February 2010 £3.50 ISSN 0141-0857

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Exclusive Review!

Alinco's new budget priced rig

THE DX-SR8 HF TRANSCEIVER

Inside – six page review by Rob Mannion G3XFD

Valve & Vintage
With Ben Nock G4BXD

Practical Way
With George Dobbs G3RJV

Emerging Technology
With Chris Lorek G4HCL

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£1479 D

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A complete station audio system that integrates into your station with ease.

What you get.

- *Combined headset & Boom Mic.*
- *8 input Mixer*
- *AC power supply*
- *CC-1 8 pin mic lad of choice*
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The W-184Mx allows you to use the professional supplied mixer with the included headset. This allows you to control the audio level and importantly, adjust the frequency response with the 3 EQ controls. And you can monitor your transmitted audio in the headphones. The necessary leads are included to match any 8-pin equipped radio. (see below for modular input radios). But that's not all. You can also mix the receiver audio into the headphones and again adjust the EQ response for received signals.

For modular mic radios you need to purchase one of the adaptors below.

Yaesu	ADMY-817	£23.95
Icom	OPC-589	£21.95
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Practical Wireless February 2010

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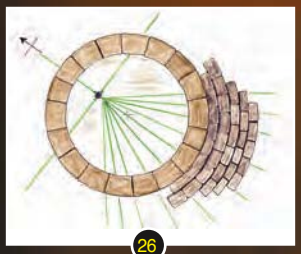
Volume 86. Number 2. Issue 1233. On sale 14 January 2010



Cover: The new Alinco DX-SR8 receiver, picture courtesy of Nevada Radio.

The Editor's apologies:
Because of the major, and most important introduction of the Alinco DX-SR8 and the resultant review, we've had to hold over a number of articles. Please see *Coming Next Month* on page 81. **G3XFD.**

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Published on the second Thursday of each month by PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: 0845 803 1979. Printed in England by Holbrooks Printers Ltd., Portsmouth P03 5HX. Distributed by Seymour, 2 East Poultry Avenue, London EC1A 9PT, Tel: 020 7429 400, Web: http://www.seymour.co.uk. Sole Agents for Australia and New Zealand - Gordon and Gotch (Asia) Ltd.; South Africa - Central News Agency. Subscriptions INLAND £38, EUROPE £47, REST OF WORLD £57, payable to *Practical Wireless*, Subscription Department. PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: 0845 803 1979. *Practical Wireless* is sold subject to the following conditions, namely that it shall not, without written consent of the publishers first having been given, be lent, re-sold, hired out or otherwise disposed of by way of trade at more than the recommended selling price shown on the cover, and that it shall not be lent, re-sold, hired out or otherwise disposed of in a mutilated condition or in any unauthorised cover by way of Trade, or affixed to or as part of any publication or advertising, literary or pictorial matter whatsoever. Practical Wireless is Published monthly for $50 per year by PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW, Royal Mail International, c/o Yellowstone International, 87 Burlews Court, Hackensack, NJ 07601. UK Second Class Postage paid at South Hackensack. Send USA address changes to Royal Mail International, c/o Yellowstone International, 2375 Pratt Boulevard, Elk Grove Village, IL 60007-5937. The USPS (United States Postal Service) number for Practical Wireless is: 007075.

Rob Mannion's

keylines

Looking for interference sources at home.

After my enforced absence from my shack for most of the time between June and November – with only sporadic on-air sessions – I've really got back into the 'swing of things' again. Indeed, it's been great fun to get busy on various projects again.

However, getting back into the shack has drawn my attention to the ever-increasing noise signals on the high frequency (h.f.) bands. The increasing numbers of noise sources and their intensity, was drawn to my attention when I visited my good friend **Phil Ciotti G3XBZ**, who is also a *PW* author and a fellow member of the **Poole Radio Society**. Phil and I had been working closely together in evaluating the new Alinco DX-SR8 transceiver, which is published in this issue.

Phil G3XBZ is a very talented constructor and his wiring skills reflect his professional work in electronics. He's rescued me on many occasions, particularly in assembling microphone plugs on my behalf!

On my last visit, the Alinco DX-SR8 review loan rig was switched on and working on 7MHz and I noticed how little TV line timebase noise and switch mode power supply interference could be heard. Phil then tuned up to 18.110MHz, the **International Beacon Project** (IBP) 17 metre c.w. beacon allocation. Expecting to hear a particularly unpleasant switch-mode type equipment harmonic just below 18.110MHz, I was pleasantly surprised that the QRN source wasn't audible at G3XBZ's QTH!

I then remembered that Phil and his wife **Chris** don't have any TV in their detached bungalow and the only cathode ray tube (c.r.t.) device (with all its own inherent QRM possibilities) is the G3XBZ computer – no Internet, another QRN source! – that he and his XYL share. Incidentally, it's also worth noting that the delightful couple even share the shack – and alongside the Amateur Radio goodies, the artwork and craftware produced by Chris can be seen. What a remarkable relationship they have!

The lack of TV power supply, line and field timebase QRN made me think – just how much of the noise we suffer from on the air is a result of **our own lack** of anti-QRN precautions?

Phil G3XBZ then reminded me that he does get interference from from neighbours' TV sets, etc. Despite this I could tell generally speaking that he – even with his antenna running over the roof of their bungalow at a fairly low height – was much less affected by QRN than my own home, which is only 10 minutes drive away.

Food For Thought

As I drove home after my visit to Phil's home, I certainly had some food for thought regarding just how much QRN I was receiving in my shack could be originating in the G3XFD household! Incidentally, as I drove home I had my car radio tuned to 198kHz to listen to the Shipping Forecast for an up-date on the (dreadful) weather. Then suddenly – the fairly noisy long wave background noise ceased as the street lighting went off (traffic lights went out too) as a mains surge took place.

The few minutes of the electricity black-out was quite revealing and I could hear another long wave station in the background of the 198kHz transmissions from Droitwich. I hadn't been able to hear the other station for many years (the last time was when I lived in north west Ross-Shire, south of Ullapool in Scotland). It rammed home the fact that we're living in a 'virtual' ocean of electrical noise!

When I arrived home I started to list every possible source of QRN under my direct control and top of the list of new suspects was the new CCTV system and alarm I had installed after the break-in to my shack earlier in the year. Placing a portable long wave broadcast receiver near the central hard disk unit, the power supplies (for the cameras and hard disk drive) soon proved it was a potent source of QRN. Indeed, the individual screened cables to the four cameras were radiating enough noise to be heard in my shack!

I'll let you know via *Keylines* how I tackle the new problems and in the meantime, I welcome any feedback on how you tackle your household QRN-generators!

Rob Mannion G3XFD/EI5IW

Practical Wireless
PW Publishing Limited
Arrowsmith Court
Station Approach
BROADSTONE
Dorset BH18 8PW

Tel: 0845 803 1979
Fax: 01202 659950

Editor
Rob Mannion G3XFD/EI5IW
rob@pwpublishing.ltd.uk

Technical Editor
NG (Tex) Swann G1TEX/M3NGS
tex@pwpublishing.ltd.uk

Art Editor
Stephen Hunt
steve@pwpublishing.ltd.uk

Advertising Typesetting/Admin
Peter Eldrett
peter@pwpublishing.ltd.uk

Advertisement Sales
Roger Hall G4TNT
roger@pwpublishing.ltd.uk

Finance Manager
Alan Burgess
alan@pwpublishing.ltd.uk

Book Orders
bookstore@pwpublishing.ltd.uk

PW Publishing Website
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Orders for back numbers, binders and items from our Book Store should be sent to: PW Publishing Ltd., Post Sales Department, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW, with details of your credit card or a cheque or postal order payable to PW Publishing Ltd. Cheques with overseas orders must be drawn on a London Clearing Bank and in Sterling. Credit card orders (Access, Mastercard, Eurocard, AMEX or Visa) are also welcome by telephone to Broadstone 0845 803 1979. An answering machine will accept your order out of office hours and during busy periods in the office. You can also FAX an order, giving full details to Broadstone 01202 659950.
The E-mail address is bookstore@pwpublishing.ltd.uk

Technical Help
We regret that due to Editorial time scales, replies to technical queries cannot be given over the telephone. Any technical queries by E-mail are very unlikely to receive immediate attention either. So, if you require help with problems relating to topics covered by PW, then please write to the Editorial Offices, we will do our best to help and reply by mail.

readers' letters

The Star Letter will receive a voucher worth £20 to spend on items from our Book Store or other services offered by *Practical Wireless*.

Components & Shopping For Bits

Dear Rob,
At nearly 60 years-old I recall that when I was a youngster if I wanted a component I went to one of four shops in Croydon; **John Bull Components**, **Electro & Servo**, **Huggetts** or **RSL** almost next door to each other. Not only were there new components but a plethora of surplus bits and bobs, wireless sets, Morse keys, life jacket lamps (nicely greased) and tools too. Thanks to the availability I've had a varied radio career, having owned and operated a variety of sets: WS18, 19, 38, 46, 88, 62 as well as C100, R107 and B40 sets. My poor Mum never knew what I was going to turn up with next – but she had a hard and fast rule. One in, one out. That way my bedroom was never over-cluttered with junk.

Then I started construction. My first radio was indeed built from a 'blueprint' from *PW*. I wound coils on toilet roll centres (much to Mum's disgust) and used the baking tray as a chassis. The valves were two 1T4s and the voltages 1.5V for the heater and I think 67/90V for the anodes derived from a Parmeko transformer I had acquired. I never stopped after that; the junk box just grew and grew. After reading **Ross Bradshaw's** letter in January 2010 *PW,* and I agree totally with the points he has raised.

I remember the ads in the backs of radio magazines that read along the vein of "Inductor marked ZA34567 needed to complete project", the builders of these projects doubtless reaching for the Valium, Prozac or even the Largactil to prevent their rage building to 'blown safety valve proportion' as their attempts to build something was stymied by having the wrong junk box content!

I also read in *Topical Talk,* that your disagreement with Ross' views is due to the fact that many persons have an extensive junk box on which they rely. Well, so do I, but over Christmas it's all going to be gashed except for the variable capacitors.

In the same January 2010 issue the **Reverend Dobbs G3RJV** suggests a Mouser transformer, from the junk box, to use with the TL431. That's plainly an American component and not all of us will have been lucky enough to gather American components. Doesn't that just make the point that everyone with a junk box will rarely have anything near the right component? Junk boxes are much like bookshelves; the content is always very different.

Like Ross I have noticed the lack of availability of component suppliers; I already use **Bowood Electronics in Chesterfield** and it's excellent service as you state.

What is frightening today, is the move to surface mount components – I now have difficulty in seeing discrete components let alone handling diminutive SMC should I need to make any repairs on today's equipment.

Couldn't you have a constructors'

Star Letter

Derby's At Sea? The GB1LBD – RNLI January Fundraising Event

Dear Rob,
Two keen Amateur Radio operators in land-locked Derby, **Dave Goodwill G1VAB and myself Dave Allsebrook G1VAC**, will be operating a special event callsign for a 24 hour period during January 2010. They are seeking sponsorship for each contact they make with other Radio Amateurs, the funds going to the **Royal National Lifeboat Institution**.

The station, using the callsign **GB1LBD** (Life Boats, Derby), will be operational from 1000hrs on Saturday January 30th through to 1000hrs on Sunday 31st from the **Carlton Road United Reformed Church** in Derby, which is also the headquarters of the **Derby & District Amateur Radio Society** and visitors will be welcome.

We anticipate operating on the h.f. Amateur bands 3.5, 7, 14, 18 and 21MHz, the v.h.f. bands, and 430MHz, using either the f.m. or s.s.b. modes during the 24 hour period.

To reduce costs QSL-ing will only be via **eQSL.cc** and all sponsorship money will be paid to the RNLI. The event is being funded at the expense of the operators.

Support is coming from friends, the Church's Elders, members of the Derby & DARS, and the local support group for the RNLI in Derby.

Please listen for and call the station, as every contact made will mean more money to help maintain the important and voluntary work of the RNLI crews around our shores.

Further information about the SOS Radio Week can be obtained from: **www.sosradioweek.org.uk** and the main site giving further details about the **RNLI SOS Fundraising Day** can be found on **www.rnli.org.uk/sosday/**

Requests for electronic versions of the sponsorship forms and other information should be sent to **GB1LBD@googlemail.com** and we hope to work many *PW* readers!
Dave Goodwill G1VAB
City of Derby
Derbyshire

Editor's comment: *Good luck to David G1VAB and David G1VAC! It just shows that you don't need to be near the sea to help the RNLI doesn't it? – and I hope to work you over the weekend in question.*

corner where component suppliers are simply listed with contact details? That would really be a help and I doubt it would encroach on advertising. I'm sure all of us have a favourite list of suppliers where we get particular bits from and would be only too pleased to share it in this way. Regards,
Paul Beaumont G7VAK
Upper Norwood
London

Editor's comment: *Thanks for your comments Paul. I invite you to join me on the* Topical Talk *page but – please, please don't empty your junk box. You'll immediately regret it Sir!*

Rob's Twenty Years & Those Components Again!

Dear Rob,
My congratulations on your 20 years as *PW* editor – a fine business, as the saying goes! I also read that the old chestnut about availability of components for projects is still going strong. I get a feeling of deja vu, having seen this subject crop up since 1960, when I read my first *PW*. We are lucky to get components at all considering much of industry uses surface mount these days. I can hardly see those things, let alone work on them.

Projects appearing in *PW* are hardly rocket science. Much of the circuitry has been around for a while, and it is worth supporting radio rallies to collect bits and pieces. I believe in the 'might come in handy' syndrome, and have a collection which has grown over many years. I agree that i.c. chips can be a problem as many become obsolete rather quickly, but then 'phones and computers are often obsolete in six months.

This is what consumerism is about. We 'radio hams' buck the trend by repairing gear and hanging on to it. My old TS-130 is still pottering on, while my newish FT-450 went pop. I must however, compliment **QSL Communications**, one of *PW*'s advertisers, for their helpful service – thanks to them the Yaesu is now up and running again!

I would also like to mention that I am now the secretary of the **International Short Wave League** (ISWL). My address now appears as headquarters on their website **www.iswl.org.uk**/ I am QRV in the call book and *QRZ.com*, and *Hamcall*, so that anybody who is interested in our club can write or E-mail. All the best to all at *PW* for 2010. (I hope you can print this as a letter in *PW*).
Peter Lewis G4VFG/ISWL G20322
Bittaford Wood
South Devon

Editor's comments: *Thank you for your congratulations Peter – and I wish you well in your new job at the ISWL. It's a most worthy organisation!*

Equipment & Battery Supplies

Dear Rob,
There's a growing trend among some Amateurs to run equipment from 12V car battery rather than from mains run p.s.u.s, to avoid mains borne hash, etc. However, the FT-101ZD draws about 260W from the mains when tuned into a dummy load. Maplin advertise a 12V inverter that supplies 240V mains 600W from a 12V input (battery). Has anyone tried to run an FT-101 or Trio equivalent from one of these inverters? It would be interesting to find out!

Next, not long ago I contacted the American maker of an automatic a.a.t.u. to ask about the possibility of using one with a valved transceiver such as my FT-101Z. The answer was an emphatic – Don't! It could be possible to tune into a dummy load and then connect the a.a.t.u. and use lower power whilst it hunted for settings but even so it was not recommended. So, anyone tempted to use an a.a.t.u. with a valved transmitter section, the advice is do not do it, only use a solid state p.a. rig.

Some Amateurs like to use an a.a.t.u. with their rig, the Alinco DX70TH and EDX 1 combination to name just one. I visited an Amateur one day who had such a set up. Chatting in the shack and one ear to the signals coming in, he suddenly wanted to contact the station that had

Inspection Lamps

Dear Rob,
Re the letter from **Reg Byres** in the January edition of *PW*, may I please add a caveat (warning)? In industry there have been problems with using some inspection lights – Lenses with a fluorescent lamp in them – with transistors and integrated circuits. It is thought that the radiation from the lamp can damage the junctions. It's not always a quick kill, but sometimes the circuit fails very early in its life. Not what one wants with circuits in critical applications like flying aircraft!

Therefore I would be wary of using such lamps on circuits with i.c.s. Not a problem, obviously, with other circuit elements. Also we had no problem with fluorescent lights mounted at the usual height just below the ceilings.
Alan Gordon G3XOI
Shoreham-by-Sea
West Sussex

Editor's comment: *Thanks for the tip Alan! Fortunately, the type of bench light that Reg and I use, actually use incandescent lamps that are tinted to provide a spectrum similar to daylight. I have heard of the ultra-violent radiation that leaks from fluorescent tubes causing problems, but I understand that the manufacturers, having learned of the problems, have produced especially certified (more expensive of course!) tubes for inspection units with magnifying lenses, etc. Readers using this type of bench lamp are advised to check with the manufacturers, especially if they work with EPROMS and other UV sensitive equipment!*

Projects & Components Problems

Dear Rob,

I'm writing after reading in the January 2010 edition of *Practical Wireless* the letter concerning 'Home-brew projects and component problems'. I too, can sympathise about the lack of components and **it is** frustrating. There are, however, people submitting articles where components can be obtained from various sources including **RS Components**, **Farnell**, **CPC** and **Rapid**, just to mention a few. A search on the Internet will also indicate where components may be available. There's the famous **Component Site** where auctions and immediate purchases are available. It would be prudent to check on the prices first, or what you would be prepared to pay.

As far as circuits for the more experienced Radio Amateur is concerned, (those that have held their licence for several years) articles published perhaps provide more of a guide rather than an exact component placement design. So, if the component suggested is not available, then some other may be available as a substitute. Isn't Amateur Radio an experimental hobby? As you have mentioned, there are kits available for those who want to 'assemble' projects.

Some of my projects consist of other peoples' ideas and circuitry and I adapt it to my needs and the components that are to hand.

The junk box is often the Radio Amateur's component source and the rallies (offering rather fewer components these days) are the places to seek these out. Also, there must be some radio 'hams' that can help out with the bits. Most of my projects (albeit using valves) have been built from the junk box.

Recycling is a good way to obtain parts and indeed, this is my main supply of 'obsolete' parts. To see what is possible to build from the 'junk box' take a look at **qrz.com** and type in my callsign. Best 73.

Eric Edwards GW8LJJ
Barry
Vale of Glamorgan
South Wales

Editor's invitation: *Nice to hear from you Eric! Please join me on the* Topical Talk *page for further discussion and ideas.*

just appeared. Tuning to the station he hit the **Tune** control on the rig, and tuned up the a.a.t.u. I pointed out to him that he had just tuned up on top of the station who was already working some one. He was unaware of this ! The correct procedure would have been to off tune the rig a couple of KHz to one side of the station, in a clear area and then tune up. Afterwards it would be no problem to tune back down to the required.

In my letter published in the January edition, in your reply you mentioned I did not say what the project was. After your E-mail mentioning that matter, I sent another E-mail listing about three projects I had to abandon. One was a 90V p.s.u. where I could not get any of the three transformer I wanted, and could only get two of three electrolytic capacitors.

By the way the only reason I used Maplin is that they are the only suppliers in this part of the country, one branch in Barnstable the other in Plymouth. Now I have other suppliers you have sent me, I shall try them.

An item that may be of interest to you. I have sent three or four E-mails to you but no reply or acknowledgement. With your work load I suppose it is not practical to reply to every E-mail you get.

However, why not get one of your computer boffins to set up an automated reply? Once you have read the E-mail you hit the 'auto' button and it is all done for you as you move onto the next E-mail. Finally, I'm sorry to hear about **Rowley Shears G8KW**'s passing, I still use one of his KW 107 a.t.u.s – best buy I ever made! Regards.

Ross Bradshaw G4DTD
Roche
Cornwall

Editor's comments: *I do my very best at replying to the E-mails coming in to me Ross. Unfortunately, I've not been able to reply to every single one immediately recently (my normal approach, otherwise they pile up very quickly!) and they've been replied to whenever I can find time to reply. Magazine production takes precedence at all times, as you'll understand.*

A great deal of correspondence intended for 'letters' now arrives via E-mail, and although there's no problem in general, many correspondents are forgetting to provide their postal address. I have to remind readers that although we will not publish a full postal address (unless we are asked to do so), we require it if the letter is to be considered. So, please include your full postal address and callsign with your E-Mail. All letters intended for publication must be clearly marked 'For Publication'. **Editor**

Denigrating Fluorescent Lighting

Dear Rob,

I really must protest about the denigration of fluorescent lighting in *PW*. My main work bench light for the past five years has been a 15W fluorescent tube following the re-design of my constructional area. (The actual tube length is 18 inches). There is also a 20W energy saver as the main room lighting but it is rarely switched on as the standard of lighting on my workbench from the fluorescent tube is excellent with the minimal of shadowing.

Additionally I also have a small low wattage halogen angle lamp should I require to do some very close up work, i.e. surface mount, but even this is not put to use very often. Originally I only ever had one 40W standard fluorescent tube, but when I redecorated the room I installed a standard bayonet fitting hence the energy saver.

My XYL tried out one of the daylight lamps for her craft work but with the condition of her eyesight worsening (She has cataracts) reverted to a curly 9W energy saver lamp many moons ago. This she found to be so much better due to the minimum of shadow content and it costs much less to run.

Geoff Sims G4GNQ
Glossop
Derbyshire

Send your letters to:
Rob Mannion
PW Publishing Ltd.,
Arrowsmith Court,
Station Approach,
Broadstone,
Dorset BH18 8PW
E-mail: pwletters@pwpublishing.ltd.uk

Spectrum Defence Fund Announced By RSGB

The **Radio Society of Great Britain** has announced in *Radio Communication,* their monthly members' journal, that they have established a **Spectrum Defence Fund** to challenge UK regulator Ofcom over its interpretation of the various Acts and Directives that cover **PLA**/**PLT** and the threat they pose.

The RSGB announcement states that: "This may take the form of a Judicial Review, but we will be advised by our lawyers on the direction to take. The cost of a Judicial Review is likely to be in excess of £75,000 and we are not guaranteed success. But now is the time to stand up and be counted and make it known that we, as a community of Radio Amateurs and short wave listeners (s.w.l.s.) alike are not prepared to accept any level of interference from non-compliant devices. We are looking to our administration, Ofcom, to protect our interests, which is their statutory duty. This is a long term project and all monies donated will be ring-fenced for those actions alone."To donate to the Spectrum Defence Fund please make cheques payable to **The Spectrum Defence Fund** and send them to: **Spectrum Defence, Radio Society of Great Britain, 3 Abbey Court, Priory Business Park, Bedford MK44 3WH**

Alternative methods of payment such as PayPal etc will be announced in due course). The RSGB is appreciative of the efforts and support from Society members, the UKQRM group and its membership, among many others. Please note: You can now donate on-line to the Spectrum Defence Fund at **www.rsgb.org/defencefund**

Practical Wireless & PWP Ltd. Supports The Spectrum Defence Fund

The Editor comments: The RSGB's announcement of the **Spectrum Defence Fund** (SDF) was made after I had written the February *Keylines*. As I wasn't aware of the RSGB's initiative prior to the announcement, it's a remarkable coincidence I have discussed interference problems that are badly affecting my own enjoyment of the Amateur Bands and short wave broadcast bands. I strongly urge all *PW* readers resident in the UK to support the RSGB's initiative, which reflects my own suggestion of a special legal defence fund for general legal problems several years ago. I'll be personally donating to, and fully supporting, this extremely important cause, along with our Publishers, **PW Publishing Ltd**, with their own donation. I'm doing so because unless something is done soon, the h.f. bands will be denied to us due to the extreme interference from the many different devices – including power lines adapters (PLA) and power line transmission (PLT) – that are given the stamp of approval by Ofcom, who seem to be less-than-aware of the real situation. Without immediate action, our hobby – particularly in the high density urban areas most of us live in – could be a thing of the past. Member of the RSGB or non-member, I urge everyone to support the legal fight for our wonderful hobby. **Rob Mannion G3XFD**.

LAM COMMUNICATIONS
Tel: 01226 361700

January Sale Day For LAM Communications!

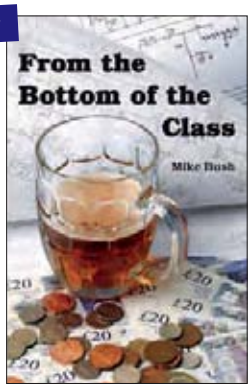
Barnsley-based LAM Communications contacted *Newsdesk* to announce that their January Sale day will take place on Saturday January 2010 from 0930 to 1600. The invitations also states that, "We will be offering some price reductions on transceivers and accessories. There will be some light refreshments available. We look forward to seeing *PW* readers on the day! Regard, **Lee Marsh M0LAM**.

Directions: LAM Communications are located three quarters of a mile from Junction 36 of the M1 motorway. If you're using SatNav, enter our postcode S74 0DQ.

LAM Communications Ltd.
52 Sheffield Road
Hoyland Common
Barnsley S74 0DQ
Tel: **(01226) 361700**
www.lamcommunications.net
www.junksale.co.uk

From the Bottom of the Class Book Review

By Mike Bush
Published by Microlab, PO BOX 228, Hereford HR1 9GA
Price £8.99. Telephone orders: 01432 354892.
Website: www.offthewallgifts.co.uk



Mike Bush is a Radio Amateur – callsign **G3LZM** – who has written a truly inspirational story of a life that has been full of 'ups and 'downs' – is a man must surely be admired for the way he's triumphed over adversity and ill-health. And even though there are some truly inspirational teachers who have been involved with *PW* readers in the past, I have no doubt that many of us (including myself) may have been 'written off' as failures by the less-than-inspirational teachers – but have gone on to build successful careers.
Mike Bush had learning difficulties at school and was 'written off' and is – as far as I'm concerned, a first class example of someone who has 'risen above' what everyone else thought about to him and achieved his own high level watermark.

I think that those amongst us who has suffered from depression and has literally felt as though they've been 'driven into the ground' when working for someone else, would benefit and feel inspired to achieve more by reading Mike's book. The book is 'self published', as are many specialist books nowadays. Once unfairly dubbed as 'Vanity Publishing', self-publishing helps bring us many excellent publications that have by-passed wary commercial publishing houses.

What is of special interest to the Radio Amateur reader is Mike's own involvement in the hobby and a career in electronics and how he has become a high earning achiever. Perhaps being cynical for a moment, I could say that in todays' monetary-minded society, Mike's success would only be measured by his remarkable financial status. However, from my point of view, I think his success should be valued against what he has achieved on a personal level. It's a truly inspirational book by someone who has shaken off the adversity thrown at him in life, enough to enjoy himself and share the experience in a fascinating read. Highly Recommended reading. **Rob Mannion G3XFD**.

Silent Key

Frank Ralph Howe BSc.(Eng) CEng. MIEE G3FIJ

Bill Hammond G4SOB remembers his friend Frank Ralph Howe, who was often known and referred to as G3FIJ, has sadly passed away at the age of 81, after a long illness.

Frank was widely known and respected by all who knew or came into contact with him, by Radio Amateurs, educationalists and in many other spheres of activity, both at County and local levels. Through determined study, he was awarded a BSc. First Class Honours degree in Engineering, along with a C. Eng., and MIEE.

He was a lifelong Colcestrian and a pupil at Colchester Royal Grammar School for a number of years. After a period of employment in the electrical department of a local store, he worked for the Marconi Co. Ltd in Chelmsford before he decided to change to an academic life.

In 1951, Frank joined the then North East Essex Technical College and School of Art, as an Assistant Lecturer in the Electrical Department. By 1975, the College had developed into a much larger organisation, Colchester Institute, and in that year, Frank was appointed Deputy Director, being responsible for Administration, while still performing a teaching function.

Frank was a gifted and dedicated teacher and administrator, who knew all members of staff in the Institute and was much respected by all who were employed there as teachers or in the Administration Department

Amateur Radio Passion

One of the passions, which was to dominate Frank's life, was Amateur Radio. He was first licensed in 1947 and in 1965 he was instrumental in founding **Colchester Radio Amateurs** and became Club Secretary, a post which he occupied continuously until shortly after he became unwell. During the past 40 years, it is estimated that over 1,200 Radio Amateurs, in the local area and in other parts of East Anglia, got their Licences, as a direct result of his extensive knowledge and enthusiasm in teaching the RAE Examination syllabuses.

Frank had a superb ability to use Morse Code as a means of communication and his transmissions, using this mode, were a delight to hear. His knowledge, ability and enthusiasm in the Radio Amateur field, knew no bounds and he made contacts with many Amateurs worldwide, using speech, Morse code, satellite, moon-bounce and data transmission, on h.f., v.h.f. and u.h.f. bands.

In 1989, Frank retired from teaching, after 37 years service and this gave him the opportunity to pursue even more spheres of activity. Two of these were REMAP, an organisation helping to provide mechanical and other aids for people with disabilities, the local branch of which he had set up in 1982.

Also, as a past President of the Colchester Engineering Society, he and a group of engineers, tested and repaired electrical goods, donated for sale to the St. Helena Hospice and in the process raising tens of thousands of pounds for the Hospice, here in the town.

In recognition of his time as a student, at the Royal Grammar School, Frank, in conjunction with the Colchester Radio Amateurs Club, decided to institute an Annual Technology Award, to be presented to the student displaying the most outstanding work in Technology. The trophy consists of a handcrafted Morse Key, inscribed *From Morse to Microchip* accompanied by the book *World at their Fingertips*. The first presentation was made in 1998 by **Mike Baker**, a former BBC Education Correspondent, who was also an old boy of the Grammar School. The School have informed us that they intend to perpetuate Frank's memory by continuing to present the Award annually.

Much of what Frank did was undertaken quietly and unnoticed behind the scenes, but was always to the benefit of others in many ways. In the New Year's Honours List of 1998, Frank was granted an MBE, in recognition of his services to the community over many years The award was presented to him by HM the Queen, at Buckingham Palace..

Frank, G3FIJ is sorely missed by all the members of the Amateur Radio fraternity who knew him. He will long be remembered by them, as someone who delighted in helping others to further their enjoyment of the hobby. **Bill G4SOB**.

Send all your news to:
PW Publishing Ltd.,
Arrowsmith Court,
Station Approach,
Broadstone,
Dorset BH18 8PW
E-mail: newsdesk@pwpublishing.ltd.uk

Joint Blackpool Stand For RAFARS & RSARS

Roy Walker G0TAK writes: "It has been agreed with the committee of the **Northern Amateur Radio Societies Association** (NARSA), the organisers of the **Norbreck Castle**, Blackpool rally, that next year, The **Royal Air Force Amateur Radio Society** (RAFARS) and **Royal Signals Amateur Radio Society** (RSARS) stands will be co-located and jointly staffed by Members of each Society. This will enable Amateur Radio enthusiasts who are members of both the societies to 'one stop shop', sign in and meet both 'teams' on **April 11th 2010**.

"There has been, for a long time, a close relationship between the two societies. Indeed, RAFARS and the **Air Formation Signals Society** often stage events which have a joint nature and are of interest to members of both organisations.

"If arrangements come to fruition for the 2010 rally, there will be a Special Event station in the grounds of the hotel, which will be set up, and staffed by members of both the societies. It will showcase Amateur Radio and military radio skills by young persons who are members of the **Air Training Corps** and the **Army Cadet Force**.

"The organisers are looking for suitably qualified Cadets and current ATC/CCF Instructors to assist in the manning of both these activities. If you have the skills and qualifications please get in touch with myself, **Roy Walker G0TAK**. Tel: (**01539**) **738293** E-mail: **g0tak@kencomp.net** (marking your E-mail's subject text as 'NARSA Volunteer' please).

Introducing The Martyn Jones Visual Bandplans Service!

Martyn Jones GW6ITJ writes: "Hi *Newsdesk*, I'm very conscious of possible problems – and I don't want to step on anyone else's toes when operating and always try to refer to the bandplans, especially when using a band I've not visited for a while. With the next solar cycle upon us (?) that might be quite a few 'new' bands in the future!

To help me out I created a visual version of the HF Bandplans which includes all (I think) the information that the RSGB provides. I thought it might be helpful to some of your readers to print out and have a copy handy in the shack see **http://sites.google.com/site/gw6itj/bandplan**

I know *PW* have published the different *Datacards* – so if I'm re-inventing an already turning wheel, let me know! **Best 73 Martyn GW6ITJ**.

Editorial comment: Well done Martyn! **Tex G1TEX** and I think readers who need an instant up-date on the bandplans will find your service very useful. The only problem you have now is to keep it up-to-date! Congratulations to you for providing a very useful website Martyn. **G3XFD**.

Newsdesk's Australian Safe EME Level Find

The *PW* Editorial team are often asked by readers – including those who have heart pacemakers fitted, "what's the safe levels of r.f. radiation for us to operate in". However, while even though our resident pacemaker user **Tex Swann G1TEX** is prepared to discuss his experiences with readers – including accidental exposure to the Rugby 16kHz transmissions while we were driving on the A5 road, the *PW* Editorial team think that the Australian website **www.acma.gov.au/WEB/STANDARD/pc=PC_1826** Electromagnetic energy (EME) health exposure requirements for transmitter facilities offers more information.

As a condition of licence to operate radiocommunications transmitters, licensees are obligated to ensure that electromagnetic energy (EME) levels from their facilities do not exceed mandatory health exposure limits at places accessible to the general public.

The ACMA has produced a booklet entitled *Human Exposure to Radiofrequency Electromagnetic Radiation – Information for licensees of radiocommunications transmitters* available to download as a .PDF file. The booklet explains the EME health exposure regulatory arrangements and how they apply to licensees of radio communications transmitters.

Competition Winners

Winner of the G-Whip Backpacker Antenna, reviewed in August 2009 (competition in September 2009) is:
Mr J Parkinson G1PIC
Penwortham
Preston
Lancashire

The winner of the Alinco DJ-G7E Tri-Band hand-held rig, reviewed in October 2009 (competition in November 2009) is:
Mr Michael J Shurley
M0TVG
Wroxham
Norwich
Norfolk

Congratulations to both winners! **Editor.**

New Owners & Initiative For QuartSLab

Dave Hayes G4AKY, a long time supporter of *PW*, contacted *Newsdesk* to bring the news that he's purchased QuartSLab, the specialist crystal supplier.

Dave G4AKY writes: "Please see below some notes about myself and QuartSLab which I hope will be of interest regarding our mutual interest, i.e. that of yours to find suppliers of specialised components that feature in *PW*'s excellent construction articles, and those of mine to let you and your readers know of QuartSLab's existence as possibly the only remaining supplier of one-off quartz crystals to the radio constructor.

"As I said to you on the 'phone, thank goodness we radio enthusiasts have a magazine like *PW*. I am a subscriber and every month's issue gets me excited at the thought of building and operating that piece of radio equipment described in the pages of each issue! I seem to get an even bigger kick out of building radio gear now than I did 40 years ago and one of the delightful aspects of this building, especially those items in older issues of *PW* (of which I have a big collection), is seeking out the components of the day, e.g. Denco Coils.

"Again, as I said, QuartSLab has always been run by Radio Amateurs and continues to be despite having changed hands. I've enclosed a photo which might be of interest. It shows us three little 'Daves', i.e. **Dave Collins G4YIB** on the left as viewed, myself Dave Hayes G4AKY in the middle and **Dave Court G3SDL/EI3IO** (and several other callsigns of 160m/6m fame) on the right. This picture was shot on the day that ownership of QuartSLab changed hands to me during July 2009 when we all meet up in my local Indian Restaurant for a good meal! This photo will appear on the QuartSLab web site shortly and you are welcome to publish it.

"My Amateur Radio background: I'm 55 years young, licensed in 1971 as G4AKY, initially equipped my shack (as most of us had done then and 10/15 years before) with ex-WD equipment (some from Lisle Street, London!!) modified as necessary and home-brew to get on the h.f. bands ands (and particularly Top Band) (plus ex-pmr crystal controlled gear converted for the bands), I have always preferred c.w. operating and DXing on 160m (awarded 160m DXCC #127 in 1985) became my passion. I could mention all the other 'emporiums' in London and the south east that, like Lisle Street, offered wonderfully cheap means of getting on the 'Air' cheaply and traditionally.

"I have such great memories of my early days on the air, and prior to that as an s.w.l., and of the equipment I saw and/or used then, and I've been collecting specimens of those that I particularly liked over recent years, refurbishing them and getting them on the air again for l.f. band a.m., e.g. KW *Vanguard* (and the KW160 and *Valiant*), Codar AT5, 19 and 62 Sets.

"Nowadays I really enjoy building the few QRP transmitters and simple receivers that time allows, and love the articles in *Practical Wireless*, plus building the popular transmitters and receivers designed by **G3OGR** and his predecessors that were published in *PW* and elsewhere during 1960s and early 1970s. I've always found that the G3OGR project's did work!

"Currently I'm QRV multi-mode on all bands 160m to 23cm, with various commercial rigs (Yaesu, Trio and Icom) but struggle to spend as much time QRV as I'd like to be. I enjoy experimenting with, and getting the very best out of, wire aerials on the LF Bands.

"My professional career: I'm a senior radio engineer, 30 years in the UK Civil Service, initially in Ministry of Defence's Procurement Executive (air and ground radio/radar/frequency agile development) and latterly in the Radiocommunications Agency (EMC policy prior to the implementation of the infamous EEC Directive and personnel management). Retired in 2001 to pursue other interests.

"QuartSLab: I acquired QuartSLab in July this year, my wife (**Denise**) and I run the business from Sevenoaks (Kent) – in addition to our family history research business. The 'company history' page of our web site **http://www.quartslab.com/** gives a great account of QuarSLab's 35 year history.

"The company slogan remains **No order is too small or too large**. Our range of Crystals covers 1.5 to 225MHz however we also supply below and above this range, and includes Fundamental, 3rd/5th/7th/9th Overtone, Parallel or Series cut, over a wide range of frequency and calibration tolerances to suit all applications include oven Crystals if wanted. We currently supply Crystal to Government Establishment, broadcasting equipment manufactures and many commercial companies throughout the World.

"Please do not hesitate to contact me if you would like me to clarify or add to the above. Keep up your splendid influence in the *PW* corridors of power!" Very Best 73.
Dave Hayes G4AKY
QuartSLab
Tel. 020 7100 6357

Please check with the organisers that the rally is 'on' before leaving home.

rallies

Radio rallies are held throughout the UK. They're hard work to organise so visit one soon and support your clubs and organisations. PW Publishing Ltd. is attending at rallies marked *.

Send all your rally info to

PW Publishing Ltd.,
Arrowsmith Court,
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Dorset BH18 8PW
E-mail: newsdesk@pwpublishing.ltd.uk

January

January 17th
The Dover Radio Boot Fair
The Dover Amateur Radio Club will be holding their sixth radio boot fair at the Whitfield Village Hall, Sandwich Road, Whitfield, Dover CT16 3LY. This is just off the A2, five miles north of Dover port. There will be talk-in on GB3KS (145.625MHz tone G, 103.5Hz) and the doors will be open from 9.30am to 2.00pm. Admission will be £1.00.
Ian Keyser G3ROO
Tel: 01304 821588
www.DARC.org.uk.

