Nov – 12 Dec	3B9HA
29 Nov – 8 Dec	HC8LU
2-4 Dec	9M4IOTA (AS-058)
6-13 Dec	8Q7RB
17-30 Dec	3W9CW
21 March – 3 April	7Q7EI
March 2018	Pajaros Rocks (SA-100)
10-20 March 2018	9MOW Spratly (AS-051)
April 2018	St Brandon by F ops

Martin Atherton, G3ZAY
g3zay@btinternet.com

VHF/UHF

Major EME DXpeditions in quite different locations & conditions bring many new DXCC entities.

Terrestrial propagation conditions were generally mediocre during October however there were fleeting instances of VHF/UHF tropo into Europe from the southern and east coast areas of England. There were also short duration Sporadic-E openings on 6m that, in some cases, were quite intense lasting possibly 10 minutes or so but enough to complete QSOs on SSB/CW or MGM modes like FT8, JT65 etc. Storms Ophelia and Brian kept numerous towers luffed. On 15 October, a minor G1 geomagnetic storm was evident with reasonable visual displays around North and South polar regions however little usable propagation resulted. December sees the return of the Geminids meteor shower that peaks between 4th/15th of the month. Possibly one of the more reliable showers in the meteor calendar a ZHR of over 100 meteors per hours can be expected.

John, G4SWX (JO02) continues his EME activities and as he described it, late September and October brought a 'storm' of EME. Many new initials and 4 new DXCCs were worked including JF3MKC (PM74), OY4TN (IP62), UA6LCN (KN97), R2DLP (KO86), VK5UV (PF96), NH6Y (BL10) Hawaii, UA6IE (LN26), W2JAZ (FM29), TA2NC (KM69) and UX4IJ in KN88 plus the four major expeditions. John is an old hand at this game, but the results over the three week period were 'staggering'.

The A43MB (LL93) expedition to Oman was a new DXCC but really tough to work and it took four days of trying and was John 2nd to last in the log book. The operating conditions in Oman and EME windows available restricted operation. More information can be found on the expeditions blog [1]. The team used 2 x 13-ele vertically polarised Yagis with 35m of RLF-600 feeder to the antennas. A 0.60dB noise figure LNA, high power SSPA and IC-9100 completed the line up. The OK2ZAW team had real problems with local noise all over the 2m band – a common problem in A4 with stations in the UK.

The 3DA0MB (KG53) expedition to Swaziland were an excellent EME signal with a massive pile-up that notched up DXCC #140 for John on 144MHz. This



The 3DA0MB antenna farm in Swaziland. An excellent EME (moonbounce) signal.

was a multi band multi operator expedition covering 6m up to 3cm. High power and high gain antennas were the order of the day with very experienced EME operators. John set up a live remote feed from his location in JO02rf at the RSGB Convention and the pile up shown on the waterfall was quite extraordinary. Further details and confirmed log entries per band are available at the website of Lins, PA3CMC [2].

The T8EM (PJ77) expedition to Palau was another new DXCC operated by Kay, JH3AZC/T88CX/T8EM and Taka, JP3EXR/T88DG/T8EM. Palau is an island nation located in the Western Pacific consisting of approximately 340 islands, forming the western chain of the Caroline Islands in Micronesia. This was another rare DXCC entity that attracted an enormous JT65b pile up. Equipment used was FT-991/FT-817, high power SSPA Italab Phoenix-1000A (output: 800W), LNA and 2 x 9-ele home made Yagis. Over 200 stations were worked over the five days of the expedition [3].

A jewel in the DXCC list was RI1F (KR80). This was an expedition to Viktoriya Island, a deserted Arctic island in the Barents Sea located between Franz Josef Land and Spitsbergen. Administratively the island is part of the Arkhangelsk region of the Russian Federation and is the most northwest Russian territory. Located in grid KR80id, new IOTA designation EU190, Viktoriya

Island was prime for an HF and VHF so the team developed a multi band expedition that entailed serious logistical issues and government approval plus shipping all the HF/VHF and survival equipment from the collection point in Murmansk. Equipment used during the expedition on VHF included 2 x 8-ele IOJXX crossed Yagis with horizontal and vertical polarisation. PA IOJXX 1kW SSPA with a Tokyo 400W back up unit. Icom IC-910 (FT-897D backup) plus SHF-Elektronik LNA type HP-MVV-144 & MVV 144-VOX. Yaesu G5500 azimuth/elevation rotator. Software used for JT65B emissions was WSJT and MHSV. Stations worked were JHOBBE, UA3PTW, RK3FG, EA8DBM, IK1UWL, RX3A, DL8FBD, DL1KDA, S52LM, SM2A, VE1KG, DK5YA, DL1KDA, DM1CG, YL2GD, DF7KF, RW3PX, S5500, UX5UL, ZS4TX, SM2IZO, UT6UG, RX1AS, I2FAK, ZS4TX, PA3CMC, LA8KV, HB9Q, DF2ZC, EA1YV, OZ1LPR, PA0JMV, I3MEK, PA2CHR, OZ1CT, ON4KHG, PA5MS, UN9L, G4SWX, K9MRI, KG6NUB, W2HRO, KD7UO, K5QE and W5ADD. All 45 stations were worked just in time as the team had to vacate the island urgently when

Richard Staples, G4HGI
g4hgi@live.com



The Extreme Arctic Expedition Team, RI1F, on Viktoriya Island.

they ran out of ammunition. The full story can be seen on the group's QRZ page [4]. Thanks to John, G4SWX and Joop, PA0JMV for the information and congrats to both for working them.

UKSMG Winter Marathon

The UKSMG aims to promote and encourage activity on the six metre band and the Winter Marathon is an ideal opportunity to raise activity particularly using digital modes as the chance of Sporadic-E is considerably less during the winter months. The Winter Marathon is open to *all* amateur radio operators world-wide and UKSMG membership is *not* required.

The objective is to work as many 4 digit grid squares as possible on the 6m band between 1 December 2017 at 0000UTC and 2359UTC on 31 January 2018. Activity on 6m is generally at a low ebb during the winter, however this is an excellent excuse to keep the 6m antennas on the tower and make some QSOs. Earlier in the year the Summer Marathon which runs throughout the peak of Sporadic-E conditions was won by PA2M who worked 518 individual grids with an ODX of 11,019km. UK & CD stations involved included, amongst others, G0GGG (8th & 362 grids), G3PXT (9th & 323 grids), G0MBL (15th). Bob, MD0CCE (IO74) worked the best DX of all the UK stations that entered, at 10,695km.

RSGB Convention 2017

This year's Convention in October and was very well attended. Of particular interest to VHF/UHFers, the lecture stream in Room N2 was quite exceptional, covering numerous topics from construction of power amplifiers and antennas to extreme DX connected propagation and Sporadic-E. The radio amateur community shows conclusively

that we have significant research being conducted by operators at the top of their game. John, G4SWX needs to be congratulated on compiling and arranging the VHF stream with excellent lectures that will be available in due course as videos for RSGB Members.

VHF/UHF band noise & QRN was a major subject discussed at the Convention and the partial content of one of the lectures was the creeping increase of QRN / noise emanating from modern day electronics and home appliances etc. It is clear that many stations have the same issues and a simple but effective way of measuring the noise level on a particular band was discussed. You will be able to read more about this in the January 2018 *RadCom*.

MSHV Software

Users of this software will be aware that have been some changes made in recent weeks. From update 1.48 FT8 was removed as part of the package for some development work. Christo, LZ2HV just advised that the latest

update 1.53 has FT8 back as a stock mode within the package with a few improvements. Added Mode FT8, recommended settings for better sensitivity and Menu Decode to Deep + AP. Improvements have been made to the JT65 decoder to perform better on distorted or Doppler affected signals. Removed birdie messages and other bad decodes from the average decode procedure. There has also been an issue for some when uninstalling MSHV to then re-download and run a new version where the usual Add/Remove Programs section in Windows doesn't fully remove the software. This then creates an error when running the next updated version. A further step to aide this is to find the MSHV Directory in program files and rename it .old. It is possible to then delete it altogether before installing a new version if required. Be careful to save any log files you have created to ADIF format before you fully delete any MSHV files. Check into the MSHV website regularly as there are updates quite often and important ones regarding functionality [5]. For Linux users Peter OZ1PIF compiles the required MSHV files and the full packages are available from his web site [6].

Sign off

Thanks to John, G4SWX once again for the EME input and also to everyone I met up with at the RSGB Convention. There was a lot of DX talk during that weekend and coupled with the excellent lectures, next year's event will certainly be in the 2018 diary. (*That's 12 to 14 October 2018 – Ed*).

Websearch

- [1] <http://ok2zaw.blogspot.co.uk/2017/09/a43mb.html>
- [2] www.pa3cmc.nl/#category9
- [3] www.qrz.com/DB/T8EM
- [4] www.qrz.com/DB/ri1f
- [5] <http://lz2hv.org/mshv>
- [6] www.frenning.dk/OZ1PIF_HOMEPAGE/MSHV-Download.html



Every year, Dick GM4PPT spreads the word for the VHF & UP Muster at the National Hamfest. It seems to grow year on year. There were 56 VHF and UHF enthusiasts who gathered this year, too numerous to mention them all.



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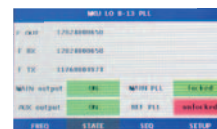
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Microwave EME from Africa

Early October highlights for the GHz EME community were a couple of activations from the continent of Africa. The first was to Ceuta by Zdenek, OK1DFC and, just after this column's deadline, a group was planning to go to Swaziland as 3DAOMB. I hope to report on this in January.

Ceuta, EA9, is a Spanish enclave in North Africa and counts as a separate DXCC entity. Zdenek drove the more than 3,000km from the Czech Republic via the Barcelona ferry carrying a superbly engineered EME system. He took a 3.2m dish for 23 and 13cm and a 1.8m dish for 6 and 3cm with QRO on all bands. The photo shows his 3cm setup with the 1.9m dish. He operated from the QTH of EA9LZ, working a mix of CW and JT and one moon pass per band. On 1.3GHz he worked 83 stations and, despite lower activity, 30 on 2.3GHz. 20 QSOs were made on 5.7GHz, and 29 on 10GHz. Quite a one-man DXpedition! The flawless operation testifies to the planning and system trials before he set off.

I worked him with my 1.9m dish on 1.3 and 5.7GHz and, for many, this DXpedition meant a WAC on 10GHz. Notably, Charlie, G3WDG's QSO was the first ever 10GHz digital mode EME QSO with Africa. Have a look at [1] for some more photos of Zdenek's trip and equipment.

Activity

The summer season of portable activity on the upper GHz bands is well behind us now. There was a flurry of activity in the September 24/47/76GHz UK Microwave Group Contest with Doug, VK4OE and Pete, G1DFL joining the 'usual suspects' at Hackpen Hill just south of Swindon and then doing some roaming to give them different callsigns to put in their logs.

