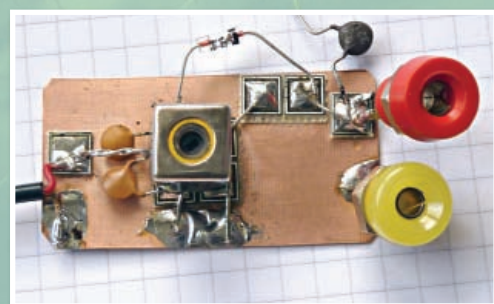


Practical WIRELESS

Britain's Best Selling Amateur Radio Magazine

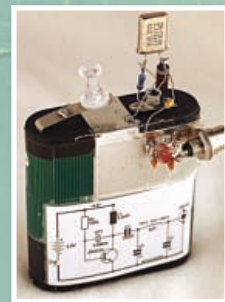
Antenna Workshop

Balanced feeding



Practical Way

A novel DC receiver and a 'just for fun' transmitter!



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2012 PW 144MHz contest rules

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VHF/UHF rigs – a low-cost option!



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The standard system that includes receiver, antenna and software. It provides a flat display on your PC/laptop screen and is ideal for normal use.

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HF - UHF in One Box!



FT-897D base or portable, this 1.8 - 440MHz transceiver is great value. 1.8 - 50MHz 100W 2m 50W 70cm 20W. **IN STOCK £819.95 D**

FT-857D The great value mobile or base 1.8 - 440MHz HF-6m 100W, 2m 50W 70cm 20W. **IN STOCK £714.95 D**



KENWOOD



The **TS-2000E** is a firm favourite for those wanting ultimate all-mode performance on all bands. 1.8-144MHz 100W 70cm 50W. It has the highest power on 2m & 70cms and the TS-2000X version adds 23 cms! Includes auto ATU, DX cluster facility and digital IF for superb weak signal performance. **IN STOCK £1549.95 D**

ICOM IC-7000



The most compact, high spec. HF-UHF transceiver available. With its lovely display and digital IF filters, it can handle all your needs - SSB CW and data. HF-6m 100W, 2m 50W and 70cms 35W. All in one lovely box. **IN STOCK £1189.95 D**

HF on a BUDGET!



FT-450D transceiver comes with the extra IF filter & an Auto ATU built in. 100W 160m - 6m with 3 IF filters 300Hz, 500Hz & 2.4kHz. **IN STOCK £839.95 D**



IC-718 SSB CW up to 100W from 160m-10m. You won't find a more cost effective HF radio! **IN STOCK £594.95 D**



digital IF filters.

IC-7200 this 100 Watt radio covers 160m-6m and includes **IN STOCK £839.95 D**



TS-480SAT A very compact HF transceiver that delivers 100 Watts from 160 - 6m and includes auto ATU. **IN STOCK £779.95 D**



Jupiter-538CE 160m - 10m 100 Watts SSB CW AM FM with on-screen CW reader and socket for PC keyboard. **IN STOCK £1649.95 D**



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YAESU FT-950 HF & 6m Transceiver



Step up to the FT-950 and you enter the world of advanced £1000+ class design. You get 30kHz - 56MHz Rx, Auto ATU, triple conversion Rx with 3 roofing filters, 32 bit floating point DSP, Superb dynamic range, Tx variable bandwidth and Mic EQ adjust, plus CW zero/spot feature, CW message storage etc. **IN STOCK £1264.95 D**

FT-2000 160 - 6m Transceiver

This radio is a DXers favourite and widely used for DXpeditions and contests. Covering 160m to 6m. It has all the digital features and auto ATU. Available as 100 Watt or 200 Watt version. **IN STOCK 100W £2259 D 200W £2899 D**



FT-DX5000 160 - 6m Transceiver

The current Yaesu "flagship" radio, covering 160m to 6m delivering 200 Watts. ALL **IN STOCK**
FT-DX5000 Standard radio **£4635.95 D**
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KENWOOD TS-590S 160m - 6m with superb receiver inc. dual roofing filters, Auto ATU, 32 bit f/p DSP & USB PC connection.



This radio has won the admiration of the radio press and hams all over the world. The best dynamic range in its class, digital IF, narrow roofing filters and auto ATU. Also FREE PC control program that can be downloaded. Exceptional value. **IN STOCK £1329.95 D**

ICOM IC-7410 HF-6m Transceiver

This lovely new HF-6m all-mode 100W transceiver offers superb front end dynamic range, and has a 15kHz roofing filter. It also features a 36kHz DSP razor sharp filter, internal auto ATU, PC control via a USB port and speech synthesizer. **IN STOCK £1695.95 D**



IC-7600 HF Transceiver



The IC-7600 HF/50MHz transceiver is enhanced with some of the main features tried tested on the flagship IC-7700/7800 models. It is highly regarded by Amateur operators world-wide. Features inc a double conversion superheterodyne system, dual DSP units & 3kHz IF (roofing) filter. **IN STOCK £3299.95 D**

IC-9100 HF Transceiver



The Icom IC-9100 is Icom's new offering for the operator who is looking for a complete high performance radio that covers HF - UHF in one box. It offers 100W output on all bands up to 2m, whilst on 70cms you get a healthy 75W. **IN STOCK £2899.95 D**

IC-9100X with 23cm **IN STOCK £3399.95 D**

IC-7700 HF/50MHz 200W Transceiver



IN STOCK £6364.95 D

TEN-TEC OMNI-VII HF Transceiver



Fire it up and you immediately know you are driving something different. The receiver is a delight and the transmitted audio is superb. This 100 Watt transceiver that covers 160m - 6m. Ethernet remote control ready. **IN STOCK £2699.95 D**

Software Defined Transceivers

FLEX-1500 HF Transceiver



HF - 6m All Modes All Bands
This most amazing transceiver mates up with your laptop to bring you an advanced 5W transceiver that no other manufacturer can match at the price. Filters down to 50Hz, Tx audio equalizer, Incredible DSP noise reduction, ultra sensitive receiver, Live Panoramic display and just one USB cable! Plug, Play, Enjoy! **IN STOCK £579.95 D**

FLEX-3000 HF Transceiver



100 Watt HF - 6 with Auto ATU!
It's all you need, apart from a PC. The firewire connection makes setting up easy. Experience performance & features, no hardware design can match even at twice the price! You get the ultimate in flexibility, selectivity and usability. Uses Yaesu mic wiring and requires 12v at approx. 20 Amps peak. Call for more info. **IN STOCK £1379.95 D**

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A separate receiver is a great asset in any ham radio station because it allows you to monitor anywhere in the spectrum and enjoy true dual receiver performance with total independence. You can monitor your transmission & work cross band with ease. You can also check for spurious signals and hunt out sources of interference from LF to GHz!

Frequency range: 100kHz - 3000MHz * 100 - 530kHz (not guaranteed) * All mode: WFM, NFM, SFM, WAM, AM, NAM, USB, LSB, CW * Two VFOs A / B * Memories 1,000 (20 banks x 50 channels) * An RS232 port is provided for PC access and a wideband 10.7MHz output is provided for use with a PC based SDR receiver etc. Package includes whip antenna for portable use and MW bar antenna. **£699.95 D**

Exclusive Offer - Hurry!

Kantronics KAM-XL HF TNC **£449.95**

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BRAND NEW Factory sealed stock! 1200 & 300 baud Dual Port operation * Ports: 2x DB-9 radio, 1x DB-15 telemetry, 1x DB-9 aux/GPS port, 1x RS-232 terminal port. It looks like and emulates the industry standard KAM Plus, but with many more features.

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- Built-in GPS receiver
- D-STAR DV mode
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- Full dot-matrix display & directional keypad
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- Multiple scan functions
- Built-in CTCSS/DTCS encoder & decoder



£349.95 D

QRP HF Transceivers

HB-1B HF



This little CW 80, 40, 30, 20m transceiver runs 6 Watts from ext. 12v or 4W from optional internal lithium cells. Has tunable filter 400Hz-3kHz, electronic keyer, programmable auto CQ, 30 memories, switched tuning speeds. Also receives SSB from 3.4 - 16MHz.

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**Affordable
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HM-12

The HM-12 features the new HC6 insert that provides amazing articulation. It will give your signal that "magic" lift that will add dBs to your signal's voice power. As Bob says in his live workshop, a linear costs a whole lot more! Check out our great price of **just £69.95 C** "CC-1" Wired Cables: Icom 8-pin £34.95, Icom modular £34.95, Kenwood 8-pin £34.95, Kenwood modular £34.95, Yaesu 8-pin £34.95, Yaesu modular £34.95



Pro-Set-6

The new Pro-Set-6 headset offers a complete new way of operation with its comfortable headset and adjustable boom mic, giving hands-free operation.

Pro-Set-6 £149.95 C

AD-1 Adaptor leads for Yaesu, Kenwood, Icom £22.95

Pro-Set-Elite-6

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Pro-Set-Elite-6 £179.95 C

Pro-Set-Elite-IC £189.95 C
AD-1 Adaptor leads for Yaesu, Kenwood, Icom £22.95



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75 Watt 2m 3W Audio, CTCSS, DTMF mic & "WIRES" internet. **£142.95 D**

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Quad band 10/6/2m/70cm FM 50W (70cm 35W) **£389.95 D**

ID-E880

50 Watt Dual band 2m/70cm with D-Star and airband receive. **£439.95 D**

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2m / 70cm Handheld Wideband receive **£169.95 D**



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2m/70cms handy, 5W. +FREE Case **£214.95 C**



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2m/70cms, 5W handy Wideband Receive **£129.95 C**



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Dualband 2m/70cm 5W + GPS Antenna **£349.95 D**



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Dual band 2m/70cm + wideband receive inc. SSB **£236.95 D**



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Dual band 2m/70cm with CTCSS DCS & LED torch! **£84.95 D**

NEW from Kenwood!

NEW TM-281E

2m FM 65/25W Mobile Transceiver

On or off the road, Kenwood's TM-281E is a mobile radio you can always count on. As tough as nails, this MIL-STD-compliant transceiver delivers powerful performance, excellent audio clarity, and a host of advanced features. **£169.95 D**

NEW TH-K20E

* TX 144-146MHz * RX 136-174MHz * 5.5W Max Output * 200 Memory channels **£119.95 D**

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* TX 430-440MHz * RX 400-470MHz * 5W Max Output * 200 Memory channels **£119.95 D**



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Get Ready for 50MHz Season!
With this Ultra Compact Yagi



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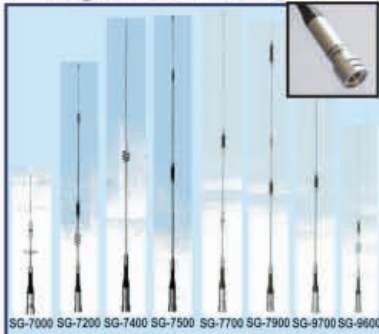
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14EL-432-LFA-SQ	14 element 432MHz yagi 2.874m long 3kw	£119.95 C
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Single sensor 0.1dB insertion loss. PEP/RMS
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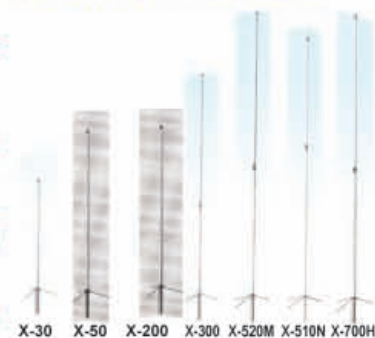
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TH-3JRS 10-15-20m beam 600W 3 el **£399.95 D**
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TH-5MK2 10-15-20m beam 1.5kW 5 el **£799.95 D**
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AV-640



This is a rigid, telescopic dipole, which has an overall length of approx. 3.5m. It collapses down to pocket size. It can be hung from a tree or clamped to a mast. SO-239 feed.

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This "screwdriver" design covers all the DX bands (inc WARC). Continuously tuned with supplied remote control, it will handle 200W and is just 1.85m long. Fitted 3/8" stud mount, it will easily fit onto a 3-way magnetic roof mount. **£429.95 D**

Carriage Charges: A=£4, B=£5, C=£8.50, D=£11



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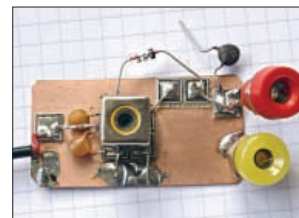
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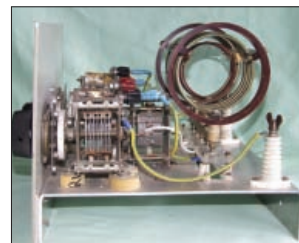
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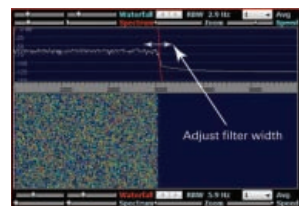
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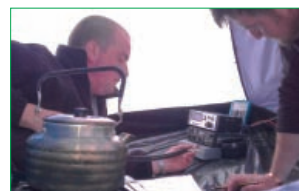
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Scheduled reviews by Tim Kirby G4VXE: Due to circumstances beyond our control Tim's reviews will now be published in the July issue. My apologies. Editor.



Rob Mannion G3XFD/EI5IW's

Keylines

This month the Editor discusses the benefits that we could enjoy by using different antennas on the h.f. bands – even if any antenna we've got room for in our gardens is a compromise.

Diversity is the name of the game! However – before you think that I'm entering the murky (and underhand) world of 'political speak' – I'm not going to start discussing 'multiculturalism' (whatever that is!). Instead, I'm sharing my ideas on antenna diversity, particularly the use of selectable antennas for the h.f. bands.

I first came across antenna diversity techniques on h.f. and v.h.f. when I was serving in the Royal Navy's Fleet Air Arm. The ships and bases where I served, often had a choice of h.f. and v.h.f. antennas – and the communications operators could switch between antennas for better reception.

I then studied antenna diversity techniques during my time with the former **Independent Broadcasting Authority** (IBA). Regular readers will remember my mention of when the late **Don Hayter G3JHM** and I flew up to Fair Isle, (of the BBC's weather Shipping Forecast fame) lying between Mainland Orkney and the Shetland Isles – north of mainland Scotland.

We were involved in carrying out antenna height diversity evaluations using the received u.h.f. transmissions from the Keelylang Hill transmitter on Mainland Orkney. We were assessing the quality of the over-the-sea link and the benefits obtained from the system to maintain the best quality reception to be re-transmitted to the Bressay transmitter in Shetland.

Simple Diversity Systems

Antenna systems using diversity techniques (using

height or different types of antennas) needn't be complicated. I've used them in the past when operating 'P' from my car on h.f. I arranged a mobile antenna and a long wire antenna with an antenna tuning unit (a.t.u.) – so I could switch between them.

The simple system worked well despite being very basic and very often helped me to complete QSOs under difficult conditions. Sometimes the mobile whip provided a better signal than the half wavelength long wire antennas I used on 7 and 14MHz – and sometimes vice versa.

My inverted-V 3.5 to 28MHz dipole antenna – fed with balanced twin feeder of around 100Ω impedance and the dedicated MFJ-974B balanced a.t.u. – has proved to be extremely successful. Indeed, it's the antenna used for the very successful **GB80PW** operations.

However, I have noticed many occasions when stations elsewhere in Europe are busy working American and Canadian stations. Observing the QSOs on PSK31 I have noticed that a large proportion of the Amateurs in QSO with North American stations were using vertical antennas – particularly on the 7 to 21MHz bands.

I soon erected a simple wire vertical using my 10m Clarke pneumatic mast and although (as expected) the received noise levels were higher than the levels I get with my inverted-V dipole – there were occasions where the simple vertical enabled me to 'hear' the DX stations (see them on the waterfall display).

I soon found it was much

quicker to use the vertical antenna in conjunction with another a.t.u. – ready and tuned up to work on the same band as my inverted-V. I could then switch very quickly from one antenna to the other (using a two-way coaxial cable fed antenna switch) to find out which system gave the best results on receive.

The Next Stage

Pleased with the results from the experimental system, I'm going to take advantage of a new mast system that I'm installing soon. I'll arrange a cantilever stand-off support on the mast, so that the permanent vertical antenna is as far away from the inverted V dipole feed point as possible.

I shall also create as good a ground plane system as I can – without making life difficult for my wife **Carol** by laying ground-plane wires across the garden! The last time I relied on a vertical antenna, I used two counterpoise type radials – one hidden along the lower half of our driveway panel fence and the other running through the branches of the trees that form two sides of our garden. This approach brought some good DX contacts.

After a few months of operating I'll report back and let you know what results I've achieved. In the meantime I would also like to hear from anyone else who has successfully used a similar antenna diversity system.

Rob Mannion G3XFD/EI5IW

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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

Send your letters to:

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

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

Please note that the opinions expressed in any letter published in *PW* are those of the named correspondent whose letter has been published and they don't necessarily reflect the opinions of the Editorial staff or PW Publishing Ltd. **Editor.**

A PW Listener Reader Says Thank You Tony!

Dear Rob,
Just a short note to tell you how much I appreciated **Tony Nailer G4CFY's** article aimed at *PW* readers who are dedicated listeners. I am one of this fraternity and I have been a reader of *PW* for well over 50 years. No other magazine appeals to me and I am happy to carry on enjoying the friendliest publication for radio enthusiasts there is. Thank you.
Phil Brown
St. Anthony's Hill
Eastbourne
East Sussex

Listeners & Practical Wireless

Dear Rob,
Personally I don't think those of us who don't transmit should feel 'left out' regarding *PW's* coverage of the hobby. On his club visits – I have attended several clubs where the Editor has visited – and Rob has always made it seem as if *PW* is 'my' magazine even though I've been a dedicated listener and constructor since the 1960s. And 'construction' is the point I'm trying to make. The article by **Tony Nailer G4CFY** made me feel even more closely associated with the rest of the

PW readership. I hope Tony will present some more ideas that we avid – but non-transmitting – readers will enjoy alongside our transmitting friends.

Talking to Rob G3XFD when he visited Bletchley Park (where a number of clubs came together) in 2010, he made it clear he regarded Amateur Radio as an inclusive hobby. The recent operations of GB80PW where the operators made sure listeners were mentioned – proved to me that *PW* lives up to the Editor's word. Best wishes.

Mike Reynolds
Aylesbury
Buckinghamshire

Transmitting Is Not For Me!

Dear Rob,
It was good to hear you and Phil G3XBZ on Saturday April 14th operating GB80PW. Radio conditions were truly dreadful but although you were not as strong here in Manchester as you were last month I was able to listen in to you most of the day.

My main reason for writing to you though is that I was so pleased that **Tony Nailer G4CFY** has presented something specifically for the non-transmitting readers of *PW*. I've never been interested in transmitting and have always thoroughly enjoyed listening on the h.f. bands as I work in

my very small workshop. Now I have retired I can spend more time doing my favourite thing – listening out for Special Event Stations and (eventually) getting their QSL cards.

I enjoyed your April Spoof – after I realised it **was** a spoof. It seemed likely indeed that anything to do with the Olympics would be expensive. Thanks for the leg-pull. Any news of the GB80PW QSL card yet please? Best wishes.

Steve Collins
Hulme
Manchester

*Editor's reply: Thanks Steve (and Phil and Mike too!) – it seems a long time since we last met at the old Rochdale G QRP Club Convention and I hope you enjoy your retirement! The GB80PW QSL cards have now gone to the printer's and I hope to clear the back-log of QSL requests as soon as possible. Anyone wishing to have a GB80PW QSL card must QSL direct to my home address **Flat 1, 1 Spencer Road, Bournemouth, Dorset BH1 3TE** and not to the *PW* offices. Bearing in mind the very large increase in UK postage cost that are due soon – please ensure you use the correct postage rate for your s.a.e. (the GB80PW cards are standard postcard sized) and please mark your envelopes clearly with GB80PW QSL Card.*

£20 Star Letter

You can do it too!

Dear Rob,
I'm offering this account of my progression in the hobby – intended as an encouragement to others. I had to retire from my job as a Police Officer in 2006 for medical reasons. I had what was described to me as a "cognitive disorder" which manifested itself as memory loss, difficulty learning

new things and inability to concentrate when reading. There was concern that it might be an early stage Alzheimer's – but the final (recent) diagnosis was that I had suffered a minor stroke.

So I sat at home, aged 51, twiddling my thumbs and getting bored and depressed with nothing to do until I read a short piece in my local newspaper. It mentioned **South Cheshire Amateur Radio Society**

(SCARS) in Crewe (website www.g6tw.co.uk/) and Railways on the air. It got me wanting to know more so I did some research on the Internet and via the RSGB website managed to get a contact number for the SCARS Hon. Secretary, **Chris Wiseman G1PUV**. I rang him and he invited me to one of their meetings at the club room at the Sea Cadet Corps TS *Ambuscade* in Crewe.

A few weeks later, on a Thursday evening, I went to a SCARS meeting and was greeted by the then Chairman **Pete Walker G4RRM**. He made me very welcome and introduced me to other members including **Dave Wilson M0OBW** (now RSGB President).

Within the hour I was sat upstairs with Dave doing a Morse assessment as a first step towards my Foundation Licence! I had explained to both Pete and Dave that I was unsure how I would manage due to my cognitive problems and they said it didn't matter. Just take things at my own pace and go as far as I felt happy with.

A big thing for me was that I felt no pressure from them at all. That made a huge difference. As a result of their attitude I joined SCARS. I got a copy of the *Foundation Licence Now* book and spent a couple of months going through it until a course was available. I then spent the weekend doing practical assessments and learning the basics of amateur radio.

Late on a Sunday afternoon I took the exam and passed. I became licensed in November 2008 as M6TVP and I had got the bug and wanted to know more! I set-up my shack, constructed my first dipole for 14MHz and had a really good time operating and getting used to propagation conditions. But I wanted to know more so I got a copy of *Intermediate Licence - Building on the Foundation*.

On looking through it I found it both interesting and confusing as there was much I didn't understand. None the less I read through it a few times until I attended a course run by Dave M0OBW. A couple of weekends were spent on practicals and instruction in the various subjects covered by the book until – yes another exam. I am pleased to say that I passed it and was licenced in November 2009 as **2E0VFR**.

I then began to be much more involved in the club activities, arranging social activities, taking part in special events although contesting was not for me as my brain didn't want to work fast enough. I decided to take a break from studying as I had found it difficult and wanted to just enjoy operating for a while and not have to think about trying to learn new things.

Then, last summer, I made the decision to try for the Full/Advanced Licence. I am still unsure why the licence from Ofcom says "Full" yet the RCF /RSGB paperwork says "Advanced" – but I don't suppose it

really matters in the great scheme of things!

Anyway, I got a copy of *Advance! The Full Licence Manual* and sat down to read it.

After about 30 minutes I thought "Oh my goodness", or words to that effect! What had I left myself in for? Most of what was contained within its pages made no sense to me whatsoever and it may as well have been written in ancient Egyptian hieroglyphics. I have no technical background and studying the law I needed when working was easier. My wife and I were concerned that this might be a step too far because the more I get stressed the worse my cognitive problems become.

Then I had a chat with **Dave Bibby G1PIX** (Pixie) and **Kath Wilson M1CNY** (RSGB Regional Manager). What they said made a big difference and took a lot of pressure off.

Put simply they said that it didn't matter how long it took as there were no time limits. If I wanted to take a few years and study slowly that was fine. Also, if I took and failed the exam it didn't matter. Nobody would judge me.

Encouraged by that I started going to Friday evening sessions run by Dave G1PIX and found them invaluable. He explained things that made no sense to me when reading the book. Thanks to his simple way of putting things he demystified some of the technical stuff.

I also tried the distance learning study run by **Steve Hartley G0FUW**. Although it was useful I found it better to have a "teacher" in front of me as I cannot learn just by reading.

I decided to take the exam although I did not expect to pass. I honestly expected to get about 52% as that was the sort of score I was managing on mock exams.

I didn't mind if I failed because as long as I got over 50% I knew I was on the right track and would continue studying and try again in a few months.

So, at 1900hrs on Monday 5th December 2011 I sat down with four other guys and took the exam. How was it? Strangely I found it to be no easier or harder than I expected and felt under no pressure at all, perhaps because I had no expectation of passing.

There were questions which I looked at and thought, 'oh yes I know that one' but there were more questions which I looked at and thought, 'what language is this because I haven't got a clue what it means'.

After the exam we retired to the bar

for a chat and I was already prepared to continue studying in January. Then, on the evening of Friday 9th December I received a phone call suggesting I check the Ofcom website. Imagine my surprise when, on checking, it allowed me to apply for a Full Licence! So, my licence was issued and I am now M0VFR and **very happy** to be so.

There were times when I considered giving up and just staying at the Intermediate level but as I am stubborn, and with support I carried on. I recommend the distance learning, run by Steve G0FUW, to anyone who can learn by reading books. I can't learn that way so having a tutor worked for me. Is the Full Licence easy to get? No – it's not, nor is it meant to be. Is it worth the effort? Most definitely yes it is!

So, why did I write this letter? Firstly to publicly say 'thanks' to a few people. **Chris G1PUV**, **Pete G4RRM** and **Dave M0OBW** who have all been there from the start and without whose encouragement and non-judgemental attitude I probably wouldn't have carried on in radio. Then to Dave G1PIX for his advice and Friday sessions. Also of course Kath M1CNY for her friendly and down to earth advice and support.

Finally, I want to encourage all Foundation and Intermediate Licence holders to give it a go! Try the next step and you might be surprised at how much you enjoy it. There are always people out there ready, willing and able to help.

What's next for me? I feel want to give something back to the hobby. I may have only been in it for a few years but surely that doesn't mean I can't help in some way. Let's see what 2012 brings. 73 to all.

Steve Tomlinson M0VFR
Crewe
Cheshire

***Editor's comments!** A much longer letter than we usually expect readers – but I felt it had to be published in full. Well done to Steve and everyone who helped him. An up-lifting story indeed!*

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 call sign with your E-Mail. All letters intended for publication must be clearly marked 'For Publication'. **Editor**



News & Products

Send your info to:

Newsdesk, PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW

E-mail: newsdesk@pwpublishing.ltd.uk

Martin Lynch's Icom Antenna Offer

Martin Lynch G4HKS contacted *Newsdesk*; "I've got hold of a cancelled commercial order – so good even I use one at G4HKS, although I wish I'd waited to buy one at this special offer!

"This Icom antenna is built to a very high commercial standard and is complete ready to go out of the box. It even comes with 30m of coaxial cable ready to plug into your transceiver and you don't even need an antenna tuner. Intended for military use, the Icom AH-710 (also known as the Yaesu YA-30) is so simple to use. Just open the box, roll out the antenna (which is fully assembled) outside where you want to erect. Connect the supplied high quality coaxial cable assembly (terminated with PL-259s so you don't even have to fit any plugs), to the centre socket. Haul between two points, (with the supplied 10m of nylon rope) up to a tree (and or post/end of wall), plug into your rig and use. For best DX try and get the AH-710 at least 15ft off the ground, it doesn't matter if it slopes and the higher the better.

"It really is that easy. No tuning, no cutting, no trimming no wandering outside with your antenna analyser. It will operate anywhere from 1.8-30MHz and better still, you don't need to use an a.t.u., manual or otherwise. This antenna is commercial grade and built to last for years. The RRP is £408 – we have limited stock at **only £189.99.**"

Technical information: The Icom AH-710 pre-assembled multi-band, folded dipole was designed to get h.f. operators on the air fast. This antenna covers all the Amateur bands from 1.9 to 30MHz [VSWR < 2:1 1.9-18MHz, VSWR < 2.5:1 18-30 MHz]. It is 24m long (80.3ft) long and can handle up to 150W. The AH-710 can be installed as a Flat Top or an Inverted V dipole. Further details from:

**ML&S Martin Lynch & Sons Ltd.,
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E-mail: Martin@MLandS.co.uk
Web: www.MLandS.co.uk**

InnovAntennas To Sponsor PW 70 & 144MHz Contests

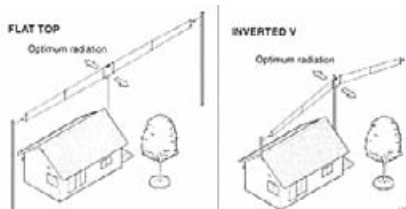
Rob Mannion G3XFD, *PW* Editor reports; "We're absolutely delighted to announce that the well known antenna designer and manufacturer **Justin Johnson G0KSC** has kindly offered to sponsor and support the *PW* 70 and 144MHz contests. Justin told me "I really do wish to promote and encourage Amateur Radio – and contests are a great way to do this".

Following our discussions, Justin generously offered to offer £200 antenna prize vouchers for both prize categories in the *PW* 70MHz contest and a £200 antenna prize voucher for the *PW* 144MHz QRP Contest. **Colin Redwood G6MXL** – the Contest Adjudicator – and I were delighted and thank Justin for his support – the £600 worth of prize vouchers will be much appreciated by our contest entrants. However, both Justin and I agreed that no amount of sponsorship could guarantee good weather and v.h.f. conditions on the day! We've just got to hope they'll be in our favour! G3XFD.

Further information from Justin at:
InnovAntennas Limited
Tel: (0800) 0124 205 (Ext. 101).
E-mail: justin@innovantennas.com
Website: www.innovantennas.com



Justin Johnson G0KSC lecturing in Holland recently. Justin regards contests as an ideal way of encouraging Amateur Radio.



The 2012 G-QRP Club Mini-Convention

Dick Pascoe G0BPS contacted *Newsdesk*. "The 2012 G-QRP Club's Mini-Convention takes place on Saturday October 20th 2012 at **Rishworth School, Rishworth, Sowerby Bridge**, West Yorkshire HX6 4QA. Doors open at 10am and *PW* readers are very welcome!"

Dick Pascoe G0BPS
SSB & Data manager G-QRP Club
Table Manger for G-QRP Convention
E-mail: g0bps@gqrp.co.uk

New PW Publishing Ltd. Website

The new *PW* Publishing Ltd. website is now up and running, Visit www.pwpublishing.ltd.uk – see page 63 for more information.

Central Lancashire Club On Track For The Preston Guild!

News from the **Central Lancashire Amateur Radio Club** (CLARC) who are planning to run **GB615PG**. The station is being run by the club who are based at the **Ribble Steam Railway Museum** (www.ribblesteam.org.uk/) in Preston, Lancashire. The station is being run to commemorate 615 years of the **Preston Guild**. The Preston Guild is a celebration, held every 20 years to commemorate the granting of a charter by King Henry II in 1179 for a guild of traders, craftsmen and merchants to be set up in the town, those individuals having the monopoly to undertake such business henceforth. Ceremonies were soon established to check members of the guild and these evolved into civic celebrations, the first recorded one being held in 1397.

In time it became apparent that frequent events were not required as the membership of the guild only changed once a generation and therefore the membership checks and the civic celebrations involved were staged only once every two decades. The control by the guild of trade in the town lasted until 1790 but the accompanying celebrations, parades and fairs have lasted to the present day, an unbroken sequence from 1522 only being interrupted in 1942 because of the wartime situation. A saying also exists in Lancashire regarding infrequent events that they happen only "once every Preston Guild"

The station will be on the air between April 1st and October 2012, but not every day. More information can be obtained from GB615PG on **QRZ.com**. More information from **Brian Nuttall M0OYG**
E-mail nuttallbn@gmail.com

Caister Marconi Amateur Radio Station Success

Radio Amateurs at the **Caister Lifeboat Visitor Centre** in Norfolk managed to contact 480 other Amateurs in 40 different countries on Saturday April 21st when they took part in the annual International Marconi Day to mark the inventor's birthday.



Jim Bacon G3YLA was kept busy operating GB0CMS.

Using the call sign **GB0CMS** and a mixture of single sideband (s.s.b.) and c.w. (Morse), notable contacts included QSOs with Australia, Barbados, Newfoundland, Canada and the USA. Other contacts included special Marconi stations in the UK, Italy, Austria and Iceland.

Contacts closer to home included many other Amateurs around the UK, including some of the other Marconi stations in Holyhead, Daventry and The Lizard in Cornwall – home to some of Marconi's early work.

The **Norfolk Amateur Radio Club** (NARC) ran the all-day Special Event station at Caister Lifeboat Visitor Centre to commemorate the village's original Marconi Wireless Station, which was established at Caister in 1900. The station was in a house in the High Street known as Pretoria Villa and its original purpose was to communicate with ships in the North Sea and the Cross Sand lightship.

On Saturday, the closest to **Guglielmo Marconi's** birthday, stations around the world were set up at sites with historical links to the inventor's work. These include Poldhu in England; Cape Cod Massachusetts; Glace Bay, Nova Scotia; Villa Griffone, Bologna, Italy and many others.

The equipment used by the NRARC was an Icom IC-756PROIII on 7MHz (40m) and an Icom IC-7400 operating on 14MHz (20m). Antennas were a W5GI 'Mystery Antenna' dipole on 7MHz and a G0KYA-designed end-fed half-wave vertical for 14MHz.

The NRAC has more than 100 members, a strong history dating back to the 1950s and has a very active calendar of talks, events, special event stations and courses. It meets at 7.00pm on Wednesdays at the Sixth Form Common Room, City of Norwich School, Eaton Road, Norwich, Norfolk, NR4 6PP, with formal proceedings starting at 7.45pm.

For further information please contact:

Steve Nichols G0KYA (NARC Press Officer)

Tel: **(07899) 992389**

E-mail: steve@infotechcomms.co.uk

Website: www.norfolkamateurradio.org/

New Nevada Power Supplies On Sale

Mike Deveruex G3SED – Managing Director of Nevada in Portsmouth, Hampshire called *Newsdesk*: "I'm pleased to tell you that the new range of Nevada branded power supplies introduced this month. There are seven models in the range, from 3 to 50A output.