January 17th
The Red Rose Rally
The West Manchester Radio Club will be holding their Red Rose Winter Rally at the Lowton Civic Centre, Hesketh Meadow Lane, off Newton Road WA3 2AJ (just off the A580 East Lancs Road). Doors will open at 10.00am and there will be talk-in on S22, a free car park, traders, a Bring & Buy, special interest groups, catering with a licensed bar, an RSGB Bookstall and facilities for the disabled.
Steve
Tel: 01942 888900
E-mail: rally@wmrc.org.uk
http://wmrc.org.uk

January 31st
The Horncastle Rally
The Horncastle Winter Rally will be held at the Horncastle Youth Centre, Lincolnshire LN9 6DZ. The doors will open at 10.30am (10.00am for the disabled) and admission will be £1.50. There will be free car parking, catering and facilities for the disabled.
Tony G3ZPU
Tel: 01507 527835
E-mail: G3ZPU@yahoo.co.uk

February

February 7th
The Canvey Rally
The 25th Canvey Radio and Electronics Rally will take place in The Paddocks, Long Road, Canvey Island, Essex SS8 0JA, which is at the southern end of the A130. There will be free car parking, the doors will open at 10.30am and admission will cost £2.00. There will be trade stands, catering and facilities for the disabled.
Dave G4UVJ
Tel: 01268 697978 (evenings).
www.southessex.ars.btinternet.co.uk

February 14th
The Harwell Rally
The Harwell Radio and Computing Rally will be held at the Didcot Leisure Centre, Mereland Road, Didcot OX11 8AY. Admission will be £2.00 (under 12s free) and the doors will open at 10.30am (10.15am for the disabled).There will be talk-in on S22 and V44, a free car park, trade stands, special interest groups, catering with a licensed bar and facilities for the disabled.
Ann Stevens
Tel: 01235 816379
E-mail: rally@ g3pia.org.uk
www.g3pia.org.uk

February 14th
The Northern Cross Rally
The Wakefield & District Radio Society will be running the 19th Northern Cross Rally at the same location as last year – Ossett School and Sixth Form College, Storrs Hill Road, Ossett WF5 0DG. Talk-in will be available under the callsign GB0NCR via the local repeater GB3YW on 145.7875MHz (CTCSS 82.5Hz). Doors will open at 10.30am (10.15am for the disabled) and the entry price will be £3.00. All the usual facilities will be available and visitors who attended last year's rally should rest assured that action has been taken to ensure that the difficulties that were experienced with both the toilet facilities and the electrics should not recur.
Ken Quinn 2E0SSQ
Tel: 07900 563117
E-mail: kquinn27@o2.co.uk
www.northerncrossrally.org

February 21st
The RadioActive Rally
The Mid Cheshire Amateur Radio Society RadioActive Show will be held at the Civic Hall, Nantwich, Cheshire CW5 5DG. The doors will open at 10.30am and admission will cost £3.00. There will be car parking, trade stands, catering and a Bring & Buy.
Simon Chettle G8ATB
Tel: 01270 841506
E-mail: info@radioactiveshow.co.uk
www.midcars.org

February 21st
The Swansea Rally
The Swansea Amateur Radio Society Amateur Radio and Computer Rally will be held at the Afan Lido (Aquadrome), Aberafon Seafront, Port Talbot SA12 6QW. This is one mile from J41 on the M4 – follow the signs for Hollywood Park. The doors will be open from 10.30am to 4.00pm and admission will be £1.50 (50p for juniors). There will be a free car park, trade stands, a Bring & Buy, special interest groups and catering.
Roger Williams GW4HSH
Tel: 01792 404422
www.geocities.com/gw4cc/radiorally.html

February 28th
The Rainham Radio Rally
The Bredhurst Receiving And Transmitting Society (BRATS) Rainham Radio Rally will be held at 10.00am in the Rainham School for Girls, Derwent Way, Rainham, Gillingham, Kent ME8 0BX. This is just off the A2 and J4 of the M2.
Trevor Cannon G6YLW
Tel: 0771 7678795
E-mail: trev@wig1.co.uk
www.wig1.co.uk

March

March 7th
The Bournemouth RS Sale
The Bournemouth Radio Society's 22nd Annual Sale will be held in the Kinson Community Centre, Pelhams Park, Millhams Road, Kinson, Bournemouth BH10 7LH. The doors will open at 9.30am and admission will be £1.50. There will be car parking, trade stands, special interest groups, a junk sale, catering and facilities for the disabled.
John G0HAT
Tel: 07719 700 771
www.brswebsite.org.uk

March 7th
The Exeter Rally
The fifth Exeter Radio & Electronics Rally will be held at the America Hall, De la Rue Way, Pinhoe, Exeter, EX4 8PW. The hall is well equipped and offers easy access as it's only a few minutes from the M5 and other main roads. Doors will open at 10.30am (Bring & Buy booking in and disabled 10.15am) and admission will be £2.00. There will be talk-in, traders, a Bring & Buy and refreshments (in-house inexpensive catering by the XYLs, including their celebrated bacon rolls). All profits from the event will be shared between GB3SW, GB3EW and GB3EX, the local 2m and 70cm repeaters.
Pete G3ZVI
Tel: 07714 198374
E-mail: g3zvi@yahoo.co.uk

March 20th
The Lagan Valley Rally
The Lagan Valley Amateur Radio Society Rally will be held in The Village Centre, 7 Ballynahinch Road, Hillsborough. Doors will open at 11.30am and there will be car parking, catering and trade stands.
Jim GI0DVU
Tel: 02892 662270
E-mail: jim.henry@ntlworld.com

March 21st
The Wythall Rally
The Wythall Radio Club's 25th Annual Radio and Computer Rally will be held in The Woodrush Sports Centre, Shawhurst Lane, Hollywood, Nr Wythall, Birmingham B47 5JW (two miles from junction 3 of the M42). Doors will be open between 10.00am and 3.00pm and admission will be £1.50. There will be talk-in on S22, car parking, radio and computer traders, a massive Bring & Buy and catering.
Chris G0EYO
Tel: 07710 412 819
E-mail: g0eyo@blueyonder.co.uk
www.wrcrally.co.uk

March 21st
The Callington Rally
The Callington Amateur Radio Society Rally will be held in the Callington Community College, Launceston Road, Callington, Cornwall PL17 7DR. The doors will open at 10.00am, admission will be £2.00 and there will be talk-in, car parking, trade stands, catering and facilities for the disabled.
Chris G7UDX
Tel: 0797 3418371
E-mail: g7udz@mac.com.

March 28th
The S. Gloucestershire Rally
The Thornbury and South Gloucestershire Amateur Radio Club along with the Avon Scouts Amateur Radio Club will be holding their second rally for the West Country at the Avon Scouts Activity Centre, Woodhouse Park, Almondsbury, South Gloucestershire BS32 4LX. This is 1.4 miles North on the A38 from the M4/5 junction. The doors will open at 10.00 am and entry will cost £2.00. There will be a talk-in, free parking, a car boot sale, catering, a Bring & Buy and facilities for the disabled. Please note, no dogs other than those providing assistance to the disabled will be allowed in.
Peter Cabban
Tel: 01454 612689
www.avonscouts.org.uk/woodhousepark/location.htm

March 28th
The Spring Hangar Sale
The Spring Militaria, Electronics and Radio Amateur Hangar Sale will take place at the Hack Green Secret Nuclear Bunker, French Lane, Nantwich, Cheshire CW5 8AL. The Bunker is situated just off the A530 Whitchurch Road, a few miles outside Nantwich, 30 minutes from Chester. From Junction 16 on the M6 motorway, follow the signs to Nantwich, then Whitchurch on the A530 (follow the brown Secret Bunker signs). The doors will open at 10.00am and admission will be £2.50.
Rod Siebert
Tel: 01270 623353
E-mail: coldwar@hackgreen.co.uk
www.hackgreen.co.uk

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

SQBM105P	2/70cm, Gain 2/4.5dBd, RX 25-2000MHz, Length 70cm, SO239 (Radial Free)	**£39.95**
SQBM105N	2/70cm, Gain 2/4.5dBd, RX 25-2000MHz, Length 70cm, N-type (Radial Free)	**£44.95**
SQBM110P	2/70cm, Gain 3/6dBd, RX 25-2000MHz, Length 100cm, SO239 (Radial Free)	**£54.95**
SQBM110N	2/70cm, Gain 3/6dBd, RX 25-2000MHz, Length 100cm, N-Type (Radial Free)	**£59.95**
SQBM200P	2/70cm, Gain 4.5/7.5dBd, RX 25-2000MHz, Length 155cm, SO239	**£54.95**
SQBM200N	2/70cm, Gain 4.5/7.5dBd, RX 25-2000MHz, Length 155cm, N-Type	**£59.95**
SQBM500P	2/70cm, Gain 6.8/9.2dBd, RX 25-2000MHz, Length 250cm, SO239	**£64.95**
SQBM500N	2/70cm, Gain 6.8/9.2dBd, RX 25-2000MHz, Length 250cm, N-Type	**£69.95**
SQBM800N	2/70cm, Gain 8.5/12.5dBd, RX 25-2000MHz, Length 520cm, N-Type	**£129.95**
SQBM1000P	6/2/70cm, Gain 3.0/6.2/8.4dBd, RX 25-2000MHz, Length 250cm, SO239	**£79.95**
SQBM1000N	6/2/70cm, Gain 3.0/6.2/8.4dBd, RX 25-2000MHz, Length 250cm, N-Type	**£84.95**
SQBM223N	2/70/23cm, Gain 4.5/7.5/12.5dBd, RX 25-2000MHz, Length 155cm, N-Type	**£69.95**

MOONRAKER Multiband Mobile

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

SPX-100	9 Band plug n' go portable, 6/10/12/15/17/20/30/40/80m, Length 165cm retracted just 0.5m, Power 50W complete with 38th PL259 or BNC fitting to suit all applications, mobile portable or base ... brilliant!	**£44.95**
SPX-200	6 Band plug n' go mobile, 6/10/15/20/40/80m, Length 130cm, Power 120W, 3/8th fitting	**£39.95**
SPX-200S	6 Band plug n' go mobile, 6/10/15/20/40/80m, Length 130cm, Power 120W, PL259 fitting	**£44.95**
SPX-300	9 Band plug n' go mobile, 6/10/12/15/17/20/30/40/80m, Length 165cm, High Power 200W, 3/8th fitting	**£54.95**
SPX-300S	9 Band plug n' go mobile, 6/10/12/15/17/20/30/40/80m, Length 165cm, High Power 200W,PL259 fitting	**£59.95**
AMPRO-MB6	6 Band mobile 6/10/15/20/40/80m, length 220cm, 200W, 3/8th fitting, (great for static use or even home base – can tune on four bands at once)	**£69.95**
ATOM-AT4	10/6/2/70cm Gain 2m 2.8dBd 70cm 5.5dBd, Length 132cm, PL259 fitting (perfect for FT-8900R)	**£59.95**
ATOM-AT5	5 Band mobile 40/15/6/2/70cm, Length just 130cm, 200W (2/70) 120W (40-6M) PL259 fitting, (great antenna, great price and no band changing, one antenna, five bands)	**£69.95**
ATOM-AT7	7 Band mobile 40/20/15/10/6/2/70cm, Length just 200cm, 200W (2/70) 120W (40-6M) PL259 fitting, (great antenna, great price and no band changing, one antenna, five bands)	**£79.95**





If we advertise it – we stock it!

MOONRAKER Yagi Antennas

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

YG27-4	Dual band 2/70 4 Element (Boom 42") (Gain 6.0dBd)	**£49.95**
YG4-2C	2 metre 4 Element (Boom 48") (Gain 7dBd)	**£29.95**
YG5-2	2 metre 5 Element (Boom 63") (Gain 10dBd)	**£49.95**
YG8-2	2 metre 8 Element (Boom 125") (Gain 12dBd)	**£69.95**
YG11-2	2 metre 11 Element (Boom 185") (Gain 13dBd)	**£99.95**
YG3-4	4 metre 3 Element (Boom 45") (Gain 8dBd)	**£59.95**
YG5-4	4 metre 5 Element (Boom 104") (Gain 10dBd)	**£69.95**
YG3-6	6 metre 3 Element (Boom 72") (Gain 7.5dBd)	**£64.95**
YG5-6	6 metre 5 Element (Boom 142") (Gain 9.5dBd)	**£84.95**
YG13-70	70 cm 13 Element (Boom 76") (Gain 12.5dBd)	**£49.95**

MOONRAKER ZL Special Yagi Antennas

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

ZL5-2	2 Metre 5 Ele, Boom 95cm, Gain 9.5dBd	**£49.95**
ZL7-2	2 Metre 7 Ele, Boom 150cm, Gain 12dBd	**£59.95**
ZL12-2	2 Metre 12 Ele, Boom 315cm, Gain 9.5dBd	**£99.95**
ZL7-70	70cm 7 Ele, Boom 70cm, Gain 11.5dBd	**£39.95**
ZL12-70	70cm 12 Ele, Boom 120cm, Gain 14dBd	**£49.95**

MOONRAKER HB9CV

Brilliant 2 element beams ... ideal for portable use

HB9-70	70cm (Boom 12")	**£24.95**
HB9-2	2 metre (Boom 20")	**£29.95**
HB9-4	4 metre (Boom 23")	**£39.95**
HB9-6	6 metre (Boom 33")	**£49.95**
HB9-10	10 metre (Boom 52")	**£69.95**
HB9-627	6/2/70 Triband (Boom 45")	**£69.95**

MOONRAKER Halo Loops

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

HLP-2	2 metre (size approx 300mm square)	**£19.95**
HLP-4	4 metre (size approx 600mm square)	**£29.95**
HLP-6	6 metre (size approx 800mm square)	**£39.95**

MOONRAKER G5RV Wire Antennas

The most popular wire antenna available in different grades to suit every amateur .... All from just £19.95!

G5RV-HSS	Standard Half Size Enamelled Version, 51ft Long, 10-40 Metres	**£19.95**
G5RV-FSS	Standard Full Size Enamelled Version, 102ft Long, 10-80 Metres	**£24.95**
G5RV-DSS	Standard Double Size Enamelled Version, 204ft Long, 10-160 Metres	**£49.95**
G5RV-HSH	Half Size Hard Drawn Version, pre-stretched, 51ft Long, 10-40 Metres	**£24.95**
G5RV-FSH	Full Size Hard Drawn Version, pre-stretched, 102ft Long, 10-80 Metres	**£29.95**
G5RV-HSF	Half Size Original High Quality Flexweave Version, 51ft Long, 10-40 Metres	**£29.95**
G5RV-FSF	Full Size Original High Quality Flexweave Version, 102ft Long, 10-80 Metres	**£34.95**
G5RV-HSP	Half Size Original PVC Coated Flexweave Version, 51ft Long, 10-40 Metres	**£34.95**
G5RV-FSP	Full Size Original PVC Coated Flexweave Version, 102ft Long, 10-80 Metres	**£39.95**
G5RV-HSX	Half Size Deluxe Version with 450 Ohm ladder, 51ft Long, 10-40 Metres	**£44.95**
G5RV-FSX	Full Size Deluxe Version with 450 Ohm ladder, 102ft Long, 10-80 Metres	**£49.95**

Accessories

G5RV-IND	Convert any half size G5RV to full with these great inductors, adds 8ft on each leg	**£24.95**
G5RV-CHOKE	inline balun to reduce RF feedback	**£39.95**
TSS-1	Pair of stainless steel springs to take the tension out of a G5RV or similar	**£19.95**

MOONRAKER Trapped Wire Dipole Antennas

Commercial quality trapped wire dipoles that resonate, so require no ATU!

MDT-6	FREQ:40 & 160m LENGTH: 28m POWER: 1000 Watts **£79.95**
MTD-1	(3 BAND) FREQ:10-15-20 Mtrs LENGTH:7.40 Mtrs POWER:1000 Watts **£69.95**
MTD-2	(2 BAND) FREQ:40-80 Mtrs LENGTH: 20Mtrs POWER:1000 Watts **£79.95**
MTD-3	(3 BAND) FREQ:40-80-160 Mtrs LENGTH: 32.5m POWER: 1000 Watts **£129.95**
MTD-4	(3 BAND) FREQ: 12-17-30 Mtrs LENGTH: 10.5m POWER: 1000 Watts **£69.95**
MTD-5	(5 BAND) FREQ: 10-15-20-40-80 Mtrs LENGTH: 20m POWER:1000 Watts **£119.95**

(MTD-5 is a crossed di-pole with 4 legs)

MOONRAKER

Manufacturers of radio communication antennas and associated products

If we advertise it – we stock it!

MFJ Antenna Tuners

New lower prices!

See our website for full details.

AUTOMATIC TUNERS

MFJ-925 Super compact 1.8-30MHz 200W **£169.95**
MFJ-926 remote Mobile ATU 1.6-30MHz 200W **£419.95**
MFJ-927 Compact with Power Injector 1.8-30MHz 200W **£254.95**
MFJ-928 Compact with Power Injector 1.8-30MHz 200W **£199.95**
MFJ-929 Compact with Random Wire Option 1.8-30MHz 200W **£209.95**
MFJ-991B 1.8-30MHz 150W SSB/100W CW ATU **£209.95**
MFJ-993B 1.8-30MHz 300W SSB/150W CW ATU **£249.95**
MFJ-994B 1.8-30MHz 600W SSB/300W CW ATU **£339.95**
MFJ-998 1.8-30MHz 1.5kW **£649.95**

MANUAL TUNERS

MFJ-16010 1.8-30MHz 20W random wire tuner **£69.95**
MFJ-902 3.5-30MHz 150W mini travel tuner **£99.95**
MFJ-902H 3.5-30MHz 150W mini travel tuner with 4:1 balun **£124.95**
MFJ-904 3.5-30MHz 150W mini travel tuner with SWR/PWR **£129.95**
MFJ-904H 3.5-30MHz 150W mini travel tuner with SWR/PWR 4:1 balun **£149.95**
MFJ-901B 1.8-30MHz 200W Versa tuner **£109.95**
MFJ-971 1.8-30MHz 300W portable tuner **£119.95**
MFJ-945E 1.8-54MHz 300W tuner with meter **£129.95**
MFJ-941E 1.8-30MHz 300W Versa tuner 2 ..... **£139.95**
MFJ-948 1.8-30MHz 300W deluxe Versa tuner **£159.95**
MFJ-949E 1.8-30MHz 300W deluxe Versa tuner with DL **£179.95**
MFJ-934 1.8-30MHz 300W tuner complete with artificial GND **£209.95**
MFJ-974B 3.6-54MHz 300W tuner with X-needle SWR/WATT **£189.95**
MFJ-969 1.8-54MHz 300W all band tuner **£209.95**
MFJ-962D 1.8-30MHz 1500W high power tuner **£289.95**
MFJ-986 1.8-30MHz 300W high power differential tuner **£349.95**
MFJ-989D 1.8-30MHz 1500W high power roller tuner **£389.95**
MFJ-976 1.8-30MHz 1500W balanced line tuner with X-needle SWR/WATT **£469.95**

MFJ Analysers

MFJ-229 UHF Digital Analyser 270-480MHz **£219.95**
MFJ-249B Digital Analyser 1.8-170MHz..... **£264.95**
MFJ-259B Digital Analyser 1.8-170MHz..... **£279.95**
MFJ-269 Digital Analyser 1.8-450MHz **£349.95**
MFJ-269PRO Digital Analyser 1.8-170/415-450MHz..... **£399.95**

LDG Tuners

LDG Z-817 1.8-54MHz ideal for the Yaesu FT-817 ..... **£119.95**
LDG Z100 Plus 1.8-54MHz the most popular LDG tuner..... **£139.95**
LDG IT-100 1.8-54MHz ideal for IC-7000 ..... **£149.95**
LDG Z-11 Pro 1.8-54MHz great portable tuner **£154.95**
LDG KT-100 1.8-54MHz ideal for most Kenwood radios **£169.95**
LDG AT-897 1.8-54MHz for use with Yaesu FT-897 ..... **£179.95**
LDG AT-100 Pro 1.8-54MHz **£189.95**
LDG AT-200 Pro 1.8-54MHz **£209.95**
LDG AT-1000 Pro 1.8-54MHz continuously **£499.95**

AVAIR SWR Meters

AV-20 (3.5-150MHz) (Power to 300W) **£34.95**
AV-40 (144-470MHz) (Power to 150W) **£34.95**
AV-201 (1.8-160MHz) (Power to 1000W) **£49.95**
AV-400 (14-525MHz) (Power to 400W) **£49.95**
AV-601 (1.8-160/140-525MHz) (Power to 1000W) **£69.95**
AV-1000 (1.8-160/430-450/800-930/1240-1300MHz) (Power to 400W) **£79.95**

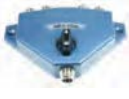
WATSON Power Supplies

POWER-MITE-NF (22amp switch mode with noise offset) **£69.95**
POWER-MAX-25-NF (22amp switch mode with noise offset & cig socket) **£89.95**
POWER-MAX-45-NF (38amp switch mode with noise offset & cig socket) **£119.95**
POWER-MAX-65-NF 60 Amp cont 65 Amp peak switch mode variable volts supply with V & A meters & noise offset **£209.95**

MOONRAKER Baluns

MB-1 1:1 Balun 400 watts power **£29.95**
MB-4 4:1 Balun 400 watts power **£29.95**
MB-6 6:1 Balun 400 watts power **£29.95**
MB-1X 1:1 Balun 1000 watts power **£39.95**
MB-4X 4:1 Balun 1000 watts power **£39.95**
MB-6X 6:1 Balun 1000 watts power **£39.95**
MB-Y2 Yagi Balun 1.5 to 50MHz 1kW **£39.95**

MOONRAKER Coax Switches



CS201 2 way coax switch, 0-1000MHz, SO239 fitting **£14.95**
CS201N 2 way coax switch, 0-1000MHz, N-Type fitting **£19.95**
CS401 4 way coax switch, 0-600MHz, SO239 fitting inc centre position..... **£49.95**
CS401N 4 way coax switch, 0-600MHz, N-Type fitting inc centre position..... **£59.95**

Cable

RG58 Standard, 5mm, 50 ohm, per metre **£0.35**
RG58-DRUM Standard, 5mm, 50 ohm, 100m reel **£24.95**
RG58M Mil spec, 5mm, 50 ohm, per metre (best seller) **£0.60**
RG58M-DRUM Mil spec, 5mm, 50 ohm, 100m reel **£39.95**
RGMINI8 Mil spec, 7mm, 50 ohm, in grey per metre (amateur favourite) **£0.70**
RGMINI8-DRUM Mil spec, 7mm, 50 ohm, in grey 100m reel **£59.95**
RG213 Mil spec, 9mm, 50 ohm, per metre **£1.00**
RG213-DRUM Mil spec, 9mm, 50 ohm, 100m reel **£84.95**
H100 Mil spec, 10mm, 50 ohm, per metre **£1.25**
H100-DRUM Mil spec, 10mm, 50 ohm, 100m reel **£99.95**
WESTFLEX103 Mil spec, 10mm, 50 ohm, per metre **£1.45**
WESTFLEX103-DRUM Mil spec, 10mm, 50 ohm, 100m reel **£129.95**
TV100U Mil spec, 6.7mm, 75 ohm, per metre **£0.60**
TV100U-DRUM Mil spec, 6.7mm, 75 ohm, 100m reel **£49.95**
300-M Ladder Ribbon, best USA quality, 300 ohm, per metre **£0.85**
300-20M Ladder Ribbon, best USA quality, 300 ohm, 20m pack **£14.95**
300-DRUM Ladder Ribbon, best USA quality, 300 ohm, 100m reel **£59.95**
450-M Ladder Ribbon, best USA quality, 450 ohm, per metre **£1.00**
450-20M Ladder Ribbon, best USA quality, 450 ohm, 20m pack **£17.95**
450-DRUM Ladder Ribbon, best USA quality, 450 ohm, 100m reel **£69.95**
FW-M Original high quality flexweave antenna wire, 2mm, per metre **£0.75**
FW-100 Original high quality flexweave antenna wire, 100m reel **£49.95**
FWPVC-M Original PVC coated flexweave antenna wire, 4mm, per metre **£1.00**
FWPVC-100 Original PVC coated flexweave antenna wire, 4mm, 100m reel **£69.95**

Antenna Wire (50m)

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

SEW-50 Multi stranded PVC covered wire, 1.2mm **£14.95**
SCW-50 Enamelled copper wire, 1.5mm **£19.95**
HCW-50 Hard Drawn bare copper wire, 1.5mm **£24.95**
CCS-50 Genuine Copperweld copper clad steel, 1.6mm **£24.95**
FW-50 Original Flexweave bare copper wire, 2mm **£29.95**
FWPVC-50 Original clear PVC covered copper wire, 4mm **£39.95**

Rigging Accessories

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

PULLEY-2 Adjustable pulley wheel for wire antennas, suits all types of rope **£19.95**
GUYKIT-HD10 Complete heavy duty adjustable guying kit to suit upto 40ft masts .. **£49.95**
GUYKIT-P10 Complete light duty/portable guying kit to suit upto 40ft masts **£29.95**
SPIDER-3 Fixed 3 point mast collar for guy ropes **£3.95**
PTP-20 Pole to pole clamp to clamp up to 2" to 2" **£4.95**
DPC-W Wire dipole centre to suit either 300 or 450ohm ladder line **£4.95**
DPC-S Wire dipole centre with SO239 to suit cable feed connections **£5.95**
DPC-A Dipole centre to suit ½ inch aluminium tube with terminal connections ... **£6.95**
DPC-38 Dipole centre with SO239 socket with two 3/8th sockets to make mobile dipole **£5.95**
DOGBONE-S Small ribbed wire insulator **£1.00**
DOGBONE-L Large ribbed wire insulator **£2.00**
DOGBONE-C Small ceramic wire insulator **£1.00**
EARTHROD-C 4ft copper earth rod and clamp **£19.95**
EARTHROD-CP 4ft copper plated earth rod and clamp **£14.95**
G5RV-ES In-line SO239 replacement socket for 300 or 450 ohm ladder line..... **£4.95**
AMA-10 Self amalgamating tape for connection joints, 10m length..... **£7.50**

Mounting Hardware & Clamps

We have all the mounting brackets you could possible want – for all options see our website

TRIPOD-HDA Free standing, heavy duty, fold away tripod, which adjusts from 50-65mm **£149.95**
TRIPOD-25L Free standing heavy duty tripod to suit masts 65mm or less..... **£69.95**
TRIPOD-20L Free standing heavy duty tripod to suit masts 2 inch or less **£59.95**
TRIPOD-15L Free standing heavy duty tripod to suit masts 1.5 inch or less **£54.95**
TK-36 Heavy duty galvanised pair of T & K brackets, 36 inches total length..... **£49.95**
TK-24 Heavy duty galvanised pair of T & K brackets, 24 inches total length..... **£24.95**
TK-18 Heavy duty galvanised pair of T & K brackets, 18 inches total length..... **£19.95**
TK-12 Heavy duty galvanised pair of T & K brackets, 12 inches total length..... **£17.95**
SO-9 Heavy duty galvanised single stand off bracket, 9 inches total length **£9.00**
SO-6 Heavy duty galvanised single stand off bracket, 9 inches total length **£6.00**
CHIM-D Heavy duty galvanised chimney lashing kit with all fixings, suitable for upto 2 inch **£19.95**
CAR-PLATE Drive on bracket with vertical up stand to suit 1.5 or 2" mounting pole .. **£19.95**
CROSS-2 Heavy duty cross over plate to suit 1.5 to 2" vertical to horizontal pole **£14.95**
JOIN-200 Heavy duty 8 nut joining sleeve to connect 2 X 2" poles together..... **£16.95**
PTM-S Pole mounting bracket with SO239 for mobile whips, suits upto 2" pole . **£19.95**

Antenna Rotators *See website for full details*

We stock all the most popular rotators to suit all requirements

AR-300XL Great entry level rotator, but strong enough for all VHF/UHF yagi antennas **£79.95**
Yaesu G-250 Entry level again from Yaesu, ideal for all VHF/UHF yagi antennas.... **£109.95**
Yaesu G-450 Medium duty rotator complete with 25m of control cable **£299.95**

Telescopic Masts (aluminium/fibre-glass opt)

TMA-1 Aluminium mast ★ 4 sections 170cm each ★ 45mm to 30mm ★ Approx 20ft erect 6ft collapsed..... **£99.95**
TMA-2 Aluminium mast ★ 8 sections 170cm each ★ 65mm to 30mm ★ Approx 40ft erect 6ft collapsed..... **£189.95**
TMF-1 Fibreglass mast ★ 4 sections 160cm each ★ 50mm to 30mm ★ Approx 20ft erect 6ft collapsed **£129.95**
TMF-1.5 Fibreglass mast ★ 5 sections 200cm each ★ 60mm to 30mm ★ Approx 30ft erect 8ft collapsed..... **£179.95**
TMF-2 Fibreglass mast ★ 5 sections 240cm each ★ 60mm to 30mm ★ Approx 40ft erect 9ft collapsed **£199.95**

Portable Telescopic Masts

LMA-S Length 17.6ft open 4ft closed 2-1" diameter **£79.95**
LMA-M Length 26ft open 5.5ft closed 2-1" diameter **£89.95**
LMA-L Length 33ft open 7.2ft closed 2-1" diameter **£99.95**
TRIPOD-P Lightweight aluminium tripod for all above **£44.95**

20ft Mast Sets

(5ft Sections)

These heavy duty masts sets have a lovely push fit swaged sections to give a strong mast set. Ideal for portable or permanent installations . . . also available singly

MSP-125 4 section 1.25inch OD mast set... **£29.95**
MSP-150 4 section 1.50inch OD mast set... **£39.95**
MSP-175 4 section 1.75inch OD mast set... **£49.95**
MSP-200 4 section 2.00inch OD mast set... **£59.95**
MSP-150S 4 section 1.50 inch 5mm scaffold gauge (very heavy duty) **£69.95**

Patch Leads

PL58-0.5 ½m Standard RG58 PL259 to PL259 lead **£2.95**
PL58-10 10m Standard RG58 PL259 to PL259 lead **£7.95**
PL58-30 30m Standard RG58 PL259 to PL259 lead **£14.95**
PL58M-0.5 ½m Mil Spec RG58 PL259 to PL259 lead **£3.95**
PL58M-10 10m Mil Spec RG58 PL259 to PL259 lead **£10.95**
PL58M-30 30m Mil Spec RG58 PL259 to PL259 lead **£24.95**
PL213-10 10m Mil Spec RG213 PL259 to PL259 lead **£14.95**
PL213-30 30m Mil Spec RG213 PL259 to PL259 lead **£34.95**
PL103-10 10m Mil Spec Westflex 103 PL259 to PL259 lead **£29.95**
PL103-30 30m Mil Spec Westflex 103 PL259 to PL259 lead **£59.95**

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

Connectors

PL259/6mm Standard plug for RG58 ..... **£0.75p**
PL259/9mm Standard plug for RG213 ..... **£0.75p**
PL259/7mm Standard plug for Mini8 ..... **£1.00p**
PL259/6C Compression type for RG58 ..... **£1.95p**
PL259/9C Compression type for RG213 ..... **£1.95p**
PL259/103C Compression type for Westflex 103 ..... **£5.00**
NTYPE/6 Compression type plug for RG58 ..... **£3.50**
NTYPE/9 Compression type plug for RG213 ..... **£3.50**
NTYPE/103 Compression type plug for westflex 103 .... **£6.00**
BNC/6 Compression type for RG58 ..... **£1.50**
BNC/9 Compression type for RG213 ..... **£3.50**
SO239/N Adapter to convert PL259 to N-Type male **£3.50**
NTYPE/PL Adapter to convert N-Type to PL259 ..... **£3.50**
BNC/PL Adapter to convert BNC to PL259 ..... **£2.00**
BNC/N Adapter to convert BNC to N-Type male **£3.50**
BNC/SMA Adapter to convert modern SMA radio to suit BNC.... **£3.95**
SO239/SMA Adapter to convert modern SMA radio to suit SO239.. **£3.95**
PL259/38 Adapter to convert SO239 fitting to 38th thread.... **£3.95**

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RADIOUSER JANUARY

- **Review – Etón G6 Aviator**
  Mike Richards takes a look at our special offer radio
- **Scanning Scene**
  Bill Robertson revisits SAR and looks at some spooky frequencies
- **Decode**
  Mike Richards looks at beacons and some software that should help you find the best paths
- **Military Matters**
  Kevin Paterson reports on exercise Neptune Warrior 09-02, the launch of HMS Defender, Pave Hawks at Lossiemouth and the closure of RAF Wainfleet
- **Policing the Airband**
  Robert Connolly looks at how a little-known branch of National Air Traffic Services polices the airwaves to keep them safe for aircraft
- **Electromagnetic Compliance UK**
  Mike Richards recently visited the EMCUK trade show and found that PLTs and the problems they're causing were the hot topics there
- **Airband News**
  David Smith reports on Free AIPs, the End of NDBs, French UAVs and Free Charts
- **Maritime Matters**
  Robert Connolly reports on piracy off Somalia, EU NAVFOR, cigarette smuggling in Ireland, AIS experiments on the ISS and his latest Mediterranean cruise
- **Sky High**
  Godfrey Manning looks at the workings of a Vertical Speed Indicator
- **SBS Files**
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Alinco's new budget priced rig!

The DX-SR8 HF Transceiver

I've always enjoyed using Alinco equipment as it's well-designed, well-made, easy–to–use and provides value for money. Many readers will know that I own an Alinco DX-70TH (my original DX-70 was stolen from my shack in March 2009) and that I was one of the earliest users of the transceiver when it was first introduced in the UK around 15 years ago. However, the original tried and trusted transceiver now has a 'new rig on the block' to contend with – the DX-SR8, the first new high frequency (h.f.) model from Alinco for many years.

A new model such in the pricing range as the DX-SR8 – around £500 – should be an ideal 'first rig' for many Radio Amateurs and possibly a second transceiver for portable and mobile use for other operators. So, how did it perform? Read on to share my experience of the 'new rig on the block'.

The Overall Design

The Alinco DX-SR8 is an h.f. only transceiver covering all bands from 1.8 to 30MHz, with the inclusion of the 5.3MHz band. Nevada will enable transmission on this band for Amateurs with the appropriate Notice of Variation (NoV). The rig provides c.w. for Morse operating, amplitude modulation (a.m.), narrow band frequency modulation (n.b.f.m.) and single sideband (s.s.b.) operations.

Transmission is only enabled for the Amateur Radio bands. The tuning scale employs a large easy-to-read liquid crystal display unit (much larger than the DX-70TH model), with a pale grey background and a light black contrast alpha-numeric display. The backlight settings can be varied using the main menu control system.

The transmitter section provides a radio frequency (r.f.) output of 100W when operating on the c.w., s.s.b. and n.b.f.m. modes. The power output can be varied (via

Exclusive Review!

Rob Mannion G3XFD evaluates the latest h.f. rig from Alinco and discovers it's a remarkable budget-priced package!

the on screen menu) between 100W (High), approximately 10W (Low) and approximately 1W using the menu system. **Note:** It's also possible to lower the r.f. output to the milliwatt range, by opening the transceiver casing and making a small adjustment.

The transmitter's r.f. output – when it's operating in the a.m. mode – is a maximum of 40W (High), 4W (Low) and 0.4W (400mW) (S-Low). The modulation systems employed are balanced for s.s.b., low-level modulation for a.m. and reactance modulation for n.b.f.m. Maximum deviation on n.b.f.m. is ±2.5kHz.

The Alinco DX-SR80's receiver is a double conversion superhet design with a first intermediate frequency (i.f.) of 71.75MHz and a second i.f. of 455kHz. The receiver has the usual audio frequency (a.f.) front panel control, and another for varying the i.f. passband (to help overcome adjacent channel interference) and a front panel controlled radio frequency (r.f.) attenuator, which allows zero attenuation, and steps of increasing attenuation. There's also an adjustable squelch control.

Unusually, for a modern commercially produced transceiver, the DX-SR8 is fitted with a narrow-band audio filter for extra selectivity, rather than by using a crystal or ceramic resonators (as used by the Alinco DX-70 series).

Note: Although I haven't seen a fully detailed circuit diagram, the specifications, as announced by Alinco and provided in the manual, are reproduced in the side panel.

The transmitter is provided with a hand-held microphone (the EMS-64) and the receiver has (unlike the DX-70 series) a small loudspeaker on the detachable front panel. An extension kit EDS-17 (not available for the review) is required if the panel is to be separated for remote operation – perhaps for a mobile installation.

Direct frequency input is possible through the control pad to the right of the main screen.

The transceiver can also be controlled by a PC through the serial interface, using the optional PC interface cable. Once set up the frequency, mode, power and memory can be selected via the computer.

The manual is to the usual good quality Alinco product, although there are several slightly amusing phrases due to the huge language barrier between written Japanese and English. Despite this, I feel that it's generally very helpful and well up to the usual 'friendly' Alinco standard.

The design also incorporates 600 memory channels for the use of the operator. These can be registered in three banks, with 200 channels per bank. Each of the memory channels can store the operating mode filter setting, split frequencies, a.g.c. setting, attenuator or pre-amplifier settings, noise blanker settings, etc.

For those who enjoy chasing the DX, split frequency operation is possible and there are scanning facilities. On the whole the SR8 is certainly not presented as a budget receiver – judging by the facilities provided.

On The Air

After I had familiarised myself with the rig I certainly enjoyed using it on the air and – inevitably – I was continually comparing the new transceiver to my Alinco DX-70TH. I listened on all bands, but kept my operations to the 3.5, 7, 10, 14 and 18MHz bands, as conditions weren't that good. I operated on c.w., a.m., s.s.b. and n.b.f.m. The a.m. and n.b.f.m. transmissions took place on 70MHz (via my 28 to 70MHz transverter and the audio reports were very satisfactory).

Though the display looks blue in the heading shot, this is a 'trick' of the photography, in reality the display looks blue/black text on an almost pure white background.

The simple back panel has little more than sockets for the power, antenna, accessories, Morse key and external speaker along with a coaxial socket to add in an external ALC voltage.

The whole front-panel pivots off for remote operations after releasing two screws – various length leads are available as extras.

Most of my s.s.b. contacts were achieved around the 100W level, although I carried out one short test at 1W with my friend and *PW* author **Phil Ciotti G3XBZ**, but even though it was on a noisy 3.5MHz band, we are very close neighbours radio-wise! Incidentally, to achieve power levels of less than 1W (milliwatts) the SR8 has to be opened up and a pot-style control adjusted (I didn't do this as the rig was on loan).

As part of my tests to check the transmitted audio quality, I again had the help of Phil G3XBZ, who lives on the opposite side of Bournemouth to me. Despite being less than 8km (5 miles) apart, conditions on 3.706MHz (obviously ground wave) s.s.b. contact weren't too good, although Phil commented favourably on the audio quality.

Despite the favourable report, I was a little disappointed because normally I receive excellent audio reports – especially when I'm using my Alinco EMS-14 desk microphone. However, we had another QSO later after I had realised that the built-in speech processing was inadvertently switched on (not really necessary for local contacts) and the the noise (we were both affected by a persistent noise on the band, not local to us) on the first QSO had abated. So, during our second test contact Phil gave me the sort of report that seems standard for Alinco h.f. transceivers. "Excellent audio Rob, very well rounded, definitely you and a pleasure to listen to!"