Pete managed 10 QSOs from his various roaming sites; quite an achievement. This shows what can be done with a good roaming setup. By using quiet hilltop sites, he could take advantage of 144.175MHz SSB talkback for most of the QSOs. It's a shame that many fixed stations can't do the same due to the mind-numbingly high noise levels many suffer on 144MHz in urban environments. At times during the day there were several conversations happening between QSO partners that meant 144.155 to 144.185MHz was extremely busy. Pete commented on how differently 24GHz performs compared to 10GHz. This is so true. 24GHz is a hard band on which to make QSOs. I had my regular one QSO per year on the band with MICRO/P at Walton on the Naze during the October 432 And Up event. Considering this, I'm making my annual selfish appeal for more 24GHz portable operation in



OK1DFC's 3cm EME setup in Ceuta as EA9LZ. Photo: OK1DFC.

range of the flatlands of East Anglia and more home stations to catch the fleeting propagation enhancements. I'm still looking for that elusive 5th square on the band from home to claim my first UKuG 24GHz squares award [2]. I've identified a possible site on the southeast edge of JO03 overlooking the Wash so I might set my home station up in beacon mode then drive up and investigate. I then need a volunteer to take my /P 24GHz system up there and work me!

On the lower bands the 'Wednesday night is digital night' I started on 1296.165MHz seems to be flagging and I'm partly to blame for that as I've had a rather busy summer. I'd like to get that idea going again – and what better time than over the Christmas period when you need to escape the turkey and TV for a while? I'd also like to float the idea of activity weekends again. These are non-competitive periods that need little organisation, just a posting on social media of activity times and the bands where people will be. This gives stations stress-free opportunities to try out new ideas and equipment with a chance of some activity. This works very well within the ATV and EME communities. My suggestion of reinstating a squares table in the column returned zero response so without input I can't create such a table. Sometimes I feel I'm 'crying in the wilderness' in my attempts to generate regular activity. Only GHz bands EME seems to be gaining in popularity. Any other bright ideas to publicise and create activity outside of contests? Your ideas must be backed up by your actions. No good just saying "The RSGB/G4BAO/UKuG should do X-Y-Z..."

Another notable GHz band SK

George Burt, GM30XX passed away at the end of September. George made several record contacts back in the 1970s in the pioneering wideband FM days on 10GHz. In later life he championed QRP HF CW and created the Foxx CW transceiver. It would be appropriate to create, or at least rename, a Scottish 10GHz beacon as GB30XX in his memory. Any volunteers offering to do this? Please contact me, as I am sure I can arrange to fund the hardware [3] and help with the licensing application via the UKuG Committee.

Finally

Season's greetings to you all. This marks the end of my fifth year writing this column. Keep band reports and technical snippets coming in to me by email. Why not join the conversation on Twitter @g4bao and @ukghz using #GHz_bands? Most importantly, *get on the GHz bands!*

Websearch

- [1] www.vhf.cz
- [2] www.microwavers.org/squares.htm
- [3] www.microwavers.org/proj-support.htm

John C Worsnop
PhD CEng MIET, G4BAO
john@g4bao.com

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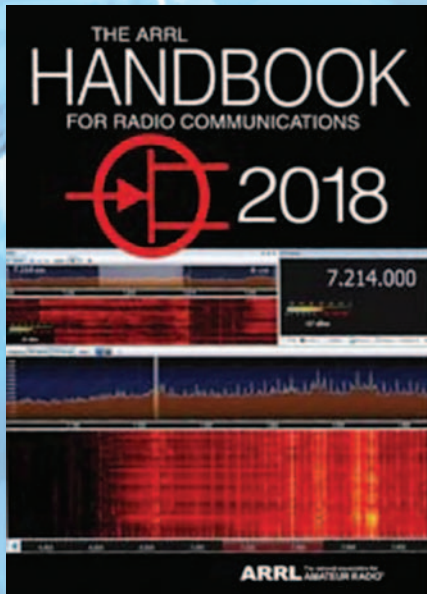
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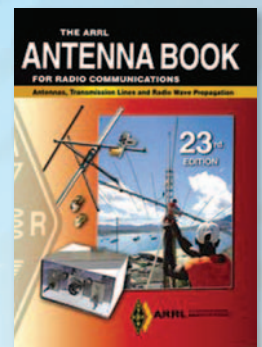
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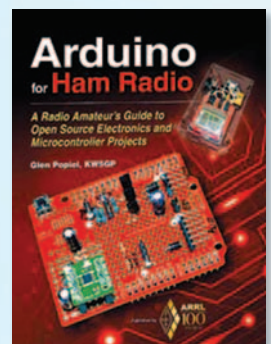
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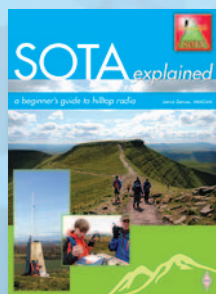
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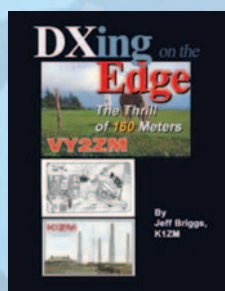
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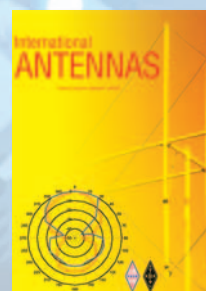
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Edited by Stephen Appleyard, G3PND

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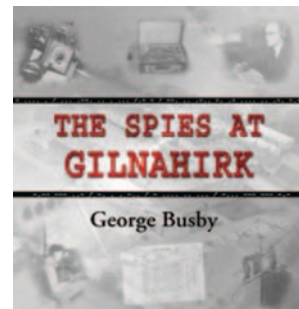
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Data

Software techniques

This month we're going to divert from data and digital communications and look at the evolution of software for radio amateurs and, especially, the way it is written. The latest techniques use concepts that leave some of us out in the cold. Things started in the late 1970s when some radio amateurs obtained single board computers such as the Compukit UK101 and started writing code in BASIC, a simple interpreted language. 'Interpreted' means the code is read one line at a time and that line is executed before the next one is read. Other amateurs used the native assembler code of the underlying microprocessor. Many of us could get to grips with all that and things were so simple that magazines, *RadCom* included, used to have program listings people could type in and run, then modify to their hearts content. As time passed computers got more powerful, new languages appeared (such as C and Pascal) but they followed the same principles, even if the line by line code was all compiled into one package that could run very much faster. Someone who could program in one language could usually follow a listing in another language after coming to terms with a new set of instruction words and symbols.

By the end of the 1980s graphical interfaces such as Windows appeared and programming languages came along to support this. Software like Visual Basic/Pascal/C still used a mostly line by line programming structure. The listing was getting more complicated; it had to support user interfacing, the mouse, graphics and, for us especially, the sound card. Ready built modules – blocks of code written by other people – were available for us to drop in. But once you'd set up the human interface, all the 'clever stuff' was written as before, line-by-line.

But things are changing again and support for the latest generation of software defined radios appears to be bringing a new type of plug 'n play programming into amateur radio that leaves many of us traditionalists completely out in the cold. The following was written by John, G4BAO who describes, slightly tongue-in-cheek but more eloquently, what is happening and comparing it to the way hardware has changed.

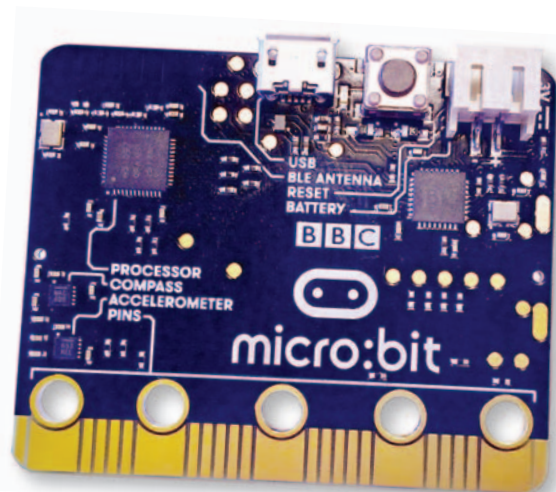
"Some of us can write and run simple PIC assembler code, write BASIC and hack other people's Arduino code, but know hardly anything about "Software Engineering". Many of us who were brought up writing line

by line code and then moved on to hardware have no concept of how things have changed in the software world. Line by line programmers are at the 1970s stage, which is equivalent (in hardware terms) to soldering individual resistors, capacitors and transistors together on Veroboard to make something work. Since then hardware has gone through integrated circuits, LSI, VLSI and on to field programmable gate arrays (FPGAs) and processors. Hardly anyone in the professional world builds discrete circuits anymore.

"Software has gone through the same transition from line by line to high level languages, to drag and drop graphical interfaces and modular, open source code blocks and languages. These are the VLSI and FPGAs of software. This advance has produced a huge *language of exclusion* barrier between those to whom software is their life, and many radio amateurs. By this, I mean when I ask a software engineer to explain to me how to set up to 'write my own code' to run on an RTL dongle to make, say, a simple FM receiver on a PC, the reply is usually along the lines of: *using your XYZ123 Blinux v7.5 build system, load up GNU Radio and drag and drop each element in to your main screen and compile it with the git link library convector widget, making sure that you keep the Python sudo vector at level 7.4. But squiddle first, of course.*

"This is of course an exaggeration, to make the point that my eyes glaze over at this kind of thing. It presumes loads of background knowledge and is an instant turn-off. I go away muttering darkly that it's 'too hard' or 'it's elitist'. In fact, my gut tells me that it's *not* that difficult, just needs a little effort on my part and the main problem is that I simply don't know where to start. If I had help setting everything up correctly and a little basic knowledge, I probably just need to use a graphical interface to draw out a design, press a couple of buttons and hey presto it works. The issue finding the start line, past the unknowing, uncaring, 'guardians of exclusivity', the 'keepers of the magic arts' who just don't understand why I don't speak their language.

"If we are not to end up as 'the old chap that polishes the brass on the steam engine', amateur radio technological knowledge needs urgent updates via courses and seminars *from those who know*. Such an



The BBC Micro:bit – a small standalone processor unit designed for educational uses, programmed by a highly graphical drag-and-drop language.

update might have each participant sitting in front of their own PC/laptop and some suitable hardware. They learn what a 'build system' is for software. They install one, they learn how to put simple apps together from code blocks, either graphically or by linking standard blocks together. At the end, the outcome is that they all walk away from the course with something like a working single frequency FM receiver on their PC, or a signal generator or whatever and, most of all, an uncontrollable urge to improve it by themselves."

I look at the new BBC Micro:bit [1] and the Raspberry Pi and think 'yes... I might well be able to program a PIC in assembler to do real time signal processing, and write FFT routines for signal detection in PowerBasic on a PC but *not that!*' It's all probably very simple; but just doesn't *look* that way to an experienced Basic/C/Pascal/machine code programmer. However, I'll bet all those complicated drag-and-drop blocks were written, at some stage, in a far more traditional way by experienced programmers sitting and typing code. So perhaps all is not lost.

Finally, a plea. If you have any datamode operating experiences to share, or anything you'd like this column to cover, please let me know via the email address below.