"In their first few days on sale the most popular model appears to be the PSW-50 delivering 50A peak current. The PSW-50 weighs just 2.5kg and with its low noise output, is ideal to power h.f. transceivers and linear amplifiers. The output has current limiting and short circuit protection plus a large meter to monitor voltage and current, essential for trouble free use with today's expensive transceivers. For a limited period we are offering the Nevada power supplies at a discounted price, with the PSW-50 being available at a £10 discount at £125.95."

Regards.

Further information from;

Nevada Radio, Unit 1 Fitzherbert Spur, Farlington, Portsmouth, Hampshire PO6 1TT

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The PSW-50, a capable 50A p.s.u.

American Amateurs On The 60m Band

Chris Page G4BUE called *Newsdesk* to share an interesting story; "On March 5th 2012 Radio Amateurs in the USA were allowed to use c.w. on 60 metres for the first time, and myself – operating as **N4CJ** – and **Colin Turner G3VTT** believe we made the first 60m c.w. QSO between the USA and Europe.

"At 0501z on March 5th (just one minute after USA Amateurs were allowed to use c.w. on the five 60m channels for the first time at 0001EST), Colin answered my "CQ" on 5.373MHz. I gave him RST549 and he gave me RST339, later changing it to RST569 as QSB took effect. I told Colin I was running 100W from my Elecraft K3 to an inverted-V dipole at 10.6m (35ft) above ground and he told me he was using 50W from an Icom IC-735 to a 36.5m (120ft) long end-fed wire antenna. It was a good QSO for my first 60m c.w. QSO in the USA.

"Both Colin and myself are members of the First Class CW Operators' Club (FOC). Amateurs here in the UK have been allowed to use c.w. on 60m for some time and I have made c.w. QSOs in the UK as G4BUE, but the QSO with Colin was my first using c.w. in the USA. I'm fortunate enough to spend several of the winter months each year in the USA when I am Licenced as N4CJ.

"Since then I've worked 9A4ZZ at 0027z on 6 March for my second 60 metre QSO with Europe." 73 de Chris Page G4BUE/N4CJ.

Editorial comment: Congratulations from the PW team go to Chris G4BUE/N4CJ and Colin G3VTT. We hope that their 'first' claim is confirmed.



Chris Page G4BUE/N4CJ on the air. Chris and Colin Turner G3VTT believe they achieved the first USA – UK 60m QSO.

Summits On The Air Activists Are Busy!

Tom Read M1EYP from **Summits On The Air (SOTA)** group contacted *Newsdesk* with his latest up-date: "One of the leading SOTA activators in Norway is **Kjell Eriksen LA1KHA**. Kjell has activated in Germany, Czech Republic, England, Wales, Scotland, Sweden and Denmark as well as Norway. He introduced a challenge to see who could make the most QSOs from a SOTA summit from a single 9V (PP3) battery.

The challenge has been enthusiastically entered into by several leading SOTA activators, and some of the results have been outstanding.

Leading the way is Kjell himself, with 569 QSOs from a single 9V battery using a Rockmite rig. Richard Newstead G3CWI has been challenging hard, and has squeezed 461 QSOs so far from an Energizer Hi-Tech 9V battery, using a home-brew 100mW rig specially built for the challenge. It has been named the 'Top Gun Special' by the constructor, probably in honour of his favourite local summit - Gun G/SP-013! This has spanned no less than 42 individual summit activations, and 17 DXCCs have been worked.

The photos **Figs 1** and **2**. show the PP3 radio in action in a summit activation, and a look inside the radio as it was being developed.

English Activators

Two activators from the English Midlands have become only the second and third participants to have activated every single summit in the English SOTA

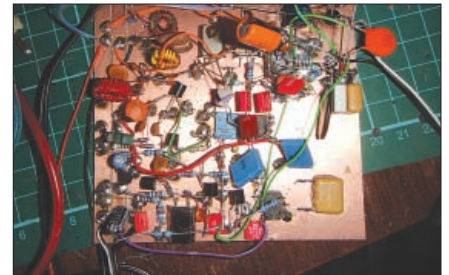


Fig. 1 The PP3 transmitter in action on a summit and Fig. 2 – inside the box. Just shows what can be achieved!

association. **Gerald Peck G4OIG** from Northampton, and **Paul Howett G4MD** from Stourbridge regularly team up for joint activations, which have recently become multi-day events as the remaining summits have got further from their home QTHs!

Gerald G4OIG – who started his SOTA campaign on Walbury Hill G/SE-001 in 2006, and Paul, who began with Walton Hill G/CE-002 the previous year, are both SOTA Mountain Goats. However, both possessed a more driving ambition to 'complete' England by activating every summit in the association. This had only ever been completed once before, by **Richard Newstead G3CWI** from Macclesfield and a co-founder of the SOTA programme.

Paul and Gerald G4MD managed to synchronise their records so that by the end it was the same subset of summits that they both needed. And they completed their goal with a joint activation of High Stile G/LD-012 in the Lake District. Further accomplishments may be on the way, as both are very close to completing every unique summit in Wales as well! The photos show Paul G4MD approaching the summit of Moelwyn Mawr GW/NW-016, and Gerald



Paul G4MD approaching the summit of Moelwyn Mawr GW/NW-016, and Gerald G4OIG/P setting up on the summit of The Cloud G/SP-015.

G4OIG/P setting up on the summit of The Cloud G/SP-015.

For more information about the SOTA programme, please contact Tom Read.

Tom Read M1EYP

**Macclesfield
England**

E-mail: tommyread@hotmail.com

Personal website: <http://tomread.co.uk>

SOTA website: www.sota.org.uk

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A Novel DC Receiver and a 'Just for Fun' Transmitter!

Receiving 3.5MHz on a cat's whisker and a 'just for fun' transmitter with the Rev. George Dobbs G3RJV.

Simplicity is the ultimate sophistication.

Leonardo DaVinci

I'm fortunate in having interesting Amateur Radio friends and this month in *Carrying on the Practical Way* (CotPW) I want to share a couple of ideas from several of those interesting friends. For example, I often exchange emails with Mike Rainey AA1TJ who lives in Vermont in the USA. To say the least, Mike is a novel and innovative radio constructor who has come up with many interesting circuit designs in recent years.

Recently, I was immediately drawn to his claim that he had been receiving 3.5MHz (80m) and 14MHz (20m) c.w. (Morse) signals using a cat's whisker receiver. But before we look at that receiver, let's go back in time.

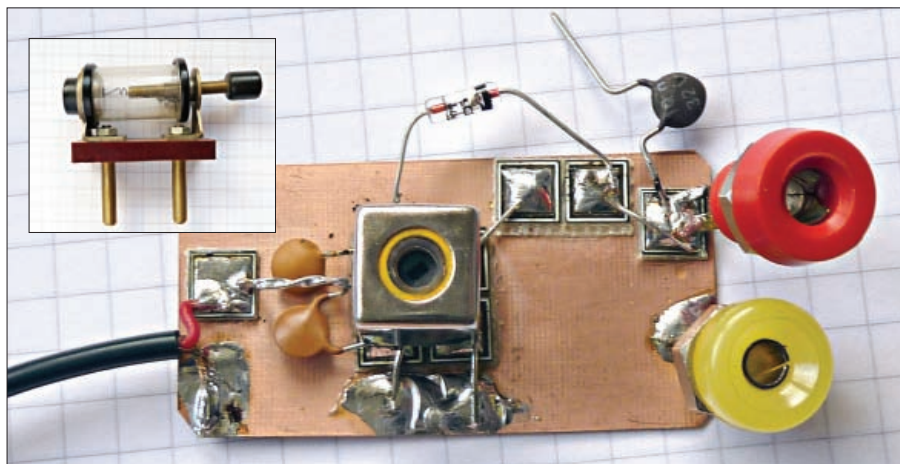
When I began my Amateur Radio construction as schoolboy in the 1950s, it was all valved technology. Gradually however, solid state technology using transistors began to appear as a possibility for the Amateur.

Red Spot Transistor

My first excursion into solid state construction came when I bought a 'red spot' transistor for ten old shillings (50p). It was large chunk of my paperboy's wages in those days! Red spot transistors were very leaky surplus germanium *pnp* devices suitable for audio frequencies.

I used the transistor to amplify a crystal set radio to feed a single high impedance headphone. I couldn't afford a pair of headphones – but I could afford a single headphone at a government surplus market stall.

Using the wire antenna in the back garden, the detector and transistor amplifier produced loud signals from the stronger a.m. stations on the medium wave band. I invited my father to listen and he commented that I had made a good radio. He seemed to intimate that I



had "done radio now" and would probably move onto something else. How wrong he was – I'm still doing it all these years later!

Reading Mike AA1TJ's blog in July 2011, I noticed Mike had been given some old germanium transistors along with a 1957 leaflet that described an amplified crystal radio using exactly the same circuit that I'd built all those years ago. It also appears that Mike had built a similar radio in the past.

However, to quote Mike, "I'm not now interested in listening to broadcast a.m. radio, and a direct conversion (DC) receiver suitable for copying c.w. only requires the addition of a beat-frequency oscillator (b.f.o.) to the receiver circuit. With sufficient b.f.o. drive, the germanium diode can be made to function as switching mixer." The outcome of this speculation by Mike, was the circuit shown in **Fig. 1** – a very simple receiver for the 14MHz (20m) band.

The inductor, L1, with C1 and 2, tune 14MHz. The capacitors C1 and 2 form a capacitive tap to match the input to a low impedance antenna. The diode, D, acts as a diode detector feeding the germanium transistor (Tr1) amplifier.

Note: The cathode of D1 'points away' from the transistor, it being a *pnp* device.

The circuit has better radio frequency (r.f.) filtering than my early amplified crystal radio. A b.f.o. signal is injected into the signal path via C3. In his version, Mike AA1TJ used a variable crystal

oscillator (v.x.o.) from an existing project. The b.f.o. signal in the 14MHz band does exactly what the name implies – it beats with the incoming signal to produce an audio output. This enables c.w. and single sideband (s.s.b.) to be heard.

The result is a very simple DC receiver. But let's now return to Mike AA1TJ's cat's whisker receiver.

Arkansas Stone

Some ten years ago, I was driving through Arkansas (pronounced Arkan-saw) with another Amateur Radio friend, **Roy Lewallen W7EL**. Some readers will have an 'Arkansas Stone' – the ultimate in grinding whetstones – in their workshop. Arkansas is geologically rich and we passed several roadside 'rock stalls' on our journey.

Stopping at one of the stalls we noticed they were selling crystals of Galena and we simply had to buy some. **Galena** is the natural mineral form of lead sulphide and is the primary ore of lead) See Wikipedia: <http://en.wikipedia.org/wiki/Galena>

Galena was the commonest crystal used to make a cat's whisker detector diode. A cat's whisker detector consists of a thin wire (often made of springy steel) that lightly touches a crystal of semiconducting mineral to make a crude point-contact diode. I have a German reproduction cat's whisker detector in an imitation 1920s crystal radio my wife **Jo** bought for me at the Friedrichshafen Hamfest in Germany. Mike AA1TJ also

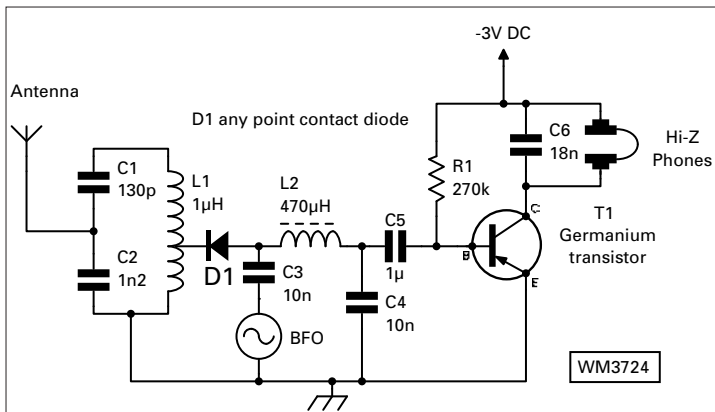


Fig. 1: Mike Rainey AA1TJ produced this simple receiver for 14MHz using a *pnp* germanium transistor amplifier.

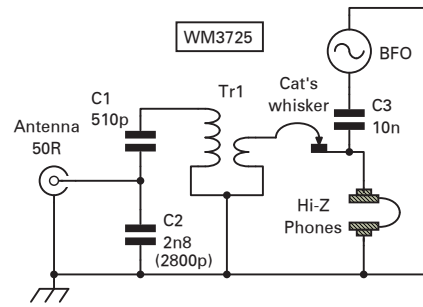


Fig. 2: Mike AA1TJ also tried a galena detector for the 3.5MHz band, this time without an audio amplifier, calling it the Cat's Meow.

has a similar cat's whisker detector and set about using it in a basic 3.5MHz receiver. The circuit is shown in Fig. 2.

The circuit in Fig. 2 is simply a cat's whisker crystal radio with an added b.f.o. The primary winding of T1 with C1 and 2 provide input tuning on the 3.5MHz band.

The transformer is a 3.5 to 6μH slug tuned coil with a 16-turn primary and a 6-turn secondary winding. The secondary winding feeds the detector, thence to a pair of high impedance headphones.

So far, this is a conventional cat's whisker detector crystal radio. The novelty comes with the adding of the b.f.o. signal. The original by Mike AA1TJ used a signal from a test bench signal generator tuned to the 3.5MHz band.

As with the simple receiver in Fig. 1, the b.f.o. allows c.w. signals to be heard as an audio tone (perhaps the Cat's 'Meow?'). In effect what we have is a DC receiver with no gain – a seemingly unpromising idea! The photograph, Fig. 3, shows Mike's original 'Cat's Meow' receiver, complete with cat's whisker

detector. The receiver is to the right of the picture – the left side is a simple transmitter.

Mike found that the unpromising receiver (rather oddly!) did work well. He operated the receiver with a very basic transmitter that uses a single 7400 chip to produce an output of only 17mW (milliwatts) into his half-wave 3.5MHz dipole antenna.

Indeed, Mike made three contacts on the first evening with his (very) QRP transmitter and the Cat's Meow. The stations were WA1HFF (227km), K3SEW (524km) and N1MX (247km). That K3SEW QSO was a distance of 326 miles! Then, quite amazingly, the Cat's Meow received the signals from **Henry O'Connor OZ3FD** in Denmark! Mike sent Henry an E-mail that read, "Hi Henry, I heard you the other evening on 80m c.w. with a simple galena and cat's whisker (no gain) receiver. I used a b.f.o. of course, but that simply turns the diode 'switch' on and off. Your signal did all the work. It's pretty neat to think your signal travelled from Denmark to Vermont and still had enough energy in it to wiggle the

diaphragms in my headphones! You were a perfect copy here – every bit as loud as some domestic stations."

The G3RJV Version

I thought I must try my version of the Cat's Meow and this is shown in Fig. 4. Cat's whisker diodes are notoriously difficult to adjust for the best results so, I began by cheating with a point contact germanium diode. Diodes such as the OA90, OA91, 1N34A or the AA119 are all suitable. They usually come with a clear glass envelope through which the wire and the crystal can be seen.

Ideally the 'wire lead' should be connected to L1. In my circuit L1 is a Spectrum Communications 5u3L coil and I used common capacitor values to form the capacitive tap in the tuned circuit. The 5u3L does have a link winding like T1 in Fig. 1 but the number of turns on the link is too small for effective transfer of the signal. I connected D1 to the top of the tuned circuit; an arrangement common in most crystal radios.

My ancient, but very sensitive, set of 4000Ω headphones were found and added to the receiver. They are excellent 'phones but do clamp to the head and ears like a medieval instrument of torture!

I began my receiver experiments by using my bench signal generator for the b.f.o. but this has a very coarse tuning rate at 3.5MHz. So I pulled out an old variable crystal oscillator (v.x.o.) from a previous *PW* article. It uses a 3.58MHz ceramic resonator; the circuit is shown in figure 4. The 1nF coupling capacitor in Fig. 5 replaces the 10nF capacitor from the b.f.o. in Fig. 4.

My version of the Cat's Meow did work – but only just! I was able to hear 3.5MHz c.w. signals in the headphones – but they were very faint. My problem was the very inefficient antenna in my small back garden which has always been 'iffy' on the 80m band.

Success for a no-gain receiver

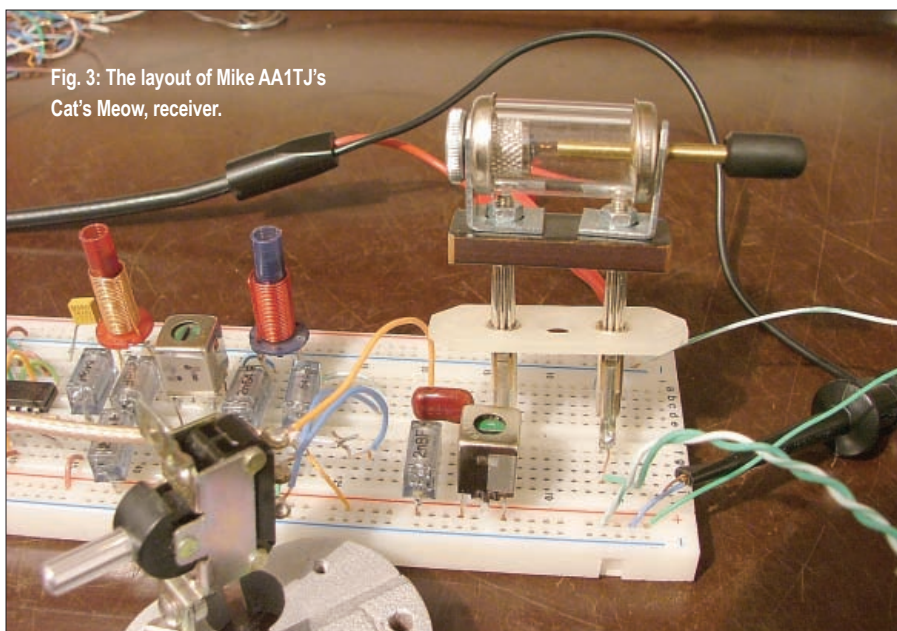


Fig. 3: The layout of Mike AA1TJ's Cat's Meow, receiver.

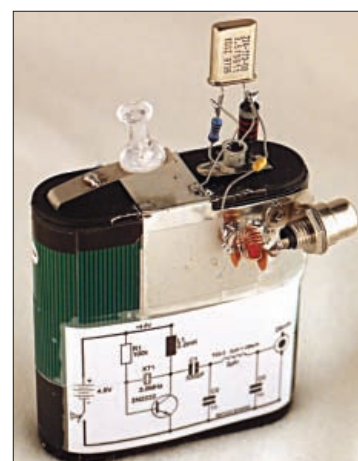
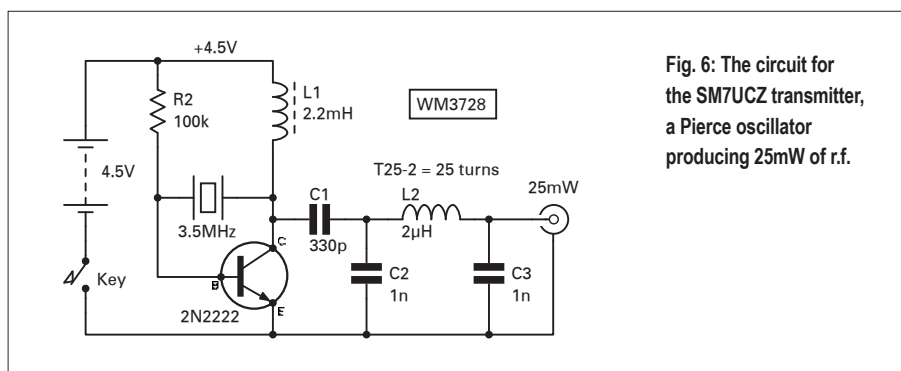
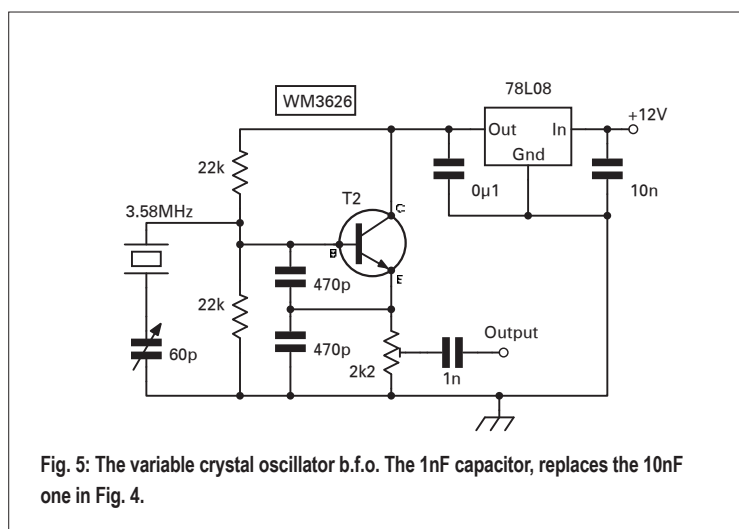
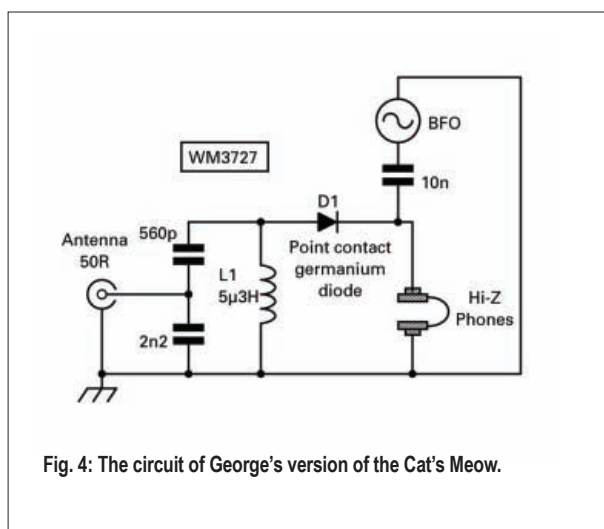


Fig. 7: The novel construction of the transmitter, built up on its power source, a 4.5V 'cycle-lamp' battery.

depends upon a good signal from the antenna. Mike had a lot of wire and I didn't have enough wire. Trying my cat's whisker diode failed to detect any discernible signals. I couldn't find what old timers used to call the "sweet point" on the cat's whisker. But the experiment did prove that the Cat's Meow certainly can work – though it requires a strong signal from the antenna.

The Low Power Transmitter

As I mentioned earlier, Mike AA1TJ used the Cat's Meow with a very low power transmitter and still managed some very useful contacts. About the same time as I was looking at the Cat's Meow receiver, another Amateur Radio friend, **Johnny Apell SM7UCZ** sent me information on a simple 3.5MHz transmitter.

Regular readers will recall that I've used several ideas from Johnny in this column. He called this little transmitter "Just for Fun". It was built directly on a 4.5V battery of the type often used in cycle lamps or small battery lanterns. These are flat pack batteries that use two metal strips as terminals – usually the shorter strip is the positive terminal. The circuit for the SM7UCZ transmitter is shown in Fig. 6.

The transmitter is just a Pierce oscillator with a low-pass filter. A Pierce oscillator has a quartz crystal between the input and output of an active device – in this case the base and collector of a

2N2222 bipolar transistor – to provide the feedback to maintain oscillation.

The frequency of the oscillations is also controlled by the crystal. An ideal choice of crystal frequency is 3.56MHz; the QRP calling frequency. These are available from several sources, including the G QRP Club.

The inductor, L1, is a commercial axial (wire coming from each end) 2.2mH inductor providing the collector load. The output signal at L1 is coupled via C1 to a low-pass filter. This is a single pi-network using a 2µH inductor and 1nF capacitors at C2 and C3.

The 2µH inductor is wound on a T25-2 core. These are rather small cores and will require thin enamelled copper wire (about 0.27mm or 32s.w.g.) to fit 25 turns in the available space.

A alternative and larger inductor would be 22 turns on a T37-2 core, although I chose the T25 core to save space in a tight layout. Bands other than 3.5MHz could be used by changing the frequency of the crystal and the values of the low-pass filter.

The photograph, Fig. 7, shows the novel construction of the transmitter. I cut a small chassis plate from a biscuit tin and the transmitter was built in 'ugly' style above the chassis.

The c.w. key is the springy negative contact strip! The knob for the key is the head from a mapping pin glued onto the contact strip. The finished result is a

small, stand-alone, transmitter with an output of about 25mW. Not a lot of r.f. power – but remember that Mike AA1TJ only had 17mW from his transmitter and that was heard over 300 miles away!

The Baltic Coast Version

With his "Just for Fun" transmitter and operating from his home in Sweden near Karlskrona on the Baltic coast, Johnny has been heard by stations in Norway and Germany. The 25mW and a decent antenna are capable of reaching several hundred miles. For little financial outlay and an evening's work, the "Just for Fun" transmitter could do exactly what it says – provide a challenge and a lot of fun.

So, we here have two very simple ideas that the more intrepid reader might like to try. Mike's Cat's Meow is a real challenge – but is very easy to build. The concept of a no-gain receiver has an odd appeal of its own! Johnny's "Just for Fun" transmitter would be interesting to use alongside an existing 3.5MHz receiver or the receive portion of a station transceiver. I would love to hear from any readers who try either of these novel circuits. Good luck!



Mike Mills G3TEV's Antenna Workshop

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Balanced Feeding!

The guest author for *Antenna Workshop* – Mike Mills G3TEV – creates an adaptable balanced antenna matching unit from bits he found in his ‘goodies’ box!



Three controls on the front panel, the two output capacitors flanking the input matching and tuning capacitor in the centre.

Welcome to my turn writing for *Antenna Workshop (AW)*! Call it what you will, either an antenna tuning unit (a.t.u.) or antenna matching unit (a.m.u.). – but if you're using any form of balanced feeder you'll have need of one to be able to present the right unbalanced load to your transmitter.

I have used open wire feeders ever since I obtained my transmitting licence in 1964 and have made many versions of the a.t.u. that I now use. The early ones used home-wound plug in coils and were very successful, but as I had obtained (many years ago) several large plug in coils that were used in the US Military BC610 transmitter – I decided to remake my a.t.u. to use these coils,

The coils are all air-cored and are

up to 100mm (3.9in) in diameter which makes for a very efficient a.t.u., as losses are small in large air-cored coils. The coils all have link windings which are series tuned, these being used to provide the 50Ω input to the a.t.u.

The series tuning capacitors labelled C1 and 2 in the circuits shown in this article, are wide-spaced as I run the full power of 400W. If you're a QRP operator, running only low power, then narrower-spaced capacitors will be adequate.

The Main Capacitors

The two main capacitors, C1 and 2 are 125pF and were recovered from an old surplus RAF T1154 transmitter that I scrapped many years ago. Although you could use almost any capacitor of about

this value or larger – it must have a low minimum capacity to enable it to tune the higher frequencies.

The input matching and link winding tuning capacitor (C3 in the circuits) is a twin-gang 500+500pF type used in old style mains radios. Both halves are in parallel to give a value of 1000pF. Balanced a.t.u.s need to be adaptable to give either series or parallel tuning according to which antenna and frequency is being used, these set ups are shown in diagrams Figs. 1 and 2 and 3.

Changing Modes

Changing from one mode to another can be easily and cheaply carried out by using a system of plugs and sockets. The diagram in Fig. 3 is a method that is very flexible and can be used to good effect if difficulties are experienced in finding a match with either of the other methods. Looking at Fig. 3, you'll see that the two capacitors can be regarded as a type of radio frequency (r.f.) potentiometer across the coil so that point B can be moved up and down.

As the capacitors are in series resonance can be maintained with a great variety of settings and hence a great variety of output impedances. The set-up in Fig. 3 can also be used to feed single wire fed or long wire antennas.

If the single wire feed is attached to point A and point B is directly earthed tuning the two capacitors will have the effect of moving the earth tap up and down the coil and a match can be found.

It's highly unlikely that anyone could make an exact duplicate of my tuner, as some of the parts are almost impossible to obtain – especially the coils. However, the coils do appear occasionally on Internet auction sites so keep looking! As my a.t.u. was never intended for public display it does look rather messily constructed, this due to it having been modified on several occasions in the past!

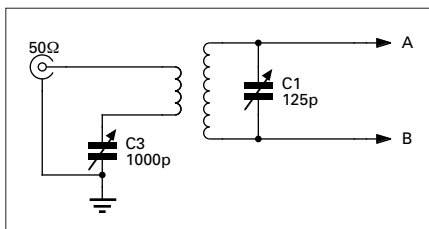


Fig. 1: Using a single capacitor in a parallel tuned output to the balanced feeders.

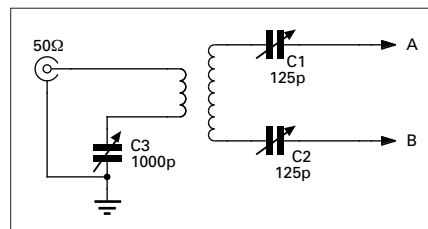


Fig. 2: In this form, the two capacitors give a series tuning output to the feeders. It also allows a degree of variation in balancing too, as each 'side' can have differing values.

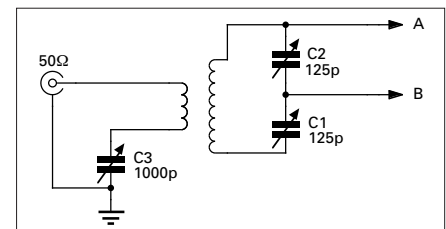


Fig. 3: A combination of both series and parallel tuning gives more versatility in impedance matching.

The Main Chassis

The main chassis of the tuner is made of 3mm aluminium sheet, the capacitors (C1 and 2) that are used to tune the main coil are insulated from the chassis on plastic blocks as both sides are 'live' and above ground potential.

The front panel is made from 4mm aluminium sheet. If a non metallic base is used the capacitors will not need isolating from the base. The link tuning capacitor (C3) is mounted on the chassis because the frame is at earth potential.

Slow motion calibrated drives are used for the link winding tuning, and I keep a record of the settings for each band enables. This allows me to make quick band changes. Most standing wave ratio (s.w.r.) bridges only indicate an impedance match and can be used to set up the a.t.u., but to take full advantage of this type of a.t.u. a bridge that indicates both impedance and reactance should be used.

Old Design

The bridge I use is a very old design that appeared way back in the 1950s. It is called *The Antenna Match* and was described in the *RSGB Bulletin* (now *Radcom*) issues of May and June 1955. It was described by the late **Frank Hicks-Arnold G6MB** and was a modification of a design for an automatic a.t.u. developed by Virgil True of the US Naval Research Laboratories.

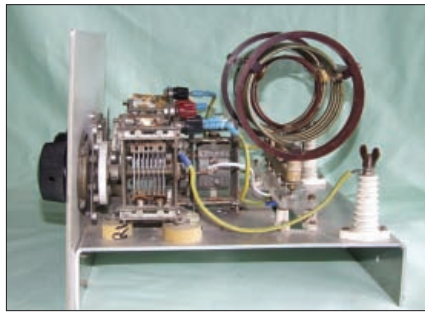
It's normal to measure the current in each leg of the feeder and try to obtain equal currents in each leg to maintain balance. This was originally done by the use of r.f. thermocouple ammeters which (unfortunately) these days are very difficult to obtain.

For low power a form of indication can be obtained using a torch bulb in each leg and obtaining equal brilliance in each bulb. For my part a.t.u. I have 'made do' by trying to keep both capacitors at equal dial readings and this has seemed to work well.

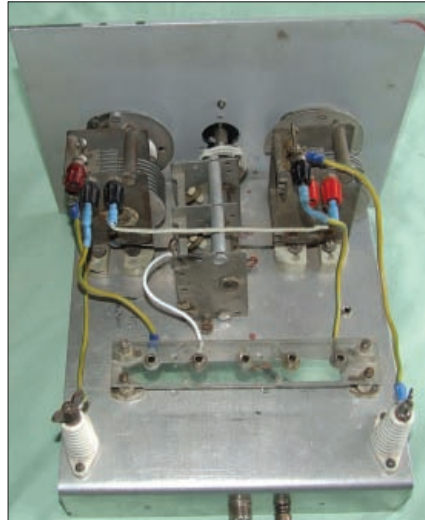
At the time of writing this article I am however, trying to make up a unit with toroidal transformers in each leg of the feeder to measure the current. This technique was described in a recent issue of the **GQRP Club's** journal *Sprat*.

Using The G3TEV ATU

To use the a.t.u. you should – first of all – tune your transmitter into a dummy load and zero your s.w.r. measuring device. Tuning the a.t.u. is carried out using the capacitors and obtaining as low an s.w.r. as possible, in fact you should in most cases be able to get a 1:1 s.w.r. – although anything below 2:1 is acceptable.



A side view of the assembled unit, with a coil suitable for the higher h.f. bands.



Rear view of a.t.u. showing plug & socket system and the linking wires on C1 and C2.

You'll also find an interaction between the main capacitors and the link tuning when adjusting until a balance is found. The interaction is most marked when you have a means of indicating reactance which – by careful adjustment – can be tuned out.

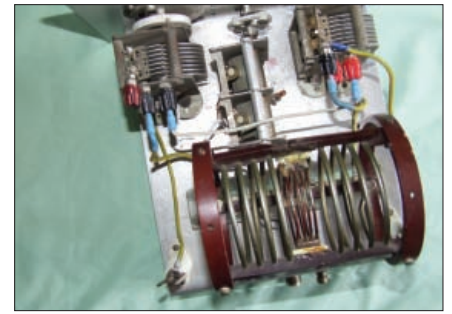
If you have an antenna analyser this can be connected to the a.t.u. The settings for all bands can then quickly be found and the settings noted for quick adjustment of the a.t.u. when used on the air.