The report came after I had changed microphones several times – from the supplied hand-held microphone to the EMS-14, Phil said that the desk microphone sounded better than the first microphone. This isn't surprising, as I tend to speak rather loudly into a hand-held microphone whereas I – speaking farther away – don't tend to overload the EMS-14 so much! The reports I received from QSOs on all the bands operated on were all very favourable using the hand-held microphone – but after establishing contact, for my own convenience I switched over to the desk microphone.

The receiver's sensitivity is excellent, more than adequate for the h.f. bands and the selectivity is also adequate for today's crowded bands for s.s.b. operating outside of contest periods. During one of my QSOs with Phil G3XBZ – because of adjacent channel interference – I selected the audio filter 'on' via the main menu and it certainly helped reduce the QRM by reducing the audio bandwidth.

Unfortunately, in common with all fixed bandwidth audio filters the SR8's filter affected the audio quality I was receiving from Phil. So, as soon as the QRM eased (as band conditions changed) I switched the filter out to regain the pleasing audio I had enjoyed before the adjacent interference began.

The supplied hand microphone attaches to the remote-mountable front panel rather than into the main unit. This means no extra microphone lead is needed to use it this way.

Unfortunately, during the review period the 14 and 18MHz bands didn't provide much DX opportunities but I worked stations all over western Europe, gaining many more favourable comments on the transmitted audio. From my end I found the receiver delightfully easy to use and the large, display was pleasant to use and although the brightness can be varied, I preferred to leave it at the default settings.

On several occasions during s.s.b. QSOs on 3.5 and 7MHz, I found that it helped if I wore my headphones, but (again to my surprise) I found that was rarely necessary because of the extremely efficient – and cleverly designed – speaker and enclosure. Indeed, I was so impressed at the performance of the small-sized front panel speaker (after some comparison tests) I preferred it to the extension speaker I use with my Alinco DX-70.

The placing and the performance of the built-in loudspeaker may, at first, not seem to be important. However, with careful design the built-in speaker and enclosure may save us having to take an extension speaker for portable/mobile operations – and Alinco's carefully thought out design has led to one of the best quality communications speaker I've ever come across. I found it was a great help on the noisy Amateur bands (see later section for general coverage receive comments).

The front panel controls for the stepped r.f. attenuator and pre-amplifier were very useful although, as the sensitivity on the 'SR8 is excellent, the extra gain from the pre-amplifier wasn't needed. Indeed, I found the r.f. attenuation was much more in demand because of the high noise levels on the bands. The built-in noise blanker also proved useful in reducing the annoying clicks that are so prevalent at this time of year as badly designed thermostats do their job!

Unusually, there wasn't a contest on during the review period. This meant I didn't get the opportunity to see how well the receiver coped during the free-for-all and jumbled everyone-on-the-same frequency melee that we've all experienced during a contest! Time will tell – but the rig seemed to perform very well on the busy h.f. bands.

On The Key

As a keen c.w. operator I was looking forward to operating the 'SR8 on c.w., even though I'm not so good on the key nowadays due to arthritis. Because of the arthritis I've gradually been operating more often with a separate electronic keyer with my own Alinco DX-70TH, but that's brought its own problems because of nerve damage in my hand, effecting my sending accuracy.

However, the vast majority of Amateurs I work are very forgiving of any errors I make. So my message must be – even if you're not too sure of yourself on c.w., have a go, you'll be made most welcome by other operators. We can also be sure to get a c.w. QSO at any time of the day on the h.f. bands!

The built-in electronic keyer on the 'SR8 intrigued me – just what would the key be like on such a budget priced rig? I needn't have been worried – it coped extremely well with my sometimes erratic 'paddling'. No details of the type of keyer design is given in the manual by Alinco but I wouldn't be surprised to discover that it's based on the well known Curtis keyer integrated circuit (i.c.).

I'm not a fan of menu operated rigs and can honestly admit that I'm very old fashioned, preferring as many controls to be immediately available on the front panel. Years ago rigs had very crowded front panels! Again, despite my initial disappointment that the SR8's keyer's controls – particularly the speed control – weren't on the front panel, I immediately found that even my slow old brain became accustomed to adjusting the speed via the menu system.

It turned out to be the proverbial 'piece of cake' and my reluctance quickly melted away.

The keyer has a comprehensive range of settings, covering speed, keying dot-to-dash length 'ratios' (we tend to refer to this as 'weighting' as we place a slighter or heavier emphasis on the dashes (usually referred to as dits and dahs) – more than enough to satisfy someone being introduced to 'luxury Morse' – as one old Telegraphist said to me when I demonstrated one of my first keyers many years ago!

The sidetone frequency is adjustable from the main menu and is very simple to change. However, I found that the keying sidetone volume level to be far too loud for me on the default setting. Unfortunately, this feature isn't controlled via the main menu and as I didn't want to open up a brand new rig (to adjust the level), on loan to me for a short period, I gently placed a small towel over the speaker grill. This reduced the sidetone volume effectively and – if necessary I could then adjust the main receiver volume using the a.f. gain control.

Once on the air, I found that I was most comfortable operating at around 12 to 14 words per minute (w.p.m.) but the keyer will work very well indeed up to around 30w.p.m. for the 'machine gun' operators if they so wish! Incidentally, in days past I was quite comfortable operating at around 20 to 25w.p.m. but because my handwriting is so slow nowadays and I prefer to copy everything down in block capitals – as the Royal Navy trained anyone they taught Morse – I prefer to operate at a slower speed. Even then, I struggle to write everything down fast enough!

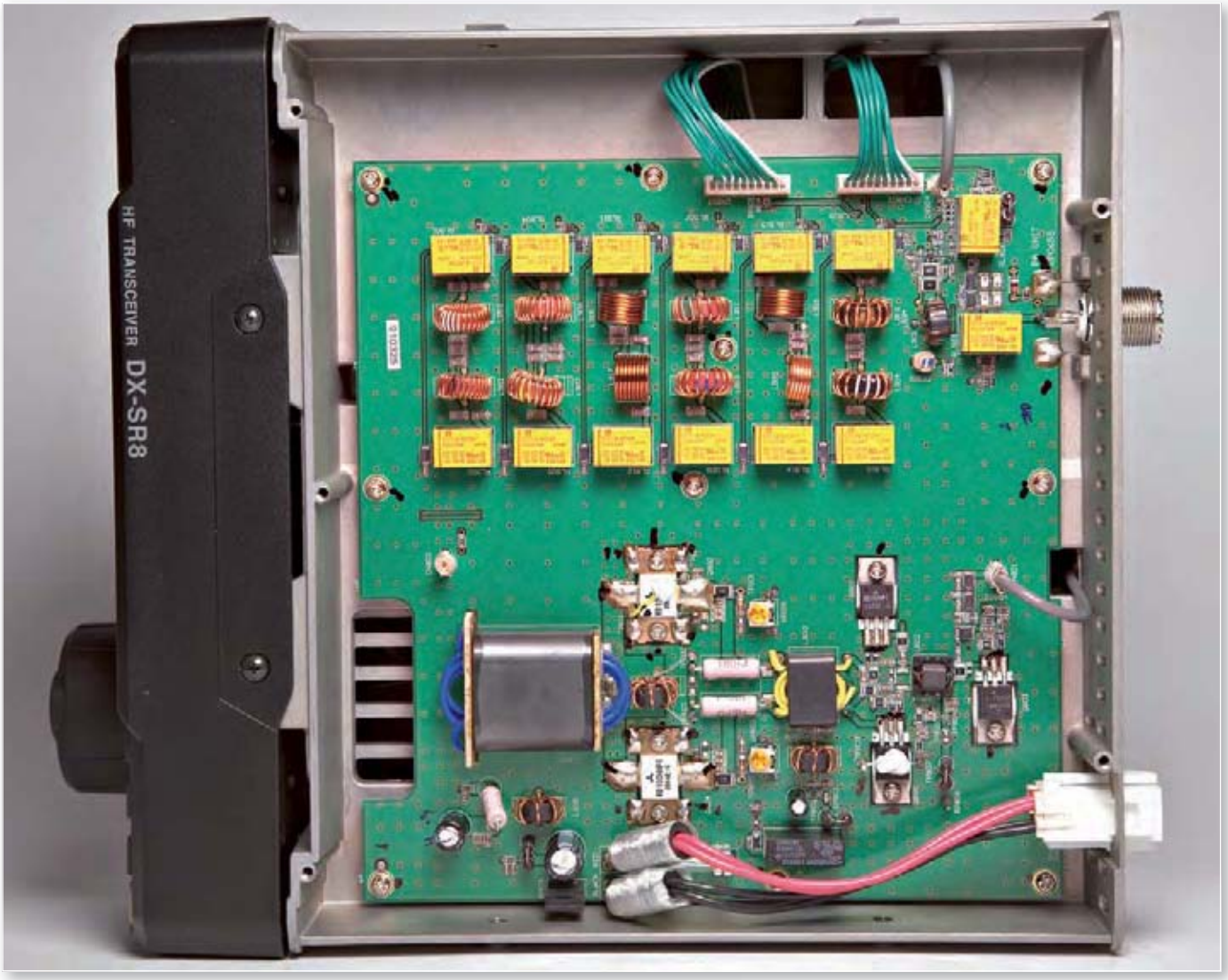
There's a choice of sending and receiving change-overs offered on the 'SR8, ranging from full break-in, where it's possible to listen in on your transmitting frequency, to semi-automatic, with pre-set (menu controlled) delays. And this is where I cam across my first real little 'niggle' with the transceiver – the clattering relays!

When full break-in is selected, the SR8's internal relay system seems to be relatively noisy compared to the Alinco DX-70TH. In fact, I found it to be quite distracting – although I'm sure it would eventually fade into the background as I got used to the rig.

To get over the problem I used the main menu settings to introduce one of the pre-set delays, which enables the receiver to drop back into receive after a key-up delay. This turned out to be very successful and after experimenting with different delays, I settled on one that gave me about two seconds or so 'key up' before the rig turned to receive. So, no problems and the relay clatter was minimised!

During daytime operations on 3.5 and 7MHz I had some enjoyable QSOs – at the same time playing around with the

The unit on the bench in Rob's shack gives a good idea of its size.



The single-board r.f. power amplifier stage and relay-switched band filters.

various menu settings for the keyer until I was comfortable with the rig. I think that even the inexperienced operator will find their way around this transceiver very quickly indeed, If I can, anyone certainly will because – as I've already mentioned – I'm not 'menu friendly'!

Operating on the crowded 3.5 and 7MHz bands on c.w. demonstrated the problems associated with the transceiver relying on a fixed narrow bandwidth audio filter to supplement the basic selectivity provided by the filters in the 'heart of the rig', the s.s.b. generator. On these bands I found that strong 'close in' adjacent stations seemed to be 'pumping' the automatic gain control (a.g.c.). With the audio filter selected, some strong close by (3kHz or so) stations were registering on the bar graph style S-meter, even though they they were barely audible on the frequency I was working on, due to the action of the filter.

After a while I realised it was better to avoid using the audio filter whenever possible. Instead – with careful adjustment of the i.f. passband control and the stepped r.f. attenuator – I found that the rig could cope quite well with the crowded conditions that we can easily find on the 80 and 40 metre bands at weekends! In fact, I had to continually remind myself that this beautifully made transceiver (it's superbly constructed inside and out) is a budget priced rig.

General Coverage Receiver

During the time I had the SR8 in my shack I used the general coverage receiver (GCR) a lot, as I had it running in the background as I worked on my bench building a project. The GCR is excellent and the version I had on loan went down to the lowest broadcasting channels on the long wave band. There are no breaks in coverage and it was interesting to listen to the various slow Morse navigational beacons below 500kHz.

The sensitivity and selectivity are ideal for general broadcast listening and as I've already mentioned – I preferred listening to the radio using its internal speaker. Incidentally, one trick I learned with tuning the SR8, was to select a.m. on the Amateur bands, so the faster tuning rate could get me up and down the band quicker. It's a useful little trick as the a.m. tuning rate is much faster and it's a moment's work to return to the slow tuning rate provided for c.w. and s.s.b.

If you're like me and enjoy a weighted, freely spinning tuning knob – you'll enjoy the control on the SR8. Unlike the DX-7-TH's it's really free spinning and a delight to use over many hours of operating. I think the the SR8 may even appeal to the non-transmitting Amateur as the receiver side is so good. However, I do far more listening than transmitting myself and the excellent GCR wouldn't be wasted!

In My Shack?

After reading my appraisal of the Alinco DX-SR8, I'm sure your final question would be – will the transceiver be found in my shack? And, of course, the answer is that I will be buying one! The rig offers truly superb value for money. Where else can we buy a ready-made, professional manufactured transceiver with all the facilities the 'SR8 offers? In my opinion it's an ideal starter or second rig and will be very useful for driving my 70MHz transverter and general 'rag chewing' and portable operations.

The low power settings – easily accessible via the menu, make the 'SR8 ideal for for operating lower power or QRP. The built-in keyer was a surprise on such a modestly-priced transceiver and I will certainly find this feature to be very useful when I'm operating /P on my own SR8.

However, despite the built-in keyer and Alinco's promotional material extolling this feature, I don't think the transceiver will appeal to the truly dedicated c.w. operator. These operators will go for a rig fitted with multiple specialist facilities, including adjustable narrow band filters, perhaps even including Digital Signal Processing (DSP) – in other words a transceiver with a much higher specification and a much greater £1000 plus price to match!

Despite my reservations and although it's not as selective as the DX-70TH, I think that the Alinco DX-SR8 will appeal to the operator who may like to enjoy an occasional stint of c.w. operating – perhaps on the bands at a time when the QRM that makes state of the art filtering necessary – especially during contest time.

It's most certainly a rig to buy and to enjoy using on the bands and I think that the 'SR8, like the Alinco DX-70 series, will carve a name for itself as 'the starter rig' with an amazingly good price. Well done Alinco – you have another winner!

My thanks go to **Mike Devereux G3SED** for the loan of the review transceiver. I'll be very reluctant to return it! ●

The Alinco DX-SR8 costs £499.95 plus p&p. More information from **Nevada**, **Unit 1**, **Fitzherbert Spur**, **Farlington**, **Portsmouth**, **Hampshire PO6 1TT**.
Tel: **023 9231 3090**, FAX: **023 9231 3091**.
E-mail: **sales@nevada.co.uk**
website: **www.nevadaradio.co.uk**

Manufacturer's Published Specifications (Abridged)

General

Operating modes:	J3E (l.s.b., u.s.b.), A3E (a.m.), A1A (c.w.), F3E (n.b.f.m.).
Memory channels:	600 channels (simplex).
Antenna impedance:	50Ω unbalanced.
Frequency stability:	±1ppm.
Power requirements:	13.8V d.c. ±15% (11.7 to 15.8V).
Grounding:	Negative ground.
Current consumption:	Receive 1A max, 700mA (squelched). Transmit 20A.
Operating temperatures:	-10°C to 60°C (+14°F to +140°F).
Dimensions:	240 (w) x 94 (h) x 255 (d) mm (9.45 x 3.7 x x 10in).
Weight:	Approx. 4.1kg (9lb).

Transmitter

Transmit frequency coverage capabilities:	Amateur Bands 1.8 to 30MHz (see note in text ref. 5.3MHz).
Power output: (c.w., s.s.b., n.b.f.m.)	100W (Hi), Approx. 10W (Low), Approx. 1W (S-Low). 5.3MHz 50W max pre-set. a.m. 40W (Hi), Approx. 4W (Low), Approx. 400mW (S-Low).
Modulation:	Balanced modulation (s.s.b.), low level modulation (a.m.), reactance modulation (n.b.f.m.).
Spurious emissions:	Less than -50dB (less than -45dB in the 10MHz band).
Carried suppression:	More than 40dB.
Unwanted sideband:	More than 50dB down (at 1kHz).
Maximum deviation n.b.f.m:	±2.5kHz.
Microphone impedance:	2kΩ.

Receiver

Receiver freq. coverage:	30kHz to 345.999MHz.
Receiver design:	Double conversion superhet.
Intermediate frequency:	First 71.75MHz, Second i.f. 455kHz.
Selectivity:	c.w., a.m.,s.s.b. (narrow) 2.4kHz/-6dB, 4.5kHz/-60dB a.m., n.b.f.m. 6kHz/-6dB, 18kHz/-60dB.
Sensitivity:	c.w. (1.8 to 30MHz) -12dBμ (0.25μV). a.m. (150kHz to 30MHz) +20dBμV (10μV). s.s.b. (150kHz to 30MHz) 0dBμV (1μV). n.b.f.m. (28 to 30MHz) -6dBμ (0.5μV).
Spurious & Image rejection ratio:	More than 70dB.
Audio output power:	More than 2W into 8Ω at 10% threshold of distortion.
Receiver RIT range:	±1.2kHz.

Mike Devereux G3SED MD of Nevada comments

Thank you for the copy of the Alinco DX-SR8 review. I'm glad you like the new radio, it has been designed to give no nonsense operation with easy to use controls at an affordable price. The QRP output will appeal to many especially as the radio has the built-in c.w. keyer with full break in. Alinco are keen to build on this radio and would always welcome feedback on how they might develop their products for the UK market. Regards **Mike G3SED**.

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SALE PRICE **£174.99**

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18 foot (1½" dia).
18 foot – 6 x 3 foot (1½") slot together ally sections.

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NEW CAR BOOT MAST SET

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Dia: 1¼" ideal to take anywhere. **£43.99**

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(Fits up to 2" mast) **£12.99** + P&P £4.50

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132m roll 4.4m nylon guy (480Kg b/f) .....£40.00 Del £7.50

NEW EASY FIT WALL PULLEY

Pulley will hang freely and take most rope up to 6mm. (Wall bracket not supplied).

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Wall bracket, screws not supplied. Simply screw to outside wall and hang pulley on WALL BRACKET £2.99 P&P £1.00

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PL-259 - PL-259	1m	£11.99
PL-259 - PL-259	4m	£14.99
PL-259 - PL-259	20m	£49.99
BNC - BNC	1m	£9.99

QS-300

A fully adjustable deluxe desktop stand for hand-helds. Includes BNC to SO-239 lead. **£19.99** P&P £4

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A superb, no mess, quick fit in-car holder (fits airvent) for hand-helds.

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Includes 5m cable **£29.99**

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PL-62M 6m/2m 1.4m (PL-259) £23.99
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Copper plated earth rod (4ft)..... £14.99 P&P £8.00
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12" T & K brackets (pair) £18.99
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All bracket measurements are from wall to end of bracket

U-bolts (1.5" or 2") each..... £1.50
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3-way guy ring £5.99
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Heavy duty guy kit (wire clamp, etc.) £39.99
Set of 3 powder coated heavy duty fixing spikes (~0.7m long)....£29.99
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Nylon dog bone insulators..... £1.00
Very large nylon insulators..... £2.00
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1¼" 6 foot ally poles..... £13.00
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Roy Walker's

antenna workshop

Roy Walker G0TAK describes his adventures installing a ground-plane system. If you can afford the exercise – try it yourself!

Editorial comment: Obviously, we realise that very few *PW* readers will have the space, resources, energy and finance to follow Roy G0TAK's entire project to the letter. However, both **Tex Swann G1TEX** and I think there are many useful tips that we can use in our own gardens. **G3XFD**.

I'll start at the beginning and **Fig. 1**, shows the situation 'before' I started the ground-plane work, so readers can see what was involved! It all started when my dear wife **Jenny** got fed up with the scruffy bit of greenery which we have called a lawn for the past seven years, and decided that it would disappear and be replaced by paving.

Towards the end of 2008 I had drained the pond, removed the liner, disconnected the fountain pump and discovered that at the bottom of the garden there was a 'plumbed in', fused, mains socket driven from the house. It was deal for a spot of QRO garden radio!

For a couple of years I have had an earth spike and rudimentary set of ground-plane wires (perhaps technically a multi-band counterpoise as it is above ground) in the garden.

Fig. 1: Photograph showing the situation at G0TAK's home 'before' he started the ground-plane installation.

Fig.1a: The final result. Invisible radials, a happy Jenny and a delighted Roy G0TAK!

But this was at one side and not very conveniently situated. Actually though, it has worked quite well when used against my 'occasional' fishing pole vertical.

So, the grass patch had to go, to be replaced by a circular paved area, after suitable ground work was done; digging out, levelling, gravel bedding and sand on top to support the pavers.

A central 2m or so circular raised bed was to have an integral seat around the retaining wall. It is within convenient range from the power point. I felt that it was an ideal, once in a lifetime, opportunity to lay a 'proper' earth mat/ground-plane and insert a short pole upon which to mount my vertical antennas.

I was pleased (and relieved!) when Jenny agreed to the new ideas, on the basis that whichever vertical was in use at the time, should be dismantled at close of play and that the existing earth spike and counterpoise wires disappeared. I didn't object to this, as we live in a nice location on the edge of the Lake District National Park and I like to observe the ethos of the area.

I had a ground-plane/earth mat system laid under the paths around the garden when I lived in Blackpool. That was a new house and the 'garden' was a sea of fine power station ash when we moved in. The system was relatively easy to establish. The antenna in that location was a vertical antenna manufactured by Sandpiper, which gave me some good results, and a bit of TVI because of the proximity of other houses, most

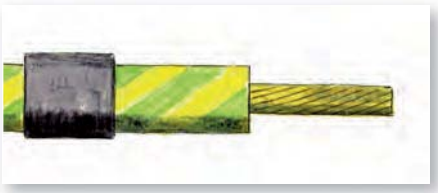

Fig. 2: Single wire tinned with self-amalgamating tape applied.

Fig. 3: Bundle of wires amalgamated and single feeder from right.

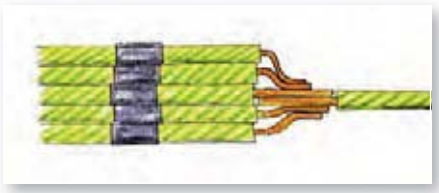

Fig. 4: bundle of wires with feeder inserted.

Roy Walker G0TAK
Highgate Barn
Low Bleaze,
Old Hutton,
Kendal,
Cumbria LA8 0LX
G0tak@kencomp.net

Combining Antennas & Gardening!

Gardening the ground-plane with a little 'trouble and strife' on the way!

of them using wide-band mast-head amplifiers. (We had an 8-element indoor TV antenna and had perfect reception and no TVI. Enough said?).

Back To The Books!

I'm fortunate in having what can be described, conservatively, as a good library of reference books on antenna design and therefore had a wealth of useful reference material from which to consider the options. Unfortunately, when you get a number of experts in any field together you come up with at least the same number of 'best options' for any problem and that was the case in my study!

The only thing that shone through the collective advice was that the optimum number of buried radials was **120**. Below that number the efficiency of the radials falls off, above it there is no significant improvement. Incidentally, I think this single fact can be relied upon as the experts at the Radio Corporation of America (RCA) did extensive research and testing to establish the optimum figure.

Many of the Amateur Radio textbooks say that as few as six elements is a good point to start from. So, adding four at a time – one in each quadrant – towards the optimum figure has got to be a bonus.

The figure of 120 radials does look pretty daunting – especially when you think that you have to tie all of them together at the base of the vertical! It gets easier mentally if you think of it as four bundles of 30 wires each fanned out over an angle of 90°, then connected together. That is one radial to each three degrees! After this, the engineering requirements seem to be on the side of the constructor.

Site Restrictions

Because of the restrictions imposed by the site, I was only able to lay a straight radial of about 4m in some of the directions from the assumed base of the antenna mount. In the opposite direction it was possible to run a few radials out to a maximum of 5 or 6m in a straight line.

Incidentally, one of the 'Not many people know that' facts I discovered in my re-reading is that the buried radials don't have to be cut to any significant length – if the height of the radiating element is less than a ¼λ on the frequency of interest. This was interesting point, because my usual temporary antenna is a fishing pole 9m long with a heavy-gauge wire running along its interior. For the Amateur band allocations on 1.8, 3.5 and 7MHz and the spot allocations on 5MHz this is effectively a 'short' radiating element.

The advice that I opted to take was that the wires don't need to be cut to a resonant length, (but the longer the better) and cut the longest radials I could accommodate within the ground plan. It might have skewed the radiation pattern but is better than no effective ground.

I planned to join the radials at a point at the base of the vertical pole, and tying them to an earth rod. Then I would lead a single wire from the joint up to a common point immediately before attaching them to a(permanently installed) 1:1 balun, with the total length of wire to be installed totalling up to 720m.

The earth mat/ground-plane at high frequency (h.f.) can be insulated wire or not, depending on what you have (literally) lying around. I opted for multi-stranded, insulated mains house wiring on the basis that I had it to hand. This cable is more durable than bare wire to water ingress and decay caused by mineral salts in the earth and mechanical damage. I was bearing in mind that it was to be an 'install and forget system', with no chance to access it for repairs –once it had been buried.

The cross sectional area of the individual radial wires has no significant effect on antenna performance as the wires don't carry significant amounts of radio frequency (r.f.) current. However, bigger cross-sectional wires are less prone to mechanical stresses (getting broken!).

Bearing in mind the quick draining glacial moraine (it has a high gravel content) that we live on in the Lake District, earth rods are virtually useless in this area and very difficult to install. The difficulty of getting anything straight into the ground is horrendous! In any event, apart from as a precaution against lightning and static discharges, earth rods are not very useful as ground for the h.f. radio frequencies that we use.

However, I did have three earth rods available and while the ground work was being done I 'planted' them in the ground around the perimeter of

Fig. 5: The bundle may be sealed but the next stage (Fig. 6) will improve matters.

Fig. 6: Cable bundles ready for 'planting'.

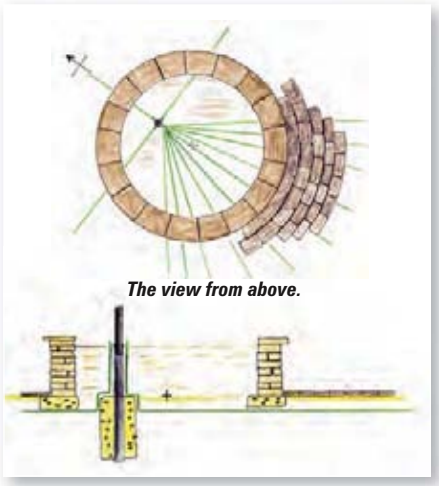

Fig. 7: The Architect's design.

Fig. 8: The old turf stripped out.

Fig. 9: Consolidating the ground – hard work for other people!

Fig. 10: The radial kit ready to be installed. Roy laid them out in 'untidy fashion' first.

the site at the 'far' end of some of the radials. This was done on the basis 'that every little helps'.

The Preparation

Having been at the negotiations with the builder – **Nick** – who did the ground work, I guessed that the average length of the wires that I'd be planting on the south and west quadrants would be just about 4m from the base and 1m vertically.

On the north and east quadrants I estimated that they would probably stretch to 6m before I run out of 'disturbed ground'. I had then planned to cut four bundles of 30 wires of each length and to bond them together in groups before the ground work started. This would enable me the get the wires pegged out on the ground with the least possible delay to the ground work.

Each fan of wires would then have a single 'leader' of about a metre to enable fixing above ground level when the work was completed. I would then ensure that the joints over the bundles would be thoroughly insulated.

I planned that sufficient galvanised wire 'tent pegs' would be constructed to enable the majority, if not all, of the wires to be pegged to the ground. This would be prior to a layer of sand being tamped down over them to provide the base for the paving. However, when it came to constructing the sets of radials first I ran out of wire and then secondly, I ran out of enthusiasm – after I had constructed four sets of ten radials! In any event, a bundle of ten radials when distributed over an arc of 90° gives a spread of only 9° and at four metres that's not a lot of lateral spacing, the ground plane will be fairly dense. The ends of the radials will be turned 90° to the left or right for the balance of their length. In the end I had about 240m of wire to bury.

Each Radial

Eventually, each radial of the ten was cut to a length of 6m and sealed at the 'far' end with a blob of hot melt glue for waterproofing. The insulation on the end – which was to be connected to the balun – was stripped back to a distance of 20mm and tinned using solder and a small blowtorch belonging to my excellent cook (Jenny!). This and subsequent soldering processes takes a lot of heat! Further up the wire by 20mm I wrapped a single turn of 10mm wide self-amalgamating tape around the insulation. See **Fig. 2**.

When all the ten radials had been prepared they were collected together in the neatest bundle possible and secured by a (disposable) cable tie between the bare area and the amalgamating tape. Be careful that the lengths of amalgamating tape are all aligned – and in as close proximity as possible to each other.

Prepare a further length of heavy gauge wire of about a metre in length by stripping back and tinning 20mm at one end. This will form the feeder to the balun and need not be sealed with amalgamated tape.

Insert the feeder, **Fig. 3**, wire into the bundle of radials and, once again with the gas blowtorch heat the bundle, adding additional solder as required. Allow the bundle to cool and set. At that stage, and not before, check that all the wires are connected together. Remove the charred cable tie. The result, in my hands, did not look pretty, just as well that the bundles are to be insulated, covered and buried!

Wrap a length of amalgamating tape around the feeder wire and, **Fig. 4**, down on to the body of the bundle as far down as the far end of the rings of amalgamating tape. This will help to ensure that there is no water ingress from the 'top' end.

The 'bottom' end of the bundle may already be sealed by the application of tape but the next step will do nothing but assist! (see **Fig. 5**). Cut a length of heat-sealing sleeve so that it covers from the top of the taped bundle to the bottom of the band of amalgamating tape. Warm

up the heat shrink until it is tight against the bundle. This should fully seal both ends of the stack of wires but I suppose on a 'belt and braces philosophy a generous helping of 'Denso' electrician's tape wouldn't go amiss.

Next, see **Fig. 6**, shows the bundle of wires amalgamated and heat sealed. Do this four times and the radials will be ready for 'planting'.

Grand Designs

The design for the installation is shown in the drawing done by the 'Architect' (Me!) drawing, which shows the view from above and the side, **Fig. 7**, although only one quadrant of radials is shown.

The centre of the original 'lawn' we planned to be a circular raised bed 1.83m in diameter and a permanently installed vertical support was arranged to be mid-way from the centre of the bed to the wall/sitting area (to accommodate a central tree, but only extending just above the earth level of the bed. The offset to the northern side was useful in that it enabled me to get just a little more horizontal wire in the ground.

When we planned the arrangements, the support pole was to be embedded vertically in the earth encased in a substantial block of concrete – with the bottom of the pole extending below the block to ensure drainage, see Architect's drawing showing the side view, **Fig. 8**. A smaller diameter pole then fits inside the support and forms a removable support for the various temporary antennae to be used – a number of separate 'bases' were then fabricated for a quick change-over between the various types of vertical used.

When we started – it took a day to strip out the grass. It was hard work, (not that I did any of it), a barrow and lots of tea. The photograph, **Fig. 8**, shows the stripped turf.

The second day was taken up with marking the centre of the proposed paving, consolidating the ground, **Fig. 9**, and starting the process of a 'first fitting of the radials. Next, **Fig. 10**, shows the radial kit ready to install. The next photograph, **Fig. 11**, shows the radials laid out in 'untidy mode. Because the minimum radius under the paving was just about 4m the ends of some of the radials had to be bent over at 90° in order to accommodate the full 6m design length. The photograph, **Fig. 12**, illustrates the radials bent over.

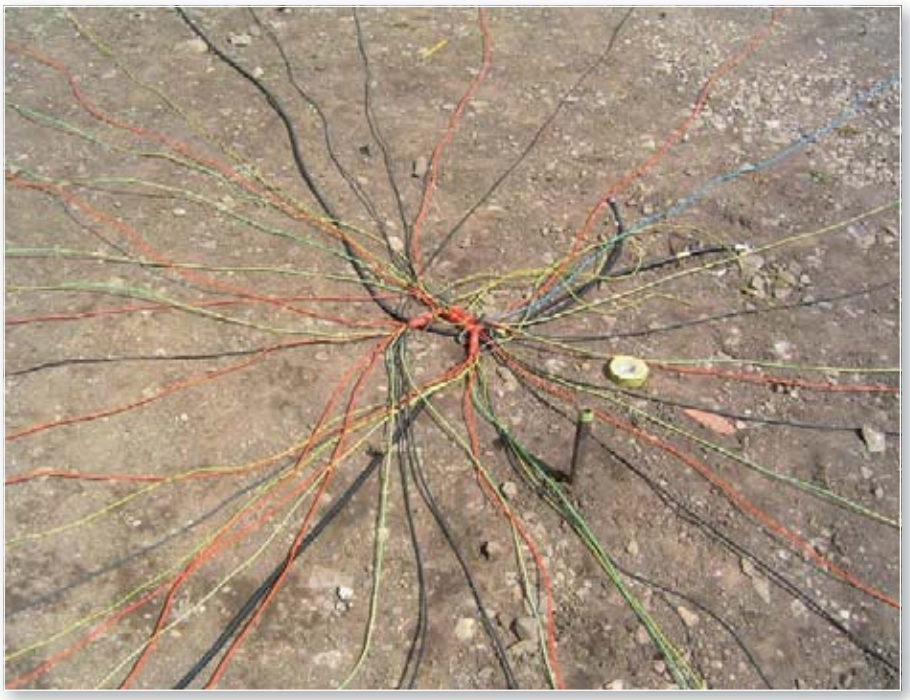

Fig. 11: The 'untidy mode' demonstrated!

In some directions the full length of the radials could be accommodated without bending. I am not quite sure, and probably never will be, how much this will affect the radiation pattern of any antenna installed on the site. Nick the builder was quick to catch on to my requirements and – while I was pegging the first quadrant – he was laying the next one. In fact he was so

Fig. 12: Some of the radials had to be bent over to be accommodated in the available space.

Fig. 13: Roy G0TAK laid a membrane (to protect the cables from corrosion) in the area, which was also filled with hardcore.

fast at it that I did not get the time to lay any of the 'far end' earth spikes before the next stage was reached!

Builder's Nightmare!

Having discussed the matter with the principle builder (fortunately, Nick is a good friend of ours – having converted our barn for habitation and lives just across the farmyard), the 'lead' client (Jenny!) decided at this stage that she would like the somewhat tatty range of decking to the North of the paved area taken out, the site levelled, paved and a summer house installed. This pleased me no end!

There was already a buried mains spur taking electricity from the house to the decking area and this was terminated in the new building for lighting (and the odd p.s.u.). I therefore took the opportunity to lay **two** RG213 feeders from the centre of the circle, one to terminate in the summerhouse, the other towards the sun lounge on the back of the house. Not to be used at the same time of course!

Once the radials were laid 'scruffy fashion', (bundles of wire have a natural affinity to tangle), they were pegged down at the centre with the galvanised wire 'tent pegs', straightened as much as possible and pegged down at the ends of their range.

The whole set of radials and the feeders were covered over with a weed-stopping membrane **Fig. 13**, (partially to protect the wires) and a layer of hard core was spread to keep the membrane/wires down and to form the basis for the paving. A small hole was left at the centre, to be opened up later so that the radial and feeder terminals could be accessed – see **Fig. 14**. Next an outer circle of paving material were laid to define the eventual paved area.

Three areas of sandstone paving were laid, one to the North to act as a base to the new summer house, one to tidy up the area of the old pond, and the third, under the existing pergola, simply to make it match. These areas were useful to cover the outer ends of some of the radials. Once the retaining walls were constructed it was simply a matter of finishing the laying of the pavers and sitting in the hole with the blowtorch and finishing off the fitting of the radials.

As soon as it was practicable to do so, at the weekend so as not to obstruct the construction work, I was able to try out the installation. I am pleased to say that the system worked first try. As the feeders and radials had been covered by this time there was nothing I could have done to rectify any problems in any event; but I was re-assured.

Fig. 14: The arrangements for the support poles.

Earthing The Beds

One aspect I did get heavily engaged in was the offloading of topsoil into the newly created beds – in excess of 8 metric tonnes! Now that was hard work! I did the offloading into a couple of barrows, Nick did the dumping, and later after he went home I assisted with the raking level. (Planting up though, wasn't part of my brief!).

Further Developments

During the course of construction I had a conversation with **Simon Poyser 2W0SAK** of the **Snowdonia Radio Company** (SRC) who, amongst other things, makes and markets a range of 9:1 unbalanced to unbalanced ('unun') toroidial transformers designed to reduce the high impedances inherent in long wires.

The SRC design permits you to use the 'unun' with or without an earthy connection. I tried one at the base of my 9m vertical and with a connection to the radial system – it gives me acceptable standing wave ratio (s.w.r.) results over all the bands. These pleasing results including the WARC allocations and the Air Cadet h.f. frequencies which I use.

Fig. 15: A quick test of the system, though it was rather late if anything had gone wrong!

Previously, I had used home-brewed 1:1 baluns for the same purpose but they have always given me the odd frequency that I couldn't 'tune'. This may well be the way forward. The SRC literature says that a wire length between 23ft and 65in (to save conversion problems I'll leave it in imperial measurements) the system will enable a 'tune' to be achieved from 3.5 to 29MHz.

In addition to my home-brew fishing rod vertical I have available a set of Hustler mobile vertical antennas antennas and I have a Sandpiper G-Whip style multi-band portable vertical. I've also been promised the loan of some mono band mobile verticals so, now that the system is fully up and running I'm planning to do much more testing and evaluation.

How does it work?

It is difficult to assess how well the ground plane is working; it is working but as I've not had such a system in this location I have nothing to compare it against. It would be unfair to assess it against my long wire and dipole antennae as the difference between the horizontal and vertical radiation patterns would tend to mask any direct comparison results.

I hope to provide readers with an update in the future, after I've had more time to evaluate the new system. Any *PW* readers who try some of my suggestions and ideas – I'd like to hear from them.

73 Roy

KITS, MODULES & AERIALS

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POUNDBURY 20/80m SSB RECEIVER

Classic superhet receiver for 20 and 80m using a 9MHz IF and a 5.0-5.5MHz VFO (as described opposite). Uses a 6 crystal ladder filter with near symmetrical passband, 2dB insertion loss, 1.8:1 shape factor, and 70dB stopband. Minimum discernable signal 0.2uV. Fixed tuned bandpass preselector on 20m, tunable preselector on 80m. Logarithmic AGC and Signal meter response. Maximum signal handling 1mV. 500mW audio output. Supply requirement 13.5V at up to 250mA. **VFO with its drilled box, preselector and main board PCB's and component kits including crystals £92. Complete kit including box and hardware £147.00. Ready built £240.00.**

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TRANSVERTERS for 2 or 4 or 6 metres from a 10 metre rig, or 4 or 6 metre from a 2 metre rig. Includes new overtone local oscillator, and integral interface unit. 20dB receive gain, 25W transmit power. Low level drive dual IF versions **TRC2-10dL, TRC4-10dL & TRC6-10dL**, high level drive single IF versions **TRC2-10sL**, **TRC4-10sL**, **TRC6-10sL, TRC4-2sL, TRC6-2sL**, Complete kit **£179.00**. **Built £266.00**

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MASTHEAD PREAMPS 400W rated, for 2 or 4 or 6metres. RF switched. DC fed via a separate wire. 20dB gain 1dB NF. Heavy duty waterproof masthead box with SO239 connector. **RP2SH, RP4SH, RP6SH. PCB & hardware kit £42.50, Ready Built £65.00**. **Masthead fitting kit £6.00**.

