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transceiver  
from Kenwood



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BARTG's Golden Jubilee

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- IC-7200 HF & 6m DSP 0.005-3335MHz wideband receive with USB port **£799 D**
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- IC-2200H **£219 D**
- IC-R3 **£389.95 C**
- IC-R6 **£172.95 C**
- IC-R20 **£384.95 C**
- IC-R1500 **£449.95 C**
- IC-R2500 **£624.95 C**
- IC-R8500 **£1379 D**
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### FT-2000 Last Chance to Purchase This Transceiver @ 17.5% VAT



Choose the 100W version or the 200W FT-2000D that gives you 3dB gain on all bands. DSP IF processing offers variable selectivity down to 25Hz - great for CW, for SSB there is a built-in 3-band graphic EQ plus adjustable Tx bandwidth to 4kHz. The first IF has triple roofing filters (15, 6 & 3kHz) for optimum performance. There is a digital voice recorder for contest CQs & dual receiver operation so you can operate split mode & listen on both channels. To help you match your antenna, there is a built-in auto ATU. The FT-2000 series has a lot going for it - it's a great investment - and this is your last chance to beat the VAT rise!

**Get £50 Heil Gift Voucher**

With this before end of February.



### Flex-1500 5W 160m-10m



This little chap is a complete USB linked 5 Watt transceiver offering all modes and all bands with amazing receiver performance.

**£599.95 D**

Latest FLEX-5000A Advanced Design **£2495.95 D**

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All FlexRadio transceivers share the same PC SDR control software which you can freely update! This handles all the transceiver processing and offers you razor sharp variable IF filters down to 25Hz, adjustable transmit bandwidth, Full transmit EQ, Amazing DSP QRM reduction, live bandscope display, Waveform monitoring, Waterfall display and an incredible number of parameter adjustments. If you are looking for a new experience in HF operation, here it is!

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The Flex-3000 gives you a 100 Watts in a footprint around the size of a laptop PC. This 1 - Watts radio covers all ham bands and all modes. It even has a built-in ATU! An amazing price - just add PC & 13.8V!

**£1299.95 D**

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### NEW VX-8DE



- \* Triple Band - 6m/2m/70cm
- \* Upgraded APRS features
- \* Rugged & Submersible
- \* Increased Memory

**New Low Price £359.95 D**

VX-8GE 2m/70cm 5W + GPS Ant **New Low Price £349.95 D**

### New Mobiles In Stock Now...

### FT-1900E



55W 2m Mobile with 200 memories.

**£129.95 D**

### FT-2900E



75W 2m Mobile + 200 memories.

**£139.95 D**

### FT-7900E



50/45W 2m/70cm Mobile + 1000 Memories.

**£229.95 D**

### NEW FT-DX5000 Series!

All 3 radios offer 200W from 160m to 6m. The "D" adds SM-5000 & the "MP" adds the SM-5000 & roofing filters.

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- FT-DX5000D **£4795 D**
- FT-DX5000MP **£5295 D**

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- FT-2000D 200 Watt version of FT-2000 with built-in PSU. **£2899.95 D**
- FT-950 100W HF - 6m transceiver with DSP & Auto ATU **£1289.95 D**
- FT-450AT 100W HF - 6m with automatic ATU & latest updates **£699.95 D**
- FT-450 100W HF - 6m transceiver - great value. **£619.95 D**
- FT-DX9000contest 200W HF - 6m "formula one" contest machine **£4899.95 D**
- FT-DX9000D Deluxe fully loaded base station **£8199.95 D**
- FT-DX9000MP Amazing 400W "legal limit" radio **£8995.95 D**
- FT-857D HF to 2m mobile, portable or base - up to 100W **£659.95 D**
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- FTM-350E **NEW LOW PRICE** 2m/70cm Mobile **£469.95 D**
- FTM-10SE 50/40W 2m/70cms stereo FM **£299.95 D**
- FT-8800E Dualband Mobile 50W / 30W **£299.95 D**
- FT-8900R 10/6/2m & 70cm Mobile **£359.95 D**
- VX-3E 2m / 70cm Handheld Wideband receive **£149.95 D**
- VX-7R Waterproof dualband handy (silver / black) **£279.95 C**
- VX-6E 2m/70cms handy, 5W Wideband Receive **£229.95 C**
- FT-60E 2m/70cms, 5W handy Wideband Receive **£169.95 C**

### VX-3E







## WiNRADIO<sup>®</sup> WR-G31DDC "Excalibur"

Receiver 9kHz - 49.995MHz

NEW



"It out-performed my 100dB HP Spectrum Analyser"

Voted the New Number One, by RSGB reviewer. Just plug into your PC USB port for a new experience in sensitivity and dynamic range. No hardware design can match the way that signals are extracted, demodulated and both visually and audibly reproduced. Serious DXer or casual operator, you will be amazed.

£599.95 D

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Why not call us for a price on that old unwanted gear? Turn it into cash or discount against a new radio. We are currently buying all kinds of communications equipment, even dead radios! So whatever ham radio items you have, we can probably turn it into cash!



## Power-Mite-NF 22 Amps In Your Hands!

The famous Power Mite is small, yet rugged. It delivers more than enough power for any 100 Watt radio, is variable up to 16 Volts and has dual meters. But what really sets it apart is its NF (noise function) feature which allows you to remove any residual noise outside the ham band you are operating on. Fits easily inside a brief case or even large pocket!



£69.95 D

## Watson Coax Switches



The new range of Watson coax switches offers an economical way to tidy up your station with the low loss switches. There is a choice of SO-239 or "N" sockets and

2-way, 3-way or 4-way units. They can easily be fitted to any flat surface such as wall or table, for secure installation.

- CX-SW2PL 2-way SO-239 £26.95 C
- CX-SW2N 2-way "N" £32.95 C
- CX-SW3PL 3-way SO-239 £42.95 C
- CX-SW3N 3-way "N" £49.95 C
- CX-SW4PL 4-way SO-239 £59.95 C
- CX-SW4N 4-way "N" £69.95 C

## MFJ Radio Accessories

### MFJ-929

**AUTO TUNER**  
1.8-30MHz 200W  
LCD readout, 20,000 memories, long wire & coax, radio interface.

- MFJ-991B Auto atu 150W £209.95 D
- MFJ-994B Auto atu 600W £339.95 D
- MFJ-962D 1.5kW ATU £289.95 D
- MFJ-969 160m - 6m 300W £209.95 D
- MFJ-971 Portable ATU £118.95 C
- MFJ-974B Balanced ATU £189.95 D
- MFJ-986 3kW differential tuner £349.95 D

### MFJ-993B 300W Auto ATU



A true "Plug & Play" Auto ATU. Covers 160m to 10m. Capable of handling up to 300W - tunes almost any antenna, has X-needle meter & digital data display.

W&S £249.95 D

**Build an All-Band Antenna  
Indoors or Outdoors - Do It Now!**

- 2 legs of wire 25 to 50ft plus some 450 Ohm ribbon & an MFJ Auto ATU
- 160m to 10m 100W - No traps - No adjustments - Just press PTT!



- MFJ-1260 Mic control 1 in/2 out £99.95 C
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- MFJ-1924 Prog. screw drv control £129.95 C
- MFJ-1925 ATAS-100 controller £72.95 C
- MFJ-202B Receiver noise bridge £79.95 C
- MFJ-250X 1kW dummy load (x-oil) £55.95 C
- MFJ-260C 300W dummy load £44.95 C



**MFJ-269** The Antenna Analyzer has been refined over the years & the MFJ-993B tells you just about everything you need to know about your antenna system - resonance, impedance, reactance & can even measure coax losses & identify the position of open & short circuits. All in a compact unit that covers 160m to 70cms. Can you afford to be without one?  
W&S £349.95 C

## MFJ-998

W&S £649.95 C



- 1.5kW SSB & CW • Digital & Analogue X-needle VSWR • 1.8 - 30MHz • 20,000 memories • Radio interfaces optional
- Built-in antenna selector • Field upgradeable firmware • Auto bypass protection
- MFJ-925 Compact auto tuner £169.95 D
- MFJ-927 200W remote auto atu £249.95 D
- MFJ-928 Basic auto atu £199.95 D
- MFJ-931 Artificial ground £112.95 C
- MFJ-932 Mini loop tuner £139.95 C
- MFJ-934 Artificial ground + ATU £199.95 C
- MFJ-935B Portable loop system £199.95 C
- MFJ-945E Mobile atu 300W £129.95 C

## Diamond HF Antenna

### BB7V

The small space answer!

- \* HF 2 - 30MHz Vertical
- \* No radials needed
- \* 250W PEP 6.7m length
- \* VSWR less than 2:1
- \* Weight 2.3kg
- \* 50 Ohms SO-239



£325.95 C

## Tigertronics Signalink Interfaces



Signalink Sound Card Interfaces do not require the use of a com port to trigger PTT on the rig. Signalink have internal links which make them compatible with most of the rigs on the market. Radio lead is supplied, state which when ordering. Extra mic leads are available.

- SL-USB-4R 4-Pin Round £89.95 C
- SL-USB-13PDI Icom 13-Pin Din £94.95 C
- SL-USB-13PDK Kenwood 13-Pin £94.95 C
- SL-USB-8R 8-Pin Round £89.95 C
- SL-USB-RJ11 Modular RJ-11 £89.95 C
- SL-USB-RJ45 Modular RJ-45 £89.95 C

## Uniden Beacat

### UBC-30XL

A real bargain whilst stocks last.

Frequency Range:  
87.5 - 107.9MHz WFM,  
108-136.9875MHz AM,  
137 - 173.99MHz FM

The radio has 200 memories. LCD display and can scan at 25 channels per sec.

£59.95 C

Check full spec. of these radios @ [www.wspc.com](http://www.wspc.com)

### UBC-3500XL

FM FMB WFM AM

Frequency:  
- 25-512MHz  
- 806-960MHz  
- 1240-1300MHz.

2500 memories, RF near signal capture, Quick keys, Scan 100 channels per sec., CTCSS & DCS, Alpha numeric tags, Data skip, Auto store, Display contrast adjust, AC adaptor/charger included.

£199.95 C

This is the Beacat Flag Ship radio. It packs an amazing number of features into a small package. If you are looking for a serious VHF/UHF scanner that covers the entire spectrum and resolves all the popular analogue modes, then this is a serious contender.

## Watson VHF/UHF Antennas

### VHF-UHF Verticals

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- W-50 2m/70cms 4.5/7.2dB length 1.8m 150W SO-239 £54.95 C
- W-300 2m/70cms 6.5/9dB length 3.1m 150W SO-239 £74.95 D
- W-2000 6m/2m/70cms 2.15/6.2/8.4dB length 2.5m 150W £89.95 C

### VHF-UHF Mobile Whips

- W-2LE 2m 0dBv length 0.48m £10.95 C
- W-285 2m 3.4dBv 1.33m £14.95 C
- W-77LS 2m/70cm 0/2.4dBv 0.43m £14.95 C
- W-770HB 2m/70cm 3/5.5dBv 1.1m £19.95 C
- W-7900 2m/70cm 5/7.5dBv 1.58m £31.95 C
- W-627 6/2/70cm 2/4.5/7.2dBv 1.8m £34.95 C

## MFJ HF Antennas

### MFJ-1792 80 - 40m

80/40 Meter vertical. Full size quarter wave radiator for 40 Meters, 10m tall. Handles 1500 Watts PEP, requires guying and radials counterpoises or ground screen. A great antenna for LF DX.

£189.95 D

### MFJ-1795 40 - 10m

Only 9ft 1500 Watts

4-Band antenna, great for small gardens and portable work. 9ft tall, easily packed away in a few minutes. Yet can handle full power. Use ground mounted with earth or elevated with wire radials (not inc).

£169.95 D

### MFJ-1796 40 - 2m

No Radials!

12ft High 1500W Has tiny 24 inch footprint! 40, 20, 15, 10, 6, 2m. Mount anywhere - ground level to apartments, trailers. Perfect for vacations, field day, DXpedition, camping.

£239.95 D

### MFJ-1798 80 - 2m

All bands HF - VHF!

10 Bands - No Radials! Self supporting 20ft antenna gives great performance from LF to VHF inc WARC bands. Needs no radials. Mount it on a stub mast or high in the air.

£299.95 D



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Rob Mannion G3XFD/EI5IW's

# Keylines

## Rob wishes everyone a 'Happy New Year' and discusses telephone-linked Internet systems – and the associated r.f. problems!

**As this particular edition of my Keylines Editorial is the first to appear in 2011 – I'd like to wish everyone a happy, peaceful and prosperous new year. And – most importantly – I also hope we'll soon be experiencing much improved h.f. band propagation conditions!**

Nowadays, most of us (I'm sure) find that our Internet connection is extremely important and speaking for myself – my domestic Internet service is vital. Indeed, without a computer, the Internet and the E-mail service I – and many other journalists and Editors – would be well and truly stuck. Incidentally, this latter point is emphasised whenever the service fails and I realise I'm cut off from the outside world!

Whenever my Internet system 'goes down,' it's really frustrating – clearly demonstrating **just how much** we depend on this incredible system. Incredible? – yes **it is** incredible when we take into account (for the majority of users in the UK) that the Asymmetric Digital Subscriber Line (ADSL) system we're using between our homes and the local exchange is using a network that wasn't originally designed to take radio frequency (r.f.) energy under normal service circumstances. It really is a miracle (in many ways) that it works with r.f. and audio frequency (a.f.) analogue audio signals on the same circuits!

Over the years I've been active in the radio hobby I've sometimes had much trouble

getting r.f. to go where I need it – and keep it from getting into where it wasn't required! With my extensive practical constructional experience, I've often thought it's been very difficult to keep my projects' r.f. in control – but just imagine what a nightmare having r.f. on telephone lines must be for the telephone companies!

Incidentally, (to explain to our worldwide readers) here in the UK the main operator of the 'copper links' (the section between our homes and the local exchange) is British Telecom (BT), although Hull in East Yorkshire had an entirely independent municipally owned system for many years. The city's grey telephone boxes proudly (and still do) trumpet their original independence from the main network (to understand the joke think back to BT's stylised nymph-like trumpeter logo on their mode modern callboxes!)

However, although the mixture of signals on the same telephone line can be a problem – the r.f. can prove useful as it can 'bridge the gap' when Bournemouth (the home of 'Super Squirrel') overhead telephone lines get nibbled by the ever hungry tree-living members of the Rodent family! Indeed, on several occasions when my own telephone line has been damaged – leaving it 'dead' in that respect with the Internet r.f. still getting through, I've been able to use the BT website to identify where the line fault is (usually at a distribution pole next to a large fir tree in the park opposite my home). Once identified, the fault can then be reported to BT and they

come to repair the terminal box. Even metal-reinforced lids on the boxes don't stop the seemingly Titanium-toothed terrors!

### Harmonics Everywhere!

Okay, I've discussed the (it's almost incredible when you think it about it!) the amazing 'window on the world' that the ADSL Internet service provides us – but what about the r.f. harmonics radiated from the telephone wiring? (they're everywhere!).

My first home Internet connection – over 10 years ago – was via a 'dial up' service, which was slow but relatively reliable. However, even though I was very satisfied with the much faster access to the world wide web – I was disappointed to discover that the harmonics from the ADSL system made indoor reception of the short wave broadcast bands very difficult and use of the Amateur bands extremely noisy.

The harmonics can extend right up to Band II and even the high quality ADSL filters I've fitted on my own system don't reduce the interference from near neighbours – who also have overhead wires from the distribution pole. Much has been said about the dreadful problems associated r.f. transmission over the mains by power line adaptors (PLA) but I think the radiation problems from the ADSL system telephone wires have been mostly overlooked.

Perhaps – one day – all the incoming telephone cable feed will be underground. Until then I think we have a problem!

**Rob Mannion G3XFD/EI5IW**

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# Readers' Letters

Send your letters to:

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

## The Editor's Daily Telegraph Letter On DAB Radio

Dear Rob

I read your recent letter to the *Daily Telegraph* concerning DAB radio, with interest. But I find I cannot entirely agree with you!

For those of us living in the east end of London, DAB is the only real choice for reliable listening. This is because in this area Band II f.m. is unusable due to the large number of 'pirate' stations operating illegally. The illegal stations not only operate on free channels between other stations, but actually **on top of other broadcasts**. This means that stations such as BBC Radio 3 and 4 are wiped out.

I've been forced into adopting DAB radio on Band III because of the illegal stations, and I must say I am delighted with it! Even using portable radios – with just a whip antenna inside my flat – I'm able to achieve reliable reception of all my favourite stations. I admit that the audio quality is not hi-fi, but for 'kitchen' listening on a portable receiver – it's more than acceptable, with a distinct lack of hiss.

The only problem with the current generation of DAB radios is that they are very power-hungry. So it's not really possible to run them off batteries, but most people who love radio have a radio in every room (well, I do!) so this is not really of concern. I think the answer is to move ahead with DAB expansion but to also keep the Band II service in place – until such a time as DAB coverage is universal, cheap and reliable. With very best wishes

**Jonathan Kempster M5AEO**  
Limehouse  
East London

*Editor's comment: Nice to hear from you again Jonathan! Please join me on the Topical Talk page for further comment.*

## Correspondents Wanted Please!

Dear Rob,

I write as a regular and eager reader of *PW* although I'm not on the air at

## £20 Star Letter

### Driving & Using Hand-held microphones

Dear Rob,

I am a retired Police Officer and have been a Driving Instructor (ADI) and a Motor Insurance Claims Investigator. I totally agree with the content of James' (the serving Police Officer) letter in the December 2010 *PW*. Apart from all the possible legal and insurance issues – how about we just use a bit of common sense?

The late **Sir Douglas Bader** once said "Rules are for the obedience of fools and the guidance of wise men" Too many of us are fools. Like James I firmly believe it is stupid to use a hand held microphone whilst driving, it is also unnecessary, there are many companies selling hands free kits or Bluetooth. There have also been a number of construction projects for building cheap hands-free microphones in *PW* and other magazines.

I have attended too many road traffic accidents and read too many insurance claims where the cause has clearly been the driver being distracted and losing control. A large proportion of those drivers belonged to the "It won't happen to me" brigade. Believe me, it will and it does. If a licensed Radio Amateur loses control of his vehicle while using a hand-held microphone and causes the death of another road user, it is of little comfort to the deceased's relatives if the Amateur stands in court and tells them he was exempt from mobile 'phone law because he was operating on a different frequency!

We do not have a right to drive motor vehicles or operate Amateur Radio transmitters. However, we are licenced to do both. Don't have either privilege taken away from you by doing something as stupid and unnecessary as using a hand-held microphone while driving. Yours sincerely,

**Ray Griffiths G0TMA**  
Bexhill-on-Sea  
East Sussex

the moment. I'm 65, retired and live in sheltered housing. I would be absolutely delighted to offer to correspond with *PW* readers by E-mail via [dhecoles@gmail.com](mailto:dhecoles@gmail.com)

Following a hugely enjoyable industrial apprenticeship in radio and television servicing, my career gave extensive and intense support to education in school, college, community and local education authority as an engineer, designer and tutor. My last full-time post supported craft, design and technology (CDT) in all schools in one London borough. Radio was promoted personally as an educational initiative. However, I was in a position to see the deletion of craft from the subject by the removal of engineering machine

tool plant from school workshops. Finally, I wish you and the *PW* team the best of health and thank you for a very successful journal. Yours sincerely,

**David Coles G7GZC**  
Twickenham  
London

### Avoiding Internet Fraud & Scams

Dear Rob,

To cut a long story short and to warn everyone, it transpires that there is a major scam taking place at present regarding Amateur Radio equipment in the 'wanted' columns world wide!

I've recently returned from what was supposed to be a holiday and rest in South Africa – it turned into a total

disaster! It was very stressful, and expensive, not only in monetary terms but also loss of faith due to systems not being in place for the protection of Individuals.

Prior to going to South Africa, I had been contacted by an Australian Amateur, saying that someone was using my personal details in the 'Wanted' adverts in VK. I then immediately reported it to my local police, for which I received a crime report number for Identity Theft.

I arrived in South Africa at the end of September and after visiting friends in Johannesburg moved down to Port Elizabeth, to collect my hire car. I then drove to my holiday home, which was to be my base for the next three weeks.

While there, I received a 'phone call from someone saying he was a police officer – he had a gentleman there reporting me for fraud via the Internet! No name or ID were given (my first question to him!) but he then threatened me with a 'red flag' on my passport. I learned later from my solicitor that this can only be done after a court case!

The person reporting me, then refused to open dialog. Six days later two police officers turned up at my holiday home. After the first call, arrangements had been made to take any statements to the local police station to which my solicitor (whom I appointed the day of the first call) would also attend. I then also had to have my passport and driving licence photocopied and provide details of my return flight to the UK.

Since returning home I have placed messages on International Amateur Radio websites, asking all Amateurs to be more vigilant. In this case I haven't lost any money – only my personal details, which were taken from an Internationally-based callsign database and Amateur Radio website. I've since removed the details, associated with my callsign. Unfortunately, the individual defrauded, was a pensioner who paid £280 for an Icom IC-756PRO. But surely such an unbelievable price for such equipment should have started alarm bells ringing?

Other Amateurs have been in contact and informed me that I have (seemingly) contacted them regarding their 'wanted ads'. The fraudsters have also hit various specialised Amateur 'For Sale & Wanted' websites in the UK. Fortunately, I have been in personal contact with the website operators to alert them.

It's suspected that the fraud

### Terry Calvert G4GBS Silent Key – A Tribute

Dear Rob,

I'm writing you to pay tribute to my good friend **Terry Calvert G4GBS**, who is now a Silent Key. A great number of people in our society think that they are special or different from the common herd – but would never contemplate voicing such thoughts because it would lay them open to ridicule or sheer disbelief – from the common herd no less!

Radio Amateurs are no different from other members of society (apart from having a strange hobby – mostly grown men playing about with bits of wire, etc!) and we also have those who think they are exceptional. And we have the others – who I would call the 'salt' of the airwaves – who quietly get the job done with little or no fuss.

The late Terry G4GBS was one of the latter group of people. Like a lot of us he hadn't been sure what he wanted to do in life and had various jobs. He helped the local farmer at weekends to get extra cash, worked as a milkman and had a spell as a garage mechanic, which allowed him to develop a liking for small and nippy motorbikes. His love in this field was, I believe, the BSA *Bantam*, which he used to 'hot up'. After this he worked for his local county council on the roads doing essential repairs and became Foreman of the gang and during this time studied at college on day release, thereby attaining sufficient qualifications to become Road Inspector for the County. It was at this time that he discovered Amateur Radio.

Terry started – like many of us – on v.h.f. and had numerous contacts with **Harold 'Aitch' White G4LFB** in Welwyn Garden City. These skeds continued when they both came onto h.f., and at the time of Terry's death they numbered well over 2000 QSOs. .

On the air Terry was always very helpful if the situation required it and was always courteous – but being a typical Yorkshire man would stand for no nonsense from the occasional fool who can be met over the air. He was a member of the Worksop (Nottinghamshire) club but a house move and latterly (the last three or four years) poor health made attending just too difficult.

Terry married his wife **Pauline** just 12, short years before he became a Silent Key. He's had health problems for some years, but for the last two years he was grimly fighting extremely painful cancer. His friends who worked him on the regular thrice weekly 80m net really marvelled how Terry and Pauline kept going during this time.

If I said that Terry G4GBS was a wonderful kindly man full of decency and genuine goodwill towards other it would be an understatement. Indeed, he was one of the exceptional people I mentioned at the beginning of my letter. However, here lies the difference – he really thought and acted as if he were one of the crowd and that he wasn't exceptional. Terry is sorely missed and will not be forgotten.

**Ron Hicks GW0JEQ**

**Knighton**

**Powys**

**Mid Wales**

originates from Nigeria. However, I have gone through all the correct procedures to report this crime – and received no assistance from any agency. Incidentally, I work for the Metropolitan Police.

If your personal details are collected and used by fraudsters, they'll assign your callsign to an E-mail address to use in connection with the fraud. Any payments are requested to be made via an unsafe International telegraphic transfer system.

The fraudsters usually claim to have sent the sold equipment via couriers. In my case the reference number provided by the fraudsters was bogus (as was the website) of course. Often, the first thing the person – whose identity has been stolen for use in the frauds will know about it – is the arrival of the police!

**Ken Blanshard M0KPB/VK2KEN/  
ZS2KPB**

**Stevenage  
Hertfordshire**



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





# News & Products

Send your info to:

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**Club Newline feature:** Due to the major news item featuring the successful Ofcom criminal prosecution in Hull – the first extracts from club newsletter/magazines, planned to appear in this issue have been held over until the March PW. My apologies for this, but I'm sure readers will understand the significance of the Ofcom news item. **G3XFD**.

## Chris Lorek G4HCL's Algerian Adventures

While busy communications engineer and PW Author, Chris Lorek G4HCL was visiting Algeria in November 2010, he was invited to the Algerian Amateur Radio Association's headquarters in Algiers and treated as a guest of honour. While there he was invited to use their well-equipped station, and had a number of contacts on 14MHz s.s.b., including a 'ragchew' with Mike Seaward M0SMJ (Bude in Cornwall) with signals 59+ both ways.

Chris told *Newsdesk* he was overwhelmed with the kindness and welcome he received from the Algerian amateurs, in particular Karim 7X2KX who treated him to a guided tour of the city. *Newsdesk* is left wondering where G4HCL will turn up next with his globetrotting job!



Karim 7X2KX provided Chris Lorek G4HCL to a grand tour of Algiers and invited Chris to operate their headquarters station.

## Martin Lynch Open Day - Successful Despite The Weather!



Martin Lynch G4HKS contacted *Newsdesk* with an up-date on his Open Day on December 4th 2010. "Despite the dreadful weather conditions around the country, several hundred people ventured out to Chertsey, joined in the festivities at our shop, ate their way through a huge hog roast and bought lots of pieces of kit at bargain prices! The day was topped by the raffle prizes – donated by Yaesu UK, Kenwood UK, LDG and ML&S, which raised over £800 for the Macmillan Cancer Support Nurses. Best Regards. Martin G4HKS.

## Billy Pollock GI3NVW - Star of West Tyrone

Kirsty Morrow MI3JVN from the West Tyrone Amateur Radio Club (WTARC) in Northern Ireland writes: Billy Pollock GI3NVW is one of WTARC's most experienced Radio Amateurs and recently marked his 50th anniversary. He got interested in electricity at the age of 14 before moving



on to radio. He was lucky enough for his father to get him into the workshop of Bob Grey who fixed radios in the Market Yard on Saturdays, this is where his love for Amateur radio blossomed and grew.

Billy then became more and more eager to obtain his licence, he participated in a correspondence course for the old City & Guilds RAE. He then arranged for the late Bobby Sloane GI3NRF and himself to successfully sit the exam in Omagh Technical College in 1957.

Morse Code proficiency was next on the list – but there was no one in the area to teach it, until Ken GI3VQ came to work in the local Labour Exchange and taught him and two years later, Billy passed the test in November 1959, when he went to University.

Billy and his friends built all their Amateur gear because there wasn't much commercial gear. He was living in Belfast after he got married to his wife Dorothy, while he was working in Shorts Aircraft Factory. Billy and Dorothy returned to Omagh in 1966. He set up a station, erecting a 60 ft tower.

In the mid-1970s the new craze was 144MHz and Billy and his friends started a successful local club, which first met at his own house every Monday evening. They spent time building bits and pieces – including 40W 2m amplifiers to improve the mobile capability.

When the first Northern Ireland repeater appeared, it only covered the Belfast area, which the club members were all understandably unhappy about! So, they set up their own local installation and the West Tyrone Amateur Radio Repeater Group (WTARRG) was born – Billy has been chair of the WTARRG ever since.

Billy was also pressed into repairing Amateur Radio equipment and someone else suggested that he should also invest in selling it – so his business 'T A Electronics' was set up in 1981. He's been active in Amateur Radio for such a long time and our members think it's wonderful to see such an accomplishment. The current West Tyrone Amateur Radio Club, family and friends would like to congratulate Billy on passing the milestone of 50 years as a GI3NVW and thank him for his efforts and inputs to local Amateur Radio.

Club website [www.wtarc.co.uk](http://www.wtarc.co.uk)  
Meeting place: First Tuesday of the month at 8pm,

**The Technology Education Centre  
2 Spillers Place  
Omagh  
Co. Tyrone BT78 1FA  
Northern Ireland**

Billy GI3NVW accepting his anniversary gift from the WTARC.



# Book Reviews

The Editor takes a look at two books that are likely to be of interest to *PW* readers and – unusually – there's a novel included!

## **The Flyleaf Killer (Novel)**

It's not often I get the pleasure of meeting other Radio Amateurs who are also keen novelists! However, meeting **Bill Prater G0EOL** at the Newark amateur Radio Show in October 2010, was indeed a pleasure and I was soon to find out this bright and sprightly 80-year old has produced a most unusual psychological thriller. Bill presented me with a copy – a hard bound book – and it provided interesting reading over a few days! Without spoiling the plot, I think that if you were ever bullied at school and wished you had a big brother or some other way of taking revenge – you'll find Bill's book exciting but disturbing reading – but not just before bedtime! If you enjoy tense, psychological themes – you'll really enjoy Bill's murderous plot! Bill G0EOL, like many budding authors had to resort to 'self publishing' to get his book into print and I'm pleased he did as I enjoyed it! **Rob G3XFD**.