Main Antenna

My main antenna is basically a 22m (72ft) long inverted-V made from 2mm copper wire, and it is about 8.5m (28ft) high at the centre fed with open wire feeders, with a spacing of 110mm (4.3in). Incidentally, the feeder spacing is because those I use, are plastic mouldings made to clip into frames to carry printed circuit boards (p.c.b.s).

At the end of each leg, where it meets the garden fence at about 1.5m (4.9ft) above ground, a home made coaxial trap for 7MHz is inserted. There's then another 11m (36ft) of wire running at rather strange angles to give a full half wave on 3.5MHz.

The traps are necessary to keep the antenna current on 7MHz up in the



A view looking down on the business side of things.



The coils are all of a common 100mm diameter, but with differing numbers of turns.

centre of the antenna. I did try it without the traps but the performance on 7MHz was extremely poor. A good earth system is essential and should be connected to the a.t.u. if a metal chassis is used.

My earth system consists of three copper pipes driven into the ground as far as I can get them, this is not very far as at about 100mm (3.9in) below soil level is solid Cotswold limestone. To improve things, I have three 11m (36ft) long counterpoises made of heavy insulated wire running out in a fan shape under the lawn and connected back to the earth spikes.

The Counterpoise wires are then connected to a 16mm (0.6in) copper pipe that runs along behind my operating table and all equipment is connected to this pipe. For safety reasons the pipe is connected back to the mains earth through a 20 turn toroidal choke which maintains electrical safety – but isolates the earthing system as far as r.f. is concerned.

The antenna has now been in position for over forty years, and since 1992 I have had a daily contact with **Brian Otter 9J2BO** in Lusaka, Zambia and we have up to the end of February 2012 had in excess of 5500 contacts. I always operate in the Commonwealth Contest and regularly work stations in Australia and New Zealand on both 3.5 and 7MHz, so you can see that even my strange antenna set-up works.

So try a doublet antenna! They do work well either as a 'flat top' or as in my case an inverted V.



Mike Richards G3WNC's Data Modes

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Filters and Spectral Displays

In *Data Modes* this month Mike Richards G4WNC looks at filtering and identifying signals when a software defined radio receiver is used.

Welcome to *Data Modes (DM)*. This month I'm continuing my examination of software defined radio (SDR) receiver technology with a look at filtering followed by some tips on signal recognition using the spectrum and waterfall displays.

One of the exceptional features of all SDR receivers is the quality of the filtering. When using digital filtering techniques, it's possible to produce performance and flexibility way beyond that available in even top quality professional receivers of just a few years ago.

Digital filter techniques allow the user to create filters with extremely steep sides, excellent stop-band and minimal ripple throughout the passband. So how is this achieved in practice?

Filter Creation Process

The filter creation process begins by defining the required filter shape and then applying this to a mathematical reverse Fast Fourier Transform (FFT) process. You'll recall from last month that FFT's divide the frequency spectrum into a number of narrow 'bins' each of which represents a narrow band of frequencies.

In the reverse FFT process you apply coefficients to say what frequencies you want and those you want to exclude – see **Fig. 1**.

The type of filter most commonly employed in SDRs is the Finite Impulse Response or FIR filter. This is one of the simplest types of digital filter and is relatively easy to design, implement and importantly for radio data use, it is phase linear.

The phase linearity means that, throughout the frequency range, the delay introduced by the filter is constant. So, that all frequencies are treated equally. If this were not the case, data signals could be damaged within the filtering process. Although FIR filters are the simplest type of digital filters to implement, they do demand quite a bit of computing power, as the filtering process involves a

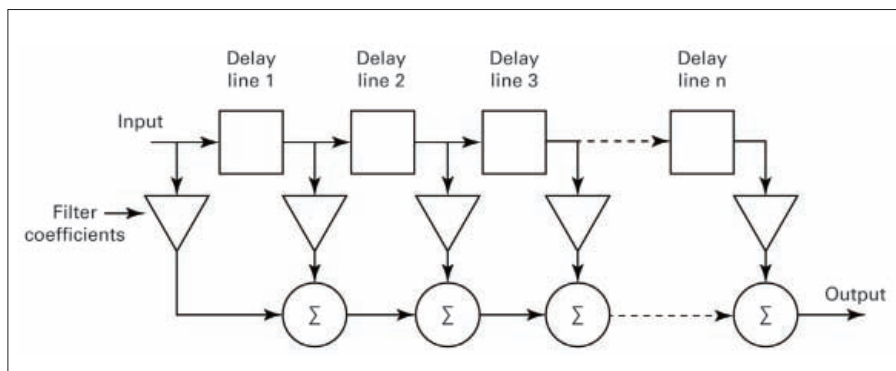


Fig. 1: Finite Impulse Response (FIR) Filter block diagram.

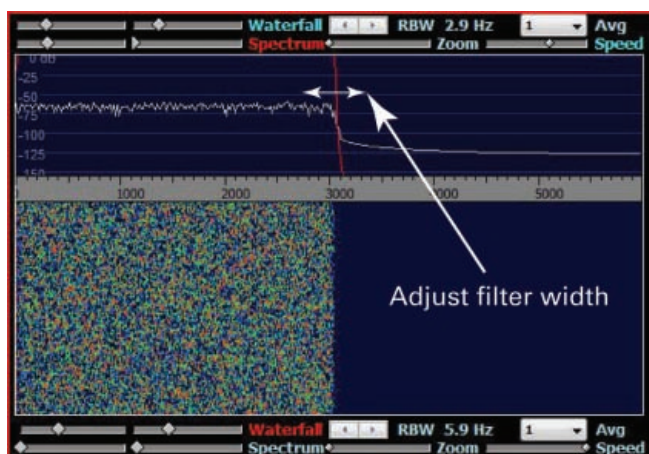


Fig. 2: Adjusting the filter width in HSDR.

rapidly repeating calculation.

One of the joys of modern digital filtering is the way in which the filter characteristics can be defined and changed visually, merely by dragging the filter shape in the spectrum display, as shown in **Fig. 2** when using the *HSDR* program. This is an incredibly powerful tool that allows you to customise the filter to match the prevailing listening conditions. There have been many times when I've just squeezed the response to exclude an interfering station whilst leaving as much of the wanted signal as possible.

In some SDR software you will find that you also have the option to alter the filter length or number of 'taps'. This adjustment needs to be treated with caution as any increase in filter length will rapidly soak-up processor capacity. Applying too long a filter length may cause your PC to freeze. And it can also

introduce distortion into the signal or even cause other unpredictable results.

If you have a powerful PC and feel the need to improve the filter performance you can increase the tap size but you do need to watch the impact carefully. Conversely, if your PC is struggling with your SDR software – you can lighten the load by decreasing the filter length.

Additionally, with the ability to customise the receive bandwidth, most SDR receivers include some very powerful notch filters that can be 'dropped into' the receive passband. On the Excalibur Pro receiver package, there are two notch filters available, each of which can be adjusted for both centre frequency and filter width. These notch filters generally have very steep sides and are able to take-out interfering carriers with minimal effect on the wanted signal.

Signal Identification

As I've mentioned previously, SDR receivers introduce a new way of viewing and tuning into the radio spectrum. To make the most of this new flexibility we need to develop some new monitoring skills. Most experienced Amateurs are able to recognise a wide range of modes, simply by listening to the sound they make as you tune across them with a conventional tuning system.

Tuning the band and listening, all changes with SDR, as you can often see most of the required band at a glance on the spectrum display. It's generally not usual, to tune across the band in the same way you would with a conventional receiver.

When using an SDR receiver system, the normal tuning method is to 'click-tune', a method in which, you see a signal of interest and you click, with the mouse, on the spectrum display to cause the software to 'tune' to that signal. That may be then followed-up by fine tuning in a number of ways.

One method of fine tuning, is accomplished, by clicking-hold and drag the tuning point to complete the fine tune. Some operators may prefer to use the simulated tuning knob or arrow buttons for fine tuning, which are often present in some software.

To make the best use of this new and very rapid tuning system, we need to be able to recognise signals from the patterns they make on the spectrum or waterfall displays. In my experience, it's the waterfall display that provides the most useful information for signal identification. The key to identification lays in understanding the modulation used for the different signals.

Voice Signals

Perhaps the easiest signals to spot are Amplitude Modulated signals (a.m.), as these comprise a central carrier with information sidebands on either side. On the spectrum analyser this type of signal shows as a steady, central peak with rapidly varying and matching sidebands on each side. Within the waterfall display, a.m. is even more obvious, as it shows a solid line for the carrier and less distinct but matching sidebands on each side.

The screen shot in **Fig. 3** shows a commercial broadcast station transmitting piano music. In the waterfall you will see that there are distinct traces that look a bit like shooting stars. These are individual piano notes that start loud when struck by the hammer but then fade, hence the diminishing trace.

Conversely, **Fig. 4** shows a commercial broadcast station transmitting speech only and here you

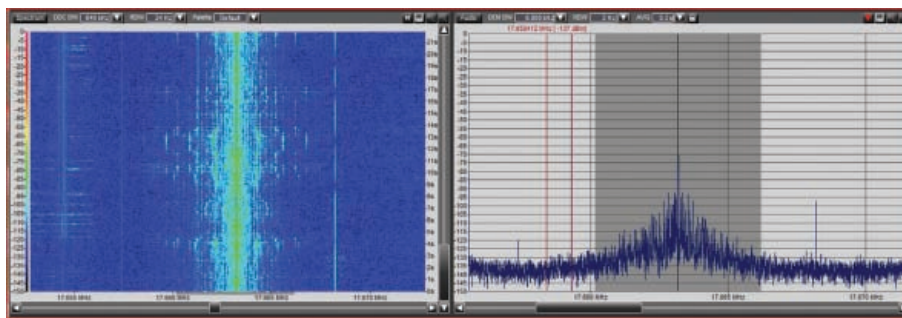


Fig. 3: An a.m. signal broadcasting piano music.

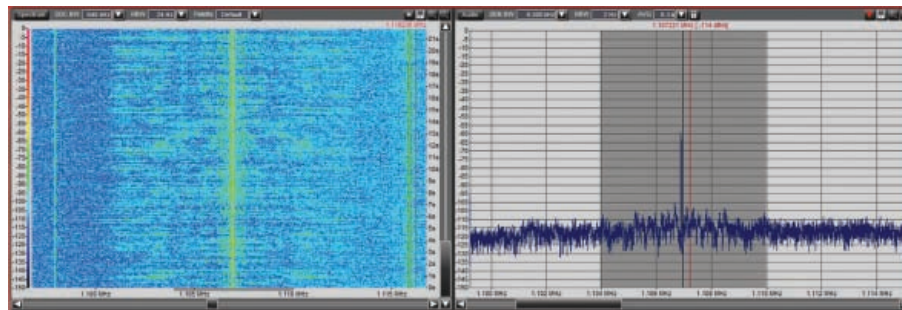


Fig. 4: An a.m. signal during a speech broadcast session.

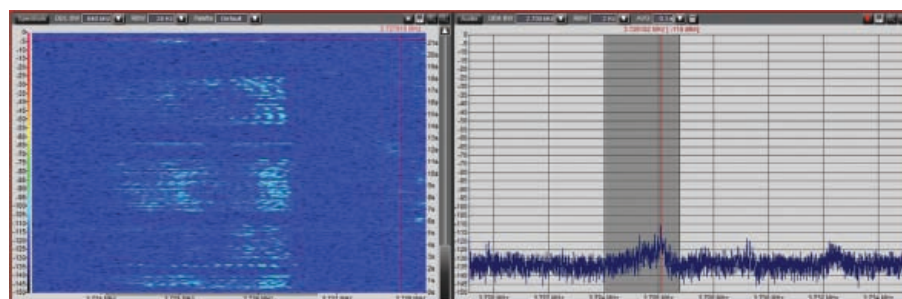


Fig. 5: An Amateur s.s.b. voice transmission.

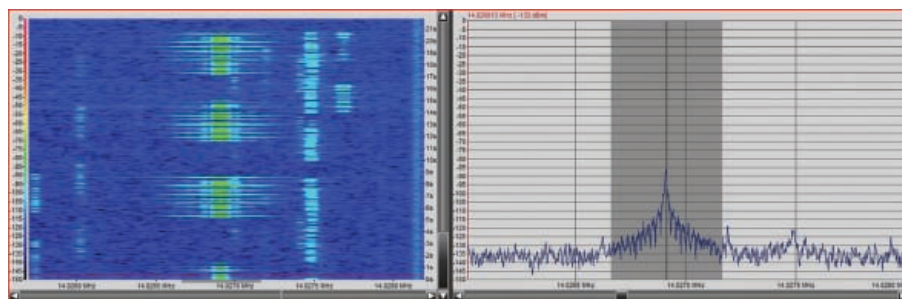


Fig. 6: An Amateur Radio c.w. signal.

can see that the central carrier remains very clear but the sidebands are far less distinct. Frequency modulation signals (f.m.) look very similar to a.m. on both the spectrum analyser and the waterfall displays. The central carrier shows up quite distinctly and the sidebands are indistinct in much the same way as for a.m. signals.

The lack of clarity is not generally a problem because both a.m. and f.m. tend to be used in totally different parts of the spectrum so you usually know what to expect.

For Amateur Radio use the most common speech signals on the h.f. bands are single side band signals (s.s.b.). The full definition of course is single sideband, suppressed carrier

which means that these signals are essentially an a.m. signal but with the carrier and one of the sidebands removed.

Looking back at the trace for a.m. signals it is easy to predict that the s.s.b. signal should contain a single rather indistinct sideband. The signal in **Fig. 5** shows a typical amateur s.s.b. transmission with the indistinct or 'smudged' look within the waterfall display. Although this may at first seem rather vague the smudged look is a really strong characteristic of s.s.b. signals making them quite easy to spot on a waterfall display.

Although the smudged look is useful, to identify an s.s.b. signals, the spectrum display may be less helpful in this case.

It would be very easy to miss signals if you relied on that characteristic alone.

When tuning an s.s.b. signal you need to click in the spot where the carrier would be, if it hadn't been suppressed. That means clicking slightly to the left for u.s.b. and to the right for l.s.b. Signals. Choosing the correct point is a matter of experience and with a bit of practice you will soon learn the correct tuning point for your system.

Additionally, while using the spectrum and waterfall displays to identify signals, you can also use these as measurement tools to check the quality of the transmissions themselves. Using these tools it is very easy to spot any splatter from an overdriven power amplifier.

Data Signals

The most basic of data signals is of course Morse code or c.w. And this is generally very easy to spot on the waterfall display as you can usually see the transmission breaks between Morse elements as shown in **Fig. 6**. As well as being able to identify the signal, again you can use the tools to check transmission quality. You will see from Fig. 6 that the signal here has some wide-band 'spikes' associated with the signal; these are key clicks.

After the simple On/Off of c.w., the next most popular data mode on the h.f. bands is probably PSK31 and I've shown traces of PSK31 on the 14MHz band in **Fig. 7**. In this case you can see that the spectrum display is not at all helpful in mode recognition but the waterfall tells a much more interesting story.

In the screen shot of Fig 7, you can clearly see the two-tone signal that precedes each transmission looking like a pair of horns and this also appears again briefly at the end of the transmission. At this stage, all we know is that this is probably a PSK signal but we don't know if it's PSK31, PSK63 or even PSK125.

However, we can verify this by measuring the bandwidth of the signal which should be approximately 31Hz, 63Hz and 125Hz respectively. The method of measuring the bandwidth will vary depending on the software you are running. The easiest way is to use the markers that are provided by many SDR programs.

To use the markers, they should be placed in the centre of each horn of the PSK signal and the bandwidth measured by calculating the difference between the two markers. With some receivers you can set one marker as the reference and all subsequent markers will show their actual frequency

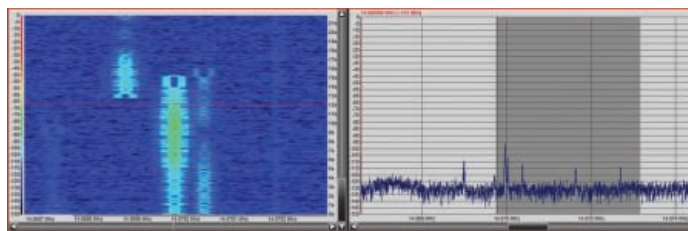


Fig. 7: An Amateur Radio PSK31 signal.

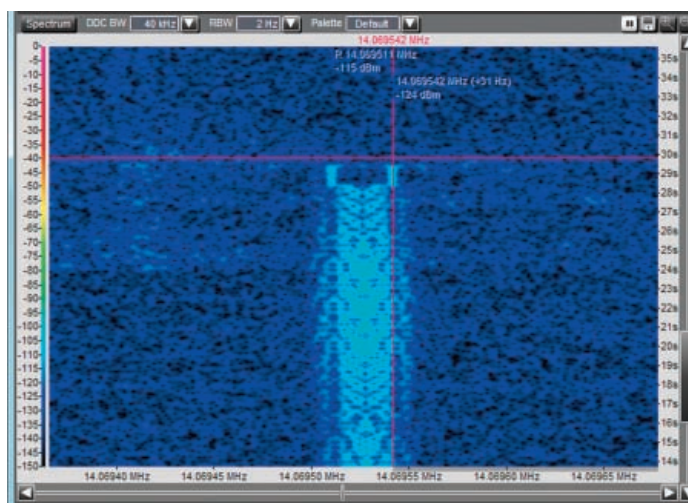


Fig. 8: Measuring a PSK signal with the Excalibur Pro.

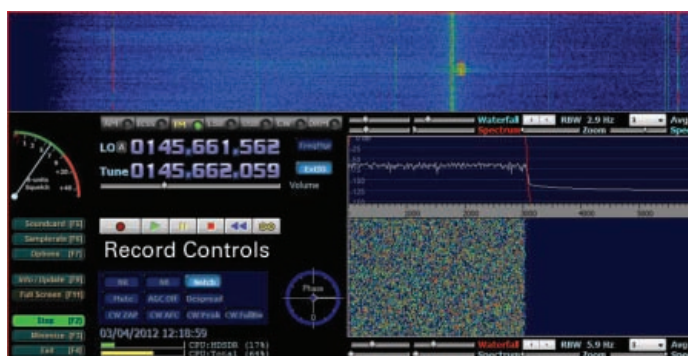


Fig. 9: HDSDR - IQ recording and playback controls

and, more importantly, the difference between the marker frequency and the reference. This makes bandwidth measurement a breeze.

Analysis Techniques For SDR

Having just started on signal analysis we need to take a more detailed look at the analysis facilities provided by using SDR receivers, as we will be making extensive use of these facilities as we progress. From the examples I've covered so far you will have noticed that the waterfall display reveals more about signals than the spectrum display.

However, before we can perform any detailed analysis we ideally need a clean copy of the signal that remains steady long enough for us to make our measurements. This is where SDR receivers excel. One of the simplest ways to achieve this is to pause the waterfall display.

The method of pausing will vary from receiver to receiver but in *HDSDR* you simply stop the receiver and the displays freeze but you will still be able to move the cursor and take measurements. In

Excalibur Pro the waterfall display has its own pause button along with the facility to scroll back through the past 99 seconds of received signal.

The pause and replay function is extremely useful, as you can scroll through the signal to find the cleanest example and make your measurements at that point. In **Fig. 8**, I've shown an example of a PSK31 signal being measured in *Excalibur Pro*. An alternative technique is to make a recording of the received spectrum.

Virtually all SDR receivers include a recording facility and it's a significant help for signal analysis. The recording captures the raw IQ signals so, that on playback, you can process the signal as if you were receiving it for the first time.

When looking at the recorded signals, you can adjust filtering, demodulation and all the other controls to help isolate the signal before starting your measurements. And if you feel it's not quite right – you can try again!

That's all I have time for this month so next time I will continue with a few more tips.



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The 29th Annual Practical Wireless 144MHz QRP Contest

Our QRP Contest Adjudicator Colin Redwood G6MXL introduces the 2012 event. Let's just hope for good weather!

The 29th Annual *Practical Wireless* 144MHz QRP contest takes place on Sunday June 10th 2012 from 0900 to 1600UTC. The format of the 144MHz contest is simple, it's designed to maximise participation from newcomers and keen contesters alike, while keeping it a friendly and fun event to take part in.

For those new to Amateur Radio contests, the *PW* 144MHz QRP contest is a perfect introduction. Every year, Amateurs new to contests try their hands for the first time. In fact, some radio clubs use it as an opportunity to introduce their members to the joys of Amateur Radio contests.

Even if you are limited to operating from home for just a short time, please

join in all the fun of the contest. So on Sunday June 10th 2012, why not find yourself a location with a good take-off, operate for a few hours with no more than 3W on the 144 MHz band?

Let's hope that the weather is kinder than the last two years and that we will be lucky with some good propagation on the 144MHz band! There will certainly be plenty of other *PW* readers on the air – eagerly wanting to work you.

Equipment Needed

In terms of equipment, all you need is a 144MHz transceiver and an antenna. While most activity will take place on upper side band (u.s.b.), there'll also be some contacts available on c.w and f.m.

If you haven't tried operating from

a local hill-top, you may be surprised just how far 3W can go! Sometimes the contest is blessed with some Sporadic-E propagation when just about anywhere in Europe might be worked with just 3W on the 144MHz band! Any source of power can be used to power the station for the *PW* 144MHz QRP Contest.

For operation on upper sideband and c.w., you will find that most stations use a horizontally polarised antenna. You will almost certainly work longer distances if you also use a horizontally polarised antenna.

Output Power

If you have a transceiver with an output power of greater than 3W, you'll need to reduce the power to 3W or below.

If you're sending your hand-written entry in by post, then this is the preferred style of logsheet to use. It may be downloaded from: www.pwcontest.org.uk

Practical Wireless 144MHz QRP Contest 2012

Date 10th June 2012	Callsign (incl /P)	Locator	Sheet no. of
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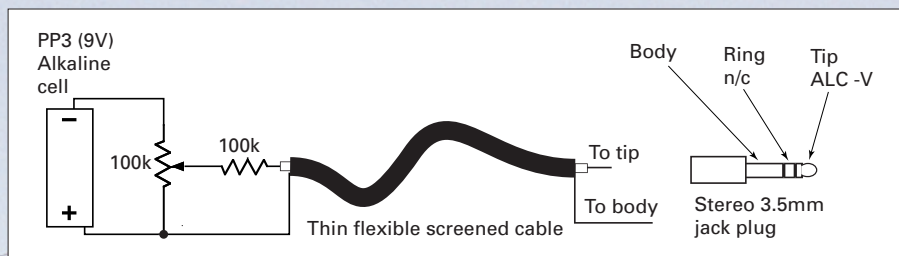


Fig. 1: A useful technique to reduce power to 3W on higher power transmitters.

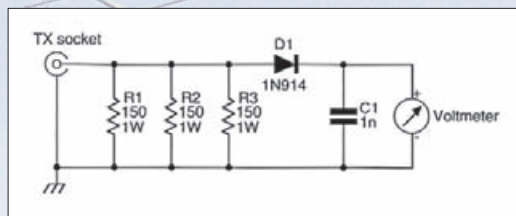


Fig. 2: A small power meter to verify the power output. A 16.7V level indicates 3W output.

Fortunately, with a number of modern transceivers such as the popular Yaesu FT-817ND for example, power can be reduced by using a menu setting. If this is an adjustment that you don't normally perform you may want to refer to the operating manual in advance of the contest.

An alternative method of getting the output power down to 3W is to use a technique that has been successfully employed by a number of stations over the years. This involves applying a d.c. voltage externally to the automatic level control (ALC) socket of the transceiver (See Fig. 1).

While measuring the power out, you should adjust the variable resistor and the ALC voltage is applied to the transmitter, – thereby reducing the power to the level required. This technique has been used (for example) with the popular Yaesu FT-897 and some h.f. transceivers when driving a 144MHz transverter.

Please note that the 3W limit is at the output of the 144MHz transmitter or output of the 144MHz transverter, not at the antenna! You cannot rely on feeder loss to meet the 3W rule.

Hints & Tips

Time for some hints and tips next and I would certainly recommend re-reading the results article of last year's contest in the October 2011 issue of *PW*. It contains many suggestions for improving your overall score in 2012.

I would also encourage entrants to enter their coversheet details on the contest web site at www.pwcontest.org.uk and to include an E-mail address, so that I can contact entrants if their E-mailed logs have not been received.



The antenna system of the winning UBA TRA-OSB Contest Team TM7T.

Outlying Squares

I strongly urge stations to point their beams towards the outlying squares. Not only can this give some really valuable multipliers, it also encourages stations in South West England, Northern Ireland, the Republic of Ireland, and Scotland to participate.

After the contest **please** submit an entry, thereby joining the thousands of Radio Amateurs who have participated over the years in this popular contest. Although electronic entries via E-mail are much preferred, the computer-phobes amongst you will no doubt be pleased to know that you can easily submit an entry without going anywhere near a computer if you so wish!

Logs Please!

Over the last few years in the UK we have not been required by our licence conditions to keep a log of our contacts. Entrants are reminded that time must be logged in UTC (not BST) and that

Editor's comment: On behalf of everyone who takes part in the contest I thank Colin Redwood G6MXL for all his hard work as Adjudicator. However, the best way we can all really show our appreciation is to join in and submit our logs – so good luck everyone!



The Callington Amateur Radio Society G1XIC/P, battled to get their tent up on Kit Hill in Cornwall.

callsign suffixes (e.g. /P) must be correctly logged for the contest.

The preferred form of a log is a computer file sent by E-mail. This may be a file generated by contest logging software, such as EI5DI's SDV or MINOS, provided it contains all the information listed above.

The log spreadsheet introduced in 2009 will be available again this year. It has proved to be popular with many entrants over the last three years. It can be downloaded from the *PW* Contest web site at www.pwcontest.org.uk. Submitting logs using the spreadsheet or REG1TEST .edi or .log formats will assist the Adjudicator.

Files in any other suitable format (plain text is fine provided each of the items required is separated by a separating character such as a comma or tab) can also be accepted. Please don't mix separators within your entry!

All entrants should please note that:
The contest web site is at
www.pwcontest.org.uk
E-mailed entries should be sent to
contest@pwpublishing.ltd.uk
Postal entries should be sent to **Colin Redwood G6MXL, 53 Woodpecker Drive, Poole, Dorset BH17 7SB.**
No matter how you submit your entry, please note that it must be **received by Tuesday July 3rd 2012. Late entries will not be accepted.** If you are entering by post, you are recommended to use first class post.

Even if you are a regular participant, please take the time to read the rules thoroughly.

Entering From Abroad

If you are entering from abroad (outside the UK or The Republic of Ireland), please note that in order for your entry to be tabulated in the main adjudicated results table, **at least one of your contacts** must be with a station located in the United Kingdom (including the

Channel Islands, Isle of Man) or Eire.

Other overseas entries are welcome. A separate certificate will be provided to the overseas station with the highest score.

Let's hope for some good propagation on the day so that we can all have a really enjoyable time. Make a note in your diary now, the 29th Annual *Practical Wireless* 144MHz QRP contest takes place on **Sunday June 10th 2012**. Don't forget to charge your batteries a day or two before and also make a note to remind yourself to submit your entry on time!



Stormy skies over the Weavers.

Stuart MW0GCT operating and Barry MW1DOU logging. Note the extremely important kettle – on the boil for a brew!

The 29th Annual *Practical Wireless* 144MHz QRP Contest Rules

1. General: The contest is open to all licenced Radio Amateurs, fixed stations or portable, using s.s.b., c.w., a.m. or f.m. in the 144MHz (2m) band. Entries may be from individuals or from groups, clubs, etc. The duration will be from 0900 to 1600 UTC on Sunday June 10th 2012.

All stations must operate within the terms of their licence. Entrants must observe the band plan and must keep clear of normal calling frequencies (144.300MHz and 145.500MHz) even for "CQ" calls. Avoid frequencies used by GB2RS during the morning (144.250MHz and 145.525MHz) and any other frequency that is obviously in use for non-contest purposes. This year there's also an Amateur Television contest taking place

the same day – so please also avoid the ATV talk-back frequencies of 144.525 and 144.750MHz. **Contest stations must allow other users of the band to carry out their activities without hindrance.**

The station must use the same callsign throughout the contest and may not change its location. **Exceptionally in 2012, Special Event Station callsigns may be used including the special GQ and MQ series for the Queen's Diamond Jubilee.**

2. Contacts: Contacts will consist of the exchange of the following minimum information:

- (i) callsigns of both stations (**including any /P suffixes**)
- (ii) signal report, standard RS(T) system
- (iii) serial number: a 3-digit number

incremented by one for each contact starting at 001 for the first contact.

(iv) locator (i.e. full 6-character IARU Universal Locator for the location of the station.

Information must be sent to, and received from, each station individually, and contacts may not be established with more than one station at a time. Simultaneous operation on more than one frequency is not permitted.

If a non-competing station is worked and is unable to send their full Universal Locator, their location may be logged instead. However, for a square to count as a multiplier (see Rule 4), a full 6-character locator must have been received in at least one contact with a station in the square.

Contacts via repeaters or satellites or using digital modes

(including DSTAR and *Echolink*) are not permitted.

3. Power: The output power of the **transmitter or transverter** final stage shall not exceed 3W p.e.p. If the equipment in use is usually capable of a higher power, the power shall be reduced and measured by satisfactory means. The simplest way is often to apply a (variable) negative voltage to the transmitter ALC line reached via the accessory socket (See Fig. 1). Stations cannot rely on feeder loss to meet the 3W power limit.

With a number of modern transceivers such as the popular FT-817ND for example, power can be reduced by using a menu setting.

The output power can be accurately measured using the

simple circuit of Fig. 2. Connect this to the 50Ω output of the transmitter and adjust the power so that the voltmeter does not exceed 16.7V on a 'good whistle' into the microphone.

4. Scoring: Each contact will score one point. The total number of points gained in the seven-hour period will then be multiplied by the number of different locator squares in which contacts were made (a 'square' here is the area defined by the first four characters of the universal locator).

Example: 52 stations worked in IO81, IO90, IO91, IO92 and JO01 squares; final score = $52 \times 5 = 260$.

Only one contact with a given station will count as a scoring contact, even if it has changed its location, e.g. gone /M or /P. If a duplicate contact is

inadvertently made, it must still be recorded in the log, and clearly marked as a duplicate (not necessary in computer logs submitted by E-mail).

5. The Log: Logs may be submitted by E-mail or by post. In either case the log must contain the following information for each contact:

- (i) time (**UTC - NOT BST**)
- (ii) callsign of the station worked (**including any /P suffix**)
- (iii) report sent (e.g. 56)
- (iv) serial number sent
- (v) report received (e.g. 54)
- (vi) serial number received
- (vii) locator received (or location).

The preferred form of a log is a computer file sent by E-mail. This may be a file generated by contest logging software such as EI5DI's *SDV* or *MINOS*, provided it contains all the information listed above, or a file in any other suitable format (plain text is fine) provided each of the items above is separated by a separating character such as a comma or tab. Give the file a name including the station callsign (e.g. g6mxl-p.log), and send as a standard E-mail attachment to **contest@pwpublishing.ltd.uk**

Most formats of log are acceptable (the REG1TEST, .log and .edi formats or the spreadsheet available on the contest website www.pwcontest.org.uk are preferred). If there is any problem with your entry, you will be contacted by E-mail.

If a computer log file is not available, a

paper log may be sent by post. This must be clearly written on one side of A4 sized paper only, ruled into columns for each of the items listed above. Underline or highlight the first contact of the locator squares worked. At the top of each sheet, write:

callsign (**including /P suffix**) of your station used in the contest
your locator as sent during the contest
sheet number and total number of sheets (e.g. "Sheet no. 3 of 5")

Log sheets and covering information sheets which may be used for paper-based entries are available for downloading from the contest Web site www.pwcontest.org.uk

6. Entries: The covering information listed below must be provided with each entry. The preferred method of submitting this is by the use of the online facility on the web site www.pwcontest.org.uk. Alternatively, the information may be written in the E-mail message to which the log file is attached. For entries sent by post, it should be written on a separate sheet of A4-sized paper.

The information required for every entry is:

Name of the entrant (or of a club etc. in a group entry as it is to appear in the results table and on the certificate.
Callsign used during the contest **including any /P suffix** (e.g. G6MXL/P).
Name and address for correspondence.
Location of the station during the contest.
Full 6-character locator as sent during the contest.

Whether single or

multi-operator (a single-operator is an individual who received no assistance from any person in operating the station, which is either his/her permanent home station or a portable station established solely by him/her); if multi-operator, include a list of operators' names and callsigns.

Total number of contacts and locator squares worked (not required for a log sent as a computer file).
List of locator squares worked (not required for a log sent as a computer file).

A full description of the equipment used including transmitted p.e.p. output power
If the transmitting equipment (including any transverter employed) is capable of more than 3W p.e.p. output in the 144MHz band, a description of the methods used to (i) **reduce** and (ii) **measure** the 144MHz output power.

Antenna used and the approximate station height in metres above sea level (a.s.l.).
If you receive or send a report of poor quality signals (e.g. wide / splattering), full details of the complaint, including time, callsign, nature of complaint and actions taken **during** the contest to investigate and resolve
The following declaration must be included in the E-mail text or written and signed by the entrant: "I confirm that the station was operated within the rules and spirit of the event, and that the information provided is correct".

Failure to supply the required information may lead

to loss of points or disqualification.

Entries & Other Information

Entries by E-mail must be sent to contest@pwpublishing.ltd.uk

Paper entries should be sent to: *Practical Wireless* Contest, c/o Colin Redwood G6MXL, 53 Woodpecker Drive, Poole, BH17 7SB.

Entries must be received not later than Tuesday July 3rd 2012. Late entries will be disallowed.