PORTLAND VFO now available as the classic 5.0-5.5MHz version to suit receivers and transmitters with a 9MHz IF to work on 80m or 20m. Can be supplied with Buffer 1 to suit transistor and IC mixers, or with Buffer 2 to suit a diode ring mixer. This is a development of the VFO which featured in March 2006 PW, and which now uses a 3 terminal regulator to supply the VFO section. There is now no perceptible drift from switch-on. **VFO and Buffer PCB's and components with pre-drilled box £26.00. Ready built £50.00.**

PSK31 INTERFACE KIT, as in PW Feb 2009. PCB £5.00. PCB and components £21.00. Box kit with cables £35.50.

SPEECH PROCESSOR increases the average sideband power of SSB transmitters without driving the PA into clipping. Includes filtering to enhance the higher voice tones to increase intelligibility, and it sounds nice too. Panel control for clip and output level. Supplied with plugs & sockets to suit most popular rigs. Type **SP1000, PCB & Hardware kit £42.50, Ready built £60.00**.

LCR BRIDGE with 5 resistance ranges 100, 1K, 10K, 100K & 1M. 3 capacitance ranges, 100pF, 1nF, 10nF and 3 inductance ranges, 1mH, 10mH & 100mH, plus external reference. Scale calibrated 0.01 to 10 times reference value. Optional drilled and labelled plastic or painted diecast box. **PCB & parts with pot and switch £26.00. With plastic box £39.00, with diecast box £44.00.**

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TWO TONE OSCILLATOR as featured in *PW* March 2005. A vital piece of test equipment used together with an oscilloscope for setting up AM, DSB, & SSB transmitters. **PCB & hardware kit £28.00. Ready Built £52.50**.

3N201 MOSFET equiv. 40673 £2.25 each, P&P £1.00 any quantity.

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Tony Nailer's

technical for the terrified

Tony Nailer G4CFY discusses the various types of crystal controlled oscillator circuits that use a transistor or f.e.t.

This month I will continue the oscillator theme by describing many of the semiconductor crystal controlled types. First though I need to draw your attention to the circuit of the crystal as shown in **Fig. 1**. This is actually an electrical equivalent of a mechanical structure. It exhibits the properties of a very high value of inductance, an extremely low value of series capacitance, a significant series resistance and a small parallel capacitance, together with an enormous unloaded *Q*.

For those who might be interested in the finer details of typical crystals, a table is shown in **Fig. 2**. A look at the table suggests that a 10MHz crystal is close to ideal, as it has the lowest series resistance and hence the highest *Q*.

Resonant Modes

The crystal disc has a number of modes of vibration, which are affected by the external loading. The spiky graph of **Fig. 3** shows a number of negative peaks designated fundamental, 3rd overtone, and 5th overtone. I would normally designate the first negative peak as series fundamental resonance. The first positive peak as the parallel fundamental resonance, and the subsequent positive peaks as harmonics.

The graph is obviously not to scale and it can be clearly observed that series resonance is lower in frequency than the parallel resonance. Usually separated at the fundamentals by about 500Hz. The circuit, **Fig. 4**, shows a lumped equivalent circuit of a crystal with its multiple resonance possibilities.

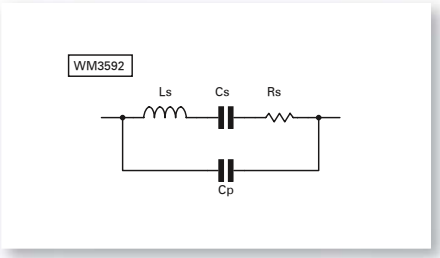

Fig. 1: The electrical equivalent of a typical crystal's mechanical structure.

Parallel Mode Colpitts

The circuit of the commonest form of parallel mode Colpitts oscillator, the emitter follower arrangement, is shown in **Fig. 5**. It's usual practice to make the series total of C2 and C3 equal the parallel value of C1 and VC1. In this case about 60pF, which gives an overall loading of 30pF. Output is normally in the region 0.5 to 1.5V peak to peak (p-p). Increased signal purity but lower output results from increasing the value of C3, while reducing C2, but keeping the series total the same.

The circuit of Fig. 5, will happily work from very low frequencies right up to the limit of parallel mode crystal, which is around 24MHz. Unfortunately, crystals below about 3MHz presumably require a different cut and are progressively more expensive. It's often cheaper to run a crystal oscillator at a higher frequency and use a c.m.o.s. divider integrated circuit, to give the required low frequency output.

Note: The supply rail stabiliser, consisting of the zener diode, the series resistor and de-coupling capacitor, will be used for the description of all the remaining oscillator types.

Series Mode version 1

One version of the common-base Colpitts oscillator is shown in **Fig. 6**. The base of the transistor is grounded at the series resonant frequency and all overtones. A useful method of getting this oscillator right, is to use a suitable value de-coupling capacitor in place of the crystal, tune the inductance to the correct frequency. Then replace the de-coupling capacitor with the crystal to achieve lock onto the required overtone.

The impedance at the collector of Tr1 is quite high, whereas the impedance at the emitter is very low. This requires that the value of C2 is a lot higher than C1 to avoid damping the resonant circuit too much. A good starting point is to choose C2 to be four times the value of C1. Output signal level will again be around 1V p-p.

Series Mode version 2

A second version of the series resonant grounded base Colpitts, as shown in **Fig. 7**, actually has a de-coupling capacitor Cd from base to ground, usually about 1nF in value. The crystal in this case provides the

Typical Parameters for AT-Cut Quartz Resonators

Freq (MHz)	Mode n	rs (Ω)	Cp (pF)	Cs (pF)	L (mH)	Q_U
1.0	1	260	3.4	0.0085	2900	72,000
5.0	1	40	3.8	0.011	100	72,000
10.0	1	8	3.5	0.018	14	109,000
20.0	1	15	4.5	0.020	3.1	26,000
30.0	3	30	4.0	0.002	14	87,000
75.0	3	25	4.0	0.002	2.3	43,000
110.0	5	60	2.7	0.0004	5.0	57,000
150.0	5	65	3.5	0.0006	1.9	27,000
200.0	7	100	3.5	0.0004	2.1	26,000

Courtesy of Piezo Crystal Co, Carlisle, Pennsylvania

Fig. 2: Some typical values for crystals at various frequencies, taken from the 1996 ARRL Handbook.

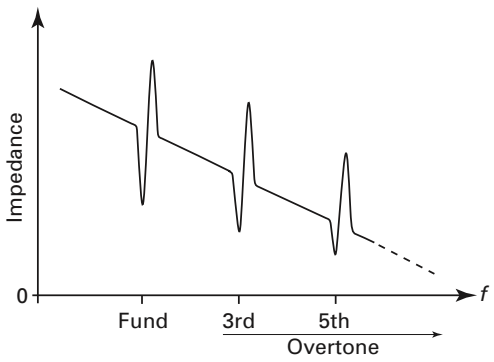

Fig. 3: A crystal can have a number of modes of vibration, affected by the external loading, giving differing impedance values (see text).

Tony Nailer
PW Publishing Ltd.,
Arrowsmith Court,
Station Approach,
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Dorset BH18 8PW
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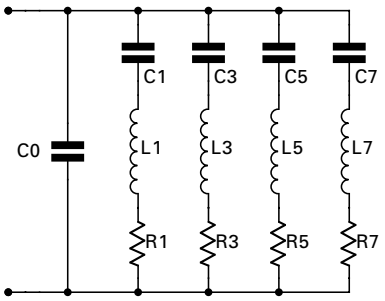

Fig.4: The lumped equivalent circuit of a crystal with its multiple resonance possibilities, taken from the **1996 ARRL Handbook.**

low impedance coupling from the capacitive divider back to the emitter. This again requires C2 to be larger than C1, and four times would again be a good starting point. The series total of C1 and 2 has to resonate with L at the required frequency.

Series Mode version 3

Yet another Colpitts series overtone oscillator, the impedance inverting type is shown in **Fig. 8**. Like the circuit of Fig. 6, it can be initially tested by replacing the crystal with a suitable de-coupling capacitor. The coil is adjusted for the required frequency, then the de-coupling capacitor replaced again by the crystal, which will lock it to the required overtone.

The low value resistor across the crystal forces it to work in the series mode. With a higher value resistor the circuit can actually run on a harmonic of the fundamental parallel mode. You will note that again I have chosen C1 to be about half the value of C2 or 3. The series combination of these three capacitors then dictates the value of inductance required for the chosen resonant frequency.

Miller Oscillator

The Miller oscillator was fairly common in the valve era, but is little used today.

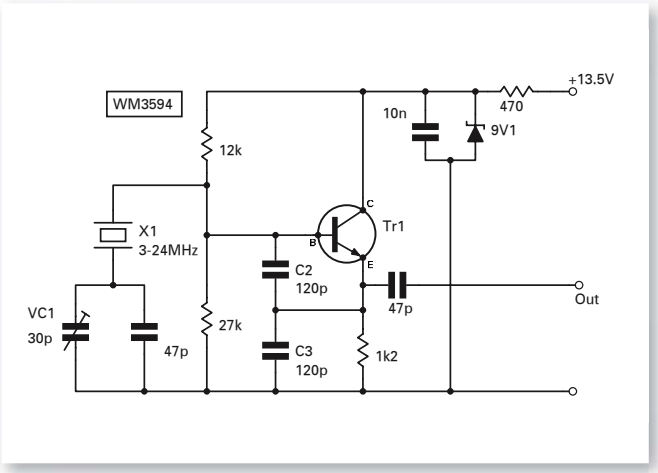

Fig. 5: The circuit of the commonest form of parallel mode Colpitts oscillator, the emitter follower arrangement.

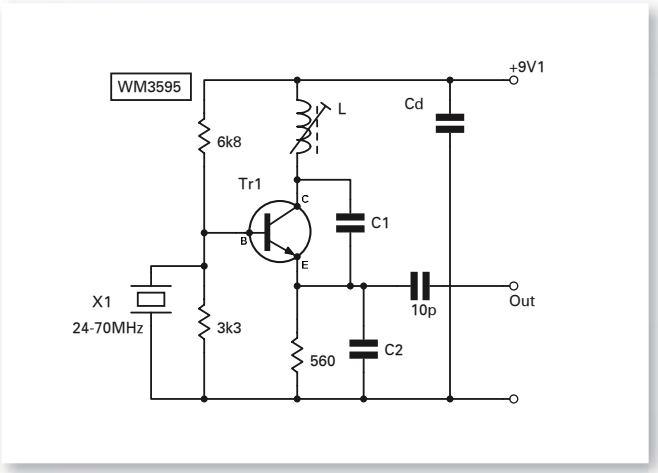

Fig. 6: In the common-base Colpitts oscillator, the base of the transistor is grounded at the series resonant frequency and all overtones.

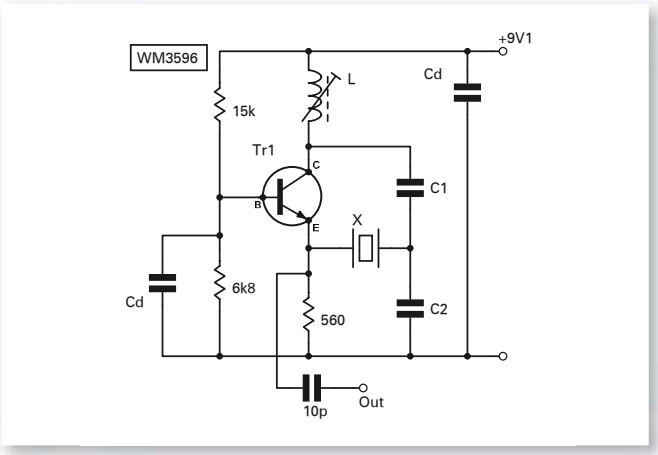

Fig. 7: A second version of the series resonant grounded base Colpitts oscillator.

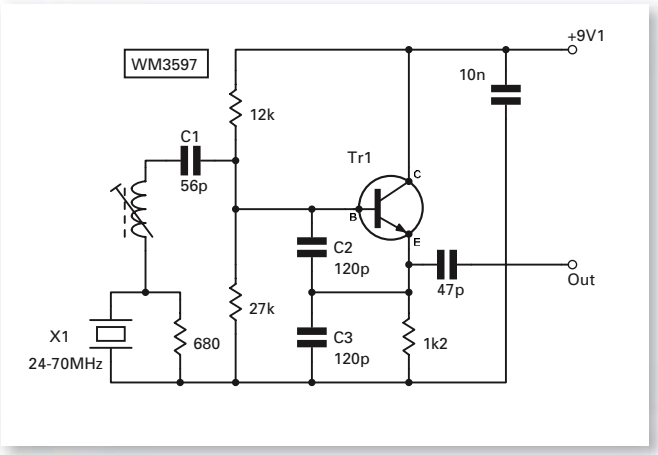

Fig. 8: Another Colpitts series overtone oscillator, this time the impedance inverting type.

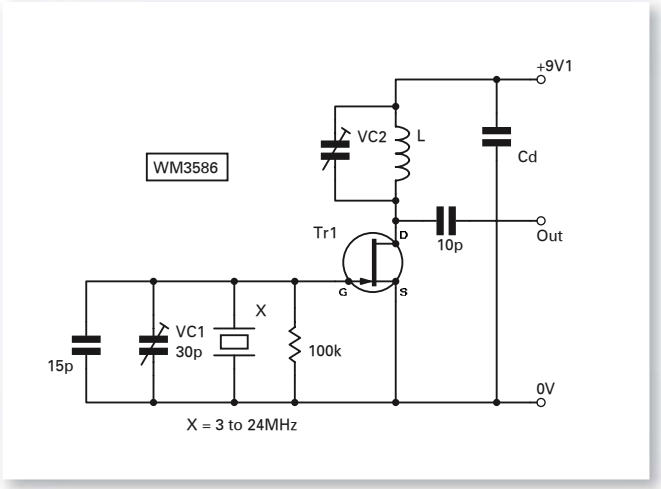

Fig. 9: The Miller oscillator was fairly common in the valve era, but is little used today, though it can oscillate quite comfortably on harmonics of the fundamental parallel frequency.

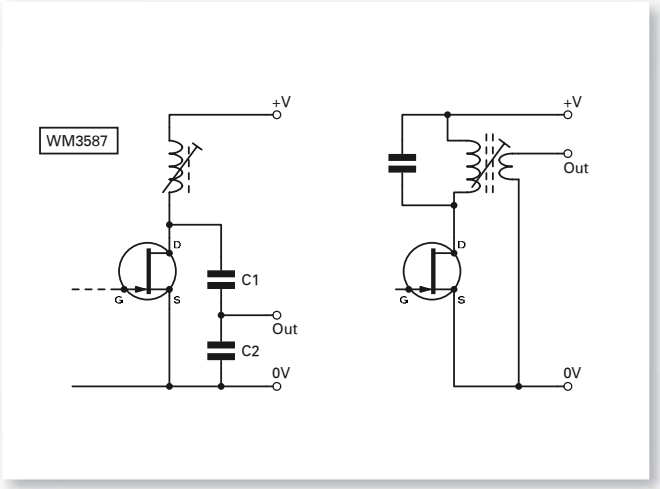

Fig. 10: Some methods of improved output coupling arrangements of the circuit shown in Fig. 9.

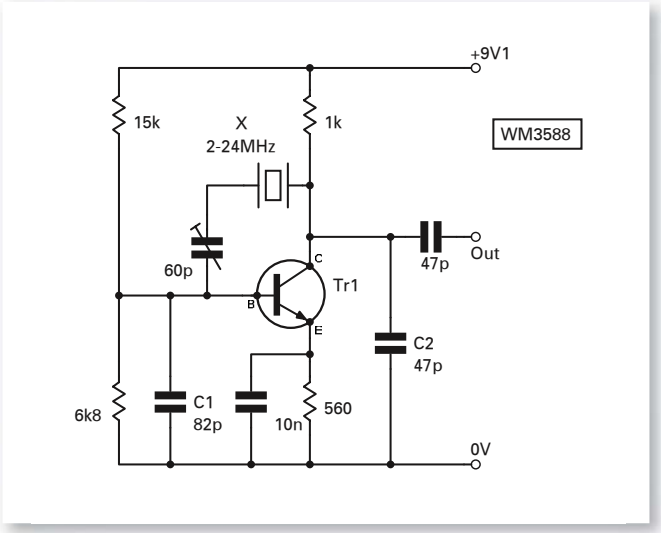

Fig. 11: A Pierce oscillator is very similar to the circuit used with logic gates.

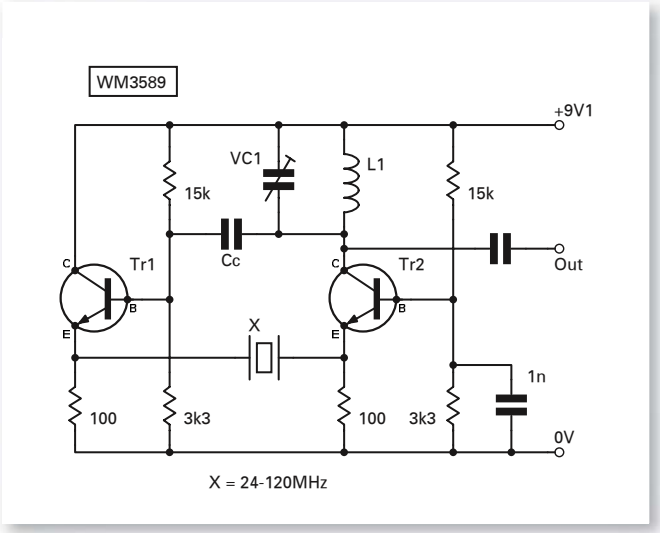

Fig. 12: The Butler overtone oscillator is favoured by the microwave enthusiasts because it can give an output of three times the crystal frequency.

It actually offers a feature not readily or reliably found with other types, in that it can oscillate quite comfortably on harmonics of the fundamental parallel frequency. It was the circuit I used with my first 144MHz receive converter, published in *PW* October 1978 and partly re-printed in *Radio Basics* on page 23 of *PW* December 2003. The circuit of the oscillator is shown in **Fig. 9** together with improved output coupling arrangements shown in **Fig. 10a** and **b**.

The circuit works due to the 2 or 3pF of (Miller) feedback capacitance from drain to gate. I unknowingly at that time assumed it would work with overtone crystals, and used it with the series overtone 38.666MHz HC18U crystals. I found that the final frequency was usually about 2kHz off frequency and blamed it on poor manufacturing quality.

It was a long time later I determined how the oscillator was functioning. The crystal was running on the third harmonic of its parallel fundamental mode. With that knowledge, it is now possible to take a fundamental parallel mode crystal, and run it directly on its third or fifth harmonic. The 15pF capacitor and 30pF trimcap allow it to be adjusted to the correct frequency.

Pierce oscillator

A Pierce Oscillator is shown in **Fig. 11**, and is very similar to the circuit used with logic gates. The crystal is in the feedback path from output to input and often will be used without the series trimcap. The capacitors C1 and C2 form an integral part of the Pierce arrangement, to provide the correct loading capacitance.

I would be a bit reluctant to use the oscillator with the output connected as shown, though that is the normal way. A better way would be to break the 1kΩ collector load resistor into say 820 and 180Ω, and take off the output via a capacitor from the joint of the two resistors. A buffer would then be required to restore the output level.

As an alternative to the trimcap in series with the crystal, I suggest putting it in parallel with C1. Now if the collector resistor has been split as suggested, the total capacitive loading will be simply that of C1 and the parallel trimmer in series with C2.

Butler Oscillator

The Butler overtone oscillator as shown in **Fig. 12** is favoured by the microwave enthusiasts, mainly because with the addition of a tuned circuit in the collector of Tr1, it can give an output

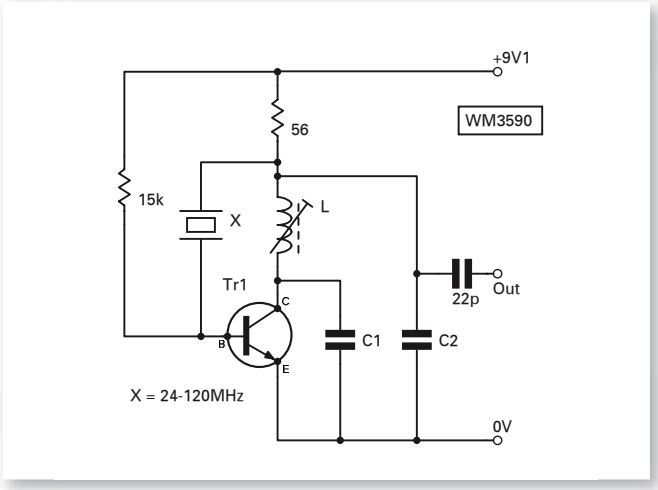

Fig. 13: The circuit of the Robert Dollar overtone oscillator shown is a quaint derivation from its valved predecessor.

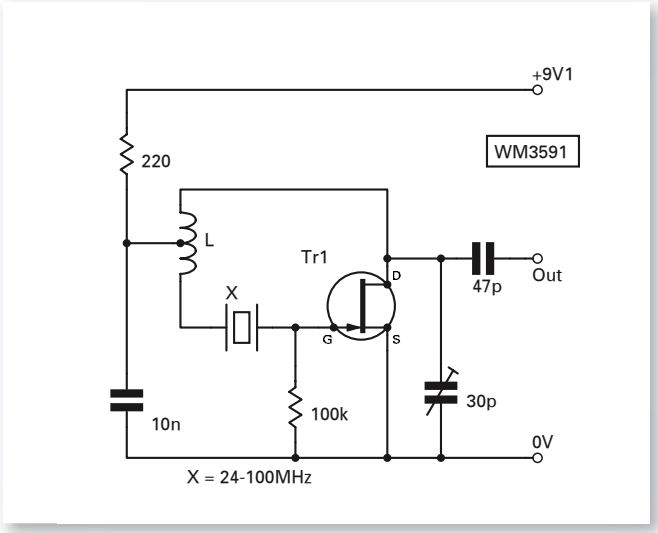

Fig. 14: The Squier oscillator shown here is derived directly from its valved predecessor.

of three times the crystal frequency. Crystals as high as 116 to 150MHz can be used in the circuit quite successfully.

The circuit works by Tr2 acting as a grounded base amplifier with the collector tuned to the appropriate overtone desired. Output from the collector is then impedance transformed by the emitter follower Tr1, to present a low impedance back to drive the other end of the crystal.

There's nothing wrong with this scheme as described. The problem comes when further multiplication is required using a tuned circuit in the collector of Tr1. But it really won't do it efficiently, because Tr1, like Tr2, is operated in class A so, it amplifies the whole of the cycle linearly and therefore produces only tiny amounts of harmonic distortion.

Though the circuit shown is the standard arrangement, I would recommend that a small value resistor, say 56 to 220Ω, be added to the collector of Tr1, and output taken via a 47pF from the collector.

Robert Dollar Oscillator

The circuit of the Robert Dollar overtone oscillator is shown in **Fig. 13** and it'is a quaint derivation from its valved predecessor. The circuit appeared in *Technical Topics* in the August 1980 issue of *Radio Communications*, and is due to **Arnold Mynett ZS6BMS/G3HBW**, with whom I worked in Racal South Africa in 1976 and 1977. He claims it works over the range 30-150MHz and with supplies from 1.5 to 9V.

Here, I would suggest here that C2 be at least four times the value of C1. The simple bias arrangement causes this circuit to draw a fair amount of current, but gives a high level of power output.

Squier Oscillator

The Squier oscillator shown in **Fig. 14** is derived directly from its valve predecessor. I tried the valved version way back in the early 1970s but have never tried a transistor or field effect transistor (f.e.t.) equivalent. Basically it's a Hartley oscillator with a crystal added.

The resonant part of the inductor is that part from the collector to the tap. Applying knowledge of the Hartley style circuit, I suggest that the winding from the tap to the crystal is one quarter the turns of the resonant part. It's likely also that by replacing the crystal with a 1nF capacitor that the oscillator can be adjusted close to the correct frequency and then the crystal substituted for the capacitor. The take-off point is the most sensitive and it's likely that the junction of the crystal and the coil would be a better place for output to be taken from.

Conclusion & Summary

In my crystal oscillator file I have numerous circuits, but they are pretty much covered by the varieties described here already. Most low frequency oscillators and digital circuits use variants of the Pierce oscillator. Others use something like the Butler though the crystal is usually in series with a trimmer capacitor (trimcap) in place of Cc in Fig. 12. The emitters are then connected together with a 10nF capacitor.

I would be very interested if a reader can experiment with the Robert Dollar circuit, using a 42MHz crystal, a 0.4uH coil (TOKO type 4028) for L, 47pF for C1 and 180pF for C2. Tr1 could be BF195, BF199, 2N2369A, BSX20, or 2N5179.

The Squier circuit also looks interesting, and it would be worth a try also using a 4028 coil. The main winding connected between collector and resistor, and the link secondary between resistor and crystal. At 42MHz the trimcap could be a fixed capacitor of 33pF. Again I would be delighted if any reader can give this a try and report back. Happy new year! ●

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The Rev. George Dobbs'

carrying on the practical way

This month the Rev. George Dobbs G3RJV looks back at the 1968 receiver – after finding an appropriate quotation!

"Study the past, if you would divine the future".
Confucius

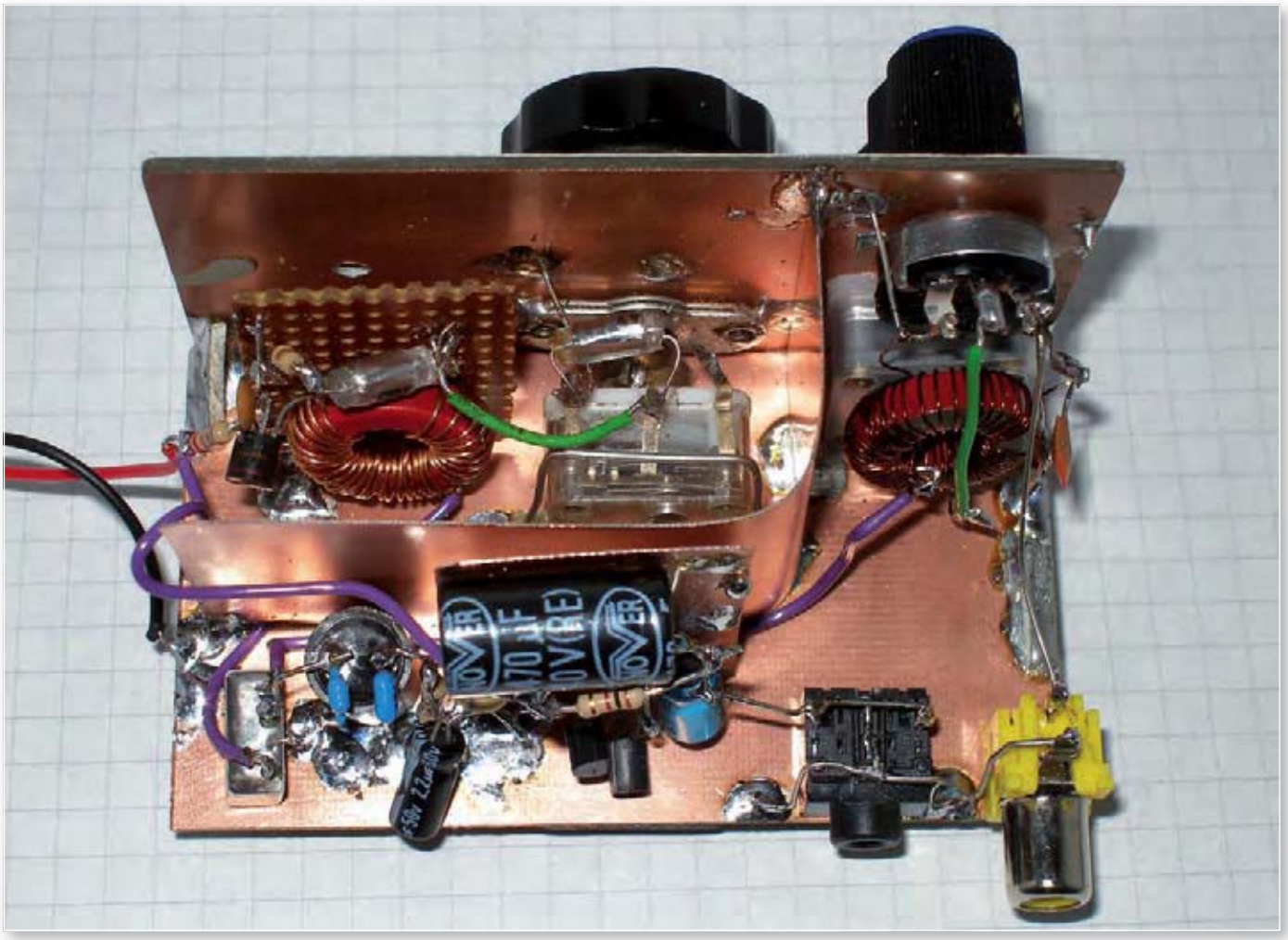
Welcome to *Carrying on the Practical Way* (*COTPW*) – where I wish everybody a happy New Year! Sometimes the past pops up in the present in most unexpected ways. Recently I was looking for some data on the free CD that comes with that most excellent book *Experimental Methods in RF Design* by **Wes Hayward W7ZOI**, **Rick Campbell KK7B**, and **Bob Larkin W7PUA**. The book is a mine of information for anyone interested in building radio equipment and has come to be known as *EMRFD*.

The blurb on the back of the book says, "*EMRFD* brings professional RF design experience to the Radio Amateur. It is written for anyone with a driving curiosity about state-of-the-art equipment." My only criticism with that is perhaps it makes the book appear rather daunting. In fact it's accessible to most Radio Amateurs who want to wield a soldering iron. I also like the book because I've been fortunate enough to come to know two of the authors personally.

I've shared speaking platforms with both Wes and Rick. That's in itself is a real tribute to the nature of our hobby in that I, a complete Amateur who simply enjoys building and using radios, was invited to speak alongside professional r.f. engineers and academics.

Rick and I once even shared a fascinating week in Sarawak, Borneo, at a QRP Convention! Additionally, some years ago I had the pleasure of meeting up with Wes in his home in Oregon in the north west Pacific region of the USA. They are two delightful people and good engineers.

The data I was retrieving from the *EMRFD* supplementary CD was information on stepped attenuators. As I scrolled down the list of available articles on the CD, I stopped dead at an entry that said, "W. Hayward and R. Bingham, 'Direct Conversion; A Neglected Technique.' *QST*, Nov, 1968." This immediately transported back 40 years – to the time when I was reading copies of the **American Amateur Radio Relay League** (ARRL)



The 1968 Receiver, as built by George G3RJV.

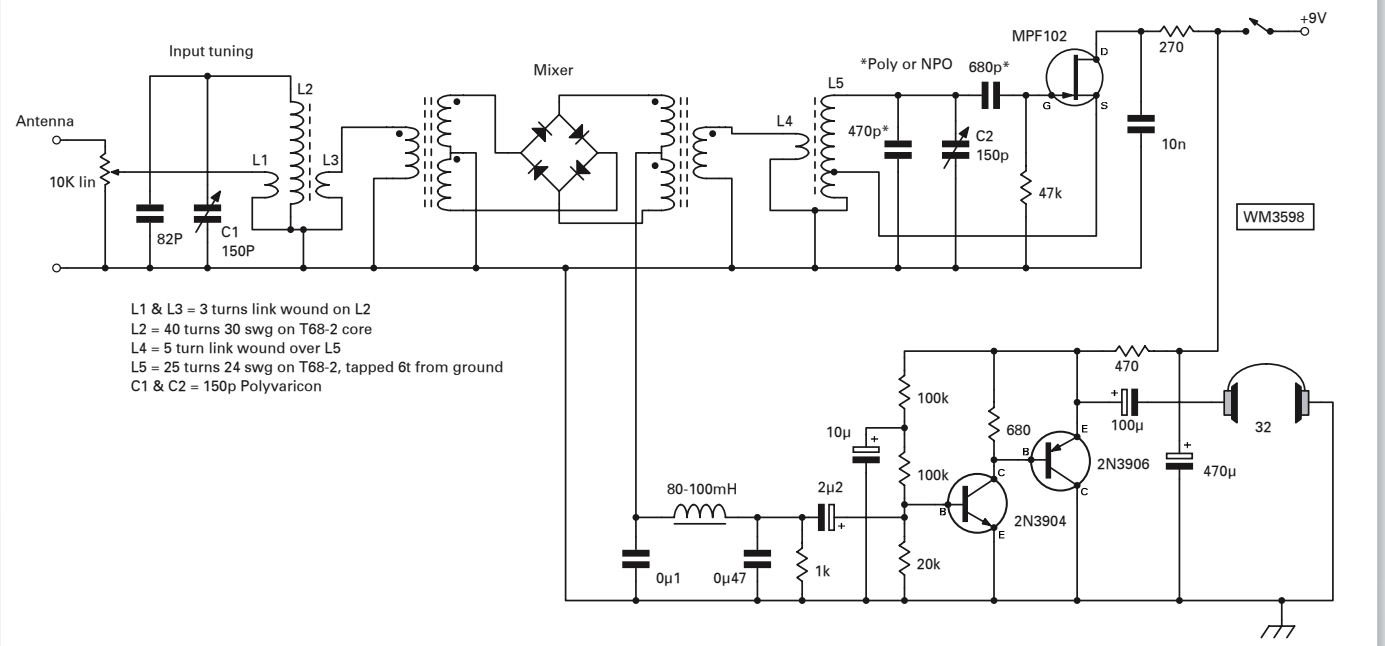


Fig. 1: The circuit of the 1968 DC receiver circuit used by George G3RJV.

journal *QST* in my local library.

Having just completed five years as a student, during which time I did very little Amateur Radio, I was taking up the hobby again but in a different format. My previous home-built radio station used valves and I understood valves as best I could, but now I was embarking on 'solid-state' construction and knew next to nothing about transistors! Around that time the *QST* had ran some excellent articles by people like Wes Hayward and **Doug DeMaw W1FB** (then **W1CER**) with very buildable projects using solid-state technology.

It was from the *QST* articles that my interest in low power Amateur Radio began. One particular article – the 1968 receiver – was special because it was the first time I had read about direct conversion (DC) receivers and it was that led to the building of my first DC receiver. So, of course, I could do nothing less than build that receiver from 1968 again!

The 1968 Receiver

The diagram, **Fig. 1**, shows my version of the 1968 receiver. It's different in several ways but still follows the principles and most of the original circuitry. It also operates on the 3.5MHz band (80 metres) as did the original receiver.

To quote from the article, "Basically the direct conversion method involves the applying of the desired r.f. signal and a local oscillator signal to a product detector. The beating of the two signals produces an audio frequency signal which needs only further amplification in order to be heard."

The article goes on to say, "This receiver was designed for simplicity and ease of duplication rather than for ultimate performance. Nonetheless, this unit in many ways out-performs many of the less expensive commercial receivers on the market today." The heart of the receiver in Fig.1, lies in the mixer (product detector) and local oscillator, a Harley variable frequency oscillator (v.f.o.).

The signal from the antenna is coupled to the mixer via the input

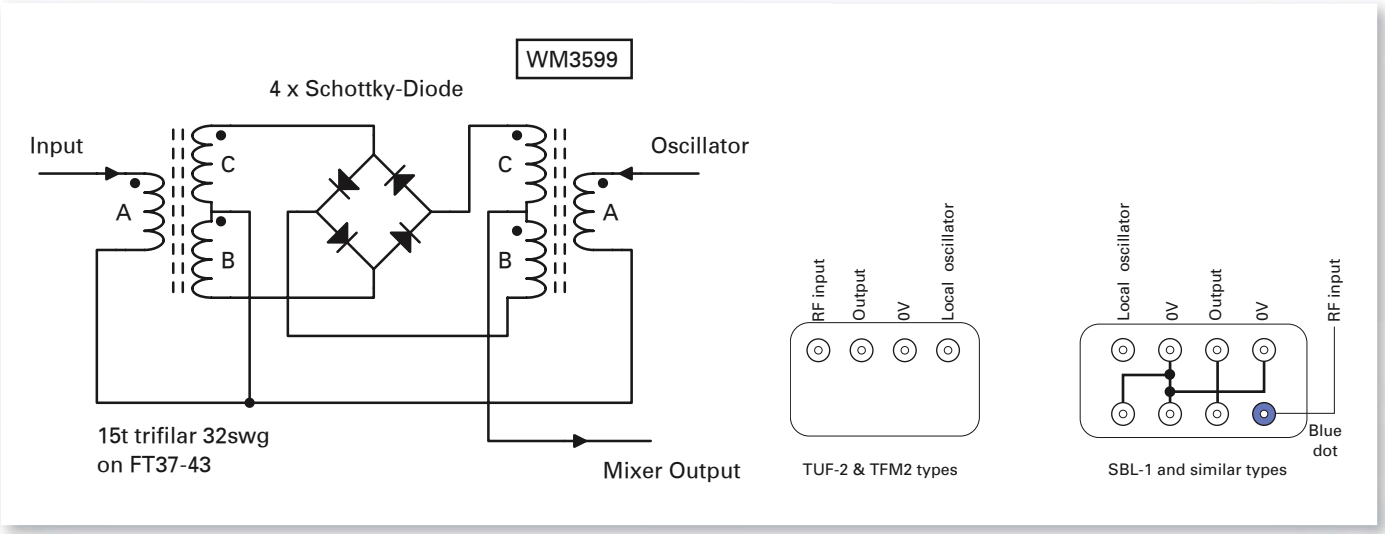


Fig. 2: The mixer module circuitry and pin view of two types of common double-balanced diode mixer.

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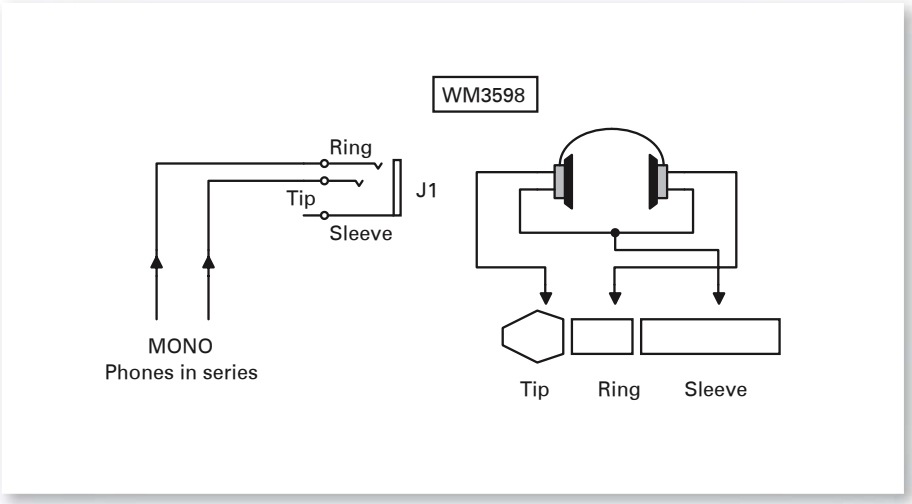


Fig. 3: The method G3RJV used for wiring the headphones.

tuning; a single tuned circuit that with the stated values could cover the 3.5 or 7MHz bands. I have added a linear potentiometer at the antenna input. This functions as a basic r.f. attenuator and is the only gain (volume) control in the receiver. Adding the gain control at the beginning of the receiver makes a lot of sense in a simple receiver.