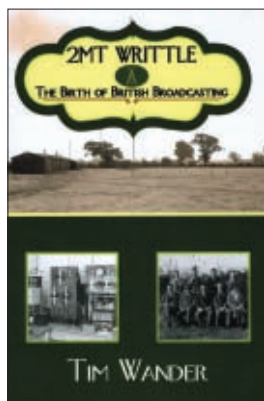
Copies of the well-produced hard-backed *The Flyleaf Killer* are available direct from Bill for £10. For further information contact him at: **44 Alundale Road, Winsford, Cheshire CW7 2QD. Tel: (01606) 594205. E-mail billg0eol@o2.co.uk**

## **2MT Writtle - The Birth of British Broadcasting Second Edition**

**By Tim Wander**

Tim Wander's large paperback book is a classic example of modern self-publishing by an enthusiast for enthusiasts. Those of us who own the original book – published approximately 20 years ago by the same author – will have enjoyed his dedication to a truly fascinating subject, describing how British broadcasting started in a wooden hut in an Essex field.

However, as we should perhaps expect in a non-professionally edited and designed book, the fact that it is an 'amateur' production will be obvious to any reader. Although, with publishing costs so high nowadays – specialist books such as this would be unlikely to see the light of day. On the other hand, I'm sure that if a professional book designer was involved – the miniature antenna towers either side of the page number at the bottom of each page would never have appeared. Having



said that – distracting as they were – I never forgot where I was in the book!

Despite the design and editing problems Tim Wander is to be applauded for his marathon effort – covering the early broadcasts, the personalities and technology that eventually led to what we enjoy today. As it is a second edition – with much historical and modern research material added on here and there (literally) it has some duplication of material for readers like myself who have the first edition. Despite this, the Author leads on from the early days at 2MT, Writtle and on to the birth of the British Broadcasting Company in an entertaining style.

Without a professional book Editor the author often seems to jump from one topic to another, before enthusiastically diverting to another aspect – he's that keen! And, despite the sometimes confusing and somewhat jumbled collection of references, and seemingly 'straight' (without enhancement or 'cleaning up') reproduction of old

documents, technical stories and history – along with what seem to be the author's own (non-attributed) anecdotes 'thrown into the pot' – it's a fascinating, enjoyable and perhaps a slightly eccentric read.

In fact the book will be ideal for other eccentrics like me who find broadcast engineering and transmitter sites to be so fascinating! Incidentally, if you own a copy of *BBC Engineering History 1922-1972* (Out of print), you'll find Tim's book invaluable extra reading. And, unlike the BBC book, I think the author's utterly dedicated interest ensures that full tribute is paid to the 'amateur' broadcasters who turned into the ultimate professionals – who then led the world into radio broadcasting. Well done Tim! Recommended reading. **£18.95p** plus £3.24p p&p UK postage. Further details from

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## **New Website & Yahoo Group For Channel Islands?**

**Rob Luscombe MJ0RZ** contacted *Newsdesk* from Jersey in the Channel Islands: "Channel Islands based *PW* readers might have heard a discussion on 2m relating to the possible setting up of a new website for radio users (Amateurs and others!) in the Channel Islands.

Rob continued: "A Yahoo group was set up many moons ago working on the basis of 'if you build it they will come' but it has seen very little activity, I think it still only has eight or so members! The advantage with a Yahoo or similar group to a conventional website is that any member of the group can upload information, documents, photos etc. so it's a lot more interactive.

If a news item or document is posted people are notified about it via E-mail – if they have joined so it saves having to try and find E-mail addresses for different people

At present the *GJ3DVC/GB3GJ* newsletter is E-mailed to people and can be downloaded from my own website but it seems we could do this through the Yahoo Group which may be preferable. If anyone would like to see the development or provision of something – we can all share in them, so please let me know. I for one think it would be an excellent idea but last time we tried to get a few more people interested it seemed to fall on deaf ears. There's a relevant link which you can find below. I look forward to hearing from interested Amateurs and other radio types! 73.

Rob Luscombe MJ0RZD (Jersey RSGB DRM).

E-mail [mj0rzd@robluscombe.com](mailto:mj0rzd@robluscombe.com)

<http://groups.yahoo.com/group/ci-radio/>

## Hull Man convicted of Offences Against Amateur Radio

**Ofcom, the UK's official telecommunications regulator have announced, "A Hull resident was sentenced at Hull Crown Court on November 22nd for causing deliberate interference to Amateur Radio users in the Hull region of Humberside between June and November 2009.**

"The defendant was also convicted of unlawfully using radio equipment without a licence from Ofcom, which was installed in his van and driven around the region to interfere with legitimate users of the Amateur Radio frequencies.

"He was sentenced to:

"Four months imprisonment suspended for 18 months.

"A curfew between 7pm and 7 am for three months via a means of electronic tagging.

"Forfeiture of his van and radio transmitters to Ofcom."

Commenting on the sentence, Paul Mercer, Head of enforcement at Ofcom, said: "There are around 900 Radio Amateur Radio, in and around the Hull area, who have



been deliberately disrupted for more than four years. Ofcom is very pleased with this result, which will hopefully give these users some welcome relief, as well as sending a very strong message to those that abuse the airwaves. This conviction followed a dedicated investigation by Ofcom involving six enforcement officers working day and night to bring the culprit to court."

Mr Sheldon, the Court Recorder commended Ofcom for the quality of the evidence that had been collated and the quality of file presented in court.

This particular investigation started in May 2009. A search was made of the number of Radio Amateurs located in the likely coverage area of the **GB3HS** repeater targeted by the defendant – and there are about 900 on record. This repeater and the Amateur frequencies in this area have been disrupted purposely for over four years.

Ofcom dedicated considerable resources to gather adequate evidence to prosecute the defendant. It also needed the support and

resources of Humberside Police to apprehend and arrest the defendant on the 15 October 2009. This work involved six Ofcom officers working around the clock.

On Monday November 22nd the defendant entered guilty pleas on two charges: Unlicensed use of radio equipment and Causing deliberate interference.

Further information from:

**Rhys Hurd**  
**Media & Corporate Relations**  
**Ofcom**  
**ofcomnews@ofcom.org.uk**  
**Tel: 0300 123 4000**

**Editorial comment:** Although Ofcom did not provide details on the convicted man, a request from me for them to do so was immediately answered – with a link to a newspaper website in Hull, which provided full details. The convicted man was **Clive McMurray**, aged 63, of Lambert Street, in Hull. McMurray was given a four month prison sentence, suspended for 18 months (plus the punishment mentioned in the Ofcom report). I shall be commenting on Ofcom's press release in a future *Keylines*. **G3XFD**.

## Dover Amateur Radio Club Foundation Success!



**On November 17th 2010 five prospective Radio Amateurs sat their Foundation Course in Dover. The trainees' hard work paid off as all five passed and are eager to join us on the bands. The Dover club meets each Wednesday evening and recent changes to the committee membership have led to new ideas and formats for club nights.**

The club will soon have a dedicated shack ready for member's use at the flick of a switch. This, along with a superb location are just two of the reasons why we hope to attract new members and see some old faces turning up as well!

With many clubs seeing declining membership and closure, the DARC committee are determined that the Dover club will champion new initiatives and aim to work closely with the RSGB on growing our hobby. The club intends to engage more with the local community and raise the profile of amateur radio. Details of the planned events and other useful information can be found at the web site [www.darc.org.uk](http://www.darc.org.uk)

We meet at The Dover Amateur Radio Club Meet every Wednesday at the Old Park Community Centre Whitfield, Dover, from 18:45pm. Everyone is welcome!

**Nigel Evans MONDE.**

E-mail: [nigel.monde@gmail.com](mailto:nigel.monde@gmail.com)

## Nevada Appointed Distributors for Pro Antennas

**Mike Devereux G3XFD, Managing Director of Nevada in Portsmouth, Hampshire, recently contacted *Newsdesk* reporting, "I'm delighted to tell you that we have concluded a deal with Carl Kidd G4GTW of Pro Antennas, to distribute his range in the UK. Nevada will carry the new Dual Beam Pro and the iPro home antennas, that Carl has developed during the last year.**

The design of both models incorporates high efficiency capacitive end loading elements, together with a matching unit, allowing coverage of all bands from 14 to 28MHz (20 to 10m) – plus 7 and 10MHz (30 and 40m) with a suitable tuner. They are space saving, low-profile designs and a first for a UK manufacturer. More information can be found on the Nevada and Pro Antenna web sites. [www.nevadaradio.co.uk](http://www.nevadaradio.co.uk) and [www.proantennas.co.uk](http://www.proantennas.co.uk)

**Mike Devereux G3SED**  
**Unit 1 Fitzherbert Spur**  
**Farlington**  
**Portsmouth**  
**Hampshire PO6 1TT**  
**Tel: (02392) 313095**  
**FAX (02392) 313091**

**Mike Devereux G3SED of Nevada (left), taking delivery of the first Pro Antennas from Carl Kidd G4GTW.**



**The successful Dover Foundation Examination candidates. From left to right, Catherine Block (Instructor), Sarah Love (2nd Invigilator), Paul Barker, Louise Flynn, Leon Lee, Neil Fairbairn, Graham Cahill (Invigilator), Stephen Ward.**

Richard Newton G0RSN is a hand-held transceiver specialist – using them in his professional communications work, he has also thoroughly enjoyed evaluating the latest Amateur Radio transceiver from Kenwood.

# The Kenwood TH-D72

Richard Newton G0RSN says, “It’s the rig we’ve been waiting for!”

**The Kenwood TH-D72 is the rig many of us have been waiting for – and it has been a long time coming! It’s a dual-band transceiver covering the Amateur 144 and 430MHz bands with the usual extended receive coverage we’ve come to expect nowadays. However – this radio is much more than just another dual-band rig! Indeed, the TH-D72 has a built in TNC that conforms to the AX.25 protocol, allowing it to be used for packet radio when connected to a computer.**

The TH-D72 also has firmware that will use the internal TNC to operate Automatic Packet Reporting System (APRS) functions without the need for a computer. But that is still not the end of its versatility, as the TH-D72 has its own built in SiRF Star III GPS with a 5000 point logger function, as well as the ability to function as a standalone GPS. The unit will also talk to the internal TNC and give you fully functional APRS operation without the need for any other bit of kit! Amazing!

However, before we get down to the more advanced features on the rig, I’d like to share my first impressions with *PW* readers. To start, the TH-D72 is a very smart radio indeed and is 58mm wide by 121.3mm high and 33.2mm deep. These measurements are those without projections like knobs and antenna taken into consideration. Incidentally, what impressed me about the size – was the depth of the transceiver, as it’s deeper than most modern hand-helds but I didn’t find this off-putting in the slightest.

My brother, **William G7GMZ** commented on the size and particularly the depth of the rig. So, I guess he makes a fair point that those with small hands may find it a bit of a handful – but I really didn’t find it an issue

at all, especially as it only weighs in at a meagre 370g complete with battery, antenna and belt clip!

As I said, the rig is really smart, finished in charcoal and grey with the kind of attention to detail and panache one has come to expect from Kenwood. However, although the display could not be described as large – the read out is clear and the controls are very sensibly laid out on.

There’s a positive and easy-to-operate joystick type control, which helps with navigating the menus. The most commonly used functions are assigned to large effectively backlit buttons on an ergonomically indented keyboard. The volume and multi function rotary controls are on the top of the rig, next to the supplied helical antenna with SMA socket.

The side panels are also home to the push to talk (p.t.t.) and functions such as back-light and monitor button, while speaker microphone and other external connections are provided via the opposite side panel of the rig.

## Richard’s Reviews

Those of you who are familiar with my reviews will know that I tend to follow a given format; first impressions count, so what does the rig look like? Answering these questions – TH-D72 passed with flying colours! Next is the ease of use test – can I pick it up and use it? And following on from there – how many functions can I use without resorting to the manual?

Well, evaluating the latter point was to be interesting – because when I got the rig the manual had not been finished! It was still in draft form, so it was fortunate then that the rig proved to be a cinch to use. Admittedly, I’m used to APRS functions and that no doubt helped me in being able to set up the more advanced features. But even here the rig was cleverly pre-configured, so all I really had to do to get on the air was input my callsign.

As for getting on the air, selecting a frequency and writing it to a memory and even initiating the internal GPS, it was all a breeze!





The very simple plain top with the recessed SMA antenna connection.

Have you ever wondered what your locator is while on holiday, or when you're just out and about? Wonder no longer – with a TH-D72 to-hand, you only need to turn on the GPS, press the **POS** (Position) button and there you'll see the Latitude and Longitude along with the Maidenhead Locator.

Time to get back down to earth Richard and look at the basic specifications! The rig packs a punch and like many of its contemporaries now offers a full 5W of radio frequency (r.f.) output – even when on battery power. It's supplied with a 7.4V d.c. 1800mAh Li-ion battery pack.

The transceiver has 1000 memories; each one can be given an eight digit alphanumeric name. Entering memories is really simple – but is even simpler when using the free software.

I noticed that the review rig came with a USB lead and saw that one of the ports on the side of the rig was labelled with an USB logo. A quick on-line search revealed that Kenwood have supplied free downloadable programming software, titled *MCP-4A*. I downloaded a little program from the site that created a communication port on my laptop. Then I downloaded the main software, all in all the whole thing from searching to downloading and initiating the software took about 10 minutes!

I then connected the rig to the PC with the supplied USB lead, following the on line instructions. Before I knew it I was programming the radio! You can configure memories, functions, APRS menus and even download the GPS loggers, it was fantastic!

### What's APRS?

I can imagine some readers asking, "So, what is APRS?" The answer is straightforward – it's a system that takes



The supplied charger.

positional data and transmits it in packets of data over the radio. This is achieved using a system of digital repeaters on 144.800MHz and these signals ripple across the land, are received, decoded and your station will appear on a map.

If you are connected to a Global Positioning System (GPS) then the radio will update as you move and your journey can be tracked. The obvious benefit with The TH-D72 is that you don't have to have a separate GPS and TNC attached to your rig; – it's all built-in, complete with the necessary firmware too!

There are several computer programs for home or portable APRS operation, *APRSPoint*, *UiView* and *WinAPRS* are just but a few, you can even get iPhone and iPod apps and APRS software for Android smart phones now!

The location and station data is also ported to the Internet and if you go to [www.aprs.fi](http://www.aprs.fi) you can see stations that have been received via Internet gateways transposed on Google maps without the need for any radio equipment at all! To illustrate this. I took a screen grab of me out and about with TH-D72.

The TH-D72 doesn't have a map included on the screen –but it does show the details of stations it hears on the APRS and provides details on the display. It then holds the information in a volatile memory bank that will hold details of 50 stations. If you select a station, you can then navigate up to 10 screens

Both sides of the TH-D72 have keys and connections.



## Conclusion

**Pros:** Incredibly versatile rig, many functions, great fun and easy to use.

**Cons:** The rig is deeper (thicker) front-to-back because of its complexity.

**Supplier:** Kenwood Communications UK.

**Price (suggested):** £479.95.

**Accessories:** The accessory list is very long so I'm only mentioning the larger items: EMC- clip microphone with D earpiece and p.t.t. £35.71, KSC-32T Rapid Rate Desk-top Charger £47.00.

**Further information:** [www.kenwood-electronics.co.uk/products/comms/](http://www.kenwood-electronics.co.uk/products/comms/)

giving you details of any status messages sent by that station, plus a distance and bearing, altitude, speed and much more!

The transceiver also incorporates *SkyCommand II*. This is a system where the TH-D72 will remote control a high frequency (h.f.) radio with the system on board – such as the new TS-590S. Once set-up, TH-D72 can be used as a remote control and speaker microphone for the main rig.

The TH-D72 also offers extended receive coverage and this includes the airband. It can also be set to receive transmissions using amplitude modulation (a.m.) and even has the 8.33 kHz airband channel step included. It's also capable of full dual-band operability – that's to say you can have both variable frequency oscillators (v.f.o.s) on v.h.f. or both on u.h.f. or any mix you require. The received audio can be faded between bands, from having an equal split to having one completely silent.

### On The Air

For the on the air evaluations I used the TH-D72 on foot, on my bicycle and in the car attached to my mobile antenna. In practice I operated the APRS on **VFO A** and had the volume turned down (so that I couldn't hear the packet radio signals bleeping away) and I either had 145.500MHz or the local v.h.f. repeater on **VFO B**.

The rig operated beautifully and the received audio was impeccable, just what you would expect from Kenwood in my opinion. And the reports I received while operating with the rig were excellent.

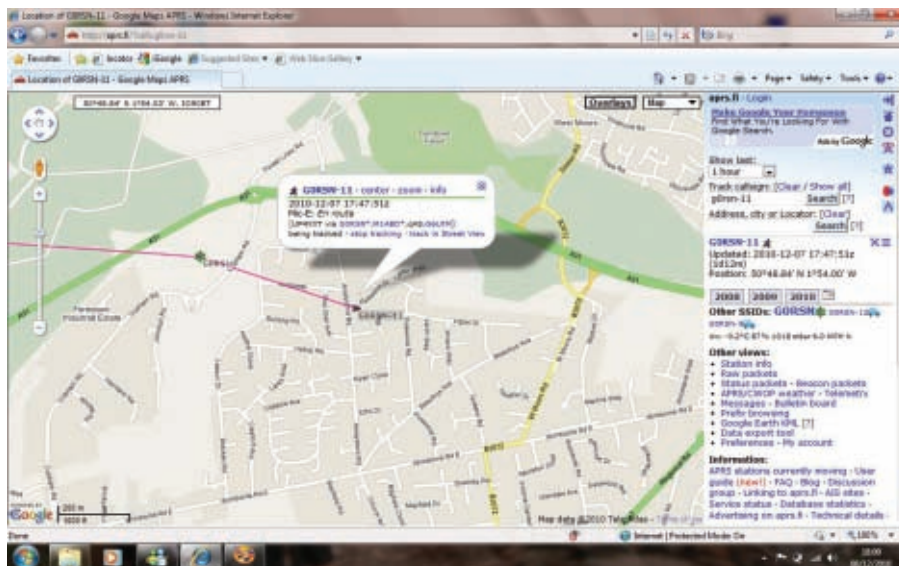
I took the rig up to my Mother's home in Minehead, Somerset and met up with family. Here I used the TH-D72 to chat to my sister-in-law **Carolyn Newton M3CSK** and brother William **G7GMZ** while they were on the way to the house. (I just used the rig on its own helical antenna, and on the internal batteries from my Mum's house).

Interestingly, I first made contact on with William and Carolyn via **GB3FI** on 430.925MHz and I was really pleased because the repeater is situated near Cheddar, about 65km (40 miles) away! We then went to a simplex v.h.f. frequency when they got closer, Carolyn M3CSK commented, "You were very loud and very clear" and "The audio is great."

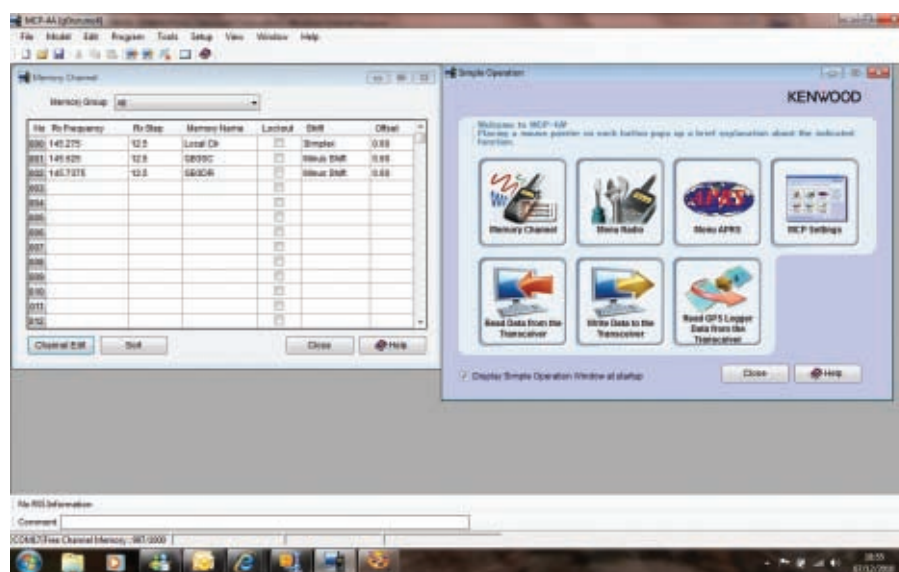
### Echolink & GPS Comments

For those Echolink fans out there the TH-D72 has 10 dedicated Echolink Dual-Tone Multiple-Frequency (DTMF) memories to store callsigns or conferences names and node numbers.

I have to say that the internal GPS really impressed me; it locked onto



A screen grab of the APRS in action.



A screen grab of the programming software in action.

satellites really quickly and seemed to work well indoors as well! Admittedly, my shack and operating desk is upstairs and near a window – but the rig was sat next to me while I was typing the review and it was quite happily receiving lots of satellites, and transmitting beacons on APRS while monitoring 145.500MHz.

### My Constant Companion!

The TH-D72 was my constant companion for two weeks, but despite this there are so many features I've just scratched the surface of what it could do in this first article. So, I'm planning to have some more fun with the transceiver and report back to readers. Watch this space!

In summing up, I must say that being a modern hand-held, the TH-D72 does everything we would want and expect – plus a lot more. Features range from the Continuous Tone Coded Squelch System (CTCSS) to automatic repeater shift and scanning of memories and VFO ranges. The menus are easy-to-use and navigate

especially when I consider the rig's many functions.

Do you remember the song *Deck of Cards*? It features a Soldier who was seen with a deck of cards in a Church and was reprimanded. In the spoken style reply **Wink Martindale** concludes the song, "So, you see sir, my pack of cards serves me as a Bible, an Almanac, and a prayer book and friends, the story is true, I know, I was that soldier".

Well everyone, I can confirm that the TH-D72 served me as a fully functional GPS, APRS Station with upgradable firmware – and a 'top of the range' Dual-Band handie and friends, that is the truth, I know, I was that lucky reviewer!

It was a long time coming – the Kenwood TH-D72 gets the thumbs up from me!

PW

**Next month I'll be enjoying delving even deeper into this complex, multi-function rig. Until then – have fun with your TH-D72!**

## Manufacturer's Specification

Radio frequency output power high:	5W (approx).	GPS port (NMEA 0183).	
Radio frequency output power low:	500mW	High quality front speaker.	
Radio frequency output power extra low:	50mW (approx).	Key beep On/Off.	
Frequency range receive v.h.f.:	118 - 174MHz	Key Lock.	
Frequency range receive u.h.f.:	320 - 524MHz	Mask unused band:	(A or B Band).
Frequency range transmit v.h.f.:	136 - 174MHz	Memory channel lock-out.	
Frequency range transmit u.h.f.:	430 - 440MHz	Memory channels with Alpha-tagging:	1000 Memory Channels
Antenna Impedance:	50Ω	Memory name function.	
Microphone Impedance:	2kΩ	Memory shiftFunction.	
Operating temperature range:	-20°C to +60°C with standard battery	Menu system for individual set-up.	
Power requirements (nominal):	(External )11.73 to 15.87V d.c.	Monitor Function	
Receiver circuitry - double superheterodyne.		MR-Shift	
Receiver intermediate frequency:	A-band 1st i.f. 49.95MHz	Multiple Scan Functions	
	A-band 2nd i.f. 450 kHz	Multi-scroll Key	
Receiver intermediate frequency:	B-band 1st i.f. 45.05MHz	Packet Operation - AX25 and KISS Mode	
	B-band 2nd i.f. 455kHz	PC Programmable Memories	
Receiver sensitivity (Main & sub bands):	Band A <0.18μV (At 12dB SINAD:)	PC Radio Control Program:	(Option)
	Band B <0.22μV	Power-On Message	
Receiver squelch sensitivity:	<0.13μV	Power-On Password Protection	
Transmitter maximum frequency deviation:	< ±5kHz (f.m.)	Programmable Function Keys	
Transmitter modulation distortion:	<3% (300Hz to 3kHz)	Reverse Repeater Checker	
Transmitter spurious radiation:	> -60dB	Selectable Repeater Offsets	
Weight:	370g (with standard battery, antenna and belt clip)	Separate Squelch for A and B Bands	
		Simultaneous two frequency receive.	
		<i>Sky Command 2:</i>	(In conjunction with a suitable Kenwood h.f. transceiver).
		Time-out timer.	
		USB Port:	Built-in Mini-USB port
		Wide/Narrow deviation selection.	
		<b>COM_AMA_APRS Features</b>	
		Alert on special call.	
		APRS data output:	To external GPS unit such as AvMap Geosat 5 APRS
		Auto message reply.	
		Decay algorithm.	
		Digipeat function.	
		Message memory:	100 Messages
		New-N paradigm	
		Packet data output:	(To a PC via the USB Port)
		Proportional pathing.	
		QSY Function.	
		Received packet data pop-ups	
		Relay path display	
		SmartBeaconing.™	
		State/Section /Region pathing.	
		Station list memory:	Lists up to 100 Stations, with filtering and sorting options
		User Phrases.	
		Visible Message Notifications.	
		Weather Station Function:	Can be connected to suitable Peet Bros. Ltd and Davis Ltd weather stations to receive, transmit and display various weather parameters
<b>Amateur Radio General Features</b>			
1750Hz Tone Burst Function.			
8.33KHz spacing on Air Band			
Alphanumeric I.c.d. display			
13.8 V d.c. input facility.			
Antenna Socket (SMA).			
APRS Function (via built-in TNC).			
Auto Power Off.			
Automatic Repeater Offset (v.h.f.).			
Built-in Packet TNC 1200/9600bps.			
Channel Display Mode.			
Clock (Time/Date Function).			
Encoder/Decoder DTMF:	Choice of 42 tones		
Encoder/Decoder DCSS:	Choice of 104 digital tones		
Direct Frequency Entry.			
DTMF Memory:	10 Channels, 16 digits		
Dual Receive:	v.h.f. x u.h.f., v.h.f. x v.h.f. or u.h.f. x u.h.f.		
Duplex Operation.			
DX Cluster monitoring (via built-in TNC).			
DX Cluster tune function:	Outputs 'Tune data to suitable Kenwood h.f. transceiver		
Echolink memory dialler channels.	Firmware Upgradable		
via USB Port	Yes		
Front panel keypad.			
Full dual-band operation:	V+V/V+U/U+U		

### ALINCO

#### Hand-helds

- Alinco DJ-G7** Great triband 2/70/23cm ..... **£299.95**
- Alinco DJ-596** Robust dual band 2/70cm ..... **£99.95**
- Alinco DJ-C7E** Slim line dual band 2/70cm ..... **£149.95**
- Alinco DJ-V17** Robust single band 2m ..... **£149.95**
- Alinco DJ-195E** Popular single band 2m ..... **£129.95**
- Alinco DJ175E** Great value single band 2m ..... **£79.95**



#### Mobiles

- Alinco DR-635E** Next generation dual band 2/70cm ..... **£299.95**
- Alinco DR-435E Mk3** Latest version single band 70cm ..... **£229.95**
- Alinco DR-135E** High power single band 2m ..... **£179.95**

#### Base/Portable

- Alinco DX-70TH** 100W HF to 50MHz AM/FM/SSB/CW transceiver ..... **£649.00**
- Alinco DX-SR8** 100W 1.6-30MHz All mode base station ..... **£549.95**



### KENWOOD

#### Hand-helds

- Kenwood TH-D72E** Dual band 2/70cm with GPS & APRS ..... **£419.95**
- Kenwood TH-F7E** Dual band 2/70cm RX 0.1-1300MHz ..... **£229.95**
- Kenwood TH-K2ET** Single band 2m with 16 button keypad ..... **£165.95**
- Kenwood TH-K2E** Single band 2m ..... **£159.95**
- Kenwood TH-K4E** Single band 70cm ..... **£159.95**



#### Mobiles

- Kenwood TM-D710E** Dual band 2/70cm with APRS RX 118-524MHz & 800-1300MHz, 50 Watts ..... **£429.95**
- Kenwood TM-V71E** Dual band 2/70cm with EchoLink RX 118-524MHz & 800-1300MHz, 50 Watts ..... **£289.95**
- Kenwood TM-271E** Single band 2m, 60 Watts ..... **£165.95**

#### Base

- "New" Kenwood TS-590S** HF & 6m 100W all mode transceiver ..... **£1,349.95**
- Kenwood TS-2000X** All mode transceiver HF/50/144/430/1200MHz 100 Watts All mode transceiver ..... **£1,749.95**
- Kenwood TS-2000E** All mode transceiver HF/50/144/430MHz 100 Watts All mode transceiver ..... **£1,489.95**
- Kenwood TS-480HX** HF/6m 200 Watts Transceiver ..... **£849.95**
- Kenwood TS-480SAT** HF/6m 100 Watts Transceiver ..... **£749.95**