Any other general comments about the station, the contest and conditions during it are welcome (written in a separate sheet of paper in the case of entries sent by post). Photographs of the station are also invited. Please note photographs cannot be returned and may be used for publication in *Practical Wireless* or on the www.pwcontest.org.uk website. Please send them by separate E-mail or post, **to arrive by Tuesday July 17th 2012.**

A summary of the results will be published later this year in *Practical Wireless*.

7. Miscellaneous:

When operating portable, obtain permission from the owner of the land before using the site. In particular observe any restrictions on access associated with Bird Flue, Blue Tongue, Foot & Mouth, etc. Always leave the site clean and tidy, removing all litter. Observe the Country Code.

Take reasonable precautions to avoid choosing a site which another group is also planning to use. It is wise to have

an alternative site available in case this problem does arise.

8. Poor Signals:

Make sure that your transmitter is properly adjusted and is not radiating a broad or poor quality signal, e.g. by over-driving or excessive speech compression. On the other hand, be aware that your receiver may experience problems due to the numerous strong signals it will have to handle, and that this may lead you to believe that another station is radiating a poor signal. Before reaching this conclusion, try heavy attenuation at the received input. The use of a high-gain r.f. pre-amplifier is likely to worsen strong-signal problems, so if you do use one, it is best to be able to switch it off when necessary.

If you receive or send a report of poor quality signals (e.g. wide / splattering), you must record on the cover sheet full details of the complaint including time, callsigns of stations involved, nature of complaint and actions taken **during** the contest to investigate and resolve.

9. Adjudication:

Points will be deducted for errors in the information sent or received as shown by the logs. Unmarked duplicate contacts in paper-based logs will carry a heavy points penalty. Failure to supply the complete information required in Rule 6 may also lead to deduction of points. A breach of these rules may lead to disqualification. In the case of any dispute, the decision of the Adjudicator will be final.

SPECTRUM COMMUNICATIONS

NEW and IMPROVED GAREX PRODUCTS

TARGET HF-3 COMMUNICATIONS RECEIVER.

30KHz to 30MHz, AM/LSB/USB, 10 memory channels. Fully synthesised in 1KHz, 10KHz, and 100KHz steps, plus +/- 1KHz clarifier. Large LCD frequency display and bar graph signal indicator. Fixed level output to drive a computer sound card. 500mW rms AF output. Supply requirement 12V DC at 300mA. Dimensions 18.5x6.5x19cm. Weight 1.3kg. **Price £215 inc delivery.** Optional **Low Noise Linear Power Supply** 12V 500mA continuous rated version **£14.00**, 500mA peak rated version **£11.00**. **P&P £3.50.**



NOMAD WIDEBAND PORTABLE SCANNER

AERIAL 25-1300MHz. For use as portable or permanent aerial where a conventional wire aerial cannot be used. The twin wire element is 1.2m (48") long and the matching unit is 18cm (7") long. It is fitted with 4m of 50 Ohm coax cable with a BNC male connector. **Price £18 plus P&P £3.50.**



RECEIVE VHF

PREAMPLIFIERS boxed built for connection between antenna and receiver. Black enamel painted steel box with BNC connectors, DC chassis plug and on/off switch. Supplied with BNC to BNC patch lead. Supply requirements 6-15V DC at up to 10mA. Box can accommodate a PP3 battery. Various frequency type available, AP-3 118-137MHz 15dB gain for Airband, WP-3 137-138MHz 25dB gain for Weather Satellite, MP-3 156-162MHz 15dB gain for Marine Band, MP-3/AIS 162-163MHz 25dB gain for AIS. Also GP 2m, GP 4m, & GP 6m for amateur bands. **PCB built £11.50 inc P&P, Boxed built with patch lead £36.50 inc P&P.**



4001 FM 4m TRANSCEIVER.

70.2500 to 70.4875MHz in 20 channels in 12.5kHz steps. Really easy to use, not menu driven. Now upgraded to give excellent audio quality on receive and transmit. RF output 5W or 25W switchable. Sensitivity better than 0.25uV for 20dB SINAD. Audio output 500mW rms. Supply requirement 13.5V DC 4A on high TX, 1.5A on low TX, 130mA on RX. **Type 4001S £185.00 plus £10 UK carriage, £18 EU carriage. Type 4001SN with a really effective noise squelch £205.00 plus £10 UK carriage, £18 EU carriage.** Upgrade kit 4001/4001S with circuit **£10.00**. Noise squelch upgrade NS1000F **£20.00**.



SLIM G 144-146MHz TRANSMIT & RECEIVE AERIAL.

Previously called the GAREX JIMP and is a portable version of the Slim Jim. Gain is 1.8dB over a vertical dipole. The main element is 300 Ohm twin feeder with a matching section in a plastic housing 18cm long. Overall length is 1.55m (61") and there is 4m of coax cable which can be supplied with either a BNC or PL259 connector. **Price £20.00 plus £3.50 P&P.**



GAREX FLEXIWHIP AERIALS.

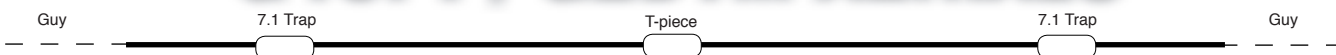
Replacements for short rubber ducks with a choice of connector. Loaded whips up to 50cm long made for a specific frequency in the range 68-145MHz. **Price £25 inc P&P.** Quarterwave unloaded Flexiwhips made for a specific frequency in the range 144-440MHz. **Price £15 inc P&P.**



2m/70cm DUAL BAND MOBILE WHIP. 510mm long gives 0dB on 2m and 3dBd on 70cm. Choice of hinge adapter or 3/8" UNF stud or PL259. **Price £23 inc P&P.**



G4CFY / G2DYM AERIALS



TRAP DIPOLE for 80/40/20/15/10m. 106 feet long. Supplied with 70 feet of low impedance twin feeder. 600W rated. Low TVI and low noise. 2 S-points quieter than a G5RV with same feeder length. PVC covered wires with lugs. Regular duty £164.50, strong £182.50, inc. carriage.



1:1 BALUN 160-10m, 1kW rated. Loss under 1dB from 1.8 to 40MHz. Ideal for use with the G4CFY trapped dipole, or any other aerial fed with low impedance twin feeder. £43.00 inc P&P. Version with Marconi-T switching. £53.00 including P&P.



TWIN FEEDER 100 Ohm, 2kW rated, 24/0.2 in individual polyethylene sheaths with an outer cover of polyethylene. Solid construction to avoid water ingress. Good flexibility to overcome work hardening and fracture. Typically 0.5dB/m quieter than wide spaced 300 and 450 Ohm feeder and coax. Loss 0.04dB/m at 10MHz. £1/metre plus £3 P&P. 100m drum. £90 inc carriage.



TRAPPED INVERTED L AERIAL 80/40/20/15 & 10m, for a small garden. Coax driven from far end of garden and tuned against ground. A good all round aerial with 6dB more gain than a 24 foot trapped HF vertical. That's 4 times power on TX and one S point extra on RX. Regular duty £84.00, strong £99.00, inc. carriage.

**12 WEATHERBURY WAY, DORCHESTER,
DORSET DT1 2EF. Tel & Fax: 01305 262250**

E-mail: tony@spectrumcomms.co.uk

Prices inclusive of postage unless stated. Payment by credit/debit card or by cheque or Postal Order payable to Spectrum Communications.

Web site: www.spectrumcomms.co.uk

Web site: www.garex.co.uk



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.**

TRANSVERTERS for ICOM rigs, supplied with cables. Automatic with no cable switching. IC756Pro & II & III, 775, 781, 7600, 7700, & 7800 use type **TRC4-10L/IC1**. IC735, 761, & 765 use type **TRC4-10L/IC3**. **Built to order £280.00.**



STATION PREAMPS for 2 or 4 or 6metres. RF & DC switched. Adjustable 0-20dB gain. 100W power handling. **RP2S, RP4S, RP6S, PCB & Hardware kit £35.00, Ready Built £57.00.**

MASTHEAD PREAMPS, for 2 or 4 or 6metres. 20dB gain 1dB NF. 100W through handling. RF switched & DC fed via the coax. Heavy duty waterproof masthead box, and a DC to RF station box with SO239 connectors. **RP2SM, RP4SM, RP6SM, PCB & hardware kit £41.00, Ready Built £65.00. Masthead fitting kit £6.00.**

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.**

TRANSMIT LINEAR AMPLIFIERS

with receive preamps, on 6m 5W in 50W out, on 4m 7.5W in 50W out. Receive gain 10-20dB panel adjustable. 13.5V DC operation at up to 8A. Diecast box with SO239 connectors. **TARP4SB or TARP6SB**. Built £126.00.



OFF-AIR FREQUENCY

STANDARD, crystal calibrator unit phase locked to Radio 4 using a two-loop system. Includes a monitor receiver to ensure Radio 4 is being heard loud and clear. Fixed outputs 10MHz at 2V p-p, and 1KHz at 1V p-p as oscilloscope CAL signal. Switched outputs 1MHz,



100KHz, 10KHz, and 1KHz at 6V p-p, into 500 Ohms. Single board design as featured in July & Sept 2008 PW. Background heterodyne whistle at 2KHz confirms lock condition. 12/13.5V DC operation at 65mA. **PCB kit with ferrite rod £50.00, PCB kit + drilled box and hardware complete £86.00. Ready built £131.50.**

NEW PRODUCT



RX AERIAL TUNING UNIT

For use with random wire aerials. Gives improved signal strength and lower receiver noise from 200kHz to at least 21MHz depending on wire length.

Diecast box size 114x64x55 mm.

Supplied with terminals for aerial and earth inputs and phono or BNC or SO239 coax output. Includes a switch for tuner or bypass. **Boxed kit £32.00, Ready Built £42.00.**



WIDE RANGE POWER METER 1.8 to 52MHz, four ranges 1, 10, 100, and 200W with an accuracy of +/-5%. Thruline concept with toroidal current transformer sampling element. Kit includes assembled sampling element, drilled and trepanned box and scaled meter. **Boxed kit £53.50. Ready built £72.00.**

Prices inclusive of P&P.

COMPONENTS

See our web-site or send A5 SAE for list.

TOROIDS & BINOCULAR CORES, dust iron types T37-2 25p, T50-2 50p, T68-2 60p, T37-6 30p, T50-6 50p. Ferrite types FT37-43 55p, FT50A-43 80p, FT37-61 55p, FT50-61 85p. BN0302-43 75p, BN1502-61 75p, BN0102-61 £1.00, BN3312-43 £4.00. P&P £1.00. T200-2 £4.00 + £1.50 P&P

MOSFETS BF964S £1.50, 3SK45 £2.00, 3N201 £2.25, 40673 £2.50.

SPECTRUM 10mm COILS. Pin compatible with TOKO types. Coil values 0.6, 1.2, 2.6, 5.3 11, 22, 45, & 90uH. Low or medium Z secondary options. Full details of turns ratio etc on web-site. 1-24qty 80p each plus £1 P&P. 25-99 60p each plus £2.50 P&P.

G6LBQ FILTER 27 Coil kit or **G4CFY/G6LBQ Improved** 27 Coil kit with table of new values, £18.70. G4CFY/G6LBQ Filter 27 coil and 45 capacitor kit with table of new values £23.20.

CTCSS TONE ENCODER as described in PW July 2011. Nine Tones link or switch selectable. PCB size 67x55x12mm. PCB Kit excluding switch £21.00. PCB built excluding switch £30.00 9-way switch £2.00.

PSK31 INTERFACE KIT. Module as described in PW Feb 2009. Suitable for a variety of digital modes. PCB and components **£21.00**. Box kit complete with cables but excluding microphone plug **£35.50**.



PORTLAND VFO. A rock stable FET VFO.

Meets the requirement for the Intermediate Licence VFO project. Modified to allow alignment to top and bottom of required band. Several versions available: 5.0 - 5.5MHz for 20 & 80 metres; 7.0-7.2MHz for a direct conversion for the extended 40metre band; or 7.900 - 8.400MHz for use as part of a mixer-

oscillator system as local oscillator for 4m RX or TX. Supplied with Buffer 2A to deliver 1.6V p-p into 50Ω with 2nd harmonic 40dB down. **PCB and component kit with potentiometer £18.00. Drilled Box and PCB kit with potentiometer and feedthroughs £27.00. Ready built £50.00.** State required frequency when ordering.



All On-board!

In *Technical for the Terrified* this time, Tony Nailer G4CFY deals with creating printed circuit board layouts for analogue circuits

In late March I received an E-mail from Howard James G3UPZ requesting that I produce an article about printed circuit board (p.c.b.) design. Howard has made many amplifier p.c.b.s and the majority of them oscillate. Due to this problem he raises the questions of track widths for signal or power, when to use double-sided and when you can get away with single-sided board and any other relevant issues.

Current Capacity

Years ago I was asked to lay out a p.c.b. for a d.c. motor controller where the peak motor current was of the order of 6A. I dutifully looked up in several data books on the current carrying capacity of different tracks. As a consequence I used tracks about 3mm wide to feed the various motors and ended up being very pushed for board space. Much later I learned that a track only 0.3mm wide blows at between 5 and 10A.

The consideration is not so much the current carrying capacity, but the d.c. resistance and hence voltage drop. High power transistor amplifiers, even at low frequency when running on supplies of just 13.5V are very sensitive to supply reductions of even just 0.5V during signal peaks. So the rule here is to keep the high current tracks wide and as short as possible.

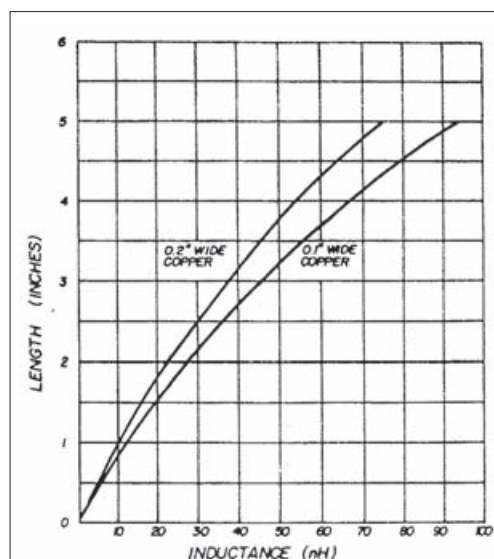


Fig. 1: A graph reproduced from the April 1973 issue of the American magazine *Ham Radio* and shows the inductance of tracks with widths of 2.5mm (0.1in) and 5mm (0.2in).

fig. 7. Inductance of 0.1- and 0.2-inch copper strips versus length. This graph may be used to determine the length of etched inductors on printed-circuit board (1-ounce copper).

Self Inductance

As most readers are aware, any length of wire or conductor has the property of self inductance. The reason for this is that when current flows in a conductor, a magnetic field is produced. When the current increases or decreases the magnetic field also expands or reduces. In so doing it causes a reverse current to be induced in the same wire opposing the change of the original current. If the wire is coiled up the magnetic fields are compounded and a coil or solenoid is produced.

Inductors – when put in series or in parallel – add or reduce in the same way as resistors. Two in series simply add the individual values. Two equal value inductors in parallel have a total value of half of either.

For unequal values the total inductance $L_t = (L_1 * L_2) / (L_1 + L_2)$. This tells us that two equal length and width tracks joined together side by side will have half the inductance of one on its own. Likewise a track of a given width will double its inductance if you double its length.

In a nutshell then, a very thin track has a very high inductance, just like a very long track. Conversely, a very short track or a very wide track has very low inductance. Two tracks side-by-side, but not joined, will couple magnetic fields with each other and act like a weak transformer. This is referred to as mutual inductance, and is the same property, which compounds the magnetic field when wire is coiled up with adjacent turns.

Using The Inductance

The inductance of tracks is quite handy at very high frequency (v.h.f) in radio frequency (r.f) power amplifier stages. Input and output impedances of the active devices are under 2Ω for stages over 25W and matching networks often only require 5-50nH of inductance to effect match.

In Fig. 1 I've shown a graph reproduced from the April 1973 issue of the American magazine *Ham Radio* and shows the inductance of tracks with widths of 2.5mm (0.1") and 5mm (0.2").

Characteristic Impedance of Microstrip

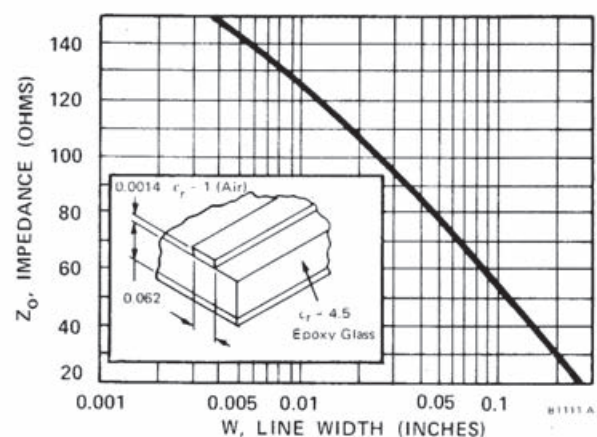


Fig. 2: Derived from a Motorola data sheet for their old emitter coupled logic devices, this shows the characteristic impedance of a section of strip-line on p.c.b. material.

Effects Of Frequency

At very low frequency an inductor has low reactance ' X_L ' according to the formula

$X_L = 2\pi F \cdot L$. So, as an example consider a length of track say 100mm long and very thin, as you might find in a computer. It might have an inductance of 0.3 μ H.

If the track is carrying a signal at 100kHz rate, either sinusoidal or square wave it would present a reactance of :- $X = 2\pi \cdot 10^5 \cdot 0.3 \cdot 10^{-6}$.

Taking the powers of 10 first, they come to $10^{(5-6)} = 10^{-1} = 0.1$.

$X = 2\pi \cdot 0.3 \cdot 0.1 = 0.19\Omega$. Clearly not a problem.

At 1MHz though, it will look like 1.9 Ω and at 10MHz 19 Ω .

Furthermore, if the track is used to couple into a low impedance input via a 1000pF capacitor the track and the capacitor form an L-network with a resonant frequency of just 2.9MHz. This is now clearly a problem.

All of the above, tells us that all the thin tracks, side-by-side on a computer motherboard cannot be carrying signals at any frequency above a few hundred kHz. Signals entering a computer from the Internet are at speeds under 20MHz and in most of our homes it's probably between 2 and 4MHz, regardless of the advertising claims.

The signals must be routed by the shortest tracks into random access memories to be accessed as instructed by the central processor (c.p.u.). Claims of computers running at several GHz refer only to what is going on within the processor across tiny pieces of silicon. The interface between the processor and the peripheral electronics is 100 to 1000 times slower.

Ground Connection

On a single sided p.c.b. there will be a number of components, which require a connection to a ground line, and usually has to connect off the board to other electronics components or boards or panel hardware. A track that becomes narrow and then widens again adds inductance to that line. For these reasons the earth track should use much thicker tracks than other interconnections and as often as possible should complete a loop around individual stages of the circuit.

High power stages obviously carry high currents and it is important that tracks are wide and that the ground track should be both generous and returned to the supply by the shortest route. Sensitive inputs with either very high impedance or with very low level signals are liable to pick up noise and signals from adjacent tracks. It's usual to surround such areas with grounded tracks to preserve stability and maintain the signal-to-noise ratio.

Double-Sided Board

A circuit can be laid out with a bare minimum of tracks on the solder side and with a continuous ground-plane on the

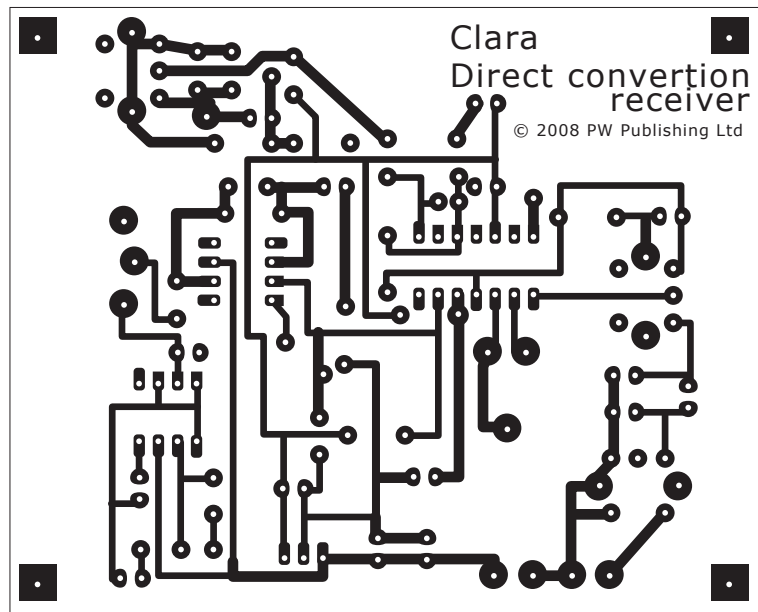


Fig. 3: The original p.c.b. layout for the Clara receiver used a larger than necessary double-sided board.

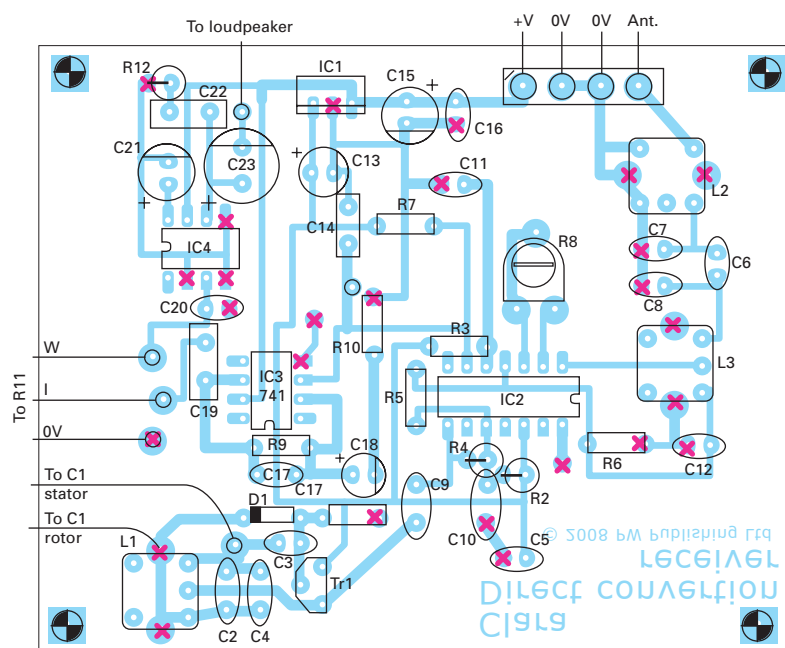


Fig. 4: The overlay of the p.c.b. of Fig. 3. The ground-plane isn't shown, but all components have clearance holes except where shown marked with a cross.

component side. Individual connections to the ground can then be made by not leaving clearance holes where the component wires go through and by soldering both sides of the board.

With the growth of digital circuits requiring large numbers of interconnects between integrated circuits, double-sided boards are the only solution to having multiple links. Indeed, the industry quickly developed through-hole plating so the board does the required linking between tracks on both sides. Nowadays even multi-layer boards are relatively common as they allow a huge number of interconnections in a relatively small p.c.b. area.

Tracks As Microstrips

Returning to the ground-plane board, which is popular for r.f. work. A length of track separated from a ground-plane by an insulator, then becomes a form of transmission line. It's considered as a line above an infinite ground-plane with a dielectric between. As such, the track has a characteristic impedance related to the width of the track, the distance from the ground-plane and the dielectric constant of the insulation used for the board.

Provided the track is closer to the ground-plane than to other tracks, it is referred to as a Microstrip. The relationship

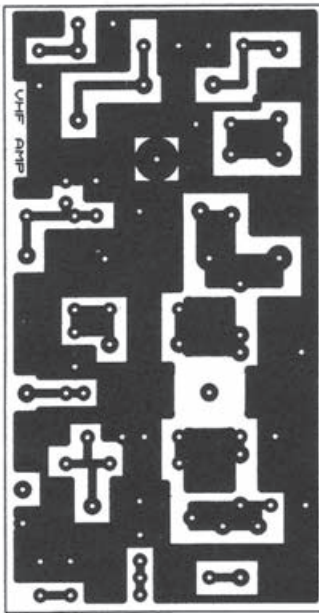


Fig. 7.

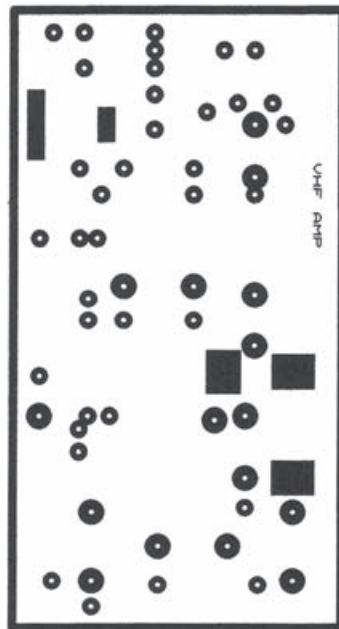


Fig. 8.

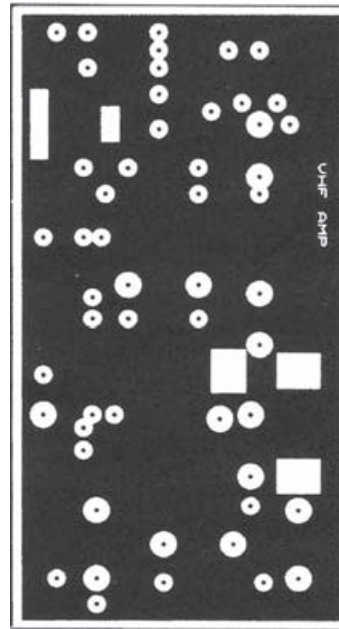


Fig. 9.

Fig. 7: the track pattern of a 10W v.h.f. r.f. amplifier.

Fig. 8: The ground-plane side of the r.f. amplifier, this time the pattern represents the areas to be etched out (see Fig. 9).

Fig. 9: Making a negative of Fig. 8, creates the pattern of the ground-plane side.

in the July 2010 issue of *PW* – is reproduced here in **Fig. 10** and uses quite a lot of diagonals. The ground-plane in amongst the tracks and dots was created by the power plane generator of the p.c.b. lay-out package. Ken also uses the *Proteus ISIS* and *ARES* p.c.b. package.

A slight variation of the same circuit with an additional component – but not using any diagonals – was published in the July 2011 issue of *PW* and is shown in **Fig. 11**. Many of the pads are larger in this version, also the tracks are thicker but shorter runs and the board is smaller overall. The grounding was built up using the same track widths and done manually.

The component placement reveals also the improved component density. Greater spacing between pads and

adjacent tracks makes the board much easier to solder with less liability to create solder bridges. The previous amount of ground track was quite unnecessary for a board working at low audio frequency.

Humans Are Better!

Humans are better at laying out analogue and r.f. circuits than computer auto-routers! The default setting for most computer packages is double-sided with through-hole plating. That then simplifies the direct paths between any two points by using many through links and alternate tracks top and bottom.

In situations where a link can't be avoided – I now specify a 'zero Ohm' resistor because it's quicker than making the right size link and fitting it. I always try to shuffle the components around and run tracks between the pads of both resistors and capacitors to avoid the use of any links. I think that a board without links is always an achievement!

Please Note

The p.c.b. diagrams in this article are for illustrative purposes and are not the same size as the those published in the original articles.

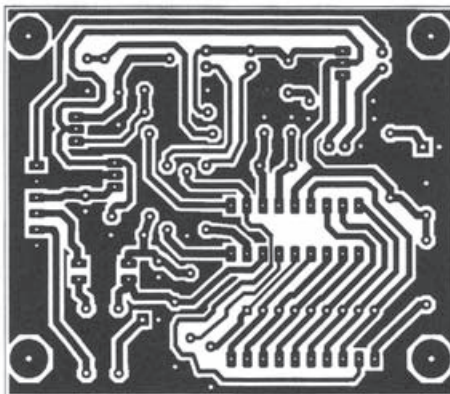


Fig. 10: Ken Ginn G8NDL's CTCSS board, as originally published in *PW*.

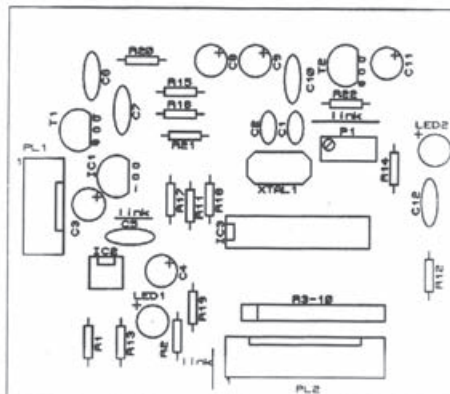


Fig. 11: after some reworking of both the circuit and the p.c.b. – this is the result.

Errata

In the previous *Technical for the Terrified* (T4T) was an error in drawings Fig. 2 and Fig. 3. The bottom diode of each diode mixer should have been the other way round. If my memory serves me right – the same thing happened when I previously did the twin diode mixer in July 2005 *Doing it by Design* and in April 2009 *T4T*. On those occasions I spotted the error before the article went to print, but in this occasion I missed it. Apologies from myself and the Editor for that!

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Buying Second-hand

VHF/UHF Rigs – A Low-cost Option!

Chris Lorek G4HCL gives some useful hints on getting a low cost ex-PMR rig for the Amateur v.h.f. and u.h.f. bands

Do you fancy a basic but high performance 70, 144 or 430MHz (4m, 2m or 70cm) narrow-band frequency modulated (n.b.f.m. but usually referred to as 'f.m.') transceiver for your car or home for just a few pounds? If so you shouldn't overlook the possibility of using a converted professional two-way radio!

The summer radio rally season is now with us, and one popular 'buy' at such events is an ex-Private Mobile Radio (PMR) rig for use on the Amateur bands. Fortunately for us PMR equipment invariably has a certain lifetime and right now many professional two-way radio users are migrating to digital two-way radio modes. These include DMR (Digital Mobile Radio, often called 'Mototrbo') and dPMR-based modes such as IDACs and Nexedge.

So, what happens to their old radios?

Well it actually costs businesses hard cash to dispose of their old radios – they're not allowed to just take them down to the local dump. Enterprising people then step in to offer to 'recycle' these radio transceivers and many are invariably available on the second-hand market. I've often seen radio rally traders with a trestle-table or three literally loaded down with ex-PMR equipment at extremely low – and very tempting – prices.

Two Books Published

In the past I've had two books published on converting ex-PMR equipment onto the Amateur bands, the first – *Surplus 2-Way Radio Conversion Handbook* – was based on using Pye/Philips equipment and the second –

PMR Conversion Handbook – was based on equipment from a variety of manufacturers. Both were 'sell-outs' and are now out of print. But this shows the popularity of the subject!

But, this article isn't a 'plug' for the books! You can't buy them new any more but like second-hand radio equipment the books are also available on the second-hand market. But there's also now plenty of information available on-line, as well as over 200Mb of information for just the cost of a CD and postage (see later!).

Many Radio Amateurs, myself included, understandably don't wish to leave an expensive and fancy-looking

radio transceiver visible inside their car when it's left unattended. But what about an inconspicuous (and to be honest rather boring-looking, 'taxi type' two-way radio under the dashboard instead?

With such a boring-looking rig, you won't get a digital frequency readout, instead there will be a channel knob or a channel display, with each channel storing a transmit frequency, receive frequency (either

the same as the transmit frequency, or a different one in the case of a repeater channel), and usually a selectable continuous tone coded squelch system (CTCSS).

This type of rig is ideal for your local daily commute to and from work as you'll probably only need a few channels at the most, and the radio will be extremely

easy to operate on the move. You'll invariably find you won't need to look down at it (highly dangerous anyway on the move!), to change frequency, repeater shift, etc., as you'll have only your most-used channels programmed into the rig.

The disadvantage would show up if you were to use the rig across the UK in varying areas with their differing CTCSS tones for repeater access. (But see later for details on how to build a very simple CTCSS encoder). In fact I used to have ex-PMR transceivers on 4m, 2m and 70cm in my car rather than purpose-made Amateur transceivers as they offered me a low cost solution for chatting both locally and on my travels around the UK.

What To Look For

You're probably now wondering what you should look out for! To begin the answer, I suggest you basically have two choices here. You can either buy a ready-converted ex-PMR transceiver that's already operational on the Amateur bands with plenty of selectable channels, or you can buy a 'raw' ex-PMR transceiver that has come straight out of two-way radio service and getting this onto a v.h.f. or u.h.f. Amateur band.

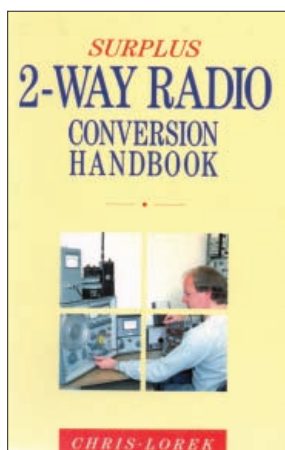
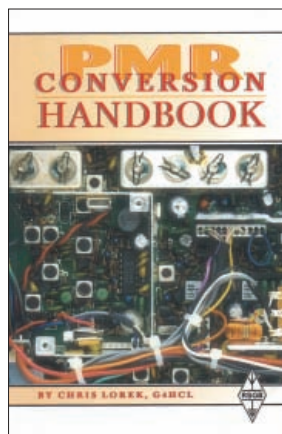
I'll treat these two options separately. There's a vast range of ex-PMR equipment available – so I naturally can't detail every single type here.