In addition to performing as a volume control for the receiver output, reducing the signal at the input also helps to prevent over loading the receiver with unwanted signals from broadcast station break-through and cross modulation. This should be a carbon track potentiometer as a wire wound potentiometer would introduce extra inductance to the input circuit. Any value between 1k and 10k would work in this application.

Main Tuned Circuit

The main tuned circuit winding, L2, is 40 turns of 30 s.w.g. enamelled copper wire, wound to occupy about three quarters of the circumference of a T68-2 core. A link winding, L1, made by winding three turns over the grounded end of the L2 winding, provides for a low impedance input from the antenna. Another three turn link winding, L3, is added over the centre of L2 and provides the low impedance input to the mixer.

The input tuning capacitor is a 150pF polyvaricon type variable capacitor with an 82pF parallel capacitor to bring the tuned circuit on to the 3.5MHz band. If you're building the receiver for the 7MHz band this capacitor would be omitted.

The mixer (product detector) functions around four diodes in a ring configuration acting as a double balanced mixer. In the original receiver the diode ring mixer was home-made from four diodes and the associated transformers. However, I cheated and used a commercial diode ring mixer! My choice (because I had some) was the TFM-2 mixer, but the common TUF-2 mixer or the SBL-1 mixer would be suitable alternatives.

The connections for these mixer modules are shown in **Fig. 2**. The diagram also shows how to make your own diode ring mixer. Making a diode ring mixer isn't difficult and I have discussed it in previous editions of this column. The main problem is the winding of the two transformers and the correct placement of the transformer windings within the circuit.

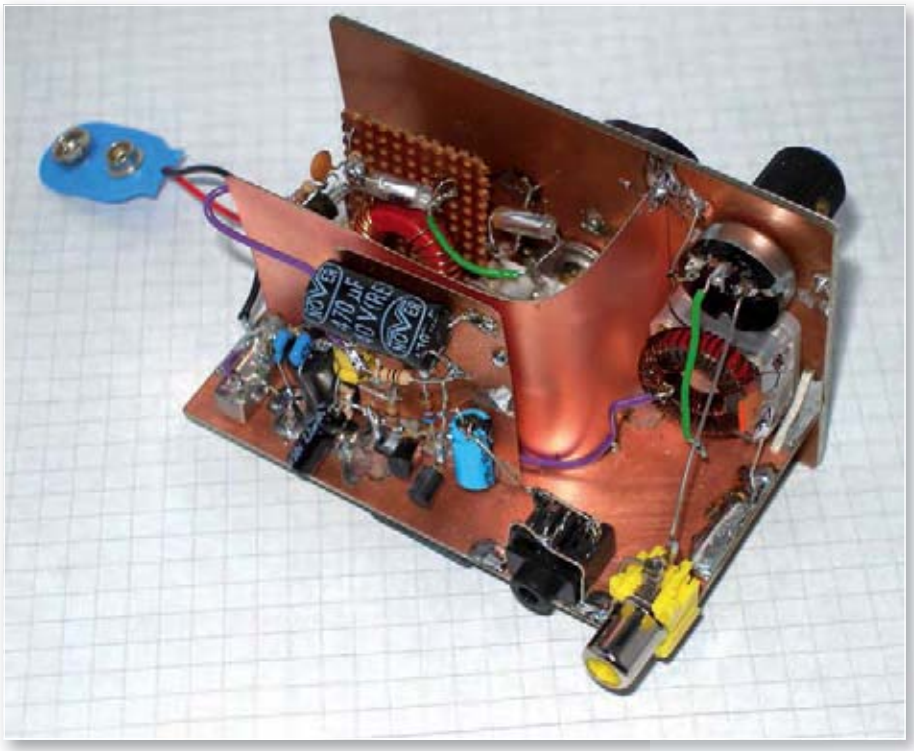
The two transformers consist of 15 turns of 0.3 or 0.35mm (28 or 30s.w.g.) wire wound trifilliar fashion on FT37-43 ferrite cores. A trifilliar winding is where three wires are twisted lightly together and then wound on the core as if they are one wire. This forms windings A, B and C as shown in Fig. 2.

Note the dot marked at one end of each winding. This designates the beginning of the winding. The ends of all the wires are cleaned of the enamel coating and tinned with solder. Then using an ohm-meter the beginning and end of each winding is identified (A dot, B dot and C dot).

The Winding

The winding A on each side of the diode ring becomes the low impedance input or output winding. The beginning of winding B is connected to the end of winding C and becomes the centre tap for higher impedance bifilliar winding.

Windings B and C are connected as shown in the circuit of Fig. 1. The correct placement of the wires from the windings is essential for the mixer to function. Normal silicon diodes, like the 1N914, may be used in the circuit but there is considerable advantage in



The double-balance diode mixer can be seen behind the audio board in front of the screen separating the local oscillator (top left) from the r.f. input, filtering and attenuator (right-hand side).

using Schottky diodes like the BAT42 or the BAT47 for their uniformity and faster switching speed (as well as their lower signal requirements).

The local oscillator is a basic Hartley v.f.o. The feedback to maintain oscillation is via the tapping point on L5, which is made up by 25 turns of 0.56mm (24s.w.g.) enamelled cooper wire wound on a T68-2 core tapped six turns from the grounded end. The oscillator signal is fed to the diode ring mixer from L4; a five turn link winding wound over the centre of L5.

The values for the tuned circuit (L5 with C2 + 470pF in parallel) should provide full coverage of the 3.5MHz band within the tuning range of the variable capacitor. The capacitor C2 is another polyvaricon capacitor of the type used for C1 in the input tuned circuit. The capacitors associated with the oscillator tuning and marked with an asterisk symbol ought to be temperature stable components; polystyrene or n.p.o. would suit the purpose.

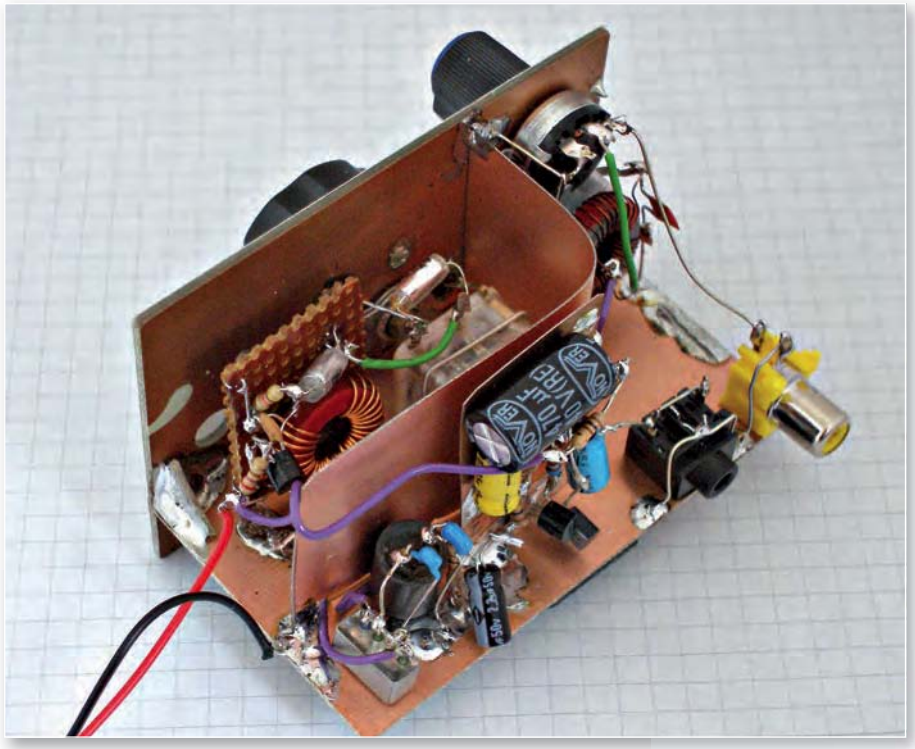
Since a 9V battery supply is envisaged, no voltage stabilisation is included for the oscillator and the mixer circuit provides a constant load on the output.

The Original Circuit

Following the original circuit, the output from the mixer is applied to a single section low-pass filter using an inductor and two capacitors. In the 1968 version an 88mH toroidal inductor was used – these were once very common items in the electronics surplus market having been loading coils for telephone lines.

They are no longer easy to find so I used a Toko 10RB inductor from **JAB Electronics**. These are available in 82 and 100mH values and I found that the 82mH inductor worked well in the circuit. The filter helps to prevent mixer output signals above the audio frequency range over-loading the audio amplifier. The filter also adds some extra selectivity to the receiver.

The original receiver used an audio amplifier with three directly coupled *npn* transistor stages. This simple amplifier fed a pair of high impedance headphones. As high impedance headphones are also no longer easy to find, I decided to use an alternative that would drive a pair of portable cassette player/MP3 player headphones. Although there's a good range of suitable integrated circuit (i.c.) amplifiers – this didn't seem true to the spirit of a 1968 circuit!



Now seen from the left-hand side, the double-balance diode mixer shows up better, as does the local oscillator circuitry.

So, I opted to use (yet again!) a very useful little circuit from **Johnny Apell SM7UCZ** that I offered to *PW* readers in the June 2009 edition of this column. Based upon the Sziklai pair configuration, it produces a useful amount of gain from very few parts and can drive a pair of small stereo headphones connected in series.

The method of wiring the headphones is shown in **Fig. 3**. The amplifier should be capable of about 65dB of gain and some 10 to 20 milliwatts (mW) of output. In practice, this is just enough for the receiver but it might be worth adding a pre-amplifier after the low-pass filter. Having said that my stereo headphones were a cheap pair of unknown manufacture and cheaper headphones are notorious for poor sensitivity.

Receiver Building Style

The receiver could be built in any style and I used 'ugly' construction, mounting the parts over a front and base panel made from printed circuit board (p.c.b.) material. The true 'ugly' nature of the receiver can be seen in the photograph(s). Being an economical radio constructor (some may even say "mean") I pressed a previously used front and base panel unit into use for this receiver.

Regular readers of the column may recognise the panel as I have used the same piece of dubious hardware twice before in this column! The front panel had a ready mounted reduction drive for the tuning capacitor C3. A reduction drive is probably essential to enable a reasonable tuning rate for the receiver.

The 1968 builders recommended building the local oscillator in a separate screen enclosure. And although I've often been careless in this respect when building DC receivers – I decided to follow the advice this time! I have a quantity of very thin p.c.b. stock – indeed, it's so thin that it can be bent into a sharp curve. The oscillator enclosure, such as it is, is just a small piece of this material bent to surround the oscillator. I leave readers to sort out their own arrangement.

I've very pleasantly surprised by the 1968 receiver. The sensitivity is adequate for the 3.5MHz band and it proved stable for c.w. and s.s.b. reception. The bandwidth is somewhat large, due to lack of filtering, but for casual 80 metre listening, it's a pleasant receiver to use. It also reminded me that DC receivers with a passive mixer and very few parts are pleasingly free from internal noise. Well done Wes and Dick!

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ICOM — ML&S carry the largest stock holding of Icom equipment in the UK!

ICOM COUNT ON ML&S!

ALL AVAILABLE EX-STOCK

Icom HF products

IC-718	Basic HF Radio, 12V, 100W output	£449.95
IC-703	No longer in production	£539.95
IC-706mk11G	100W HF/6m + 2/70 Multimode Mobile	£739.95
IC-7200	Mr T's choice for tough HF/6M Operation	£779.95
IC-7000	Full DSP, TFT Screen, 100W HF/6m + 2/70	£939.95

IC-7400
100W HF/6M/2M Base, full DSP, Auto ATU £1199.95

IC-7600	100W, Twin RX, Huge Display. No psu	£3369.95
IC-7700	Superb 200W HF/6M Base, PSU/ATU	£Call!!
IC-7800	Icom's Flagship radio has gone up again	£Call!!
IC-PW1Euro	1kW Fully automatic HF/6m Linear Amp	£Call!!
NEW IC-9100	HF through to 23cms Base Transceiver	

Click on our website to see a video from Tokyo Hamfair August 2009!

Icom V/U Products

IC-E92ED	As above c/w D-Star fitted & splash–proof	£369.95
IC-E208E	Brilliantly easy to use 2/70 remote-head	£269.95
IC-E2820	Proper dual band, dual display, remote etc	£395.95
IC-E2820+D	Supplied with UT-123 D-Star board	£539.95
IC-910H	Multimode 2/70 Base Station	£1249.95
IC-910X	As above but with optional 23cm UX-910	£1449.95

Icom Receivers

IC-R9500	Flagship Base Receiver, 50kHz-3335MHz	£Call!!

PC Controlled Receivers from ICOM

All Windows XP, Windows 7 & Vista Controlled via USB

IC-R1500	10kHz-3300MHz All Mode with remote head	£449.95
IC-PCR2500	Twin Receiver version of PCR-1500	£509.95
IC-R2500	As above but with remote head	£559.95

ICOM IC-7000

The IC-7000 continues to be the ONLY COMPACT base or mobile All Band All Mode Transceiver available today with a TFT Colour screen.

Don't be fooled by its mobile radio sized dimensions. The IC-7000 really is a spin-off of the IC-756Pro111 together with all the additional bands (2/70) that the IC-706mk11G has to offer.

If you require a good performance HF IF DSP transceiver that offers exceptional all round versatility then the IC-7000 is the rig for you.

Only £939.95

For more details see: www.ic-7000.co.uk

For full list of options see:
http://www.hamradio.co.uk/acatalog/IC-7000_Accessories.html

KENWOOD — LISTEN TO THE FUTURE WITH ML&S!

Kenwood HF Products

TS-480SAT	Remote head HF/6m 100W inc ATU Transceiver	£749.95
TS-480HX	200Watt version of above, no auto-ATU	£849.95
TS-2000E	100Watt all mode HF/2/6M with auto-ATU etc	£1479.95
TS-2000X	As above but fitted with 10Watts on 23cm (all mode)	£CALL

Kenwood V/U Products

TH-F7E	The only 2/70 FM Handie with SSB/CW WB Receiver	£229.95
TM-V71E	First Class 2/70 FM Mobile with remote head	£289.95
TM-D710E	The only 2/70 FM Mobile/Base with APRS/TNC etc	£429.95
TM-D710E+AvMap Bundle. Personal Navigator for GPS located APRS		£Call!!

KENWOOD TS-480SAT/HX

ML&S Price:
£749.95 (SAT)
£849.95 (HX)

The very popular TS-480 is available in two versions, 100W with Auto-ATU (SAT) and the 200W version without ATU (HX). For those that want the extra power we recommend the MyDEL MP-9600 60Amp PSU and LDH AT-200Pro Auto tuner. **What a package!**

MyDEL VENTUS G730 GPS-LOGGER

This USB memory stick sized unit is a fascinating pocket device with multiple commercial and personal uses for individual movement tracking. It's very light, extremely easy to use and logs your route automatically. It also adds your GPS location to digital pictures. It presents the route you have taken in 3D via Google Earth™ on your PC and it can export in different formats.

An example:
At the start of your walk, car or cycle ride turn on the G730 and when you finish your journey, turn it off. Once home plug the G730 into your PC, open the software, click on two icons and the route and pictures you have taken are viewed on Google earth/maps.

The G730 records your speed, altitude, distance etc., even showing how long you have stopped for during your journey. You can even use your digital images taken on route for future reference. How good is that!

Accuracy is to within 5 metres and you get up to 18 hours continuous use after a 2 hour charge via your USB port on your PC. Use the MyDEL VENTUS GPS-logger for cycling, rambling, jogging, skiing, trekking, sailing etc.

MyDEL Ventus WX-831

Introducing the next level of professional weather stations

This new much improved wireless Weather Station is built to a very high standard and even includes O-Ring seals on battery compartments that are mounted externally. The quality of external hardware is built to last for years and really moves the game on when it comes to "Professional Weather Stations"

RRP £169.95.
Introductory offer of only £99.95.
Options: Additional wireless temperature monitors: £24.95.
PSU to run the WX-831 from 240V: £19.95

ML&S are the sole UK distributor for the Ventus G730 and W-831

See www.hamradio.co.uk for more details on all of these items ... and much, much more! E&OE

NEW!

MicroBit Remote Rig interface

A complete remote control system for Amateur radio

Using Microbit's advanced technology, full remote control of your rig is available today.
Imagine going on holiday but missing your HF system back home. Well no more! Using the RRC-1258 system all that is required is for you to take the head unit of say your IC-706 or TS-480 together with one half of the RRC-1258, plug into a LAN connection connected to the web and within seconds you are "ON AIR" as if you were sitting in your shack at home. (Minus the cat, TV and any other external interference!)

The Microbit is available in three formats for the IC-706, TS0480 or RS-232.
We can supply a set of leads ready made at an additional £24.95.

Microbit-1258 £399.95. Interface Leads £24.95
For more info see **www.hamradio.co.uk/rrc-1258.shtml**

ML&S are the sole UK & Ireland distributor for Microbit.

Palstar New Product

Palstar Commander HF-2500 1.5kW Amplifier

Palstar are pleased to announce a new range of HF Linear Amplifiers built to the highest standard (As you would expect from the USA Manufacturer). We have started with the "Commander HF-2500" which is available from stock. The 2m & 6m versions will be available during early 2010. ML&S: £3499.95. See web for more details.

Full range of Palstar now in stock. See www.hamradio.co.uk for lowest prices!

AT-500 600 Watt PEP Antenna Tuner .. **SPECIAL PRICE £329.95**
AT-Auto Automatic 1500 Watt ATU **£1179.95**
AT-1KP 1200W Antenna Tuner **£369.95**
AT-1500DT 1500W Differential Antenna Tuner **£449.95**
AT-2K (2000W) Antenna Tuner **£399.94**
AT-4K (2.5kW)Antenna Tuner **£735.94**
AT-5K (3.5kW) Antenna Tuner **£1079.95**
BT-1500A Balanced Antenna Tuner **£659.95**
ZM-30 Antenna Analyser **£359.95**
PM-2000AM Power/SWR Meter £149.95

Palstar Dummy Loads
DL-1500 (1.5KW) **£109.95**
DL-2K (2kW) **£229.95**
DL-5K (5kW) **£359.95**

Palstar Receiver
R30A Receiver Palstar R30A, fitted Collins filters for SSB & AM **£549.95**
MW550P Active preselector & ATU for AM & 160M reception **£279.94**
SP30 Matching Desk Speaker **£69.95**
AA30 Active Antenna Matcher 300kHz-30MHz **£99.95**

MyDEL

HB-1A Ultra Compact 3 Band CW Transceiver

Offering up to 4 Watts output on 40/30/20M Bands, this tiny HF portable is powered by 8 x AA cells and is aimed at the serious QRP enthusiast and has performance similar to that of the Elecraft KX-1.

- 20 meters, 30 meters and 40 meter amateur bands.
- CW Transceive, SSB receive.
- Receiving from 5 MHz to 16MHz.
- Maximum transmission power of about 4 watts on external 12V.
- Weight 350Grams (approximate).
- Battery compartment to hold 8 rechargeable AA cells.
- Built-in auto function keys.
- DDS VFO with 20 frequency storage memory.
- Digital dial with LCD technology.
- Automatic keyer with the CQ programmable with your call.
- RIT 10 Hz, 100 Hz.
- Frequency conversion super-heterodyne receiver.
- Unit will operate with voltage supply from 8-14 VDC.
- Built in AGC function.

£249.95. Call or see website for further details.
NOW IN STOCK - very limited quantity.

MyDEL

CG-3000

ML&S: £279.95

With 200W and 200 memory channels.

- Tunable frequency: 1.8 - 30 Mhz with long wire antenna from 8 meters
- Input impendence: 50 ohms
- Input power: 10 - 200W PEP
- SWR: <2:1
- Power supply voltage: 12V +/- 10%
- Current consumption: <0.8A
- Auto tuning time: Approx. 2 seconds (first time tuning)
  Less than 1 second (return to memory frequency)
- Memory channels: 200
- Weight: 1.8 KG
- Size: 310 x 240 x 72mm (L - W - H)

CG-3000 shown with optional remote switch.

NEW! Remote control for the CG-3000 and CG-5000. £39.95

CG-5000MkII

At last! 600W PEP High Speed Remote Tuner from MyDEL
Specifications:

- Tuneable frequency:
  1.8 - 30Mhz with long wire antenna from 8 meters
- Input impendence: 45-55 ohms
- Input power: 10 - 600W PEP
- SWR: <2:1
- Power supply voltage: DC 13.8V
- Current consumption: <1.5A
- Memory channels: 800
- Auto tuning time: 0.5-6 seconds (first time tuning), less than 0.2 second (return to memory frequency)
- Weight: 3 Kg.
- Size: 385mm x 280mm x 110mm (L - W - H)

ML&S: £549.95

The World's BEST ANTENNA TUNERS from ML&S

LDG Auto Tuner Range

LDG

AT-100pro	Desktop tuner covering all frequencies from 1.8-54 MHz	£189.95
AT-200pro	Designed for new generation of rigs	£209.95
AT-1000Pro	1kw 160m-6m (1.8-54MHz) High speed Auto ATU, tuning range 6-1000Ohms	£499.95
AT-897	Bolt-on Alternative Auto Tuner for the FT-897. Wider tuning range and cheaper too!	£179.95
IT-100	New version of the AT-7000	£149.95
YT-100	NEW AUTO ATU for FT-897/857 or FT-100 with additional Cat Port Control	£169.95
Z-817	Ultimate autotuner for QRP radios, including the Yaesu FT-817D	£119.95
Z-100Plus	Ultimate autotuner for Yaesu FT-817D	£139.95
Z-11Pro	Portable compact & tunes 100mW to 125W	£154.95
RCA-14	4-way DC Breakout Box	£49.95
KT-100	Dedicated tuner for Kenwood radios	£169.95
RBA-1:1	Probably the best 1:1balun out there	£34.95
RBA 4:1	Probably the best 4:1 balun out there	£34.95
DTS-6 + 6R	Remote Antenna Switchers. 1.5kW 1-54MHz.	£43.95

NEW FTL- Meter
Jumbo size meter for your FT-857/FT-897. LDG's new version of the its popular Yaesu meter is the FTL-Meter. It's a highly readable 4.5 inch meter face with calibrated scales for signal strength or disc on receive; power out, SWR, Mod, ALC or supply voltage on transmit. Each function is selected from the radio's meter menus. RRP: 79.95 INTRO PRICE: £67.95

MyDEL

Power Supplies

New MyDEL PS-30SW11

Latest high performance switch mode PSU. Die-cast Alloy chassis, full over-voltage protection and short circuit design. **RRP £119.95.**
Introductory offer only £79.95

SPS-8250	25A continuous, fully metered power supply	£79.95
MP-9626	120A, 13.8V DC power supply	£299.95
MP-8230	13.8V DC, 25A power supply	£69.95
MP-925	Linear 25-30A, 13.8V DC power supply	£99.95
MP-9600	60A switch mode power supply	£179.95
MP-6A	13.8V DC, 6A power supply	£29.95

MyDEL

AS REVIEWED IN PW December Issue 2009

CG SB-2000 USB Radio Interface

NEW PRODUCT

- This small self contained beautifully styled box weighing only 400 grams really is a one stop solution to your data and radio control. It employs a CAT/CIV interface as standard and supports CAT with RS232 protocol.
- The MyDEL CG SB-2000 Interface connects to your PC via USB and Sound Card and connects to your radio via Custom leads.
- Once connected and configured you have Computer Control via USB and decoding via your soundcard using HamRadio Deluxe or other packages.
- **Intro price of only £99.95** High quality ready-made leads for most rigs available at only £18.95.

Mini VNA PC Controlled Antenna Analyser

ML&S: £259.95

The mRS miniVNA is a compact 100kHz to 180MHz antenna analyser interface that is operated via a PC powered by a single USB connection. You can see at a glance where the antenna is resonant, what the SWR and the return loss is. The best (minimal) SWR frequency is automatically found and displayed. An optional internal RS232 connection is also available.

See www.hamradio.co.uk for more details on all of these items ... and much, much more! E&OE

club news

Please remember to include full details of your club, E-mail and telephone contact details and the postcode of your meeting venue - it helps potential visitors to find you!

Send all your club info to

PW Publishing Ltd.,
Arrowsmith Court,
Station Approach,
Broadstone,
Dorset BH18 8PW
E-mail: newsdesk@pwpublishing.ltd.uk

AYRSHIRE (Scotland)

Kilmarnock & Loudoun ARC
Graham MM0GHM
Tel: (0780) 2954 739
E-mail: mm3gdc@btinternet.com
www.klarc.org
We meet every 2nd and 4th Tuesdays at the clubhouse at E. Ayrshire Internal Transport, 36a Main St., Crookedholm, Kilmarnock KA3 6JS

BEDFORDSHIRE

Shefford & DARS
David Lloyd. Tel: (01234) 742757
www.sadars.org.uk
The Shefford and District Amateur Radio Society meets every Thursday at the Community Hall, Ampthill Road, Shefford, SG17 5BD (next to the Chip shop). See web site for our full programme.

BERKSHIRE

Reading & DARC
Pete Milton. Tel: (01189) 695697
www.radarc.org
The Reading & District Amateur Radio Club meets on the second and fourth Thursday of the month at Woodley Pavilion, Woodford Park, Haddon Drive, Woodley, Berkshire RG5 4LY. Mid-september sees commencement of the Advance Licence Course run by Alison Johnson G8ROG, details from g3ngx@radarc.org

CAMBRIDGESHIRE

Huntingdonshire ARS
Gerald G8AKL. Tel: (01487) 740794
E-mail: hunts.hams@yahoo.co.uk
www.hunts-hams.co.uk
Huntingdonshire ARS meets at the Medway Centre, Medway Road, Huntingdon PE29 1SF. Meetings are from 7.30pm until 10pm on the 2nd & 4th Thursday of the month.

Peterborough & DARC
G4EHW.
www.radioclubs.net/padarc
Meets on 4th Wednesday of the month at Southfields Community Centre, Stanground, Peterborough. PE2 8RZ. Directions and full details on website.

CHESHIRE

Chester & DRS
Barbara Green.
Tel: (07957) 870770
E-mail: barbara@rutland.go-plus.net
www.chesterdars.org.uk
The Chester & District Radio Society meets on Tuesday evenings at the Burley Memorial Hall, Common Lane, Waverton, Chester CH3 7QN.

Halton RC
Sam. Tel: (01928) 714231
http://g7wfs.sytes.net/hrc/index.htm
The Halton Radio Club meets in The Play Centre, Norton Hill, Windmill Hill, Runcorne WA7 6LJ every Thursday from 7.30 to 9.30pm. There's plenty of parking and full disabled access.

Macclesfield & DRS
Adie Dodd. Tel: 0795 7765511
www.gx4mws.com
The Macclesfield & District Radio Society meets every Monday at the Pack Horse Bowling Club, Westminster Road, Macclesfield SK10 3AT at 8pm. Licence courses are run year round and visitors are always welcome.

Stockport RS
David Simcock. Tel: 0161 456 7832
E-mail: secretary@gx4mws.com
www.stockportradiosociety.co.uk
The Stockport Radio Society meets on the first and third Tuesdays at their new location of: Walthew House, Shaw Heath, Stockport SK2 6QS

Warrington Amateur Radio Club
Paul Carter.
E-mail: g7odj@warc.org.uk
www.warc.org.uk
The Warrington Amateur Radio Club meets every Tuesday at 8pm at the Grappenhall Youth and Community Centre, Bellhouse Lane, Grappenhall, Warrington WA4 2SG.

CORNWALL

Cornish RAC
Steven G7VOH
Tel: (01209)844939
E-mail: g7voh@btinternet.com
www.cornishradioamateurclub.org.uk
The Cornish Radio Amateur Club meets at the Church Hall, Church Road, Perranarworthal, Truro TR3 7QE on the first Wednesday of every month at 7.30pm. There is also a Computer Section that meets at the same venue and time on the second Monday of every month, except December.

Newquay and District ARS
Joe Bell. Tel: (01726) 891557
E-mail: joe_bell@btinternet.com
www.btinternet.com/~kevin.francks/index.html
The Newquay and District ARS meets every other Thursday at Treviglas Community College, Bradley Road, Newquay. TR7 3JA with either arranged talks on the evening or just a general chit chat amongst members. Also the club offers foundation training on club nights.

Poldhu ARC
Keith Matthew.
Tel: (01326) 574441
E-mail: g0wys@yahoo.co.uk
www.gb2gm.org
The Poldhu Amateur Radio Club meets at The Marconi Centre, Poldhu Cove, Nr Mullion, Cornwall TR12 7JB. Tel: 01326 241656.

COUNTY DOWN

Bangor and District ARS
Mike. Tel: 028 4277 2383
http://www.bdars.com
The Bangor and District Amateur Radio Society meets on the first Thursday of every month in 'The Boathouse', Harbour Car Park, Groomsport BT19 6JP at 8pm.

COUNTY DURHAM

Bishop Auckland RAC
Mark Hill. Tel: (01388) 745353
http://barac.m0php.net/
The Bishop Auckland Radio Amateur Club meets every Thursday at 8pm in the Village Community Centre, Stanley Crook, Co. Durham DL15 9SN. Tuition for Foundation, Intermediate and Advanced licences is available. The club is as an RSGB registered exam centre.

Great Lumley AR&ES
David Barclay. Tel: 0191 3888113
E-mail: m0bpm@btinternet.com
The Great Lumley Amateur Radio & Electronics Society meets in the Community Centre, Front Street, Great Lumley, Chester-le-Street, Co. Durham DH3 4JD on Wednesday nights from 7 to 9pm.

DERBYSHIRE

South Normanton Alfreton and District ARC
A J Higton. Tel: (01773) 783658
E-mail: Snadarc@aol.com
www.snadarc.com/
The South Normanton Alfreton and District Amateur Radio Club meets in the Village Hall, Community Centre, Market Street, South Normanton, Derbyshire DE55 2EJ.

DEVON

Exemouth ARS
Mike G1GZG. Tel: (01395) 274172
E-mail: micael.newport1@btinternet.com
The club meets on the 1st and 3rd Wednesdays of each month at 'The Scout Hut', Marpool Hill, Exmouth Devon EX8 1TD.

Exeter ARS
Phil 2E0PCJ
Tel: (01392) 877413
E-mail: philcjays@aol.com
The Exeter Amateur Radio Society meets on the 2nd and the 4th Monday at 7.30pm in the Moose Centre, Spinning Path Lane, Blackboy Road, Exeter EX2 5RP. Tuition for Foundation, Intermediate and Advanced licence is available. The club is an RSGB registered examination centre.

Torbay ARS
Dave Helliwell.
E-mail: g6fsp@tars.org.uk
www.tars.org.uk
The Torbay Amateur Radio Society meets Fridays at 7.30pm in the Teignbridge District Scout Headquarters, Wolborough Street, Newton Abbot, Devon TQ12 1JR.

DORSET

Blackmore Vale ARS (BVARS)
Nick Perrin. Tel: (01747) 838936
E-Mail: bnperrin@theiet.org
www.radioclubs.net/bvars/
BVARS meets in The Youth Club, Coppice Street, Shaftesbury Dorset SP7-8PF each Tuesday evening at 7.30pm. The Club callsign is G4RBV. The main meeting is the second Tuesday of the month and details of events and full details of the Club can be found on the website.

Bournemouth RS
John. Tel: 07719 700 771
www.brswebsite.org.uk
The Bournemouth Radio Society meets on the first and third Friday of each month at the Kinson Community Centre, Pelhams Park, Millhams Road, Kinson, Bournemouth BH10 7LH. Meetings take place in Room 5 at 8pm and members assemble in the bar from 7.30pm. Visitors are always welcome.

Poole Radio Society G4PRS
'Tex' G1TEX. Tel: 07966 460 552
www.g4prs.org.uk
Meetings are every Friday at 19:30 for 20:00 at the The Old Chapel Hall, Cabot Lane, Creekmoor, Poole BH17 7BX, the second meeting of each month is the formal evening, all others are basically shack and Natter nights. After the recent successful Intermediate course, training begins again in September.

DUMFRIES & GALOWAY (Scotland)

The Wigtownshire Amateur Radio Club
Ellis Gaston. Tel: (01776) 820413
Web: www.gm4riv.co.uk
The club meets every Thursday from 19:00 Hrs at the The Aird Unit, Stranraer Academy, Stranraer, DG9 8BQ, South West Scotland.

EAST SUSSEX

Brighton RC
Reg Moores. Tel: (01273) 503869
The Brighton Radio Club meets on the second and fourth Tuesdays of each month at the Vallance Community Centre, Conway Court, Sackville Road, Hove BN2 3WR at 7.30pm. Anyone wishing to know more are welcome to come along to a meeting, entrance is free.

Hastings E&RC
Gordon Sweet.
Tel: (01424) 431909
E-mail: gordon@gsweet.fsnet.co.uk
www.herc.uk.net or
http://g4cus.mysite.wanadoo-members.co.uk/
The Hastings Electronics & Radio Club meets on the third Wednesday at the Taplin Centre, Upper Maze Hill, St Leonards on Sea TN38 OLQ at 7pm.

ESSEX

Braintree & DARC
Keith. Tel: (01376) 329279
www.badars.org.uk
The Braintree & District Amateur Radio Society meets on the first and third Monday of the month in The Clubhouse,

Braintree Hockey Club, Church Street, Bocking CM7 5LJ.

Colchester RA
www.g3co.ccom.co.uk
The Colchester Radio Amateurs meets at 7.30pm on alternate Thursdays at St Helena School and The Colchester Institute, Sheepen Road, Colchester, Essex CO3 3LE. Members and non-members welcome.

Chelmsford ARS
Martyn Medcalf. Tel: (01245) 469008
E-mail: info2007@g0mwt.org.uk
www.g0mwt.org.uk
The Chelmsford Amateur Radio Society meets on the first Tuesday of each month in the Marconi Sports & Social Centre, Beehive Lane, Great Baddow, Chelmsford, Essex CM2 9RX at 7.30pm. - All welcome.

Loughton & Epping Forest ARS
Marc Litchman. Tel: 020 8502 1645
E-mail: info@lefars.org.uk
www.lefars.org.uk
The Loughton & Epping Forest ARS meet Friday fortnightly at All Saints House, Romford Road, Chigwell Row, Essex IG7 4QD between 7.45 and 10pm. All visitors will be made most welcome.

South Essex Amateur Radio Society
Norman M0FZW. Tel: 01268 692776
E-mail: secretary@southessex-ars.co.uk
www.southessex-ars.co.uk/
Meets: Meet at 8pm on the second wednesdays of each month at South Benfleet Primary School, High Rd, South Benfleet, Essex SS7 5HA. (Entrance: 51°33'10.45N 0°33'39.65E), (Opp. Smiths Wood Yard). All are welcome to come along or join our net on 145.225MHz weekdays @17.00hrs..

FIFE (Scotland)

Glenrothes & DARS GM4GRC
D Francis MM0DYX.
Tel: 01383 823878
Meet Wednesdays at the Football Pavillion, Station Rd. Thornton Fife KY1 4AX. Club Chairman Ken GM3YBQ runs course at all licence levels.

GLOUCESTERSHIRE

Cheltenham ARC G5BK (CARA)
Derek G3NKS. Tel: 01242 241 099
E-mail: g3nks@blueyonder.co.uk
www.caranet.co.uk
The club meetings are held on the first Friday of each month, starting at 8p.m. at Prestbury Library, The Burgage, Cheltenham, Gloucestershire, GL52 3DN.

Forest of Dean Amateur Radio Group
Adrian Lane M3TVF
Email: adrian@fodarg.com
www.fodarg.com
We will be meeting every Tuesday night as from now at 19:30 hours at Ruardean Sports & Social Club, Ruardean Hill, Drybrook, Gloucestershire GL17 9AS. Anyone with an interest in any aspect of radio or electronics is welcome.

Gloucester Amateur Radio and Electronics Society
Anne 2E1GKY/M3GKY
Tel: (01452) 548478 (After 10am)
E-mail: hamreed@blueyonder.co.uk
www.g4aym.org.uk
Meet at Churchdown School, Winston Road, Glos. GL3 2RB, every monday evening at 7-30pm until 10pm except for Bank Holidays when we operate from a local escarpment. Monday Oct 5th Talk by Brian G4CIB on LUNDY, 12th Sale of Junk and Books, 19th Operating Club Equipment, 26th Informal Evening.

GWNEDD (Mid-Wales)

Meirion ARS.
John MW0VTK. Tel: 07772 720099
E-mail: tawelfan@talk21.com
http://meirionars.multiply.com/
Meirion ARS, meet in the Royal Ship hotel, Dolgellau LL40 1AR, on the 1st Thursday evening of each month. 8.30 p.m. for 8.45 p.m. start New members and visitors are very welcome. Regular talks are organized and all the details for meeting and special events can be seen on the club website.

HAMPSHIRE

Andover Radio Amateur Club.
Martin M0MWS. Tel: (01980) 612070
E-mail: martinsmith@kukltd.co.uk
www.arac.co.uk
The Andover Radio Amateur Club meets on the first and third Tuesdays in the month at the Club venue in The Village Hall at Wildhern, SP11 0JE. Map Ref SU350510 at 19:30 hours.

Fareham & District ARC
Alastair Sinclair.
Tel: 01329 235397
E-mail: secretary@fareham-darc.co.uk
www.fareham-darc.co.uk/
The Fareham & District Amateur Radio Club meets on Wednesdays evenings from 7.30pm in the Fareham Sailing & Motor Boat Club, The Boathouse, Lower Quay, Fareham. PO16 0RA

Farnborough & District Radio Society (FDRS)
Derek G3OFA
E-mail: mail@fdrs.org.uk
www.fdrs.org.uk
Meets every 2nd and 4th Wednesday in the month at 7:30 for 8:00 pm in the Farnborough Community Centre, Meudon Avenue, Farnborough, Hampshire, GU14 7LE Visitors and new members are always most welcome. July 22nd Construction Contest and Junk Sale.

Horndean & District ARC
Stuart Swain. Tel: (02392) 472846
E-mail: stuart.swain@hotmail.co.uk
www.hdarc.co.uk
The Horndean & District Amateur Radio Club meets on the first and fourth Tuesdays each month in the Lovedean Village Hall, 160 Lovedean Lane, Lovedean, Hants PO8 9SF at 7.30pm. Visitors are always very welcome. The will be running a Foundation Licence course and exam in October in the Waterlooville area. Pre-registration is essential, and more details can be obtained from Stuart.

Isle of Wight Radio Society
Tony Pegg. Tel: 01983 868 978
E-mail: tony.pegg1@btinternet.com
www.g3sky
The IWRS meets every Friday evening 7.00pm-10.pm at Haylands Farm,Salters Rd. Ryde PO33 3HU. Visitors very welcome.The club runs courses for Foundation, Intermediate and advanced licenses. The club is registered as an RSGB exam centre.