### YAESU

#### Hand-helds

- Yaesu VX-8DE** Triband same spec as VX-8E but with enhanced APRS ..... **£359.95**
- Yaesu VX-8GE** Dual band with built-in GPS antenna and wideband 100-999.90MHz Rx ..... **£349.95**
- Yaesu VX-7R** Tri band 50/144/430MHz RX 0.5- 900MHz, 5 Watts output **£279.95**
- Yaesu VX-6E** Dual band 2/70cm RX 1.8-222/420-998MHz, 5 Watts output ..... **£229.95**
- Yaesu FT-60E** Dual band 2/70cm RX 108-520/700-999.99MHz, 5 Watts output ..... **£169.95**
- Yaesu VX-3E** Dual band 2/70cm RX 0.5-999MHz, 3 Watts output ..... **£149.95**
- Yaesu VX-170E** Single band 2m, 16 digit keypad, 5 Watts output ..... **£99.95**
- Yaesu FT-270E** Single band 2m, 144-146MHz, 137-174MHz Rx ..... **£99.95**



#### Mobiles

- Yaesu FT-857D** All mode HF/VHF/UHF 1.8-430MHz, 100 Watts output **£659.95**
- Yaesu FT-350E** Dual band with Bluetooth, GPS & APRS ..... **£469.95**
- Yaesu FT-8900R** Quad band 10/6/2/70cm 28-430MHz, 50 Watts output ..... **£359.95**
- Yaesu FT-8800E** Dual band 2/70cm RX 10-999MHz, 50 Watts output ..... **£299.95**
- Yaesu FTM-10E** Dual band 2/70cm, 50 Watts output ..... **£299.95**
- Yaesu FT-7900E** Dual band 2/70cm 50/40 Watts with wideband RX ..... **£229.95**
- Yaesu FT-2900E** Single band 2m 75 Watt heavy duty transceiver ..... **£139.95**
- Yaesu FT-1900E** Single band 2m 55 Watt high performance transceiver ..... **£129.95**



#### Portable

- Yaesu FT-897D** HF/VHF/UHF Base/Portable transceiver 1.8-430MHz 100 Watts HF+6, 50 Watts 2M, 20 Watts 70cm ..... **£759.95**
- Yaesu FT-817ND** HF/VHF/UHF Backpack Transceiver RX 100kHz - 56MHz 76-154MHz 420-470MHz 5 Watts ... **£499.95**

#### Base

- Yaesu FT-DX5000MP Deluxe** HF/6m all mode 200W transceiver with 300Hz roofing filter & SM-500 station monitor ..... **£5,295.95**
- Yaesu FT-DX5000D Deluxe** HF/6m all mode 200W transceiver with SM-500 station monitor ..... **£4,795.95**
- Yaesu FT-DX5000** HF/6m all mode 200W transceiver ..... **£4,339.95**
- Yaesu FT-2000D** HF/6m All mode 200 Watts transceiver RX: 30kHz - 60MHz ..... **£2,899.95**
- Yaesu FT-2000** HF/6m All mode 100 Watts transceiver RX: 30kHz - 60MHz ..... **£2,299.95**
- Yaesu FT-950** HF/6m 100 watt transceiver with DSP & ATU RX 30kHz - 56MHz ..... **£1,289.95**
- Yaesu FT-450AT** Compact transceiver with IF DSP and built in ATU, HF+6m 1.8-54MHz, 100 Watts output ..... **£699.95**
- Yaesu FT-450** Compact transceiver with IF DSP, HF+6m 1.8-54MHz, 100 Watts output ..... **£619.95**

#### Hand-helds

- ICOM IC-E80D D-Star** dual band 2/70cm handheld with wideband RX 0.495-999.99MHz ..... **£314.95**
- ICOM IC-E92D** Dual band 2/70cm RX 0.495-999.9MHz with built in DSTAR ..... **£369.95**
- ICOM IC-E90** Tri band 6/2/70cm RX 0.495-999.9MHz ..... **£234.95**
- ICOM IC-770E** dual band 2/70cm handheld with 5W Tx & 700mW loud audio ..... **£149.95**
- ICOM IC-V80E** single band 2m handheld with 5.5W Tx & 750mW loud audio ..... **£99.95**



#### Mobiles

- ICOM IC-7000** All mode HF/VHF/UHF 1.8-50MHz, 100 Watts output ..... **£1,149.95**
- ICOM ID-1** Single band 23cm 1240-1300MHz digital and analogue DSTAR transceiver ..... **£699.95**
- ICOM IC-E2820 + UT123** Dual band 2/70cm with DSTAR fitted, 50 Watts output ..... **£639.95**
- ICOM IC-E2820** Dual band 2/70cm DSTAR compatible, 50 Watts output ..... **£424.95**
- New ID-E880 D-Star** ready dual band with wide band RX 0.495-999.99MHz ..... **£429.95**
- ICOM IC-2200H** Single band 2m 65 watts ..... **£219.95**



#### Base

- ICOM IC-7800** HF/6m All mode 200 Watts Icom flagship radio ..... **£8,699.00**
- ICOM IC-7700** HF/6m 200 Watts with auto ATU transceiver ..... **£5,999.95**
- ICOM IC-7600** HF/6m 100 Watts successor to the IC-756 ..... **£3,195.00**
- ICOM IC-7200** HF/VHF 1.8-50MHz RX 0.030-60MHz, 100 Watts output (40w AM) ..... **£799.95**
- ICOM IC-718** HF 1.8-30MHz RX 300kHz - 29.999MHz, 100 Watt output (40w AM) ..... **£579.95**
- ICOM IC-910H** dual band with optional 23cm, 100 Watts output ..... **£1,249.95**

### Wouxun

#### Handhelds

- Wouxun KG-UVD1P** Great value dual band 2/70cm ..... **£89.95**
- Wouxun KG-699E** Brilliant single band 4m 44-88MHz ..... **£89.95**
- Wouxun KG-679E** Superb single band 2m ..... **£58.95**



### TYT

- TYT 800** 2m 144-146MHz 5 watts 199 channels ..... amazing **£49.95**
- TYT TH-UVF1** 2/70 5 watts 128 channels **£99.95**



### QUANSHENG

- Quansheng TG-UV2** dual band 2/70cm 5 Watts with 200 memories ..... **Only £79.95**



### LUITON

- Luiton LT-UV** Dual band 2/70cm transceiver with FM RX 70-108MHz 5 Watts with 128 memories ..... **just £79.95**



### AirNav Systems

#### "New" AirNav RadarBox 3D

**£489.95 + £7.99 P&P**

- Watch all the action from home ● Real-Time radar Mode-S and ADS-B decoder ● Zoom worldwide to runway level ● Network your station with others ● Self powered from your computer or laptop USB port ● Centre map on your home - Direct reception

This new 3D version of the ever popular AirNav Radar Box adds Google Earth as a map overlay. In addition, the new 3D picture library displays the selected aircraft, enables you to zoom down and see the airport runway, or zoom out and see the aircraft fly over towns, sea and mountains. Never before has such detail and excitement been available.

**AirNav RadarBox-Pro. £399.95** The original box with everything you need including RadarBox, antenna and easy to install software.

**"NEW" AirNav RadarBox 3D Upgrade. £109.95** Upgrade your existing RadarBox 2009 to 3D version with this plug and play software.

Radar Box Accessories Available: Base Antennas, Amplifiers & Cable leads

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Antenna when  
purchasing either  
Radarbox worth  
£49.95



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### MOONRAKER Yagi Antennas

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

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

### MOONRAKER ZL Special Yagi Antennas

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

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

### MOONRAKER HB9CV

Brilliant 2 element beams ... ideal for portable use

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

### MOONRAKER Halo Loops

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

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

### MOONRAKER G5RV Wire Antennas

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

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

Accessories

G5RV-IND Convert any half size G5RV to full with these great inductors, adds 8ft on each leg.....	£24.95
MB-9 Choke Balun for G5RV to reduce RF Feedback.....	£39.95
TSS-1 Pair of stainless steel springs to take the tension out of a G5RV or similar.....	£19.95

### MOONRAKER Trapped Wire Dipole Antennas

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

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

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

### MOONRAKER MTD-300 2-30M Broadband wire dipole antenna.....£149.95

The MTD-300 broadband dipole antenna is designed to provide optimum performance over a wide frequency range and is very easy to assemble and use.

- Frequency 2-30MHz ● Radiator length: 25m (82ft) ● Type: Terminated Folded Dipole ● Radiation: directional ● Feedline: 50 Ohm coax (30m) ● Connector: SO239
- SWR: <2.0:1 to <3.0:1 depending on factors ● No transmatch required ● Power: 150W (PEP)
- Spreaders: 46cm (18in) ● Weight 3.1kg.

### MOONRAKER Multiband Mobile

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

SPX-100 9 Band plug n' go portable, 6/10/12/15/17/20/30/40/80m, Length 165cm retracted just 0.5m, Power 50W complete with 38" PL259 or BNC fitting to suit all applications, mobile portable or base ... brilliant!.....	£44.95
SPX-200 6 Band plug n' go mobile, 6/10/15/20/40/80m, Length 130cm, Power 120W, 3/8" fitting.....	£39.95
SPX-200S 6 Band plug n' go mobile, 6/10/15/20/40/80m, Length 130cm, Power 120W, PL259 fitting.....	£44.95
SPX-300 9 Band plug n' go mobile, 6/10/12/15/17/20/30/40/80m, Length 165cm, High Power 200W, 3/8" fitting.....	£54.95
SPX-300S 9 Band plug n' go mobile, 6/10/12/15/17/20/30/40/80m, Length 165cm, High Power 200W, PL259 fitting.....	£59.95
AMPRO-MB6 6 Band mobile 6/10/15/20/40/80m, Length 220cm, 200W, 3/8" fitting, (great for static use or even home base - can tune on four bands at once).....	£69.95
ATOM-AT4 10/6/2/70cm Gain 2m 2.8dBd 70cm 5.5dBd, Length 132cm, PL259 fitting (perfect for FT-8900R).....	£59.95
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# Enjoying 1.3GHz Home-brew

## Part 2

John Cooke GM80TI concludes describing his electronic adventures getting started on the microwave bands – including building a new local oscillator!

**Welcome to Part 2 of my ‘adventures’ getting going on microwaves! As I briefly mentioned at the end of Part 1, I eventually decided to ‘start again’ with the multiplier chain. The first design (with a tripler as the final stage) wouldn’t produce the required 864MHz harmonic, the second (using a doubler for the final stage) worked well.**

The final version (Fig. 8) was boxed up in a home made tinplate box (the tinplate coming from savoury snack tub bases saved from Christmas!) and assembled together with the oven controlled crystal oscillator (o.c.x.o.) and transverter board in a diecast box (Fig. 9).

At last, the transverter was working properly – I could detect the **GB3EDN** beacon from home, which is more than 3km away and over a hill. In fact, I could detect it even with the antenna disconnected? Well, I can only conclude that, close to the beacon, the signal

from the beacon was strong enough to act as a local oscillator, which mixed with a very weak 864MHz harmonic being generated by my original poor local oscillator chain; so with these signals mixed, I could hear the Morse code generated by the beacon in my receiver.

### Better Antenna

As I seemed to be getting closer to real use of the transverter, I decided that a better antenna would also be useful. I wanted to try a **Günter Hoch DL6WU** design, and on the web came across design software by **John Drew VK5DJ** which made it easy to get the details for these designs.

I decided to build a 15-element design, which would fit on a 1m boom, yet give a reasonable amount of gain (about 14dB more than a dipole). The illustration, Fig. 10, shows the driven end of this antenna.

### Output Amplifier

With the receive side working well, I was now able to go back to the transmit side. There was now a measureable output at 1296MHz on transmit, but at only a few milliwatts – not really enough for communication at reasonable

distances, I guessed. Since there was more room in the output amplifier box, I built a little extra amplifier using an MMIC which provided about 20mW of output – still a little low.

Using *PUFF*, an Open Source computer aided design programme for microwave circuits, originally developed at the California Institute of Technology, I designed and built a new output amplifier using a BFG591 transistor which seems to work well, giving me an output of about 400mW (Fig. 11). The wavemeter showed that the output appeared to be satisfactorily free of unwanted harmonics, so I decided that everything was now ready for a real test.

### My First QSO

Having followed the later stages of my little project closely, **Jon Joyce GM4JTJ** was keen to set up a ‘sked’ for my first microwave QSO. We did this, and achieved a clear s.s.b. contact over a 90km obstructed path. I was more than pleased! The following day I went to my local summit (Allermuir Hill, 493m) for the RSGB Evening Microwave Activity Contest and made five contacts around central Scotland, up to 95km away, mostly at 59.

The figure numbers in this second part of John’s article follow-on from the seven illustrations in the first part of his article, published in last month’s issue of *PW*. **Editor**.

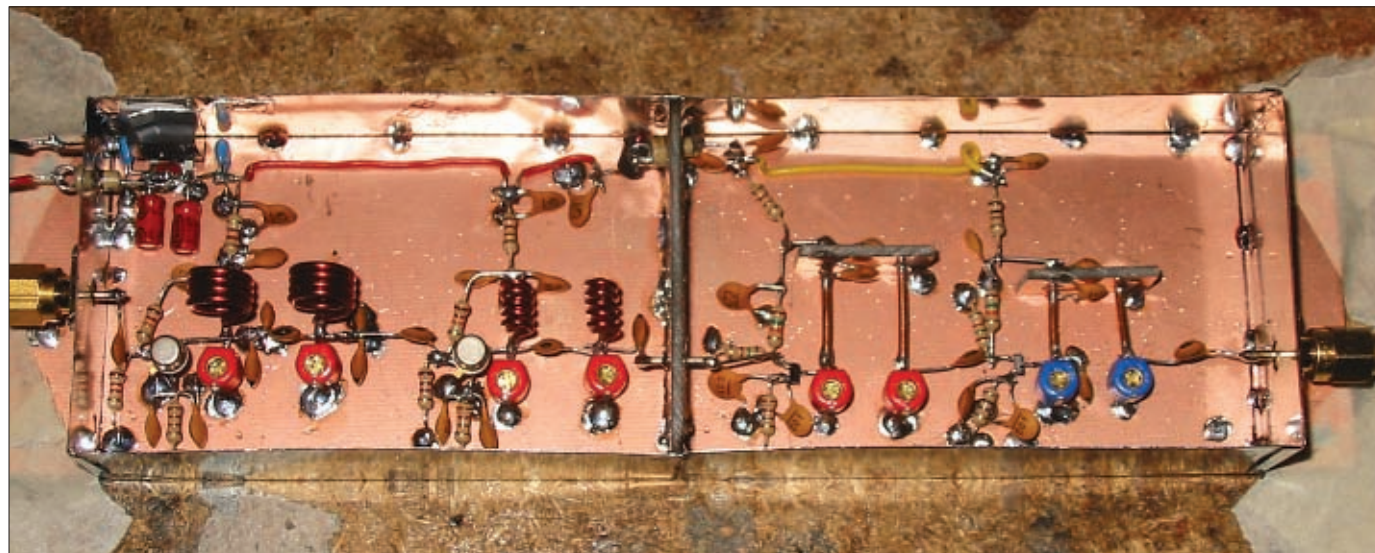


Fig. 8: Final version of the local oscillator multiplier chain.

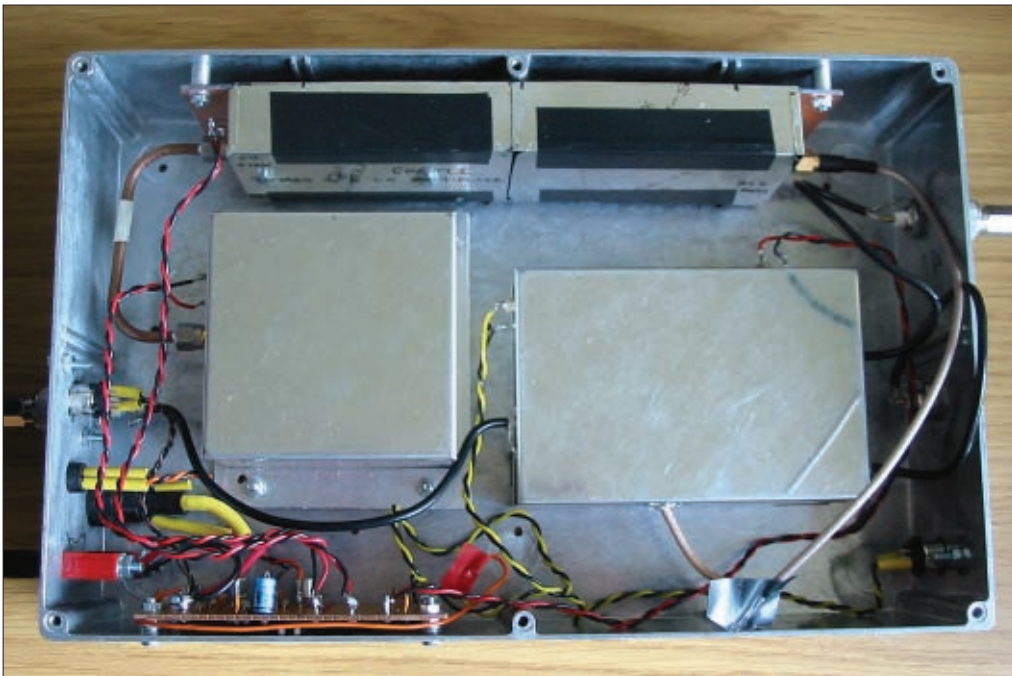


Fig. 9: Local oscillator, multiplier chain and main board boxed up and ready to go.

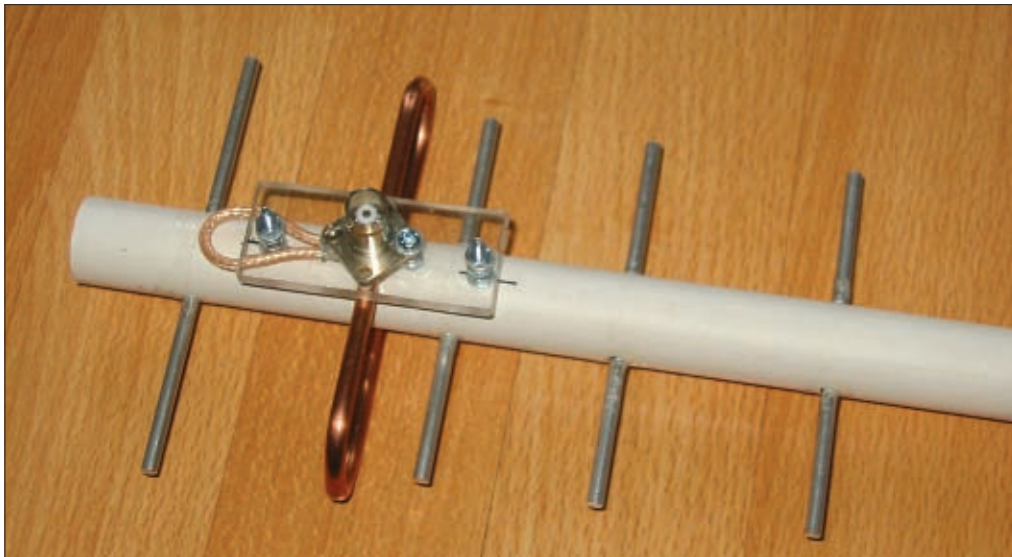


Fig. 10: Driven end of the 15-element Yagi antenna. The loop balun (pink coaxial cable) matches the unbalanced feeder coaxial cable to the balanced folded dipole.

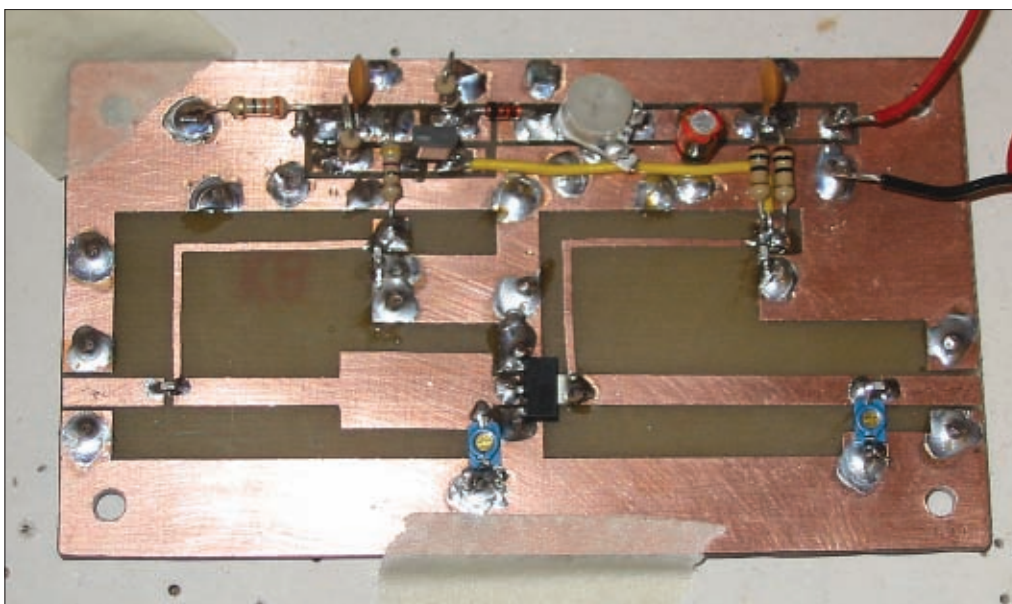


Fig. 11: John's home-brewed output amplifier board.

My success was followed a week later with a Summits on the Air (SOTA) 'Summit-to-Summit' contact with **Gerald Peck G4OIG** using f.m. over a 117km (73 miles) line-of-sight path. With less

than half a watt at each end the signals were fully quieting, showing that the transverter works just as well using that mode. These contacts were a very satisfactory start to my own microwave

activities. The photo, **Fig. 12** shows the antenna in use, and **Fig. 13** shows the rest of my portable station.

### Why So Much Fun?

So what is it that makes microwaves so much fun, and what are the key points to learn? Firstly, at these frequencies home-brewing from scratch is challenging! In particular the circuit layout (even with surface mount components) can be critical. It is possible to build microwave equipment without access to expensive test equipment – but you do need to build some simple test equipment. And because it's challenging – it's also very rewarding when it all finally works!

Building the transverter and getting it going on the air has enabled me to learn a lot about getting started in microwaves – and I'm very keen to progress. There are several projects that I want to complete for 1.3GHz before I move up to 2.4GHz.

It seems to me that it would be good to re-design and rebuild the transverter, using ideas and experience I have picked up. I also have some transistors that will enable me to increase the output power to between 5 and 10W, which will be practicable for hilltop portable operation.

Finally, I have ideas about building a much higher gain antenna, which will be interesting to test. And, of course, I'm planning to report on some of these experiments to *PW* readers in due course. 73 John GM8OTI.



**PW** Fig. 12: The 15-element Yagi antenna in use.

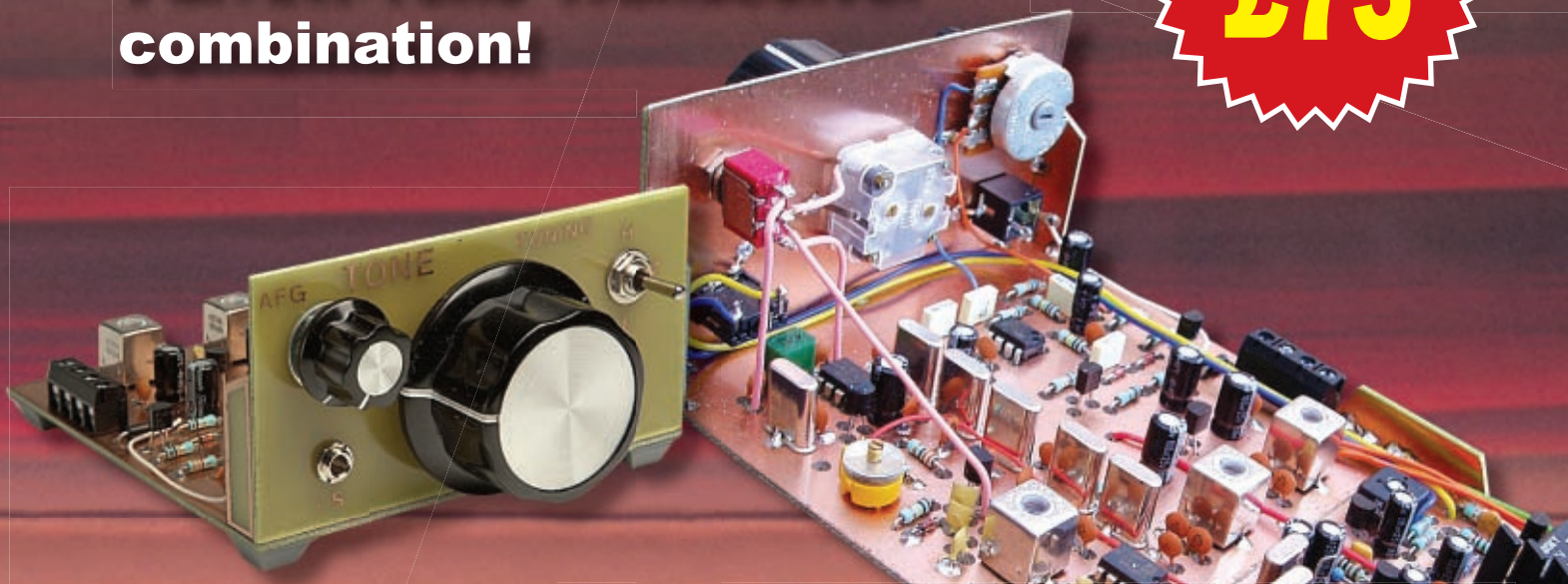


**Fig. 13:** The station, used for hilltop portable operation – transceiver and transverter and the essential waterproof bag that doubles as a mat for use on damp grass!

# Competition Time

## Win the Walford Electronics Parrett-Tone Transceiver combination!

WORTH  
£75



You've read the two part kit construction-review by keen constructor Phil Ciotti G3XBZ and now you have the opportunity to see the quality of his work by winning our simple competition!

Phil Ciotti G3XBZ presented his construction review of the Walford Electronics *Tone* entry level single sideband (s.s.b.) receiver in the December 2010 issue of *PW*. The *Tone* receiver is designed to work with the Parrett s.s.b. transmitter kit and Phil G3XBZ went on to construct and review the transmitter section, which was married to the *Tone* receiver in the January 2011 issue of *PW*.

In part 2 of the construction review featuring both units Phil describes getting the Parrett-Tone on the air and enjoying himself! To win the prize – kindly donated by Tim Walford G3PCJ, the proprietor of Walford Electronics – all you have to do is to answer three simple questions, which you can find below.

Send your completed entry page (photocopies are acceptable but you must detach the corner flash and attach it to your entry) to the address detailed on the right. Good luck with your entry and Phil G3XBZ hopes the winner has as much pleasure operating the Parrett-Tone as he did building it!

### Questions

The answer to all three questions are based on Part 1 and Part 2 reviews, as published in the December 2010 and January 2011 issues of *PW*.

**Question 1:** What i.f. frequency does the Tone receiver use?

**Question 2:** What Amateur Radio band does the Parrett-Tone transmitter-receiver combination cover?

**Question 3:** What antenna did Phil Ciotti G3XBZ use at his QTH to evaluate the completed Parrett-Tone transmitter-receiver kit on the air?

### Rules & Closing Date

Please send the completed entry form (if you photocopy the page you must attach the corner flash with your entry) to be received in the PW Broadstone offices by **Friday February 11th 2011**. Late entries will be disqualified. Entries by post only – no FAXed entries. Multiple entries and those with photocopied corner flashes will be disqualified.

Please provide your daytime telephone number and E-mail address. The first entry (with three correct answers) drawn from the Editor's outside hat during the following week will win the competition. The winner will be notified and arrangements made for sending the prize to them by post.

**Note:** By entering the competition using this form you are deemed to have accepted the rules. The Editor's decision will be final and no correspondence will be entered into.

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## Mike Richards G3WNC's Data Modes

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# QSO Aids, Advice and MFSK

Mike Richards G4WNC says it's time to take a look at multi-frequency shift-keying (MFSK) in his Data Modes column after a few helpful ideas and advice.

**A slight change of direction for this month as we move on to look at data modes that depend on frequency changes to communicate their messages. However, before I do that I need to tackle a couple of issues that have been raised by PW readers.**

### Band Plans

The first concerns band plans and where you should operate with data modes. For the definitive guide on this I suggest you check with the RSGB web site as they always post the very latest agreements. The band plan can be found at:

[www.rsgb.org/spectrumforum/bandplans/rsgb\\_band\\_plan\\_2010.htm](http://www.rsgb.org/spectrumforum/bandplans/rsgb_band_plan_2010.htm)

And there's one significant change that is still being ignored by many. After the recent extension to the 40m there was a frequency move of the 'all digi-modes' section, from 7.035–7.040MHz to 7.040–7.060MHz. That's not only a frequency shift but a useful increase in available space from just 5kHz to 20kHz.