Websearch

[1] BBC Micro:bit – tinyurl.com/htqf9wl or www.bbc.co.uk/programmes/articles/4hVG2Br1W1LKcmw8nSm9WnQ/the-bbc-micro-bit

Andy Talbot, G4JNT
andy.g4jnt@gmail.com

Book Review

Two fascinating code and cipher books this month

LORENZ

Breaking Hitler's top secret code at Bletchley Park

by Captain Jerry Roberts

Where to start with a book like this? The story of the Enigma machine, used by Axis forces in WWII, is now relatively well known. But Enigma had a 'big brother' – known as Lorenz – that was much more secure and used for the highest-level communications, including those to and from Hitler himself.

The most remarkable thing about this book is that it is a very readable, first-hand account of how the Lorenz code was broken and the fascinating people behind that stupendous achievement – which some say was the greatest intellectual feat of the twentieth century.

Jerry Roberts was "one of the three original senior cryptographers". He, along with Capt Peter Ericsson and Maj Denis Oswald had a very special position in the early stages of the attack on Lorenz. They all made key breakthroughs and ended up being shift leaders in the 'Testery' – with a total staff of 118 – working around the clock.

In this book we learn about the people, ranging from those doing relatively low-level jobs up to the "three heroes of Bletchley Park" – Alan Turing, who everyone has heard of, mathematician Bill Tutte, who broke Lorenz SZ40/42 cipher system and Tommy Flowers, who designed Colossus – arguably the grandfather of all today's computers. Many notable people worked at 'BP', including the politician Roy Jenkins and the man who went on to found Amnesty International, Peter Benenson. In addition to the people stories, there are detailed descriptions of precisely how the various codes were broken and an analysis of the Codebreaker's effect on shortening the War.

But that's not all the book is about. There are five main parts: the author's early life ('The Making Of A Codebreaker'), codebreaking during the war years, discussed above, the years after the War (including his work on War Crimes), the years of seeking recognition for Bill Tutte and the Testery, and finally a short resume of the author's personal life and interests.

Regrettably, Captain Jerry Roberts is no longer with us, like so many of those who worked at Bletchley and elsewhere in the War. But his well-written and illustrated book serves as a lasting, detailed testament to their work.

Size: 164x242mm, 240 pages, ISBN 9780750978859

Non Members' price £20.00, RSGB Members' price £11.99 (40% off)



A Clear Case of Genius

Room 40's code-breaking pioneer

by Admiral Sir Reginald 'Blinker' Hall

Room 40. Such an innocuous name. It suggest something like a stationery cupboard or perhaps a junior typing pool. But no – Room 40 was the hub of British code-breaking efforts in the early 20th century and, despite its title suggesting it was bounded by four walls it did, in fact, have tendrils to outstations all over the world.

After a distinguished career commanding various ships (including being Captain of *RMS Queen Mary*), Admiral Hall went to the Admiralty in London as Director of Naval Intelligence. Among other highlights he was closely involved with the 'Zimmermann Telegram', which brought the USA into the First World War.

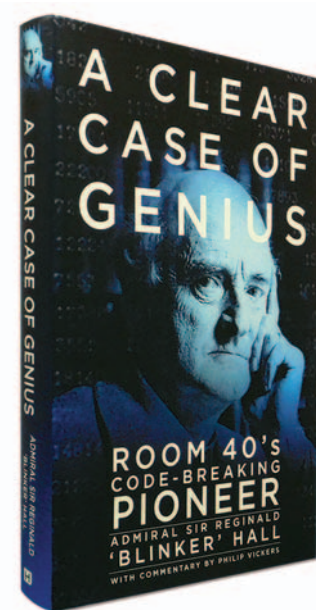
Not surprisingly, all of this was considered most secret. In the early 1930s though, Admiral Hall started writing his memoirs. Intended to be some thirty chapters in all, he got quite some way through it but then The Powers That Be got wind of what he was doing. Whilst I can't imagine that the former Director of Naval Intelligence would naively 'blow' years of work, the upshot was that many chapters of his autobiography and countless supporting papers were lost – destroyed – thus depriving future generations of a fascinating insight into what had happened. Admiral Hall passed away in 1943.

But some material survived. This book is the result of painstaking reconstruction (and a little editorial filling-in) and comprises seven of the planned thirty chapters, as close to their entirety as possible, making up some two-thirds of the book.

A lateral thinker well ahead of his time, Hall was also an eccentric and had a sense of humour, which comes over in his writing. 'Blinker' Hall – so nicknamed because of his habit of blinking rapidly and repeatedly – writes well, clearly and cogently, in exactly the way you'd expect a man described to US President Woodrow Wilson as "a clear case of genius". It is all fascinating stuff and well worth a look.

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Club of the Year

2016

Feature



South Bristol Amateur Radio Club won the 3rd place small club spot in the RSGB's 2016 National Club of the Year competition, sponsored by Waters and Stanton.

South Bristol ARC prides itself on its training. During 2016 they completed an Advanced course (66% success rate) where the students were graduates of earlier Intermediate and Foundation training. A second course for three students who are also Intermediate and Foundation graduates is now underway.

The first Intermediate course had a 100% success rate from previous Foundation training and all have gone on to study for the Full licence. A second Intermediate course is underway with more students from the Foundation training. Foundation training remains an important way to attract new members and progression through the exam levels has been encouraged as its key to the retention of those members.

Special event stations

In May, GBOSBM operated from Saltford Brass Mill in Keynsham as part of Mills on the Air. Operating *al fresco* they mounted a single station operating at various times on 6m, 20m, 40m and 80m SSB, making over 100 contacts. The location brings interaction not only with people visiting Brass Mill but also with passers-by as the station is located on the roadside adjacent to the Mill.

In June, a small party of club members went to Lundy Island, taking with them a variety of equipment for a week of HF and digital modes, operating as GB2BLE.

The club has been regular participants in June's VHF National Field Day, with varying degrees of success. In 2016 they entered the low power 2m section. Most of the operators were all newly licensed and not familiar with contest operating. Nevertheless, they managed 5th place overall in the 2m Low Power class with a confirmed QSO count of 104 on 2m SSB.

In August, GBOCCC was on the air from the *John Sebastian* in Bathurst Basin, Bristol as part of International Lighthouses and Lightships on the Air. They made over 100 contacts over the weekend on 20m, 40m and 80m SSB. Bathurst Basin is a popular tourist area of Bristol's historic City Docks.

In September, it was GBOSDR from the Somerset and Dorset Railway Heritage Trust in Midsomer Norton as part of the Railways on the Air event. This is very much a flagship special event operation with both digital modes and SSB making over 180 contacts over the weekend.

Club nights

During 2016 they maintained an interesting and healthy calendar of weekly meetings that were publicised widely.

There were a couple of Fox Hunts in the year. In order to open this to the widest possible audience within the club, they adopted a collaborative as opposed to competitive approach. This involved a number of members acting as DF stations relaying information back to the clubhouse. Some of the DF stations were situated in public areas such as the Downs in Bristol that are frequented, particularly on the warmer summer evenings we chose for our activities, by walkers, joggers and others enjoying the area. This resulted in some of those DF station operators being quizzed by passing members of the public allowing a further opportunity to explain the hobby as well as the DF activity.

Speakers from the Great Western Air Ambulance and the Weston-super-Mare RNLI gave presentations at the club. These evenings were both interesting and enjoyable and a collection on behalf of these volunteer organisations was taken both within the club and the Novers Park Community Centre where the club is based.

Awards

Several awards are made during the year. The Club's annual award for the best homebrew construction, the Terry Dunsford Award, is open to all club members. The Jean Fletcher Award is presented to the club member who, in the judgement of the committee, has given the most support to the club in the last year (and is not open to officers or the committee). The DX Challenge certificate is the club's annual award to the winner of The South Bristol Amateur Radio Club DX Challenge.



Interesting club nights.



Portable operations.

Please send news reports to radcom@rsgb.org.uk. To get future events listed here and put on GB2RS, email details of your meetings as early as possible to radcom@RSGB.org.uk Include your club name, RSGB Region number, contact name, callsign & phone number, date and details of meeting. Example: Fraser Road Radio Club, Region 9, Steve, M1ACB, 01234 832 700, 29 Oct, On the Air. We normally acknowledge all submissions within 3 working days: if you don't hear from us, please phone. We don't normally include 'closed', 'TBA' or 'every Tuesday'-type entries. The deadline for the January issue is 23 November and for February it's 14 December. For GB2RS, the deadline is 10am on the Thursday of the week of broadcast.

CLUB EVENTS CALENDAR

INTERNATIONAL

Pafos Radio Club, Cyprus
Richard, 5B4AJG, 00 357 97 857 891,
5b4ajg@gmail.com www.cyhams.org
Meets 3rd Thursday at DT's Bar. Visitors and holidaymakers welcome.

International Federation of Railway Radio Amateurs (FIRAC) www.firac.org.uk
Nets Sun 14.320MHz at 0830UTC, Wed 21.3MHz at 1430UTC g4gnq@hotmail.co.uk

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 Railways Amateur Radio Society
m0zaa@brars.info, www.brars.info
Net Friday 1600 on 3.685MHz

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

Radio Amateur Old Timers' Association
MemSec@RAOTA.org, www.RAOTA.org
Nets: Wed 3.763MHz 1000, 1.963MHz 2100
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8 New design antenna, Tom, GM3HNN
22 Fishbox antenna, Austen, MM6OOP

Cockenzie & Port Seton ARC
Bob, GM4UYZ, 01875 811 723
1 Normal club night
9 Christmas night

Livingston & District ARS
Cathie, 2M0DIB, 01506 433 846
5 AGM
12, 19 Social evening/Operating
26 Closed

Lothians RS
Mike, MM0MLB,
secretary@lothiansradiosociety.com
6 Christmas curry, Himalaya Tandoori

Mid Lanarkshire ARS
Kevin, 2M0KVM, 0772 509 6279
1, 8, 15, 22, 29 Club night

Stirling & District ARS
Lyndsay, MM6KEO, 0778 688 5566
7, 14 General amateur radio shenanigans

West of Scotland (Glasgow) ARS
www.wosars.org.uk
1, 8, 15, 22, 29 Regular club night

REGION 2: SCOTLAND NORTH & NORTHERN ISLES

Regional Manager: Andrew Burns, MM0CXA
RM2@rsgb.org.uk

Aberdeen ARS
Fred, GM3ALZ, 01975 651 365
7 Junk Sale
14 AARS Christmas Party

Dundee ARC
Martin, 2M0KAU, 0776 370 8933
5 VHF contest
12 Club night/ tuition
19 RSGB talk Andy/Martin
23-30 SSTV club contest

Glenrothes & District RC
Dougie, MM6KNR, dougie@digitalmaker.co.uk
6 Christmas eats; planning for AFAS

REGION 3: NORTH WEST

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

Bolton Wireless Club
boltonwireless@gmail.com
11 Open evening and table top sale
25 Closed

Chester & District RS
Bruce, M0CVP, 01244 343 825
5 Christmas social
12 Committee meeting
26 Closed