Itchen Valley ARC
Charlie M0WYM
Tel: (02380) 439560
E-mail: secretary@ivarc.org.uk
www.ivarc.org.uk
The Itchen Valley ARC meets on the second and fourth Friday of each month at The Scout Hut, Brickfield Lane, Chandlers Ford, SO53 4DP, doors open 7.30 pm. See website for our programme, visitors welcome. Join our club net on 145.550, Thursday evenings at 8.30 pm. The club is a registered as an RSGB examination centre.

Lymington Community Association Radio Club
Keith G8MZF Tel:(01590) 672337 (*work*)
(02380) 849395 (*evenings*)
Email: lymcomass@aol.com
The club meets at Lymington Community Centre, New Street/Cannon Street, Lymington SO41 9BQ, on friday nights. Talk-in on the night on or near 145.550 club call M0LCC. All are welcome. Start time hopefully 7.30pm bar open from 7.00pm. Plenty of free parking nearby.

HERTFORDSHIRE

Verulam Amateur Radio Club (St Albans)
Norman. Tel: (07773) 628912
E-mail: g1bsz@aol.com (sec)
www.radioclubs.net/verulam
The club normally meets every 3rd Tuesday of the month 800pm at Aboyne Lodge School.Etna Road, St Albans, AL3 5NL. New members and visitors are always very welcome. Regular talks, events, Foundation, Intermediate courses exams are held. Club nets also take place every Sunday 12.00noon 40m (7.150MHz), then 14.00pm 2m (145.375) and on Tuesday 19.45pm 160m (1.975) then 20.00pm 2m (145.375). For further information about the club and events please see the website.

Stevanage & District ARS
John. Tel: (01462) 459254
E-mail: jmccutcheon@freeuk.com
www.sadars.org/
The Stevenage and District Amateur Radio Society meet every Tuesday 7.30pm, at the Stevenage Resource Centre, Chells Way, Stevenage, SG2 0LT. Regular talks and demonstrations. Registered centre for Foundation/Intermediate/Advanced exam courses (40+ passes last year). Club Net last Friday of month 7.30pm on 145.450MHz. All welcome, see website for further details.

HUMBERSIDE

Hull & District ARS
Keith Shaw.
Tel: 01482 217776
E-mail m3shw@yahoo.co.uk
raymond penny Tel: 01482 376835
E-mail penibs@penibs.karoo.co.uk
Hull & DARS meet every friday night at 1930 – 2200 at the walton street leisure centre, goathland close, walton street hull, East Yorks HU3 6NG.

JERSEY

Jersey Amateur Radio Society GJ3DVC
Rob Luscombe (secretary) 2J0RZD.
Tel: 07797 923916
E-mail: gj3dvc@gj3dvc.org.je
http://www.radioclubs.net/gj3dvc/
The Jersey Amateur Radio Society meets every Friday at 7.30pm at The German Signal Station, Rue Baal, La Moye, St. Brelade, Jersey, JE3 8HQ, also on a Wednesday evening from time to time to maintain, alter and improve the shack, antennas etc. and also for club training. Coffee and car parking available, visitors are always welcome, shack rental available. See our website for further information.

KENT

Bredhurst RATS
www.the-brats.co.uk
The Bredhurst Radio Amateur & Transmitting Society meets on Thursdays at the Parkwood Community Centre, Rainham, Gillingham, Kent ME8 9PN at 8.30pm. If you are interested in joining the club, write to: Membership, The BRATS c/o The Club Room, The Parkwood Community Centre, Long Catlis Road, Rainham, Gillingham, Kent, ME8 9PN.

Hilderstone Radio & Electronics Club
Mike Howland
E-mail: g4mix@waitrose.com
www.g0hrs.org.uk
Meetings now at The Science Block, Chatham House School, Chatham Street, Ramsgate, CT11 7PP on 2nd and 4th Friday of the month at 7-30pm.

Bromley & DARS
Graham
E-mail: bdars@grahamc.net
www.bdars.org
The Bromley & District Amateur Radio Society meets in The Victory Social Club, Kechill Gardens, Hayes, Kent BR2 7NH (off B265, Hayes Lane, Bromley) on the third Tuesday of the month at 7.30pm.

LANARKSHIRE (Scotland)

Mid-Lanark ARS
Dennis. Tel: 07505529335
Email: mm0dnx@yahoo.co.uk
www.mlars.org.uk/
The Mid-Lanark ARS meets on Friday evenings at the Newarthill Community Education Centre, 288 High Street, Newarthill, Motherwell ML1 5JU. Visitors and new members are very welcome. The club has HF and VHF shacks for use on club evenings. Courses fro all levels are run at the club. See web site for details of our upcoming meetings.

LANCASHIRE

Oldham RC
Christopher. Tel: 07749347142
E-mail: secretaryoarc@btinternet.com
www.oarc.org.uk
The Oldham Radio Club meets on Thursdays at Royton Air Training Corps, Hillside Avenue, Royton, Oldham OL2 6RF at 7:30pm.

Ellenroad RC
David. Tel: (01706) 358650
E-mail: info@ellenroadradioclub.org.uk
http://www.ellenroadradioclub.org.uk/info.htm
The Ellenroad Radio Club (ERC) meets every Monday evening from 7 to 9pm at the Ellenroad Steam Museum, Elizabethan Way, Newhey, Rochdale OL16 4LG. The museum houses the UK's only fully-working cotton mill engine, complete with its 220ft high chimney. Newcomers are always welcome.

Morecambe Bay ARS
Martin Hazel. Tel: (01524) 848193

E-mail:
martin@mbars.internationalham.com
www.mbars.internationalham.com
Morecambe Bay Amateur Radio Society meet at the Trimpell Sports and Leisure Club, Out Moss Lane Morecambe, every Tuesday evening from 1930. They also have a new website at all of their events calendar for the next year is to be found there.

Preston Amateur Radio Society G3KUE
Richard M3URD. Tel: (01772) 864 639
www.prestonars.co.uk/joomla/
The Preston ARS meet every Thursday evening at the Longsdale Club, Fullwood Hall Lane, Fullwood, Preston PR2 8DA. Meetings start at 1900 and all are welcome.

Thornton Cleveleys ARS
(G4ATH, & G6GMW)
John. Tel: (01253) 399377,
E-mail: m3waz@hotmail.co.uk
www.tcars.org.uk
Meet monday evenings at the Frank Townend Center, Kensington road, Cleveleys, Lancashire FY5 1ER starting from around 7.30pm.

LEICESTERSHIRE

Loughborough & District ARC
Chris Walker. Tel: (01509) 504319
Email g1etz@aol.com
www.radioclubs.net/ladarc
Loughborough & District Amateur Radio Club meets at the Glenmore Community Centre, Thorpe Road, Shepshed, LE12 9LU on a Tuesday evening from 7.30pm. The clubs programme of events can be found on our websites. Visitors and new members most welcome.

LINCOLNSHIRE

Franklin ARC
Brendan. Tel: (01754) 820204
E-mail: bren.sykes@btinternet.com
We meet the last Wednesday of every month at the Victoria Inn Wainfleet Road Skegness Lincolnshire PE25 3RG. @19:30hrs. We also have regular nets, on the 1st and 3rd Tuesday of every month on 145.550± @20:00hrs. Registered as an RSGB examination center for courses run by G0OTH Robert. We are organizing special events, field days and our own rally (See Rallies Section) this year so listen out for us, our call sign is M0FRC.

Friskney & E Lincolnshire Communications Club (M0LFC)
Bren 2E0BDS Tel: 01754 820204
www.felcc.webs.com
A new club, our meetings are held on the first Tuesday of every month at Friskney Village Hall (6m south of Skegness) Church Road Friskney Lincolnshire. The hall is large, modern and warm for those winter months., Our training officer is Ant M0HAZ and we're an affiliated test centre for Foundation and Intermediate Exams. All are welcome to come and join us.

Lincoln Short Wave Club
Pam Rose Tel: 01427 788356
E-mail: pamelagrose@tiscali.co.uk
www.g5fz.co.uk
The Club meets every Wednesday 8 p.m. at the BSA Social Club, Village Hall Lane, Aisthorpe, Lincoln, LN1 3SJ and some Saturday mornings in the shack for Foundation/Intermediate course tuition and to air the club callsigns G5FZ and G6COL.

Spalding & DARS
Graham Boor. Tel: 07947764481
E-mail: secretary@sdars.org.uk
www.sdars.org.uk
The Spalding & District Amateur Radio Society meets at the Castle Sports Swimming Complex, Spalding PE11 1QF on Fridays at 7.30pm.
Stenigot "Chainhome"
Amateur Radio Club
Steve Burke M5ZZZ. Tel: (01507) 600202
E-mail m5zzz@btinternet.com
www.stenigotchainhomearc.co.uk
Meetings are held on the third Friday of the month commencing 19.30 at Gayton le Marsh Village Hall, Gayton le Marsh, Lincolnshire. LN130NW.

LONDON

Cray Valley Radio Society
Bob Treacher.
Tel: 020 8265 7735
www.cvrs.org
The Cray Valley Radio Society meets on the first and third Thursdays of the month at the Progress Hall, Admiral Seymour Road, Eltham, London SE9 1SL at 7.30pm for 8pm.

Edgware & District Radio Society
Michael G4RNW.
Tel: 020 8950 0658
E-mail: michael.stewart5@ntlworld.com
Edgeware &District radio Society meet at the Watling Community Centre, 145 Orange Hill Road, Burnt oak, Edgware HA8 0TR.

Radio Society Harrow
Linda Casey Tel: 020 8386 8586
Email: lcasey@imperial.ac.uk
www.g3efx.org.uk
The Society meets on friday at 20.00 on the 2nd and 4th weeks of every month, at The Elsie Fisher Room, St Lawrence Centre, St. Lawrence Church, 2, Bridle Road, Eastcote, Pinner HA5 2SJ. All welcome! We also run exam courses - see website for details

Southgate ARC
David Sharp. Tel: 01992 422622
E-mail: david.sharp1@tesco.net
The Southgate Amateur Radio Club meets on the second Wednesday of the month at Hazelwood Lawn Tennis and Squash Club, Ridge Avenue, Winchmore Hill, London N21 2AJ at 7.30 for 8 pm.

Wimbledon and District ARS
Jim Bell M0CON
Tel: 020 8874 7456
E-Mail: jamesm0con@o2.co.uk
http://www.gx3wim.org.uk
The Wimbledon & District Amateur Radio Society welcomes new comers to our meetings whether they are licensed or not. We hold our meetings the second and last Friday of each month at Martin Way Methodist Church, Buckleigh Avenue, Merton Park, London SW19 9JZ. The church is on the corner of Martin Way and Buckleigh Avenue.

THE LOTHIANS (Scotland)

Cockenzie & Port Seton ARC
Bob Glasgow.
Tel: (01875) 811723
E-mail: gm4uyz@cpsarc.com
www.cpsarc.com/news.php
The Cockenzie & Port Seton Amateur Radio Club meets in the Thorntree Inn (Lounge Bar), High Street, Cockenzie, East Lothian EH32 0HP from 7pm till late. Organised talks are held in the Port Seton Community Centre, South Seton Park, Port Seton, East Lothian EH32 0EE. Timings 18:30 to 21:30hrs.

Lothians Radio Society
Tony Sigouin.
Tel: 07739742367
E-mail: enquiries@lothiansradiosociety.com
www.lothiansradiosociety.com
The Lothians Radio Society meets on the second and fourth Mondays of the month in the Royal Ettrick Hotel, 13 Ettrick Road, Edinburgh EH10 5BJ from 7pm. Membership costs £12 per year and includes a free BBQ every June!

MERSEYSIDE

Wirral & District ARC
Tom. Tel: (07050) 291850
E-mail: secretary@wadrac.com
www.wadarc.com
The Wirral & District Amateur Radio Club meets at the Irby Cricket Club, Mill Lane, Irby CH61 4XQ on the second and fourth Wednesdays of each month. Other Wednesdays are informal (D&W) meetings at a local hostelry.

NORFOLK

King's Lynn ARC
Ray Dowsett, MBE.
Tel: (01553) 671307
E-mail: ray-g3rsv@supanet.com http://www.klarc.org.uk
King's Lynn Amateur Radio Club meets every Thursday at the Scout HQ, Chequers Lane, West Winch, King's Lynn, PE33 0NY off the A10 at West Winch at 7.30pm.

Norfolk ARC
Mark Taylor. Tel: (01362) 691099
E-mail: narc@g0lgj.co.uk
www.norfolkamateurradio.org
The Norfolk Amateur Radio Club meets every Wednesday at the Eaton CNS School, Eaton Road, Norwich, NR4 6PP, where it meets weekly,from 7-10pm, usually in 6th form centre at front of school, every Wednesday from 7-10pm.

North Norfolk ARG
Tony Smith.
Tel: (01263) 821936
E-mail: g4fai@btinternet.com
www.radioclubs.net/nnarg/
The North Norfolk Amateur Radio Group meets in the Radio Hut at the Muckleburgh Collection Military Museum, Weybourne, North Norfolk NR25 7EG on Wednesdays and Thursdays from 10am to 4pm and some Sundays from 1 to 4pm. New members always welcome.

NORTHAMPTONSHIRE

Kettering & District Radio Society
Lorna Froggatt. Tel: 0153 676 2523
E-mail: LornaSteveLorna@aol.com
The Kettering & District Radio Society meets each Tuesday from 7 to 9pm in the winter at The Lilacs Pub, Church Street, Isham, Northants NN14 1HD and in the summer at the Carpetbagger Aviation Museum, Sunnyvale Farm Nursery, Harrington NN6 9PF. Courses at all levels are held regularly.

OXFORDSHIRE

Harwell Amateur Radio Society
Malcolm Tel: 01235 524844
E-mail: info@g3pia.org.uk
www.g3pia.org.uk
The Harwell Amateur Radio Society meets at the Rutherford Appleton Laboratory Social Club, Chilton, OX11 0QX. (Turn left at the Diamond Light source roundabout and continue to the satellite dish). Club meetings are held on the second Tuesday of each month at 1945 and there is a Shack Activity night on the fourth Tuesday.

SHROPSHIRE

Salop ARS
Richard Golding.
Tel : (01743) 356195
The Salop Amateur Radio Society meets in The Telepost Club, Railway Lane, Abbey Foregate, Shrewsbury SY26BT on Thursday between 8 and 10.30pm.

Telford & District ARS
Mike Street. Tel: (01952) 299677
E-mail: mjstreetg3jkx@blueyonder.co.uk
www.tdars.org
The Telford & District Amateur Radio Society meets on Wednesdays at the Little Wenlock Village Hall, Malthouse Bank, Little Wenlock. Telford TF6 5BG at 8pm.

NOTTINGHAMSHIRE

Worksop Amateur Radio Society (W.A.R.S.)
'Daz' Spence. Tel: (01623) 747314
Email- g3rcw@qsl.net
www.qsl.net/g3rcw/
Meets every Tuesday at 7:00 pm. Our cubhouse is located at 59 - 61 west street, Worksop, Nottinghamshire. S80 1JP. Exams and courses run frequently for all licence levels. Licensed bar & hot food available on club meet nights. Membership fee for the year is £10.

SOMERSET

Mid Somerset Amateur Radio Club
Shaun M0RTS/G1IOK
E-mail: m0rts@hotmail.co.uk
Shaun has reformed the Mid Somerset Amateur Radio Club which unfortunately folded in 1997. The new club now meets on the 2nd tuesday of every month at: Peter Street Rooms, Peter Street, Shepton Mallet BA4 5BL at 7:00pm.

North Bristol ARC
Dick Elford Tel:(01454) 218362
E-mail: g0xay@aol.com
www.nbarc.org.uk
North Bristol ARC meet Fridays at 7.30pm at SHE7, Braemar Crescent, Northville, Filton Bristol BS7 0TD. We carry out training for all the Radio Amateurs examination, and our next training course is to be for Intermediate exams.

South Bristol ARC
Len Baker. Tel: (01275) 834282
E-mail: g4rzy@msn.com
www.sbarc.co.uk
The South Bristol Amateur Radio Club meets every Thursday evening at Novers Park Community Centre, at the rear of 122-124 Novers Park Road, Filwood, Bristol BS4 1RN

Yeovil ARC
Steve G7AHP
E-mail: steve@g7ahp.co.uk
www.yeovil-arc.com/
The Yeovil Amateur Radio Club meets at the Red Cross Centre, Grove Avenue, Yeovil BA20 2BE (on the corner where Grove Avenue meets Preston Road).

Weston-super-Mare Radio Society (WSMRS)

Kirstie M3UWI (01934) 613094
Email:- Kirstiejones1@msn.com
www.radioclubs.net/wsmrs/
Meets every Monday at the Devonshire Road social club BS23 4LG at 8pm. Main meeting including talks/Guest speakers every 3rd Monday of the month. Training to all levels of Licence available.

SOUTH GLOUCESTERSHIRE

Thornbury and South Gloucestershire ARC
Tony. Tel: (01454) 417048
E-mail: tonytsgarc@sky.com
The Thornbury and South Gloucestershire Amateur Radio Club meets in the United Reformed Church Hall, on the corner of Chapel Street and Rock Street, Thornbury BS35 2BA at 7.30 - 9.30pm.

SOUTH WALES

Barry ARS
Glyn Jones. Tel: (01446) 774522
E-mail: glyndxis@talktalk.net
www.bars.btik.com
The Barry Amateur Radio Society meets on Tuesdays from 7.30 to 10.30pm in the Sully Sports & Social Club, South Road, Sully CF64 9TG.

SOUTH YORKSHIRE

Axholme Radio Club
John Fennell. Tel: (01427) 872522
E-mail: g4hoy@tiscali.co.uk
The Axholme Radio Club meets at Hollytree Farm, Westend Road, Sandtoft, Epworth DN9 1LB on Wednesdays at 10amm to 4pm, Thursdays at 7 - 9pm and Saturdays from 10am - 4pm (other times by arrangement).

Sheffield ARC
Trevor Wood. Tel: 0114 2216947
E-mail: trevorwood6@yahoo.co.uk
www.sheffieldarc.org.uk
The Sheffield Amateur Radio Club meets at the SYPTE Social Club, Greenhill Main Road, Sheffield S8 7RH every Monday at 7.15pm. We hold classes for all licence levels .

STAFFORDSHIRE

Tamworth Amateur Radio Society
Colin Marks
Tel: (01827) 700893
E-mail: colin.marks2@ntlworld.com
The Tamworth Amateur Radio Society meets every Thursday at 7.30pm at St Francis Church, Masefield Road, Leyfields, Tamworth B77 8JB.

SUFFOLK

Bury St Edmund's ARS
George Woods G3LPT.
Tel:01359 259518
Darren Coe G7SDC
Tel: (01284) 701732
storno@yahoo.co.uk
www.radioclubs.net/bsears/
The Club meets on the third Wednesday of the month (except August and December) at the Culford school, Culford, Bury St. Edmunds, Suffolk IP28 6TX at 7.30PM. Visitors are welcome. Please see our web site for further details.

SURREY

Coulsden Amateur Transmitting Society
Steve Conway G7SYO
Tel: (01737) 353517
E-mail: steve.conway@landg.com
www.sthost.co.uk/webspace/cats/
Regular meetings are held on the second Monday in each month at-: St. Swithun's Church Hall, Grovelands Road, Purley, Surrey CR8 4LA at 20:00 to 22:00hrs. On the first Saturday of month at 1715 Crescenta Valley / CATS Net on Echolink Normally via MB7IPL node on 145.2875 MHz.

SRCC - Surrey Radio Contact Club
Ray Howells G4FYY
Tel: 0208 644 7589
www.g3src.org.uk/
The club meet 1st and 3rd monday evenings of each month at Trinity School, Shirley Park, CROYDON, CR9 7AT with meetings starting at 7.45p.m.

Sutton & Cheam RS
John Puttock.
Tel: 020 8644 9945
E-mail: info@scrs.org.uk
www.scrs.org.uk
The Sutton & Cheam Radio Society meets on the third Thursday of the month at 7.30pm in Sutton United Football Club, The Borough Sports Ground, Gander Green Lane, Sutton, Surrey SM1 2EY. In addition to monthly meetings, licence training courses are held at regular intervals in Banstead Surrey.

TYNE & WEAR

Angel of the North RARC
Nancy Bone. Tel: 0191 477 0036
E-mail: nancybe2001@yahoo.co.uk
www.anarc.net
The Angel of the North Radio Amateur Radio Club meets every Monday 7 to 9pm at Whitehall Road Methodist Church Hall at the corner of Whitehall Road and Coatsworth Road, Bensham, Gateshead NE8 4LH. The entrance to radio club room is through door at the side of building next to the car park. The car park entrance is on Whitehall Road.

Tynemouth ARC
Tony Regnart G8YFA
Tel: 0191 280 1981
E-mail: mail@g0nwm.com
www.g0nwm.co.uk
The Tynemouth Amateur Radio Club meets each Friday from 7 to 9pm at St. Hilda's Church, Stanton Rd, North Shields, Tyne & Wear NE29 9QB. It's known locally as 'the church near the fire station'.

WARWICKSHIRE

Coventry Amateur Radio Society
John Beech G8SEQ.
Tel: 079 58777 363
www.coventryradio.org.uk
Coventry Amateur Radio Society meets most Fridays at 2030hrs in St Bartholomew's Church Hall, Brinklow Road, Binley, Coventry CV3 2DT. Further details on CARS activities can be obtained from the Secretary – John G8SEQ

WEST MIDLANDS

Aldridge & Barr Beacon ARC
Ted Roberts. Tel:(01922) 614169
E-mail: albertg0kfs@raynet-uk.net
www.radioclubs.net/aldridgearc
The Aldridge & Barr Beacon Amateur Radio Club is a daytime club and meets at the Aldridge Community Centre, Middlemore Lane, Aldridge, Walsall WS9 8AN on the first and third Monday of every month at 2pm to 4pm. They have a long wire and a v.h.f. antenna for radio operation using the club callsign M0GRX.

Midland AX25 Packet Radio Users Group
Miles. Tel: (01384) 254199
www.maxpak.org.uk
The Midland AX25 Packet Radio Users Group, MaxPak, meets on the first Monday of the month at The Sir Robert Peel, 104 Bell Lane, Bloxwich, Walsall WS3 2JS.
South Midlands RS
Don. Tel: 0121 458 1603
South Midlands RS meet in the West Heath Community Centre, Condover Rd., West Heath Birmingham B31 3QY. macrh 13th and 20th are construction evenings. 223rd is a 'ragchewing' evening.

Stourbridge and District ARS
John. Tel: (01562) 700513
www.g6oi.org.uk
The Stourbridge and District Amateur Radio Society meets on Monday evenings, except for Bank Holidays at The Radio Shack, Old Swinford Hospital School, Heath Lane, Stourbridge, West Midlands DY8 1QX at 8pm. We have Open Shack Nights - Tea/Coffee always available, along with an opportunity to get on the air or just a natter with whoever attends

Sutton Coldfield RS
Rob 2E0ZAP: (01827) 288 483
E-mail: spirit.guide@hotmail.co.uk
www.hamradio.piczo.com
The Sutton Coldfield Radio Society Meets on the second and fourth Monday of the month at 7.30pm (no meeting on bank holiday Mondays) in the Sutton Coldfield Rugby Club, 160 Walmley Road, Sutton Coldfield, West Midlands B762QA.

Wythall Radio Club
Chris Pettitt. Tel: (07710) 412 819
E-mail: g0eyo@wythallradioclub.co.uk
www.wythallradioclub.co.uk
The Wythall Radio Club is based at Wythall House, Silver Street, Wythall, near Birmingham B47 6LZ. They meet every Tuesday at 8pm and meetings are informal and friendly.

WEST SUSSEX

Horsham ARC
Andrew Vine. Tel: (01483) 272456
http://www.harc.org.uk/
The Horsham Amateur Radio Club meets on the first Thursday of the month at The Guide Hall, Denne Road, Horsham, West Sussex.

Mid Sussex ARS
Sue Davis: 01273 845103
E-mail: g6ypy@msars.org.uk
www.msars.org.uk
The Mid Sussex ARS meets at 1945hrs on most Friday evenings at Cyprus Hall. Cyprus Rd.Burgess Hill.W Sussex. RH15 8DX. Tuition is available for all Licence levels and the club is a registered exam centre. Our permanent and well equipped radio room is available for all to use. We offer regular talks, demonstrations quizzes etc. and radio use on all bands. Visitors always warmly welcomed.

Worthing & DARC
Roy or Joyce. Tel: (01903) 753893
www.wadarc.org.uk
The Worthing & District Amateur Radio Club meets every Wednesday at 8pm in the Lancing Parish Hall, South Street, Lancing, BN15 8AJ. There's a free car park at the rear and full disabled access. Visitors are always welcome.

WEST YORKSHIRE

Denby Dale Amateur Radio Club
Gerald, G3SDY.
Tel: (01484) 602905
www.g4cdd.net/
The Denby Dale club meat at Pie Hall, Denby Dale, Huddersfield HD8 8RX. October 7th Mini-rally, surplus sale and flea market. 21st Annual General Meeting.

Otley ARS G3XNO & M8Y
Paul (2E0PAK) Tel: 07768 996370
E-mail: 2e0pak@otleyradio.org
www.otleyradio.org
Otley Amateur Radio Society meets every Tuesday at Clifton Village Hall, LS21 2ES, (north of Otley just before The Spite public house on Newall Carr Rd). Meetings alternate between a shack night and members' presentations/forums/ educational events - refreshments always available. The Club, a registered RSGB examination centre, also maintains the local repeater station callsign GB3WF. (Input: 434.950MHz Output: 433.350MHz CTCSS 82.5 Hz).

Pontefract & District Radio Club
Colin. Tel: (01977) 677006
E-mail: info@pontefractradioclub.org
www.pdars.com
The Pontefract & District Radio Club meets every Tuesday from 7pm and Thursday from 8pm at the Carleton Centre, Carleton Grange, Carleton Road, Pontefract, West Yorkshire WF8 3RJ.

WIGTOWNSHIRE (SW Scotland)

Ellis Gaston.
Tel: 01776 820413
www.gm4riv.co.uk
Wigtownshire ARC meet weekly at The Aird Unit, Stranraer Academy, Stranraer DG9 8BQ. Visitors always most welcome

WILTSHIRE

Trowbridge & District AR
Ian Carter.
Tel: (01225) 864698
E-mail: ian.l.carter@btinternet.com
www.radioclubs.net/trowbridgedarc/
The Trowbridge & District Amateur Radio Club meets at Southwick Village Hall, Southwick (nearest postcode is BA14 9QN).

WORCESTERSHIRE

Worcester RAA
Martin Carter
Tel: (07976) 917987
E-mail: secretary@m0zoo.co.uk
www.wraa.co.uk
The Worcester Radio Amateurs Association meets on the second and fourth Tuesday at the Hallow Scout HQ, off Main Road, Hallow, Worcester WR2 6PP. Visitors, as always, will find a warm welcome at the new clubhouse, as will potential new members.

Club Secretaries

Please remember to include full details of your club, E-mail and telephone contact details and the postcode of your meeting venue - it helps potential visitors to find you!

Radioworld Ltd

34-42 Brook Lane, Great Wyrley, Walsall, WS6 6BQ
Tel:01922 414796 Fax: 01922 417829 skype:radioworld_uk

KENWOOD

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TS-2000X-HF/6/2/70/23cm... £1629.00.
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TH-F7E - 2mtrs/70cm's..... £229.95.
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what next?

Colin Redwood G6MXL provides some ideas for overcoming nerves surrounding the first QSO.

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It's time for your first QSO! For newcomers to Amateur Radio, the greatest concern is not wishing to make a fool of themselves on the air. As a result, many newcomers get nervous about their first QSO. Some even use the term 'Microphone (mic.) shy' to describe their feelings.

So, this month I am looking at ways of making the first few QSOs a little easier on the nerves. Amongst my suggestions I am hoping that newcomers will find something to help. I am also going to cover a typical voice QSO which may also be helpful to those preparing for the practical part of the Foundation Course.

Not everything I'm going to suggest will be appropriate to everyone, but I do hope that it will at least encourage newcomers to have a go! What was the point of getting your licence if you don't make use of the privilege to transmit that the licence gives you!

It's useful to remember that most listeners will not realise, when you put out your first "CQ" call, **that it is your** first QSO using your new licence. This is because many Amateurs now choose the three letters after the M3 or M6 in their callsign, it's not easy to guess – from your callsign – whether you have been licensed for one day or one year ago. Although the M6 series of callsigns is relatively new, by now there are enough of them 'out there', that your callsign won't be instantly recognised as a brand new licence!

It's also worth remembering that whoever does hear your CQ call, will, most certainly, have had to go through the same feelings as you are having. No matter how long they have held their licence, they too will have had their first QSO, and therefore know how you are feeling.

Local Club

One good way to break the ice is to go along to your local radio club and operate under supervision using the club's callsign. You'll probably find someone there who will be only too pleased to show you the ropes. In fact, I would suggest going along to the club where you did the practical aspects of the Foundation Course and asking the person who helped you through the practical part for a little help.

Once you have had a little practice operating from the club, why not invite whoever helped you to your home, and ask them to sit with you whilst you make your first few QSOs under your own callsign?

Club Net

Another approach is to join your local club's net. Many clubs have a weekly net, where members of the club take it in turns to talk. If you listen in for a while, you will soon get the idea of the operating technique in a net.

If you prefer not to have your first QSO with so many people listening, then perhaps pre-arranging a contact or schedule (usually referred to as a 'sked') with another club member. To arrange your sked, both of you agree a date, time, frequency and mode for a QSO in advance. But make sure that you are both clear whether the time is UTC or clock time by the way. Though clock and UTC (GMT) agree in winter, they're different in summer!

By convention, many skeds are arranged with the time in UTC (The same in winter, but one hour earlier than clock time during the summer time in the UK). For your first QSO, I would also suggest that you arrange that the more experienced station calls CQ, and that you reply.

If you are really shy and want to minimise the number of people who might listen in, I would suggest choosing a band and mode where not many people are likely to be listening. Avoid for example, the local repeaters and the 144 and 430MHz calling frequencies.

An obscure f.m. frequency on either band is less likely to be heard by many others. Even though it may not be used much, good operating procedure, requires that you ask if the frequency is in use, before calling CQ.

If you really want to avoid the locals hearing you, then I would suggest using the h.f. bands. Whilst you might be heard on the other side of Europe, most locals either won't be able to hear you, due to the lack of ground-wave propagation, or won't be on your frequency.

I suggest that you prepare for the first QSO by writing down the key information that you are likely to want to exchange with any station. This will include name, QTH (town), transceiver, antenna and signal report (RST).

A Typical QSO? So just what is a typical QSO? If you've listened on the bands, you will have soon discovered that all QSOs aren't all the same. For the example below, I am going to assume that your callsign is *M6ZZZ*, your name is Fred, you live in Sunderland and that you are going to have a QSO with me Colin at my station G6MXL. So, let's see how it will go. You have found what you think is a clear frequency on one of the h.f. bands. Anything you say is in **bold italics** with my suitable replies in *italics*.

"Is this frequency in use? This is M6ZZZ." Now listen to see if anyone comes back. If they do reply that the frequency is in use, you will need to look again. If you don't hear anything, check once more. ***"Is this frequency in use? This is M6ZZZ."*** If you still don't hear anyone reply, then you assume that the frequency is yours to call.

Next, you can call CQ. ***"CQ CQ CQ from M6ZZZ, mike six zulu zulu zulu calling CQ and listening."*** If you don't hear anything then call again. ***"CQ CQ CQ from M6ZZZ, mike six zulu zulu zulu."*** You can repeat this a few times. If you still don't get a reply, leave it for a few minutes before starting again (remembering to first check that the frequency is still not in use).

Getting A Reply Let's now assume that I hear your "CQ" call. I will reply to your CQ call "*M6ZZZ from G6MXL Golf six Mike X-ray Lima calling and standing by*." Make a note of the other station's callsign (G6MXL), the date and time (UTC).

Responding With Report You now say ***"G6MXL from M6ZZZ, good evening, thanks for your call, you are 57. My name is Fred, I spell Fox Romeo Echo Delta and my QTH is Sunderland in North East England. How copy? G6MXL from M6ZZZ. Over."*** Make a note of the 57 report. (I looked at reports and logging in the October 2008 *What Next?* column).

Report From Other Station I – as G6MXL – will now come back with some information, "*M6ZZZ from G6MXL, good evening Fred, I copy you OK, 54, readability 5, strength 4. My name is Colin, Charlie Oscar Lima India November, and my QTH is Poole. Back to you Fred. M6ZZZ from G6MXL. Over*." Make a note of the operator's name, his report of your signal and the town he's operating from.

More Information It's now your turn to give some more information. ***"G6MXL from M6ZZZ, thanks for the report Colin. My working conditions are a FT817ND running 5 watts with a 40m dipole, 8 metres high. I would like to exchange QSL cards with you, and will send my card via the bureau. Many thanks for this contact, 73 and see you soon again, I hope. G6MXL from M6ZZZ."***

More Information Received *"M6ZZZ from G6MXL, all copied 100%. Here I am using an IC-703 running 10 Watts with a quarter wave vertical antenna. I will also send you my QSL card via the bureau, Fred. 73 and I hope to meet you again soon. M6ZZZ this is G6MXL clear with you."* (You may want to note the details of the G6MXL's station).

Clearing With G6MXL ***"73 Colin and see you soon from M6ZZZ now clear with G6MXL."*** If you want to work another station you could say, ***"M6ZZZ listening for any stations calling."*** If you hear none, you could call "CQ" again.

Logging Requirements

Although UK licence conditions no longer require that Radio Amateurs keep a logbook, this is still a requirement in most other countries. Despite the fact we don't have to keep a log, I recommend that you keep a log of your contacts as it will at least enable you to refer to previous contacts. Immediately after you've finished a contact, I suggest that you write up the log (unless of course you have been called by another station). Include the details you noted down during the contact, plus frequency and mode and the ending time (UTC).

You may also want to note in your log that you have promised to send a QSL card, and also to mark when you have actually sent it. **Reminder:** I looked at QSL cards and the QSL card bureau in the November 2008 *What Next?* column.

Points To Consider

Let's now look at some points to consider. As the contact progressed, at the start and end of each over both stations made it clear to one another and anyone else who might be listening who they were communicating with. Both stations also made use of some of the information received (the other station's name).

While it's not essential, it helps to make a contact seem much more personal and friendly. Most stations on the air do not use the word 'over' to indicate the end of an over, whilst others will use 'mic.' back to you' or 'QSL?' (meaning do you copy?) or similar.

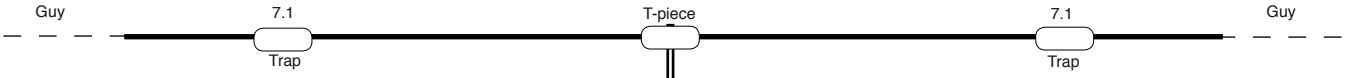
Foreign Stations

As you gain confidence on the air, you will no doubt change the words that you use, and have contacts that are longer and discuss more things. It is however worth remembering that for foreign stations, having a contact such as I have outlined above may be the extent to which they have mastered English. If you prefer, it is perfectly acceptable to use their language. ●

Next Month

Having covered a basic 'rubber stamp' s.s.b QSO, next month I will be looking at a variety of operating techniques that can be helpful to know about and use from time to time. A happy New Year to all *WN?* readers.

G2DYM / G4CFY AERIALS



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Feature

Emerging Technology

Chris Lorek G4HCL learns how amplitude modulation has a future in data transmission, and news of virus-based batteries.

This month I can reveal how amplitude modulated radio is one of the keys to faster data over radio, and how virus-based batteries could be with us in the near future

We all know that the radio spectrum is valuable, so much so that prime parts of it are very much in demand. Especially so by commercial users, who will literally pay millions for a small slice!

In fact back in the year 2000 when the UK government auctioned off just a small bit for 3G cellphone use, they made £22,000,000,000, that's right **22 billion** pounds, out of it! Key spectrum such as this very routinely sells for millions or even billions of pounds, Euros or dollars around the world.

But at any given location, from investigations, it looks like only one fifth of these prime 'key' parts of the spectrum are in use at any moment in a given location. To make an analogy, have a look at our 144 or 430MHz bands.

Next, have a scan across these and see how much activity you can hear from your location right now. Not a lot, eh? A lot less than 20%, probably more like half a percent or even less! But in the more popular bands, such as those for cellphone use, it's rather higher but of course still mostly never at full capacity. However, they're often at full capacity at say, midnight on New Year when everyone's trying to wish everyone else greetings and your text takes an hour or two to get through!

In other bands, such as those used by the military, some of the spectrum is 'reserved' for training exercises but again most isn't used. Except, again, when there's the need for it, such as military action, when it can spring into very heavy use. But the fact remains that at any given time, across the tuning range of a given radio on v.h.f., or u.h.f., there's a lot of spectrum that's not used and when it is used, the activity 'comes and goes'.

It's perhaps now obvious that if some way of utilising this dynamically-changing empty spectrum could be found, we'd be able to squeeze rather a lot more radio users in. Or from a commercial viewpoint with spectrum being auctioned, someone out there would be able to make a lot more money! There's already been a possible answer to this, where technologists have proposed an intelligent or 'cognitive' radio system. This can work out which parts of the spectrum around the radio's centre channel aren't being used, and can adapt its transmission to suit. The radio then transmits in short bursts, regularly checking in between transmissions to make sure the channel is still clear. If it isn't, it simply hunts again for a vacant part of the nearby spectrum and uses that.

The idea has been mooted around prospective users and manufacturers and some rather 'big' names have given their support to it. These include people like Motorola, Philips, Microsoft, Google and Intel, to name just a few. So, the interested parties include not just two-way radio and cellphone organisations, but those who also see the benefits of this for PC communication use. This is because there are a range of new possibilities that could be taken advantage of, some of which they say we can't even begin to imagine at the moment. Some are a little more obvious though.

For example, with the every-increasing use of the Internet, more and more people are looking to this for communication, not just PC based but for entertainment such as on-demand high-definition TV which of course needs lots and lots of bandwidth.

Fibre Optic Cable?

Not everyone can have a fibre optic cable going into their house for the required ultra-wide bandwidth and, of course, there are many people in rural areas who are rather limited to what they can connect to in the first place. Certainly – if there was radio spectrum available for this –then it could very well be an answer. Again, not everyone will want to use it at the same time, and the use is often intermittent, so cognitive radio could be a real answer here.

But there's a problem with the idea. Right now it's illegal to use cognitive systems because, in the UK and Europe at least, but also in most other countries as well, the transmitting device either has to be exempted from licensing (which is the case with many low power devices), or be licensed.

National regulatory organisations, such as Ofcom in the UK, are rather cautious about cognitive radio. Which isn't a surprise if you think about it, because if a radio transmitter was allowed to just transit anywhere it wanted it could cause a lot of problems!

If the receiver developed a fault for example, it could think a given channel is free and start transmitting – maybe automatically raising it's transmit power more and more when

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it can't get through. This of course could cause havoc to other radio users, emergency services for example, as well as possibly causing problems to domestic reception of radio broadcasts and the like at the 'other end' of the scale. The latter is actually more of a problem than you may first think, as it could occur very easily and indeed quite often.