However, many Radio Amateurs appear to be unaware of the change and the bulk of the 40m PSK activity remains fixed in the old slot. It would be helpful if all PW data mode users could change to the new allocation as I'm sure others will follow suit and as the saying goes, if we don't use it we'll lose it!

When using the plan you should also refer to the notes to make sure you understand the meaning of the various mode allocations. One common misconception is to assume that all data modes are narrow-band modes – that's not the case, especially with some of the MFSK modes we will be covering over the next couple of issues. Narrow-band modes are those that occupy a bandwidth of 500Hz or less.

### The QSO Aids

Next point is about trying to get away from those awful automated QSOs that

depend entirely on stored macros and start some more meaningful QSOs.

One of the root causes of the overuse of macros is a lack of typing skills. For me this isn't too much of a problem, as I spend many hours typing away at the keyboard so can easily keep a live conversation going on PSK-31.

However, I do understand that many readers won't be able to manage that sort of speed. The trick is to set-up your macros to give you some typing/thinking time. In addition to using a macro for your CQ calls, you need a macro that you can use to respond to a CQ call, e.g. G1??? de G4WNC G4WNC G4WNC PSE K.

Next you need to store some basic information to get the QSO started, the routine here is normally to supply a signal report (a real one please – not 599!), your name and QTH plus locator. While that is being sent you can type away at your own speed with your personal messages, questions or perhaps answers to questions that have been asked of you.

You will also need simple macros to top and tail your QSO, e.g. G1AAA de G4WNC and at the end G1AAA de G4WNC PSE K. Please try and avoid the long 'brag lists' that detail the station equipment right down the processor and amount of memory in the PC!

Unless someone has specifically asked, they really don't need that much information. The important station information is the antenna and transmit power. If you want to try and start a live conversation with a data operator, the trick is to ask an open question, by that I mean a question that can't be answered with a simple yes or no.

Here are a few examples: "What's the WX like in your location? How is that antenna performing for you? What DX have you worked recently? Can you tell me some more about your antenna system?" You could store some of these open questions in macros if you like but you need to be prepared to respond to the answers. I promise you it is worth

the effort and you may well make a few new friends – something you'll never do with an automated QSO!

### Voice Typing

Final point before I get into the 'meat' of the MFSK subject. I've recently started experimenting with the voice recognition software that's built into most of the later Windows operating systems. This software appears to be quite effective and can be used to control the PC by entering specific commands or you can use it to type into a word processor or other program.

It was this latter application that interested me and I wondered whether or not it would work with data programs so that you could speak/spell the words directly into the data software. I tried it with *Ham Radio Deluxe (HRD)* and it seemed to work OK other than the fact that I was using a webcam microphone that picked-up lots of other background noise.

However, I was able to speak words into the microphone and have them appear as transmitted text in *HRD*. From my initial experiment I would say that you really need to use a boom microphone and spend some time using the training software and adding specialist Amateur Radio words to the dictionary.

You need to add the special words, because the software doesn't know what to do with the Q code! If anyone has success with this or has some tips to get the best from the software please let me know.

### What's MFSK?

Now to look at MFSK and what it is! In some ways MFSK is a natural extension of RTTY which uses just two tones to convey its messages. However, practical MFSK systems can use 16, 32 and even 64 tones. In the systems we'll be covering here, each tone is sent separately and is used to represent an element of the message.

There is a potential problem here – if



we were to stop the signal and then send a different tone the sudden stop and restart could manifest itself as a significant key-click. The solution is to keep the amplitude constant and produce a clean transition between the tones with no phase discontinuities. Fortunately, this is relatively simple to achieve with today's digital signal-processor (d.s.p.) based PC soundcards.

In addition to keeping the bandwidth under control, the use of this technique results in a constant transmitter output amplitude so p.a. stages don't need to be linear and you don't have to worry about the impact of ALC, etc. The use of MFSK has a long history and was used extensively by diplomatic services during the cold war years in the late 1950s. Systems such as the British *Piccolo*, French *Coquolet* and the Russian *Crowd36* dominated diplomatic communications.

The MFSK mode has a number of inherent advantages that make it ideal for h.f. communications and these include; good tolerance to fading, multi-path and Doppler effects. It has good noise rejection and simple transmitter drive requirements as the signal amplitude is constant. It's probably simplest to explain the system by selecting a mode to cover in detail so let's start with one of the original amateur MFSK modes - MFSK-16.

As the name suggests, MFSK-16 uses 16 tones for its transmission system and these are spaced 15.626Hz from each other with an overall bandwidth of 316Hz thus making MFSK-16 a true narrow-band mode. The baud rate or symbol rate of MFSK-16 is set at 15.625 baud. As we have 16 tones at our disposal, each one can represent one of 16 data combinations.

Going back to earlier *Data Modes* features, 16 combinations equate to four data bits (See **Table 1**) so every tone represents four data bits. From this

With the recent addition of 7.1–7.2MHz to the 7MHz band, the 'all digi-modes' section has moved from its old 7.035–7.040MHz slot to the new one of 7.040–7.060MHz. That's not just a frequency shift but a very useful increase, from what was just a 5kHz slot to 20kHz. A significant change that is still being ignored by many Amateurs.

### MFSK-16 Frequencies

MFSK-16 signals can appear in any of the data slots on the band plan but the following make a good starting point:

1.838MHz	3.5825MHz	10.147MHz,
14.078(-082)MHz	18.10265MHz	21.0865MHz,
24.9215MHz	28.076MHz	

**Table 1**

### MFSK-16 Tone to Data

Tone	Binary Weight			
	8	4	2	1
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
10	1	0	1	0
11	1	0	1	1
12	1	1	0	0
13	1	1	0	1
14	1	1	1	0
15	1	1	1	1

we can see that the data rate of the link, is four (number of bits per tone) x baud rate (15.625) = 62.5 bits per second. To improve the reliability of MFSK-16, Forward Error Correction (FEC) has been included using a convolutional encoder – see last month's *Data Modes* for a description of that process.

The FEC system doubles the number of bits to be transmitted so that our

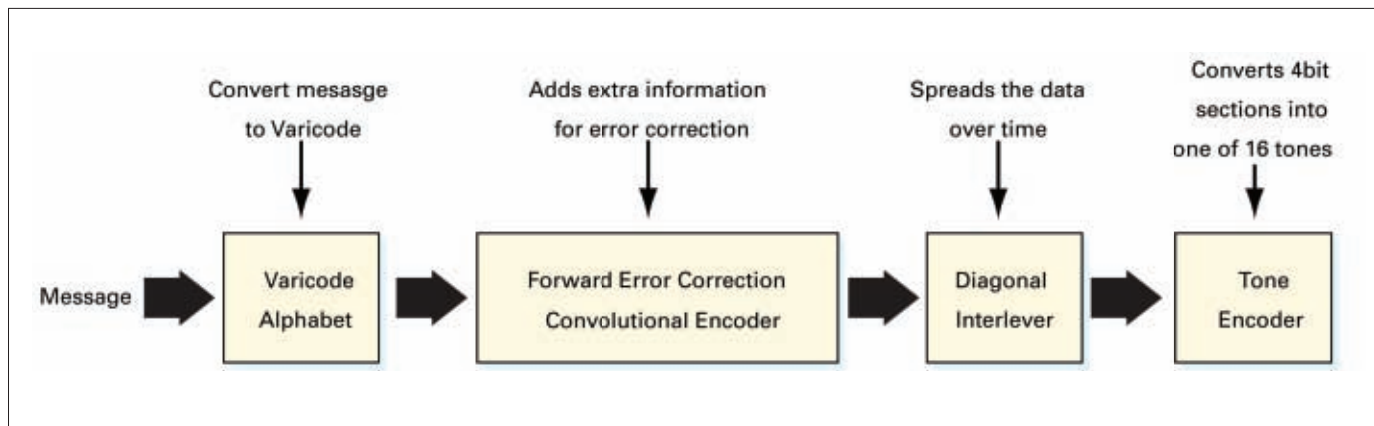
final data rate is reduced to 31.25 bits per second, much the same as PSK-31. However, prior to transmission, a device known as a 'diagonal interleaver' is added and this is used to spread the data bits over time. This is done to improve overall link reliability because the Viterbi decoder that's used in the decoder struggles if consecutive blocks of bits are damaged.

By mixing the bit pattern during transmission and then reconstructing the correct order at the receiver, the risk of consecutive bit loss is greatly reduced – a pretty neat idea! However, one aspect of MFSK-16 I've not yet mentioned is the alphabet employed to convert your plain text message into data for the encoding process.

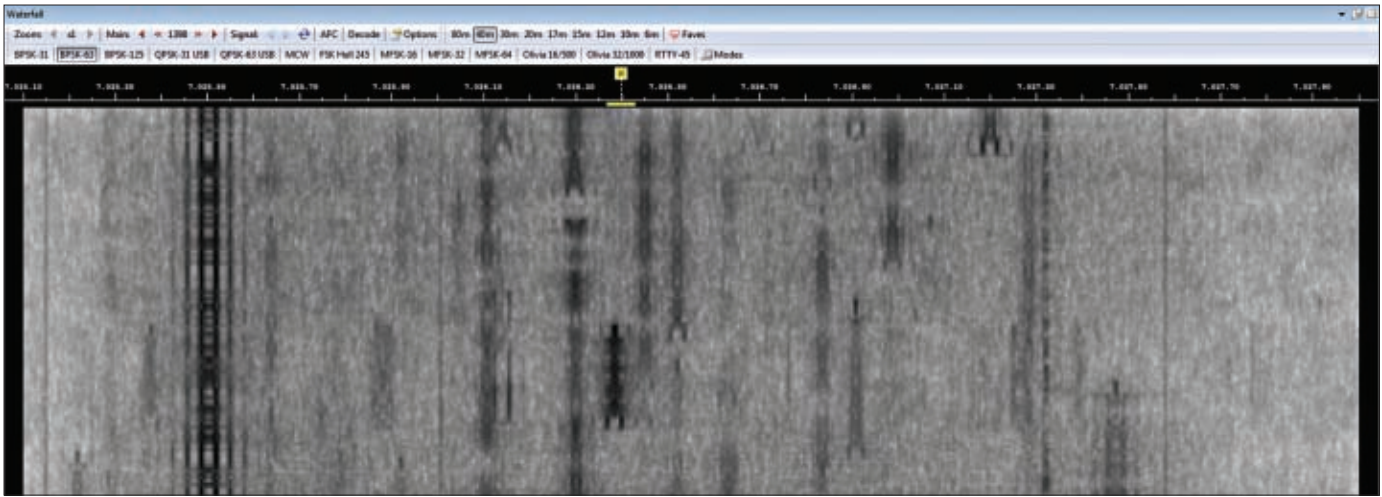
The alphabet is known as Varicode but is not the same as the Varicode used for PSK-31. The Varicode used for MFSK-16 is a revised version developed by **Nino Porcino IZ8BLY**. However, the same basic principles are employed, i.e. the letters most commonly used are allocated the shortest codes but some additional characters and control codes are added. See **Fig. 1** for a block diagram of the MFSK-16 encoding process.

### Receiving MFSK-16

Most of the popular decoding software systems include MFSK-16 as standard,



**Fig. 1:** the MFSK-16 Encoding process.

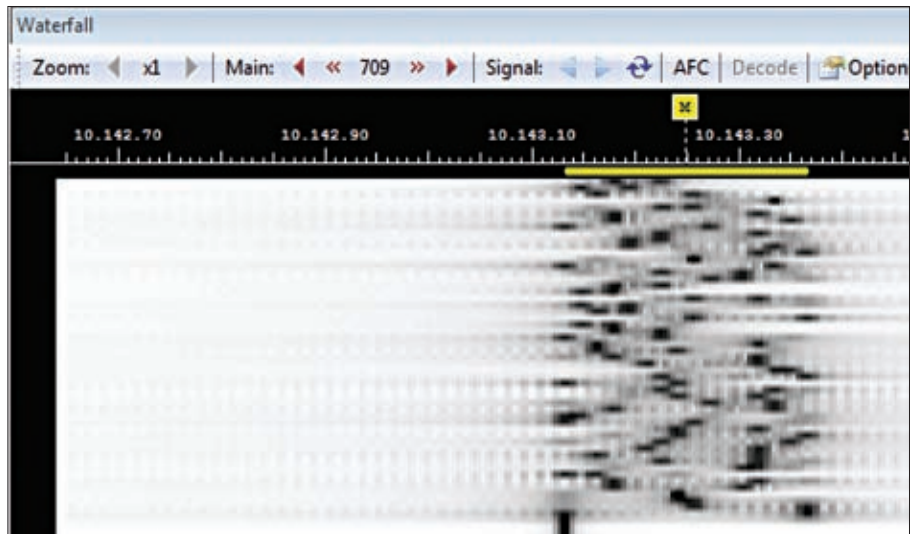


Many Radio Amateurs are still using the old Data Modes section of the 7MHz (40m) band.

so you shouldn't have any problems finding software. If yours doesn't include MFSK-16, then *DM780* within *Ham Radio Deluxe (HRD)* has a very comprehensive set of data modes and is a free download. Many people struggle to recognise new modes so it's always a good idea to listen to a sample of the sound before you start operating particular mode.

There are a number of sites on the web where you can find sound samples and here are a couple you might like to try **Gary Hahn KB9UKD's** site: [www.kb9ukd.com/digital/](http://www.kb9ukd.com/digital/)  
 British Amateur Radio Teledata Group (BARTG): [www.bartg.org.uk/modesamples.asp](http://www.bartg.org.uk/modesamples.asp)

PW



Waterfall spectrum of a MFSK-16 signal.

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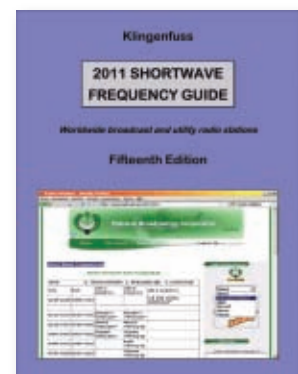
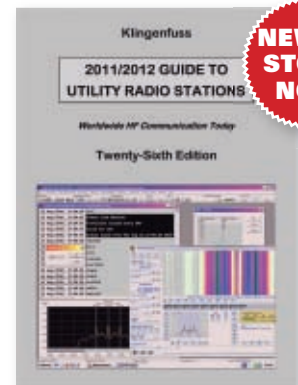
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SEE THE BOOKSTORE ON PAGE 72

# Emerging Technology

Feature

Chris Lorek G4HCL looks in to the near future where planning permission might not be needed for invisible antennas!

This time I'm discussing how pioneering 28 and 144MHz antenna work by a Radio Amateur is just now finding applications around the world. I'm also looking at why planning permission may be a thing of the past in the future with invisible antennas!

## Multi-band Fractal Antennas

One thing that a certain cellphone manufacturer learned, from the disastrous mistake they made with the antenna on their latest 'smartphone', was of the difficulty of integrating multi-band antennas into a portable radio device! Their design wrapped antennas around the shell, but they reportedly had no way to combine them into one piece, so needed to split them. Maybe it's because of the publicity of this that even more work is now being done on the implementation of 'Fractal' antennas.

Most readers won't be familiar with fractal antennas (neither was I until I started researching the subject!). Basically, a fractal element antenna is shaped using fractal geometry, where a fractal is a complex pattern built from the repetition of a simple shape. By using this technique allows antennas to be made typically 50 to 75% smaller than traditional types.

Also, for multi-band antennas the fractal types can be more reliable and be made at a lower cost than traditional



*Nathan 'Chip' Cohen W1TW started out as a Novice in 1966 as WN1HBX aged 11.*

antennas. This is because the antenna performance is achieved through the geometry of the conductor, rather than using separate elements, loading coils, or traps – all of which all increase the complexity of the resultant antenna.

Even with the antenna being shrunk down to half-sized or smaller, it can still give surprisingly good performance. Multi-band operation can have non-harmonic frequencies and at higher frequencies the fractal antenna is itself naturally broadband.

Now you may think all this is something new, and in a way you'd be



*Fractal antenna can be used for multi-band operation on h.f., v.h.f. and u.h.f. as well as higher frequencies.*

right. But it may come as a surprise to find that, over 30 years ago, the very first fractal antenna was designed by a young Radio Amateur who lived in an apartment in Boston, USA, and who didn't have much room for antennas. **Nathan 'Chip' Cohen W1TW** started out as a Novice in 1966 as **WN1HBX** aged 11.

In 1988 Chip assembled the first true fractal antenna to operate on 144MHz. He later built a 28MHz fractal loop, which had the characteristics of a dipole and using this worked dozens of stations in Europe with a transmit power of just 1W.

As well as having many professional papers and presentations, Chip W1TW also recently gave a presentation titled 'From Ham Radio Origins: the Weird World of Metamaterials' at the New England Ham Convention on August 28th, and was the Banquet Speaker at this year's ARRL and TAPR Digital Communications Conference. Once again, Radio Amateurs pioneer new and emerging technology. But read on!



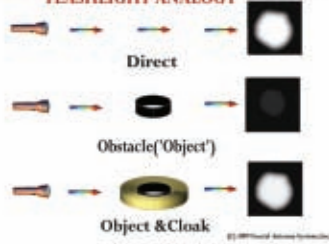
## Merging Fractal Antennas & Metamaterials

On a related subject, regular readers may remember that last year I detailed an 'invisibility cloak' using metamaterials. Here, the metamaterials can effectively bend electromagnetic rays, radio and light, around an object to in effect make it invisible.

Recent research has merged this with close-spaced fractal antennas, which are built up as layers of separated printed circuits to form a covering or 'cloak'. If you think this is all a huge (early) April fool joke – take a look at [www.metacloak.net](http://www.metacloak.net)

Another rather interesting feature is that, if a radiating dipole is placed in the middle of the 'cloak', it doesn't reduce the

### FRACTAL's Wideband Invisibility Cloak FLASHLIGHT ANALOGY



## Adaptive Earplugs

When you're using your handheld transceiver outdoors, if you're in a noisy location such as walking along a footpath by a busy road, often a major problem is being able to hear the receive audio from the handheld's speaker. Plugging in an earphone is a popular choice, but even here external noise can get through, and trying to get your own transmission understood with loud background noise is often also quite a problem. This may just be an annoyance for hobby radio use, but where such radios are relied on for vital communication, such as in emergency situations, it could literally be a life-or-death situation.

'Active' noise-reducing earphones have been around for a while, usually intended for high-quality entertainment listening. Now this technology has now been adapted specifically for hand-held radios, and extended with a transmit facility which lets only your voice through and with little or no background noise.

The 'Quietpro' earplug was originally developed in Norway for military radio

radiation from this, meaning the antenna can be used as normal. So what could this mean in the future? No more worries about large towers or antenna arrays on your roof, planning applications and associated neighbour's objections, just make them invisible! Mind you, the local pigeons could get knocked out by repeatedly flying into your invisible antennas!

*Fractal Antenna Systems' wide-band invisibility cloak works at a vast range of microwave frequencies. Using a flashlight as an analogy, the cloak lets the microwave 'light' slip around the obstruction, so the light is the same intensity as when there is no obstruction or 'object', having effectively become invisible.*

use, no doubt under a shroud of secrecy. It's currently in use 'under wraps' in armoured vehicles as well as in other applications and this new technology has now been released to the public.

A small microphone on the outside of the new 'offshore' version of the earplug picks up ambient sounds. The sound is digitally processed and unwanted loud noises are filtered out before the sound is sent to a tiny speaker inside the earplug.

On transmit, a microphone on the inside of the earplug picks up speech signals through the skull, being passed via bone vibration. This means that users don't need a microphone in front of their mouth, another advantage is that the microphone inside the ear doesn't pick up background noise in the way that a microphone in front of the mouth does.

The microphones are being tested right now on Norwegian offshore platforms, and **Asle Melvæ**, a noise specialist who initiated and is responsible for the R&D project, recently concluded that, "Users of the new device do not have to strain to hear what is being said over the radio and the noise



*The 'Quietpro' earplug was originally developed for noisy locations. It features external sound-cancelling on the earphone and the built-in microphone.*

reduction system in the earplug means that the level of sound is adapted to the surrounding environment. On board an oil platform understanding messages transmitted by radio can be a matter of life and death."

No doubt we'll soon be seeing this new technology introduced into hobby radio equipment as well as professional radios. We'll have crystal clear reception from, and transmitted audio to, our local repeaters rather than lots of background noise each way!

## Smart Clothing Power

Many of us are aware of kinetic energy, where physical movement can be used to generate at least small amounts of electrical power. Kinetic-powered wristwatches have used this for some time, Recently, researchers at Southampton University have gone several steps further and revealed their plans to develop clothing fabric that generates electricity, not just through the wearers' movement – but also from body heat.

The smart fabrics will be made by using rapid printing processes to attach a film of piezoelectric or thermoelectric material to a textile base, which will then be able to harvest and conduct electricity for potential use. For the material (which will be attached as a film) the team are testing a range of polymers with piezoelectric properties – either from the polymer itself or from ceramic powder in the polymer – meaning they generate electricity when mechanical strain is applied.

For generation from body heat, the thermoelectric material will be made from two attached semiconductors (p-type and n-type), which create a voltage by a process known as the Seebeck effect when they are at different temperatures. The team leader, **Dr Steve Beeby** says, "The objective is that its impact on the fabric is as minimal as possible, so that a nice-feeling, compliant fabric doesn't become stiff".

Interesting eh? I've previously detailed flexible electronics which can be built into fabrics such as caps and jackets, so these clothing items could soon also be used to power them as well!



*Dr Steve Beeby of Southampton University is leading a team researching Smart Clothing to power portable electronic devices.*

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



# Feeders – Coaxial, Ribbon or Twin?

In this session of Technical For The Terrified, Tony Nailer G4CFY, looks into feeding the antenna with your signals – but which type of feeder should you use?

**I think It's time to deal with feeders, as they are a part of the antenna subject, which fascinates the majority of amateurs. I have described in general terms twin and open wire feeder systems, random wires, dipoles, trap dipoles, and baluns in Technical for the Terrified (T4T) in June 2007 and February 2008.**

I'm now going to deal in greater depth with the common types of feeder. This will include a little mathematics, but, as I've said many times, **please don't panic!** Many calculators have log and square root functions so, that's all you need along with the 'normal' add, subtract, multiply and divide capabilities.

### Coaxial Cables

I suppose, that the most common feeder in Amateur Radio use is coaxial cable. It's a popular belief that it's inherently screened – and it then neither radiates nor picks up signals. Unfortunately, this isn't true in many instances as the inner core and outer screening have completely different dimensions and geometry and thus different electric and magnetic fields. Also the length of the cable will have a dramatic effect on the operation of an antenna at frequencies where the feed-point is a poor match to the cable characteristic impedance ( $Z_0$ ).

The insulating material between inner and outer, called the dielectric, has a 'braking', or slowing down effect on the speed of the wave travelling along the cable. Thus the wavelength of the signal in and on coaxial cable is shorter. Polyethylene (polythene) insulating material found in most of the 50Ω solid dielectric cables and it has a dielectric constant, called  $\epsilon$  of 2.3. The 'braking' effect or velocity factor  $vf = 1/(\sqrt{\epsilon})$  so for common coaxial cables  $vf = 1/(\sqrt{2.3}) = 0.66$ .

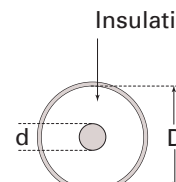
To determine the length of solid dielectric coaxial cable that is to be a quarter wavelength at a particular frequency, simply multiply the free-space quarter wavelength by 0.66. So, a (free-space) full wavelength is  $L = 300/F$ , where L is metres and F is MHz. And the free-space quarter wavelength is therefore  $75/F$ .

For a quarter-wave of a signal in solid dielectric coaxial cable this becomes simply  $L = 50/F$ , as 50 is  $75 \times 0.66$ . As an example a quarter wavelength in a typical coaxial cable at 14.1MHz is  $50/14.1 = 3.546$  metres.

Lengths of coaxial cable, which are a quarter of a wavelength at a particular frequency will act like a 'see-saw' to the impedance seen at either end (only at that particular frequency). If the feed-point impedance is 50Ω, then the other end will also be 50Ω, in other words, the see-saw is level.

But if, the feed-point is now 25Ω (depressing one 'end' of the see-saw) then the other end of the cable will appear as 100Ω. The relationship between the characteristic impedance of the cable  $Z_0$ , and the impedances  $Z_{in}$  and  $Z_{out}$  is:

$$Z_0 \times Z_0 = Z_{in} \times Z_{out}$$



Insulation with dielectric constant  $\epsilon$

$$Z_0 = \frac{138}{\sqrt{\epsilon}} \text{Log} \left( \frac{D}{d} \right)$$

For RG58 Cable      outer diameter D = 0.130in  
inner diameter d = 0.037in  
 $\epsilon$  for Polyethylene = 2.3

$$Z_0 = \frac{138}{\sqrt{\epsilon}} \text{Log} \left( \frac{D}{d} \right) = \frac{138}{\sqrt{2.3}} \text{Log} \left( \frac{0.13}{0.037} \right)$$

$$= \frac{138}{1.516} \text{Log} (3.51) = 91.03 \times 0.546 = 49.7\Omega$$

and  $vf = \frac{1}{\sqrt{\epsilon}} = \frac{1}{\sqrt{2.3}} = \frac{1}{1.5166} = 0.66$

Fig. 1: The layout and calculations that affect the various parameters of coaxial cables.

Lengths of coaxial cable, which are half wavelength long at a particular frequency, will always have the same value of impedance at each end but the impedance will have the opposite sign. So, if the feed-point has an impedance of 100Ω which is, say, inductive due to the antenna being too long at that frequency, then at the other end of half wavelength of feeder the impedance will be transformed to a capacitive impedance of 100Ω.

### Ratio Of Diameters

The dielectric constant of the insulating material also affects the ratio of diameters of inner and outer conductors to achieve a particular characteristic impedance  $Z_0$ . If you refer to the coaxial cable characteristic impedance calculations shown diagrammatically in Fig. 1, you'll see that for a piece of good quality RG58U coaxial cable the diameter of the inner is 0.94mm (0.037in) and the (inside diameter) of the screening is 3.3mm (0.13in), measured with a micrometer. The formula including the velocity factor results in a characteristic impedance of 49.7Ω. Clever isn't it?

When not perfectly terminated at both ends, coaxial cable, due to its imbalance of electric and magnetic fields, will radiate signals along its whole length, creating strong r.f. fields all the

way from the transmitter (or a.t.u.) to the antenna feed-point. When feeding any form of balanced antenna you'll also require a 1:1 ratio balanced-to-unbalanced transformer (balun) at the feed-point.

Without fitting a balun the waves on inner and outer are unlikely to be equal and opposite, so the wave currents and phases in each half of the antenna will be different, which will slew the radiation pattern. The imbalance will be different on different bands due to the length of feed-line being different proportions of wavelengths. So it will, perhaps, slew one way on one band and a totally different direction on another band.

On receive, the imbalance of inner and outer conductor currents, will allow noise signals to be developed and picked up along its whole length. This results in the signal received by the antenna being progressively buried further in man-made and galactic noise. Also – contrary to popular belief – coaxial cable is affected by being strapped to masts and against walls, particularly when mismatched. It also produces a transformer-like action if it's coiled up.

### Ribbon Feeder

The ribbon type of twin-wire feeder has much lower loss than coaxial cables, because the dielectric between the two wires is very thin. Nowhere could I find the dielectric constant for this type of construction, but knowing that the air itself has a value of 1 and the polyethylene path value is 2.3, I estimated a value mid-way value of around 1.65.

If you refer to the twin-feeder characteristic impedance calculations shown diagrammatically in **Fig. 2** you will see that for a length of ribbon cable with two cores, each 0.75mm diameter with polythene sleeve and separated by 10mm between centres with a polythene web (with an  $\epsilon$  value of 1.65) that the characteristic impedance comes out at 307 $\Omega$ .

By re-arranging the formula, Fig. 2, I calculated that to get 300 $\Omega$  would require the dielectric constant,  $\epsilon$ , to be 1.72. The velocity factor of this feeder would then be 0.76. Both 300 $\Omega$  and 450 $\Omega$  twin-feeder obviously have a geometry that would indicate a balanced performance, which they achieve to some extent. But the separation of the two lines is wide enough to allow significant emissions from each wire that are not cancelled out by the emissions from the other.

The differences of emissions from each wire, of course, has both advantages and disadvantages. It allows the two wires to be driven with different waves and thereby deliberately to form part of the radiating wires of the antenna system. This means that the top wires of the antenna can be any equal lengths, then by using wide-spaced feeder and an antenna tuning unit (a.t.u.) it's possible to cover a very wide range of frequencies with the antenna system.

The disadvantages of twin-feeder are much the same as coaxial cable, with regard to emissions, and the potential to cause TVI. Twin-feeder also still has the ability to pick up of man-made and Galactic noise.

At the shack end of the feeder, a 4:1 balun in the a.t.u. converts the high impedance line value down to an impedance between 25 and 100 $\Omega$ . Wide-spaced twin-feeder must not be put close to any other surface, such as pole support, bricks, etc., as this will dramatically affect the characteristic impedance and increase losses.

### Low Impedance Twin-Feeder

The low-power, low-impedance feeder available in the UK for many years comprised of two 0.9mm diameter (20s.w.g.) single-wire cores, separated by about 1.4mm between centres. The cable was moulded in solid polyethylene to prevent moisture ingress.