Macclesfield & District RS
Greg, M0TXX, info@gx4mws.com
4, 18 Christmas party/film night
11 Shack on the air
25 Closed

Mid-Cheshire ARS
Peter, G8HAV, 0791 931 5547
6 Contest logging software
13 Beer & hotpot
20 27 Shack night/Open evening

Quantum AR&TS
www.g7lfc.me.uk
7 Meeting, 7.30pm, with refreshments, small charge
21 Closed

Rochdale & District ARS
Robert, M0NVQ, m0nvq@outlook.com
6 Club night & AGM
13, 20 Club night

South Manchester R&CC
Ron, G3SVW, 01619 693 999
7 Shack night
14 Band plans and allocations
21 Christmas party
28 Closed

Stockport Radio Society
Heather, M6HNS, 07506 904 422
1, 15, 22 Club net, 433.525MHz, 2pm
5 Society meeting
12 Radio night
14 Club net, 145.3755MHz, 7.30pm
19 AGM and social evening
27 HQ radio night & HF net, 3.675MHz, 2pm

Thornton Cleveleys ARS
John, G4FRK, 01253 862 810
4 Practical night / on the air
11 HF propagation, Paul, G3OSR
14 Christmas dinner
18 Party, Jacobs Joint

Wirral ARS
William, G4YWD, 0780 488 4245
5-7, 12-14, 19, 21 Club open from 7pm
20 Christmas social

REGION 4: NORTH EAST

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

Blyth Radio Club
John, 2E0DCV, 0191 237 1729
6, 13 Club night & Morse training
20, 27 Closed

Denby Dale RC
Darran, G0BWB, 0797 442 3227,
3, 10, 17, 24, 31 Club net via GB3HD,
10.30am
6 Film night
20 Christmas party

Keighley ARS
Geoff, G7JZM, 0777 489 1641
7 The Old Sun Inn, Haworth, 8pm

Ripon & District ARS
David, G3UNA, 01423 860 778
7, 14, 21 Club night

Sheffield ARC
David, G6DCT, littlewood20@btinternet.com
4 Talk
11 Shack night
18 Club night
25 Closed

Spen Valley ARS
Russell, G0FOI, 01274 875 038
7 Shack meeting
21 Christmas social

Tynemouth ARC
www.G0NWM.com
1 Common mode baluns / chokes
8 Christmas do, members only
15 Closed
22, 29 Club night

Wakefield & District RS
Charles, M0OXO@wdrs.club
1, 8, 15 Social and natter night

The next deadline is
23 November.

We wish all clubs and their
hard working volunteers
a Happy Christmas and
peaceful New Year.

IC-R8600

COMMUNICATIONS RECEIVER

High Performance Software Defined Receiver



- 10Hz~3.0GHz Super Wideband Coverage
- Software Demodulation by FPGA Processing
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- P25, NXDN, dPMR, D-STAR Mode
- Ample Memory Channels
- Variety of Scan Functions
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- Remote Control Function
- ...and so much more!

Count on us!

REGION 5: WEST MIDLANDS

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

Coventry ARS

John, G8SEQ, 07958 777 363
1 40 years of amateur radio, Bob, G4GEE
4, 11, 18 Net, 8pm, 145.375MHz FM and/or
7.16MHz SSB ± QRM
7, 14, 21, 28 Net, 8pm, 50.175MHz SSB
8 Project introduction & video night
15 Christmas social
22 Net, 145.375MHz instead of meeting
29 Radio workshop

Gloucester AR&ES

Anne, 2E1GKY, 01242 699 595, daytime
4 Dinner at the Toby Carvery, informal and
general operating at school
6, 13, 20, 27 Net, 145.475MHz, 7.30pm
7, 14, 21, 28 Net, 7.30pm, 145.475MHz, often
moving to 80m SSB
11 Grand Christmas draw
18 Informal and general operating
25 Closed

Malvern Hills RAC

Dave, G4IDF, 01905 351 568
12 Christmas get together
26 Closed

Midland ARS

Norman, G8BHE, 0780 807 8003
6 General meeting, shack OTA & training classes
13 Christmas party, 7.30 pm
20, 27 Closed

Mid-Warwickshire ARS

Don, G4CYG, 01926 424 465
12 Christmas meeting

Salop ARS

salopamateurradio@gmail.com
5, 12, 19, 26 CW net, 4.30pm, 144.070MHz
6, 13, 20, 27 Net, 8.30pm GB3LH
7 Natter night / committee meeting
8 Closed
14 Meteor scatter talk & demo, Nik, M5DND
21 Mince pies & Christmas raffle

South Birmingham RS

Gemma, M6GKG,
gemmagordon.m6gkg@gmail.com
1 Work in the shack
4 Final planning for Christmas party
5, 12, 19 Coffee morning, 11-1, visitors welcome
7, 14 Training classes, Dave Murphy, G8OWL
8 Christmas Party starting at 7.30 pm
11, 18 Checking aerials & feeders
22 Cleaning shack before Christmas break
25, 26 Closed
29 Boys and their new toys

Staffordshire Portable ARC

Lynn, M6LIN, 0192 244 9668
5, 9, 19 Meeting at Bolehall Manor Club
8 Meal at the Longwood, Fazeley
16 Chasewater Park, Brownhills
19 Radio interference by Mark Rider

Stratford upon Avon & District RS

Clive, G0CHO, 01608 664 488
11 SDR kit build, Quentin, MOOAE
18 Net, 145.275MHz, 8pm
25 Christmas Day net, 145.275MHz, 10.30am

Sutton Coldfield ARS

Robert, rob2e0zap@gmail.com
4, 18 Net, 145.250MHz, 7.30pm
11 Christmas party
12 Net, 70.475MHz FM, 7.30pm

Telford & District ARS

John M0JZH, 07824 737 716
6 Committee meeting, GX3ZME OTA
13 Christmas meal, The Woolpack
20 Mince pie and mulled wine social
27 Net instead of meeting

Wythall Radio Club

Chris, G0EYO, 0771 041 2819
2 Club trip to ML&S
3, 10, 17, 24 Net, 8pm, 145.225MHz or GB3WL
5, 12, 19, 26 Morse class, 7.30pm
5 Free 'n easy night
12 Committee meeting
16, 19 Christmas party / Christmas
contest briefing

REGION 6: NORTH WALES

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

Marches ARS

marchesars@hotmail.co.uk
4, 11, 18 NE Wales open net, 9pm,
145.425MHz

North Wales RS

Liz, GW0ETU, 0776 019 0355
7 General meeting
14 Christmas party
21, 28 Closed

Wrexham ARS

Eifion Parry, mw6eyu@gmail.com
6, 13, 20, 27 Net, 7.30pm, 145.300MHz

REGION 7: SOUTH WALES

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

Aberystwyth & District ARS

Ray, GW7AGG, 01970 611 853
13-14 YOTA event for young enthusiasts
28 Club net, 145.500MHz then 145.550MHz

Carmarthen ARS

Andy, GW0JLX, 07768 282880
5 Christmas dinner (members only)
19 Club night

REGION 8: NORTHERN IRELAND

Regional Manager: Philip Hosey, M10MSO
RM8@rsgb.org.uk

Bangor & District ARS

Harry, G14JTF, 0289 042 2762
7 Open evening, rag chew, datamode demo

REGION 9: LONDON & THAMES VALLEY

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

Aylesbury Vale RS

vic@rakewell.com
13 Christmas party at G3MEH QTH

Bracknell ARC

David, M0XDF, M0XDF@alphadene.co.uk
6, 20, 27 Open net, 8pm, 145.375MHz
13 Social evening

Burnham Beeches RC

Charles, G0SKA, 01753 647 101
4 Christmas do
8 Video and natter night

Chertsey Radio Club

James, M6FLT, chertseyradioclub@hotmail.com
5 Social on-line gathering

Harwell ARS

John, G6LNU, 01235 223 250
14 AGM

Newbury & District ARS

Rob, G4LMW, 0797 088 5614
13 Christmas dinner

Shefford & District ARS

www.sadars.co.uk/
7 Getting started with WSJT-X, Ken, G4YRF
14 Mince pie night

Southgate ARC

Keith, G8RPA, g8rpa@arri.net
13 AGM

Verulam ARC

Greg, M0PPG, 01582 413 345
12 Bun fight, festive food, Bring & Buy, raffle

REGION 10: SOUTH & SOUTH EAST

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

Bredhurst R&TS

Nicky, secretary@brats-qth.org
7 TX Factor episode 18
14 Christmas party, 8pm, PWCA
21, 28 Club night

Bromley & District ARS

Andy, G4WGG, 01689 878 089
6, 13, 20, 27 Net, 9pm, 145.500MHz (and QSY)
19 Christmas social, quiz and mince pies

Coulsdon ATS

Andy, G0KZT, secretary@catsradio.org
11 AGM

Crawley ARC

Richard, G3ZLY, 01342 843 545
8 Fish & chip supper (members & families only)

Cray Valley RS

Dave, G8ZZK, 0773 954 9822
7 Amateur radio at the movies, Paul, G4DCV
21 Christmas drinks & buffet

Crystal Palace R&EC

Bob, G30OU, 01737 552 170
1, 17 Christmas social

Dorking & District RS

David, M6DJB, djb.abraxas@btinternet.com
7 Christmas dinner

Fort Purbrook ARC

Chris, G3WIE, g3wie@fparc.org.uk
4, 11, 18 Open net, 8pm, 145.275MHz
14 Christmas social, mince pies etc, 7pm

Hilderstone R&EC

Ian, 2E0DUE, secretary@g0hrs.org
14 Christmas meal, Jolly Farmer, 7pm

Horndean & District ARC

Stuart, G0FYX, 02392 472 846
1 Natter night/social evening
8 Christmas meal, Southwick Park Golf Club
15 Mince pies and quiz

Horsham ARC

Alistair, G3ZBU, 07855 268666
2 Christmas bash, The Chequers
7 AGM
22 Social, The Cricketers Arms

Itchen Valley ARC

Paul, G6MCX, 01725 578 004
1, 15 Club net, 145.525MHz

8 Christmas social, all welcome
22 Closed
25 Christmas Day net, 145.525MHz

Mid-Sussex ARS

Peter, G4AKG, 01444 239 371
1 Christmas dinner in house
8 Radio night
15 Christmas quiz

North Kent Radio Society

Stephen, G8JZT, secretary@nkr.sinfo
5 Natter night
12 Christmas curry night
19 Christmas EGM with mince pies

Southdown ARS

John, G3DQY, 01424 424 319
4 Confessions of a cold war spy, Brian Spiby, 8pm
6 Net, 145.275MHz, 8.30am; shack, 10.30am; cafe, 12.30pm
13, 20, 27 Net, 145.275MHz, 8.30am; cafe, 12.30pm

Surrey Radio Contact Club

John, G3MCX, 020 8688 3322
1, 8, 15, 22, 29 Net, 145.350MHz, 8pm
3, 10, 17, 24, 31 Net, 1905kHz, 9.30am
4 Radio astronomy, George, M0TPH
7, 14, 21, 28 Net 70.300MHz, 8pm
18 Informal pre-Christmas session