In my location for example, there's a hill between my housing area and the TV transmitter which is located at Rowridge on the Isle of Wight and serves my area. As such, I and all my neighbours need fairly large high-gain rooftop TV antennas to be able to receive a reasonable TV picture (mine is a 100 element type complete with a band-filtered variable gain masthead preamplifier).

However, if I were to use a cognitive radio in the location around my house, it would quite correctly determine that it can't receive any signals whatsoever in the u.h.f. TV broadcast band, and thinking this was 'clear' it could attempt to use that for communication, possibly wiping out one of the TV channels being watched by my neighbours.

The problem, the 'hidden node' effect, is one reason why regulators are cautious about cognitive radio. However, in the TV broadcast bands there are 'guard bands' left between channels which could indeed be used, in fact in the UK they are used, for studio-based wireless microphones. But another problem is that there are many different technologies and devices used for radio communications. Cognitive radios would need to be able to detect these differing modes to be able to see whether the channel or spectrum area is indeed free.

Nowadays, with the every-advancing rate of technology which is, right now, bringing us software-defined radios, cognitive radio may not be very far away. One other solution could be if the cognitive radio were firstly to be able to locate where it was at any time (i.e. 'geolocate'). For example, if it had a built-in GPS receiver, as several two-way radio handhelds and cellphones have nowadays. It could then secondly check in a database which area of the spectrum it was allowed to use in that area and which parts of the spectrum were reserved for other users in that vicinity.

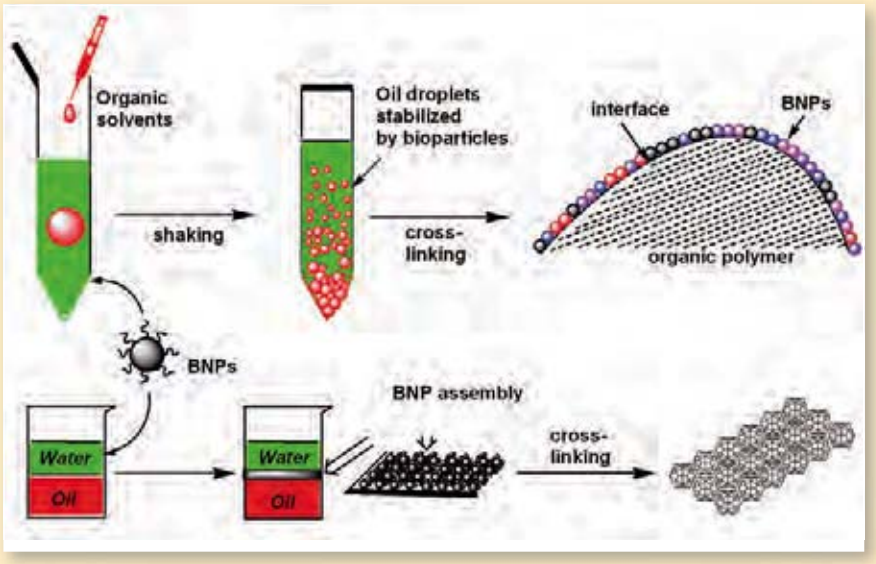
Is this all a pipedream? The answer is – **No it isn't!** This is because earlier this year Ofcom started a consultation on cognitive access. Additionally, in November 2008 the USA's Federal Communications Commission (FCC) – their equivalent of our Ofcom – put forward legislation to allow cognitive access to TV bands for devices that could indeed geolocate and consult a database. So the future isn't as far away as we might think!

Batteries & Viruses!

Lithium batteries have now been in use for quite a while – since the 1970s in fact – and although those weren't rechargeable types initially, that they have, of course evolved into now. Lithium-based batteries have about the best energy density at the moment, in other words the amount of energy they can store for a given volume and weight. This energy density is slowly increasing over time, around 8% each year, some of this due to better technology but is also because of better packaging.

One key to a better battery is the material that the two electrodes used. Graphite electrodes are commonly used now, but other materials such as silicon and sulphur are also being considered.

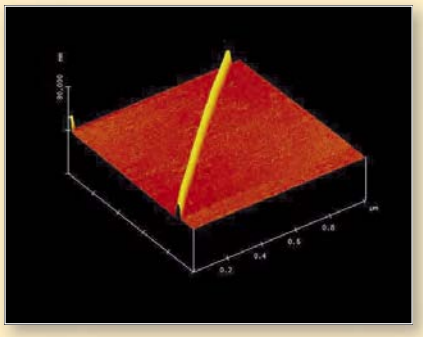
Nanowire electrodes using silicon should theoretically let a battery be charged in less than ten minutes and have an energy density almost three times that of current technology batteries. The challenge is however to find a material for the other, negative, electrode. Conventional manufacturing techniques, like those used for making silicon semiconductor chips, could be used but this is very time-intensive.

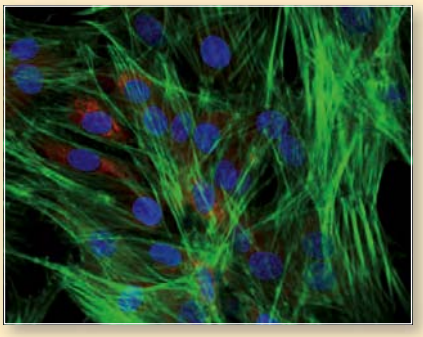


Surprisingly perhaps, biotechnology is another way to nanowire electrodes, and teams at the **Massachusetts Institute of Technology** (MIT) in the USA have already used viruses to form the wires. Other teams have been looking at using DNA as one way of creating templates from polymers. The MIT team have shown that they've engineered viruses that could build an anode by coating themselves with gold and cobalt oxide and then self-assembling into a nanowires.

The 'M13' viruses they've used are good for building wires it seems, because they are thin and long. This all works at room temperature and doesn't need any toxic organic solvents to be used. Also, the viruses infect bacteria and have the advantage of not killing their hosts, so that they can keep on producing M13, and the good news is that these are harmless to humans. Unlike some other batteries, like mercury types, which you certainly wouldn't want to swallow and let your stomach try to digest!

Again, in the USA another team,





this time lead by **Qian Wang** and colleagues at the **University of South Carolina**, are working with M13 viruses as well as the tobacco mosaic virus, which is rod-like, to make nanowires that use purely organic conductors, including polyaniline. But instead of using mutant forms of M13, this team is using chemical agents to alter the proteins on the outer shell of the virus which bind a lot better to the actual wiring molecules. There's plenty of work going on in this field and it's looking very promising!

So, did you think that batteries were just chemicals inside a metal tube? Maybe they have been up to now, but not for too much longer! These 'safe' viruses inside our future batteries could possibly even make recycling that much easier by helping out in breaking down other organic matter on a compost heap!

Faster Data Over Radio

Many of us are already used to high speed data on our wireless devices, such as being able to watch mobile TV on our cellphones. Radio Amateurs have been pioneering in our use of packet radio for a long time now and currently High Speed Packet Access (HSPA) extensions to cellphone Wideband Code-Division Multiple Access systems (which are also known as UMTS) can currently achieve 3.6 and 7.2Mbit/sec data rates in the up and down links respectively, which is already pretty fast!.

The next generation of mobile data could support data rates of up to 100Mbit/sec on the move, and even up to around 1Gbit/sec when used from a stationary position, such as a fixed communication unit in your home. How is this going to be possible? The answer is firstly, by using more advanced methods of modulation, like using 16 symbol QAM (Quadrature Amplitude Modulation) – just when you thought a.m. was all but dead for future efficient over-air use!

However, the other, more recent, innovation is to use multiple antennas at each end of the communication points, i.e. the base station and the mobile terminal. These Multiple-Input, Mutiple-Output (MIMO) antenna arrays will use either two, four, or eight separate antennas at both ends, proving very useful where the communication stations receive several versions of the transmitted signals because of reflections from moving vehicles and the like, and also stationary reflection points – such as buildings when the mobile radio is moving around.

Research has shown that a four-by-four MIMO system combined with 16 symbol QAM can indeed give 1GBit/sec communication, including getting over Doppler shift when you're on the move. The next step though, is given the name of Long Term Evolution (LTE), which was ratified by the European Telecommunications Standards Institute a year ago.

Sensibly, LTE is designed to bring together all the current cellular communication standards, including those used in China (TD-SCDMA) and the USA (WCDMA) as well as the commonly-agreed standards we in the entire rest of the world use. If we mate this with software-defined radios as I've described in past *Emerging Technology* columns – as well as those mentioned this month (which again we Radio Amateurs are already using) the future could be starting to look rather clearer!

See you soon as I explore the future on behalf of *PW* readers. Chris G4HCL.

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David Butler's

vhf dxer

Share your news, views and reports with fellow readers. Reports to David by the last Saturday of each month please.

This month David Butler G4ASR takes a look at the 50MHz band and has details of new allocations on the 70MHz band.

Surprisingly, there were five Sporadic-E openings reported on the 50MHz band during November, with one of them, on the 20th, lasting for over four hours. Very little was reported on the 70MHz band apart from a few scheduled meteor scatter (m.s.) contacts and it was similarly bleak on the 144 and 430MHz bands. The Leonid meteor shower was encountered during November and this created an increase in DX activity albeit for a few days.

The 50MHz Band

Sporadic E (Sp-E) is an unusual form of radio propagation that uses characteristics of the ionosphere approximately 90km above the Earth. Most forms of sky-wave propagation use the normal, but constantly variable ionospheric properties of the F-region to refract (or bend) radio signals back toward the surface of the Earth. However Sp-E propagation bounces signals off smaller 'clouds' of unusually ionised atmospheric gases in the lower E-region. This occasionally allows for long-distance contacts to be made on the v.h.f. bands not usually well-suited to such communication.

Communication distances of approximtely 800-2200km can occur using a single Sp-E cloud. This variability in distance depends on a number of factors that include the cloud height and density of ionisation.

The maximum usable frequency (m.u.f.) also varies considerably, but most commonly falls in the 25-110 MHz range. This spectrum includes CB radio (27MHz), the Amateur Radio bands (28, 50 and 70MHz), Band I television (41-68MHz) although much of this has been phased out in Europe and the f.m. broadcast band (87.5-108MHz). Strong events have allowed propagation at much higher frequencies, typically the 144MHz Amateur band though – and sometimes as high as 300MHz or above.

As the name suggests, Sp-E can occur at almost any time, but it does display seasonal patterns. Maximum activity peaks predictably in the summertime around June-July, although 50MHz openings start earlier in May and finish towards the end of August. Interestingly a much smaller peak is often seen around the winter solstice. Activity usually begins in mid-December in the northern hemisphere, with the days immediately after Christmas being the most active period.

Last month, I curiously reported that there had been a considerable rise during the last four years (2006-2009) of 50MHz Sp-E openings during October. Surprisingly, this situation continued into November with openings being reported on the 1st, 17th, 19th, 20th and 21st. Most events were fairly short in duration, contacts being made with c.w. and s.s.b. stations such as DK2EA (Germany), ES1CW (Estonia), IT9CJC (Sicily), IW4BET (Italy), LY2BG (Lithuania), OM2CM (Slovakia), SP2BNJ (Poland) and S57RR (Slovenia).

The opening on November 20th was quite good considering it happened so late in the season and interestingly, for a change, it favoured stations located in northern England and Scotland. **Jim Rabbitts GM8LFB** (Caithness IO88) was one of the first stations to spot that the 50MHz band was open at 0915UTC when he heard the beacon station of OE3XAC (Austria 50.066MHz). Using an Icom IC-7400 transceiver he also heard the Italian station IK2HDF (JN45) and the IW3FZQ beacon (50.001MHz).

The band then remained open for over four hours with contacts being made from the UK into Austria, Balearic Islands, Germany, Hungary, Italy, Poland, Sicily, Slovakia, Spain, Switzerland and Portugal. The last report of signals heard came at 1322UTC when the station of **David Gillies MM0AMW** (Argyllshire IO75)

Fig. 1: The antennas at the QTH of Klaus Dreckshage DL3YEE.

Fig. 2: The dual-band 50MHz/70MHz antenna at the QTH of David Shaw G8TXJ.

David Butler G4ASR
Yew Tree Cottage
Lower Maescoed
Herefordshire HR2 0HP
Tel: (01873) 860679
E-mail: g4asr@btinternet.com

contacted EA6SX (JM19) some 1878km distant.

The 70MHz Band

Last month I mentioned the excellent news that Finland (OH) and its territories, Aaland Islands (OH0) and Market Reef (OJ0) now have permanent access to the 70MHz band. On the very next day, November 5th, it got even better when the Norwegian authorities announced that it has allocated segments of the 70MHz band to Radio Amateurs in Norway (LA) and its territories of Jan Mayen (JX) and Svalbard (JW).

Additionally the islands of Bouvet (3Y) and Peter 1st (3Y), separate DXCC by the way, have also been granted access to the 70MHz band. Unfortunately, these uninhabited volcanic islands are located in the Antarctic more than 2500km south west of South Africa – so you won't be hearing any stations from there very often!

Surprisingly, the announcements weren't the end of new 70MHz allocations because on November 19th the Belgian authorities announced that Radio Amateurs in Belgium (ON) can now permanently use a spot frequency of 69.950MHz. This allocation – some 50kHz below the UK band – may seem a bit unusual but it's the best that could be obtained at the time. Incidentally, this is very similar to the situation in Germany (DL) where a small number of stations (DI2AX, DI2PM, DL6BF and DL3YEE - shown in the photograph, **Fig. 1**) have temporary permission to use exactly the same frequency. So, to contact these countries you need to operate split-frequency, transmitting somewhere in the area allocated for narrowband modes and listening on 69.950MHz.

At the end of November 2009 there were 35 DXCC entities that have permanent allocations in the 70MHz band. The list includes the Aaland Islands (OH0), Azores (CU), Belgium (ON), Bouvet Island (3Y), Cape Verde Islands (D4), Crete (SV9), Croatia (9A), Denmark (OZ), Dodecanese (SV5), Estonia (ES), Faeroe Islands (OY), Finland (OH), Gibraltar (ZB), Greece (SV), Greenland (OX), Ireland (EI), Jan Mayen (JX), Luxemburg (LX), Madeira (CT3), Market Reef (OJ0), Monaco (3A), Norway (LA), Peter I Island (3Y), Portugal (CT), Slovenia (S5), South Africa (ZS) Sovereign Bases-Cyprus (ZC), Svalbard (JW) and of course the UK (G, GD, GI, GJ, GM, GU, GW).

Additionally there are a number of countries such as the Czech Republic (OK), Germany (DI), Hungary (HA), Italy (I), Slovakia (OM) and Spain (EA, EA6, EA8, EA9) that in recent years have had temporary access to the 70MHz band. However, not all of these countries possess the 500kHz of bandwidth between 70.0-70.5MHz that we have in the UK and individual frequencies and band plans can be exceedingly fragmented. To keep up to date with all international 70MHz allocations I suggest that readers of *VHF DXer* take a look at the associated website **www.70mhz.org**

The 70MHz band is certainly becoming very popular and my records show that 30 DXCC entities were worked from the UK last year. From a DXer's point of view what makes this so interesting is that you can utilise many different types of propagation modes to contact these countries. These include aurora, meteor scatter, sporadic-E and tropospheric propagation.

Many new stations are appearing on the band and although most use the narrowband modes of c.w. and s.s.b. and digital transmissions such as JT6M and FSK441 there are a significant number that only use frequency modulated (f.m.) equipment. However, it's not difficult to contact distant stations using this mode during Sp-E openings. Just call on the appropriate f.m. frequencies during the summer season and you may be surprised who answers you. Last year I made low-power f.m. contacts with stations in Croatia, Denmark, Gibraltar, Portugal, Slovenia and Spain.

Propagation conditions on the 70MHz band during November were pretty dire but nevertheless there were still DX contacts to be achieved. Most QSOs were made via meteor scatter using JT6M and included the stations of 9A1Z (Croatia), DI2PM, DL3YEE, DL6BF (Germany), LA4ANA, LA4LN, LA4YGA, LA6MV (Norway), LX1FX (Luxembourg), ON4IMM, ON4PS, ON5QRP (Belgium), OZ1DJJ, OZ2LD, OZ2OE, OZ3ZW (Denmark) and S51DI (Slovenia).

Dual-Band Activity

Last month (January 2010 *PW*) in the *Antenna Workshop* column I described

dual-band antennas for the 50MHz and 70MHz bands. These beams are becoming increasingly popular with v.h.f. stations suffering with limited space for towers and antennas but who still want to be active on as many bands as possible.

The dual-band Yagi is a little compromised in terms of forward gain with regards to a conventional single-band Yagi on the same length boom but nevertheless the performance can still be excellent and such an antenna saves considerable space. With a single feed-line though you can only listen or transmit to one band at a time. However, you can easily make or buy a diplexer to split off the 50 and 70MHz signals.

David Shaw G8TXJ commented that both **Seamus Import G7ITT** and he have built the YU7EF design 50MHz/70MHz Yagi as shown in the photograph, **Fig. 2**. The design consisting of 5-elements on each band can be found at **www.yu7ef.com/LowTemperatureAnt.htm**

David mentions that using all new aluminium tubing and associated antenna materials the dual band antenna only cost £100 to make and that he's very pleased with the results. His only variation from the YU7EF design is that the centre section of the 70MHz elements (about 300mm) is made from half inch tubing as he could only get 2m lengths of three-eighths of an inch tube and the mounting clamps were for half inch tube anyway!

Seamus on the other hand, made the entirety of his 70MHz elements from half inch tubing as he had plenty in stock. He also fitted plastic end caps which are believed to lower the resonant frequency of an antenna of this design. He measured a v.s.w.r. of 1.2:1 at 70MHz rising to 1.8:1 at 70.5MHz which is perfectly usable. However, Seamus does intend to change the elements for 3/8" tubing and remove the end caps to see whether the impedance match can be improved.

David G8TXJ also commented about a 50/70MHz diplexer that he constructed from an article in the March/April 1996 editions of the RSGB's members' journal, *Radio Communications*. The diplexer designed by **John Regnault G4SWX** uses lengths of RG-213 coaxial cable to provide rejection notches of up

Fig. 3: The dual-band 50/70MHz antenna at the QTH of Fernando Garcia EA1ABN.

to -80dB, an insertion loss of only 0.35dB and is capable of handling greater than 400W of r.f. power. David followed the dimensions given in the article exactly and then tested the finished article with a signal generator and power meter.

David then connected the diplexer the 'wrong way' round and tested it with the signal generator into the respective 50MHz and 70MHz receivers. In both instances the rejection was approximately -75dB which he decided was near enough! In practice he notices no ill effects on 50MHz when transmitting on 70MHz (45W from a Cray transverter and amplifier) or on the 70MHz band when transmitting on 50MHz with 100W from an Icom IC-7400 transceiver. David mentions that he hasn't measured the through losses – but it's definitely not noticeable on either of his receivers.

If you want to discover how to make v.h.f. diplexers just post an email to **g4asr@btinternet.com** and I'll send you a PDF copy of the article reproduced by kind permission of the RSGB.

Propagation Forecast

Ionospheric propagation during January-February is normally quite subdued at this point in the Solar Cycle. There is however a possibility of some extended tropospheric propagation into Scandinavia and towards countries in Eastern Europe. These openings will primarily be observed on the 144MHz band and higher frequencies. Unfortunately it won't be until May that the 50MHz and 70MHz bands will start coming alive again.

The only propagation mode that is reasonably predictable is meteor scatter. The New Year begins with the intense but brief Quadrantid shower with maximum activity around January 3rd-4th. The month of January overall has good meteor rates but this diminishes somewhat during February and March. Two major showers now appear. The first is the Lyrids with a maximum around April 21st-22nd that raises meteor rates for several nights.

The Eta Aquarids on May 5th and 6th enrich late nights of May's first half, sometimes quite substantially. June to mid-July has fair meteor rates. The last half of July has rates increasing steadily as the Delta Aquarids (July 27th and 28th) and Alpha Capricornids (July 30th-August 1st) have maxima at the end of the month's. Overall, late July to mid-August is very rich in meteors. Even the Perseids are beginning to show a little activity.

The Perseids maximum, just before mid-August (August 12th and 13th) is fairly prolonged and quite rich. High sporadic activity after midnight continues for the rest of the year, but especially in September and the first half of December. Mid-October to mid-December is a nearly continuous period of heavy meteor activity. The Orionids (October 21st –22nd) during the second half of October have a prolonged plateau maximum for several nights.

The Taurids (November 11th-12th), active for two months, are most numerous in November's first half and can be rather variable in strength. The Leonids of mid-November (November 17th-19th) are quite unpredictable with rich displays occurring roughly every 33 years. The last Leonid storm period occurred from 1998 through 2002. The Geminids shower of mid-December (December 13th–14th) climax the year with many rich meteors.

Finally, the overlooked Ursids complete the year's activity, reaching maximum around December 21st –22nd.

Deadlines

That's it for this month. Thank you for your reports and comments. Please keep sending them in, preferably by E-mail to: **g4asr@btinternet.com** to reach me by the last Saturday of each month. Good luck with the DX and see you again next time. Happy New Year!

73 David G4ASR

Ben Nock's

valve & vintage

Ben Nock G4BXD taking his first turn in the shop for 2010, discusses new arrivals for the 'Kidderminster Kollection'.

Well here we are again, another new year started! I hope you all had a great Christmas and I would like to wish all the readers of *Practical Wireless* a very happy, and let's hope for a prosperous new year! I had something of a rush at the end of 2009, several new sets arrived for the 'Kidderminster Kollection', most requiring work of one kind or another by the 'Kurator'!

Some of the items I obtained completed one station and started a new thread in the museum's books. Both are of Russian extraction and both designs date from the Second World War, I'll start with the first – a tank set.

Russian 10RT Tank set

I've owned the receiver part of the Russian 10RT tank set for some time now, so it was exciting to find the other parts being offered for sale recently. With these items, **Fig. 1**, secured, I now have the matching transmitter and power supply unit. There are still various ancillary items to find, such as the correct Morse key, microphone and headset – but I am a firm believer that everything comes to the Kurator who waits!

No doubt many readers interested in this column will know and will have played with the British Wireless Set No19 over the years – so it was nice to see what the Russians made for their tanks. I think it's fair to say this set doesn't look as nice as the WS19, there are not as many knobs to twiddle and the lack of a meter is another point.

With the imminent arrival of the other items, I thought I'd better re-visit the receiver and get that working first. I recall that I had tried the set when I first got it but I was still surprised when I started to work on the unit. Luckily, after a request via the web **Valery Gromov**, **RA3CC**, sent me an excellent copy of the circuit diagram – and a clear circuit diagram is always a great help with any project.

It turned out that the receiver was not as simple as I first thought. It's a standard single conversion superhet with an intermediate frequency (i.f.) of 456kHz but there are two extra valves inside. One valve is used as a separate 456kHz crystal controlled oscillator and another as a buffer amplifier. These two stages are used when the station is in the transmit mode.

The crystal oscillator signal is mixed with the local oscillator of the receiver to generate a signal back at the received frequency, this is then amplified by the buffer stage and then fed back to the transmitter via the common antenna connection used between the transmitter and receiver. In this way the frequency of the transmitter tracks the frequency being received or listened to by the operator.

The receiver, and hence the transmitter, could be operated with full crystal control as well. The two oblong black units on the lower right of the receiver each hold a crystal and trimming capacitors, selected by the range switch which is coloured red, yellow and black.

Another odd feature of the receiver circuit is the method of receiving Morse code (c.w.) signals. In more conventional receivers a beat frequency oscillator (b.f.o.) is used to mix with the incoming signal and produce a beat note that the listener hears in the speaker. In this receiver it was rather different.

Connected between anode and grid of the first i.f. stage is an audio transformer and network, which when switched in, generates an audio

Fig. 1: The 10RT-26 station, power unit left, receiver in the centre and transmitter on the right.

tone of about 1 kHz. This, in turn modulates the i.f. signal. So, when the set is tuned to a Morse signal the on–off keying of that signal causes the 1kHz tone to be demodulated by the detector stage and thus provides the note in the loudspeaker.

The – rather complicated – method does work for Morse transmissions but doesn't work for single sideband (s.s.b.) signals. While I was only expecting to use the set on either Morse or possibly amplitude modulation (a.m.) I thought it might be nice to be able to listen to s.s.b. at times so I installed a small oscillator, a 455kHz ceramic resonator with a 4096 c.m.o.s. chip. I also slightly altered the wiring, so that the old b.f.o. switch now switched this new oscillator on and off using the heater supply voltage, which was dropped by a resistor and stabilised with a zener diode. This worked perfectly and s.s.b. signals can now be resolved with ease.

The original station tuned from 3.75 up to around 6MHz, so I decided to add a small amount of extra capacitance to the oscillator and radio frequency (r.f.) stages to enable reception down to the bottom end of the 3.5MHz Amateur band and thus gain access to the c.w. portion. At the time of writing *V&V* I was awaiting the delivery of some Russian 6P3 valves for the transmitter but it's quite likely I may have already worked one or two of you with the transmitter by the time you're reading this.

The RBM-1 Transceiver

The other exciting bit of Russian equipment I received recently, is an example of the RBM-1 set, this was apparently developed during Second World War but was – it seems – still seeing action into the 1950s in various Communist Bloc countries. Various dated components in this example are marked 1955 and with Polish language lettering.

I like playing with the older type of equipment, especially if it can be used on today's Amateur bands, much more fun than modern gear I feel. The RBM-1, **Fig. 2**, is a two band receiver transmitter tuning around 1.5 to 5MHz on a.m. and c.w. with about 1W of transmit power. The set ran off a battery pack, using 2.5V for the heaters and a 200V high tension (h.t.) battery for transmit. It also had a tap at 80V for the receiver supply.

When I received the radio I – rather excitedly – examined the set inside. All the valves were present and the set looked in good condition. However, closer examination revealed some cut leads and missing components. Again I was lucky to find a circuit diagram on the web which revealed just which parts were missing and what their values should be. After replacing one of the missing heater links and the missing voltage feed to the b.f.o the set started to receive an i.f. signal from the generator but was totally deaf to signals via the antenna socket.

Further examination revealed some missing capacitors around the oscillator stage. It would seem that at some time someone had been trying to raise the tuning range, probably to reach the 7MHz Amateur band.

I replaced the missing capacitors and started a full alignment of the set and then, at last, signals were being heard. So, after an evening messing with the set I was very pleased with the results and the receiver turned out to be surprisingly lively on the Amateur bands. The photo, **Fig. 3,** shows the inside of the set.

Looking at the transmitter I found what I thought was just one capacitor missing. This was replaced and the output was tested into a dummy load. Again, I found the set needed a full alignment, the main problem in getting the set 'on the nose', was caused by the low power output. Using a very low reading power meter

Fig. 2: The RBM-1 transmitter receiver, transmitter tuning on the left and the receiver tuning on the right.

Fig. 3: Inside the RBM-1, the large coil in the centre is the antenna matching unit (a.m.u.).

Ben Nock G4BXD
62 Cobden Street
Kidderminster
Worcestershire DY11 6RP
E-mail: military1944@aol.com

Fig. 4: Underside of RBM-1, transmitter stages on the left, receiver stages on the right and bottom section.

Fig. 5: The RF10 transceiver with microphone, whip antenna and battery pack attached.

Fig. 6: The controls of the RF10 – simple and well laid out!

I was able to squeeze the last drop from the transmitter, but I still felt there was something amiss with the set so I then really had scrutinise the circuit more closely.

It turned out that there was indeed another capacitor missing – it was the coupling capacitor from the anode of the output valve going to the output tuned circuit. No wonder there had been so little output! With the missing capacitor replaced I suddenly got about 1.5W out of the transmitter which was much more like it! The photograph, **Fig. 4**, details the underside of the set.

While the 10RT runs off a 26V supply, the RBM-1 originally had a second box which housed the batteries. I felt it would be easier – certainly for portable trials – to run the set off a battery supply rather than build a mains powered unit.

With the small PP3 9V batteries so cheap in various high street stores I bought 24 and wired them in series to give 216V, with a tap after battery nine, to provide 81V for the receiver. I used 2 D-sized cell re-chargeable batteries for the heater supply. Incidentally, the current drawn from the h.t. battery is less than 10mA on receive and just 35mA on transmit!

The Czech RF10

Another recent addition is this rather more modern little transceiver, the RF10, **Fig. 5**, made by a company called Tesla in a town called Pardubice in the Czech Republic, 65 miles east of Prague. The cute little set tunes 44 to 53.75MHz in 25kHz steps and was planned as a replacement for the obsolescent R-105 and R-109 sets of Russian design. Power output is about 1W of frequency modulated (f.m.) signal running off a battery pack housing five re-chargeable D cells.

What was amazing was the condition the set arrived in – basically it was complete and 'as new'. The box contained the set, two battery packs, two whip antenna, one 500mm and one 1.5m, along with reels of wire for erecting a larger antenna array in the field. There was also a handbook with a detailed circuit diagram and pictures of the types of antenna to be used in the field, a box of spares and a nice carry-case with straps.

The mode switch on the set, **Fig. 6**, selects 'whisper' mode, where the microphone gain is increased so the operator need only whisper to achieve full modulation. There's also normal operation with two levels of audio output for reception and a squelch function turned on, normal output with the squelch off and a test position where the transmitter output is routed to a built-in dummy load. Finally, there's a green light emitting diode (l.e.d.) that indicates to the operator that the unit's on full output – and hence also tests the battery level.

And Finally

And finally – I had a very nice E-mail from **Nathan Markley G7HUG**, thanking me for bringing back early radio memories with my 619 that I mentioned last time. Another E-mail from **Ken Randall G3RFH**, was received and he also had memories of his days as a Leading Telegraphist in the Royal Navy who actually used the 619 on his ship commenting that it never let him down, even during the Suez crisis in 1956. I'm glad my article was appreciated Ken!

Well that's about it for this 'stint' at the *V&V* shop. I hope you've enjoyed the selection I've had 'on the counter' this time for you – and there are more pictures at **www.qsl.net/g4bxd**

As always I can be contacted at the 'Kidderminster Kollection' via my E-mail address: **military1944@aol.com**
Cheerio for now! ●

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Make	Model	Description	Price
Uniden	UBC-60XLT	66-512MHz (with gaps) FM Hand Held Receiver 80Ch. 4 x AA cells	£55
Icom	IC-A3E	Airband H/Held + NAV/COM 50ch Alphanumeric	£180
Optoelectronics	Optolinx	TTL to RS-232 Interface (supports 4 devices)	£65
Ameritron	AL-82	10-160m 1.5kW Linear Valve Amplifier with 2x 3-500 Tubes	£1,699
Yaesu	FT-712RH	70cm FM Mobile Transceiver 35W	£125
Microset	PT-110	12V Stabilized 10A PSU with Over V / A protection	£69
Optoelectronics	Model40	"Scout" 10MHz-1.4GHz Frequency Counter + Reactive Tune & 400ch.	£199
Nevada	PSDL	50ohms Dummy load Dc-3000MHz max 15W	£30
MFJ	MFJ-216	Deluxe Amplifier Saver to Adjust Amplifiers without Transmitting	£55
Uniden	UBC-278CLT	25-174,406-512,806-956MHz AM,FM,WFM + MW Desk/ Mobile Receiver 100Ch. 10V + psu	£99
Matsui	MR-4099	Portable World Band Receiver with FM stereo and SSB	£59
Heil	AD-1-Y4	Cable for pro set and yaesu 4 pin round	£10
Icom	IC-T3H	2m FM transceiver with CTCSS and DTMF keypad	£89
Cobra	HG-S100	15W Rugged External Speaker with 4" cone	£19
PacComm	Tiny-2 mkII	VHF Packet TNC Controller APRS ready 12V	£95
DRAE	VHF	140-460MHz Wavemeter	£25
Alinco	DJ-X3E	100kHz-1300MHz AM, FM, WFM Hand Held Receiver 700Ch, 8.33kHz + Ni-MH & Charger	£109
Icom	PS-55	12V 20A Matching PSU	£99
Adonis	AM-508	Base Microphone with Amp and Compressor	£59
Icom	IC-R5	150kHz-1300MHz AM,FM & WFM Hand Held Receiver 1000Ch. + Nicads	£119
Linear Amp UK	LA-SPC	Supertuner 10-160m 1.5kW ATU + 2x Coax, Balanced Feed & PWR/SWR Meter	£329
AOR	AR-1500	500kHz-1300MHz All Mode Hand Held Receiver 1000Ch	£99
Toyo	T-200	3.5-500MHz 200w Dummy Load	£39
Alinco	DJ-V17E	2m FM Palm Transceiver 5W, DTMF keypad & CTCSS	£95
Eton	E1100	Compact Portable AM, FM stereo & 10 Shortwave Bands Receiver + Clock	£25
Morphy Richards	27002	Portable Analogue AM, FM stereo & 10 Shortwave Bands Receiver	£19
Nissei	RX-503	SWR/PWR meter forward/Reflected AVG/PEP Xneedle 1.8-525Mhz	£49
Icom	IC-R3	0.5-2450MHz AM,FM,WFM Hand Held Receiver 450Ch. + 2" TFT colour TV	£249
Heil	BM-5-5	Lightweight Single Headset & Boom Mic with HC-5 insert	£39
Icom	SP-10	5W Mobile Speaker 4ohms	£35
Yaesu	MEK-2	Microphone Lead Extension Kit for Yaesu Mobile Trasceivers	£25
B.N.O.S	F144-L/U	2m low pass filter	£29
Vectronics	LP-30	HF Low Pass Filter cuts off at 35 MHz (-70 dB) 1.5kW	£65
Panasonic	RF-3700	Portable Receiver with 32 presets FM LW MW	£29
Roberts	R-9914	Portable Receiver with SSB 45Ch.	£69
Yaesu	Ft-3000M	2m FM Mobile Transceiver 70W + CTCSS	£149
Alinco	DJ-X3E	100kHz-1300MHz AM, FM, WFM Hand Held Receiver 700Ch + 8.33kHz step	£95
Daiwa	PS-304	13.8V Variable 30A PSU with A/V meter	£79
Kenwood	AT-50	1.8-30MHz 100W Matching Automatic ATU	£219
Kenwood	TS-50S	HF Mobile/Base All Mode Transceiver with Gen.Cov.RX 100W 12V	£329
Kenwood	TS-2000E	HF,6m,2m,70cm All Mode Transceiver + Gen.Cov., Auto ATU & DSP	£999

RADIOWORLD

01922 414796

IC-756PRO-MKIII Icom HF + 6m Trx £1,795
Yaesu FT-1000MP MKV 200w HF DSP Base £1,399
Yaesu FT-1000 "CLASSIC" HF Transceiver £1,399
Kenwood TS-2000X HF/6m/2m/70cm & 23cm Transceiver £1,299
Icom IC-R8500 Receiver £1,099
Kenwood TS-790E Dual-Band Base/Mobile Transceiver £999
Icom IC-910H 2m/70cms base 100w £999
Yaesu FT-920AF HF / 6M Base £899
Yaesu FT-847 HF-6-2-70 Base £899
TenTec Jupiter 538 ..... £899
Yaesu FT-920 ..... £799
Yaesu FT-736R 6m, 2m & 70cm Base £799
Kenwood TS-850S/AT £699
TS-480HX £599
Kenwood TS-570DG/E HF transceiver £599
Yaesu FT-736R 2m/70cm Base Multimode £599
Icom IC-706MkIIG DSP £549
Fairhaven RD-500VX Comm Rx £499
Icom IC-R7000 HF MOD FITTED £499
AOR AR-8600MkII £499
Yaesu FT-857D Multi-band Mobile £475
ELDORADO-BK High Sierra Motorised Vertical Antenna £469
Kenwood TS-930SAT £450
AOR AR-3000A Wideband Receiver £450
TS-440SAT built in atu £399
Palstar AT-1KP Antenna Tuner £339
Yaesu FT-101ZDmk3 HF Transceiver £325
Microset SR-200 2m 200w £319
MFJ-989C MFJ 3kW ATU, ANTENNA TUNER £299
Yaesu FRG-8800 RX inc Converter £299
AOR AR-8200Mk3 Scanner £299
Yaesu FT-690R II £275
Ten tec RX-320 PC COMMUNICATIONS RECEIVER £275
Yaesu FTV-901R 2m / 6m Transverter £275
Icom IC-490E 70cms Mobile £250
Yaesu FT-290MkII 2m Multi-mode transceiver £250
Magnum S-9 Multi Mode mobile Transceiver £240
Kenwood TH-D7E Dual Band Handheld £240
Icom IC-T81E 50-54 / 144-146 / 430-440/1240-1300 ..... £240
DR-635E Alinco 2m/70cm FM Dual Band Mobile T £230
UBC-800XLT mobile scanner £229
Eton Satellit 750 FM Stereo/LW/MW/SW/Air receiver £225
Yaesu FT-480R 2m Transceiver £220
AOR AR-2002 Receiver £199
Yaesu FC-30 Antenna Tuner Unit ..... £ 189
AOR AR-8000 ..... £189
Kenwood TM-G707E Dual Band Mobile £189
Ranger RCI 2950DX 10 - 12m Transceiver £179
Kenwood TH-F7E Dualband Handheld Transceiver £179
MVT-7100 Scanner £179
Yaesu FV-901DM VFO £175
ICOM IC-2200H 144–146 ..... £175
IC-E90 6m / 2m / 70cm Handheld £169
Alinco DJ-X10 Wide Band Rx £165
Kenwood TS-271E £165
PS-33T Kenwood 13.8V 20.5A PSU £159
Yaesu FT-790 ..... £159
FT-290RMKI 2m Multi mode £150
Daiwa CNW-518 Antenna Tuning Unit £149
MC-90 Desk Mic for DSP £149
MFJ-784 DSP Filter £149
M/Mods 144/100 ..... £149
Icom PS-60 ..... £149
Kamtronics KAM Multimode TNC £140
Alinco DJX30 Scanning Receiver 100KHz - 1.3GHz £140
Icom IC-T7E Dual Band Handy £139
MFJ-462B CW/RTTY/ASCII/AMTOR Decoder £139
AOR ARD9000 Digital Voice Interface £129
Magellan GPS 315 Receiver £129
Icom IC-R5 Receiver £129
MFJ-949E Versa Tuner £125
Yaesu FT-41R Handheld Transceiver £120
Microset PT 135 PSU £120
CUB Optoelectronics MINI Counter £119.95
Icom PS-15 20A power Supply £119

Carl Mason's

hf highlights

Share your news, views and reports with fellow readers.

Carl Mason GW0VSW provides his regular news round-up from your reports on the h.f. bands. As usual, all reports by the 15th of the month please!

For the past few months I have been spending a good deal of time on 10MHz using PSK31, a mode that has allowed me to make many contacts when conditions were too poor otherwise. As part of the usual 'exchange' of information such as RST, name and QTH there often followed a list of the clubs the operators were members of, including one or two I had not heard of.

One of these was **The 30M Digital Group** founded by **Donald Hobson KB9UMT** who have a great website administered by **'Rob' Roberts ZL3RG** and it contains everything from awards and FAQs to 10MHz 'spots' and even an online PSK receiver. This group has been set up for both Amateurs and short wave listeners (s.w.l.s) who have a common interest in 10MHz activity using digital modes and as membership is free of charge it is well worth joining.