Ready Converted

The ready converted rig is, of course is the simplest option! You just buy a radio that's ready to go on 50MHz (6m), 70MHz (4m), 145MHz (2m) or 433MHz (70cm). It'll invariably operate on f.m., and will be programmed, or crystallised in the case of much older radios, on one or more simplex and/or repeater channels.

If you're buying from a private seller, either from a second-hand magazine advert, an on-line auction site such as eBay, or a local club 'junk sale', you'll just need to make sure it's programmed or otherwise fitted with the channels you'd like to operate on. This could, of course just be your local club's weekly 'natter net' f.m. channel.

I once had a Pye MF25FM Europa transceiver on 70MHz f.m. on a single channel for local nattering – it was permanently on and monitoring whenever I was in my shack. I would listening out for other local club members



who wanted a quick friendly chat rather than them calling “CQ” on 2m S20, 70cm SU20, or one of the local repeaters.

Another variation to this option is where a second-hand two-way radio dealer has bought a quantity of ex-PMR transceivers and is offering them for sale and is willing to supply them programmed to your own choice of channels and accompanying CTCSS tones for each channel. I've seen several such dealers advertising their wares in this manner – they will usually already have the required programming software and transceiver programming interfaces, as well as radio communication test equipment to check that its functioning perfectly after programming to get your radio operating on your desired channels.

The dealer will have often have recovered the PMR units from a fleet user whose switched to a digital radio system and have been ‘stuck’ with them! Of course, you'll typically expect to pay some extra cash for this programming service but it can often a lot cheaper than trying to do it yourself from scratch!

Buying To Convert

Personally, I think that buying a PMR rig to convert is usually by far the lowest cost option. You'll (typically) be able to pick up a transceiver for no more than a few pounds. I've seen 430MHz hand-helds go for £2 each and 145MHz and 430MHz mobiles for less than £5 each. You'll often come across a veritable pile of such ex-PMR transceivers stacked up on a rally or radio boot sale stand, on a ‘pile ‘em high and sell ‘em cheap’ basis.

You'll also sometimes see a sign saying “convertible to 2m” or whatever. But please be on you guard! I say this because I once saw a small pile of 24V to 12V d.c. converters with a sign “convertible to 2m”, because the units physically looked like A200 in-line v.h.f. linear r.f. power amplifiers. But the trader probably (giving him the ‘benefit of the doubt’!) didn't have a clue what he was selling!

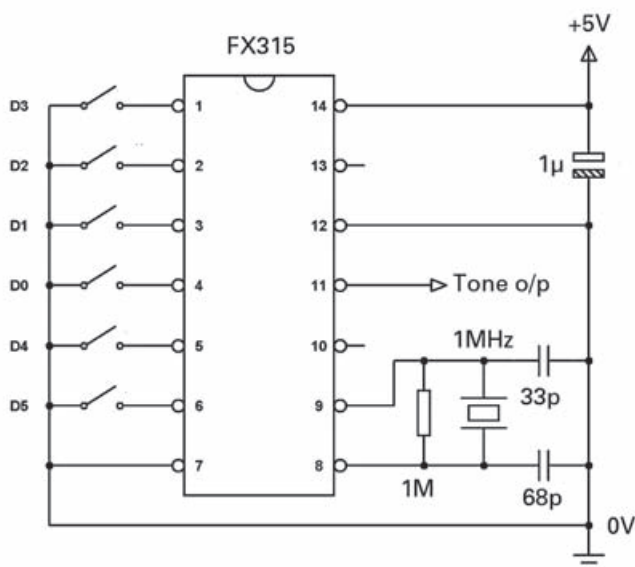
When you're buying second-hand PMR equipment – you should go prepared. My strongest advice is to already have in your possession the information and capabilities to convert the radio to the Amateur band you're interested in. You should also ask the prospective seller for the conversion details in printed or software form to give to you there and then – **before** you part with any money for the radio.

In my younger days – at a national Amateur Radio Rally – as a naive teenager having just become a licensed G8 Radio Amateur, I mistakenly bought a



A selection of the typical ‘bargain buy’ ex PMR equipment that Chris G4HCL says are waiting for keen buyers!

The simple CTCSS encoder circuit recommended by Chris G4HCL.



Pye Vanguard AM25B remote-mounted transceiver. Unfortunately it didn't have its control box and lead, that was claimed to be “convertible to 2m”. It probably was – with a lot of work! Additionally and unfortunately it was an ‘E’ band version which operated on 66-88MHz.

Fortunately, after I'd brought it home with the immense help of my great friend and mentor at the time, **Greg Wimlett G8GLS**, he managed to get it operating on 144MHz for me after a lot of work. I had plenty of contacts with it, and it enhanced my fascination with PMR equipment which eventually lead to my life-long career in two-way radio. Thank you Greg! From this you'll see that I had learned the hard way, and I hope my comments here will save readers a lot of time.

Will It Work As Required?

Firstly, you should ensure that the radio you're buying will be eventually capable of operating on the frequency band you require. A 68-88MHz transceiver will naturally operate on 70MHz, likewise a 136-174MHz equipment will operate on 145MHz) and a 405-470MHz transceiver on the 430MHz band.

However, some radios are designed to operate on, let's say, 148-174MHz. And some radios – notably Motorola equipment from my experience – will simply not allow you to program a 2m frequency on 145MHz into it – even though it's just a few MHz away. This is usually only the case with earlier equipment, typically around 15-20 years old, where the equipment operated in narrower bands of typically 136-160MHz

and 148-174MHz, and 405-450MHz and 440MHz-470MHz.

In each of these cases mentioned, the former band variant will operate fine on 2m/70m, but the latter band variant will either offer poorer performance or will need 'converting' for optimal operation. At worst it will not operate at all if the programming software is 'intelligent' enough to interrogate the radio band and subsequently refuse to allow you to program out-of-band frequencies into the rig.

Yes, I know there are lots of programming 'tricks'! However, I'm afraid these are beyond the scope of this short article. Just ensure you have this specific information from the seller for the transceiver you're interested in before you buy the radio!

Simple CTCSS Encoder

Some ex-PMR radios will already have CTCSS encoding faculties built-in but many others don't. This is because often the facility is provided by an 'add-on' plug-in unit, invariably connecting to an integral 'facility socket'. These are for such as CTCSS, or in-band sequential signalling or voice scrambling.

I've been using this simple circuit, **Fig. 1**, now for many years. It's a CTCSS (sub-tone) encoder using just one integrated circuit (i.c.), three capacitors, one resistor and a 1MHz crystal or ceramic resonator. The tone frequency is set from a table of standard CTCSS tones, by grounding one or more of six pins of the i.c., or you can use switches if you want to vary the frequency.

The circuit – I hope – is self explanatory you shouldn't even need a printed circuit board (p.c.b.) or matrix board if you solder the few components directly to the IC pins. This way it should also fit into even the smallest of spaces, including inside hand-helds.

You may need to add some form of level control, a pre-set potentiometer and a d.c. blocking capacitor. This is because the tone output has a d.c. level of 2.5V – in line with the output, to suit whatever your radio requires unless it already has suitable circuitry for CTCSS deviation setting and d.c. blocking (which many facility socket equipped radios have).

You'll (typically) need the CTCSS deviation level to be set between 250-500Hz deviation on 12.5kHz channel spacing, and 500Hz-1kHz deviation on 25kHz channel spacing. The FX315 is available in one-off quantities (they currently have several hundred available) from **Solid State Supplies Ltd, Eastlands Lane, Paddock Wood, Kent TN12 6BU, Tel: (01892) 836836**, at a price of £12.26 plus VAT and p&p.

Table 1: CTCSS Encoder Tone Settings
Programmable Inputs

Tone (Hz)	D0	D1	D2	D3	D4	D5
67.0	O/C	O/C	O/C	O/C	O/C	O/C
69.3	O/C	GND	GND	O/C	O/C	O/C
71.9	O/C	O/C	O/C	O/C	O/C	GND
74.4	GND	O/C	O/C	O/C	O/C	O/C
77.0	O/C	O/C	O/C	O/C	GND	GND
79.7	O/C	GND	O/C	O/C	O/C	O/C
82.5	GND	O/C	O/C	O/C	O/C	GND
85.4	GND	GND	O/C	O/C	O/C	O/C
88.5	GND	O/C	O/C	O/C	GND	GND
91.5	O/C	O/C	GND	O/C	O/C	O/C
94.8Hz	O/C	GND	O/C	O/C	O/C	GND
97.4Hz	GND	O/C	GND	O/C	O/C	O/C
100.0Hz	O/C	GND	O/C	O/C	GND	GND
103.5Hz	GND	GND	O/C	O/C	O/C	GND
107.2Hz	GND	GND	O/C	O/C	GND	GND
110.9Hz	O/C	O/C	GND	O/C	O/C	GND
114.8Hz	O/C	O/C	GND	O/C	GND	GND
118.8Hz	GND	O/C	GND	O/C	O/C	GND
123.0Hz	GND	O/C	GND	O/C	GND	GND
127.3Hz	O/C	GND	GND	O/C	O/C	GND
131.8Hz	O/C	GND	GND	O/C	GND	GND
136.5Hz	GND	GND	GND	O/C	O/C	GND
141.3Hz	GND	GND	GND	O/C	GND	GND
146.2Hz	O/C	O/C	O/C	GND	O/C	GND
151.4Hz	O/C	O/C	O/C	GND	GND	GND
156.7Hz	GND	O/C	O/C	GND	O/C	GND
159.8Hz	O/C	GND	GND	GND	O/C	O/C
162.2Hz	GND	O/C	O/C	GND	GND	GND
167.9Hz	O/C	GND	O/C	GND	O/C	GND
173.8Hz	O/C	GND	O/C	GND	GND	GND
179.9Hz	GND	GND	O/C	GND	O/C	GND
183.5Hz	GND	O/C	GND	GND	O/C	O/C
186.2Hz	GND	GND	O/C	GND	GND	GND
189.9Hz	O/C	O/C	GND	GND	O/C	O/C
192.Hz	O/C	O/C	GND	GND	O/C	GND
1966Hz	GND	GND	O/C	GND	O/C	O/C
19.5Hz	O/C	GND	O/C	GND	O/C	O/C
23.5Hz	O/C	O/C	GND	GND	GND	GND
06.5Hz	GND	O/C	O/C	GND	O/C	O/C
210.7Hz	GND	O/C	GND	GND	O/C	GND
218.1Hz	GND	O/C	GND	GND	GND	GND
225.7Hz	O/C	GND	GND	GND	O/C	GND
229.1Hz	O/C	O/C	O/C	GND	O/C	O/C
233.Hz	O/C	GND	GND	GND	GND	GND
2418Hz	GND	GND	GND	GND	O/C	GND
250.3Hz	GND	GND	GND	GND	GND	GND

O/C = Open circuit, GND = Ground connection

More Information

More information is available and in the March 2012 cover dated issue, *PW's* sister magazine, *Radio User*, offered readers a two DVD set with over 9Gb of 'Mods and Manuals' for hobby radio equipment for £5 including worldwide p&p. Back issues are available from the PW Book Service department.

As well as giving a huge amount of information on Amateur transceivers, receivers, scanners and accessories

the DVDs also included manuals, programming software and details of programming interfaces for a number of ex-PMR transceivers from various manufacturers.

If however readers of this feature would like just the ex PMR information from this, with over 200Mb of PC programming information and files for both hobby and ex-PMR (Private Mobile Radio) equipment plus several conversions to the Amateur bands of

ex-PMR equipment on a recordable data CD or DVD, I'll be pleased to provide this on receipt of a recordable CD/DVD, with CD/DVD sleeve and a return protective CD/DVD mailer with sufficient postage (e.g. 'large letter' stamps, currently 75p for 1st class* on both the sent envelope and return envelope if necessary).

Alternatively you can instead send me a cheque/PO for £2.00 payable to myself (or a £2 coin) and I'll be pleased to provide the recorded CD, CD sleeve, CD mailer and return 1st class postage to you. My postal address is **Chris Lorek G4HCL, PO Box 400, Eastleigh SO53 4ZF.**

Editorial note: As there's a very large increase due on 1st class postage rates in the UK, readers are advised to check current prices at their your local post office before sending the envelopes off to Chris.

Popular Second-hand Receivers!

My recent coverage of a selection of h.f. receivers that are commonly available on the second-hand market has – from the many letters and E-mails I've received, proved extremely popular! I'm planning to add other receivers to future columns in this bi-monthly feature, as well as some 'bargain' h.f./v.h.f. transceivers to



Chris G4HCL prefers to use ex PMR equipment in his car because they don't appeal to potential thieves!

hopefully help get you on the bands at low cost.

I'm always very pleased to hear from readers, especially for suggestions for future equipment with either specific

models or a range or type to feature in *Buying Second-Hand*, so please do get in touch. My E-mail address is g4hcl@rsgb.org.uk or postal address as above.

THE PW PUBLISHING RADIO BOOK STORE

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AIRWAVES 2012

Airwaves 2012 – The Complete HF/VHF/UHF Aviation Frequency Directory, which is published by Photavia Press, has undergone considerable revision during the past year, not least due to the many changes to the UK Air Arms resulting from the Strategic Defence and Security Review published in October 2010. Airfields have closed or changed status, Squadrons have been disbanded or moved and others have re-formed at different airfields. Some frequencies have changed or been withdrawn, while others have been reinstated. In addition, there has been the expected number of air traffic frequency changes and new frequencies. The top of the Military airband, from 380 to 400MHz, is being handed over to the UK emergency services for use during the London 2012 Olympic and Paralympic Games. Therefore, many of the current users of this portion of the spectrum have been allocated new frequencies and, at the time of writing, some are still waiting to move. There have also been quite a number of additions and changes to the list of Military Discrete frequencies, especially to those for Forward Air Control, AWACS and so on. Many of these new frequencies allocated to the 500 Series TADS have been re-confirmed and a couple of new ones added. There have also been further changes in the HF frequency and other listings.



CALLSIGN 2012

Callsign 2012 – The Civil and Military Aviation Callsign Directory, which is published by Photavia Press, has undergone significant revision during the past twelve months. Despite the changes and deletions resulting from the Strategic Defence and Security Review published in October 2010, nearly 250 new entries have been added to the Military Callsign database during the past year, making the total almost 2200. Thanks to a new source of information, the Civil Callsign database has been completely overhauled and a number of new operators added. During the past year, some airlines went bankrupt or suspended their operations and quite a number of new ones started up, with other new start-ups planned for 2012. The civil database now contains the details of almost 1600 airlines and other operators.



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See page 75 for ordering information.



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Still our best selling HF
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G-450C Medium duty
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MFJ-969	Manual Roller ATU Metered 1.8-54MHz, 300W.....	£209.95
MFJ-993B	Auto ATU Metered 1.8-30MHz, 300W.....	£249.95
MFJ-1786X	Magnetic Loop 10-30MHz, 150W.....	£429.95
MFJ-1788X	Magnetic Loop 7-22MHz, 150W.....	£469.95
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Lots more MFJ stocked! See web for details



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The WinRadio WR-G33DDC 'EXCALIBUR Pro' is a high-performance, low-cost, direct-sampling, software-defined, shortwave receiver with a frequency range from 9 kHz to 49.995MHz. **£1599.95**

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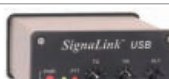
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The new miniVNA PRO is an extraordinary and unique handheld vector network analyzer that makes available a multitude of new features and capabilities which are perfect for checking antennas and RF circuits for hams and commercial users.

MiniVNA original still available
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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 *. Please check with the organisers that the rally is 'on' before leaving home.

MAY

May 12th

The Rochdale Flea Market

The Rochdale and District Amateur Radio Society Summer Ham Radio Flea Market and Junk Sale will be held at St Vincent's R.C. Church Hall, Caldershaw Road, Norden, Rochdale OL12 7QL. The doors will open at 10.00am. There will be trade stands, a Bring & Buy, a car boot sale and special interest groups. Pitches will cost £7.50 and the first 22 bookings will get a free table.

GOPUD

Tel: 01706 346517

E-mail: dave.shawl@sky.com

May 18th/20th

The Dayton Hamvention

The Dayton Hamvention will be held at the Hara Arena, 1001 Shiloh Springs Road, Dayton, Ohio, 45415 USA. A three-day pass purchased in advance costs \$20.00 or \$25.00 on the door. There will be free parking behind the Salem Mall, trade stands, a flea market, a car boot sale, lectures, special interest groups, a prize draw, catering and facilities for the disabled.

www.hamvention.org

May 20th

Amateur Radio Car Boot Sale

The Dunstable Downs Radio Club will be running the 29th National Amateur Radio Car Boot Sale at Stockwood Park, Farley Hill, Luton – exit at Junction 10 off the M1 and follow the yellow Dunstable Downs Radio Club (DDRC) signs. The car boot sale will open for buyers at 9.00am and the entrance/car parking fee will be £2.00 per vehicle. There will be talk-in on S22, catering and toilet facilities will be available. For buyers using SatNav, the postcode for the area nearest the park visitors' entrance on Farley Hill is LU1 5NR. Traders will be able to gain access the site from 7.30am, via a separate entrance.

www.ddrcbootsale.org

JUNE

June 2nd

Mini Ham Radio Convention

The Central Scotland Mini Ham Radio Convention will be held at Crofthead Farm Community Education Centre, Templar Rise, Livingston EH54 6DG. The doors will open at 10.00am (9.50am for the disabled). There will be trade stands, a flea market, a

Bring & Buy, lectures, an RSGB bookstall, a prize draw and catering will be available.

<http://uk.groups.yahoo.com/group/cshrc>

June 3rd

The Spalding Rally

The Spalding and District Amateur Radio Society Annual Rally will be held at the Sir John Glead Technology School, Halmer Gardens, Spalding, Lincolnshire PE11 2EF. The doors will open at 10.00am. There will be free car parking, trade stands, a car boot sale and catering will be available.

John G4NBR

Tel: 07946 302815

E-mail: rally-secretary@sdars.org.uk

www.sdars.org.uk

June 10th

The Junction 28 QRP Rally

The 11th Junction 28 QRP Rally organised by the South Normanton, Alfreton and District Amateur Radio Club (SNADARC) in association with the G-QRP Club will take place in the Alfreton Leisure Centre, Church Street, Alfreton, Derbyshire DB55 7BD. This is ten minutes from J28 on the M1 and the A38. The doors will open at 10.00am and admission will cost £2.50, which includes a raffle ticket. There will be talk-in on S21, free car parking, trade stands, outdoor stalls (weather permitting), special interest groups, catering, a licensed bar and facilities for the disabled.

Russell Bradley G0OKD

Tel: 01773 783658

E-mail: russell.bradleyg0okd@ntlworld.com
www.snadarc.com

June 16th

Ham Con

Ham Con – The Northern Ireland Amateur Radio Conference – will be held by the West Tyrone Amateur Radio Club at the Technology Education Centre, 2 Spillers Place, Omagh BT78 1 FA. There will be trade stands, lectures, demonstrations, special interest groups, catering, a prize draw and facilities for the disabled.

<http://wtarc.co.uk/Conference.aspx>

June 17th

The Newbury Rally

The 25th Newbury Radio Rally and Boot Sale will be held at the Newbury Showground, Priors Court, Hermitage, Thatcham,

Berkshire RG18 9QZ (next to M4 J13). The gates will open at 9.00am and admission will cost £2.00. There will be talk-in on S22 (V44), free car parking, trade stands, a big display area with amateur radio stations, exhibitions and special interest groups, a flea market, catering and facilities for the disabled. Sellers will have access to the site from 8.00am and pitches will cost £10.00.

E-mail: rally@nadars.org.uk

www.nadars.org.uk

June 22nd/24th

The Friedrichshafen Rally

The International Amateur Radio Exhibition with HAMtronic (electronics, internet and computers) will be held at Messe Friedrichshafen, Neue Messe 1, 88046 Friedrichshafen, Germany. The doors will be open between 9.00am and 6.00pm on the Friday and Saturday and from 9.00am to 3.00pm on the Sunday. Advance day tickets, purchased online, will cost €8.00 and an advance three-day ticket will cost €18.00. Admission on the day will cost €9.00 and a three-day ticket will cost €20.00. Concessions will be available for students, pensioners, disabled persons on presentation of an identity card. There will be car parking, a camp site, trade stands, a flea market, special interest groups, lectures, a licensed bar, catering and facilities for the disabled.

www.hamradio-friedrichshafen.de

June 24th

The West of England Radio Rally*

The West of England Radio Rally will be held at the Cheese & Grain, Bridge Street, Frome, Somerset BA11 1BE. There will be car parking, trade stands, catering and facilities for the disabled.

Shaun G8VPG

Tel: 01225 873098

E-mail: rallymanager@westrally.org.uk
www.westrally.org.uk

JULY

July 1st

The Ipswich Radio Rally

The East Suffolk Wireless Revival (Ipswich Radio Rally) will be held at The Orwell Crossing Lorry Park, A14 Eastbound, Nacton, Ipswich IP10 0DD. The doors will open at 9.30am and admission

will cost £1.00. There will be talk-in on S22, car parking, a Bring & Buy, a car boot sale, special interest groups, GB4SWR HF station, an RSGB bookstall and catering will be available.

Steve M1ACB

Tel: 07711 329624

www.eswr.org.uk

July 1st

The Barford Norfolk Radio Rally

The Barford Norfolk Radio Rally will be held at Barford Village Hall & Green, Barford, Norwich NR9 4AB.

The doors will open at 9.00am and admission will cost £1.50 (under 16s are free). There will be talk-in on S22, free car parking, trade stands and car boot sales, a Bring & Buy, special interest groups and catering will be available. Indoor tables cost £10.00 and outdoor pitches cost £8.00 (traders will have access from 8.00am).

E-mail: radio@dcpmicro.com
www.norfolkamateurradio.org

July 1st

The Red Rose QRP Festival

The 16th Red Rose QRP Festival will be held at the Formby Hall, Alder Street (off High Street), Atherton, Manchester M46 9EY. The doors will open at 11.00am and admission will cost £2.00 (under 14s are free). There will be free car parking, trade stands, a Bring & Buy, special interest groups, catering, a licensed bar and facilities for the disabled.

Les Jackson G4HZJ

Tel: 01942 870634

E-mail: g4hzj@ntlworld.com

July 7th

The Bangor Rally

The Bangor and District Amateur Radio Society Rally will be held at the Donaghadee Community Centre, County Down BT21 0HB. The doors will open at 11.30am and admission will cost £3.00. There will be trade stands, a Bring & Buy, special interest groups, a prize draw and snacks and light refreshments will be available.

Bill G14AAM

Tel: 02891 816707

E-mail: bill.langtry@btinternet.com
www.bdars.com

July 7th

The Stockport Rally

The 3rd Stockport Rally (previously known as the Reddish Rally) will be held at

Walthew House, Shaw Heath, Stockport SK2 6QS. The doors will open at 10.00am and admission will cost £1.00. There will be talk-in on 145.550MHz (G6UQ/P), car parking, trade stands, catering and facilities for the disabled. Tables will be available and will cost £10.00 each.

Bernard G3SHF
Tel: 01625 850088 (Daytime)
Nigel G0RXA
Tel: 07973 312699 (Evenings)
E-mail: info@stockportally.co.uk
www.g8srs.co.uk

July 8th

The CRAC Rally

The Cornish Radio Amateur Club will be holding the 49th Mobile Rally at Penair School, St Clements, Truro, Cornwall TR1 1TN. The doors will open at 10.30am and admission will cost £2.00. There will be talk-in, free car parking, trade stands, a Bring & Buy and catering will be available.

Steve
Tel: 01209 844939
E-mail: g7voh@btinternet.com
www.cornishamateurradioclub.org.uk

July 15th

The McMichael Rally

The McMichael Rally and Boot Sale will be held at the Reading Rugby Football Club, Holme Park, Sonning Lane, Reading RG4 6ST. The doors will open at 9.30am and admission will cost £2.00. There will be talk-in, free car parking, trade stands, a car boot sale, special interest groups, a prize draw, a licensed bar and catering will be available.

Pete G8FRC
Tel: 01189 695697
www.mcmichaelrally.org.uk

July 15th

QRP in the Country

QRP in the Country 2012 will be held at Upton Bridge Farm, Long Sutton, Langport, Somerset TA10 9NJ. There will be trade stands, special interest groups and family attractions. The event will be held outdoors if the weather is good or inside the farm barns if it's bad.

Tim Walford G3PCJ
E-mail: walfor@globalnet.co.uk

July 27th/29th

The Lithuanian Hamfest

The Lithuanian Hamfest 2012 will be held by the Lithuanian Amateur Radio Society at the Surviliskis Village, Kedainiai, Lithuania.

Rolandas
Tel: 00 370 657 57373
E-mail: ly4q@lrmd.lt
http://lrmd.lt/saskrydis_en.htm

July 29th

The Horncastle Summer Rally

The Horncastle Summer Rally will be held at the Horncastle Youth Centre, Willow Road, Cagthorpe, Horncastle, Lincolnshire LN9 6DZ. The doors will open at 10.30am and admission will cost £1.50. There will be free car parking, catering and facilities for the disabled. Tables cost £5.00 and power will be free.

Tony G3ZPU
Tel: 01507 527835
E-mail: G3ZPU@yahoo.co.uk

July 29th

Blind Veterans UK Rally

The Blind Veterans UK (formerly St Dunstan's) Radio and Computer Rally will be held at St Dunstan's, Ovingdean, Brighton, East Sussex BN27BS. The doors will open at 10.30am and admission will cost £2.00. There will be talk-in, car parking, trade stands and catering will be available.

Eddie
Tel: 01273 300772
E-mail: eddie@zamboodle.demon.co.uk

AUGUST

August 5th

The Great Eastern Radio Rally

The King's Lynn ARC 23rd Great Eastern Radio Rally will be held at the Gaywood Community Centre, Gayton Road, King's Lynn PE30 4DZ. The doors will open at 10.00am and admission will cost £2.00. There will be trade stands, a car boot sale and catering will be available. In addition, a campsite is available by prior arrangement.

Ray G3RSV
Tel: 01553 849700
E-Mail: ray-g3rsv@supanet.com
www.klarc.org.uk

August 5th

The Lorn Radio Amateur Rally

The Lorn Radio Amateur Club Rally will be held at the Crianlarich Village Hall, Main Street, Crianlarich, near Oban, Perthshire FK20 8QN. The doors will open at 10.30am and admission will cost £1.00. There will be trade stands, a notice board for private sales, a prize draw and catering will be available.

GM0ERV
E-mail: gm0erv@sky.com
www.gm0lra.freeuk.com

August 10th

The 19th Mini Rally Night

The Cockenzie and Port Seton Amateur Radio Club 19th Annual Mini Rally Night will be held in the main hall at Port Seton Community Centre, South Seton Park, Port Seton, Prestonpans EH32 0BQ. It's an opportunity to bring along your own junk and sell it yourself. The event runs between 6.30pm and 9.30pm

and admission costs £2.00, tables will be available on a first come first served basis.

<http://cpsarc.com>

August 12th

The Flight Refuelling Hamfest*

The Flight Refuelling Amateur Radio Society Hamfest will be held at the Cobham Sports and Social Club Ground, Merley, Nr. Wimborne, Dorset BH21 3DA. The doors will open at 10.00am. There will be talk-in on S22, car parking, trade stands, a car boot sale, a licensed bar and catering will be available.

Mike M0MJS
Tel: 01202 883479
E-mail: hamfest@frars.org.uk
www.frars.org.uk

August 17th/18th

15th International EME Conference

The UK Microwave Group (in conjunction with the RSGB) will be hosting the 15th International Earth Moon Earth (EME) Conference at Churchill College, Cambridge. Further details can be found on the conference website.

www.eme2012.com

August 19th

The Rugby Rally

The Rugby (Princethorpe) Annual Radio Rally will be held at Princethorpe College, Princethorpe, Rugby CV23 9PX. The doors will be open between 10.00am and 4.00pm and admission will cost £2.00. There will be talk-in on 145.550MHz (GB5RRR) and on Channel RB06 via GB3ME. There will be car parking and catering. Pitches cost £10.00 if pre-booked before August 11th and £14.00 on the day.

Tony G0OLS
Tel: 07759 684411
E-mail: rally@rugbyats.co.uk
www.rugbyats.co.uk

August 26th

The Milton Keynes Rally

The Milton Keynes Amateur Radio Society Rally will be held at Bletchley Park, Sherwood Drive, Bletchley, Milton Keynes MK3 6EB. The doors will open at 9.30am and admission will cost £2.00 (under 14s cost £0.50). Please note there is no on site car parking available for the rally. However, limited on street parking is available locally and there is a multi-storey car park at Bletchley Station. There will be trade stands, a car boot sale, special interest groups, an RSGB bookstall and catering will be available. Why not make this a family day and visit the Bletchley Park Museum too?

www.mkars.org.uk/mkars/rally

August 27th

The Huntingdonshire Rally

The Huntingdonshire Amateur Radio Society Rally will be held

at the St Neots Community College, Barford Road, Eynesbury, St Neots PE19 2SH. The doors will open at 10.00am and admission will cost £2.00. There will be talk-in on S22 (V44), car parking, trade stands, a Bring & Buy, a car boot sale, catering and facilities for the disabled.

Clive Burchell G3NKQ
Tel: 01480 810473
E-mail: clive.burchell@btinternet.com

SEPTEMBER

September 2nd

The Andover Rally

The Andover Radio Amateur Club will be holding their autumn Radio and Computer Boot Sale at Wildhern Village Hall, just north of Andover on Grid reference SU350510, post code SP11 0JE.

The doors will open at 10.00am and admission will cost £1.50. Indoor tables cost £8.00, outdoor pitches cost £6.00 and sellers will have access to the site from 9.00am. Refreshments will be available and there will be facilities for the disabled.

David G4YVM
Tel: 07749 199453
E-mail: aracsec@hotmail.co.uk
www.arac.org.uk

September 2nd

The Telford Hamfest

The Telford Hamfest will be held at the Enginuity Technology Centre, Coalbrookdale, Telford TF8 7DU. The doors will open at 10.30am. There will be talk-in on S22 and 433.200MHz (GB3TF), free car parking, trade stands, special interest groups, lectures and family attractions.

Martyn G3UKV
Tel: 01952 255416
www.telfordhamfest.co.uk

September 9th

The Friskney Rally

The Friskney & East Lincolnshire Communications Club Rally will be held at the The Friskney Village Hall, Church Road, Friskney, Lincolnshire PE22 8RR (6.5 miles south of Skegness).

Bren 2E0BDS
Tel: 01754 820060
Ian Donnelly 2E0XOD
Tel: 07554 362020
E-mail: felcc@btinternet.com
www.felcc.com

September 15th/16th

The AMSAT-UK Space Colloquium

The AMSAT-UK Space Colloquium 2012 will be held at the Holiday Inn, Guildford GU2 7XZ. The event will include a full lecture programme, a Gala dinner on the Saturday evening along with a fund raising auction, the AMSAT shop and GB4FUN.

www.uk.amsat.org



Harry Leeming G3LLL's In the Shop

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

A 20A Fuse - Gone in a Trice!

In this month's *In The Shop*, Harry Leeming G3LLL faces a faulty h.f. mobile rig that's blowing 20A fuses!

Welcome to *In The Shop (ITS)* where I look back at my time running Holdings in Blackburn, Lancashire, a time when I often came face-to-face with many perplexing faults on equipment! One tip I'd like to pass on this time regards tracing the cause of a blown fuse in a mains operated valved rig, without the risk of causing more damage.

Tracing such a fault can be done by running the rig from 24V a.c. You then check the voltages, (which should then be about a tenth of normal) and find the area of the problem by noting where the voltages are lower than a tenth.

However, reducing the input voltage to a tenth of normal, so that a 13.8V rig is running from 1.38V isn't terribly practical,

as some devices will then hardly conduct at all. "So, what do I do?" Peter asked "Do I put a large fuse in and see where the smoke comes from?" I told him "No"....but to answer his question let's take a look at the problem.

A Typical Rig

A typical 100W rig, in good working order, will normally take just over 1A in the receive mode, or on s.s.b. transmit (with the microphone gain at zero) and 15-20A at full power. A well equipped workshop should have a current limiting power supply with 'fold back' protection, which can be set at any value from a few hundred mA to let's say 5A.

Set it at 4A, and if the rig is okay it will work as normal on receive. But if the

carrier control is advanced in the transmit mode to give more than a few watts out, the supply voltage will drop to prevent more than the set current flowing.

If there's a fault causing the rig to try to take excessive current, limiting the current in this way gives you a chance of experimentally disconnecting various supply voltage feeds, without risking damage. Once you have ascertained where the excess current is going, you can then try narrowing the trouble down further by removing devices and components, or even cutting tracks on the printed circuit board (p.c.b.), until you locate the trouble.

If you don't happen to have a p.s.u. with adjustable fold back protection, you can still limit the current when making tests, by connecting a high wattage 1.5Ω wire-wound resistor in series with the live 13.8V lead. On receive if everything is okay, and the rig is taking around 1A, then 1.5V will be dropped by the resistor, and 12.3V will arrive at the rig.

If you try and transmit at very low power you should get a few watts out. However, when you turn up the carrier and draw more than 2A, then the voltage drop will increase, the input to the rig will fall below 11V and it will then not function properly.

Once again if there is a fault, even if



The Yaesu FT-980 rig has very expensive transistors that needed replacing in pairs.

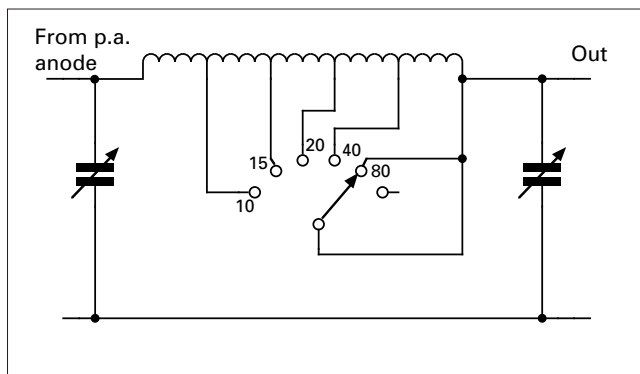


Fig. 1: A simplified circuit of the p.a. coil band switching used on many valved p.a. stages.