Worthing & District ARC

Al, M0OAL, information@wadarc.org.uk
3 Sunday breakfast
6 Tea and chat night
13 Christmas party and annual awards
20, 27 Multi band nets

REGION 11: SOUTH WEST & CHANNEL ISLES

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

Appledore & District ARC

Alan Fisher, M6CCH, 01237 422 833, fisheralan@btinternet.com
11 Christmas party

Blackmoor Vale ARS

Keith, M0TMO, 01747 851 260
12 Quiz
26 Boxing Day Net, 11am, 2m & 40m; no meeting

Callington ARS

John, G4PBN, 01822 835 834
6 Club night

Cornish Radio Amateur Club

Steve, G7VOH, 01209 844 939
6 Committee meeting
7 Main meeting
21 Social evening

Mid Somerset ARC

David, 01749 670 085,
1 Christmas buffet, 1st Shepton Scout Hall

North Bristol ARC

Mat, G7FBD, g7fbd@gb3bs.com
1 Relax and chat evening plus operating
8 Cruising Around, part 2
15 Christmas meal
22 Relax and chat evening
29 Video evening plus relax and chat

Saltash & District ARC

Mark, M0WMB, 0781 054 8445
7 Christmas meal (last meeting of the year)

Torbay ARS

John, G4VUD@tars.org.uk
1, 22 Club night
8 Club night with business meeting
15 Christmas party

Weston Super Mare RS

Martin, G7UWI, 01934 613 094
4 Construction, operating & natter night
11 Christmas party
18 End of year awards ceremony

Yeovil ARC

Rodney, M0RGE, 01935 825 791
1, 22 Construction and on-air at Sparkford
7 Amateur radio and exploration, G3MYM
14 Morse practice, G3MYM
21 Mince pies
29 Table-top rally at Sparkford, 10 am

REGION 12: EAST & EAST ANGLIA

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

Braintree & District ARS

Edwin, G0LPO, 01376 324 031
5, 19 Net, 8pm, 145.375MHz
12 Christmas social
26 Natter night

Cambridge & District ARC

Richard, G4AWP, 0770 229 5300
8 Christmas social, quiz and refreshments
22 Closed

Chelmsford ARS

secretary@g0mwt.org.uk
5 Christmas social

Colchester Radio Amateurs

Tony, 2E0FTQ, 0783 177 4669
14 Christmas bash

Essex Ham

Pete, M0PSX, news@essexham.co.uk
2 Essex YL Net on GB3DA, 8pm
4 Online Foundation course
4, 11, 18 Net on GB3DA, 8pm, www.essexham.net

Felixstowe & District ARS

Paul, G4YQC, pjw@btinternet.com
4 Show & Tell
18 Christmas noggins, video & mince pies

Huntingdonshire ARS

David, M0VTG, secretary@hunts-hams.co.uk
14 Christmas dinner
28 Closed

Leiston ARC

John, G4XVE, secretary@larc.org.uk
2 Christmas lunch

Loughton & Epping Forest ARS

Dave, M0MBD, 0798 016 5172
8 Christmas buffet and review of the year
22 Closed

Norfolk ARC

Chris, G0DWV, 01603 898 308
6 Club quiz
13 Christmas party
20 Informal; Morse in the back room

Thames ARG

Patrick, G8JLM, 01621 855 461
1 Christmas social
8 Christmas meal at Toby Carvery

Train the Trainers

15 TARGnet night, practical radio projects
22, 29 CW net, 7.30pm, 144.250MHz then voice net, 8pm, GB3DA

Thurrock Acorns ARC

Gordon, M0WJL, acorns@taarc.co.uk
5 2m SSTV open net, 7.30pm
7, 14, 21, 28 2m FM open net, 7.30pm
19 Winter snack & chat evening

REGION 13: EAST MIDLANDS

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

Derby & District ARS

radio@dadars.org.uk
5 Junk sale
12 Committee meeting
19 Fish & chip supper at Zanfish
26 Closed

Leicester RS

Sandra, G0MCV, 0793 027 4044
4 Morse class, night on the air
11 Morse class, committee meeting
18 Christmas party
25 Closed

Lincoln Short-Wave Club

Pam Rose, G4STO, 01427 788 356
2 Open Shack & G5FZ, 9.30am
6 Christmas party, 7pm, Fox and Hounds
7 Net via GB3LM, 8pm
9, 16, 12, 30 Open Shack & G6COL, 9.30am
13 Christmas nibbles and natter night
14, 28 Net, 145.375MHz, 8pm
18 Committee meeting
20 Formal meeting
21 Net via GB3LS, 8pm
27 Closed

Loughborough & District ARC

Chris, G1ETZ, 01509 504 319
5 Radar, George, G4EUF
12 Open forum
19 Darts & mince pies
26 Closed

Melton Mowbray ARS

Phil, G4LWB, 01664 567 972
2 Christmas dinner
15 Raffle, informal chat

Nunsfield House ARG

Paul, G1SGZ, pr@nharg.org.uk
1 *Practical Wireless* - shack equipment (Part 2 on the 2nd)
4, 11, 18, 25 Shack night
7, 14, 21, 28 Club Net, 145.325MHz, 8pm
15 Mince pie evening
22 Natter night
29 Looking forward to 2018

RAF Waddington ARC

Bob, G3VCA, 07971 166 250
1, 4, 11, 18 Club net, 145.325MHz, 8pm
8, 15, 22, 29 Club night
14 Christmas dinner at the Pyewipe Inn

South Normanton Alfreton & District ARC

A Lawrence, 2E0BQS, 01246 456 625
4, 11, 18 Club meeting
25 Closed

Welland Valley ARS

Peter, G4XEX, 01858 432 105
4 Club net, 8pm 145.275MHz
19 Christmas gathering

REGION 3: NORTH WEST



Stockport RS reports that one of their oldest members, Alan Cook, aged 89 (right), has passed his Foundation exam. Alan was previously a telegraphist with the RNV(W)R Royal Naval Volunteer (Wireless) Reserve for 10 years from 1949 to 1959, then serving the community as a Church of England Vicar until he retired in 1993. Due to ill-health he was able to take his exam from his home. Alan, now M6KOY will be on the air regularly on the club nets and will also be assisting in the Morse training sessions, from his home. Alan would like to thank Nigel, 2EOCKA, Phil, MOXYA, Alan, GOROW and John, MOTJU, for their support.



Furness ARS held a demonstration of data modes in September. Chris, MOTES demonstrated the WSJT-X software, focusing primarily on JT65 and WSPR. Also included was a demo of the SOTABEAMS WSPRLite unit and software, along with the original WSPRnet website. Chris, MOKPW followed this with a specific look at the FT8 mode. Using his IC-7300 and laptop he showed worked CT1ERW, SP4TKR, IU4ASI, S57DD and EA5DM over a short period of time. In October, Chris, MOKPW and Nick, GOHIK delivered a presentation on a new club project for 5.6GHz ATV. After some more information from the British Amateur Television Club, units were ordered to create two retransmit and receiver stations. The plan is to get the two stations operational and transmitting and receiving over a short distance, building up to many miles in the Cumbrian hills.

REGION 4: NORTH EAST

Denby Dale ARS have had a busy summer with GB2NCM for International Museums Weekend from the National Coal Mining Museum, GB6YD or Yorkshire Day and GB4WL for International Lighthouses weekend from Whitgift Lighthouse near Goole. The club has competed and been well placed in many Worked All Britain contests, and have also taken part for the third year in the IOTA contest. Classes for Foundation and Intermediate licences are on a rolling program and they are producing good results.

For the 5th year Gateshead Council ran E day. Over 260 teens and young adults were able to experience a wide range of examples from the digital world. Members of the **Angel of the North ARC** took an active part and enabled the attendees to experience VHF and HF radio together with historical and current digital techniques for global communications. Because of space restrictions on the site a novel solution was implemented to raise the HF aerial wire with a helium balloon.

Sheffield Wireless had a 100% pass rate at the Intermediate exam. Thanks to Mark, MOTGW and Krystyna, 2EOKSH for the training, and Steve, GOEAK of Worksop ARS and David, M5DWI for the independent invigilation. The 6 students and 2 trainers are; Kemlo,

2EOPOM, Steve, 2E0FST, Jayne, 2E0SVN, Mark, MOTGW, Krystyna, 2EOKSH, Paul, 2E0YPD, Malcolm, 2E0EJQ and Ian, 2E0IEB/. Jayne, 2E0SVN then went on to become the first YL member of Sheffield Wireless to gain a Full licence during the Society's most recent history. She got 95% in the exam with just 3 questions wrong. An excellent achievement.



Nancy Bone, G7UUR congratulating Lisa Johnson on passing her Foundation exam with Angel of the North ARC.



REGION 7: SOUTH WALES

Despite suffering from Asperger's Autism, Declan has passed his Foundation exam and is studying for his Intermediate exam. He showed his enthusiasm in a short interview while having his photo taken. **Blackwood RS** and Glyn Jones, GWOANA, RM7 would like to wish him well in his further studies.



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Amplified DSP speaker:

- Rotary filter select switch
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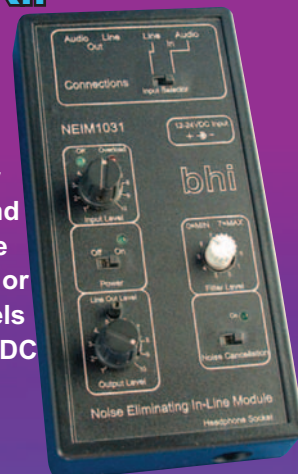
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**Amplified in-line
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EA&O

REGION 8: NORTHERN IRELAND



Mid Ulster ARC took part in International Air Ambulance Week as they activated a station at the Ulster Aviation Society that sits on the same site as the Northern Ireland Air Ambulance. After a picture and a quick tour around the helicopter, the club members gave a demonstration and explanation on amateur radio and exactly what the purpose of the Air Ambulance week was and how it worked. Although band conditions were poor, there were some links made with other participating stations and a good day was had by all. At the AGM, Jimmy, G100ND was elected as Honorary President. This is a lifetime appointment and fitting as Jimmy is one of the original founding members from 1965. Three awards were presented, Joe, M10NWA received the Services to Amateur Radio Cup for leading the club's training department, Brian, M10TGO received the Services to the Club Cup for spearheading the MUARC meeting room home brew extension and Keith, 210KXM was the first recipient of the Adrian Ismay, 210IZI Memorial Cup for services to the community. Adrian, 210ISI (SK) was a club member who was involved in the Community Rescue Service in Northern Ireland.

REGION 9: LONDON & THAMES VALLEY

Started by members of the UK's **Chertsey Radio Club**, Project Thomas Watch aims to enable the use of PMR radios by families of children with autism. Through their recent summer raffle the club has now purchased an Ofcom small business licence for the project. The raffle winners are: Retevis RT-82 DMR to Ryan Ballard; Retevis robot walkie talkies to Leigh Preece, AMSAT-UK membership to Bob Conduit, MOTGN Morse tutor courtesy of @KangaSales to David Jolly, DX40 receiver kit, courtesy of @KangaSales to Allan Gallop, The Pixie 40m CW kit was won by D P Wickes, *International Antennas* book, courtesy of the RSGB to Martin Harvey and *Stealth Antennas* book courtesy the RSGB to Alex Champkin.