The type of construction of the earlier low-impedance twin

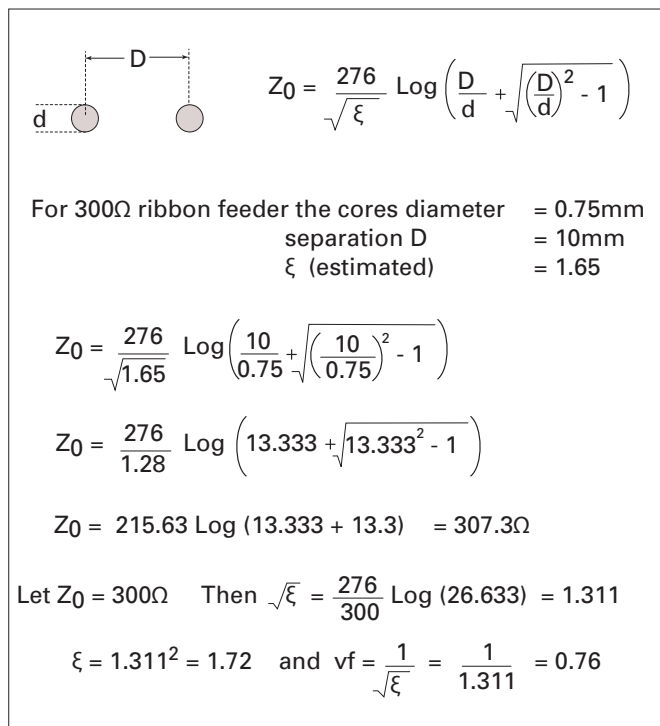


Fig. 2: The layout and calculations that affect the various parameters of ribbon twin-feeders.

has a problem, in that it's relatively rigid and liable to fracture one or other of the cores, often close to the cable grip at the feed-point. Also, when making-off the wires you cut between them and peel off the sheath, leaving two bare wires. It's then required to sleeve the cores individually, before adding an overall heat-shrink sleeving, so that no water can get in. It's quite a time consuming operation and has a high liability of failure.

The original manufacturer and supplier of this cable, Permanoid, were no longer interested in producing a new stock in 2008, so **Waters & Stanton** had some made and imported from the Far East through the cable supplier Webro. The new cable had the separation between core centres of only about 1.25mm.

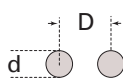
If you refer to characteristic impedance calculations shown diagrammatically in **Fig. 3**, you'll observe that the cable with a solid dielectric of 2.3 calculates at an impedance of 67.9 $\Omega$ . A 10m sample of this cable had a measured impedance of 65 $\Omega$ , and has about the same loss as coaxial cable as well as the same velocity factor of 0.66.

### The G4CFY Twin-Feeder

To overcome the problems of fracture and water ingress at the made-off end of the solid encapsulated twin, I decided to design my own cable, based on two cores, made up from 24 strands of 0.2mm diameter wires, each with its own polyethylene sheath. The two cores were then jointly moulded into an oval outer polyethylene sheath.

The individual cores were 1.3mm diameter and I wanted the sheath thickness of 0.5mm or less. Unfortunately, the minimum sheath thickness was 0.6mm to hold the wires tightly together and I couldn't get a sample to test first. So, I had to commit to the full production run without determination of characteristic impedance, except my own calculations.

If you refer again to Fig. 3, you will see that the 0.6mm sheath gave a centre-to-centre spacing of 2.5mm and the calculated impedance is just over 100 $\Omega$ , which has since been confirmed by measurement. The velocity factor and loss of this new cable are much the same as good quality RG58U.



$$Z_0 = \frac{276}{\sqrt{\xi}} \text{Log} \left( \frac{D}{d} + \sqrt{\left(\frac{D}{d}\right)^2 - 1} \right)$$

Original Lo-Z feeder the core diameter = 0.9mm  
separation D = 1.4mm  
 $\xi$  (polyethylene) = 2.3

$$Z_0 = \frac{276}{\sqrt{2.3}} \text{Log} \left( \frac{1.4}{0.9} + \sqrt{\left(\frac{1.4}{0.9}\right)^2 - 1} \right)$$

$$Z_0 = \frac{276}{1.51} \text{Log} (1.555 + 1.192) = 80.2\Omega$$

For recent Lo-Z feeder core diameter = 0.9mm  
separation D = 1.25mm  
 $\xi$  (polyethylene) = 2.3

$$Z_0 = \frac{276}{\sqrt{2.3}} \text{Log} \left( \frac{1.25}{0.9} + \sqrt{\left(\frac{1.25}{0.9}\right)^2 - 1} \right)$$

$$Z_0 = \frac{276}{1.51} \text{Log} (1.3889 + 0.9638) = 67.9\Omega$$

For the new multi-strand Lo-Z feeder

24/0.2mm core diameter = 1.3mm  
separation D = 2.5mm  
 $\xi$  (polyethylene) = 2.3

$$Z_0 = \frac{276}{\sqrt{2.3}} \text{Log} \left( \frac{2.5}{1.3} + \sqrt{\left(\frac{2.5}{1.3}\right)^2 - 1} \right)$$

$$Z_0 = \frac{276}{1.517} \text{Log} (1.923 + \sqrt{3.698 - 1})$$

$$Z_0 = 182 \text{Log} (1.923 + 1.643) = 100.5\Omega$$

$$\text{and } vf = \frac{1}{\sqrt{\xi}} = \frac{1}{1.517} = 0.66$$

Fig. 3: Comparing the three variants of low-impedance twin feeder. The new low-impedance twin-feeder has individually sheathed multi-stranded cores within an overall sheath.

The cores of the new twin-feeder are so close together that, the magnetic and electric fields cancel effectively. This means there is virtually no feeder radiation when transmitting and there is virtually no noise or signal pick-up on receive. Typically the feeder is 0.4dB/metre quieter than wide-spaced twin or coaxial cable.

Any excess run-length can be coiled up quite tightly without any significant degradation to performance. It's also less affected by proximity to masts, poles and brickwork. However, it has to be used with a 1:1 balun in the shack and those most often found in most commercial matching units, being 4:1, are not suitable.

### Feeder Comparison

Coaxial cable and wide-spaced twin-feeder both allow differential signals between cores, which allows a bit of freedom to use the cable as part of the antenna, with the aid of an a.t.u. Power loss in wide-spaced twin-feeder is much lower than coaxial cable, it's also lighter and cheaper.

Both coaxial cable and twin-feeder work well with short lengths and are particularly good with length corresponding to half a wavelength on a specific band. At low frequency coaxial cable may work like screened cable – but at v.h.f. it definitely does not! At v.h.f. where wavelengths are short compared with feeder length, coaxial works as it should, particularly satellite cable, with its low dielectric constant and low loss. At u.h.f. coaxial cable probably works more like waveguide with no emission of electric or magnetic field.

From the experience with a large number of **Spectrum**

**Communications** customers using the new twin-feeder, it's clear that it does not work like either wide-spaced twin, or coaxial cable. It just doesn't work well with lengths under 15 metres but beyond that it doesn't seem to matter how long it is.

I have reasoned that it's actually working like a balun transformer. A balun transformer is usually made using two or more wires tightly twisted together and then wound onto a high permeability core. The core is used to massively increase the effective length and ensure good coupling between the wires.

Low impedance twin does not allow itself to become part of the resonant radiating wires of the antenna. The evidence is that for lengths over 15 metres the signals in the cores are equal in magnitude and opposite in phase. Lengths taking into account velocity factor to produce multiples of quarter or half wave have no effect on standing wave ratio.

### Final Words

I had hoped to deal with wire antennas also as transmission lines but space did not allow it. I make no apology for the mathematics, as there must be readers who will find the calculation of interest. Hopefully, by separating the calculations into separate blocks it should allow those really terrified readers to ignore them, but puts them all together for the ease of others.

PW

If you have any comments or questions regarding this article or others in the series, you are invited to contact me on: [tony@pwpublishing.ltd.uk](mailto:tony@pwpublishing.ltd.uk)



## TECHNICAL FOR THE TERRIFIED

This book started out as a series of articles by Tony Nailor G4CFY in *Practical Wireless* aimed at introducing the more technical aspects of the hobby to readers who, unnecessarily perhaps, felt that it was beyond them. It is aimed at bridging the gap between basic understanding, as gathered by students of the Intermediate and Advanced Radio Amateur courses and other – more project-based articles. Aimed at the less-experienced radio enthusiast, the articles are of a general nature, written to remove the fear of technology/techniques and theory. As Tony says, when it gets technical, there's no need to panic! **New, easy-to-read design, spiral bound, 124 pages, £12.99**

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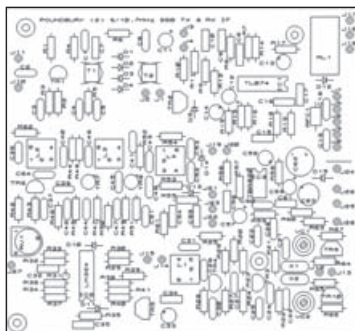
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# Looking back at BARTG's Golden Jubilee

Roger Cooke G3LDI reflects on the very successful 50 years behind BARTG.

**The British Amateur Radio Teledata Group (BARTG) has just celebrated our Golden Jubilee year – and as we have just finished it (with over 7000 QSOs) it seemed appropriate to write this brief History of BARTG over the last 50 years.**

I was first licenced as G3LDI in 1956, in the days when chasing DX on c.w. (Morse) was the main interest of most Radio Amateurs. There wasn't much single sideband (s.s.b.) and amplitude modulation (a.m.) anode and screen modulation was the norm for voice transmissions.

Data modes didn't exist at all, apart from c.w. of course! We had communications receivers and home-made transmitters – there weren't many commercially-built transceivers in those days! Listening around the short wave bands produced hundreds of broadcasting stations broadcasting (in some cases) their propaganda and in turn being jammed by the 'opposite side' if the transmissions were deemed to be conflicting with political ideologies.

## Jammers & Jingle Bells

So, there were lots of jammers and also the jingle bells of commercial 850Hz frequency shift keying (FSK) radio teletype (RTTY) stations. They were also broadcasting news from Associated Press (AP), United Press International (UPI), Reuters – the pioneering news agency, and some propaganda-based news services from behind the Iron Curtain.

We couldn't decode the commercial RTTY services at that time. But, one day I and many others heard

the characteristic 'jingle bells on 14.090MHz, with a c.w. identifier from Jim Hepburn VE7KX in Australia. Working him on c.w. Jim told us that RTTY was a great mode – so the seed of interest was planted in fertile ground!

The sound of the 'jingle bells' (for the uninitiated, the characteristic RTTY sound was just like sleigh bells!) on the Amateur band was quite fascinating and we wondered just how we could participate in the Teletype activity. We (the keen group who were already showing much interest) couldn't source any equipment, but one day received a telephone call from Dr. 'Doc' Gee G2UK. He told us he had found a source of old Creed 3X tape printers. Bill Brennan G3CQE, Dave Johnson G3MPN, Pat Gowen G3IOR and myself spent a very interesting evening with Doc – we were quite keen to become involved.

Pat and Dave dropped out after a while and I was involved with studies and couldn't devote too much time. However, some tests were conducted using the 3X printer, on a local loop mainly. Then we managed to obtain some copies of the *RTTY Handbook*. Unfortunately, I parted with mine several years ago and regret it now as it would have been nice to look back at. I think the author was Byron H. Kretzman – that name always stuck in my mind for some reason!

## First RTTY Contacts

BILL G3CQE managed a contact with Doc G2UK and we were all building a converter designed by Marvin Bernstein W2PAT. Then Bill put RTTY onto 21MHz and his first QSO was with Jim VE7KX. Jim always had a superb

signal into the UK and I worked him on c.w. a lot before I got onto RTTY myself.

Bill G3CQE was in great demand on h.f. as he was the first G station on h.f. RTTY and he had a ball! Most of the contacts were with USA and Canadian stations; they had already been active on RTTY for a few years. Bill was writing a column in the *Short Wave Magazine* and soon more G stations became interested. This was 1959, a time when we all used 850Hz shift and had to identify on c.w. at the end of every transmission!

Interest was growing rapidly in the UK so a club was formed in June 1959 and it became known as the **British Amateur Radio Teletype Group**. Although it's still known as BARTG today, we had to dispense with Radio Teletype as it's a registered trade mark. So, even though the acronym is the same, it's now the **British Amateur Radio Teledata Group**, appropriately so, of course, as there are numerous data modes now.

## Parts Problem

Obtaining parts for our surplus teleprinters was a problem, but with quite a few people involved, contacts were increasing. We soon found sources, for things like polarised relays, toroids, d.c. power supplies, centre-zero meters and so on. Obviously, as teleprinters were electromechanical devices, a new pool of knowledge had to be acquired.

Handbooks were rare, but were available and the main problem was the maintenance on the teleprinter itself. However, we managed to acquire stroboscopes, feeler gauges, tension gauges and so on, not forgetting the oil-can and grease that was also needed! Paper was also a problem, especially as most of the machines were the Creed 3X tape printer.

I well remember looking at the pictures of the 28ASR machine in the *RTTY Handbook* (Fig. 1). It was like the Holy Grail of the teleprinter world to most of us, something to be admired and almost never to be obtained! However, the Norfolk RTTY enthusiasts did see these being used at USAF bases in Norfolk, Lakenheath and Mildenhall. We used to attend the annual air-show at Mildenhall, one of the largest USAF bases in the UK and used to joke about how we would get a couple of 28ASRs into the car without being seen by the Americans!

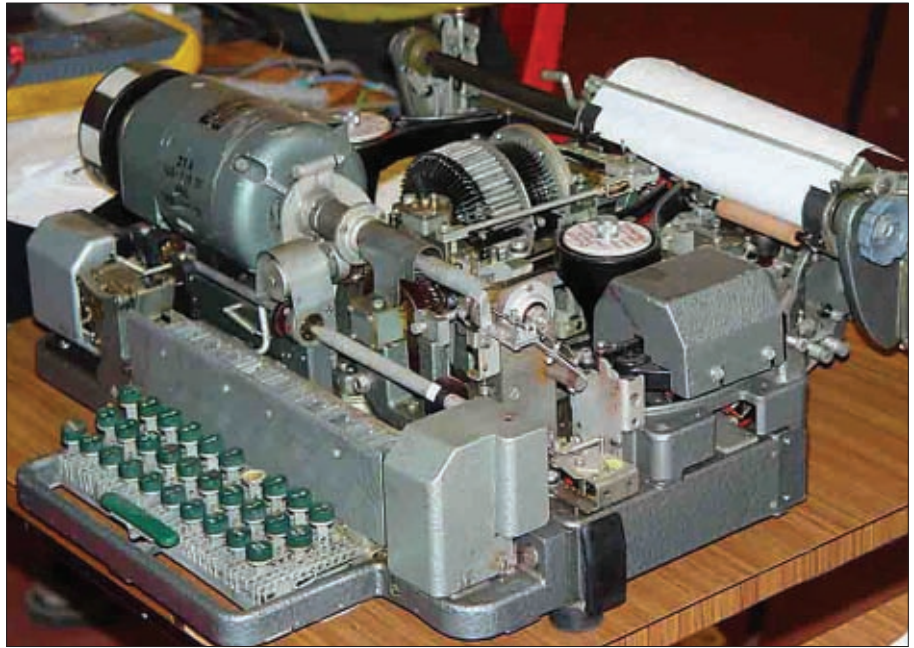
In 1960, the first BARTG dinner was held in London, at the New Agricultural Hall and on the menu was RTTY Soup, FSK Steak, TU Apple Tart and





Fig. 1: The massive 28ASR machine was like the Holy Grail of the teleprinter world to most of us in the early days.

Fig. 2: The going price on the Creed 7B teleprinter was around £10 and became the standard. You would certainly need a silence cover for it as they were noisy!



Perforator Coffee. It was attended by about 20 people, including **John Adama PA0FB** who had travelled a long way for a meal and discussing getting those difficult-to-find teleprinter parts!

It was about 1961 that I disposed of my Creed 3X and concentrated on building my s.s.b. transmitter and linear. I was also busy with music professionally not to mention courting my wife to be, so time for RTTY was limited. Once I had the SSB exciter working, I added FSK to the VFO and with the Creed 7B, and I was finally active!

### Junk Yards

We used to visit junk-yards looking for bits, often travelling down to Chelmsford, where there was a very productive junk yard. This was done on a regular basis just to check the latest offerings! Indeed, one day we came across a load of packing crates in the back of a container lorry that looked interesting – one was open and we found a Creed 7B!

The going price on the 7B was around £10 and that became the standard, **Fig. 2**. I managed to obtain a silence cover for mine (they were noisy!), and it looked really neat. The only problem was the speed. We had to use 50 bauds for UK contacts and 45.5 bauds for USA and foreign contacts. This entailed adjusting the governor on the motor every time we changed from working EU to USA. Using the Stroboscope quickly became an art form in contests! Some operators even made an opto-electrical system for controlling the speed of the motor.

**Arthur Owen G2FUD**, set up a 'Newsflash' system for obtaining equipment and accessories. The system started with a pile of stamped addressed

envelopes that were lodged with Arthur. It sprang into action when used to send out a Newsflash every time something new came on the market. This was an extremely useful service and Arthur ran it for several years. The photo, **Fig. 3**, shows Bill Brennan, G3CQE seated in the shack of G2FUD.

The main Terminal Unit (TU) used in those days was a rack mounted FSY 1.1 that I used for some time. Adding to the 7B series, the 6S3 auto-transmitter was the next 'must-have' item, together with a 7T/R re-perforator or a stand-alone perforator. These were used to make the 'brag tapes', and pictures that were fed through the 6S3 auto-sender.

When all this equipment was being used the noise was horrendous! It didn't seem to bother us too much – but most of us were in sheds in the garden anyway! The neighbours used to view us with a great deal of suspicion. Goodness knows what they would think under the present day domestic noise chaos!

Paper for the 7B wasn't easy to obtain, and some even resorted to begging the remains of a paper roll from a News Agency, and sawing it up to the correct length. I was very lucky, as I had a relative in the Royal Navy, who had legal access to boxes of brand new rolls of teleprinter paper. In fact, I had some until only a couple of years ago! Talks on RTTY were given to Radio Clubs to encourage activity, and Bill G3CQE, had his regular RTTY column in *The Short Wave Magazine*.

Bill also wrote for the American magazine, *The RTTY Journal*. This was a very good magazine and I also subscribed for a few years. Unfortunately, I gave all my magazines to a Radio Club and they were lost over time. However, again with

progress in technology, I now have the complete *RTTY Journal* (until it finally ceased publication), on CD ROM. The CDROMs are still available if anybody is interested.

### Activity Increased

Activity increased on h.f. and more countries started to appear. Running RTTY on a DX-pedition in those days really did require stamina! Carrying a teleprinter, power supplies and terminal unit to DX locations was a feat undertaken by only the brave!

The callsign GB2ATG was used to transmit RTTY news on Sunday mornings on 80 metres and was read by quite a lot of EU stations as well as the UK stations. Of course in those days, there always seemed to be lots of RTTY news to report, as machinery was the order of the day. Chasing DX was becoming a common quest and DXCC was within the grasp of the DXer.

Designing 'pictures' for RTTY developed into an art form in itself (masses of type letters formed recognisable pictures and scenes) and these were regularly exchanged and passed around. Sending a picture over the air had its effect however, because one picture could take 30 minutes to send – and QSB together with QRM could take their toll on the printed copy.

Former Royal Navy radio types tell me that it was traditional to send images of Lord Nelson over the teleprinter links during Trafalgar Day on October 21st. These were usually then followed by very good representations of our Queen Elizabeth!

Contesting became more popular, most of the participants were USA stations, with a sprinkling of DX and EU stations – and if 100 contacts were



Fig. 3: Showing Bill Brennan G3CQE seated in the shack of Arthur Owen G2FUD.

worked over a 24 hour period, it was a pretty good score. Compare that with today, with over 1000 QSOs being made and it just shows how popular RTTY is today, even after 40 years!

Just think of the paper that would be used for those 1000 contacts! The thought of transcribing that lot to a log suitable for a contest entry is enough to dissuade anybody from entering the contest in the first place. It was a difficult enough job with 100 QSOs. However, with the advent of the use of computers the log could then be processed and sent via E-mail, all within ten minutes of finishing the contest!

### Preparing For Contests

Preparing for a contest in those days, included: oiling and greasing the teleprinter, checking the polarised relays for bias distortion, and making sure enough paper was at hand. The Friday night preparations were essential if trouble during the contest was to be avoided. I once spent about a week stripping the 7B teleprinter completely to the last nut and bolt, cleaning and re-assembling, adjusting all the tensions and gaps etc, re-oiling and greasing it with tender loving care!

By the time I'd finished the service it was running as sweet as a nut when I had finished and I was very proud of that machine. In fact, was always in awe of the people that designed and built them in the first place. However, after some years, American gear started to appear and the Model 15 and the Model 19 became quite popular and available.

### Fig. 4.

I changed the Creed 7B for a Model 19 unit, complete with table. It worked quite well, and I used that for a number of years. The ST-5 and ST-6 terminal units became the standard, and the older gear was gradually replaced. The BARTG promoted this design and it remained very popular for a number of years. Parts and kits were also available and there were several other kits that could also be obtained from the BARTG.



Fig. 4: Some American gear started to appear and the Models 15 and 19 became quite popular and available for reasonable prices.

As the years passed, the BARTG Spring contest became a regular in the contest calendar and still runs today alongside a few others as well. The QCW award was also introduced and is still available today. Working 25 countries and all continents was a very difficult thing to do in the early years, but now it is quite a disappointment if 6 continents are not worked in one contest together with well over the necessary for the QCW 25 award!

Teleprinters became more obtainable, and the Creed 75 and Creed 444, **Fig. 5** became quite popular. However some of the USA machines attracted a lot of interest too. The model 15 and 19 were used by quite a number of amateurs, as were the 28ASR for those lucky enough to own one!

### Solid State Advent

In the late 1970s, **Peter Martinez G3PLX** designed a solid state RTTY unit and I finally took the plunge and built one – replacing my Model 19. It was great, no noise, absolute quiet RTTY, real luxury! A few years later, Peter produced **AMateur Teleprinting Over Radio (AMTOR)**, a specialised form of RTTY. The AMTOR system is derived from the commercial **Simplex Telex Over Radio (SITOR)** system, developed primarily for Maritime use in the 1970s. In the early 1980s, Peter G3PLX, made several changes to the SITOR protocol and called it AMTOR.

Also in the early 1980s Packet Radio exploded onto the scene and many commercial **Terminal Node Controllers (TNCs)** were produced that could also decode RTTY. Computers in Amateur Radio had arrived with the ZX81 earlier, but progress was rapid via the Spectrum, BBC-B and then onto the Personal Computer (PC), with a *Windows* based operating system. Originally mute, a sound card was introduced onto the PC and it was not long before programs were readily available for all data modes.

Software was developed, some



Fig. 5: A Creed 444 Teleprinter needed a strong table to support it!

for RTTY alone, like *MMTTY*, *RITTY*, *RCKRTTY* and so on. The *MMTTY* program is one of the most popular programs for RTTY and in conjunction with a contesting and logging program, such as *Writelog*, or *N1MM*, this makes RTTY contesting one of the easiest modes to use.

Unfortunately, all the computer technology has tended to kill off the mechanical teleprinter to a large extent, although there are still those who run machines instead of computers. This fact was driven home to me at a recent Club junk-sale. A friend of mine asked me to take two working model 32ASRs including plinths and power supplies, plus RS232 interfaces along. Unfortunately, they didn't attract one bid. In fact I overheard a couple of youngsters say to each other "I wonder what they are?" (I must be getting old!).

Nowadays, RTTY still remains an extremely popular mode for contesting. That's what it is now – just another mode with no specialist knowledge needed. Indeed, some transceivers, like the Icom IC-7800 or the IC-756 ProIII have RTTY capability built-in. With present day technology, using the PC with *N1MM* and *MMTTY*, in contests (especially) the recently re-introduced 75 Baud BARTG Sprints, it's possible to run four contacts a minute on RTTY, which still takes some beating! Activity on RTTY also seems to be on the increase, despite it being old technology, with no error correction and so on.

### Machinery Or Computers Choice

The beauty of the RTTY mode, is the fact that a machinery enthusiast (and there are quite a few operators who still run real teleprinters) can also still take part alongside the latest PC program. The modern station looks completely different to the 1970s station. The two can be compared from RTTY contesting is growing. The *N1MM* program has a Friend.INI file within it and if set up correctly can refer to the station being worked by name.

Obviously, it's almost impossible for a human to remember all names as there are over 24,000 entries in there. It shows how popular the mode is. Just take a listen to the RTTY segment in any major contest. You will see what I mean! We certainly have come a long way since 1960. Unfortunately Doc G2UK, Bill G3CQE, Jim VE7KX and Arthur Owen G2FUD are all Silent Keyboards now, but they certainly started something that looks likely carrying on.

Arthur was also one of the founders of BARTG with a membership number of 4. Arthur G2FUD and Bill G3CQE, the first UK station on RTTY, are pictured as they appeared in *RTTY Journal*.

### Old & New Stations

The photograph, **Fig. 6**, shows **Ted Double G8CDW** from the 1960s and the photograph, **Fig. 7**, shows **Don Hill AA5AU** a present day RTTY operator.

The RSGB Club Cumulative contests have played an important part in increasing both the interest and activity in RTTY, with a lot of newcomers to the mode taking part in the contests. These events are part of a suite – consisting of the CW, RTTY and SSB contests. They take place on 3.5MHz (80m) so it's mainly UK stations with a sprinkling of stations from Europe. The contests are only 90 minutes long and are usually quite well supported.

### Still Going Strong!

The BARTG is still going strong and in the last year has undergone major changes, full details of which can all be found on the website. And *PW* readers are more than welcome to use the BARTG Forum, in fact we would encourage you to do so. With the advent of computer sound card technology, RTTY is the most popular mode to make use of this technology. With this in mind, RTTY on any DXpedition is usually just a lap-top and interface to the transceiver, and this has made it possible to work over 300 countries on RTTY.

As a specialist group BARTG regularly sponsors DXpeditions in order to encourage the RTTY mode. There are lots of different commercial interfaces available, although it's still easy to make your own simple one from circuits to be found on the Internet.

The two main BARTG contests are the BARTG Sprint, which usually takes place the last weekend of January, and the BARTG Spring h.f. contest, normally falling on the third weekend of March. The newer 75 Baud Sprints take place in June and September and are shorter.



Fig. 6: Ted Double G8CDW operating at the keyboard in the 1960s.



Fig. 7: Don Hill AA5AU – a present day and very keen RTTY operator.

Full rules can be found on the BARTG website. These two contests are very well supported, but if you haven't taken part yet, then please do give it a whirl in 2011. We would love to see you in there. I usually devote a large part of that weekend to the contest.

I don't stand much chance of winning, as I do have other things to do, but I just remember the old adage, hackneyed it may be, that – it's the taking part that counts – not the winning. Winning is a bonus, but I have been a supporter of the six or 12 hour sections for those that don't have the 48-hour stamina!

The BARTG website caters for all data modes from c.w. to Pactor and



even some of the obscure modes, such as MFSK, MT63, Throb, Olivia and so on. The location is [www.bartg.org.uk](http://www.bartg.org.uk)

Take a look and see just what BARTG can offer. You can see the mugshots of the committee along with contact details, including E-mail addresses and you would be more than welcome to join. As you can tell, I am somewhat biased, but then I am the Chairman of BARTG, so I guess that follows!

Membership of BARTG is free now and is a web-based interest group only. We are always looking for interesting articles and ideas for the website, so your membership would be a greatly valued one!

See you on the Green Keys? Well, alright then, they're often grey keys nowadays! UE (73) de G3LDI.

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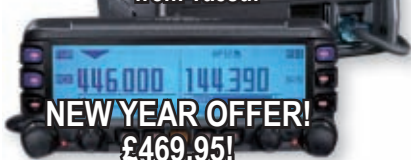


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Unlike lower class direct sampling receivers, the PERSEUS RF analog front-end has been carefully designed for the most demanding users. PERSEUS can also be operated in a wide band mode as a 10KHz - 40MHz spectrum analyzer with more than 100dB dynamic range in a 10KHz resolution bandwidth. PERSEUS is a Software Defined Radio and relies on PC software applications to carry out the demodulation process.



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See [http://www.hamradio.co.uk/acatalog/RF\\_Space.html](http://www.hamradio.co.uk/acatalog/RF_Space.html)

£469.95



only  
**£599.95**  
as reviewed in  
Radcom May  
Issue

## The New RadarBox is now available from ML&S!

We like to give our customers a choice when it comes to choosing a new Virtual Radar so what better way than to add the RadarBox to the range.