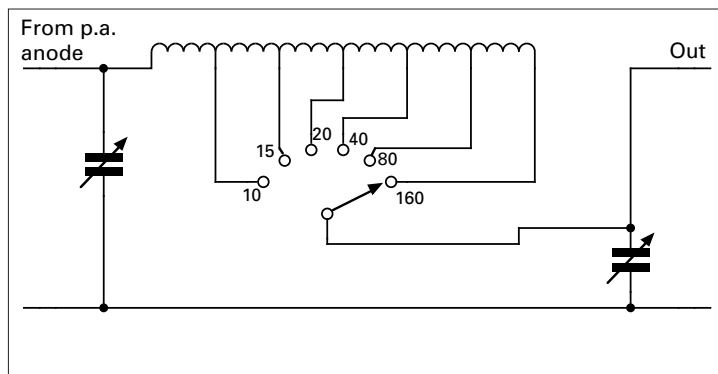


Fig. 2: Someone had added extra turns and rearranged the switch wiring to use a spare contact, but what is wrong with this circuit?

the rig goes completely short circuit, the maximum current will be limited, in this case by Ohm's Law to just over 9A. In practice it's likely to settle down to much less and this will give you a chance to find out where the current is going – and hopefully cure the fault.

Protecting Equipment

Protecting equipment during tests after repair is a good precaution. If the rig 'tries' to take a sudden gulp of current under fault conditions, any resultant damage will then be limited. I learnt this lesson the hard way!

A Yaesu FT-980 came in with blown 28V power amplifier (p.a.) output transistors, there didn't seem to be any reason for their demise. So, after testing the bias, etc, I fitted a new pair, which at that time cost around £100.

The rig ran for a few weeks and then blew the new pair – somewhat of a disaster! I certainly didn't want to have this happen again and as I did not have a 28V current limiting supply, I fitted a high wattage 10Ω resistor in series with the feed to the p.a. transistors and then fitted a new pair.

The standing current set-up satisfactorily and with no drive was at about 200mA. As I increased the drive the current increased and the rig worked okay as long as I kept the drive down so as to give less than 10W out. Beyond this the resistor got extremely hot and as the voltage fell the p.a. stage saturated.

Under normal operation with 100W output, the p.a. transistors in the FT-980 take a maximum of about 10A and so I reasoned that whatever happened – as it wasn't possible for the p.a. stage to take much over 2A – it should not blow another £100 worth of transistors. But what had destroyed them?

To answer my question I started tapping and poking around the p.a. stage and as I hit a point near to the bias control the current shot up. I switched the rig off and removed the circuit board but I couldn't see any obvious fault and so I

went over every joint in that area with a soldering iron. I then re-fitted the power amplifier board, cleaned the bias control and tried again.

This time once the bias had been adjusted the current remained stable, but I wasn't aiming to being bitten twice! So I left the resistor in circuit for a couple of weeks while I put the rig through extensive 'soak' and 'bump' tests. I then removed the resistor, reassembled the rig, tested it for 15 years and it's still working. I know this because I part exchanged it and kept it for myself.

Limiting the possible current is also a good idea after you have finished building a new piece of kit. If – for example – the speech processor you've just finished is expected to take 100mA at 13V, connect it to a p.s.u. that's set to limit at 200mA, and if something is wrong – you're not likely to do any damage. However, if you don't have a suitable p.s.u. connect a resistor of about 12Ω in series with the feed during your initial trials.

If all is well at 100mA the resistor will only drop 1.2V, which should enable the processor to operate as normal. If however, there's a fault the current will be limited to around 1A and the chance of causing damage to the processor or the p.s.u. will be minimised. Leaving the resistor permanently in circuit is not such a bad idea, as it will protect against any accidental short and also help to filter out any r.f. arriving via the power lead.

Valved PA Stages Conclusion

I'm now going to conclude the valved p.a. stages discussion – with a comparison as a warning! Years ago I had a small mole on my face and my wife **Brenda** ordered me to see our Doctor. He thought it looked suspicious, and sent me to have it removed at a local hospital. They reported that, whilst the mole had been cancerous – it had been caught in time and successfully removed. (A warning for us all.)

As I mentioned in the September

2011 issue, small ailments in p.a. stages can often become large ones if they are ignored. If you haven't used your rig for some time, it's not unusual to hear a slight fizzing noise when tuning up due to dust or dampness. **If however**, the noise carries on for more than about a second, release the push-to-talk (p.t.t.) quickly, and return to receive.

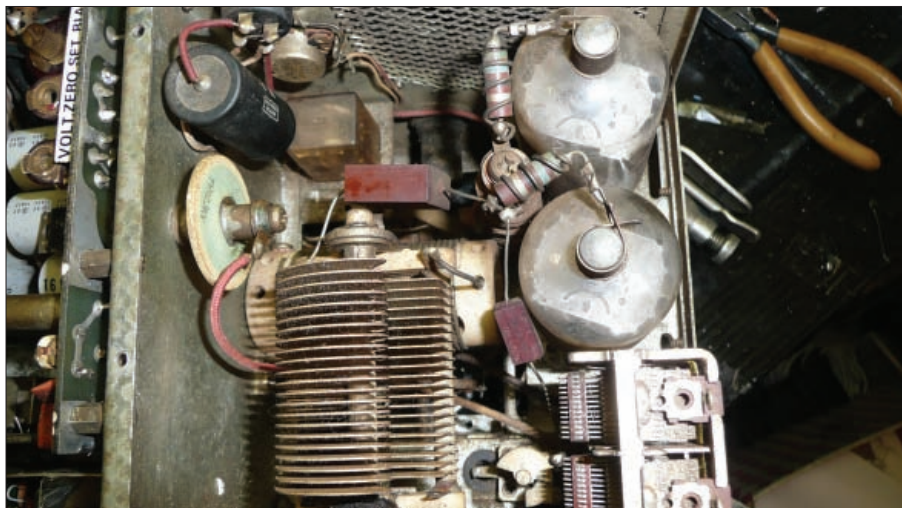
As with all presumed faults, before jumping to conclusions please do try loading up into a good dummy load via a tested patch lead. An open or short circuit patch lead can produce some high voltages and cause a flashover!

A valved p.a. stage uses high voltages and quite a bit of power and sustained sparking can damage irreplaceable parts. If arcing persists, disconnect the rig from the mains, wait five minutes for the high voltages to discharge. Then remove the covers from the p.a. stage and short the valve top caps to chassis just to be sure.

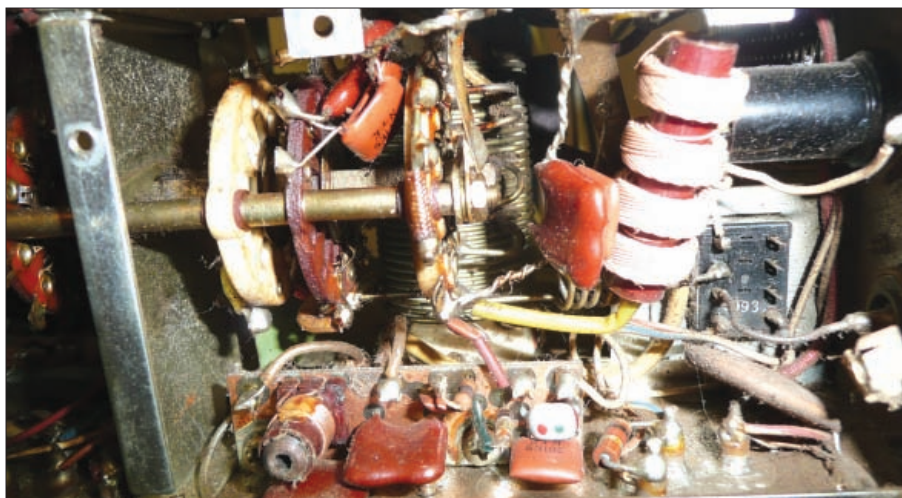
Next, have a very careful look around the wiring switches and parts, to see if you can spot any signs of burnt insulation. In many cases curing the fault may be as simple as moving two wires further apart. But if you can't see anything obvious, dim the lights and stand the rig on its side so that you can see both the top and bottom of the p.a. stage.

The next stage is **potentially dangerous**. Please note the cardinal rules; "You must never try and turn a piece of equipment over, or grip it tightly, when the covers are removed and it is connected to the mains, or expose yourself to high voltages if you are on your own". So, get a friend to help.

Next reconnect the mains, switch on, and try to load up. You should then be able to see where the arcing is occurring. Once you are sure of this, disconnect the mains, discharge the high voltages again as already discussed, and sort out what needs doing. You may need to re-insulate some wiring, or even take the high voltages off a switch contact as I



Dust in the p.a. stages is one of the major causes of arcing on valved equipment, due to the very high voltages that can be generated.



Someone had modified the switching circuitry making it prone to arcing on some bands.

explained in the September 2011 issue. But while the problem should be pretty obvious – its cure might not be easy.

If some insulation is flashing over, try cleaning it, and applying an insulating spray, a friend who was once employed repairing the older television sets, or video monitors that incorporated a cathode ray tube, or a garage mechanic, may be able to help with this.

The PA Coil Switching

A simplified circuit of the p.a. coil band switching is shown in **Fig. 1**. You may have been puzzled as to why it's wired like this, as the short circuited turns must have a large current induced into them by transformer action and this will introduce losses. I had vaguely wondered about this myself – and then the answer came in a flash!

Many moons ago, when you could still get spares for the original FT-101, **Tony** brought an early version into me with a burnt out p.a. switch. I replaced the switch and started to test the rig on all bands – but when I got to 14MHz (20m) there was a terrific flash and the new switch burnt out. I wondered – where on

earth had all the voltage come from?

I was puzzled but noted that the rig had not originally been fitted with the 1.8MHz (160m) band and that this had been added. There wasn't enough inductance in the coil for this to tune up efficiently on 1.8MHz, so someone had added extra turns and rearranged the switch wiring to use a spare contact, as per **Fig. 2**. But what was wrong?

In **Fig. 1A**, as I then realised, the unused turns are shorted out for a very good reason. Look at **Fig 1B**. When the rig is switched to 14MHz there are about eight turns on the p.a. coil which are actually in circuit from 'A' to 'B' but the total coil from 'A' to 'C' has around five times as many turns as this.

If there is (let's say 500V of r.f. voltage at point 'A') then due to the coil acting as a transformer this will be stepped up and there will be at least 2,500V at point 'C'. This however, is only half the story!

A coil of wire has self capacity and so it will be resonant at some frequency or other. I checked with a dip meter and just guess at what frequency the unused turns from 'B' to 'C' were resonant! The answer is 14MHz! No wonder there

was a flash, as well as the stepping up transformer action, the voltage was also magnified by the Q of the tuned circuit formed by the self-capacity of the coil.

There must have been tens of thousands of volts at point 'C', no wonder a terrific flash occurred and the switch burned out. Turns of wire that are unused **must never** be left 'going nowhere' in a p.a. stage – they must always be short circuited.

I had already spent more time on the repair than I would be able to charge for. So, as I was in no mood for experimenting, I re-wired the switch as original, removed the extra turns of wire and arranged that (as recommended by one of the Yaesu importers) a large amount of capacity was switched into circuit on 1.8MHz to enable the p.a. circuit to resonate.

As the L/C ratio on 1.8MHz was then 'all wrong' the efficiency was poor and the rig would only give around 30W out on 'Top Band' – but at that time this was all that Tony's licence allowed so it had to do!

Free Advertising

Advertising can be quite expensive, but I soon realised that in the world of Amateur Radio, the best kind of promotion could be free. I made quite a few add-on bits for the old Yaesu FT-101 series such as our r.f. speech clipper, a double-balanced mixer, and an f.m. unit. The profit they produced was small, but when Radio Amateurs used them on the air and listed their equipment, they were effectively advertising my shop Worldwide.

I found it quite amusing meeting visitors to the UK, who took the trouble to look me up. And while they were usually too polite to say much, many were obviously surprised that the business only consisted of a scruffy little shop in a back street! One visiting VK Amateur even insisted on taking my photograph to show to his radio club "down under". There is no accounting for taste! See you next month. ●

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).

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Colin Redwood G6MXL's What Next?

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Countries, Prefixes and DXCC Entities

Confused by terms such as countries, prefixes, ITU regions, ITU zones, IARU regions, CQ zones and DXCC? Don't worry – this month Colin Redwood G6MXL clarifies the situation!

There's no doubt about it, the numerous prefixes, countries, regions and zones, let alone DXCC entities can all seem quite confusing at times. So this month in *What Next?* (WN?) I'm aiming to remove all the mystery, so readers can get a better understanding of terms that can seem quite complex and confusing at times!

To start – we'll look at the role of the **International Telecommunications Union (ITU)**, which is the United Nations specialised agency for information and communication technologies. The ITU's Radio Communication Sector plays a vital role in the global management of the radio-frequency spectrum and satellite orbits.

The organisation co-ordinates the ever increasing demand from a large and growing number of services, such as fixed, mobile, broadcasting, Amateur, space research, emergency telecommunications,

meteorology, global positioning systems, environmental monitoring and communication services, many of which ensure safety of life on land, at sea and in the skies.

It's the ITU that decide what callsign prefixes are allocated to each country. So the ITU made the decision that the UK has callsigns prefixes starting with the characters G, M and 2 (its dependent territories have a few other characters).

The ITU Regions

The ITU divides the world into 3 regions known as ITU regions (**Fig. 1**). Region 1 covers Europe, Africa, the Middle East and Northern Asia. Region 2 covers Northern, Central and Southern America.

Region 3 covers the rest of Asia and the Pacific (including Australia and New Zealand). Note: Short wave (h.f.) broadcast planning is based on these regions.

The International Amateur Radio Union

The International Amateur Radio Union (IARU) is the organisation that has been the watchdog and spokesman for the world Amateur Radio community since 1925. At the international level, national societies, such as the Radio Society of Great Britain (RSGB) and others throughout the world, work together for the international good of Amateur radio under the auspices of a representative democracy, the International Amateur Radio Union (IARU).

The IARU Regions

The IARU is organised into three regional organisations that correspond the three regions of the ITU. You may be asking "what is the relevance of the three ITU and IARU regions to Amateur Radio?" The answer is because the International Amateur Radio Union (IARU) aligns its regions to the ITU's regions, many of our Amateur Radio allocations are also ITU region-based.

For example, the size of the 7MHz (40m) band allocated to Amateur Radio by the ITU differs between ITU regions, depending on the extent of the use of adjacent frequencies for h.f. broadcasting. This is reflected in the separate IARU band plans for each IARU region. There are awards based on the IARU regions, such as the RSGB's IARU Region 1 Award for working at least 40 countries (not DXCC entities) in IARU Region 1.

The ITU divides the world into ITU zones for h.f. broadcasting purposes (**Fig. 2**). The UK (including The Channel Islands), The Republic of Ireland, France, Belgium, Netherlands, Andorra,

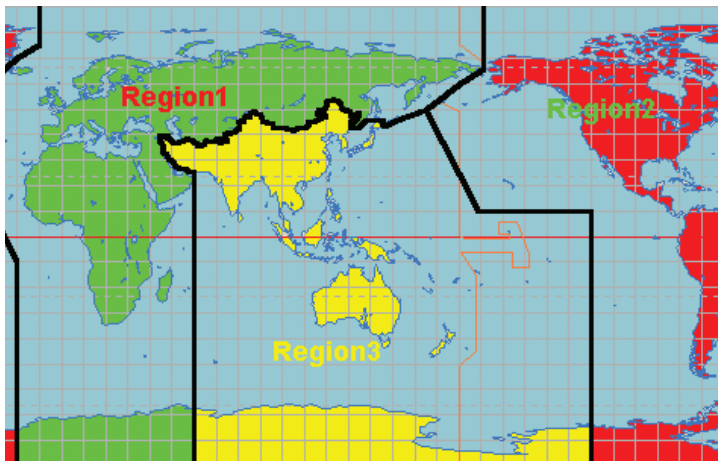


Fig. 1: Map showing the 3 ITU and IARU regions

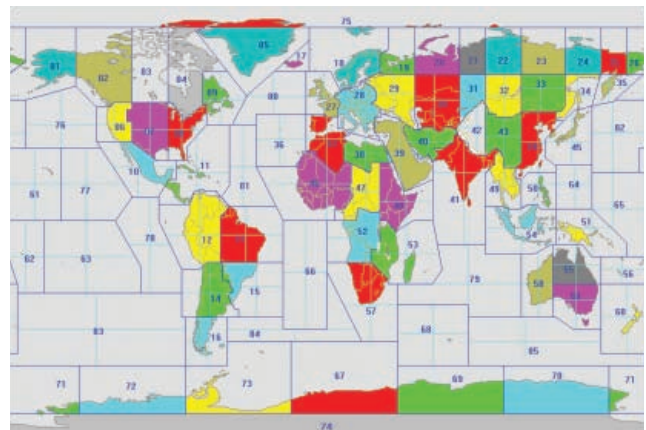


Fig. 2: A simplified map showing the ITU zones. Please refer to more detailed map or reference material for detail of individual countries.

Monaco and Luxembourg are all in ITU Zone 27. The ITU Zones are sometimes used as part of contest exchanges. If you are a serious DXer, you'll probably want to put your ITU Zone on your QSL cards.

American CQ Magazine

The American CQ magazine is a popular journal for contesters and DXers, particularly in the United States. The magazine has a number of awards available and organises various contests during the year, mainly on the h.f. bands. These awards and contests are based around the CQ Zones. There are 40 CQ Zones (**Fig. 3**).

The UK (including The Channel Islands), the Republic of Ireland, France, Belgium, Netherlands, Andorra, Monaco, Luxembourg, Portugal (but not Madeira), The Azores, Germany, Spain (including the Balearic Islands but not the Canary Islands), Switzerland, Lichtenstein, Faeroes, Denmark, Sweden, Gibraltar and the United Nations in Geneva (4UITU) are all part of CQ Zone 14.

As you can see, the CQ Zones are different in size and comprise different countries to the ITU zones. If you are a serious DXer, you will probably want to put your CQ Zone on your QSL cards in addition to the ITU Zone.

Note: You may have noted that the Canary Islands and Madeira were both excluded from the list of countries in the CQ Zone 14. This is because they are closer to Africa than to Western Europe.

Defining Countries

Back in October 1935, **Clinton B. DeSoto**, Assistant to the Secretary to the **American Radio Relay League** (ARRL), proposed a method for defining countries for Amateur Radio purposes. He did this so that Amateurs could have a common measure of how many 'countries' they had worked. Without it, Amateurs couldn't agree whether, for example, the UK was one country or whether its constituent parts such as England, Wales and Scotland should be counted as separate countries.

After much deliberation and consultation with others, Clinton DeSoto came up with what now seems a very pragmatic definition. He proposed that each discrete geographical or political entity is considered to be a 'country' which he termed an 'entity'. Thus England, Scotland, Wales, Northern Ireland, Isle of Man, Guernsey and Jersey are each considered to be separate entities for Amateur Radio purposes,



Fig. 3: Map showing the CQ zones.

on the grounds of each of them being separate political entities. He also refined the definition for island groups under common political control, so that Sark, Alderney, Herm in the Channel Islands were all treated as being Guernsey for Amateur Radio purposes.

Whilst the term DXCC 'country' has unfortunately tended to stick, the **correct** term is DXCC 'entity'. Although the definition of a DXCC entity has been refined a little over the decades since 1935, De Soto's proposals remain at the core, with the definition of geographical and political entities now being much more precisely defined than in the 1930s.

It's important to understand that the DXCC list of entities can and does change from time to time. To take a few examples, the splitting of Czechoslovakia into the Czech Republic and the Slovak Republic on January 1st 1993, caused Czechoslovakia to become a deleted DXCC entity and the Czech Republic and the Slovak Republic both to be added as new DXCC entities. The timing of changes is usually linked to their official recognition by the United Nations.

Recent DXCC Changes

I'll now mention some recent DXCC changes. At 0400UTC on October 10th 2010 when the Netherlands Antilles was dissolved, new prefixes came into being for Curacao (PJ2), Bonaire (PJ4), Saba & Sint Eustatious (PJ5 & PJ6) and Sint Maarten (PJ7). Before this PJ1, PJ2, PJ4 and PJ9 were all considered as the Netherlands Antilles for DXCC purposes, and PJ5, PJ6, PJ7 and PJ8 were all considered the single DCC entity of Sint Maarten, Saba and Sint Eustatious.

Incidentally the Netherland Antilles was known even earlier as the Dutch West Indies. More recent changes have included the creation of South Sudan with a prefix allocation from the ITU of

Z8A to Z8Z, following its split from the rest of Sudan on July 14th 2011.

Explaining DXCC!

Having talked about DXCC, I think I should also explain what it stands for! The acronym DXCC stands for the DX Century Club. The DXCC is an award issued by the ARRL for confirmed contacts with at least 100 DXCC entities. Many awards – not only those issued by the ARRL – are based on DXCC entities. Likewise, many contests have DXCC entities as either multipliers or another factor in scoring.

The UK Ofcom Regulator

As I mentioned earlier, the ITU allocates callsign prefixes to countries and allocated the UK callsigns starting G, M and 2. Ofcom, the regulator in the UK, and its predecessors use different prefixes for the different parts of the British Isles.

Callsign Prefixes

With a few exceptions, each DXCC entity has a range of Amateur Radio callsign prefixes allocated to it. The specific allocation for Amateur Radio purposes is usually decided by an administrative body (Ofcom in the UK) from its full allocation as determined by the ITU.

The ITU has allocated the UK callsigns starting with (prefixes) G, M and 2. From these Radio Amateurs in the UK have been allocated callsigns by Ofcom and its predecessors, using the prefixes listed in **Table 1**. The prefixes define the DXCC entity, whilst in the UK the combination of prefix and number defines the type of licence (**Table 2**).

In many countries, a letter is used to define the type of licence and the number to some regional breakdown. Some other users of the radio spectrum are also allocated callsigns such as aircraft and companies that build and maintain transmitters (not only for the Amateur bands). The UK also has

Country	Prefixes	Table 1: The main Amateur Radio callsign prefixes for the UK. The table does not include prefixes used by special event stations (or the 'GQ' 'MQ' and 'GO' and 'MO' being used for the Queen's Jubilee and Olympic/Paralympic Games) and various types of beacons, repeaters, nodes and mailboxes, which usually start GB, or MB
England	G, GX, M, MX, 2E	
Isle of Man	GD, GT, MD, MT, 2D	
Guernsey	GU, GP, MU, MP, 2U	
Jersey	GJ, GH, MJ, MH, 2J	
Northern Ireland	GI, GN, MI, MN, 2I	
Scotland	GM, GS, MM, MS, 2M	
Wales	GW, GC, MW, MC, 2W	

some other ITU allocations which are used as prefixes for callsigns in various colonies and dependencies, such as ZB – Gibraltar, ZD7 – St Helena, VP5 & VQ5 Turks and Caicos Islands.

Where Is It?

When we work a station, and (if you're very new to the hobby) you'll probably ask "How do we know in which DXCC entity it's located?" Fortunately, there are several sources of reference. Without doubt, my favourite is the RSGB's *Prefix Guide Book* (Fig. 4). I find the presentation and content just right.

For each prefix, the guide provides the DXCC entity that it refers to, and also other prefixes used by the same entity. So, by looking up the callsign prefix 2M or MM, it will be apparent that the prefix applies to the DXCC entity of Scotland, and that it counts the same as the prefix GM for DXCC purposes. It really is easy to work out the DXCC entity from a callsign prefix.

Rather Complex?

By now you might be forgiven for thinking that this is starting to be rather complex; and you would be correct! If you thought that the situation when the Netherlands Antilles was dissolved was a bit complex, try getting your mind around the break-up of the former Soviet Union (USSR) into independent states!

Fortunately the *Prefix Guide* takes this all in its stride. Incidentally the Oblasts* it refers to are roughly the equivalent of counties in the UK.

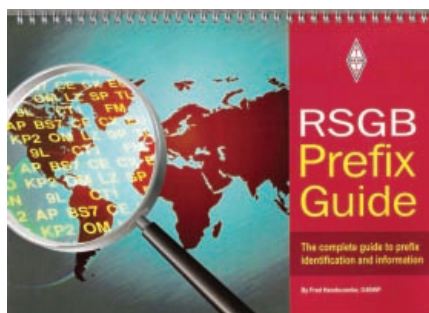


Fig. 4: The RSGB *Prefix Guide*.

If you prefer something on-line, then I find <http://www.ac6v.com/prefixes.htm> to be easy to use and accurate.

*For further information on Oblasts see <http://en.wikipedia.org/wiki/Oblast>

In Practice

So, what does everything I've mentioned matter in practice? Let's take a look. For example, if you come across a contest station giving an exchange ending in 29 (e.g. 5929), it's likely that they are participating in a contest where the exchange is the report followed by either their ITU Zone or CQ Zone. To establish which, refer to the RSGB's *Prefix Guide* book to establish which zone corresponds to the station's prefix.

For example, if you hear S51AF (Slovenia) giving a report of 5928, you'll see that his ITU Zone is 28 and the station's CQ Zone is 15. From this you can deduce that the station is exchanging ITU zones. If you are in the UK or the Republic of Ireland and you want to work the station, then you'll need to exchange report and ITU zone (27 for the UK).

In rounding off this month I hope I've clarified the situation regarding Countries, Prefixes and DXCC Entities. However, if you need more help or have any questions that could help form the basis of a What Next? article – please contact me. I'll be pleased to hear from you!

Licence Type	Country	Prefixes & Number
Foundation	England	M3, M6
	Isle of Man	MD3, MD6
	Guernsey	MU3, MU6
	Jersey	MJ3, MJ6
	Northern Ireland	MI3, MI6
	Scotland	MM3, MM6
	Wales	MW3, MM6
Intermediate	England	2E0, 2E1
	Isle of Man	2D0, 2D1
	Guernsey	2U0, 2U1
	Jersey	2J0, 2J1
	Northern Ireland	2I0, 2I1
	Scotland	2M0, 2M1
	Wales	2W0, 2W1
Full	England	G0, G1, G2, G3, G4, G5, G6, G7, G8, M0, M1, M5
	Isle of Man	GD0, GD1, GD2, GD3, GD4, GD5, GD6, GD7, GD8, MD0, MD1, MD5
	Guernsey	GU0, GU1, GU2, GU3, GU4, GU5, GU6, GU7, GU8, MU0, MU1, MU6
	Jersey	GJ0, GJ1, GJ2, GJ3, GJ4, GJ5, GJ6, GJ7, GJ8, MJ0, MJ1, MJ58
	Northern Ireland	GI0, GI1, GI2, GI3, GI4, GI5, GI6, GI7, GI8, MI0, M11, MI5
	Scotland	GM0, GM1, GM2, GM3, GM4, GM5, GM6, GM7, GM8, MM0, MM1, MM5
	Wales	GW0, GW1, GW2, GW3, GW4, GW5, GW6, GW7, GW8, MW0, MW1, MW5
Club	England	GX0, GX1, GX2, GX3, GX4, GX5, GX6, GX7, GX8, MX0, MX5
	Isle of Man	GT0, GT1, GT2, GT3, GT4, GT5, GT6, GT7, GT8, MT0, MT1, MT6
	Guernsey	GP0, GP1, GP2, GP3, GP4, GP5, GP6, GP7, GP8, MP0, MP1, MP5
	Jersey	GH0, GH1, GH2, GH3, GH4, GH5, GH6, GH7, GH8, MH0, MH1, MH5
	Northern Ireland	GN0, GN1, GN2, GN3, GN4, GN5, GN6, GN7, GN8, MN0, MN1, MN5"
	Scotland	GS0, GS1, GS2, GS3, GS4, GS5, GS6, GS7, GS8, MS0, MS1, MS5
	Wales	GC0, GC1, GC2, GC3, GC4, GC5, GC6, GC7, GC8, MC0, MC1, MC5

Table 2: The table of prefixes with number, to show not only the DXCC entity but also the type of licence.

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- New, two touch repeater access
- High Grade body compatible to IPX7 (submersible 1m/3feet for 30min) and rugged body
- 39 CTCSS tone squelch encode + decode settings)
- Large 40 mm internal speaker for great audio
- Highly visible backlit alphanumeric display
- Direct frequency input through illuminated keypad
- 200 memories, plus one call channel and one repeater access parameter memory
- VFO, Memory and scan modes
- Ultra flexible antenna with SMA connector - avoids breakage
- 4 User selectable tonebursts (1750, 2100, 1000, 1450Hz)
- 104 DCS digital code squelch
- Time out Timer
- 9 Auto dial memories easily accessed from the DTMF keypad
- Ni-Mh Battery 7.2v 700mah fitted as standard
- Refresh function for rechargeable battery reconditioning
- Cable Cloning feature
- Frequency step: 5,10, 12.5, 15, 20, 25, 30kHz
- Dimensions: 58(W) x 110(H) x 36.4(D)mm
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- Dual VFO's - Split frequency operation
- 600 channel memories in 3 banks
- Connection for Auto tuner
- ALC for Linear amplifier
- CTCSS enabled for 10 mtr FM repeater access
- Large Cooling Fan with overheat power limiter
- SWR Protection built in
- Dimensions: 240 (w) x 94 (h) x 255 (d) mm
- Weight: 4.1 kg (approx)

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Feed-back from Australia!

Tim Kirby G4VXE introduces his monthly round-up of what's been going on above 30MHz with feedback from Steve Mahony in Australia – a long time *PW* supporter.

Welcome to the world of Amateur Radio above 30MHz! I received a long letter that started with the greeting, "Now that summer's over!" Hopefully not our summer, although you can never tell! But it's nearly summer's end in South Australia (SA) and it was great to receive a letter from Steve Mahony VK5AIM (Elizabeth, SA).

Steve – who has supported *PW* for very many years – had read the recent piece in this column about balloon tracking and mentioned Project Horus, run by Terry Baum VK5VZL. The group have had weather balloons go up to an altitude of 35000m launched from the Riverland in South Australia and ending up in the Pacific Ocean. The balloons are usually equipped with GPS, APRS and a 433MHz to 145MHz transponder.

On one of the launches, Steve worked the Horus transponder on a dual-band hand-held from Salisbury SA, contacting a station on the east coast of New South Wales (VK2) using an Arrow dual-band Yagi antenna. Project Horus has an excellent website at <http://projecthorus.org> which contains details of the flights, paths and lots of other interesting information

Steve VK5AIM also has been spending some time tracking weather balloons and reading their telemetry on around 400MHz. The balloons are launched twice daily, morning and afternoon from Adelaide and other country airports. They transmit telemetry on wide-band f.m. and a decoding programme is widely available. Steve says that he tracks the flights using a hand-held set to wide-band f.m. and using an 8-10 element 433MHz Yagi antenna.

On one flight, they tracked the balloon from Adelaide airport all the way across the city, across Elizabeth and into the Barossa wine growing area some 50km north of Adelaide. Steve

says that the wine growers don't like the balloons landing in the vines as the battery, in particular, could contaminate the grapes.

Steve was also kind enough to include some very interesting v.h.f./u.h.f. news from Australia. On January 3rd this year there was some incredible tropo on 144/432MHz with a path opening between Australia and New Zealand. In David Smith VK3HZ's *VHF/UHF – An Expanding World* column in Amateur Radio he says, "At times signals were so strong that stations in Melbourne with only a dipole or vertical whip were easily able to work into ZL. There were so many stations on, that 144MHz was, at times, like 14MHz on a busy day."

Amazing to read about! Good tropo on v.h.f./u.h.f. over the sea is fascinating! I've highlighted the tropo news, but there was also some spectacular 50MHz Es worked in early January, across the Pacific from VK/ZL into Peru, Nicaragua, Mexico and the US (California). Thanks for a very interesting letter, Steve!

The 50MHz Band

Ronald Pincho ZB2B caught a couple of DX openings on the 50MHz band. On March 10th he worked 6V7SIX (IK14) and PY5HOT (GG46) quite late on around 2319z. Next day on March 11th there was a good opening to Brazil, with PY2XB, PP5KR, PY2LED, PY2HN, PT7CQ, PY5EW, PP1CZ, PT9PA and PY2ZR worked between 1853z and 1946z. Ronald was using around 80W to a 4-element Yagi antenna.

Both Ronald and Ernie Stagnetto ZB2FK reported that Amateurs from Gibraltar have permission to use the ZQ prefix in celebration of the Queen's Jubilee – so expect to hear those callsigns on the air during the Es season. Ernie writes that his plans, to install a 50MHz Yagi antenna, have

been put on hold for a little while, so that some maintenance work can be carried out on the building where he lives.

As always Mark Marment CT1FJC's log from Portugal has plenty of interest! Mark writes that there has been some good t.e.p. and F2 deep down into Southern Africa and South America during the late afternoon and early evenings, with stations such as CX8DS and CX7CO being worked. He reports that FG4NN and 9Y4D are heard most evenings along with LU5FF. On April 1st there was a surprise Es opening to Italy from 1900z to around 2030z with many S9 signals.

On April 2nd, Mark was delighted to work Reunion Island, FR1GZ. It was an interesting opening that swept across Cyprus, Greece, Sicily and Malta, then towards Spain and finally, to Portugal. Mark says that the path seemed to be very narrow and gave only a very small time window in which it was possible to work him. Next day on April 3rd J52HF from Guinea Bissau was a great signal. On JT6M using meteor scatter, Mark worked G3VYF (JO01) on April 5th.