The club ran its second Virtual Buildathon at the end of August when 14 people join from the UK, Europe and the USA. The session was presented by Bob, M6FLT and hosted / filmed by James, MOJFP. They used WebEx to share the build video and so that they could share webcam and audio between the group. You can watch the video from the blog at <http://chertseyradioclub.blogspot.co.uk/2017/09/virtual-build-thon-2-70-diplexer.html>

REGION 11: SOUTH WEST & CHANNEL ISLES

Torbay ARS is now looking forward to the next 70 years, starting with a BBQ in September with almost 40 members in attendance. The Annual Communications Fair followed a couple of weekends later and it was a very enjoyable day. This year they ran a Special Event Station. RSGB President Nick Henwood, G3RWF was in attendance and many people were able to meet him. Two other Special Event Stations have taken place for the Open Day at Stover Canal and Railways on the Air at Buckfastleigh Railway Station.

Thornbury & South Gloucester ARC had an informative talk by the Severn Area Rescue Association and the lifeboat team. It was really interesting to hear how the teams operate and the amount of equipment involved. Members are discussing the possibility of accompanying the lifeboat team/s on exercise just to get a feel for what they do and to see how joint communications technology would interface.

REGION 12: EAST & EAST ANGLIA

Peterborough & District ARC enjoyed a presentation by Alan, G8XLH on data transmitting. He outlined the popular modes of data – PSK 31, JT 65, WSPR and the latest and probably most popular, FT8. Using the club's Icom IC-7200 and a laptop connected to a big screen, he showed how quick and easy it was to get started. David, G3RED gave a short talk on logging data contacts, which was followed by a lively Q&A session.



The **Thames ARG** held a Foundation course in October with John, MOJDT, Andy, M6KSE, Chris, M6QJP, Sureshkumar, M6VSE and Alan, M6JDT all passing. Senior tutor Mark, MOIEO with the other club tutors have helped 100 candidates pass their exams since 2013. The 100th pass goes to Sureshkumar who was presented with a unique certificate to mark the occasion.

Congratulations to the three successful Foundation candidates on the 36th Chelmsford ARS training course, pictured left with the invigilator and trainers. Chris, GOIPU (centre, rear) is stepping down as the Training Manager, after training with the society since 2002. Two of the candidates, Jayne and Andrew, made use of Essex Ham's free online training course to study and revise prior to exam night.

Loughton & Epping Forest ARS had a busy summer with a field day, teaming up with the Secret Nuclear Bunker DX group for a weekend of radio at Kelvedon Hatch Secret Nuclear Bunker. Multiple stations were run over the weekend with most bands in use in multiple modes. The Foundation course and exam had 9 candidates gaining passes. Congratulations to Donna, Warwick, Marisol, Merlin, Anton, Toby, John, Greg and Chris. The course was led by John, G0VEH, assisted by John, G8GZH and John, G1DJI. Dave, G3ZXF provided refreshments and



The Chelmsford ARS AGM was held in October, including the presentation of the Constructors Competition awards. The Anthony Martin Shield was won by Peter, G3SUY for his home-designed and constructed SSB transceiver, the second prize went to Colin, G0TRM for his Little and Large Variometer tuned SW Crystal sets and the third prize was won by Andy, G0IBN for his RAF Memorial set piece. The club was invited to be part of the October Science Discovery Day, which had a space and communications theme this year. Chris, G0IPU coordinated the activities, which included DF, rockets, snap-circuits, radio controlled moon-buggy cars and 2m VHF. This was the busiest Open Day; by mid-morning well over 1000 people had passed through.

assisted in exam invigilation with John, MOJGR. There was an interesting lecture from Dr Clive Poole, M0IEW on negative resistance. Clive went easy on the audience keeping the maths to a minimum, but gave people lots of food for thought. Before the lecture started, there was a presentation to the family of David Burton (SK), his parents wish that his equipment was donated to the club and made available for purchase by club members. A glass plaque was presented to his father by Marc, G0TOC as a token of our appreciation and a memento for the Burton family.



Cambridge and District ARC has enjoyed a successful year, with activities including a Mills on the Air activation, social evenings and a picnic day for families, all with radio related activities. The training team has run two Foundation courses as well as an Intermediate course with 12 successful candidates, including one who has gone on to pass his Advanced exam within the year. Training has also taken place at a local secondary school with 2 pupils obtaining Intermediate licences. CDARC put together stations for the Practical Wireless 2m QRP contest, VHF National Field day & SSB Field days, as well as the 144MHz Trophy. Individual members regularly enter UKAC nights and, best of all, won the G5RV Trophy for the Local section of the 80m Club Championship.



In support of International Air Ambulance Week, Essex Ham operated for three days using the callsign GB4EAA from Earls Colne Airfield (near Colchester), the base of the Essex Air Ambulance. Over the three days, GB4EAA was active on several HF bands (SSB and CW), as well as on 2m/70cm, and was able to make contact with other air ambulance stations in the UK. The club would like to thank the Essex & Herts Air Ambulance Trust for allowing them to support this year's event, and to Anglian Flight Centres for their hospitality.



Scott, G8EQY and Tony, G0IAG visited Cambridge & District ARC to give a talk and demonstration on Portable Appliance Testing (PAT). Scott outlined what PAT is and the requirement for it. He said that although it is not a legal requirement, most insurance companies insist on it for mains driven appliances and leads in the workplace and at public events. Scott then proceeded to test club and individuals' power supplies and mains equipment for correct earthing etc, while Tony did visual inspection of leads, plugs and correct fusing. All items that passed the test were duly so labelled.

REGION 13: EAST MIDLANDS

Eagle Radio Group is a small group that tries to have a guest speaker each meeting and a large number of these have been technical covering many subjects. Occasional family nights gives something back to partners because, without their support and understanding of the hobby, most wouldn't be able to enjoy it. At the latest family night, Sue Cadman from the 1970s Dance Group called The Roly Polys was a guest. The evening was well attended with over 30 people including Jim, G0EJQ (RM13) enjoying the evening. Sue's stories and recollections of her varied career were enjoyed by all. The photograph shows, from left to right, Alan, M0AQC, Sue Cadman, Jim, G0EJQ.



Two Foundation candidates were successful in September exam at Nunsfield House ARG. Ronald Jones and Richard O'Sullivan are now looking forward to taking the Intermediate exam next year when they have completed the course. Special thanks to Adrian, M0OJR, Tony, G6MWS, Ken, G0JKC and Ken, G3OCA.

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FOR SALE

10.5m 3 SECTION TENNAMAST c/w cage and new ground sleeve. Mast dismantled but buyer collects. Part of SK sale. £300 OVNO, Robert, G0MSEI, 0777 967 6995, gm0sei@googlemail.com (N Ayrshire, Scotland).

AMERITRON

AL 811 in good condition, recently inspected by Castle Electronics and described as Mint condition, non-smoker. Buyer must collect due to the weight. £495 OVNO. Alan, M1JAK, 0797 310 3213, brunoalan1941@gmail.com (Warwickshire).



BUDDIPOLE W3BP inc TRSB (2009), 6m Yagi kit, 4 long whips, counterpoise wire adaptor & wire, mast guying kit, VGC, £400 ONO. Colin, M0XED, 01227 904 492 (Canterbury).

CUSHCRAFT 3-ELE 2m aerial. 1 year old. £35. Buyer collects. Chris, G4KWH, 01234 356 139 (Bedford).

CUSHCRAFT A3WS 3-ele Yagi for 12/17m, in good condition and good working order. Taken down and ready to collect, £150. Buyer collects or arranges collection. Nigel, G0BNR, 0786 683 9751, druzhba100@hotmail.com (Huntingdon, Cambridgeshire).

DIAMOND 2m mobile 7/8 antenna. Jim Durey, M6JEK, 01621 892 042 (Essex).

DIAMOND antennas, as new CP6S vertical, in box, £100. 2m Yagi 10-ele, pre-tuned, £30. 70cm Yagi, 10-ele, pretuned, £20. JBeam V.3 20, 15, 10 in fair condition, £20. Alan Date, G0FQU, 0777 327 4009 (Hanslope, Bucks).

ELAD FDM-DUO SDR TRANSCEIVER. 5 to 8 watts output, 10kHz to 54MHz. Standalone or PC control with FDM-SW2 16 bit software. Immaculate condition with very little use. £699 plus £15 P&P. GW3RIY (EA7RIY), +34 607 711 727, alanchapman07@gmail.com (Cardiff).

ICOM IC-7300. Almost brand new and has never been used except to power up. Original box and packing, plus all sundries. £965. Big saving on new! Genuine reason for sale. Manson EP-925 25A PSU, £60. Graham, 2E0VPT, 0774 258 9369, graham.2e0vpt@gmail.com (Walsall).

KENWOOD TS 950 + 60m Nevada PSU, MFJ ATU 949e, £700. Stuart Bradshaw, G3WEJ, 0770 784 4031 (Devon).

MFJ-868B 1.8-60MHz VSWR/PWR meter, 20/200/2kW. MFJ-867 VHF/UHF VSWR/PWR meter, 20/200/400W. Both large meters, 6", types, £60 each. Daiwa CN801V VHF/UHF/PWR meter, 20/200W, £55. Plus carriage. All with manual, boxed. Bob, G8BCA, 01638 714 051, g8bca@talktalk.net (Mildenhall, Suffolk).

MYDEL CG-3000R REMOTE ATU, remote keypad, 15m control cable (fitted plugs), brand new, unused. £120. K1EL K42 Morse code keyboard/

reader KIT. Brand new, never built (requires PS2 keyboard, not included with original kit), £80. Buyers inspect/collect; post at extra cost. G3VRY. 01494 583 469, g3vry.james@ntlworld.com (Chesham, Bucks).

PAIR EIMAC 4CX250B/M tetrodes c/w bases and chimneys, NOS, £100. Pair Brown-Boveri Q450-1 tetrodes (similar to 4-400) c/w bases, £30. Buyer inspects, collects or pays carriage. Nick, G3VNC, g3vnc@uk6.net (Cheddar).

RACAL TR15A tcvr for fixed or mob installation, USB/LSB/CW, 100W, 12v + mains pwr pack, int ATU, 2-16MHz, good condx though short of drive on Tx, hence requires attention. Includes service man. £120, heavy, buyer to collect. G3YPS, 0780 360 1176 (Lincs).

SK SALE. FT-101E, plastic still on front panel box etc, great rig, £175. Hameg HM208 20MHz digital storage oscilloscope, £85. Pair of GE 6LQ6 / 6JE6C valves boxed unused £65. Will ship all. 2EOARR, 0748 640 5031, pwa987fa@gmail.com (Notts).