Radar Box-3D. ML&S: £489.00

Radar Box-Pro. ML&S: £399.00



There is more excitement amongst RadarBox users and potential users now that the 3D version of the RadarBox is now available. This radical software upgrade brings to life the RadarBox with superbly detailed Google Earth mapping overlay. This is a major advantage that puts RadarBox firmly on top of it's competitors. Just look at these crisp, clear screenshots with the pictures of the aircraft in 3D and their precise position shown on the map. RadarBox has always given the best graphics of any system, and this latest addition really underlines the superiority of RadarBox. Known as RADARBOX-3D this complete system is available from all good communications dealers around the world. There is also an upgrade disc available for all existing users of RADARBOX-PRO, order this upgrade as RADARBOX-UG. RADARBOX-PRO is still available for those users who want a radar decoder without Google Earth and 3D.



NEW AT ML&S



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## Want to dabble in D-Star without the expense of a radio?

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The DV Access Point Dongle, (DVAP for short) by Internet Labs, provides a way to connect to the international D-Star network. The DVAP is used with a PC/Mac and an internet connection. Unlike the DV Dongle, the new product allows amateur radio operators to walk away from the computer and transmit/receive D-Star voice and data using a two meter D-Star radio. Note that a D-Star radio is required to communicate with the DVAP and an internet connection is required to communicate with the D-Star network



See web for more details. **NOW IN STOCK! £229.95.**

### DV-Dongle

The DV Dongle connects to your PC or Apple Mac via a USB port and provides encoding and decoding of compressed audio using the DVS1 AMBE2000 full duplex vocoder DSP chip. AMBE technology is used in all D-Star radios to provide efficient voice transmissions. It is also used in some HF digital protocols by vendors like AOR. The DVTool application used with the DV Dongle may be installed and run on Microsoft Windows XP/Vista, Mac OS X Leopard, or many flavors of Linux.



**In stock, works with MAC or PC. £209.95**

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## NEW Mini VNAPro Now with Bluetooth!

The new miniVNA PRO, the big brother of the well-known miniVNA, 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. Together with your PC/Laptop, you can add to your laboratory the further advantages of having this first-class VNA instrument. This is the first world's wireless analyzer able of scanning and sending the data using an integrated Bluetooth module to a remote PC/Notebook up to 100 meters from the miniVNA PRO's location. This makes real-time antenna setup easy!



ML&S: £349.95

MiniVNA original still available (without Bluetooth): £259.95

## Miracle Antenna

Miracle Antenna is back! With some important Hot New products. Introducing the New MMD Mixed Mode dipole. The first and only electrically centre-fed mechanically end-fed dipole ever offered to the Ham Radio market, the MMD provides a host of benefits never available in an end-fed dipole.

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				Miracle AntennaHF-70cm fitted with telescopic.....	£109.95



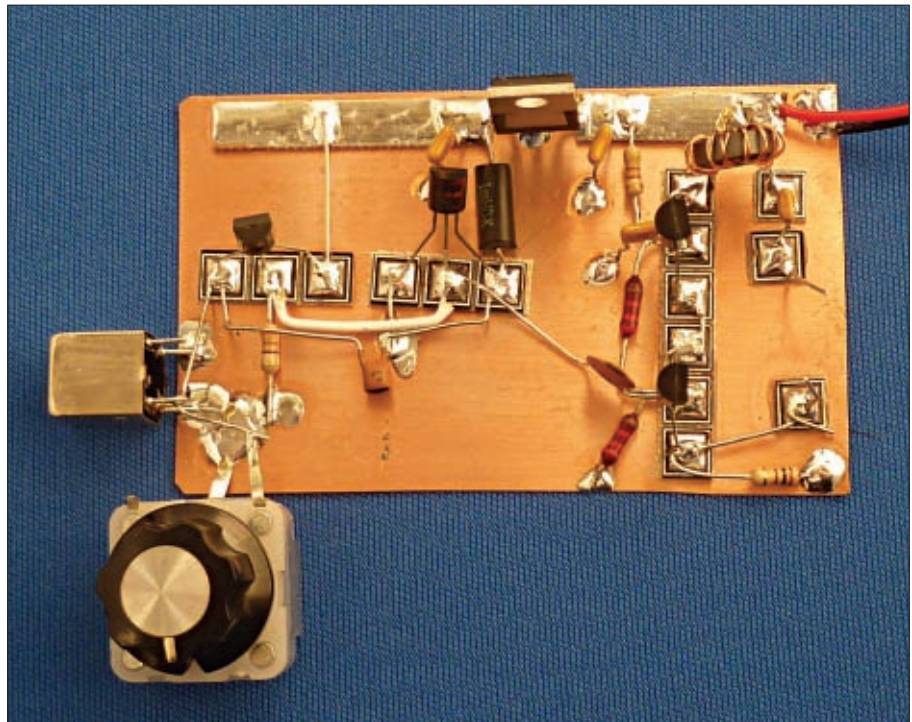


# Another Wide Range Oscillator

The Rev. George Dobbs G3RJV switches on his soldering iron and provides an exceptionally appropriate quote before describing another useful oscillator!

*"With a bit of persuasion, anyone can get a quart into pint pot, but it takes an engineer to get a quart out of a pint pot!"*

Jack Hardcastle G3JIR. (AD MMX).



**Welcome to Carrying on The Practical Way (CoTPW) where I must start this time by being completely honest and confess that some projects I offer in this column are capable of improvement! By its very nature and size, to say nothing of its frequency, the CoTPW projects are small – and manageable by anyone who can handle a soldering iron.**

In fact, in the past, I've described my published work as "doodling with a soldering iron". I get pleasant feedback from readers who derive their Amateur Radio satisfaction in a similar manner.

## A Stage Further

However, there are other readers who take the projects a stage further, perhaps improving the circuitry and, in some cases, making a more complete item of equipment. The photographs that you often see in this column, usually reveal the 'ugliness' of my construction techniques and I suspect that almost any reader who builds their version of what I offer here will produce something that looks better!

The wide range test oscillator that I offered in the November 2010 column produced quite a lot of reader feedback and some useful ideas. The

most interesting were responses from both **Tony Nailer G4CFY** and **Jack Hardcastle G3JIR**. Indeed – I was flattered because Tony G4CFY is the author of the *Doing it by Design* column here in *PW* and I know Jack G3JIR from his excellent published work on crystal ladder filters.

Two notable Engineers taking the time to read the ramblings of a retired Vicar with a soldering iron and no formal training! I'm also indebted to Jack for his quotation at the head of this article. Both Tony and Jack described the same inherent problem with the circuit and offered slightly different ways to solve it.

The diagram, **Fig. 1**, shows the basic oscillator configuration that I offered in the November 2010 *CoTPW* column. My source was an article by **Stefan Petrov LZ1OV** from the G QRP Club journal *Sprat*. It's a cascode oscillator using a *pnp* bipolar transistor and a field effect (f.e.t.) transistor. Not only is the circuit very simple, the oscillator frequency depends upon the values of only two of the components an inductor and a capacitor (L1 and VC1).

The problem with the original circuit is that the amplitude of the output varies greatly as the oscillator is tuned over a wide range. This variation happens because the configuration of the transistor and f.e.t. results in a very low

operating voltage across the transistor – making it virtually impossible to control the output amplitude. The solutions offered by G4CFY and G3JIR both involve overcoming this voltage problem but in slightly different ways.

## The G4CFY Modification

The diagram **Fig. 2** shows the G4CFY modification. In his variation Tony uses a potentiometer as a potential divider from the main circuit supply line, with a series resistor for safety. The new resistor allows an adjustable voltage to be fed to the gate of the f.e.t. A capacitor is also added between the gate of the f.e.t. and the collector of the transistor to block the direct current (d.c.) voltage yet maintain the radio frequency (r.f.) signal path. When I tried the arrangement, I found it certainly did improve the output.

In fact, I was able to obtain an output of about 1V peak-peak (p-p) up to about 10MHz. The output voltage was then fell away as the frequency of the oscillator increased. The modification certainly helps, although the variable output at the higher frequencies still remains.

## The G3JIR Modification

The diagram, **Fig. 3**, shows the G3JIR modification. Jack also uses a potential divider to feed a voltage to the cascode oscillator. But in this version the voltage

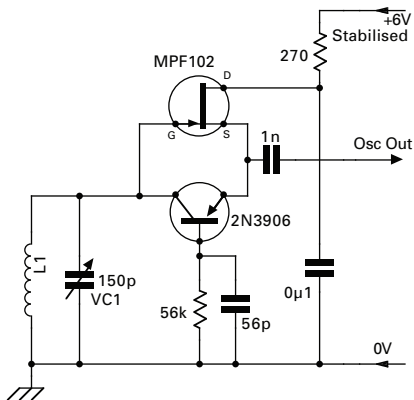


Fig. 1: The oscillator by Stefan Petrov LZ10V, as it featured in the November 2010 *CoTPW* column. It suffers from an output that varies with frequency.

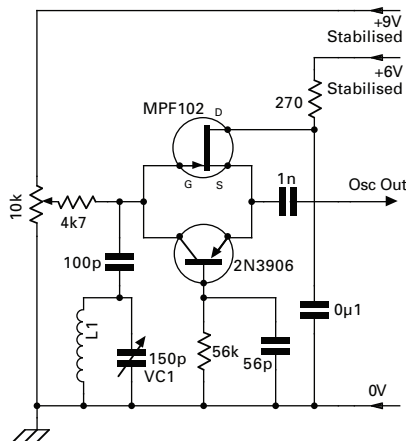


Fig. 2: Tony Nailor G4CFY's modification to the oscillator of Fig. 1, uses a variable potential divider from the main circuit supply line to allow the output level to be varied.

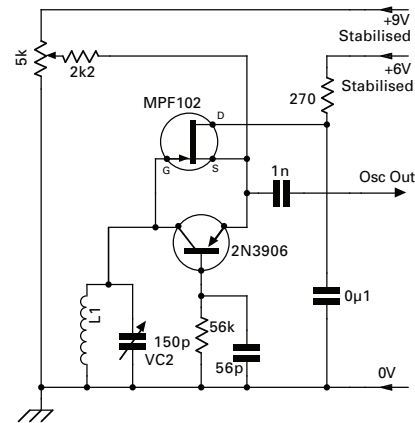


Fig. 3: In Jack Hardcastle G3JIR's modification, he also uses a potential divider but this time the voltage is applied to the source of the f.e.t., which is connected to the emitter of the transistor.

is applied to the source of the f.e.t., which is connected to the emitter of the transistor. When looking at the circuit, remember that the transistor is a *npn* device. With a little adjustment I was able to get about 2.5V peak p-p output in the range 1.5 to 5MHz. The output then fell away as the frequency increased but it was still 1V at 25MHz.

The modifications offered by Tony and Jack are both useful and worthwhile and readers who have built the circuit from the November issue may like to try them. They are both very simple to implement at very little cost and effort. My thanks go to Tony and Jack for their support and help in this project!

### Wide Range Oscillator

Coincidentally, at the very time that Tony and Jack were contacting me about the wide range oscillator circuit, I was looking into a possible better circuit for a wide range oscillator. Over the years I have written this column it has become my practice to collect ideas and snippets of circuits that might be useful someday. I knew that in amongst my papers I had information on the Franklin oscillator.

The Franklin oscillator was the brain child of **Charles Samuel Franklin** (1879 – 1964), a notable British radio pioneer who published his work as C. S. Franklin. Franklin trained at Finsbury Technical College in the 1890s and spent his entire working life with the Marconi Company and was credited the invention of the variable capacitor (patented in 1902).

The Franklin oscillator is capable of a wide frequency range, the only frequency determining components being a tuned circuit consisting of an inductor and capacitor with one end grounded. The capacitors and resistors in the oscillator

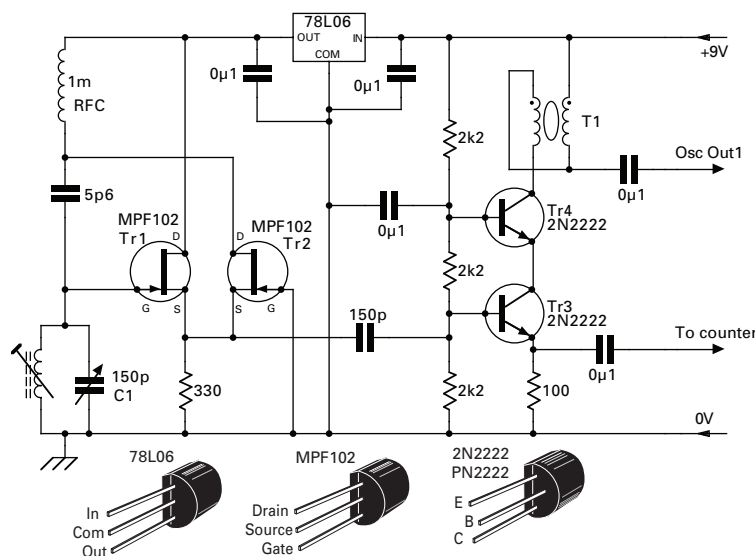


Fig. 4: George's version of the Franklin oscillator using two similar f.e.t.s. The buffer amplifier has two outputs, a low-level one suitable for a frequency counter and a second with a greater output from the transformer.

circuit remain the same regardless of the frequency being generated. It is a truly universal variable frequency oscillator (v.f.o.) circuit.

I first met the Franklin oscillator in a very short item by **Frank Brumbaugh KB4ZGC** in the *QRP Quarterly*, the journal of the main American QRP group, the QRP ARCI, some 15 years ago. It was filed away as a possible useful circuit and has lain dormant in my rather chaotic filing system since that time!

Then in 1999, the same author, under his later callsign of **W4LJC**, offered a v.f.o. based on the Franklin oscillator in the American 73 magazine. My filing system had this cross referenced (a fancy term for a pencil scribble on the top of a photocopy) from the earlier article. In the versions of the Franklin oscillator I have, two f.e.t.s are cross-coupled rather in the manner of an astable multivibrator to induce the oscillation. The great merit

of this circuit is that it has to oscillate. As Martin Luther once said, it "can do no other"!

My attempts to study the Franklin oscillator further on the worldwide web (the fount of all knowledge nowadays) yielded very little except for an interesting item by **Andrew Woodfield ZL2PD**. Most f.e.t. based Franklin oscillators have both f.e.t. devices coupled to the other with a capacitor but ZL2PD suggests that only one coupling capacitor is really required. The circuit for such a Franklin oscillator is shown in **Fig. 4**.

### Amplifier With Feedback

The two MPF102 devices (Tr1 and 2) form a two stage amplifier with feedback. The first f.e.t. stage (Tr1) offers high gain a high input impedance resulting in very little damping of the tuned circuit (L1 and C1). There is also minimal internal

capacitance at the gate of Tr1, so C1 has a wider tuning range with L1.

The f.e.t. Tr2 has its task to provide gain and the feedback route to Tr1 via a small value of capacitance (5.6pF). A low impedance input allows Tr2 to share the same source resistance as Tr1. The output impedance of Tr2 is high so, again, there's very little damping of the tuned circuit.

The one millihenry (1mH) radio frequency choke (r.f.c.) that forms the load in the drain of Tr2 is an important component. It has high impedance at radio frequencies, acting as an effect load, but a low resistance to direct current (d.c.) for supplying voltage to Tr2.

Very small off-the-shelf moulded axial chokes may not be the best choice in the circuit. This is because they often use very thin wire wound over a tiny ferrite core and can present extra resistance. A 'proper' wire wound choke is a probably better choice. If you don't have one of those, try about 30 turns on a BN-43-302 'pig-nose' core, or similar. Having said that, I did use a moulded inductor, but it was a large high current type that worked well in the circuit.

The oscillator output is coupled, via a 150pF capacitor to Tr3 and 4, which forms a cascade buffer stage. An optional frequency counter output may be taken from the emitter resistor of Tr3; the main output being taken from the collector of Tr4 via a 4:1 broadband transformer.

**Note:** The oscillator circuit is powered from 9V – I used a PP3 battery. In the interests of stability, a three-lead 6V integrated circuit (i.c.) regulator supplies Tr1 and Tr2. The small 78L06 device is shown in Fig. 4. I couldn't find one so, and as the photograph shows, I used the larger 7806 regulator.

### Winding The Transformer

Winding the broadband transformer (T1) is probably the most difficult task in building the oscillator. The transformer has 10 bifilar wound turns on an FT37-43 ferrite core. A bifilar winding is one in which two wires are wound together on the same core. Usually, the two wires are lightly twisted together and the winding made as if the two wires are one wire.

The ideal wire for the transformer is 0.32mm (30s.w.g.) enamelled copper wire, although 0.38mm (28 s.w.g.) wire would probably fit the core. Cut about 750mm of the wire and fold it back on itself; two wires of about 370mm – open at one end and a hairpin loop at the other.

I usually grip the two open ends in a small vice or the clip on a 'third-hand' soldering jig. Then insert a pencil in the

looped end and gently rotate the pencil to twist the wires together. About two or three twists per 10mm is ideal.

**Note:** You may have to 'coax the twists along' the length of the wires, using the forefinger and thumb, to obtain a reasonably even twist rate. This is because when using this method, the twists tend to 'pile' up at the pencil end of the wires.

Next, treating the twisted wires as one wire, wind 10 turns through the FT37-43 ferrite core. Each time the wires pass through the middle of the core counts as one turn. When the winding is complete, trim the four wires to leave about 15mm at each end.

Using a small knife, or glass paper, scrape the enamel coating off 10mm at the end of each wire. Then, with a soldering iron and solder, tin the bare copper at the end of each wire.

Then comes the interesting bit – making sure that each wire goes to the correct place on the circuit! The illustration of T1 in Fig. 4 shows a dot at one end of each winding. These dots indicate ends of the windings that emerge from the same side of the bifilar pair.

The next task is to identify the appropriate ends of the two windings. This is easily done with a continuity tester such as the lowest resistance range of a multi-meter. Using the meter, identify the beginning and ending of each winding. If we call them 'winding 1' and 'winding 2', connect the end of winding 1 to the beginning of winding 2. These will

be at opposite ends of the core, **Fig. 5**.

The common point of the joined wires provide the output from the amplifier and is connected to the 100nF (0.1µF) capacitor. The start point of winding one goes to the 9V supply and the end of winding two goes to the collector of Tr4. The transformer should now be ready for use. **Note:** Constructors may find it easier to mount the transformer vertically as shown in the photograph.

### Testing The Oscillator

I tested the oscillator using a Spectrum Communications 5u3L 10mm coil for L1 and a 140pF polyvaricon variable capacitor for C1. This gave a useful tuning range (5.40 to 15.03MHz) to try the wide band possibilities of the oscillator.

Using a simple diode probe and a meter, I measured a very healthy output of between 15 and 17V p-p across the tuning range. I repeated the testing with a 50Ω load connected across the output. At 5.4MHz the output was 3.6 volts peak to peak, at 7MHz the output was 4V and at 15MHz it was 4.7V. The frequency stability was also surprisingly good.

So, the Franklin oscillator proved to be an ideal circuit for a wide range h.f. oscillator. The switch coil arrangement used in the oscillator described in the November issue could be used or individual constructors may experiment with inductors and capacitors to obtain the tuning range they require. I feel sure I will come back to the Franklin oscillator again! Cheerio for now.

PW

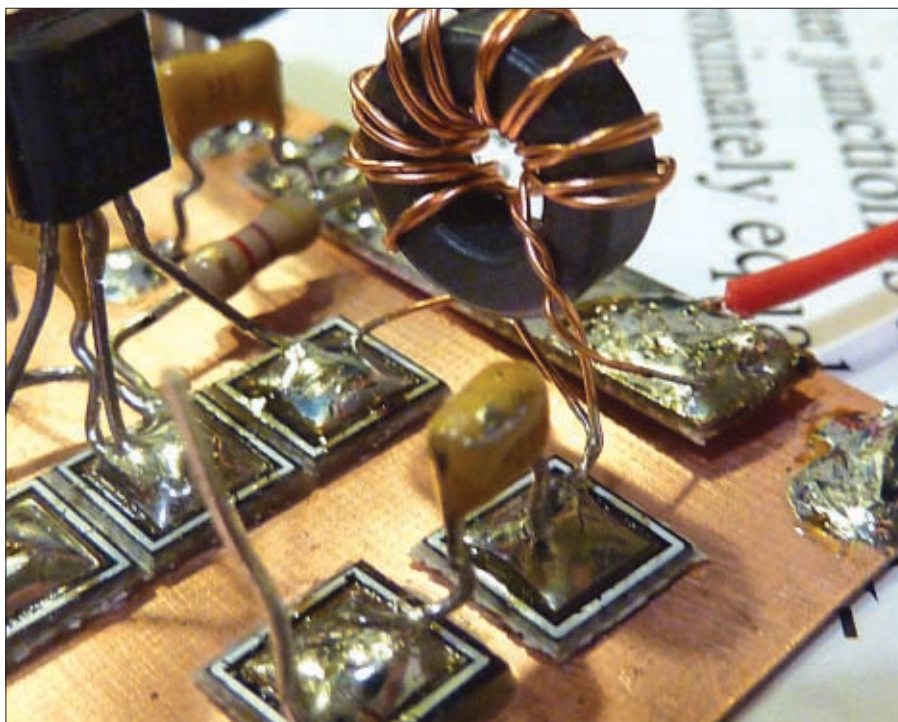


Fig. 5: This is how to create the transformer T1. The windings are created using a twisted pair of wires, the start of winding one goes to the +9V rail, the end of winding one and the start of winding two both go to the output capacitor and the end of winding two goes to the collector of Tr4



# Rallies

Radio rallies are held throughout the UK. They're hard work to organise so visit one soon and support your clubs and organisations. PW Publishing Ltd. is attending at rallies marked \*. Please check with the organisers that the rally is 'on' before leaving home.

## Send your rally info to:

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

E-mail: [newsdesk@pwpublishing.ltd.uk](mailto:newsdesk@pwpublishing.ltd.uk)

### January 2011

#### January 16th

##### The Dover Rally

The Dover Amateur Radio Club Rally will be held at the Whitfield Village Hall, Dover CT16 3LY. The doors will be open from 9.00am to 1.00pm and admission will be £1.00. There will be talk-in via GB3KS, trade stands and catering.  
[www.doverradiorally.co.uk](http://www.doverradiorally.co.uk)

#### January 16th

##### The Red Rose Winter Rally

The West Manchester Radio Club will be holding its Red Rose Winter Rally at a brand new venue - The George H Carnall Leisure Centre, Kingsway Park M41 7FJ. This is just off Junction 9 of the M60, opposite the Trafford Centre. The doors will open at 11.00am and there will be a free car park, trade stands, a low cost Bring & Buy, special interest groups, a café area with a licensed bar and facilities for the disabled.

Steve

Tel: 07502 295141

[www.wmrc.org.uk](http://www.wmrc.org.uk)

### February

#### February 6th

##### The Canvey Rally

The 26th Canvey Radio & Electronics Rally will be held at The Paddocks, Long Road, Canvey Island, Essex SS8 0JA, which is at the southern end of the A130. The doors will open at 10.30am, admission will be £2.00 and there will be a free car park, trade stands, catering and facilities for the disabled.

Dave G4UVJ

Tel: 01268 697978 (evenings)

[www.southessex-ars.co.uk](http://www.southessex-ars.co.uk)

#### February 13th

##### The Harwell Rally

The Harwell Radio and Electronics Rally will take place at the

Didcot Leisure Centre, Mereland Road, Didcot OX11 8AY - 3 miles from the A34 between Oxford and Newbury. The doors will open at 10.30am (10.15am for the disabled) and admission will be £2.50 (children under 12 free). There will be talk-in (GX3PIA) on 145.550MHz, free car parking, trade stands, special interest groups, a flea market, catering with a licensed bar and facilities for the disabled.

Ann G8NVI

Tel: 01235 816379

E-mail: [rally@g3pia.org.uk](mailto:rally@g3pia.org.uk)

[www.g3pia.org.uk](http://www.g3pia.org.uk)

#### February 13th

##### Northern Cross Rally

The Wakefield & District Radio Society Rally will take place in the sports hall (at the original venue) of Thomes Park Athletic Stadium, Hornby Road, Wakefield WF2 8TY. Talk-in will be provided on their local, wide-coverage repeater GB3YW (145.7857MHz, 82.5Hz, Narrow Deviation) courtesy of the Five Towns Repeater Group. More details to follow.

Ken Quinn 2E0SSQ

Tel: 07900 563117 (before 20.00 please)

E-mail: [kquinn27@o2.co.uk](mailto:kquinn27@o2.co.uk)

### March

#### March 6th

##### The Exeter Rally

The Exeter Radio and Electronics Rally will be held at the America Hall, De la Rue Way, Pinhoe, Exeter EX4 8PW. The doors will open at 10.30am (10.15am for the disabled) and admission will be £2.00. There will be talk-in, trade stands, a Bring & Buy and catering. All profits from the event will be shared between the local 2m and 70cm repeaters, GB3SW, GB3EW and GB3EX.

Pete G3ZVI

Tel: 07714 198374

E-mail: [g3zvi@yahoo.co.uk](mailto:g3zvi@yahoo.co.uk)

#### March 13th

##### The Wythall Rally

The Wythall Radio Club's 26th Annual Radio Rally will be held at the Woodrush Sports Centre, Shawhurst Lane, Hollywood, Nr Wythall, Birmingham B47 5JW, which is only two miles from J3 on the M42. The rally will be open from 10.00am to 3.00pm and admission will be £2.00. There will be talk-in on S22, on-site parking, trade stands, a Bring & Buy and refreshments.

Chris G0EYO

Tel: 07710 412 819

E-mail: [g0eyo@blueyonder.co.uk](mailto:g0eyo@blueyonder.co.uk)

[www.wrcrally.co.uk](http://www.wrcrally.co.uk)

#### March 19th

##### The Lagan Valley Rally

The Lagan Valley Amateur Radio Society Rally will be held at The Village Centre, 7 Ballynahinch Road, Hillsborough. The doors will open at 11.30am and there will be car parking, trade stands and catering.

Jim G10DVU

Tel: 02892 662270

E-mail: [jim.henry@ntlworld.com](mailto:jim.henry@ntlworld.com)

#### March 20th

##### The Yeovil QRP Convention

The 27th Yeovil QRP Convention will be held at Digby Hall, Hound Street, Sherborne, Dorset DT9 3AA (adjoining the central shopping car park). The doors will be open from 9.30am to 4.00pm and there will be talk-in on S22, car parking, trade stands, a Bring & Buy, catering and facilities for the disabled.

Derek M0WOB

Tel: 01935 414452

**Club Secretaries and Event Organisers: Please send us all your details if you would like your event to be mentioned here.**

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#### Alinco DX-R8 Review

Mike Richards takes an exclusive first look at the new Alinco DX-R8 HF communications receiver

#### Scanning Scene

Bill Robertson looks at Global Rescue Services, a new USB all mode radio dongle, a VHF marine repeater, the Ocom Spectrum Register and much more

#### Special Offer

Save £20 on the GRE PSR-200 base scanner with another exclusive RadioUser readers' offer!

#### Decode

Mike Richards revisits HF FAX and offers some advice on how to correct misaligned charts

#### Military Matters

Kevin Paterson reports on the launch of the last Type 45 destroyer and his final sighting of the Ark Royal

#### Maritime Matters

Robert Connolly reports on the changes to NAVTEX areas that are due to be implemented in the coming year and he looks at a new maritime radio service

#### Sky High

This month, Godfrey Manning looks at the evolution of Mode S, then he shows a reader how easy it is to find his local airways frequencies

#### Airband News

David Smith reports on the first use of live VoIP for pilots communicating with ATC, the arrest of a plane spotter in South Africa and the installation of solar powered runway guard lights at Southampton Airport

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Chrissy Brand brings you a selection of readers' reports, logs and news and she has some festive and free radio stations for you to tune in to

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Keith Hamer and Garry Smith have no room for their usual satellite TV roundup this month because of some exceptional autumnal tropospheric enhancement

#### SBS Files

Kevin Paterson brings you his thoughts on the latest virtual radar system to reach the market, the long-awaited, medium-priced Aurora Virtual Radar 3D system from Aurora Eurotech

#### Off the Record

Oscar the Engineer comments on band conditions in the darker evenings

#### Comms from Europe

Simon Parker reports on two new radios, the Maas DX-5000 and the Albrecht AE2990 and on a day in September when propagation conditions made it a radio day to remember

#### Feedback Readers' letters

#### Radio Related Websites

Chrissy Brand offers suggestions for radio related Christmas presents, recommends some festive reading for the holiday and looks at websites with a yuletide theme

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## Colin Redwood G6MXL's What Next?

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# Setting Up Indoors

Colin Redwood G6MXL aims to answer all the questions that arise for those just getting started in Amateur Radio.

**Welcome to What Next? (WN?), where this month I'm looking at setting up a station indoors. This is what most Radio Amateurs would call their 'shack'. Fortunately, when starting out most of us have just a small amount of equipment and the space needed to set it up and operate isn't a major problem.**

Typically, a basic station will consist of little more than a transceiver with microphone or Morse key, power supply and an antenna tuner unit (a.t.u.).

In some cases the transceiver may combine a power supply and a.t.u., which can make for a very compact station – often set up in a spare room.

However, as time moves on, most Amateurs will gather more and more equipment, some of which may be test equipment. Many will also want to undertake some construction projects. Add a copy of *PW* each month, callbooks and other reference books, a log book, a computer with monitor and

printer and it's easy to quickly outgrow the space initially set aside for Amateur Radio activities!