When you apply by E-mail you receive a very nice certificate and a membership number almost by return so take a look at **www.30mdg.net**/ for further details. There are also two other clubs that may be of interest and both are also free to join. They are the **European PSK Club: http://eu.srars.org**/ or **EPC** which is an informal club dedicated to promoting activity using PSK modes on all amateur bands and the **Digital Modes Club: www.digital-modes-club.org**/ which promotes activity using all digital modes.

The DX News

On to some DX news now and heading for a vacation on Aruba SA-036 will be **Martin Grozinski W2CG** who will be active until the January 26th using one of two special callsigns, **P40C** or **P40CG**, which was awaiting approval as I put this column together. Marty will be using either c.w. or RTTY on all h.f. bands between 1200 -1400 and 2000 - 2400UTC with other times as his schedule permits. A QSL is good via the *Log book of the World* (*LoTW*), which he prefers, or via his home callsign via the Bureau.

Returning to McMurdo Station **KC4USV** on Ross Island AN-011 Antarctica until February 20th is **William 'Bill' Erhardt K7MT** who hopes to be QRV looking for Europe on 14243 kHz at 1800UTC on Saturdays and around 0000UTC on Sundays with some PSK31 on 14070kHz and c.w. around 14043kHz if time permits and a QSL is via K1IED.

The 'Izvestiy Tsik' is an archipelago composed of two large and two small islands covered with tundra vegetation, shingle and ice which are located in the Kara Sea about 150km from the coast of Siberia and just 45km north of the nearest island group, the Arkticheskiy Institut Islands or Arctic Institute Islands. The largest of these is called Troynoy AS-086 and the seas surrounding it are covered with pack ice in the winter and numerous ice floes even during the summer. This island group is part of the **Great Arctic State Nature Reserve** which is the largest reserve in Russia. There is a Scientific station based there called Polyarnaya Stantsiya and it is from here that **Vasiliy Nadein RA9LI** has relocated and is operating during his spare time as **RA9LI/0** for most of this year. A QSL is preferred 'direct' to Serge Abyshev UA9LP, PO Box 698, Tyumen, 625000, Russia.

Your Reports

On to your reports now and the first is from **Bill Ward 2E0BWX** who lives in Edwinstowe, Nottinghamshire who logged several stations on 3.5MHz including 9A2X (Croatia) 2008, RK3DH (European Russia) 2247 and DO1BEN (Germany) at 2250UTC using a Icom IC-7400, 50W s.s.b. to an SRC X65 end fed wire antenna.

The 7 & 10MHz Bands

On 7MHz Bill 2E0BWX, found ON4PTC/M (Belgium) 1340, RK3K (European Russia) 1818, IZ0IWC (Italy) 2120 and SV3DCX (Greece) at 2130UTC.

The band also provided several contacts for **Martin Addison 2E0MCA** in East Finchley, North London as DL0MFK (Germany) 1017, OT5A (Belgium) 1023, Stephen GW0BKG in Porthcawl at 1025, OL7R (Czech Republic) 1027, LY2W (Lithuania) 1046, LA9Z (Norway) 1056, HB0/HB9AON (Liechtenstein) 1058, EI6JK (Ireland) EU-115 at 1059, PA150SLH (Netherlands) 1059, Ray GA0KET in Mintlaw, Aberdeenshire airing the special Scottish prefix at 1145, EU1AZ (Belarus) 1307, IZ4COW (Italy) 1308, 9A2VJ (Croatia) 1310, OZ7X (Denmark) 1312 and LX1KC (Luxemburg) 1321UTC all made his log using a Yaesu FT-2000 and 50W into a half size G5RV.

The log of **Eric Masters G0KRT** in Worcester Park, Surrey, shows a good deal of activity especially with QRP where his 5W c.w. reached DF5WBA (Germany) 0614, OZ/DL8KX (Denmark) 1825, IZ3NWT (Italy) 1858 and HA5UY (Hungary) at 2045UTC while 100W

Fig. 1: The 30m Digital Groups '10 on 30' Award.

Fig. 2: The 30MDG logo.

Fig. 3: The LZ1195IR QSL worked by Bill 2E0BWX on 14MHz s.s.b.

Carl Mason GW0VSW
2 Golwg-y-Bryn
Woodland Road
Skewen
Neath
Port Talbot SA10 6SP
Tel: (01792) 380882
E-mail: gw0vsw@btinternet.com

s.s.b. worked EE9Z (Ceutu & Melilla) 0643, GD4WDY (Isle of man) EU-116) at 1627 and CR3L (Madeira Islands) AF-014 at 2317UTC running a Kenwood TS-570 with a home-brew modified W3EDP antenna tuned with a SG-230 auto-tuner.

On to 10MHz now and the log of **Geoffrey Powell M1EDF** in Seckington, Staffordshire who used an Icom IC-718, MFJ-949E tuner and doublet antenna at 18m to work F8APV/MM off the French coast near Le Harve at 0855, LX30AK (Luxembourg) 1745, CT7/DJ5YQ (Portugal) 1935, OK1AVG (Czech Republic) 2034, 4X4CF (Israel) 2035, PY2XB (Brazil) 2036, RA3BQ (European Russia) 2040, TA3AX (Turkey) 2050, UT5JAJ (Ukraine) 2058, a large number of American stations including KO1EA (USA) at 2111 and SV2AVP (Greece) at 2140UTC using c.w. at 100W.

Fig. 4: The N1EA QSL worked by Geoffrey M1EDF on 18MHz c.w.

The 14MHz Band

In Cambridge, New Zealand, **Peter Leng ZL4TE** spends most of his operating time on the 14MHz band using just a vertical antenna. Peter said in a recent E-mail, "I hardly use the G5RV now as I find the Cushcraft vertical works very well especially into Europe and the States though a 'ZL' callsign does help! I ignored the advice regarding radials and instead put a short length of chicken wire two inches under the earth near the base of the antenna and have been more than pleased with the results".

Peter's contacts using s.s.b. this month include JA0JHA (Japan) 0016, CP5RC (Bolivia) 0400, DR800GRZ (Germany) 0706, John M0JWK in Alton at 0755, LA8UJA (Norway) 0801, LT2BAW (Lithuania) 0829, KH2A (Guam) OC-026 at 0841, F1PKH (France) 0843, SM0GU (Sweden) 0909 and BX2AAL (Taiwan) AS-020 at 0913 while c.w. worked PA4C (Netherlands) 0910, UA9FQS (Asiatic Russia) 0915, RX3DFS (European Russia) 0917 and BX2ABD at 1004UTC using a Yaesu FT-1000MP MkV and a Ranger amplifier to put out 500W into a Cushcraft AV-3 3 band vertical.

The log from **Martyn Medcalf M3VAM** in Chelmsford, Essex contains 10W s.s.b. contacts with E74AA (Bosnia & Herzogovina) 0919, SN7Q (Poland) 0936, LA1PK (Norway) 0954, UX3MZ (Ukraine) 0956, RN3DY (European Russia) 1016, LZ5K (Bulgaria) 1227, HB0/HB9AON (Liechtenstein) 1521, AM3SSB (Spain) 1252, OE2S (Austria) 1259, S57RTH (Slovenia) 1322, VE2IM (Canada) 1333, ES7FQ (Estonia) 1342, DL0KHZ (Germany) at 1925 with a special call run by the Club Station DARC OV Karlsruhe to celebrate 40 years of the twinning of Karlsruhe with Nottingham 1969 -2009, EI0CL (Ireland) EU-015 at 1936, IY1NGM (Italy) 2014 and F8DRE (France) 2035UTC using his Icom IC-746 and Comet CHA-250BX vertical antenna.

Fig. 5: The ON4PTC QSL worked by Bill on 7MHz s.s.b.

Enjoying a two month break in Fethiye, Turkey is **Paul Whitelock G0GMY** who usually operates from his car using a Yaesu FT-857D and Yaesu ATUS 120 antenna, which provides h.f., v.h.f. and u.h.f. coverage with automatic motorised tuning for the 7, 14, 21, 28, 50, 144 and 430MHz bands. However, he was unable to remove it from his vehicle as the main unit has been professionally fitted and would require some effort to remove it! Paul therefore put an 'old' AKD Target receiver in his luggage together with a short length of wire for the antenna.

Fortunately, at his apartment he found a piece of redundant coaxial cable that ran up to the roof and with a

good earth was more than pleased with the results. Propagation has been good especially on 14MHz with the band showing good DX between 0600 and 1400. Stations logged to date include SQ7VO (Poland), VK6BW, VK4LMB and VK8DP (Australia), G7GYM, HZ1BL (Saudi Arabia), GM0MNV, ZP2CB (Paraguay), EA7EPF (Spain), S51JX (Slovenia) between 0615 and 0735 and VU2ASH (India), DU1DL (Philippines), A41LD (Oman), YI1IRQ (Iraq) between 1331 and 1350UTC which is not bad considering the simple set up. I bet Paul wishes he'd had a transceiver with him!

The s.s.b. from Bill 2E0BWX worked YO5AMF (Romania) 0800, LZ1195IR (Bulgaria)at 1130 and a special call dedicated to St. John of Rila who was the first Bulgarian hermit QSL via LZ1KZA, E73EPA (Bosnia & Herzegovina) 1310 and 1A1AB (SMO of Malta) in Italy at 1520UTC. This last call is interesting as the **Sovereign Military Order of Malta** or **Knights of Malta** for short is actually a Roman Catholic order based in Rome, Italy and is a DXCC entity in its own right. The SMOM is a sovereign subject of international law and takes its origins from the **Knights Hospitaller** which was an organisation founded in Jerusalem in 1050 to run a hospital that would provide care for the poor and sick pilgrims that lived, or travelled in the Holy Land.

After the conquest of Jerusalem in 1099 during the First Crusade, it became a Catholic military order under its own charter. After the loss of Christian held territories to the

Fig. 6: The AKD Target receiver used by Phil G0GMY in Turkey for his s.w.l. operations.

Fig. 7: The VP8DIF QSL – sent to Geoffrey M1EDF following a14MHz s.s.b. QSO.

Muslims, the Order operated from Rhodes between 1310 to 1523 and later on from Malta from 1530 over which it was sovereign until 1798, when the order was thrown out by Napoleon.

The Order, as such, survived its expulsion from Malta and retains its claims of sovereignty under international law and has been granted permanent observer status at the United Nations. These Observers have the right to speak at United Nations General Assembly meetings and participate in procedural votes as well as sponsor resolutions.

The SMOM is now considered to be the main successor to the original medieval Knights Hospitaller, which today has over 12,000 members, 80,000 permanent volunteers as well as medical staff including doctors, nurses, auxiliaries and paramedics. Their aim is to assist the elderly, handicapped, refugees, children, the homeless and those with terminal illness and leprosy in all five continents of the world, without the boundaries of race, colour or creed and to assist the victims of natural disasters, epidemics or armed conflicts.

There were a few s.s.b. contacts on the 14MHz band for Martin 2E0MCA as ES20W (Estonia) at 0957 QSL via ES1QD, Z36T (Macedonia) 1643, VE7SZ (Canada) 1636, S50O (Slovenia) 1647, EA2IF (Spain) 1751 and EA8YB (Canary Islands) AF-004 at 1924UTC all made his log.

Fig. 8: The yacht used by Pierre Goasguen F8APV, moored in Deauville, near Le Havre, France. On board Pierre uses an Icom IC-7000 with 100W to a vertical multi-band antenna with an auto-tuner.

The 18 & 21MHz Bands

On to 18MHz now where Geoffrey M1EDF found the band open to the States around 1800 and used c.w. once again to work N1GKE in Rhode Island, K8GTQ and W7JW both in Michigan and UR4IOR (Ukraine) at 1820 while Eric G0KRT also used the key to work K9EU in Illinois and K4LTA in Tennessee around 1640UTC.

Back in New Zealand Peter ZL4TE had s.s.b. contacts with JA0JHA (Japan) at 0016 followed by KH6/N6GQ (Hawaii) OC-019 at 0121UTC.

The 24 & 28MHz Bands

The higher h.f. bands have had some activity on them with the occasional opening during the day which pleased Eric G0KRT as he managed 100W s.s.b. contacts with CN8YE (Morocco) 1134 and PZ5M (Suriname) at 1529 before moving to 28MHz where he found LY7Z (Lithuania) 1348, OE4VIE (Austria) 1400, DL5RBW (Germany) 1405, HA6NL (Hungary) 1405, OK2BPU (Czech Republic) 1413 and EA6/AA5UK (Balearic Islands) EU-004 at 1554UTC.

Signing Off

Well, that is the February column for 2010 and as usual my thanks go to all our reporters for their logbooks and to **Mauro Pregliasco I1JQJ/KB2TJM** editor of the *425 DX Newsletter* for all the DX information. I hope that we will see a continued improvement in propagation over the coming year especially on the higher bands which are finally showing the occasional openings. Until next time may I wish you all good DX and a very Happy New Year.

73 Carl GW0VSW.

Harry Leeming's

in the shop

Harry Leeming G3LLL looks back at 'boosting' TV tubes and caring for elderly 6146 and 6JS6C power amplifier valves.

Welcome to *In The Shop* (*ITS*)! I'm starting this month by remembering equipment prices – if you think that electronic equipment is too expensive now, think yourself lucky that you were not trying to buy a new TV in the 1950s!

I started work as an apprentice radio and TV engineer in 1952 on my 15th birthday (put your calculator away please!) at £1.50 per week. We didn't have a television at home, for the simple reason that a 12 inch black and white TV cost around £50, and this would have swallowed up a whole month of Dad's wage!

For the families who did manage to buy a TV, "How long will the tube last?" was a constant worry. To replace the cathode ray tube (c.r.t.) when the picture became dim, cost half the price of the set and while television sets were sold with a '12 month guarantee', the small print gave valves only three months, the tube usually six – and excluded labour – you can imagine how much 'aggro' that caused.

However, there were ways of extending the tube life, if you couldn't afford a new one. I managed to get Mum and Dad a cheap second hand 12 inch Murphy, with a tube that was slightly low in emission.

By fitting a small transformer I boosted the heater voltage – and with occasional further boosts in voltage – it gave them several years' service. These booster transformers were widely used – and many an innocent purchaser was sold a second had TV with so much boosted voltage on the tube heater– that it glowed like a light bulb and hence had a very short life expectancy!

Of course it's not only cathode ray tubes that can have their life extended by boosting the heater voltage. If your pair of 6146Bs or 6JS6Cs are 'down' in emission and your rig is only giving (let's say 60W out), you can try increasing the heater voltage by about 10%, and you may be lucky, on the other hand you may burn out the heaters – it's at your own risk so please don't blame me!

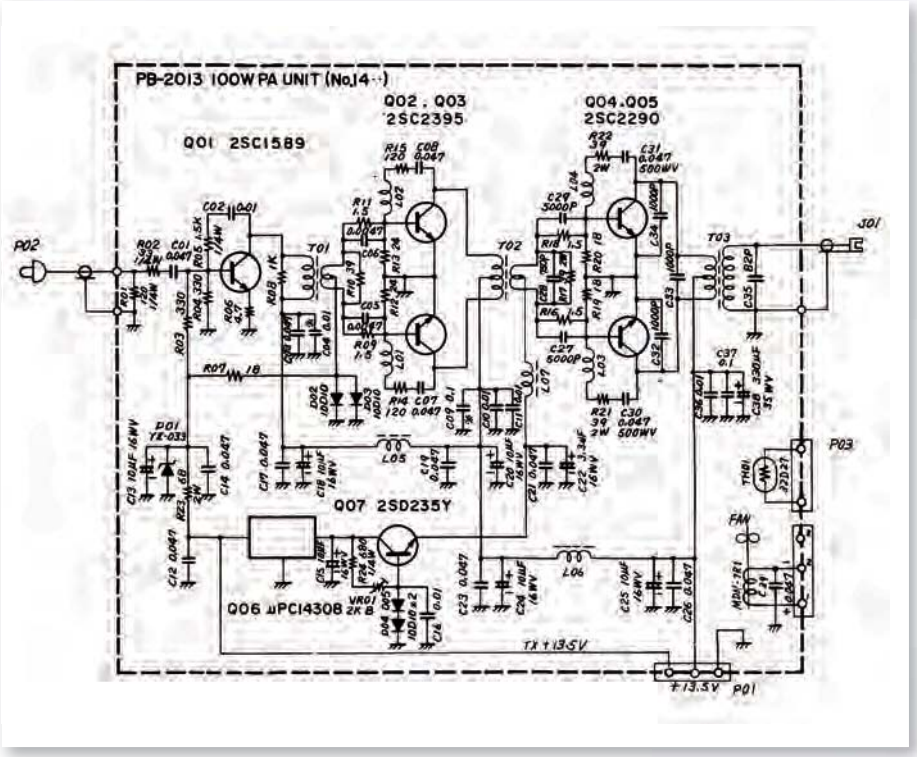

Fig. 1: The FT-1017 p.a. circuit. Copyright of Yaesu.

Harry Leeming G3LLL
The Cedars
3a Wilson Grove
Heysham
Morecambe LA3 2PQ
Tel: (07901) 932763
E-mail: G3LLL@talktalk.net

Fitting New Output Transistors

While it's not quite as catastrophic as a faulty c.r.t. in a 1950's family 'goggle box', a blown power amplifier (p.a.) stage in a transistorised rig, is quite an event. The cost can vary from a couple of pounds for the device used in a hand-held portable, to the top side of £100 for a pair of 28V devices as used in some high frequency (h.f.) rigs like my FT-980.

Unlike valves, the transistors don't 'just plug in', and with the inaccessibility of many transceivers, replacing the output devices can involve a few hours work. With workshop time costing anything from £30-£60 an hour, there's every incentive to do the work yourself, but before jumping in and risking blowing a new set of p.a. transistors, it's as well for me to ask you the straightforward question, "Are you sure that they are faulty, and if so, why did they blow?"

The output stage in a transmitter usually operates in one of two modes – Class C or B. When an output transistor is operating in Class C, it's at its most efficient, as it doesn't pass any current in the absence of drive. Because of this, it operates in a cooler fashion, and generally with any given transistor, it's possible to produce a higher output power.

There is, however, a snag with a Class C stage – the output is a very distorted representation of the input signal waveform, and so whilst it's suitable for the frequency modulation (f.m.) or c.w. modes, it's of no use for amplifying single sideband (s.s.b.) transmissions.

An output transistor, operating in class B is biased to pass a small

'standing current' and if this is set correctly it will amplify an s.s.b. transmission linearly – i.e. without excessive distortion at reasonable efficiency. In most transmitters the standing current is adjustable, if it's set too low the transmission will be distorted and will splatter, if it's set too high the transistor will overheat and the efficiency will be low.

The diagram, in **Fig. 1**, shows the circuit of a typical 100W p.a. stage (as used in the FT-707 and FT-107) and is similar to that used in several other Yaesu and Kenwood h.f. rigs. The current in the output transistors is set for Class B operation and is controlled by VR1.

When checking the output stage, the first thing to do is to check the voltage on the base of the two output transistors. With the rig is in the transmit mode with the drive and microphone gain controls at zero, this should measure between 0.5 and 0.6V d.c. If it's much higher than this, the base emitter junction of the transistors is probably open circuit. However, if the voltage is very low or zero, one of the transistors is likely to be short circuit – check this with an ohmmeter.

If the voltage turns out to be okay, the transistors are possibly also okay. To check, switch off and break the 13.5V connection to transistor T03. Place a meter in series with the feed, switch on and you should get a reading of around 100 to 300mA (0.1-0.3 Amps) in the transmit mode when there is no radio frequency (r.f.) drive. This current should be adjustable by VR01 and if **it is adjustable** then the p.a. transistors are okay, so you can reconnect the lead to T03 as the fault is elsewhere.

Removing Transistors

If it's necessary to remove transistors, to enable sufficient heat to be applied to unsolder them, it's usually necessary to release the printed circuit board (p.c.b.) and all the transistors from the heat-sink. It's not necessary to completely remove the board, as long as the screws are removed and thermal contact is broken.

Once the removal operation has been completed, make a careful drawing of the parts that are soldered directly to the output transistors or are 'in the way' and unsolder them. Then apply a large chisel bit type soldering iron of 100W (or more) to each of the tabs on the output transistors and carefully prise them off the board. Clean any surplus solder off the board, and then screw it lightly back in place.

Next, it'll be time to fit the replacement. Tin the tabs on the new transistors with solder, and apply a **little** heat sink paste to their bodies, (you can get this from Maplin's or a computer shop). Make sure the heat sink is clean, and apply a **little** more paste to it. Then, very lightly fix the new transistors in place with their screws, (don't screw them down too firmly, or you may not be able to apply sufficient heat) and double check that they are the correct way round.

Next solder the transistors in position whilst pushing them down with a tool so that they touch the heat sink. Then refit the temperature sensing current stabilising diodes, add a blob of thermal paste, making sure that they're actually touching the body of the transistors and then re fit any other parts that it has been necessary to remove. When this has all been completed, firmly tighten all the screws around the p.a. stage, so that the transistors all make good thermal contact with the heat-sink.

Fastest Fuse?

Next, if you're not careful, can come the expensive bit! Transistors have been classed by some engineers as 'the fastest fuse known to man'! So, it's wise precaution not to rely on fuse protection for your initial trial, instead it's essential ensure that it's impossible for the new output devices to pass a destructive current. The simplest way to do this is to limit the current to about a quarter of the normal maximum with a low value high wattage wire wound resistor. In the case of a 13.5V 100W output stage, current limited to be between 4–6A, should be a safe value.

Before connecting to the p.s.u., break the connection to transistor T03, and wire in a meter on the 10A range in series with a 2 or 3Ω resistor of at least 20W, as per **Fig. 2**. Next, plug in your dummy load and power output meter, power up the rig in the transmit mode – and with no drive the meter should read around 100 to 200mA.

Adjust the bias control (VR01 in this case) until the current stabilises in this range, at whatever current is stipulated in the service manual. Then (carefully but firmly) poke and prod at VR01 and the joints and components around the amplifier, to make sure that there is no intermittent variation of current due to bad joints or connections. Once you have done this it is time to advance the drive control, or whistle into the microphone, for a couple of seconds, and your power meter should register an output of a few watts – then try the rig on all bands.

Don't prolong the test or the wire wound resistor current limiting resistor will get red hot. If the current increases on the 10A meter when you whistle or apply drive, but there's no output shown, you have an open circuit or a short somewhere between the power amplifier and your power output meter. Sort this out, **before** you remove the wire wound current limiting resistor, or you'll risk blowing the new transistors.

Once things seem to be functioning at low power switch off, short out the wire wound resistor, and switch the test meter to read 20A, (or remove them both and restore the link to TO3). Then with the rig set to **Tune** or **CW**, power it up again, and gradually increase the drive until the output reaches 100W.

Next find the ALC/power level pre-set control, and turn this until the output just starts to fall slightly, if you then increase the drive it should not be possible to exceed 100W output.

Warning: Be careful when making these tests that you do not run full power for more than say 30 seconds, or things may get rather too hot.

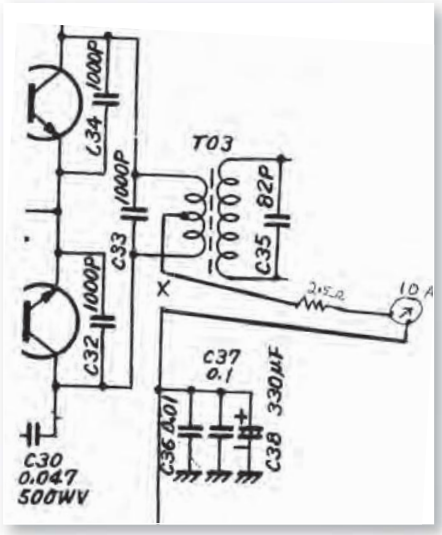

Fig 2: Connecting a meter into circuit for testing.

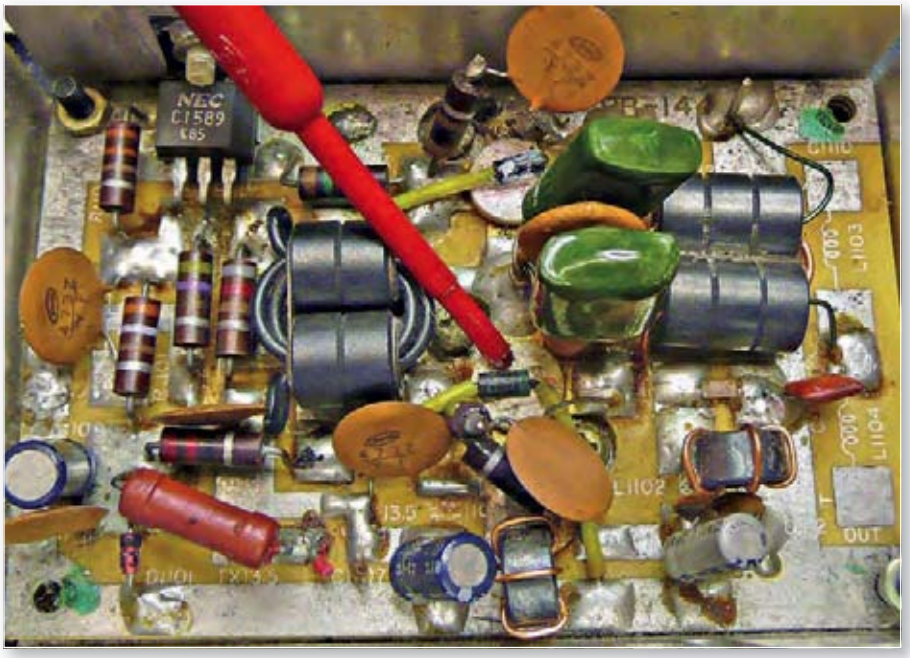

Fig. 3: A close-up view of the sample p.a. stage featured in Harry's article this month.

To protect against excessive heat the rig's fan should come on when things start to warm up, if it doesn't – check that the heat-sensing thermistor is in good thermal contact with the heat sink or the transistors. If in doubt – carefully warm it with a soldering iron and the fan should run.

Finally, check that you have 90 to 110W available on all bands, and reset the ALC/power level pre-set if necessary. **Note:** On some rigs you may find a separate power level control that needs adjusting for 28MHz, 10 metre band operation.

If the rig hasn't previously been interfered with, all should now be in good order. However, if you suspect that a previous owner might have had their fingers inside, make sure you go through the setting up procedure for the standing wave ratio (s.w.r.) protection circuitry, as detailed in the manual.

Advice Read Carefully?

Do you read advice carefully and then believe what you think you have read? Writing down advice or instructions that cannot be misunderstood or misrepresented, is difficult. (I'm told that sorting out problems with ambiguous home made wills, is very profitable for the legal profession!).

In the early 1970s I was very much involved with audio. Hi-fi was then something of a specialist's hobby and many enthusiasts enjoyed playing and experimenting with the equipment – more than listening to the music. One day I had a customer in who was having a problem with equipment we had supplied and I was trying to give him advice. Unfortunately, he just didn't seem to want to believe my explanation and said that according to an article he had read in *HI-FI News* that the equipment was faulty.

I tried to explain to my customer that he had misunderstood what the writer was trying to say in the article – but he wouldn't listen to my explanation. In the end I had to politely point out to him that I did know exactly what the writer had tried to say, as I was the author who'd written the article he was referring to!

Since I was in my teens I've always had an urge to see my ideas in print but as I was hopeless at spelling that didn't seem possible. It wasn't until I married **Brenda** – and found that I had gained a typist and a grammar and spell checker – that I was able (with her help) to start doing a few items.

Classic Symptoms

When I was in my 30s I read an article on dyslexia and realised that I have many of the classic symptoms. I am right handed but I aim and look through a telescope with my left eye and I instinctively use a computer mouse in my left hand, get in a muddle with my lefts and rights, can't spell, and also, as poor Brenda will confirm, I'm untidy!

Now I use a computer with built in grammar and spell checking, and have even been known to do letters for Brenda, they are wonderful! (I mean Brenda as well as the computer). And so I'll leave you with a thought for the month – "Why is Dyslexia so difficult to spell?" ●

Fig. 4: Typical p.a. stage transistors.

Tackling Problems

I like to hear about problems with older equipment, particularly pre-1990 Yaesu rigs. Please E-mail me, (add some radio related term in the subject heading, to differentiate against spam), or write and enclose a stamped addressed envelope. Remember that electricity is dangerous, if you are not familiar with safety precautions you must never work on your equipment whilst it is plugged into the mains. (Switching off at the wall socket does not necessarily make equipment safe).

Graham Hankin's
in vision

Graham Hankins G8EMX
84 Shirley Road
Acocks Green
Birmingham B27 7NA
E-mail: g8emx@tiscali.co.uk

Graham G8EMX has had two letters – which form *In Vision* this month – concerning his suggestion that a change of name might be in order for the BATC.

Dear Graham,
I was interested to read your report on the 60th anniversary of the **British Amateur Television Club**. I too was present and became very concerned on hearing some of the comments such as "the BATC started as a club that did not transmit but developed the use of video" and "the use of streaming maybe the way forward".

Surely this is not the accepted view of 'television'? If it is the case then the BATC perhaps should be renamed **The Virtual Amateur Television Club** or the British Televideo Club. It will be difficult to justify its association with the RSGB which has 'Radio' in its title. The fear is that it will not be regarded by many amateurs as being not truly radio-based communication in the same way that many people think that *Echolink* is not full blooded radio.

Whilst streaming does facilitate national coverage of events such as the 60th anniversary or the Amsat colloquium it should perhaps not be used in the first instance to cause people not to monitor their local repeater or to send and receive material 'On air'.

A better scheme might be for clubs and enthusiasts to make their own material of club activities and individual or group activities and to send it on DVD to their local repeater keeper who could run it in the background when the repeater was not in use for point-to-point. The material could also be exchanged between repeater keepers so there was a changing supply of material to be seen.

The BATC – perhaps – should also delay streaming of some material until it has been offered to repeaters for a month or more before streaming it on the national site. Thus encouraging Amateurs to make use of the repeaters so generously supported erected and maintained by loyal volunteers. Otherwise a decline will set in with Amateurs simply watching on their computers and not using the ATV sectors of spectrum which need to be justified by use.

When leaving the 60th celebrations I overheard a conversation between two traders who had been exhibiting r.f. equipment for ATV and one said: "Well, why do we bother? It's now clear r.f. TV is being killed off".

Despite this decline is not inevitable. I have just moved from Holland and there under the auspices of a group in VERON (the Dutch equivalent of the RSGB), ATV is healthy and even 70cms TV is seeing a recovery. It has been very sobering to look at the results of recent International ATV contests and see just how much more alive and energetic other countries are in this hobby.
But it is perhaps, on reflection, clear why this is so.
Yours sincerely
Bill Shepherd G0KPR/PA3FDK

Hello Graham,
Following from your latest in *PW*, I've idly followed the doings of BATC ever since I were a lad when Malcolm Sparrow came over to pick me up to go and visit his shack – such doings, our road had never had a Jaguar visit, let alone our house! He was just building a Slow Scan rack, all six foot of it, with a 931 photo-multiplier tube. I couldn't even afford the 931, let alone the rest of it and our family would have frowned on "scrounging" so it remained a dream.

In due course I joined the BBC and saw no point in spending time and money trying to emulate the professionals – a big generalisation but hopefully you get my drift. When I started to dispose of some of the bits I'd picked up I was laughed-at by much of Solihull Club because I took an ACR19 long-persistence tube to the junk sale. Out of step, moi?

I think the point of this ramble is that perhaps BATC is too focussed on the high-tech aspects? Obviously others think so too, and your quote of *Wikipedia* underlines it precisely – no room there for Slow Scan, Nipkow Disc or whatever. I realise that many innovations have been made by Amateurs but most of us are outside that group.

Obviously this is, but part of a larger problem involving plug-and-play, money and the easy availability of apparently similar facilities by computer and cellphone. There's an emptiness between the expensive high-tech and the extreme basics, the George Dobbs end, and many of us lack also the mentality required to innovate using computers. I've just been to investigate a fairly new Club at Chirk and it was nice to see youngsters having a play with the soldering iron as well as the older-timers doing their own thing, hopefully I might get more involved there.

As to your specific query about the Worcester ARS talk, drawing a parallel with Wrexham ARS last night, I'm sure the speaker's home-made Screwdriver antenna and how it was made was much more interesting that if it had been the £500 commercial one!

Reading this through, I'm not sure it's going anywhere but I've typed it so I may as well send it! Perhaps the answer is that the magic has gone out of too many things and life is just too busy... Regards
Ant Astley G0AJA

Thanks for the letters Bill and Ant! Any more suggestions and comments readers? See you in the April issue and here's wishing you all a happy New Year!

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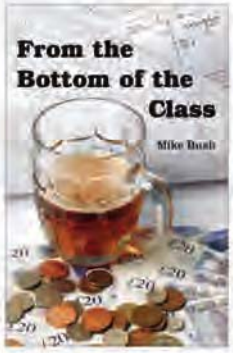
From the Bottom of the Class

by Mike Bush G3LZM



Mike Bush tells of coping through a lifetime of events and setbacks during the course of unsuccessfully working for a succession of companies. Finally, in spite of having had learning problems at school, and recurring illness, he makes a break from tradition to work for himself and discovers powerful creative abilities which eventually made him achieve financial independence.

I have edited and written several biographies but *From the Bottom of the Class* by Mike Bush is a truly inspirational story. He does not gloss over for a moment his setbacks, failures and mental breakdown problems. By sheer hard work, guts and the discovery of hidden talent he has made a great success of his life. John Jenkins

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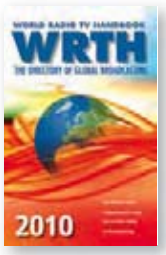

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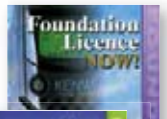

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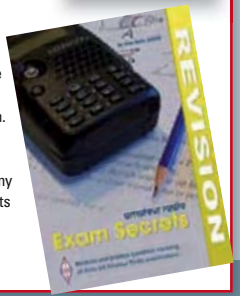

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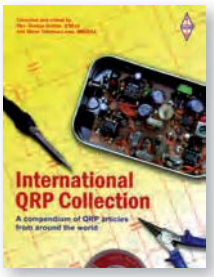

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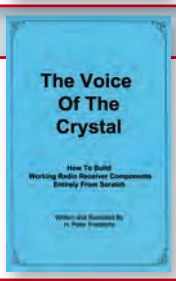

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Rob Mannion's

topical talk

This month Rob Mannion G3XFD responds to the suggestions from readers' letter regarding getting hold of the components we need!

The *PW Letters* pages have really started to fizz with feedback regarding the often thorny problems encountered when we need specialised components for projects. However, at this point I must again stress again that when projects are commissioned from our authors, we make it very clear to them that wherever possible the components and active devices used are standard and easily obtainable.

To be fair to our authors, they do try their very best to 'work with us' and adhere to the guidelines we lay down to ensure projects are 'buildable'. This co-operation from authors has even led to PIC programming services being made available by the authors to encourage our readers.

Additionally, although it's not part of their remit, our authors have often found themselves corresponding with readers who have come across problems with projects. They do this quite cheerfully and I like to think it's part of the enormous feeling of goodwill that exists between *PW* itself, the Editorial team, our valued authors and the essential readers!

Occasionally, through habit and a long association with our all-absorbing hobby – an author will mention that they've got 'something-or-other' from their junk box and to be quite frank I'm not prepared to request that this stops forthwith as it's rather unfair! On the other hand, I will suggest to our authors that wherever possible they fully describe the components – whether it be an active device, transformer, or special inductor – so that readers get every assistance possible in locating what's required.

In his letter this month, **Peter Lewis G4VFG** demonstrates his usual commonsense approach by mentioning that Amateur Radio projects aren't 'Rocket Science'. And I take part of his meaning to be the fact that no specialist engineering is required, although we should be prepared as he suggests – to help ourselves by collecting and recycling components and equipment. Like Peter, I try to re-cycle all electronics!

Peter G4VFG, looking back over his many years in the hobby, comments that the component availability topic has surfaced, sunk and bobbed up again many times and – unfortunately it will continue to do so unless we work together to try to minimise the problems. What we need is a real team effort – co-operation in it's most active form!

Highlighting Suppliers

Although we already have extremely helpful suppliers such as **Bowood Electronics** and **Sycom** and others 'on board' – the suggestions coming in via the *Letters* pages from **Eric Edwards GW8LJJ** and **Paul Beaumont G7VAK** are very good indeed. Following the idea further, I'd like to encourage readers who have personally experienced the service of specialist components suppliers to write in an mention them in a letter to be published.

The promotion that comes with a letter published in *PW* may encourage specialist traders to advertise in *PW*, especially if they start getting enquiries from our readers! And there's room for many more specialists because their individual stock and approach is so varied.

Incidentally, the **Rev. George Dobbs G3RJV** actually mentions one specialist trader – **JAB Components**, website: **www.jabdog.com**/ in *Carrying on the Practical Way* this month. George often refers to JAB and I've often purchased components from JAB myself at the major rallies.

Nowadays, we face a very tough commercial world and many component suppliers probably find advertising to be an extra cost they can't bear very easily. This is one of the reasons why *PW* carries the *Specialist Dealers'* panel at the rear of the magazine – it's an effective, budget-wise method of ensuring our readers know who's about! Additionally, the *Classified Adverts* are available for 'one off' adverts, or a series, to help attract custom. As I've mentioned before – in today's tepid economic climate we need to help each other!

As the Editor – and as professional, ethical journalist – I usually have to try to distance myself from the seemingly murky world of advertising. However, with specialist component suppliers becoming a real rarity – I feel that, for the sake of *PW*'s core subject – practical wireless and all it entails – we must work together. So, let's be hearing from you all please!

Rob Mannion G3XFD/EI5IW

coming next month

IN THE UK'S BEST AND ONLY INDEPENDENT AMATEUR RADIO MAGAZINE

Valve Classification Systems

Stef Niewiadomski decodes the valve identifier systems, fiendishly secretive (to most of us), so that we can all tell the difference between a 6J6 and the 6L6!

Getting Tired calling "CQ" in the PW contests?

If so, try **Barry Horning GM4TOE's** Contest Voice Keyer project to save your voice for the QSO!

Coil Winding

Sam Dick G8OWX provides some practical ideas and theory to take the fear and hard work out of preparing inductors.

Doing it by Design

This month **Tony Nailer G4CFY**, brings everything together and finalises the design for the 1.8MHz 'Top Band' receiver, commissions it and selects a rather neat little case for the project. Just right for the very dark winter evenings!

Plus Valve & Vintage, Carrying on the Practical Way, HF Highlights, VHF DXer and much, much more!

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Here's what Kenny said about this tough antenna:

'I am the Platform's Radio and Telecomms engineer and work MM0GKB/P when on rota 2 on and 3 off, the locator being IO98UK. The performance is excellent with max VSWR on a few bands approx 1.5 : 1, radio is KW 570DGE @ 100W o/p and I use CW only. You will notice near base of antenna a slight bend this due to a whack from a container on crane some time ago, must say the antenna is one hell of a strong 'beast' taking into consideration the batterings it takes from the weather.I have been in the radio industry approx 40 years built my first record player at age 13, went to sea for some time merchant navy as radio & electronics officer, worked in television engineering for some time and eventually ended up in the oil industry looking after radio systems, sat comms etc'.

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