STEREO TAPE RECORDERS. Revox A77 quad track. Handbook, circuits, tapes on NAB spools. Uher Report 4200IC. Leather carrying case, power supply. Slight mechanical fault. Offers. Collection only. Raymond Burgess, G3RXG, 01934 843 562, raymond.burgess@mypostoffice.co.uk (Cheddar).

TRAILER MOUNTED TOWER. 30ft lattice mast on heavy duty trailer. All fully galvanised. Some spare ropes and pulleys. Buyer collects or delivery at cost. £1,000 ONO. Peter, G4JNL, 0786 810 8482, peter.g4jnl@hotmail.co.uk (Lincoln).

TRIO 9R-59De

perfect, unscratched condition, matching speaker. Mains operated, recently serviced; alignment checked. Understood to have been hardly used by former operator (now SK). Serial No 840142. In original manufacturer's packaging. £100, prefer collect, might deliver, or carriage negotiable. Copy handbook. M1CCF, 0208 654 2582, mikeb@vmars.co.uk (Croydon).



WAVE NODE SWR/power meter, VHF/UHF. Manual, software, boxed, only used three times. £300 inc UK mainland delivery. YAESU VX3, manual, boxed, spare battery, brand new, never used. Still under 3yr warranty from 8/2017. Bargain, £100, UK mainland post at cost. Dave, G1LNA, 01209 617 261 (Cornwall).

YAESU FT-1000MP with SSB narrow filters, Inrad roofing filter kit, SP8 speaker and MD-100A8X desk mic, £650. Kenwood TM-D700E dual band mobile, £190. Kenwood TH-D7E APRS handheld, £180. MFJ259B analyser, £90. Timewave DSP-9+ audio filter, £60. All boxed and immaculate. Will South, G7MND, 0796 616 1692, wsouth@ensign-net.co.uk (Dorset).

YAESU FT-101E, YO100 monitor scope, matching speaker & Magnum Two 2m transverter. With instructions but no boxes or microphone, £185. For sale by family of G4FPJ (SK). juliet.brough@googlemail.com. Buyer to collect; equipment located in North East Cheshire.

YAESU FT-2000D bought in 2010, with Yaesu SP-980 speaker and MD-1 desk microphone. All in excellent condition with original packing, £1,100. Collection only. Tom Bloxam, GW3LJS, 01792 363 442, twb.1515@btinternet.com (Swansea).

YAESU FT-890 100W HF transceiver with built in ATU. in good condition with hand microphone and power lead, £300. Buyer collects. Ken Powell, G1NCG, 0771 673 9804, kenpow_99@yahoo.com (Swindon).

YAESU FT-991, as new, little used as too big for my location. Excellent condition, non smoker, all boxed. Also two HF whips on mag mounts, one Moonraker 40m, Watson multi 9. £850. Charlie Meakin, 2EOCTM, 01332 880 754 ctnl1@tiscali.co.uk (Derbyshire).

YAESU FTdx1200, excellent condition. Boxed, complete with power cable, MH-31 microphone, user handbook, circuit diagram. Around 18 months old with little use, £600. Stephen, 2EOWSF, 0773 608 3472, stephen.fine@gmail.com (Tring, Herts).

WANTED

436.000, 435.185 & 433.333kHz HC6U crystals from The Scarab Filter or Sphinx SSB TX made by SSB Products Derby during the 1960s. Whole or incomplete filter or SSB transmitter acceptable. WHY? Peter, G3YYN, 0778 538 1342, peter@terbo.plus.com (Milton Keynes).

ADVANCE TYPE T2 OR T2E Q METER

similar to that shown, preferably with the stand-off platform and Test Inductor set. If required I can arrange collection by courier at my expense. Alan, G3WXI, 0114 288 1692, g3wxi@qsl.net (South Yorkshire).



BIRD TERMALINE S0239 or N type Quick Change Connector wide flange. May also consider Bird 43 QCC in pairs. (Name and callsign withheld by advertiser's request). 0752 603 6257, spencert@outlook.com (Stanford Le Hope).

FT-221/225 muTek front end board, working or not, or bare bones PCB. Mike Ayres, G4OQG, 01249 443 037, g4oqg@hotmail.co.uk (Wiltshire).

ICOM M700 marine radio telephone. Working or not. Frank, G8FPW, 01406 330 883, frank.brown24@btinternet.com (Spalding).

MURPHY ADMIRALTY B40 OR B60 receiver to bring back happy memories of my SWL days. Will collect or pay all expenses. Must be working ready to go. GM4TPQ, 0780 282 1040 (Ayrshire).

STATIONARY ENGINE Lister D or similar size, older the better. Also old belt driven DC dynamo / generator. Old magnetos, engine parts and switchboards or parts. WHY? Photos of items appreciated. John, G0LJS, 01380 859 088, hubertsims@btinternet.com (Chippenhams, Wiltshire).

YAESU FT-101 DC PLUG, lead and in-line fuse holder, to replace the original one sold with car 30 years ago! Peter J Wilde, G3XDS, 01623 640 598, radiog3xds@gmail.com (Mansfield, Notts).

ZX80 COMPUTER. Even better if it works! Godfrey, G4GLM, 020 8958 5113, cgmm2@btinternet.com (Edgware, Middlesex).

EXCHANGE

I HAVE A FLEX 1500 in VGC with slight marks with power cable plus USB cable and pre-loaded with latest K9NS software, to swap for an Alinco DX70TH in very good condition and unmodified. John, M0ELS, 0788 189 2136, m0els@yahoo.co.uk (Basildon, Essex).

UP FOR GRABS

DOUBLE BEAM OSCILLOSCOPE HM203-7. DC to 20MHz. With manual. Good working order. Free to any good home who can collect. F W Lukey, 01226 763 827, barbaramaryfrankwilliam@gmail.com (S Yorks).

RADCOMs 2002-2016 without gaps. Boxed by year. Free but collection must be arranged. John, G0SGF, 0115 933 4914, johnrbarrett81@gmail.com (Nottingham).

WW2 R1115 RADIO SET. Restoration Project, only missing DF valves. With PSU, free to a good home. Collection only from B74 (West Midlands). Roger, G70BC, roger@egerton.myzen.co.uk.

YAESU FT-102, FC-102 ATU, SP-102, FV-102, FC-902, FTV-107R. Free, but take all or nothing. G1NGZ, 07810011741, m1northweald@aol.com (North Weald, Epping).

SPECIAL EVENT STATIONS

These callsigns are valid for use from the date given, but the period of operation may vary from 1-28 days before or after the event date. Details published here were kindly provided by Ofcom on 2/11/17.

Start	Callsign	Name	Location
28/12	GB0HNY	Happy New Year	Huddersfield
28/12	GB1HNY	Happy New Year	Huddersfield
28/12	GB2HNY	Happy New Year	Huddersfield
28/12	GB5HNY	Happy New Year	Huddersfield
28/12	GB8HNY	Happy New Year	Huddersfield

RALLIES & EVENTS

When Members of the RSGB Regional Team will be present with a bookstall at a rally in the coming month it is marked with an RSGB diamond.

2 DECEMBER

SOUTHS LANCS ARC WINTER RALLY

Bickershaw Village Community Club, Bickershaw Lane, Bickershaw, Wigan WN2 5TE
There are a limited number of pitches available. Doors open to the public at 9am, admission £2.50 (stall holders entry 7.30am). There will be a Bring & Buy, special interest groups and trade stands. Catering is available on site. Details from Jason, G0IZR, on 01942 735 828.

The only 2018 rallies we yet know about are:

14 JAN – Red Rose Winter Rally

27 JAN – Horncastle Radio Rally

25 FEB – BRATS Medway Radio Rally

25 FEB – Pencoed ARC Table Top Sale

4 MAR – Grantham ARC Radio & Elec Rally

15 APR – West London Radio & Electronics Show

29 APR – NARSA Exhibition (Blackpool)

6 MAY – Thorpe Camp (was Dambusters) Hamfest

7 JUL – Stockport RS Rally

10 JUN – Junction 28 Rally

24 JUN – West of England Radio Rally

4 NOV – West London Radio & Electronics Show

If your rally or event is not listed here,
PLEASE SEND US FULL INFORMATION

ASAP by email to radcom@rsgb.org.uk

The monthly deadline is the same as Around Your Region

SILENT KEYS

We regret to record the passing of the following Members.

Name, callsign	Date
Mr B T Roff, GORVS	8/2017
Mr R C Hussey, GM1FGN	25/10/17
Mr G Davis, G3ICO	2/10/2017
Mr G C C Knapp, G3NMJ	23/8/2017
Mr R H Jennings, G3NXV	2/2017
Mr R H Edmondson, G3YEC	28/9/2017
Mr W B Glover, G4BQW	21/10/2017
Mr E H Brockie, GM4EHB	16/10/2017
Mr G Watson, GW4EVJ	10/2017
Flt Lt D H Rycroft, G4OKO	21/08/2017
Mr R Wood, G8GUA	13/9/2017
Mr J Nunn, M0DIF	8/9/2017
Mr K Cook, M6KBD	13/10/2017
Mr S M Foulkes, MW1STE	27/9/2017
Mr S H Watson, RS163536	21/7/2017
Mr R P Philpott, DJ0OW	28/8/2017



RSGB Convention 2017 report (continued from page 24)

Chris Duckling, G3SVL ran through the typical DXpedition presentation in about a minute! Then he went on to explain the detailed planning steps over many months leading to choosing the destination and location with adequate accommodation and space for antennas with good take offs in the required directions – which for ZL7 was all points of the compass! The logistics of assembling the equipment and material list was then explained in details and Chris showed how the airline weight restrictions could be mitigated by just asking for more.

Professor Hugh Griffiths, G4CNV, a world leading expert on radar research, gave a truly enlightening presentation on the History of radar to a packed audience. Hugh gave his insight on the various technologies used by both the British and German forces during WW2 including introducing recently declassified material to deliver an objective and highly fascinating talk.

Raffle

Thanks to the companies that supplied the various prizes including Icom UK, Kenwood UK and Yaesu UK. As always, thanks must also go to the two most enthusiastic and diligent raffle ticket sellers – Linda, G0TPX and Geoff, G0DDX. The proceeds go to the RSGB's DXpedition Fund.

The IC-7300 was won by Mark, M0LXQ, a member of Wythall Radio Club, the Kenwood



The event would not be possible without a large number of volunteers, to whom the RSGB offers its thanks.

was won by Mike, G4DYC from Norfolk ARC. Yaesu FT-817s were won by Rob, M0ZAF and Camb-Hams volunteer Colin, G4ERO.

Exams and Morse

The Morse Code Pile-up saw 34 people have a go over the weekend. The winning score, by G4BUO, was 41 correctly copied calls out of 100 sent in four minutes. The runner-up was G4BWP with 39.

The US exams took place on Sunday with five candidates all achieving the top grade of Extra Class. Two already had General Class and three were starting from scratch.

The UK exams took place over the two days. Three candidates passed their Foundation exam, three passed the Intermediate and seven passed the

Advanced exam, two of whom had sat all three levels over the weekend. Thanks to all the invigilators and exam secretaries that made all these possible.