After a few years the shack can start to become a 'junk room' and it risks becoming a safety hazard. And – for many of us – it could cause much domestic strife!

So what can be done to keep the shack tidy? The answer, of course, is the provision of plenty of storage, operating and construction space and some discipline! To help, I'll look at each of these in turn. But before doing so, I think it is important to consider just what 'sort' of Radio Amateur we are.

### Operator Or Constructor?

To start my first question is – are you primarily an operator or a constructor? I know for some this is an almost impossible question to answer – but in my experience, Radio Amateurs spend most of their time either operating or constructing. To find out which you are, imagine that you weren't allowed to do any Amateur Radio for a few months

and were then allowed just a couple of hours to pursue your hobby. What would you switch on first – the soldering iron or the rig?

If you chose the soldering iron, then in my view you should concentrate on space to construct. If however, you chose to switch on the rig, then you should concentrate on facilities to operate. If you are lucky, you may be able to find space for both!

This month I'm concentrate on the operating space. I'll look at construction space on another occasion.

### Operating Space

In my view, for operating, the important thing is to have the rig directly in front of you, and space for your microphone, Morse key, paper log (if you use one), headphones, and computer keyboard, mouse and screen (if you use one). Obviously, if you have more than one transceiver then you'll need to consider space for each.

Nowadays, most of the main manufacturers offer transceivers



Fig. 1: Kenwood's TS-2000 is a modern compact transceiver covering h.f., v.h.f., and u.h.f. bands with a built-in a.t.u., which can save a lot of space in comparison with separate equipment.





Fig. 2: An extra wooden bar added under the shelves for added support.

that cover high frequency (h.f.), very high frequency (v.h.f.) and ultra high frequency (u.h.f.) bands (Fig. 1) all in one 'box'. Using one of these transceivers can save a lot of space in comparison with separate dedicated transceivers, one for h.f., another for v.h.f. and yet another for u.h.f.

Let's now look at important factors for operating comfort and to start – the height of the operating surface is extremely important. If it's too high or too low, it will soon become uncomfortable to operate – not a good idea for contest operating! Somewhere around 650 to 800mm above the floor will be right for most people. Try an office desk at work or visit an office supplies shop to work out what is the right height for you and then measure it.

It's all very well having a surface on which to place the transceiver, but what about various accessories? These might for example include standing wave ratio (s.w.r.) meters, a power supply and/or charger, transverter, pre-amplifier, power amplifier, etc. A shelf below the main operating surface is a good place to locate the power supply and the main computer processor (assuming you don't use a lap top).

Above the accessories shelf, an additional shelf is a good place to keep reference materials, books and magazines. But why limit yourself to one shelf and waste space? I think it makes sense to install as many shelves as you can fit above the operating position. They don't need to be so deep as the operating surface. I suggest separating the shelves by at least a magazine height (don't forget to add the thickness of the shelf!).

I don't pretend to be a do-it-yourself expert (quite the contrary!). So, I reckon if I can do it, then almost anyone can. I'm going to illustrate what's involved using an example of a small area, the size of a small wardrobe, typical space that might be found in a spare bedroom. And by the way, I know of a number of Amateurs that have converted either a



Fig. 3: A switched multi-way mains outlet.

free-standing or built-in wardrobe into an operating area – ingenuity and a practical approach can work wonders.

### Cubby Hole

My own 'cubby hole' in the spare bedroom measures about 1.35m across and about 700mm deep. The previous owners had mounted a couple of horizontal poles across it with a curtain in front – probably as a wardrobe for visitors to use. These were easy enough to remove and I was lucky enough to be able to re-use the pairs of wooden end pieces that the poles were mounted on as end-supports for two of my shelves.

One pole was at about the right height where I wanted the first shelf above the main surface. I made careful measurements, and then paid a visit to my local DIY store. For the main surface I decided that the 20mm thick plastic veneer covered chip board (often branded 'Contiboard') was too flexible, and I chose a 30mm thick matching kitchen work surface that has a rounded front edge.

Rather than cut these to size myself, I arranged for the DIY store to do this at no extra cost and I can certainly recommend this! Not only is the cut absolutely to size, it's also straight, at right-angles to the main edge and clean (no bits chipped off), which I certainly couldn't achieve with my limited range of hand tools and skills.

I had sufficient work surface to get two full shelves out of the board. I decided to use one as the main work surface with the other placed high up to store items that aren't regularly used.

For the shelf above the main surface, I used 20mm 'Contiboard', but chose one that was narrower front-to-back so that it didn't block the light too much, and more importantly I didn't bang my head on it when standing up! Incidentally, I'm sure that some guidance must exist, but my view is that 'Contiboard' (and even the thicker kitchen worktops) need to be supported, at least every metre – because

otherwise they'll sag significantly when loaded.

If they are going to support heavy items such as rigs, power supplies and books, then they need support at less than 1m intervals. I put an extra piece of 34 x 34mm wood underneath all my shelves and surfaces to be certain of adequate support (Fig. 2).

### Adequate Ventilation

Make sure that you leave enough space at the back of and above equipment to provide adequate ventilation. Avoid placing equipment directly on to carpet – this can easily block ventilation holes. A hot summer can easily cause temperatures to rise indoors – as I'm sure we've all noticed.

### Important Lighting

It's also important to have adequate lighting that allows reference books and log books to be read with ease. Ideally, the lighting should not prevent the frequency display in the transceiver or the display on the computer monitor from being seen. I would also suggest checking proposed lighting arrangements to make sure that they do not contribute to r.f. noise ('low energy' fluorescent type 'bulbs' can cause interference

### Mains Outlets

Without doubt a number of mains outlets will be required and I think it would be difficult to have too many outlets. So, on the back wall just above the main work surface, I mounted a switched multi-socket outlet (Fig. 3). I ran the input lead at the back of the main surface down to a suitable 13A mains socket.

As a safety feature, I terminated the input lead in a plug with a built-in protection device – an earth leakage detector sometimes referred to as residual current circuit breakers or RCBs, these are very efficient and 'trip' out very quickly when problems develop. If you are planning to have

additional main sockets installed, then I also suggest going for double sockets everywhere, as they cost little more than singles and will give much more flexibility for the future.

### Antenna Feeders

Getting your antenna feeder to the transceiver needs careful planning – particular when you're operating from inside a house. Some Amateurs prefer to route the feeder in plastic trunking and terminating the feeder in a wall-mounted socket (e.g. SO239) (Fig. 4). They then use a short patch-lead between the transceiver and the wall-mounted socket.

My personal preference is to terminate the feeder coming in from the antenna in a plug suitable for the transceiver and plug it directly into the transceiver, thus saving any losses associated with the additional plug and socket and eliminating the source of a possible future poor joint.

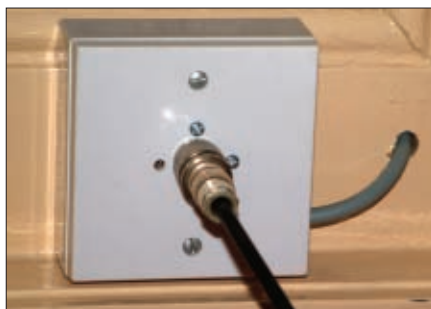


Fig. 4: An SO239 socket mounted on a standard electrical blanking plate.

At h.f. I don't think there is a compelling argument either way. At v.h.f. and above the extra connections will contribute a small additional loss (a fraction of a dB). If space is at a premium at the back of the transceiver, I use right-angle plugs which can save all space needed to meet the minimum bending radius of the feeder.

### Magazine Storage

No doubt you will want to keep issues of *PW* tidy. The binders available from the *PW* Bookstore are ideal for this (Fig 5). For other magazines, club newsletters, catalogues, instructions and servicing manuals etc., I find the cardboard magazine boxes available from office supplies shops ideal for the purpose.

Some magazines sell sets of back-numbers on CDROM which I have found can dramatically reduce storage space once I dispose of the hard-copies of the magazines.

### Any Old Chair?

It's very tempting to make do with any old chair for the shack. In fact, I



Fig. 5: Practical Wireless binders will protect and keep copies of our favourite magazine well protected. The binders are available from the *PW* Bookstore.

remember that for a period in temporary accommodation I relied on sitting on the edge of a bed and I soon found that my back ached. So, in my view it is well worth investing in a good adjustable office chair for comfort. As you only need one chair, you may be able to pick a bargain from a second-hand office furniture shop, or an end-of-line at an office supply company.

Opportunities may also occur when offices close or relocate. Indeed, I purchased an excellent office chair,

when the company I worked for relocated offices. The only draw-back was that the upholstery was bright orange!

### Your Shacks & Ideas

Hopefully you'll have picked up a few ideas for setting up your station indoors but I would be pleased to feature examples of readers' shacks in a future *WN?* column. Finally, I wish you all a Happy New Year!

**PW**



Fig. 6: The finished arrangement.



## Harry Leeming G3LLL's In the Shop

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# Will your Japanese rig commit hara-kiri?

Harry Leeming G3LLL looks back to the time he ran a well known Amateur Radio shop – and the electronic adventures provided by his customers!

**Welcome to In The Shop (ITS) where I'm looking back to my time running Holdings in Blackburn, Lancashire.** Readers may remember that I mentioned Yaesu's 'self destruct' 13.5V output socket about 18 months ago in connection with the FT747. However, more recently **Dave Penny G3PEN** sent me this graphic description of his experience with this socket on the FT-757.

Dave wrote, "Somehow, the jack plug became partially inserted one day, resulting in the plug shorting out the 12V supply. This was fed inside the rig by a thin wire that connected to the main 20A+ wiring loom, but without any fuse. The short melted the insulation on the thin wire, which then melted the insulation on adjacent wires in the loom, causing the main 20A supply to be earthed also. Within seconds, the entire loom was melted down, wires went open circuit, and bits of circuit board were burnt. I was enveloped in a thick pall of greasy grey smoke, and only then (I assume) did the main fuse blow.

*"The rig was a total write-off, the*

*repair required a complete rewiring – plus changing of several boards. Luckily, I was insured with a new-for-old policy on household goodies, which eventually resulted in me getting an FT-900 as a replacement. (The only insurance claim I've ever had to make, incidentally.)*

*"The worst thing about this problem is that unless we delve into the guts of the rig, there's nothing that can be done to avoid the problem – adding an outboard fuse is beyond the problem area. Basically, the power socket should be sealed off and never used."*

Thanks for writing Dave! I fully agree with you, the 13.5V output socket fitted on some Yaesu rigs is an 'accident waiting to happen'. So, if you want to be safe – don't use it!

### Weak Signals

When we're are trying to make sense of a weak signal buried in noise, listening on a speaker only seems to add to the difficulty. Clamping on a pair of headphones relieves us from local distractions, helps concentration, and

also makes life easier for those who have to share the house with us! 'Joe' inherited a pair of 1930s headphones, and wanted to know why they had + and – marks on the connections. "Surely it doesn't matter which way round you wire a pair of phones?" he asked.

To answer the question, we need to look into a little history. This is because in the early days of radio listening, receivers contained no amplification and hence the only way of listening to a crystal set was via a sensitive pair of headphones. These 'phones had a flat metal diaphragm that produced the sound, held a fraction of an inch from an electromagnet. The magnet was wound with many turns of wire and typically had an impedance of several thousand ohms. The audio from the crystal set was applied to the electromagnet and this attracted the metal diaphragm in sympathy with audio to reproduce the sound.

Had the magnet been purely an electromagnet, both the positive and the negative halves of the input signal would have attracted the diaphragm, and because of this the sound would have been at twice the original frequency – and very distorted. The solution to this problem? The electromagnet in this type of 'phone was also permanently magnetised.

On one half cycle, the audio cancels some of the permanent magnetism, and the diaphragm moved towards the users ear, on the other half cycle the electromagnetism added to the permanent magnetism, and the diaphragm moved away from the ear, hence the whole cycle was reproduced at the fundamental frequency.

Even when valves appeared, many receivers weren't powerful enough to operate a speaker and headphones were still used. It was common practice to wire the phones in series with the high tension (h.t.) supply to the anode of the last valve and the user sat there rather like a condemned criminal in the



Fig. 1: A photograph of the workings of the older high impedance headphones. The flat plate diaphragm is attracted to the 'pole-pieces' of the electromagnet, which also requires some permanent magnetism to give a reasonable quality audio as explained in the text.

electric chair! (With a directly connected mains powered set, today's 'Health and Safety' would throw a fit!).

As the current to the output valve passed through the 'phones this either increased the strength of the permanent magnetism if they were correctly wired. Alternatively – if they were wrongly wired – they could be demagnetised (hence the polarity markings). The + and – marks also enabled the user to wire the phones so that the sound to both ears is in phase.

Communications equipment made before about 1970 was sometimes designed to operate with high impedance headphones. The headphone socket wasn't fed from the output stage, instead the audio was taken via a capacitor from the anode of the previous valve. This type of circuit don't function satisfactory with modern low impedance headphones. If you have an early Eddystone or Yaesu receiver with the capacitor fed audio arrangement and don't have an old pair of high impedance phones, it's probably best to rewire the headphone socket to take the output from the speaker terminals.

Modern headphones, for hi-fi or communication equipment, usually employ low impedance moving coil units, which are really little loudspeakers with an impedance of around 8–64Ω. Receivers and transceivers are now fitted with a stereo headphone jack socket, wired so that stereo or mono 'phones can be inserted. As the 'phones only need a fraction of a watt to operate an attenuator is also incorporated.

Older equipment is often fitted with a mono jack socket and if stereo phones are inserted into this type of socket, the sound will only come through one earpiece. Insertion of the wrong type of headphone plug also may not switch the internal speaker off (this is normally done as the jack plus is inserted), and it's necessary to replace the jack plug fitted to the phones with a mono type and wire the two earpieces in parallel.

Some older equipment won't incorporate an attenuator. If you plug modern hi-fi headphones into these units the volume will be much too loud, and the rig's volume control will have to be set to nearly minimum. Background hum and noise will often then be found to be annoying. To solve the problem, purchase a pair of headphones fitted with volume controls and set these so that the required comfortable volume is obtained when the audio control on the rig is set to the level required for good loudspeaker reception.

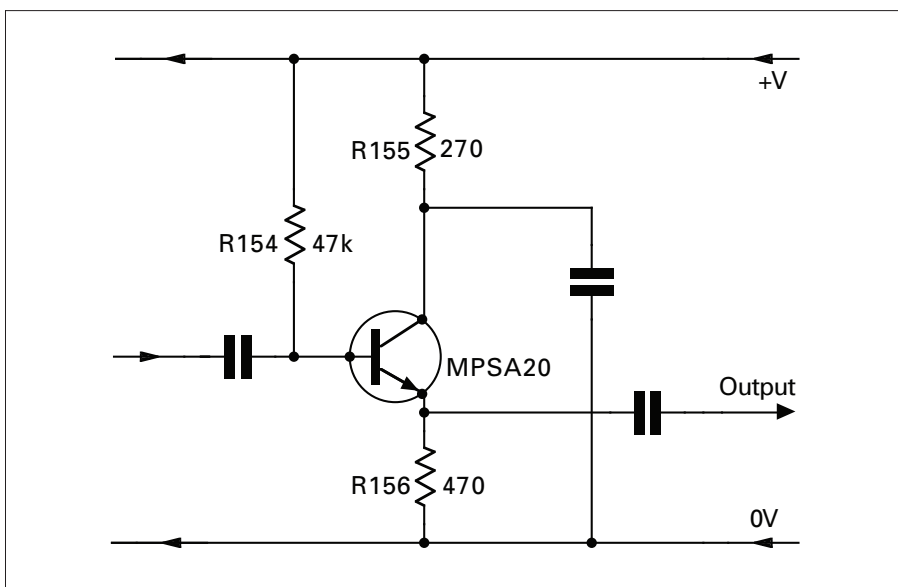


Fig. 2: The buffer stage of the Heathkit HW9 as designed and supplied by Heathkit. However, differing transistors gave poor operation, due to manufacturing spreads of the d.c. gain of each device.

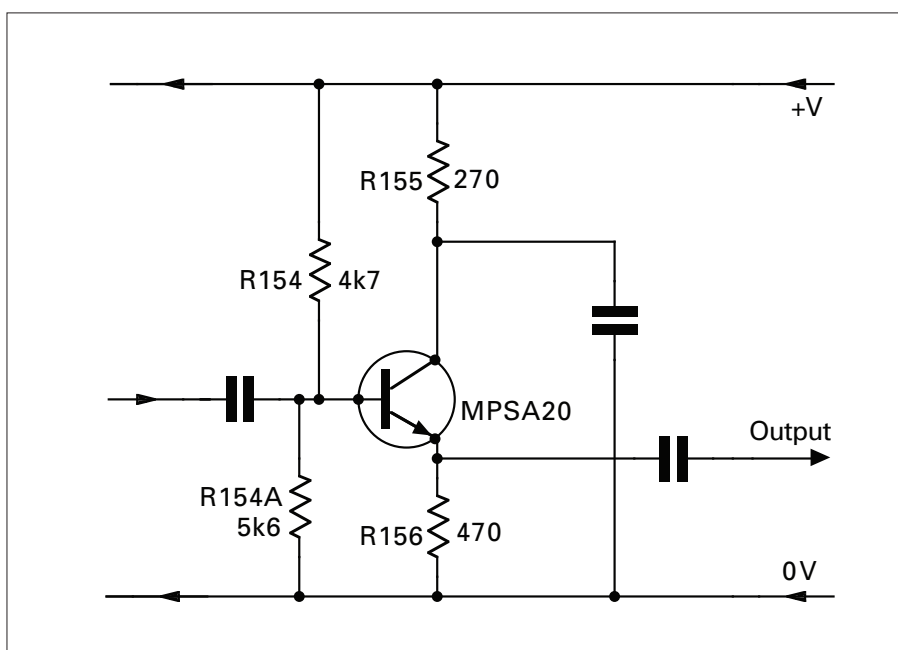


Fig. 3: Changing the biasing arrangement to this shown here, allowed the HW9's b.f.o. buffer to work effectively with any transistor, of that type, whatever, its d.c. gain.

### A Bargain FRG-7700

I had a call from 'Tony', who had just picked up a bargain FRG-7700. It worked satisfactorily but he was having problems with the analogue tuning display. For example, when he rotated the tuning control (which seemed rather stiff) the analogue display would not stay in synchronisation with the digital display. Unfortunately, I've come across this problem on a few rigs, particularly after they have been handled via carriers.

In transit the rig gets a bump and the tuning knob is forced further on to its shaft until the rear of it fouls the adjuster for the 0-900 dial. The cure is simple; undo the knob's grub screw and move it forward a fraction. It's simple when you know how!

### Stocking Up On Transistors

Years ago, I was stocking up for the last production run of our camera shutter tester, and I needed 600 BC109C transistors. When I compared prices I found that it was slightly cheaper to buy a 1000, and throw 400 away, than it was to purchase 600! Obviously we went for the thousand, and after that whenever I wanted a low noise high gain silicon transistor I was never short!

The BC109C is at the high-gain low-noise end of the BC107, 108, and 109 series production spread, and so, provided you observe its power rating, can be used as a pretty universal low level npn audio transistor in repairs and projects; they can however be too good, as the following illustrates!

We spotted a design for a hi-fi

distortion meter which used about half a dozen 'low noise silicon audio transistors', so we built it using BC109Cs. However, when we tried to set it up it kept breaking into oscillation – but we could find nothing wrong in the circuit or wiring.

Eventually, we wondered if the BC109C transistors we had used had too much gain and we then tested a batch of BC108 transistors, selected the ones with the lowest gain (the worst!) and fitted them. The unit then functioned perfectly!

The problem with many DIY projects is that often the constructor may have only built a few items. Because of they may not come across all the difficulties that can occur when all the tolerances are in the same direction – as was the case with us! I noticed this problem when we were doing a little manufacturing of various projects; we would make the first dozen or so with no problems and then find that the next batch didn't work properly.

Transistors have enormous gain spreads, for instance, an MPSA20 can have a d.c. gain of anything from around 40 to 400. However, a transistor that's at the opposite end of the gain spread to the device that was fitted to the prototype can, as we shall see, cause real problems! Transistors are also heat sensitive and as they get hotter the current through them increases. As far as possible compensation for these variations should be built into the design, but as you will soon read, even the experts sometimes omit to allow for the variations.

### Heathkit HW9

As part of a deal I ended up with an un-built Heathkit HW9 QRP c.w. rig. As Heathkit had by then closed down, I was not too keen to sell it via the shop and have to handle any problems that an unskilled purchaser might have, or cause. (In a shop it is not considered tactful to say to a customer- "*Sorry mate but I can't sell this to you, as I think you are too thick to build it!*"). So, I decided then that I could best dispose of the rig was by letting my son-in law, **Pete Grigson G0TLE** have it.

A few weeks later Pete, rang to say that the rig was up and running, but that he had discovered and corrected what appeared to be a design fault. The diagram, **Fig. 2**, shows the beat frequency oscillator (b.f.o.) emitter follower buffer amplifier. This stage provides the beat tone on receive and the carrier on transmit.

When Pete first tried the rig the transmit power was acceptable for



The Heathkit HW 9 has a design fault in its oscillator buffer stage, which Harry describes you how to fix.

the first minute, but then gradually fell off to around half of its rated 4W. He eventually noticed that the MPSA20 used in this stage was taking too much current.

Biasing the base of a transistor by using a single resistor, R154 in this case, saves the cost of one resistor and provides a high impedance input to the buffer stage. It does not however, automatically compensate for differences of transistor gain, or for any increase of temperature.

The transistor in Pete's rig obviously had higher gain than the one used in the prototype, and this caused an increase of current. The increase of current made the transistor get warmer, which then caused the current to increase. If it had not been for R155 and R156, the increase would have carried on upwards until the transistor had destroyed itself ( i.e. thermal runaway) – as it was the circuit simply saturated and stopped working properly.

### Sparing No Expense!

Sparing no expense, Pete had added an extra resistor and re-designed the circuit as per **Fig. 3**. An emitter follower buffer stage works best when the emitter is biased at around half the supply voltage. The 4.7kΩ and 5.6kΩ resistors form a potential divider and apply just over half the supply voltage to the base of the transistor.

The emitter then 'follows' the base so that the transistor passes just enough current for it to be about half a volt lower

than this. The d.c. input resistance of the base of a transistor is approximately the same as the value of the emitter resistor (R156 470Ω in this case), multiplied by the gain of the transistor.

The input resistance will therefore vary from about 20kΩ (470 X 42.5) with a transistor at the low end of the gain spread to 200kΩ with one with a gain of around 400. These value of input resistance is in parallel with R154A, but as it's higher than the fixed resistors, even the extremes of the gain spread no longer alter the transistor current enough to upset the operation of the stage.

If the transistor gets hot and 'tries' to pass more current, the voltage on the emitter increases. Any increase of voltage reduces the bias between base and emitter, thereby tending to cancel the current increase, making the circuit self-compensating.

There is nothing unusual about Pete's circuit, in fact it is the 'norm', which makes one wonder why Heathkit didn't use it in the first place; perhaps they wanted to keep the input impedance of the buffer stage as high as possible?

In that case Heathkit could have measured the gain of a specially selected MPSA20. Then they could have supplied a value of R154 that would enable this particular transistor to function at the correct current at average temperatures. Puzzling isn't it? Well that's it for now, see you next month!

PW

### 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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# Make sure you have a QSO every day!

Tim Kirby G4VXE – as keen as ever on the v.h.f. bands – passes on some good advice.

**Welcome to the World of VHF (WoVHF). As you many of you will probably have gathered by now, I believe passionately that one of the keys to keeping our hobby vibrant and exciting is for there to be more activity.**

With that in mind, it's always good to see initiatives which support this. Sometimes these are initiatives from special interest groups, other times they come from individuals and **Keith Maton G6NHU** has come up with a great one for 2011. Each day he's going to try and make at least one QSO.

The one QSO doesn't sound much (or perhaps it does!) but I know from personal experience that it can be quite challenging, especially when you've had a really busy day doing something else! Keith has bravely started a blog on the internet to document how he's getting on, which you can find at <http://qso365.co.uk/> Take a look at Keith's site and perhaps you can support his initiative by having a contact with him – or even trying to have a contact each day yourself!

## The 50MHz Band

We're out of the main season for Es DX now (although with improving solar conditions, keep an eye out for F2!) so, it's interesting to hear from people who are using the band for more local communication. I'm fascinated by what's possible on 50MHz frequency modulation (f.m.) – my impressions are that it gives excellent coverage and deserves more usage. So, it was good to hear from **Matthew Porter, 2E0XTL** from Ludlow in Shropshire on the subject.

Matthew says, "Both **Alan Richards G7RHF** and myself are trying to encourage people on to 51MHz section of the 6m band. We feel that there is so much more commercially available gear for this band and question why it's not more popular! We would be very grateful if you would be so kind as to

mention our activities on 51MHz vertical polarisation in your next *PW* Article!

He continued, "We monitor 51.51 and 51.53MHz most evenings and would welcome people on from the West Midlands and Wales!"

I wrote back to Matthew saying that I'd hope to be able to make some contacts into his part of the world and he told me that there are plans, hopefully to be realised soon, for there to be a new 50MHz repeater, **GB3GT** on Titterstone Clee Hill in Shropshire. This should have great coverage, so I look forward to hearing more news soon.

From my **G4VXE** mobile operations, I've been a little more active on 50MHz f.m. over the last few weeks. The Farnham repeater, **GB3FX** works well from around my home in Oxfordshire most of the time and indeed, I frequently hear it further north and west up on the Cotswolds. Unfortunately however, from time to time, the repeater suffers interference on the input, so you may find that on occasion, you can hear the repeater better than it can hear you.

Despite the input interference problem, I have enjoyed a number of good QSOs through the repeater. Also, **GB3ZY** near Bristol is frequently heard around my part of Oxfordshire too, although I have to travel a little further west before I can use the repeater reliably.

Thanks also to **Mark Haynes MODXR** for taking the trouble to write when he was in the middle of preparing to move house – that's real dedication to the hobby! The good news is that Mark's new house should be a more favourable v.h.f./u.h.f. location. Mark enjoyed the October RSGB VHF 50MHz activity contest and was very pleased to make 53 contacts including the best DX, **G14SNA** at a distance of 516km.

That's a good distance for 50MHz tropo Mark! It's sometimes surprising what can be worked on 50MHz tropo. At my last QTH in Windsor, I used a long

wire antenna for h.f. and it seemed to work on 50 and 70MHz to some extent and I made a number of unexpected contacts on 50MHz tropo – including into Ireland and the Isle of Man.

So, if you have a rig that will transmit on 50MHz but no dedicated antenna, try tuning up a bit of wire or putting up a dipole! Listen when you know there (or where you expect) will be some activity on the band. At this time of the year, realistically it means a contest – but I'll bet you'll hear something. Let me know how you get on.

## The 70MHz Band

**Wally Sawyer G7FHN** wrote to mention the **Reading & District Amateur Radio Club** (R&DARC) 70MHz net, which is run each Tuesday evening at 2130 local time. The net is run by the club chairman, **Vin Robinson G4JTR**. The initial call is made on 70.450MHz and then the net moves to 70.425MHz.

Wally says that all are welcome and that there a number of stations, including Wally's son, **Jonathan 2E0VJO** who join in the net. So, if you're within v.h.f. range of Reading, it may well be worth a listen out on Tuesday nights and calling in, if you can.

## The 144MHz Band

It was great to hear from **Robert Taylor G1WEX** from near Halesowen in the West Midlands. Robert had picked up and enjoyed a copy of *Practical Wireless (PW)* on returning from a 15 year break from the hobby. Previously, Robert had particularly enjoyed 50 and 70MHz and hopes to get back on those bands soon. In the meantime, as well as h.f., Robert has been enjoying getting back on 145MHz f.m. with his Yaesu FT-2800 and a mobile antenna. Please keep us posted on how your v.h.f./u.h.f. operations develops Robert!

Here at **G4VXE**, the main 144MHz activity was during the November 144MHz CW Contest. I love being



active during this event, as there's so much activity around Europe and – even in 'indifferent' – conditions it's remarkable what you can hear. This year unfortunately, over the weekend of November 6th and 7th, conditions were probably mostly 'indifferent'!

However, I was pleased to work a number of continental stations including F6DWG/P (JN19), PA6NL (JO21), F6FLB (JO00), ON4TX (JO20), ON4KHG (JO10). Best DX was F8DGY/P (JN18) at just over 450km from me. Two other stations, further afield were heard, but unfortunately, I didn't manage to attract their attention; DK0BN (JN39) was just above the noise for quite a period on the Saturday afternoon.

I heard TM0W (JN36), similarly weakly on the Saturday afternoon and evening, just above the noise with occasional peaks, but I although I got a "QRZ G", my little signal wasn't quite enough! It was fun to listen though and interesting to notice some great meteor bursts (short duration and good signal strength) from them on the Sunday morning, when I could no longer hear them on tropo.