Here at G4VXE (Oxfordshire), I have been monitoring 50.230 using the JT6M mode, primarily looking for Es, but have decoded meteor bursts from GD6ICR, F8ZW, EA1YV and G7DWY amongst others. This is using nothing more sophisticated than the vertical antenna – so it's well worth trying, even if you have a very simple station.

Try it out and see what you can hear! Activity is probably best at weekends unless people suspect the band is opening up.

The 144MHz Band

Paul Bowen M0PNN (Shropshire) has had a good month on the band and says that it's amazing what you can work with a basic set-up. He says that it can be frustrating to hear someone

a few miles away working DX that you cannot even hear! This is true – and I can confirm that I have several times heard Paul working stations that I could not hear! It's all part of the fascination of v.h.f./u.h.f. propagation.

Paul's log includes on March 4th, ON4WY (JO11), F5SE/P (JN19); March 12th GM0HTT (IO89) via tropo; March 14th DF5NF (JN59), DF9IC (JN48); March 15th EI4DQ (IO54) – via Aurora. Then came EA1FDI (IN53), EC1AJL (IN73), F5VMB (IN98) via tropo; March 25th ON6ZT (JO10), PA4VHF (JO32), DK2ZF/P (JO43), DL6YDF (JO31), DO9PL (JO31) and DL8YE (JO32).

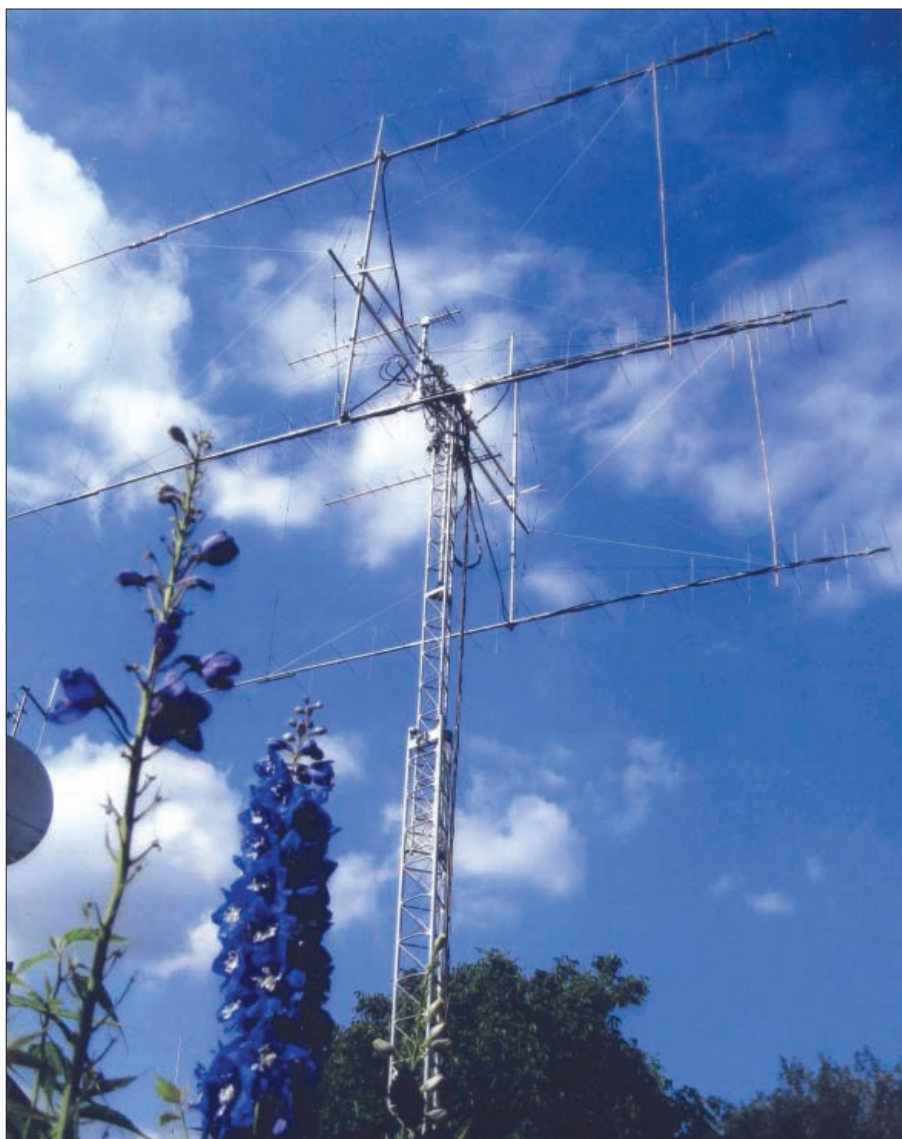
Paul also writes that the Telford and District ARS will be visiting Guernsey between June 22nd and 27th. They will be active on h.f. as well as all bands from 50MHz to 24GHz – so plenty of opportunity for some interesting contacts!

Fellow *PW* contributor **Ben Nock G4BXD** (Kidderminster, Worcestershire) enjoyed the tropo opening in mid March. On March 14th, he turned on his rig to hear a strange 'pip' on a repeater frequency which turned out to be a French one. Ben worked F4EOB through the F5ZFS repeater at St. Gobain in JN19QO. What was noteworthy was that F4EOB was using a hand-held from the kitchen of his Parisian flat! Ben went on to work four more French stations as well as stations in Luxembourg and the Netherlands. Ben was using 25W to a collinear at 6m.

Norman Bland M0JEC and **Dennis Smith M1DLG** (Newbury) went portable on Warbury Hill (IO91GI) during the tropo on March 14th. They used a Yaesu FT-857 and a 7-element beam at approximately 1.5m from the ground. The hill is around 300m ASL. They concentrated on repeaters and were able to work through GB3CF (Leicestershire), GB3IN (Nottinghamshire), GB3PO (Ipswich), GB3TO (Northamptonshire) and GB3NB (Norfolk). They also had one QSO on s.s.b. with G8PZT in Kidderminster. Norman says that they hope to go back on to the hill perhaps during one of the RSGB UK 144MHz activity contests to see if they can do better.

David Bowen 2W0ZJA (Brecon) reported a QSO with **John Phelan EI4EY** (Raheen, County Limerick) on the morning of March 25th – nice going over a very difficult path through the Cambrian mountains. David found conditions better than normal owing to the high pressure which was sat over the UK at the time.

It was really great to hear from **Franz van Velzen OE3FVU** (Kirchstetten, Austria) for the first time. Franz had



Franz OE3FVU uses 4x14 element cross-polarised Yagi antennas with MGF1302 pre-amplifiers.

a great time in the tropo and reports, "The morning of the March 14th, I was on the ON4KST chat (www.on4kst.com), monitoring what was going on with the enhanced conditions, and I noticed at 0854z that GW8JLY (IO81) was working into Germany. I turned my antenna towards Lyn. I asked him to turn his beam to me, as I seemed to hear something!

"Once that was done, I could clearly copy him with 51, and with his report of 55 I had a new best 144MHz tropo DX of 1407 km in the log. A bit later I worked G4LOH (IO70) at 1537km, again a new best DX ! I also worked **Pete Millard 2E0NEY** (Chippenham, Wiltshire), who gave me a 59 report over 1337 km. I thought he was mistaken as he was 51 at my place. After learning that Pete is using a modest station with a long Yagi antenna and 50W, I was very pleased with this QSO! After working G4RRA (IO80) at 1445 km, I heard a local QSO on the frequency on which I was calling 'CQ' for quite a while.

"It turned out to be **Don Roomes**

G0RQL (IO70) asking G4RRA who he had just worked. John turned his beam and another very nice QSO at 1475 km was in the log! Again a station without a huge antennas and without huge power, just 100W and a single Yagi. I also managed to work F1CXW (JO20), G4SWX (JO02), G4AEA (JO01) and PA2CHR (JO32) – PA2CHR was my first Dutch station in Tropo. My take off to the Netherlands is very difficult as I have a mountain in front of me which is about 800m higher than where I am, in the valley.

"The direction to the UK is far better! Conditions dropped around 1030z and no real DX was heard until just after 2200z when I heard G4SWX again with real 59+ signals here in Austria. Later I worked M0CUS (IO92) and my first ON station in Tropo, ON4KHG (JO10). G7RAU popped up in IO90 and then PA3BIY (JO22), ON6NL (JO21), ON4LP (JO10) and OR0A (JO20). I also tried to work some GM stations, but to no joy. I stopped at around 2400z, hoping for similar or better conditions next

morning! Unfortunately, conditions were back to normal. But it had been a great day!"

Thanks for your fascinating letter Franz! Incidentally, Franz also added that he's always open for Meteor Scatter (MS) tests, especially with newcomers to the mode. Just contact him via franz@oe3fvu.eu or via the **ON4KST** chat site. Franz uses 4x14 element cross-polarised Yagi antennas with MGF1302 pre-amplifiers, with separate cabling for horizontal and vertical. Interestingly, Franz feeds the EME signals from each polarisation into separate PCs.

Franz can run around 1200W for e.m.e. or around 400W on meteor scatter. He can also switch to a single 9-element Yagi as the e.m.e. array can be too narrow for use on tropo occasions. Thanks for a fascinating description of propagation from the 'other side' Franz, as well as describing your excellent station.

Franz also commented about the *PSK2K* software, which I covered recently and his comments reflect what I have seen elsewhere. "I run four PCs in my shack for Amateur Radio purposes; two of them run *Windows XP/SP3*, one *Windows7/32bit* and one *Windows/64 bit*. A few months ago, I had *PSK2K* installed on one of the *XP* PC's, but for some other reason I had to reinstall *XP*. So basically it was then a 'clean machine'.

"After installing *Matlab* (a library which is required to run *PSK2K*) I wanted to install *PSK2K*, however, starting *PSK2K* resulted in an error as it would not work with the Delta 44 card, which I use for SDR reception. I did not bother too much, and started installation on the three other PCs, but starting *PSK2K* on any of these three resulted in an error (*Matlab* not found). So back to the only PC, I knew was working before! Re-installing resulted, however, in the very same error.

"Asking questions on the **ON4KST** chat and in the Yahoo group gave me a wealth of offered help, but it did not lead to any positive result!"

Thanks again Franz! Incidentally, Franz feels – and I'm inclined to agree – that although the project looks very promising, it's not yet ready for 'prime time' and though the core functionality looks good, it needs to be easier for 'ordinary' people to install and use.

Graham Boor G8NWC (Spalding, Lincolnshire) found some good conditions on the morning of March 25th and worked **OO7K** (JO21), **OP7V** (JO10), **DL6YBF** (JO31) and **ON6ZT** (JO10).



Ernie Stagnetto ZB2FK's new QSL card. Radio Amateurs in Gibraltar have permission to use the ZQ prefix in celebration of the Queen's Jubilee.

Although it wasn't 'real' DX – but enjoyable all the same – was a QSO that I had when on top of White Horse Hill in Oxfordshire whilst out for a walk as **G4VXE/P**. I worked **Mike Hunter 2E0YYY/P** on Long Mynd in Shropshire using my IC-E92 hand-held running around 5W f.m. to a 'rubber duck' antenna.

From home I missed most of the tropo although heard a good number of DL stations at reasonable distances. However, during the RSGB's UK Activity Contest on April 3rd, I worked a few stations including **F1VNR/P** (JO10) and **GD8EXI** (IO74).

Gavin Nesbitt M1BXF (Trumpington, Cambridgeshire) has had a good month and worked around 81 QSOs on 144MHz including contacts with France, Germany, Netherlands, Sweden, Czech Republic, Belgium, Denmark and Spain. Gavin says "When 2m gets busy I like to switch from my IC-910 to my SDR set-up which consists of a FLEX-1500 driving a Microwave Modules 28/144 (28MHz i.f.) transverter which allows me search and pounce if needed, this drives into my Sagra 600 (2 x 4CX250) amp which happily runs at 350W. The antenna is a 9-element YU7EF antenna at 13m a.g.l. on a SCAM12. I also have an SSB Electronics masthead pre-amplifier but it's not used much as the coaxial cable run is only 17m."

Phil Oakley G0BVD (Great Torrington, Devon) says he's been very busy working outside but did manage to get in front of the radio to work **F4BNF** (IN99) and **F6APE** (IN97) on March 13th. Phil missed working **DF5NK**, but heard him at good strength.

The 432MHz Band

It was good to hear from **Matt Porter G8XYJ** (Ludlow) who had previously written when he had the call **2E0XTL**

– congratulations on the upgrade! Matt and his friend **Dave Passey M0MYA** (Kidderminster) operated in the RSGB's 432MHz UK Activity Contest on March 13th using the callsign **M0TWC**. They worked some 25 continental stations from Sweden, Denmark, Germany, The Netherlands, Belgium and France. Both Dave and Matt agreed that this is the best DX they have ever experienced on any v.h.f./u.h.f. band!

Here at **G4VXE**, my best DX during the tropo was **DF0HF** (JO50) who had an excellent signal on March 14th. I looked carefully for Czech stations, but sadly couldn't hear anything. It seemed that the band was best in the morning and evenings as the temperatures transitioned from night to day and back again. During daylight hours, conditions were not spectacular, although quite good around the UK judging by some of the repeaters that I was hearing.

The 1296MHz Band

Next it's on up to the 1296MHz band, where **Gavin Nesbitt M1BXF** writes, "On 23cm I use my IC-910 into a home-constructed 80W p.a. based on a pair of **G4BAO** 45W modules and **W6PQL** hybrid combiners. I also have a home-brew **G4DDK** masthead pre-amplifier fed with 17m of Ecoflex-15 coaxial cable and the antenna is a 35-element Tonna, above the 2m beam at 14m."

Gavin's best reported DX on the band was **SM7ECM** at a distance of 934km on March 25th.

Well, that's it for this time! Some spectacular openings reported this month from all over the world! Hopefully we shall soon have some Es to report – be vigilant on the lower v.h.f. bands particularly during the late mornings and early evenings. Good luck and have fun! Cheerio until next month.



Carl Mason GW0VSW's HF Highlights

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E-mail: gw0vsw@btinternet.com

Enjoying Amateur Radio Afloat on Rivers and Canals!

Carl Mason GW0VSW extolls the delights of operating from inland waterways before presenting his round up of your h.f. activities. All reports to Carl by the 15th of the month please!

Did you know that over half the population of the UK live within 8km (5 miles) of a canal or river and that every year more than ten million people visit Britain's inland waterways to fish, walk the towpath, observe the wildlife or go boating? Well John Rogers M0JAV has had the idea to organise British Inland Waterways on the Air (BIWOA) in a similar manner to Railways on the Air. To begin with John saw this as an opportunity to rag chew with fellow Radio Amateurs operating on, or close to, Inland Waterways.

Operating locations could include being onboard narrow boats and other water craft or operating from the towpath as pedestrian, bicycle or field station/Mobile. In the longer term, depending on the level of interest, enthusiasts could attempt as many

British Inland Waterways contacts as possible. Categories could include Worked All Canals and/or Rivers (WACAR), Worked all Lock Pounds or even Worked all Canal and River pubs.

Incidentally, *PW* reader Mark Proctor G1PIE said last year the Chorley & District Amateur Radio Society (see website at <http://www.radioclubs.net/chorleyamateurradiosociety/news.php>) took part in the first BIWOA event at the end of July operating as MX0ISN from the top lock at Wheeton near Chorley (Fig. 1) and made just over 100 contacts on both h.f. and 144MHz using a Yaesu FT-920 and an Icom IC-208. The antennas included a dipole for 3.5MHz and a G5RV for other h.f. bands and the dual-band vertical for v.h.f./u.h.f.

Mark reported to *HF Highlights* that

20 members of the society were on site during the day including our youngest member Joe Rowen M6JRZ, Fig. 2. Further information can be found at www.biwota.org/ and this year's event will take place over the August Bank Holiday weekend to coincide with Inland Waterways Associations Campaign Festival 2012 www.waterways.org.uk/events_festivals

The proposed operating times are from Sunday August 26th at 1200 until Monday August 27th at 1600UTC. If you are interested in the BIWOA or the event the get in touch with John at drm131@rs.gb.org.uk A list is already being made up for this years event and it would be good to see activity from all around the UK.

Foundation Licence

On to Bob Taylor G1WEX next. Bob sent in a short E-mail saying "I must thank you for adding the information I sent you to your April column. I feel it fair to say a large number of our members have taken, or are taking, the Foundation Licence which at face value is a good thing. However, a debate as started about the usefulness of 10W on the h.f. bands and the common practice of exceeding this level with the excuse being 'it can't hurt' despite what the licence conditions state. There also seems to be a lack of enthusiasm to move higher up the 'licence ladder'. I'm not sure what *PW* or I can do to bring about a change to this attitude? Maybe it's just that the Foundation Licence is not working!"

Thanks for your E-mail Bob! Now, I'm sure there are many of you out there with views on this and if so let's hear them.



Fig. 1: Mark Proctor G1PIE from the Chorley & District Amateur Radio Society took part in the first BIWOA event in 2011, operating as MX0ISN from the top lock at Wheeton near Chorley, Lancashire.

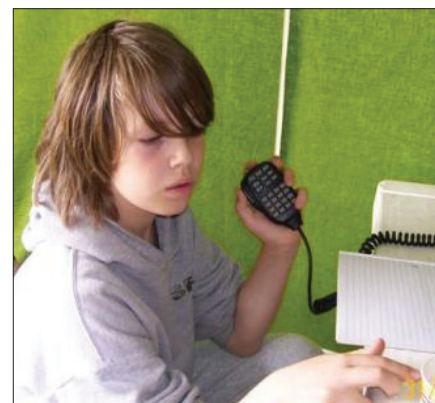


Fig. 2: More than 20 members of the Chorley & District ARS were on site during the BIWOA including their youngest member Joe Rowen M6JRZ.

The DX News

On to some DX news and there'll be two Special Event stations celebrating the 57th edition of the Eurovision Song Contest to be held in Baku, Azerbaijan in May. The club stations 4K7Z and 4J4K will be using the special callsigns **4KS0NG** and **4JS0NG** respectively until June 15th on all h.f. bands.

Closer to home **Geoffrey Pendrick M5GAC** will be staying in a cottage next to the sea on the Isle of Arran EU-123 WAB NS02 from the July 1st to 8th and will be operating as MM5GAC/P. He plans to operate early mornings and evenings on the 3.5, 7 and 14MHz bands with a new and much improved doublet antenna 31m (102ft) long at about 12m (40ft) high with his Yaesu FT-840, using 100W s.s.b. employing a Heil Pro headset.

Your Reports

On to your reports now and once again it's the logbook of **Eric Masters G0KRT** in Worcester Park, Surrey who starts us off with contacts on the 3.5MHz band. Using a Kenwood TS-570 and modified W3EDP antenna tuned with an SG-230 smart tuner Eric had 100W c.w. QSOs with W2FU (USA) in New York at 0327 and VY2ZM (Canada) in Eastern Kings County, Prince Edward Island at 0336UTC. This station has an interesting webpage at www.vy2zm.com which is well worth a look.

On 7MHz Eric used QRP at 5W working 9H3ET (Malta) EU-023 at 0613. The call is that of **Peter Hobbs G3LET** who was operating from Gozo Island (often referred to as 'Malta's Garden!') mainly to participate in the RSGB Commonwealth Contest. Peter operates from a cliff-top site to the NW of Gozo and uses an Elecraft K3/100 (with a K2/100 as back-up) into a tri-band vertical antenna for 14/21/28MHz. He also has the option of a multi-band dipole covering 7 to 28MHz to allow for the shorter skip within Europe and tuning is accomplished using an LDG a.t.u.

The antennas are supported by 2 x 18m and 1 x 12m Spiderpoles, which enables the station to be assembled by a single person. Peter's operation is from his Seat Alhambra MPV using the vehicle battery – but there's also a small generator and home-brewed 13.8V 20A supply available for use during longer operating periods. Check out the photos on Peter's *QRZ.com* pages.

A little later K3ZO (USA) in Maryland made it into Eric's log at 0734. Even later on the 10MHz band Eric found UX7UA (Ukraine) 2025UTC using c.w. at 100W.



Fig. 3: Tom Ruddell 2I0TJR received this QSL from VK2GWK (Australia) following a 14MHz s.s.b. QSO.



Fig. 4: The Athens QRPNet arranged an h.f. QSO activity in March to mark the end of the Morse requirement in Greece and Panos SV1GRN enjoyed a day on the beach!



Fig. 5: Panos SV1GRN built the Delta Loop described by Ray G4OWY in *PW* and found it to be very successful.

The 14 & 18MHz Bands

The 14MHz band was in "Great shape with good propagation to VK and ZL via long path around 0800UTC" according to **Tom Ruddell 2I0TJR** in Portadown, County Armagh in Northern Ireland. He used his Kenwood TS-570DGE and 50W s.s.b. into a home-brewed vertical antenna to work VK2GWK (Australia) (Fig. 3) OC-001 in New South Wales at 0806, and then ZL3OZ (New Zealand) OC-134 in Timaru. Then came South Island at 0927, SV5BYR (Dodecanese) EU-001 at 1503, VO1DGP (Canada) 1510, CN8QN (Morocco) 1842 QSL via EA7FTR, HZ1DG (Saudi Arabia) at 1908 also via EA7FTR, 4Z5RR (Israel) 1921 and WB2REM (USA) in Florida

at 1924UTC. Tom added "Interesting that the European 'Big Guns' seemed unaware of these openings and it was not until a few days afterwards that the pile-ups really began".

A log from **Bill Ward 2E0BWV** in Edwinstowe, Nottinghamshire shows data contacts with PSK31 stations EU6AW (Belarus) 1155, OE9HNV (Austria) 1212, HB9DOU (Switzerland) 1235, IN3GNV (Italy) 1415, and R3FO (European Russia) 1515. Then came DK6WH (Germany) 1526 and OM7OM (Slovak republic) 1702UTC using an Icom IC-7400 and 25W to a Pro Whip antenna.

In Yeovil **George Davis G3ICO** used QRP once again to log ZL3IO (New Zealand) OC-036 North Island at 1458, S540DKR (Slovenia) 1529 QSL Radio Club Skofja Loka QSL via S59DKR, VK3TDX (Australia) in Victoria at 1533. Next into the log was 9A201CTL (Croatia) 1539 Radio Club Lipik (QSL via 9A4MF), HS0ZJF/9 (Thailand) 1556 QSL via ON4AFU, 7X2ARA (Algeria) 1715, VP2MOM (Montserrat) NA-103 at 2023 (QSL via DL7JOM) and finally, J88DR (St. Vincent) NA-109 at 2006 (QSL via G3TBK) using a Elecraft K2 at 5W to a doublet antenna.

From Athens in Greece, **Panos Dadis SV1GRN** E-mailed to say "Until recently Greece had two radio Amateur Radio Licence classes, Class 1 (SV) and Class 2 (SW) although the written exams for both of these were the same. Class 1 had the option of a Morse test but that has recently been abolished and the two classes are now equal – giving several of our local Amateurs in Athens access to the h.f. bands.

"It was said by a great many operators, that the Radio Amateur examinations used Morse as a 'filter' to reduce the number of Amateurs. So, to mark this change the Athens QRPNet (www.athensqrp.net) announced an h.f. QSO activity in March called the 'Bye-bye CW filter Party' to welcome these Amateurs to the h.f. bands (Fig. 4). Today, five months after the law changed, I realise how it has benefitted the local Amateur Radio community. For an antenna I decided to build the Delta Loop antenna (Fig. 5) presented in *PW*'s February issue by **Ray Howes G4OWY** and I must say that the antenna worked flawlessly – especially on 14MHz during the event.

"Contacts were made throughout Europe and with DX stations including K1TO and VK2DX. The party was a deemed a great success by all participants and our team of 14 licenced operators (Fig. 6) made many contacts on the h.f. bands, both local

and DX, from our location by the sea at Artemida.

"On the other side of the Aegean Sea a group from Izmir (Turkey) activated the special callsign **TC3IRESC** with similar results. Many of the other Greek stations were also using antennas from Sandpiper, a company based near you in South Wales and their successes on the 14 and 21MHz bands included VR2VBV, RA9UKB, VU3LMS, 9M2MSO, V5/DK2WH, YB0NSI etc. We are now preparing the next event and hope that many readers of *PW* will participate when it's announced." Thanks for your report Panos – we'll all look out for your announcement.

Using his Icom IC-756PROIII at 100W and a Sandpiper MV10 vertical antenna on the 18MHz band, Panos logged HA7RM (Hungary) 1054, UT9LI (Ukraine) 1101, 9A206ZT (Croatia) 1109 (QSL via 9A6ZT). Then came SP1TJ (Poland) 1127, OK1VKQ (Czech republic) 1147, YL2KF (Latvia) 1411, HZ1TT (Saudi Arabia) 1432 (with G5RV), DL8AKR (Germany) 1437, RA9FGW (Asiatic Russia) 1446, and finally, (Fig. 7) IW2NLU (Italy) 1457UTC.

The 21 & 24MHz Bands

On the 21MHz band **Terry Martin M0CLH** managed to catch a few DXpeditions using his Cushcraft R8 vertical antenna – but using full legal power from his SPE 1K-FA linear amplifier. Terry reports "I have to say that this amplifier is a dream to use. Once it is matched to the antenna on all required bands – it just automatically follows the IC-756PROIII! This is in sharp contrast to the Club station G3ZEF (Fig. 8) that I operate from on Wednesday lunchtimes at the Culham Science Centre near Abingdon, from which I retired last year. There we have a Kenwood TS-570D as an exciter to an elderly Drake L7 linear – which was rescued from a skip by one of my colleagues when a disused laboratory was being cleared out! There's a picture of it and the station on **QRZ.com** Band hopping with this venerable device to catch the DX takes somewhat longer." Thanks your report Terry!

Terry's logbook included A71AM (9) (Qatar) FY/F6CKD (French Guiana) 1149, 9K2F (Kuwait) 1205 QSL via 9K2HN, 6V7S (Senegal) 1230 (QSL via RK4FF), and UT5EJT (Ukraine) at 1231. Then came TN2T (Republic of the Congo) 1346 (QSL via M0URX), WX4QN (USA) in Tennessee 1443, A61QQ (UAE) at 1417 (QSL via IZ8CLM). Finally, he worked A92GE (Bahrain) at 1451, and HK0NA (Malpelo



Fig. 6: The team of Amateurs from the Athens QRPNet thoroughly enjoyed the 'on air' activity in March.



Fig. 7: Panos SV1GR received this QSL card from IW2NLU for a QRP contact on 14MHz.

Island) SA-007 at 1200UTC (QSL via N20O).

Also on the band was **Maynard Beddard M1EGX** in Sutton Coldfield (West Midland), who used a simple dipole to work VU3XU (India) at 1155, CO6LC (Fig. 9) (Cuba) NA-015 at 1305 (QSL via EA5GL), A61QQ (11) (UAE) at 1310 and PJ7PT (Sint Maarten, Caribbean) NA-105 at 1845 (QSL via SP9PT) using a Yaesu FT-920 and 100W s.s.b.

The PSK31 from **Steve Wellon G0SAS** provided a QSO with WA0AM (Fig. 10) (USA) in Texas at 1613UTC using an Icom IC-756PROIII and PSK31 at 20W to a Cushcraft MA5B mini-beam.

A move to the 24MHz band provided Maynard with VR2XMT (Hong Kong) 1152, XW3DT (Laos) 1203 QSL via RK3DT and AP2IA (Pakistan) at 1235UTC.

In Croydon **Nicholas Phillips 2E0BPU** tried the 24MHz band once again finding H2T (Cyprus) AS-004 at 0903 (QSL via 5B4XF), UP0L (Kazakhstan) 1514 (QSL via DL8KAC), UA4PAN (European Russia) 1516, UR7AA (Ukraine) 1619, ER3ZZ (Moldova) 1647 and 4Z5PG (Israel) at 1651 using an Icom IC-703 and 7W s.s.b. to a 30m (100ft) doublet antenna.



Fig. 8: Terry Martin M0CLH often operates the Club station G3ZEF during lunchtime now he's retired.



Fig. 9: Maynard Beddard M1EGX received this card from CO6LC after a QSO on 21MHz.



Fig. 10: Steve Wellon G0SAS received this QSL from WA0AM following a PSK31 QSO on 24MHz.

The 28MHz Band

Finally, the 28MHz band was open for a time and Eric G0KRT used 100W s.s.b. to work SV5BYR (Dodecanese) at 1633. Meanwhile in Yeovil George G3ICO used 5W c.w. again working 9H3ET (Malta) at 1144, and ZD7XF (St. Helena) AF-022 at 1256 (QSL via G3TXF). Then came 7Q7BP (Malawi) at 1149 (QSL via G3MRC), 9J2BO (Zambia) at 1423 (QSL via G3TEV). Then came ZS1EL (South Africa) 1432 (QSL via K4YL), 6Y0A (Jamaica) NA-097 at 1542 (QSL via WA4WTG). Next into the log came ZF1UM (Cayman Islands) NA-016 at 1625 (QSL via G3NKC), C56XA (The Gambia) 1634UTC (QSL via G3SWH) and 5R8AL (Madagascar) also via G3SWH.

That's it!

Well, that's for another month and as usual my thanks go to **Maurio Pregliasco I1JQJ/KB2TJM** editor of the **425 DX Newsletter** for all the DX information and to all our reporters for their logs. Until next time I wish you all good DX. 73, Carl GW0VSW

Roy Walker G0TAK takes a look at the need for and the use of phonetics – something that still causes confusion!

Phonetics

The Evolution

Soon after the invention and development of a satisfactory microphone for use 'On Air' in radio communications – including radiotelephony (r.t.) it was realised that there was a need to ensure that the 'correct' message got across. Broadcasters were faced with national audiences exhibiting different local dialects and pronunciation and potentially foreign audiences not speaking the broadcasting country's language as their mother tongue. And the military and the postal services required the accurate transmission and reception of messages to their various units, often in noisy environments.

Correct Pronunciation

Broadcasters such as the British Broadcasting Company (before it became the British Broadcasting Corporation) insisted on correct pronunciation and use of correctly

constructed grammatical text. The famous 'Standard English' was born. Since then almost every country seems to have jumped on the bandwagon and imposed its own Phonetic alphabet.

The military found it necessary to spell out critical parts of messages to avoid confusion and 'Chinese Whispers'. We all probably remember this game - the classic being the whispered 'Send reinforcements - we're going to advance' – which ended up as the classic 'Send three-and-fourpence – we're going to a dance'!

I have no doubt that the ever resourceful 'Tommy' invented his own version of well known words to indicate specific letters but it was soon necessary to standardise the use of phonetics so that there were no inadvertent errors and so that the informal procedures could be regulated by a formal set of operating rules.

My copy (I'm not the original owner Hi!) of the *Army Field Service Pocket*

book (of 1914) devotes 10 pages to 'Intercommunication' including the Morse alphabet (including long and short numerals), flag hoists, semaphore; with separate paragraphs detailing communications with the Royal Navy and the Indian Army. Nowhere is there any reference to a phonetic alphabet.

By the way, on page 64 of the booklet, it allocates "prefixes" to messages to indicate the precedence and order of transmission. For a message which is "to be transmitted at the receiving station" the prefix allocated is '**DX**' I wonder if this is where the term DX, meaning a distant station came from?

The RAF Pocket Book 1937 (A.P. 1081) introduces, on page 42, the first British Phonetic Alphabet I've been able to find. The letter 'T' and 'H' in this phonetic alphabet are the basis of the expression "As dim as the Toc H lamp" T.H. Being the acronym for the Talbot House Charity of First World War fame. (google Toc H).

The *British Railways Rule Book 1950* contains a deal of information about signalling, as you might imagine, but no sign of a preferred alphabet!

British Phonetic Alphabet

The words used to represent letters in the British phonetic alphabets are unmistakable and don't offer any chance of being confused with any other letter, (well almost). The equivalent letters in other languages offer the same advantages but reveal something about their origin.

The British 'A' (or international) alphabet consists of the names of cities around the world.

The French and German alphabets consist almost entirely of appropriate forenames.

The Italian alphabet is constructed from names of Italian cities and the Spanish version is a mix of names and cities.

A more complete explanation is contained in morsecode.scphillips.com/alphabet.html and on the website bckelk.uk.fsn.org

Tiny Fraction Of Variations?

The phonetic system shown in **Table 1** are almost certainly only a tiny fraction of the variations we'll come across on the air. However, I'm not awarding prizes for you to identify others!