Thanks

Grateful thanks to all the lecturers (including radio amateurs, those from industry and from academia) who gave up their time to come and speak, the volunteers who kept the Convention running smoothly and the staff at Kents Hill who help make the weekend a success. We would like to thank everyone who took the time to complete either an online survey or the paper version about their Convention experience. This was extremely useful to the RSGB and will enable us to improve the event in years to come.

HF F-Layer Propagation Predictions for December 2017

Compiled by Gwyn Williams, G4FKH

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Time (UTC)	3.5MHz	7.0MHz	10.1MHz	14.0MHz	18.1MHz	21.0MHz	24.9MHz	28.0MHz
*** Europe								
Moscow	6662...26666	526432353236	1.155443...1	...55551	...2652	...1331	...22	...11
*** Asia								
Yakutsk	321...34334	...3...1	...11.1	...	...	...	...	...
Tokyo	...1122111	...22322.1	...232	...22	...1	...	...	...
Singapore	...21111	...331112	...23	...13	...	...11	...	...
Hyderabad	3...12332	3...23323	...23	...4441	...3442	...121	...	...
Tel Aviv	552...5555	5541...35555	1.532224...1	...	...	...	...	...
*** Oceania								
Wellington	...2221	...14543	...4441	...232	...1	...	...	...
Well (ZL) (LP)	...	...	...	...	...	...	...	...
Perth	...1111	...33222	...32	...23	...21	...1	...	...
Sydney	...1111	...1442	...3441	...332	...22	...	...	...
Melbourne (LP)	...11.12	...22	...23	...3	...1	...	...	...
Honolulu	...11.12	...1222	...1	...	...	...	...	...
Honolulu (LP)	...	...	...	...	...	...	...	...
W. Samoa	...1.11	...3432	...233	...2	...	...	...	...
*** Africa								
Mauritius	2...2222	3...32223	1...3	...11	...	...	...	...
Johannesburg	32...223	43...2333	21...22212	...2	...111	...111	...	...
Ibadan	4442...2444	53531...14555	3.1421124312	...43223	...34332	...14441	...111	...
Nairobi	331...3333	442...4444	1.1...21	...2.13	...1.22	...	...	...
Canary Isles	6665...2566	666531.14666	341543335633	11.1544431	...12211	...11	...	...
*** S. America								
Buenos Aires	2222...2	2314...12	1.3	...	...	...	...	...
Rio de Janeiro	3323...12	3324...123	11.4...1	...21	...1	...	...	...
Lima	2212...1	22.2...1	...	...	...	...	...	...
Caracas	3333...13	33.42...1.1	...13	...21	...22	...1	...	...
*** N. America								
Guatemala	2222...1	12.23...1	...21	...11	...1	...	...	...
New Orleans	33331...2	11.32...1	...1	...2	...2	...	...	...
Washington	4442...24	24.43...2.1	...1.1	...2	...1	...	...	...
Quebec	44431...133	12...1.1	...1212	...33	...3	...1	...	...
Anchorage	121...2	...3	...	...	...	...	...	...
Vancouver	2222	...1.1	...2	...	...	...	...	...
San Francisco	22122	...1.211	...1	...1	...	...	...	...
San Fran (LP)	...	...	...	...1	...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 December, January & February 2018 are respectively (SIDC classical method – Waldmeier's standard) 21, 20 & 19 and (combined method) 24, 24 & 25. The provisional mean sunspot number for October was 13.2. The daily maximum / minimum numbers were 36 on 1 October and 0 on 9-13 & 15-20 October.

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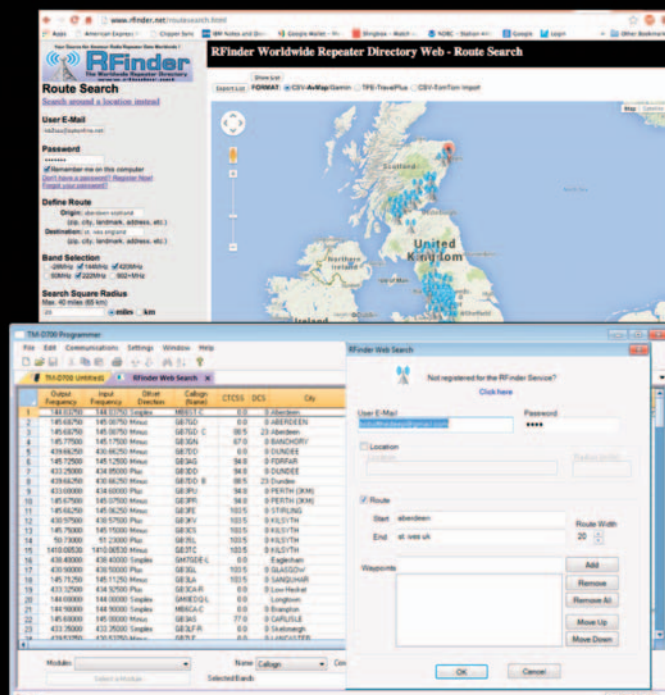
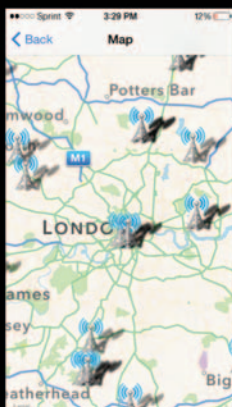
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NO SUNSPOTS – BANDS ALIVE – WHEN?

Sam Turner, G4UQB

You may recall publishing my letter: 'No Sunspots – Bands alive – when?' in the May edition of *RadCom*.

Well, *déjà vu*, same again for the CQWW DX SSB Contest on 28/29 September 2017, where I worked over 25 countries during a small period on the Sunday – the 'open' bands for me being 15, 20, 40 and 80 – yes 15 too.

And 15m, what a band! Everywhere from Brazil through the USA to Canada and across Europe and beyond. And further still, what of 15 where propagation predictions are still saying dead – especially to the USA? Yes, as before, some big guns were out there, but my lowly 80-100W/dipole set up was getting through and being heard. Certainly during the hours 1400-1700Z, 15m was wide open to the Eastern Seaboard of the Americas.

So, I am still posing the question: are the HF bands becoming contest-only? As outside contest operating, there's hardly anyone there the rest of the year.

Silence is Golden – hope not.

IMPROVEMENTS IN THE EXAM SYSTEM

Nancy Bone, G7UUR

It is now 3 years since I and David Stansfield, G0EVV organised the Invigilator training workshop for a group of amateur radio clubs and societies in Region 4, the Five Bridges Cluster and STARS, which was attended by 40 members. We then compiled a report with recommendations based on the feedback from members and a presentation was delivered at the Education and Training Committee Forum at the RSGB Convention. Our workshop identified a wide range of concerns about the then current examination system. Slowly but surely the RSGB has addressed our observations. A major improvement was the re-writing of the Examination Guide EX500 a year ago.

I am pleased to say that our remaining concerns have all now been addressed at this year's Convention at the Education and Training Committee Forum and our thanks go to all involved at the RSGB. The concerns are addressed as follows

- Indicative marking is not needed if 'online' examinations are used by exam centres, and instantaneous pass/fail with performance feedback provided by the software.
 - Online exams are now available for Full and will be rolled out to Intermediate in November with Foundation in January 2018.
 - Independent Exam Inspectors (independent of clubs) are being appointed and trained.
- I am no longer Deputy Regional Manager for the Five Bridges Cluster and STARS but

have been asked to continue as Convenor for ongoing activities such as training and education and special events and activities especially involving children and young people and help with access to the hobby for all.

WHY CW?

E F Lingard, G3WNQ

Continuing the 'Why compulsory CW' debate, The Last Word Oct/Nov 2017. While most ship-borne WT equipment couldn't operate on the amateur bands, at one time Coast Stations' transmitters certainly could. The W5 transmitter, for instance, could operate on CW and RT on the 2MHz band. This Tx was designed and built by GPO (now BT) engineers and equipped many of the coast stations around the UK. The 2MHz marine band, 1.6-4.0MHz certainly was not *RT only*. For several years both Wick Radio and Humber Radio operated a CW service around 1.6/1.7MHz for the UK's fishing fleets that fished distant waters such as Iceland, Bear Island, and the White Sea.

The 1.8-2.0MHz and 3.5-3.8MHz amateur bands fell in this marine band and thus were designated as 'shared' bands. Despite this, interference by amateurs was rare. In my 28 years at Humber Radio only once did I ask an amateur to move frequency. His CW signals were so strong they were interfering with a ship-shore telephone call. Unfortunately this occurred after the old W5s were taken out of service and the new (bought-in) Txs didn't have a CW capability.

So, being able to imitate owl calls by blowing through my cupped fingers, I put my skill to use by 'blowing' a nice AF modulated CW into the mic and politely asked the QRM station to QSY – which he did. (If this was you please let me know.)

I have a PMG Radio Certificate – First Class, a Radar Maintenance Certificate and over thirty years service as a Radio Officer at sea and UK Coast Stations – part of the UK Search & Rescue Organisation.

J M Dunnett, G4RGA

Regarding recent letters on this subject: the compulsory Morse test was an ITU requirement to which administrations had to adhere. This stipulation was removed in 2003. See <http://tinyurl.com/ybcl5hgt> (RSGB website).

Why it was the only requirement specified and whether it was a credible qualification for HF access is a matter for debate.

RAYNET INVOLVEMENT

Maurice George, M6GZX

I became a licensed amateur radio operator (a rather grand term to describe my feeble radio skills) for one reason only: to put the medium to good use in the real world by joining RAYNET; this meant qualifying via the Ofcom route. I'm a fairly clued-up tech person but the technology in radio stretched my capabilities to the limit. I'm proud that I passed the Foundation exam but much of the language and terminology is still out of my reach. I'm sorry to say that most of *RadCom* means nothing to me.

On the RAYNET outings that I've attended, I greatly admire the way they've been organised and implemented. They've all supported grassroots community events. They've also been of practical assistance, involving someone experiencing a heart attack, a horse rider having trouble controlling her horse and similar problems. Fortunately, my local RAYNET has never been called to a major catastrophic event.

Currently we're reading about the way that local amateurs in Puerto Rico and other nearby areas have played a valuable role in easing communications in places in which all conventional media have been incapacitated. Here in Britain, RAYNET came to the rescue in the Carlisle floods that affected thousands of people. In cases like these, it's disturbing that authorities including the police, the hospitals, the government and so on seem to have no way of communicating with each other.

Most letters in *RadCom* deal with technical matters. But here I'm looking at the broader issues: compassion, usefulness, community. More coverage of RAYNET would be a step in the right direction.

We welcome reports of RAYNET activities, whether they are training exercises or assisting at public events. Send reports and photos to radcom@rsgb.org.uk – Ed.

I THOUGHT I WAS GOOD AT MORSE...

Bob Houlston, G4PVB

It's often remarked that young people should be encouraged into the hobby so I would like to tell you about 10 year old Emilia who is in the video mentioned here.

I thought I was a Morse code guru until... www.youtube.com/watch?v=ODQyLMkSk5I

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