Table 1

	RAF 1937	RAF 1943	Telecon B	British 1952	NATO 1956
A	Ack	Apple	Alfred	Abel	Alfa
B	Beer	Beer	Benjamin	Baker	Bravo
C	Charlie	Charlie	Charles	Charlie	Charlie
D	Don	David	David	Dog	Delta
E	Edward	Edward	Edward	Easy	Echo
F	Freddie	Freddy	Frederick	Fox	Foxtrot
G	George	George	George	George	Golf
H	Harry	Harry	Harry	How	Hotel
I	Ink	Ink	Isaac	Item	India
J	Johnnie	Jug/Johnny	Jack	Jig	Juliet
K	King	King	King	King	Kilo
L	London	Love	London	Love	Lima
M	Monkey	Mother	Mary	Mike	Mike
N	Nuts	Nuts	Nellie	Nan	November
O	Orange	Orange	Oliver	Oboe	Oscar
P	Pip	Peter	Peter	Peter	Papa
Q	Queen	Queen	Queen	Queen	Quebec
R	Robert	Roger/Robert	Robert	Roger	Romeo
S	Sugar	Sugar	Samuel	Sugar	Sierra
T	Toc	Tommy	Tommy	Tare	Tango
U	Uncle	Uncle	Uncle	Uncle	Uniform
V	Vic	Vic	Victor	Victor	Victor
W	William	William	William	William	Whisky
X	X-ray	X-ray	X-ray	X-ray	X-ray
Y	Yorker	Yoke/Yorker	Yellow	Yoke	Yankee
Z	Zebra	Zebra	Zebra	Zebra	Zulu

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Paul Beaumont G7VAK shares his experience of dealing with extremely high levels of interference from electrical and electronic devices

RNAS Yeovilton International Air Day

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Scanning Scene

Experiencing unseasonably warm weather, Bill Robertson's thoughts turn to ducting and the final journey for the NASA space shuttle Discovery

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Mike Richards presents a solution to a problem for many Decode readers – audio patching associated with software defined radios

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Pat Carty brings you news on the MC-130J Commando II, the P-8A Poseidon, changes to Italian Air Force callsigns, the RAF Northolt Flight Watch scheme and the final journey for the NASA space shuttle Discovery

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David Smith reports on the temporary restrictions to be implemented during the Olympic Games

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Radio rally calendar

DVT

Keith Hamer and Garry Smith provide you with an update on activity on Bands I and II

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Robert Connolly looks at the wide range of weather related broadcasts intended for mariners that might also be of interest to the hobby radio enthusiast

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Godfrey Manning answers readers' questions and advises them how to find out the frequencies allocated to flights in their areas

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Chrissy Brand shares readers' logs, hints and tips and reports on her recent trip to the Canary Islands

Spectral Analysis – Software Defined Radio Fundamentals

In the second part of this series, Mike Richards delves a bit deeper into the displays provided by software defined radio programs

Mode-S Virtual Radar

Pat Carty reports on a test flight that lasted nearly three hours and offers his initial thoughts on a new USB size receiver

My Weather Day

Georg Wiessala describes a day in his shack during which he pursues his passion for getting accurate weather information

Radio Related Website

Chrissy Brand brings you another interesting collection of links to radio related websites

Off the Record

Oscar reports on a short documentary that looks at the pirate radio scene both past and present

Comms from Europe

Simon Parker reports on the latest batch of programmable transceivers manufactured by Qixiang. He also looks at echo on the President Teddy and new vertical antennas from Sigma Euro-Comm

Software Spot

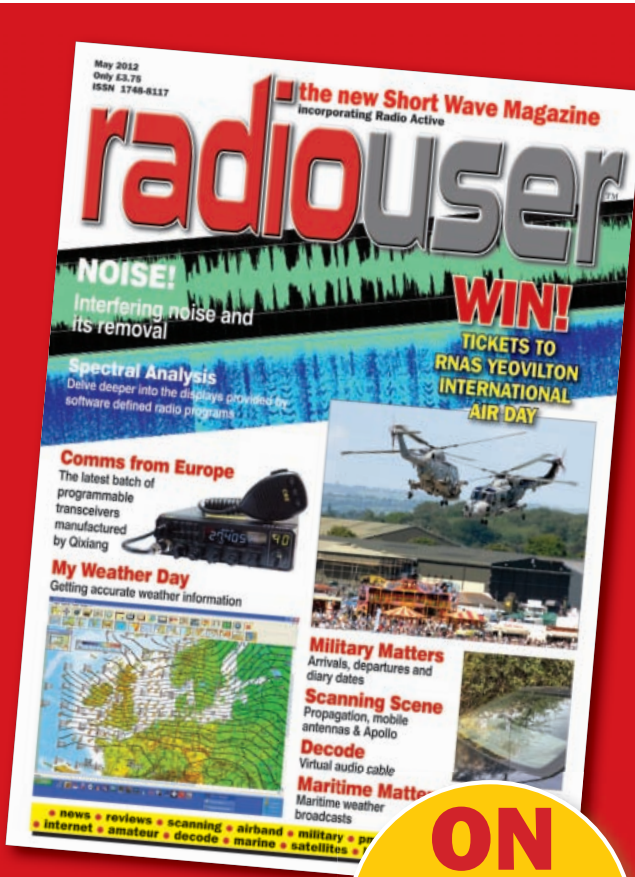
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Radio Spectrum under threat!

As users of the Spectrum, the issue is simple: PLA devices are causing interference and if we don't do something now we might not have a hobby take part in – it's that serious. We have created a Spectrum Defence Fund – not just to fight the PLT issue but other threats as and when they come up.

The Spectrum Defence fund is made up from donations from individuals and organisations with an interest in protecting the Radio Spectrum from noise, interference, and other issues that may affect licensed Amateur Radio Operation and Short Wave Listening. It is used to cover the cost of challenging the regulators of the spectrum (Ofcom, EU etc) over threats to spectrum noise level.

We are looking to our administration (Ofcom) to protect our interests, which it is their statutory duty. There are other challenges ahead and the fund will be used only to protect the Spectrum when and where we need to do so. This is a long term project and all monies donated will be 'ring fenced' for these actions alone.

If every amateur in the UK pledged £10 to the Spectrum Defence Fund we'd probably have enough to fight the cause and so we need your donations (no matter how small) to help us meet the threat.

Please help amateur radio and the radio spectrum by donating to the fund today!



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Diplomatic Wireless Service Part 3

Ross Bradshaw G4DTD concludes his look back at his career with the government's diplomatic communications service and the adventures he experienced.

To comply with the required once-a-month c.w. Morse test, some stations just switched the main Racal 500W transmitter to c.w. and blasted away on a Morse key for a few minutes before going back to Piccolo and sending traffic. The pressure of the amount of traffic forced some stations into the short cut.

However, my boss always tried to do it by the book, just as I would have preferred. So, with the Mark 123 plugged into the reserve monopole antenna up on the roof, I happily keyed away while my boss continued our morning traffic schedule.

While I was in Tel Aviv in Israel, two engineers arrived to strip out the 32-tone Mark D piccolo and install the six-tone Mark F piccolo. Just before they departed, after installing our new Mark F installation, the boss and I got them to give the pair of us the low-down on how it all worked. So much for me not needing a Mark F course!

In the photograph of the Mark F six tone piccolo installation, **Fig. 3.1**, under the antenna tuning unit for the transmitter (left hand cabinet) from the top there are the;

The PV 2277 mode selector unit. This permitted receiver A and B to be 'slaved' or for receiver A or B to work independent of each other. When the receivers were slaved, altering the frequency on one receiver automatically altered the frequency on the other receiver.

Under the double row of air vents there's a Plessey PR 2250 Receiver. Under the four rows of air vents we have the RFS 11 RF selector unit. Although transmit and receive frequencies were at least 1MHz apart, the selector unit peaked up the receive frequency to give added protection from the transmitter. Under the next row of air vents there is a six-tone Racal RA 1117 Piccolo unit. Under the RA 1117 there's the synthesiser unit – the Sayrosa 607B.

Under the Sayrosa synthesiser there's a double row of air vents and then the HCD reference oscillator – to which the piccolo unit is stabilised. The acronym HCD stands for 'Henry Charles Davenport' the designer. A large space in the rack is blanked off and then there's a row of fuses for the equipment at the bottom of the unit.

The right hand cabinet is much the same as the other one except the top unit is the SCU or Switch Control Unit. This switches the installation to the 911 room, which answers any alert by Hanslope Park, (in the past we had used a loop of five-unit tape as I've already described, but by this time it was all solid state).

To alert Hanslope Park out of normal hours, the unit could be used to operate the alerting sequence. Note that the second RA 1117 piccolo unit, the

Editor's introduction: Ross Bradshaw G4DTD's article is something rather unusual for PW and any branch of the 'Secret Squirrels' are always quite sensitive whenever their work is mentioned – even when it's historic. But I'm sure that our readers will be fascinated and if any reader remembers – and responded to – the DWS Recruitment stands at Radio Shows in the 1960s, I would be pleased to hear from you. **G3XFD.**



Fig. 3.1: Two Mark F six tone piccolo installation units under the antenna tuning unit for the transmitter.

second Sayrosa 607B and the second HCD units are spares.

The cabinet on the extreme right contains the Racal TA 1816 transmitter. The four 125W modules can clearly be seen across the middle of the rack.

Return To Hanslope Park

After my return to Hanslope Park I continued working in the Comcen building. We expected a newly-built Comcen to open in mid 1986 that would be all computerised so, doing away with the torn-tape relay. So it came about that in the middle of 1985 I went on the first ever MHS training course, ready for when our brand new CRS opened up.

It all seemed to be a bit of a waste of time as the computer system was not fully trusted; for a short time we would still be working the torn-tape system as back-up. It may seem amazing now but the computer hard disc for the MHS only had a storage space of 64 megabytes!

However, we must remember this

was in 1986! It would be nearly ten years before *Windows 95* appeared with hard drives of a whopping 512 Megabytes!

I had a computer at home at the time, it was an Amstrad CPC464 with 64 kilobytes of memory. Once a word processing program was installed I had 22 kilobytes of memory to use, about four A4 sheets worth. So, in those days our MHS memory of 64 megabytes seemed enormous!

I would be working in the Comcen to start with – but wanting more of a challenge, I asked to work in Radio Circuits Control System RCCS. Our engineers had wired up the Comcen ready but forgot that ‘operators’ would be using the system and might want to contact a station to do a frequency change. This matter had been overlooked (they should have asked the operators in the first place!) and so some hasty rewiring had to be carried out.

In the RCCS there would be about 40 stations to handle, ensuring the in and out frequencies were satisfactory, before switching them into the Comcen to pass traffic. Nearly all these stations were using TOPIC/BID 770 and six-tone (Mark F) Piccolo. Only one station was still on ALVIS/BID 610. Our on-line cipher landline link to London, the old G arm, would be on the faster cipher gear BID950/HORA.

Moving From HF

By 1992 there was a definite move away from high frequency (h.f.) radio as a means of communication. Slowly all our radio stations closed their Piccolo equipment down and went onto landline or satellite communications.

By the end of the year there had been many changes. Radio was replaced by EDUCATOR and BID770/ TOPIC by BID1280/AUCTIONEER. The landline to London was now using BID950/HORA and BID1680/ FRANTON. Whereas before, we had worked our circuits at 75Baud using BID610 and BID770, we now worked at 1200Baud.

The rather strange thing about it all

was that EDUCATOR, the acronym for Experimental Dial up Classified Telex On-line Replacement was only intended as a telex replacement! But the whole system was not as successful as had been expected; the PSTN and satellite links were proving more expensive than had first been planned, as well as more vulnerable. We (the operators) all considered that radio should have been retained but used with faster speeds to send traffic – but no one asked the operators, the people who actually operated the system.

Private Wire Cut

On October 13th 1992 Darwin ‘cut’ the private wire or ‘the M1020’ as we called it. All the Far East stations that had previously worked into Darwin then worked direct into Hanslope in the UK, some on PSTN and some on satellite. One station that had no option but use satellite was Ulan Bator because of the primitive state of the PSTN system in Mongolia at the time.

In early 1993 a ministerial decision had been made and after some 50 years of service, the CRS at Hanslope Park was to close, radio would be no more and everyone would have to travel to and from London on shifts. This seemed to be a weird way of doing things, after all we had a brand new Comcen that could take all London’s stations and not only that – the training school was across the car park from the CRS!

As things turned out, everything was moved back to Hanslope Park in 2008. By March 30th of that year we only had Tehran, Sanaa and Istanbul still working on radio into us, everyone else was on EDUCATOR. We then had more stations working into us than we had in the old radio days, which made us question why CRS was being closed!

The extra stations we then had, in addition to our 40 or so (ex) radio posts are shown in **Table 1**.

Tehran & Sanaa On Radio

By May 21st 1993 only Tehran and Sanaa (Yemen) were left on radio communications, time for our radio

posts was running out as everyone switched over to EDUCATOR. And on June 28th 1993 Hanslope Park worked the last ever Piccolo radio sked with Sanaa.

The only other radio station was Kaduna (North Central Nigeria) which had been using frequency shift keying (FSK) FSK but had been working into GKA (Portishead Radio operated by British Telecom International) for the several weeks. When Sanaa closed the Diplomatic Wireless Service passed into history, a service that had changed its name three times in the short 14 years that I had served.

Saturday July 3rd 1993

Then came Saturday July 3rd 1993 – a nice clear and fine day. No more stations to work, they had all now been passed down to the London Comcen.

Roy Tassel (DS8C) and **Fred Thorne** (DS8C) and myself (DS9C) walked around the grounds of Hanslope Park for the last time. The old CRS had been flattened some months before, only a small depression in the ground showed where it had once stood.

Razor wire topped the fences, glinting in the sun as we walked slowly along part of the fencing before ending up at a new building that had been built opposite the entrance of CRS. The new building had hanging plants and seats outside to sit on! All those years we had worked in the old CRS, (then the new CRS): we had never had conditions to work in like that!

We sat on one of the benches in the sun for a while before we returned to CRS. In the entrance porch way of the CRS building I noticed a plaque. The CRS had been opened on July 4th 1986. Only seven years later it had closed.

Today the systems we then used in the DWS may seem very slow, but in those days it was the best we had. With the expertise and dedication of its operators, the Diplomatic Wireless Service must rank as one of the best communications departments that this country has ever had. I’m proud to have been a member of its dedicated staff. ●

Table 1:

Abuja	Anguilla	Bandar Seri Begawan	Bridgetown
Canberra	Cape Town	Brisbane (telex)	Paris (paktel)
Grand Cayman	Manila	Grand Turks	Kuala Lumpur
Jerusalem	Karachi (paktel)	Luanda	San Jose
Melbourne (telex)	Tortola	Mbabane/Maputo/Maseru via Pretoria (telex)	
Montevideo	Plymouth	Port of Spain (on modem)	Wellington
Perth (telex)	Sydney (telex)		

The extra stations we then had, in addition to our 40 or so (ex) radio posts.



Roger Cooke G3LDI's Morse Mode

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Awards & RMS Titanic Keys

In Morse Mode this month Roger Cooke G3LDI mentions contest rules, an award and how you can get hold of a replica RMS *Titanic* Morse key!

Welcome to the world of Morse and *Morse Mode (MM)*! The new season has started amid much dissension, the new rules for the RSGB's CC contests are out. However, adopting the governmental hackneyed cliché of "We are all in this together", the Norfolk ARC is playing along to the new rules to see what the final outcome will be. It looks like it will be to our advantage at the moment, as we are in the section we wanted to be in and in the lead.

Much work has gone into training locally, especially with regard to the Morse classes. Despite my constant nagging at learning Morse, with my so-called 'Gruppenführer' approach, it has paid dividends. We now have three classes per week in Norfolk, ranging from raw beginners, with Improvers at 12 to 18wpm and an Advanced class, 18 to 30wpm.

All classes have club members in them and are all doing well. Our submitted log total is evidence of that. Admittedly the scores of some are low but then they have to gain both confidence and experience. Some have never even entered a contest before.

If the same approach could happen at all the other UK clubs, it would be

great. However, this doesn't seem to be happening. I even put an appeal in the CDXC magazine for some trainers – I got just one reply but so far nothing has materialised from that. Not to be despondent though, Morse is on a winning streak at present and although progress is slow, I think the momentum will gradually catch on.

My Morse book from the RSGB is still selling well, and has exceeded expectations, so that supports the increased interest in Morse! My thanks to those trainers in the GB2CW scheme that are doing a great job and let's see some more coming forward – Please!

The Essex CW ARC

A prime example of just what can be done comes from the **Essex CW Amateur Radio Club (ECWARC)**. The following came from **Steve Cocks G4ZUL** – ECWARC Chairman who wrote: "The Essex CW Club Memorial Trophy has been awarded to **Jeff Moya G7TAT** for his outstanding progress in learning the Morse Code during the c.w. classes given by **Jonathan G0DVJ** at the Colchester Radio Amateurs Club during 2011.

"The Trophy was donated to ECWARC by the family of the late **Peter Hale G4OAD** who was a member of South Essex Amateur Radio Society (SEARS). The award was presented to Jeff by ECWARC chairman Steve G4ZUL on 16th February 2012, **Fig. 1**. All members of ECWARC, would like to thank the



Fig. 1: Chairman Steve Cocks G4ZUL, of ECWARC, on the left and the Trophy recipient Jeff Moya G7TAT on the right.



Fig. 2: The replica RMS *Titanic* straight key being produced by Kent Morse Keys (Germany).

Colchester Radio Amateur Club for making this possible.

"More details can be found at: www.essexcw.org.uk The Essex CW Club is a unique group supporting and encouraging the learning and use of Morse code." Thanks for the update Steve.

Replica RMS Titanic Morse Key

Kent Morse Keys (based in Germany) are producing a replica RMS *Titanic* straight key and if you are looking for a well-engineered key, take a look at this. **Fig. 2** shows a picture of the key. If you order one before the launch, you will be entitled to a discount. Information about how you can order one, may be found at:

<http://www.kent-engineers.com/titanicinfo.htm>

Light Signalling

Light signalling – This item is almost a year old now, but still interesting nevertheless. Ever tried reading Morse with a lamp? It's not easy! However, this Morse Signalling unit looks like it was employed some years ago. Follow the links and read all about it. I found it fascinating, but not something I will be trying any time soon! **Fig. 3** shows the unit in question.

<http://www.boxted-airfield.com/richards/page3.html>

<http://www.fists.co.uk/images/keys/wwiilightsignallingunit.jpg>

<http://www.museumoftechnology.org.uk/expand.php?key=519>

<http://www.qsl.net/sv1edy/keypicture/425.htm>

Graham Smith G3ZOD g3zodfists@googlemail.com would be interested in any information. Time for 73 and May the Morse be with you! Roger G3LDI.



Fig. 3: Reading the Morse sent via a signal light, such as this one, isn't easy!

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Disclaimer

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ALINCO DJ596 DUALBAND H/HELD.....	£89
ALINCO DJC7 DUALBAND H/HELD	£84
ALINCO DX70T MOBILE HF RADIO	£349
ICOM 706MKIIG TRANSCEIVER	£600
ICOM 746 TRANSCEIVER	£699
YAESU FTC740A 4M TRANSCEIVER.....	£69
YAESU VX3E DUAL BAND HANDIE	£129

HANDHELD SCANNERS

AOR AR8200 MkII SCANNING RECEIVER.....	£299
TTI TSC3000R SCANNER.....	£79

RECEIVERS

ALINCO DXR8 COMMS RECEIVER	£459
AOR AR8600 COMMS RECEIVER.....	£475

ACCESSORIES

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BHI NEIM-1031 DSP NOISE ELIM MODULE	£79
UNIROSS CHARGER & BATTERIES	£12
ICOM AT180 AUTO ANTENNA TUNER	£399
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MFJ 1278B M/MODE DATA CONTR.....	£199
MFJ 208 VHF SWR ANALYSER	£69
MFJ 914 AUTO ATU59	
PALSTAR SP30 SPEAKER FOR R30	£49
BASIC SWR METER	£5
WATSON WPR2.....	£29
YAESU FC30 ATU	£179

B-GRADE ITEMS

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BEARCAT BCT15X SCANNER.....	£229
BEARCAT UBC3500XLT SCANNER	£170
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ETON FR650 PORTABLE RADIO	£49
ETON G3 PORTABLE RADIO.....	£69
ETON G6 PORTABLE RADIO.....	£89
ETON G8 PORTABLE RADIO.....	£39
GRE PSR200 SCANNING RECEIVER	£89
MAGIC BOX HANDHELD DAB.....	£39
MAGIC BOX KITCHEN DAB RADIO	£35
MOONRAKER M8 RADIO.....	£20
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KENWOOD TM-D700E	£275
KENWOOD TM-V7.....	£135
KENWOOD TH-28E INC BC-15 CHARGER.....	£99
KENWOOD TH-D7E	£125
ICOM IC-IC-725 INC IC-PS-55 OSU	£350
ICOM IC-706MKII	£399
ICOM IC-756PRO	£795
ICOM IC-M59 EURO	£99
SOMMERKAMP FT-102	£225
YAESU FT-1802M 2M	£75
YAESU VX-7R INC CMP-460A MIC.....	£245
YAESU VX-150.....	£99
YAESU FT-60E.....	£99
ALINCO DJ-V5	£200
ALINCO DX-70	£245
ALINCO DJ-195	£100
ALINCO DJ-S11	£75
ALINCO DR-430 70CMS	£85
ICOM PMR 446X2WATER RESIST/W.CHARG	£200
MIDLAND CB 77-250K.....	£50
MIDLAND CB 77-805UK.....	£55
MAXON ALERT 7E CB.....	£65

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WORLD RECEIVER WR2100.....	£80
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BPL WORLD SPACE.....	£25

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MFJ 949D VERSA TUNER II	£85
BNOS LPM 144/25/160	£245
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HANSEN FS-300H SWR/PWR METER.....	£35
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YAESU MD1 B8 DESK MIC	£50
YAESU SP-767	£75
YAESU XF-110CN FILTER.....	£55
YAESU XF-110S FILTER	£55
AKD WA3 ABS WAVE METER	£25
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MANSON EP925 25A PSU DEMO MODEL.....	£75
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DAIWA PS-310 30A PSU	£75
DAIWA PS-30X M11A 30A PSU.....	£95
DAIWA PS-50XM 5A PSU	£25
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WELZ SP-220 SWR/PWR METER.....	£65
PM-2000 2KW PWR METER.....	£70

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Uniden	UBC-60XLT	66-512MHz (with gaps) FM Hand Held Receiver 80Ch. 4 x AA cells.....	£59
Uniden	UBC-69XLT-2	25-512MHz (with gaps) FM Hand Held Receiver 80Ch. 2 x AA.....	£55
Icom	IC-F4SR	SRBR Hand Held Transceiver Programmed for PMR-446 24ch.....	£149
Icom	IC-F4SR	SRBR Hand Held Transceiver Programmed for PMR-446 24ch.....	£149
Alinco	DJ-191E	2m FM H/Held Transceiver + CTCSS & DTMF keypad.....	£119
Bencher	ST-1	Bencher Chrome Single Paddle on a Black metal base.....	£79
Alinco	DJ-V17E	2m FM Palm Transceiver 5W, DTMF keypad & CTCSS.....	£99
Uniden	PMR-845	Pair of PMR-446 up to 6km + VOX Twin-charger & Baby Monitor.....	£39
Albrecht	AE 6690	80Ch. 4W FM CB Mobile Transceiver + CTCSS.....	£99
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PacComm	Tiny-2	VHF Packet TNC Controller.....	£79
Yaesu	VAC-400U	Desk Rapid Charger for VX-150, VX-110 H/Holds (FNB-64).....	£35
Diamond	MX-62M	1.6-56MHz & 76-470MHz Duplexer 600W max.....	£49
TTI	TSC-100R	66-174MHz AM,FM WFM 200Ch. Mini Hand Held Receiver 4x AAA or 9V DC.....	£49
Alinco	DJ-X7E	100kHz-1300MHz AM, FM, WFM Hand Held Receiver 1000Ch + 8.33kHz step.....	£129
SSB	SSB-SP-6	50-52MHz 6m Low Noise Mast Head Preamplifier.....	£189
Yaesu	YSK-8900	Remote Mounting Kit for FT-8800 & FT-8900.....	£25
Microset	PT-105A	12V 5A (max) Protected Stabilized PSU.....	£35
Yaesu	VC-24	Lightweight VOX Headset + PTT & 3.5mm 4-pole Threaded Connector.....	£39
Yaesu	DMU-2000	Data Management Unit for FT-2000/D Transceivers will Need Monitor and Keyboard.....	£699
Uniden	PMR-885-2	Pair of PMR-446 Transceivers up to 6km + VOX Headsets Twin-charger & Baby Monitor.....	£49
Uniden	PMR-885-2	Pair of PMR-446 Transceivers up to 6km + VOX Headsets Twin-charger & Baby Monitor.....	£49
Alinco	DJ-S11	2m FM Palm Transceiver with 136-174MHz RX.....	£59
Yaesu	DMU-2000	Data Management Unit for FT-2000/D Transceivers will Need Monitor and Keyboard.....	£699
Icom	IC-7000	HF,6m,2m,70cm All Mode Transceiver + Gen.Cov.RX, DSP filters 12V DC.....	£839
MFJ	MFJ-702B	1.5-30MHz Low Pass Filter 200W max.....	£35
Yaesu	FL-2050	2m 50W Linear + 12dB Preamp 10W input 12V 10A.....	£129
Optoelectronics	Model-40	"Scout" 10MHz-1.4GHz Frequency Counter + Reactive Tune & 400ch.....	£239
Lilliput	TFT-7000	5.6" Colour LCD Display & TV Tuner + Remote & Video-In 12V.....	£79
Icom	IC-A22E	Airband Hand Held Transceiver + NAV/COM & headset adapter.....	£249
microHAM	USB-Interface II	USB Interface for Sound Card Software & Rig Control.....	£89
Alinco	DJ-X3	100kHz-1300MHz AM, FM, WFM Hand Held Receiver 700Ch + 8.33kHz step.....	£99
Yaesu	CT-61	Linear Amplifier Standby Lead for FT-847.....	£6
Yaesu	ATAS-120A	7-430MHz 120W Auto Tuning Antenna.....	£219
Microset	PT-120	12V Stabilized 20A PSU with Over V / A protection.....	£129
Microset	PC-120	13.5A Variable 20A (24A max) Stabilized PSU with meter.....	£139
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Icom	OPC-598	7m 13pinDIN ACC Lead for IC-706.....	£19
MFJ	MFJ-912	1.8-30MHz W9INN Remote Toroidal Balun.....	£49
Diamond	MX-62M	1.6-56MHz & 76-470MHz Duplexer 600W max.....	£49
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Icom	IC-7000	HF,6m,2m,70cm All Mode Transceiver + Gen.Cov.RX, DSP filters 12V DC.....	£839
Heil	FS-2	Deluxe Foot Switch + 2-outputs & 1/4" mono Jacks.....	£32
Heil	Pro-Set-Plus	Deluxe Dual Headphones + Boom Mic with HC-4 & HC-5 inserts.....	£149
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CDX	SP-350V	Static Surge Protector DC-1000MHz 400W + SO-239.....	£15
Puxing	PX-777	70cm FM 4W Hand Held Transceiver + CTCSS & VOX.....	£49
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Yaesu	FT-2000	Deluxe HF All Mode Base Transceiver + Gen.Cov. , Auto ATU & DSP filters 100W 240V AC.....	£1579
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Icom	IC-U82	70cm FM H/Held Transceiver with CTCSS, DTMF keypad, Ni-CD & charger.....	£163
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Icom	IC-E2820	2m,70cm FM Mobile Transceiver 50W, 35W DTMF mic + Remote Head, "D-Star" Ready.....	£399

RADIOWORLD

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Second Hand Yaesu FT-840 HF Transceiver.....	£379
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THE PW PUBLISHING RADIO BOOK STORE

New 2012 Books in stock Now!

AIRWAVES 2012

Airwaves 2012 – The Complete HF/VHF/UHF Aviation Frequency Directory, which is published by Photavia Press, has undergone considerable revision during the past year, not least due to the many changes to the UK Air Arms resulting from the Strategic Defence and Security Review published in October 2010. Airfields have closed or changed status, Squadrons have been disbanded or moved and others have re-formed at different airfields. Some frequencies have changed or been withdrawn, while others have been reinstated. In addition, there has been the expected number of air traffic frequency changes and new frequencies. The top of the Military airband, from 380 to 400MHz, is being handed over to the UK emergency services for use during the London 2012 Olympic and Paralympic Games. Therefore, many of the current users of this portion of the spectrum have been allocated new frequencies and, at the time of writing, some are still waiting to move. There have also been quite a number of additions and changes to the list of Military Discrete frequencies, especially to those for Forward Air Control, AWACS and so on. Many of these new frequencies allocated to the 500 Series TADS have been re-confirmed and a couple of new ones added. There have also been further changes in the HF frequency and other listings.



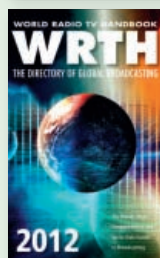
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CALLSIGN 2012

Callsign 2012 – The Civil and Military Aviation Callsign Directory, which is published by Photavia Press, has undergone significant revision during the past twelve months. Despite the changes and deletions resulting from the Strategic Defence and Security Review published in October 2010, nearly 250 new entries have been added to the Military Callsign database during the past year, making the total almost 2200. Thanks to a new source of information, the Civil Callsign database has been completely overhauled and a number of new operators added. During the past year, some airlines went bankrupt or suspended their operations and quite a number of new ones started up, with other new start-ups planned for 2012. The civil database now contains the details of almost 1600 airlines and other operators.



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MW frequency listings by region. International and domestic SW frequency listings, as well as DRM listings International SW broadcasts in English, French, German, Portuguese & Spanish.

Reference section with Transmitter locations, DX clubs, Internet Resources, and much more

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● NEW IN NOW CALLSIGN 2012 (Photavia)	104	£11.50
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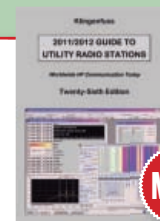
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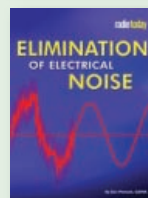
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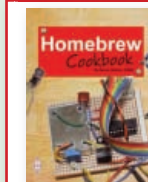
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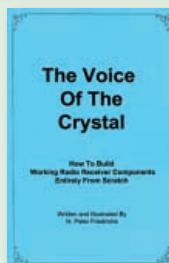
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Rob Mannion G3XFD/EI5IW's

Topical Talk

The Editor discusses topical points raised in readers' letters published this month. And it seems he's been encouraged by one special letter we've published!

In his very encouraging letter this month, Steve Tomlinson M0VFR must – surely – offer encouragement to other would-be Full/Advanced Licence candidates? I found Steve's letter to be truly inspiring and although it was much longer than we normally have space for in *PW* – I was determined to publish it in full.

I was particularly pleased to hear from Steve and – if it turns out to be that he did suffer a small stroke – he's obviously done extremely well indeed. It just goes to show that determination plays no small part in succeeding in our technical hobby. And determination can help overcome many handicaps, disabilities and disadvantages.

I'm mentioning 'disadvantages' because I often receive messages (particularly E-mails) from really keen Radio Amateurs who **are very much** disadvantaged by educational problems. In particularly and very recently, I heard from one Foundation Licence Radio Amateur who has struggled with reading and writing skills all his life. In replying to him after he apologised for his poor letter writing skills – I told him not to worry – he'd tried and got a much better result than many of the curt, 'nose in the face' type missives I've often received!

The term 'nose in the face' comes from my comparison of some extremely abrupt (verging on rudeness) notes often received via E-mail. Indeed, they can be easily compared to a total stranger approaching me

in the street – demanding information literally nose-to-nose (without any of the usual courtesies) – and then having got their information, turn on their heels and walk away! Totally unlike my recent correspondent who – despite having difficulty reading, writing and composing a letter – tried his very best!

Personally, I think the problem lies in the modern educational system where it's seemingly possible for an individual to 'coast' through school and then leave education barely able to read or write. Some of the disadvantaged people I've met in recent years have been totally dedicated to our hobby and they are all determined to progress to the maximum of their ability.

Readers may remember that one – a very good friend – enrolled himself on local further education courses to improve his education. He's made very good progress despite a very demanding job in catering that requires unsociable hours.

I have said this before and I will repeat it again with no apology – we must be prepared to help anyone who shows a spark of interest in our most scientific hobby. Incidentally, as far as I'm concerned – the very fact that someone **has shown** enough interest to start a Foundation Course – has indicated they have the bright spark of interest that can be fanned into the flaming and fizzing keenness of a lifelong Radio Amateur!

Increasing Number

As time goes by I'm hearing about an ever-increasing number of Foundation

Licence Amateurs who have gone forward to the Intermediate and eventually the Full/Advanced Licence. Perhaps more importantly – the vast majority of those Amateurs who I know have progressed through the various Licence stages have had (and continue to receive) the full support of their clubs.

I have also mentioned this before – my own club – **Poole Amateur Radio Society** – is a good example when it comes to supporting students through the Intermediate and on to the Full/Advanced Licence. There aren't huge numbers – our hobby doesn't attract huge numbers of people – but the numbers of successful candidates are still impressive and I'm sure that there are other clubs who really support their keen new Amateurs.

Readers will probably realise by now, that I'm of the opinion that it is the club training aspect and the on-going support to newcomers Amateur Radio is the future of our hobby – particular in the UK. However, although I am aware of other introductory schemes around the world – I'm aware I don't know as much about as them I would like.

So, perhaps our readers who live in other European countries, South Africa, Australia, New Zealand – in fact anywhere our hobby is allowed – would like to write in to *PW* to explain the situation in their homeland. I'm sure it will be interesting to learn in detail how other countries recruit, train and (essential this bit!) nurture new Radio Amateurs.

Rob Mannion G3XFD/EI5IW

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Doing it by Design

Tony Nailer G4CFY has been busy and describes a very useful noise bridge for h.f. antenna tuning using an unusual – but practical – air cored transformer. There are two basic switch-selected modes for antenna testing – and a 50Ω reference for antenna matching.

Antenna Workshop

Now the weather is better we should perhaps turn our attention to antenna maintenance and experimentation. The *Antenna Workshop* series features guest authors who share their extensive experience that had brought good results for them on the bands. Don't miss the July article!

In Focus – The 2454 Warbreck Squadron ATC

Brian Nuttall M0OYQ – Instructor and Radio Officer for the **Warbreck** (Lancashire) Air Training Corps 2454 Squadron introduces us to the radio activities of his keen Cadets. Many young people are introduced to Amateur Radio by the uniformed youth organisations and Brian has provided an excellent insight into his Squadron's activities.

Identifying Old Coils

Keen constructor **Stef Niewiadomski** has plenty of older tuning coils – inductors – in his spares boxes. But – how does he identify them? Stef's methods could help you identify that old coil that's been lying around for years and could still prove useful. Don't miss this helpful article!

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