Although it wasn't DX – it was good to have a QSO recently with **Peter Thompson, G8DDY** on the Isle of Wight when I was mobile, using the **GB3RD** repeater. Peter has lived on the Isle of Wight for many years and provided many people with their first QSOs with the island on 144 and 432MHz – he certainly did with me! Peter no longer has the excellent take-off he had from Shanklin towards the mainland UK, but is still active and it was good to hear him parked up on a high spot on the island where GB3RD comes in well. We did try listening for each other on simplex, but unfortunately, I was in a relatively poor location in Abingdon (Oxfordshire) at the time.

**Matt Grice 2E0FNG** wrote to say that he was pleased to have made a QSO over 32km (20 miles) distant with **Colin Horridge M6FLC** using his Wouxun KG-UVD1P and a roll-up Slim-Jim antenna when he was operating portable from a hotel room. Those sorts of QSO are always particularly satisfying owing to the challenges of getting antennas up in a temporary location.

### The 432MHz Band

When the *PW* Editorial team and I came up with the name of the column, I hoped that we would be able to cover v.h.f./u.h.f. happenings from different



This imposing stacked pair of 430MHz antenna, used for mountain-top portable operations close to the Flabouri shelter in Greece. This was sent in by Panos Dadis SV1GRN of the Athens QRP group.

parts of the world as there is much we can learn about propagation. Also, in the middle of winter, it's great to hear about QSOs taking place in sunnier climes! So, I particularly enjoyed receiving an E-mail from **Panos Dadis SV1GRN** of the Athens QRP group in Greece.

Panos explained that they have recently made many QRP contacts on 144MHz, so they decided to concentrate on 432MHz on their recent trip to Parnitha mountain (KM18UD) which is 1,158m high. The group, consisting of SV1BJY, SW1JGW, SV1GRN, SW1EIX, SV1EIW and SW1KWZ had some great results. They were supported by some other mountain top activity on 432MHz from other stations around Greece including Ymmitos mountain (KM17VX) activated by SW1MNE and SW1MNF, Kithaironas mountain (KM18OE)

activated by SW1IXP and SV1EDY and Zakyntos (KM17JS) island activated by SV8CS & SW8NAC.

Further afield, Panos and friends made contacts with **Selim Erdil TA3TTT** (Izmir, Turkey) and **Mehmet Nalbant TB3JJ** (also in Izmir) in KM38GN. Selim TA3TTT was using an FT-817 and the 'internal' whip antenna – but was a good signal with a little tropospheric enhancement.

Moving even further afield now, it was good to hear from our friends at the Elizabeth Amateur Radio Club in South Australia, once again. This time, **Darryl Ross VK5HZ** wrote with some information. Their excellent club newsletters, which includes some interesting v.h.f./u.h.f. content, can be found on the internet at [www.earc.org.au/newsletters](http://www.earc.org.au/newsletters) The October issue had a couple of items that really caught my eye, one was an article



A great bright sunny photo to cheer you up on a winter's day! Also sent by Panos, this photo shows Selim TA3TTT operating from KM38GN. Note the interesting 'natural' insulating piece connecting the antenna to the support pole!

about 56MHz History in Australia from **Steve Mahony, VK5AIM**. The other item? Baking cookies/biscuits with your callsign on it! Go and have a look and try your cooking skills!

Darryl also mentioned that the Echolinking of the VK5RLZ repeater, which I had mentioned previously had only been a temporary facility to celebrate the **Wireless Institute of Australia's** special centenary callsign, **VK100WIA**. Darryl says that would like to make the *Echolink* connection permanent at some time in the future.

Certainly, I'm a great believer in repeater linking projects **if it** leads to more activity, so I was interested to hear from **Keith Maton G6NHU** that the GB3CO and GB3CE 433MHz repeaters in Colchester and Clacton on Sea had been linked together recently. Very often these days, such projects use internet linking, but in the case of the GB3CO/GB3CE the link has been done using radio frequency (r.f.) and the G8CUL repeater logic.

### The 1296MHz band

**Jan Egholm OY3JE** contacted me via Twitter to say that he'd worked PI9CAM using Moonbounce (EME). What was particularly interesting was that Jan had been using a 'small' system of 20W

output and a single 44-element Yagi. However, we mustn't forget the PI9CAM system which uses a 25m (yes, you read that right) diameter dish! ) played a part! So, if you've got a few watts on 1296MHz and a Yagi or two, it may well be worth attempting a moonbounce contact with them!

### Satellite Operation

**Peter Goodhall 2E0SQL** wrote, "At the start of the month I decided to have a dabble with the Amateur satellites. Not knowing too much about it I opened the *Ham Radio Deluxe* satellite tracking application and enabled all the current live satellites as shown on the AMSAT status page – [www.amsat.org/amsat-new/satellites/status.php](http://www.amsat.org/amsat-new/satellites/status.php) – I turned on my FT-817, connected to the Diamond V2000 vertical in the garden and started listening, based on what the tracker was showing.

"I've heard signals from VO52, HO-68, SO-67, ISS ranging from s.s.b., c.w. and also APRS. And although my efforts have mostly been focusing on listening – I did try a bit of APRS via the International Space Station, receiving re-transmitted packets from stations around Europe. I also tried sending a few myself – but the APRS 'unproto' set-up was wrong! However, thanks to

some help from **Gavin Nesbitt M1BXF**, I've corrected that, but have not had time to try it again just yet!"

Thanks for that Pete! (Pete hopes that he will soon be able to make his first satellite QSO – so watch this space!).

It's well worth while having a listen, as Pete has done. If you pick an overhead pass to start with, with an elevation, perhaps above 40 or 50°, then you should receive good signals even on a mobile whip antenna. So, if you've not tried listening to the satellites before, you may very well have the equipment to do so.

You'll probably get more enjoyment out of listening to the s.s.b./c.w. mode satellites, as the signals are easier to hear than on f.m.. There's plenty of software around to enable you to track the satellites – *Ham Radio Deluxe*, which Pete mentions is worth a look and does much more than just track satellites, but you can even download applications for the iPhone which will tell you when the satellites will cross your piece of sky (see the *PW News* this month for some interesting apps).

Finally, I wish everyone a very happy New Year! Let's start with a resolution to keep active on our v.h.f./u.h.f. bands!

PW

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# Band incursions

## The Chinese Over The Horizon (OTH) radar system badly effected the 7MHz Amateur allocation!

Carl Mason G0VSW presents his monthly round up of your h.f. band reports and DX news. Information reports and photographs to Carl by the 15th of the month please!

**A Happy New Year to you all, and welcome to HF Highlights (HFH) where I'm beginning with the annoying subject of 'Band incursions', which appear to be happening more and more on our Amateur bands.**

For example, on November 15th the Chinese Over The Horizon (OTH) radar was again audible in Europe around 2000UTC. It was identified as using 43.5 pulses per second (p.p.s) between 7.080 – 7.120MHz and this transmission made it almost impossible for Amateurs to use that portion of the band!

On 14MHz there has been a similar problem as OTH Radar appeared on 14.185 and 14.305MHz in the mornings. Its parameters were 66.66p.p.s. with a 10kHz spread in bursts of 1.8 seconds duration every 30 seconds and originate somewhere in central Argentina.

Additionally, fisherman speaking in Spanish are abusing 3.500, 3.510, 3.550, 3.590, 7.000, 14.000, 21.000, 21.222 and 21.395MHz daily, using upper sideband (u.s.b.) at various times throughout the day. They also are often using a voice scrambler called 'CRY 2001' or only using private names rather

than a vessel's names to identify themselves.

The International Amateur Radio Union (IARU) asks that we use these frequencies **whenever possible** for 'legal' Amateur Radio traffic, so that the illegal traffic can be prevented! If you have not heard what a voice scrambler sounds like take a look at [www.signals.taurus.de/TABLES/VOCODER.HTML](http://www.signals.taurus.de/TABLES/VOCODER.HTML) where audio samples of digital voice encryption systems can be found.

The 28MHz band has also had problems as numerous taxi cabs from Russia, Belorussia and Ukraine have been transmitting between 28.000 - 29.700MHz using frequency modulation (f.m.) recently causing problems to German Amateurs. When you hear the offending operators, it's not unusual to find a female voice operating the base station, sometimes with a telephone ringing in the background, while male voices reply from the cars talking about street names and their passengers.

The list of illegal intruders can go on and it was therefore interesting to hear from *PW* reader **Bill Shepherd G0KPR** who wrote in to

say, "Perhaps fellow Amateurs need to be reminded that there is an 'intruder watch' to whom you can report unauthorised use and broadcasting within the Amateur bands".

Recently, it has been reported in *Echo Ireland* the excellent magazine of the **Irish Radio Transmitters Society (IRTS)** that churches had been illegally using 28.265MHz f.m. and heard throughout Europe with 5/9+ signals while another in the Dublin area has been transmitting on 28.030MHz in the c.w. portion of the band wiping out any activity there.

Bill said, "If you do notice any misuse, you can report it to the IARU Region 1 intruder watch. While the IRTS [www.irts.ie/cgi/index.cgi](http://www.irts.ie/cgi/index.cgi) asks that all Radio Amateurs and short wave listeners keep a listening watch around the 28MHz frequencies in particular and report any incursion to them as it is collecting all information on these illegal Church broadcasts." You can send reports to **Ger McNamara EI4GXB** at [ei4gxb@gmail](mailto:ei4gxb@gmail) (the IRTS IARUMS co-ordinator) and ideally include any names heard or details that would help identify the stations location so it can be investigated further.

The IARU Region 1 Homepage, announces that it is, "The Federation of National Associations of Radio Amateurs from Europe, Africa, Middle East and Northern Asia and it's available at [www.iaru-r1.org/](http://www.iaru-r1.org/) and to quote the opening page the IARU is there to "represent the interests of the Amateur Radio Service in the region and worldwide to relevant international organisations, promoting the interests of Amateur Radio and seeking to protect and enhance its spectrum privileges."

### The DX News

On to this month's DX news now and on to Chile in South America, a country that occupies a long narrow coastal strip between the Andean mountains to the east and the Pacific Ocean to the west. Here, **Luis Matho CX1EK** is currently



The QSL card from VE7XY who was worked by Tom Ruddel 2I0TJR using 14MHz s.s.b.

active as **CE2/CX1EK** until March 31st 2011. The QSL route is direct to Luis Matho, 2303 Nordok Place, Alexandria VA 22306, USA.

The callsign **9Q6CC** is the new call issued to **Christian Cardarello CX2CC** for his activity from Goma City in the Democratic Republic of the Congo where he is working for the United Nations. He hopes to be active using s.s.b., c.w. (Slow) and some digital modes using a Kenwood TS-430 and a wire antenna at 60ft high and expects to be in the country for a year. He will reply to QSLs on his return to Uruguay after February 2012 – so please be patient. The QSL route is via Avenida Italia 3319, 11600 Montevideo, Uruguay.

French Amateur **Henri F6EAY** is now stationed in The Republic of Cameroon in central and western Africa where he will be operating from Yaoundé as **TJ3AY**. He will be using both s.s.b. and RTTY on the 7 to 28MHz bands during his stay. The QSL route is via the bureau or direct to **René Courgibet F5LGE, 13 Ruelle Crepion, 51240 St. Germain La Ville, France**.

In Antarctica, at the King Se-Jong Korean Antarctic Scientific Base on King George Island AN-010, South Shetlands is **Lee Sang Hoon DS4NMJ (KE5CNK)**. He was a member of 19th over-wintering Party in 2006-07 and has returned to the island as part of the 23rd over-wintering party until 2011 where he will work as a Radio operator. He will use the call **DT8A** when off duty and will be active all the h.f. bands using s.s.b., c.w. and some RTTY.

The station was opened in February 1988 when it became a permanent research base for the Korean Antarctic Research Program. The station comprised six buildings and two observatories for research and accommodation – but has been added to twice, with three more facility buildings added in February 1991 and one more in February 2000.

Lee will be using a Yaesu FT-1000MP MkV with a small laptop computer for digital modes and logging, with log-periodic dipole arrays (LPDA) and dipoles antennas for most bands, while home-brew antennas will be used to cover the WARC bands. (QSL via HL2FDW).

### Your Reports

On to your reports next and to **Eric Masters G0KRT** in Worcester Park, Surrey who used his Kenwood TS-570 at 100W to a modified home-brew W3EDP antenna 26m long (84ft) with counterpoises on 3.5MHz to work DL2AGB (Germany) 1947, F1EBN



The QSL card from W3LPL after he was worked by Martyn Medcalf M3VAM on 14MHz s.s.b.



The QSL card from A4100 after he was worked by Tom Ruddle 2I0TJR on 14MHz s.s.b.

(France) 2209 and OT2A (Belgium at 2217UTC.

The 7MHz band provided **Jim Pedley GM7TUD** in Lochaberbriggs, Dumfries & Galloway, Scotland, with the new Caribbean entities mentioned in the November column using several modes. Voice contacts included PJ5/AH6HY (St. Eustatius) NA-145 at 0653, PJ7E (Sint Maarten) NA-105 at 0700, PJ2T (Curacao) SA-099 at 0706, PJ6A (Saba) NA-145 at 0738 while c.w. found PJ4B (Bonaire) SA-006 at 0745 and RTTY worked PJ7E at 0758UTC. Jim was using a Kenwood TS-50 at 100W to a Butternut HF2V vertical antenna.

It was nice to have a report from *PW's What Next?* author **Colin Redwood G6MXL** in Poole, Dorset who managed some weekend sideband operating, finding C37N (Andorra) QSL via EA4URE, HB0/HB9AON (Liechtenstein) QSL via DJ2YE and OH0JFP (Aland Islands) EU-002 between 0900 and 1000UTC.

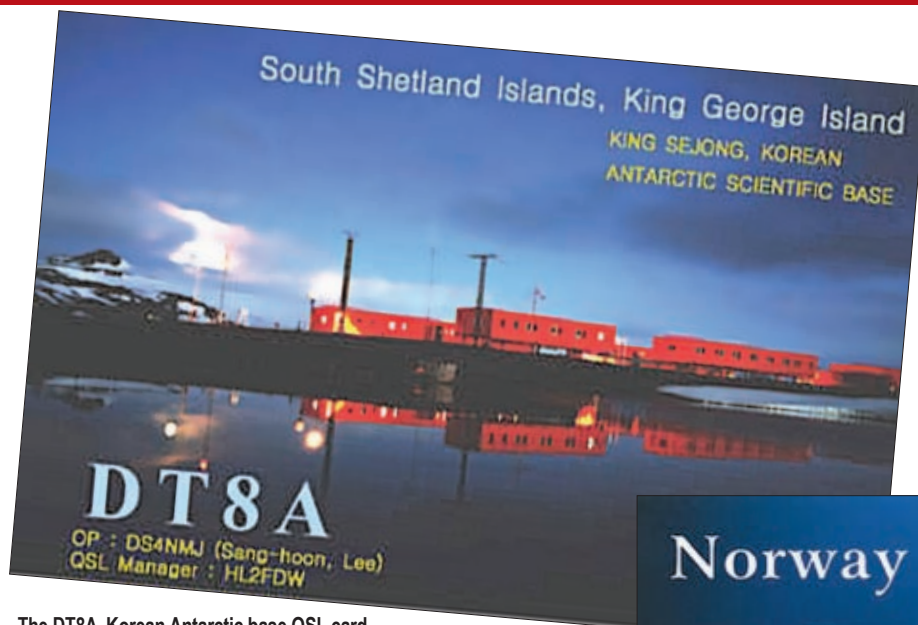
### The 14MHz Band

The 14MHz band provided Colin G6MXL with JW5E (Svalbard) EU-026,

CR3A (Madeira Islands) AF-014 and T70A (San Marino) between 0930 and 1240UTC. He was running a Kenwood TS-2000 and 100W to a SRC X80 vertical antenna.

Jim GM7TUD managed KH7HI (Hawaii) OC-019 at 0729, ZL1BD (New Zealand) OC-036 North Island at 0735, 5V7TT (Togo) 0813, VK4LDX/P (Australia) at 1212. The latter was a DXpedition to Fitzroy Island OC-172 by Craig Edwards and last activated way back in 2003. During his seven day 'holiday' style operation Craig achieved 3617 QSOs into 93 DXCC entities!

Next, Jim worked OX/DF9TM (Greenland) on Tasiillaq island NA-151 followed at 1235, 9M6DXX/P (East Malaysia) on Pulau Sebatik OC-295 at 1400 (QSL via M0URX). Then came JT1PX (Mongolia) 1603 (QSL via HA8PX), V85AVE (Brunei) at 1705 (QSL via EA7FTR only), T6MB (Afghanistan) at 1712 (QSL via SP8UFB). Jim then had a QSO with **Craig Haldane MM0SSG**, who was operating as D2SG (Angola) from Luanda at 1748 and who expects to be there until March (QSL via GM4FDM). All QSOs were made using a



The DT8A Korean Antarctic base QSL card.

Cushcraft MA5B mini-beam antenna.

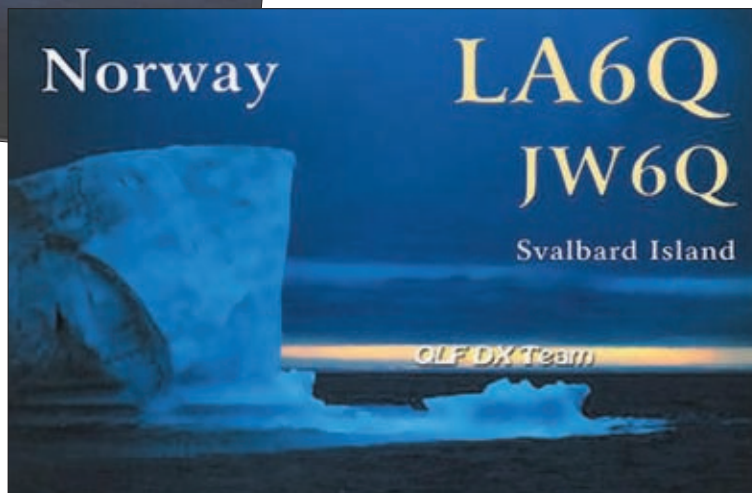
**Martyn Medcalf M3VAM** in Chelmsford, Essex used s.s.b. once again listing OL9O (Czech Republic) 1112, LY2J (Lithuania) 1138, EM8NFF/P (Ukraine) 1155, HG6N (Hungary) 1225 the Salgotarjani Varosi Radio Club QSL via HA6KNB, T70A (San Marino) 1238, SE5E (Sweden) 1252 QSL via SM5AJV, OH1JO (Finland) 1344, 9A500AA (Croatia) 1352 with the special call of 9A2AA for operating from over 500 different Croatian islands, EA3EBN (Spain) at 1422, P33W (Cyprus) AS-004 at 1814 QSL via UA3DX, IK6BGJ (Italy) at 1922 and W3LPL (USA) in Glenwood, Maryland at 1924UTC running a Yaesu FT-897 into a Comet CHA-250BX antenna.

In New Zealand, **Peter Leng ZL4TE** has been enjoying both s.s.b. and RTTY this month working JA7NVF (Japan) AS-007 at 0411, HA3NU (Hungary) 0610 and 5B50AIF (Cyprus) AS-004 at 0629. This was a special call special callsign celebrating 50 years of the Cyprus Republic (QSL direct to EB7DX). Next came OE50XLC (Austria) the Austrian Military Radio Society at 0630 (QSL via OE4RGC).

Next into the log was JW8DW (Svalbard) EU-026 at 0802, SM6BGG (Sweden) followed at 0850, then EI2CN (Ireland) 0926, PA3EWP (Netherlands) 0929, HF2010CY (Poland) followed at 0939. This was a special call to commemorate the 200th anniversary of the Fryderyk Chopin's birth (QSL via SP5ES). All stations were worked using s.s.b. Later, Peter worked US0MS (Ukraine) 0650, JA1LZB (Japan) 0657 and LA6Q (Norway) EU-079 – the QLF DX Team – at 1049UTC (QSL via LA9VDA). He was using a Yaesu FT-1000MP MkV and 100W to a Cushcraft AV-3 vertical antenna.

The 14MHz band also provided

The QSL card from LA6Q after he was worked by Peter Leng 14MHz RTTY.



**Tom Ruddle 2I0TJR** in Portadown, County Armagh, Northern Ireland, with some s.s.b. DX in the shape of A410O (Oman) 1451 (QSL via NI5DX), OX2A (Greenland) NA-018 at 1904 (QSL via OZ1ACB) for a new country. Then came YV5ANF (Venezuela) at 1926 (QSL via EA7FTR), VE5FX (Canada) at 1958, and JE7YSS (Japan) AS-007 at 2117. This was the callsign used by the Akita Scout Contest Club call from Akita City. Tom was using a Kenwood TS-570DGE and 50W to a home-brew vertical antenna mounted 3.5m above ground.

Tom said, "The band was very quiet one evening around 1700UTC and not even a European station could be heard and I was about to go QRT. I made one last sweep and heard VE7WY calling "CQ" so I replied and 5/7 was passed both ways. I enjoyed a fine contact with Mike in Vancouver that came out of an apparently dead band – which goes to show that it pays to persevere and, of course, listen!" (Good advice Tom!).

#### The 18, 21 & 24MHz Bands

The 18MHz band had some 'short' openings and **George Davis G3ICO** in Yeovil, Somerset, worked c.w. stations 9U0A (Burundi, Eastern Africa) at 1524 (QSL via DL7DF) and 4B2S (Mexico) at 1659. Moving to 21MHz George managed to work 5B0J (Cyprus) at 1310, P43JB (Aruba) SA-036 at 1457 and VO1HP at 1508UTC. He was using

a Elecraft K2 at 10W c.w. to a 40m long doublet antenna.

Also on the band was Eric G0KRT, who used s.s.b. to work LZ4RR (Bulgaria) at 0750, EM7L (Ukraine) 0752 and N1DZ (USA) in Lincoln, Rhode Island, at 1527UTC.

Meanwhile, the c.w. from George G3ICO worked 7Z1HL (Saudi Arabia) 1334 (QSL via DJ9ZB), CN8YR (Morocco) at 1410 (QSL via EA7FTR) and OX3XR (Greenland) NA-018 at 1427, before moving to 24MHz to work

P43JB (Aruba, Southern Caribbean) at 1457 and finally VO1HP (Canada) at 1508UTC.

#### The 28MHz Band

The 28MHz band also had a few openings this month (which is good to hear about!) and George G3ICO worked EA3DD (Spain) at 1410 using c.w. again. Meanwhile Jim GM7TUD used his 4-element mono-band Yagi antenna to work s.s.b. and log a good number of DX stations including LU2AF (Argentina) 1412, PJ4W (Bonaire, Caribbean) 1413, ZD7PAS (Saint Helena, Atlantic) AF-022 at 1419, 5V7TT (Togo, West Africa) at 1425, CA4MNH (Chile) at 1452, VP8LP (Falkland Islands) SA-002 at 1457, A25ZY (Botswana, Africa) at 1503 (QSL via I0ZY) and finally, TI8II (Costa Rica) at 1519UTC.

#### Signing Off

Well it's good to see that propagation has picked up a little this month! There have been reports for most of our h.f. bands and there has also been some interesting DX to work – especially on the higher bands. My thanks 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 month, I wish you all good DX.73, Carl GW0VSW.

PW



## Graham Hankins G8EMX's In Vision

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# New Co-Editor of CQ-TV

Graham Hankins G8EMX provides his round-up of Amateur Television news and passes on the update on his new status! – he's the new co-Editor of CQ-TV!

**Welcome to the world of Amateur Television! Back in December, In Vision carried the news that the British Amateur Television Club (BATC) was, "still looking" for a co-Editor to help Chris Smith G1FEF to compile its quarterly magazine CQ-TV.** Well, the good (I think!) news is that the club has now found one, but no prizes for guessing whom that 'co-Editor' might be. Yes folks (sigh) it is I – probably the only member who offered! Chris has sent me a long account of the Hamfest in Friedrichshafen, Germany 2010, written in German then translated, to 'tidy up' and shorten. Let's hope the word processor keeps going – or maybe should I hope it breaks down hi!

### New Year's Resolution

Here's my New Year's Resolution – bring some radio frequency (r.f.) activity onto this ATV page! The BATC's website has a 'UK Repeaters' link, which takes you to **ukrepeater.net** described as "The web resource for UK Amateur Radio repeaters from the RSGB Emerging Technology Co-ordination Committee." Further clicking takes you to the 'Alphabetic list of repeaters' which shows all repeaters and their modes. Most are analogue voice repeaters but I counted 44 ATV stations. Selecting a callsign brings up information, including a data page, data line and coverage map about each one, so it was interesting to have a look at the state of each and what they were all doing. A mixed picture, if you pardon the pun!

Each data page has space for a link to that repeater group's website. Some of these links are missing – or instead there's just a statement 'Removed 8/8'. Does that mean August 2008, or August 8th 2010? And why was the link removed? Or not replaced? In fact, I don't think it's really at all helpful.

Three repeaters - GB3AT at Winchester, GB3FT at Newbury and GB3XY at Hull are shown as 'not operational'. The data page for ATV

states "Application received August 2009, frequency clearance required" but there's no information dated later than this, or if the repeater is off-air for other reasons. For GB3FT there is a link to the group's website, where the statement "Latest News - Jan 2004: We are still awaiting frequency clearance by the primary user of the 13cm band but hopeful that the project will go ahead one day."

If the GB3FT date is still correct, that 'one day' is now seven years long gone! Was January 2004 really the latest news, or has the website simply not been updated? The 'Vetting' site **www.ukrepeater.net/vetting.html** carries the statement: "Please note that due to website maintenance (site refresh project) this page is not currently being updated". So, we just don't know – not from websites anyway!

The GB3XY repeater is run by the East Yorkshire Repeater Group and the data page has a link to the group's site. But on its 'Repeaters' page there is just a general description of what repeaters do, nothing specific about the fortunes or current status of its ATV repeater.

Incidentally, I used to be the Keeper of what was my nearest ATV repeater – GB3RT, located at the time at Tile Hill in Coventry. Is it still there now? Or has it moved to Leamington Spa as was being suggested many years ago? The **ukrepeater.net** pages gives Coventry in the Data Line, but shows Leamington Spa on the map!

The biggest surprise during this 'audit' was that the Bristol ATV repeater GB3ZZ, which perhaps has the most active following of all the units, doesn't have a link to its website from the Data Page! But perhaps the saddest news came from the Kent Television Group that runs GB3KT on the Isle of Sheppey. Although shown as operational, using the link to the group's website there is a statement dated November 2010 from Chris G4AYT.

Due to lack of funds, the GB3KT group expects to close down the repeater by or before April this year.

Chris commented: "It could have been sooner if the expected rise in rent this year (i.e. 2010) had materialised." The deduction from this, is that the rent did not rise last year, which 'begs the question' of how much was the rent – and could some other 'party' have stepped in to help with the costs?

By 'other party' I mean the BATC, which does have finance available – don't forget the club is going to pay members to write articles for the magazine, as I mentioned last time. Despite this, I would have considered it more of a priority to help struggling groups to stay on-air. Although the Kent TV Group only has 11 members, Chris emphasises that the group itself is not being formally closed down as the ATV repeater was only part of its activities and adds: "This leaves the 'door open' for future possibilities should they arise. The Group could have a new lease of life if a suitably enthusiastic person or persons came forward." Let's hope someone does.

### Another ATV Year

So, as we are entering another ATV year, can someone please sort out these Data Pages, Vetting sites and groups please keep your information and websites up to date. Check your Date Lines on repeater.net your coverage maps, provide a link to your website or make sure the link goes to your site! And on a few 'points of spelling and grammar' and pedantry for some web-masters, it should be MHz not Mhz and, more surprisingly, 'metres' not 'meters'! (The latter is mainly the fault of the American spell-check systems we seem forced to use!).

But my biggest 'New Year's Plea' is for ATV news please! There's certainly good technical work being done on all the ATV repeaters – so please tell the world about it! And 'pictures' are our business – send a few to me for publication please! Finally, I wish a belated Happy New Year to everyone!

PW



## Ben Nock G4BXD's Valve & Vintage

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# The Latest 'Kidderminster Kollektion' Up-date

Ben Nock G4BXD invites readers to the V&V vintage 'shop' where he seems to have gained a few more radio 'goodies'.

**Welcome to Valve & Vintage (V&V) and a very happy 2011 New Year to you all! I also hope you had a very good Christmas and that Santa bought you that all-important radio toy.**

Another year has gone by and there were plenty of new additions to the 'Kidderminster Kollektion' here meaning even less space to move around in! So, I'll describe some of the items which arrived towards the end of 2010.

### Another Eddystone

Back in August I received an interesting E-mail from **Les Harris GOULH** regarding an Eddystone set. Les said "As a regular PW reader I was pleased to see in August's edition your article on the Eddystone 930, etc. For some time I have thought about getting in touch with you, as in about 1966 I purchased an Eddystone from Hurst St. in Birmingham." He went on to say "Sadly it has – over the earlier years – been much modified and has held 6, 4 and 2 metre and other converter functions, so it doesn't reveal any of the original a.f.c. or r.f./mixer circuitry."

After an exchange of E-mail, I made a visit to Les – and I must say a very enjoyable one it was. It turned out we had both been members of the **Slade Radio Club** in Erdington, Birmingham but at different times. It also turned out the Eddystone in question was a rare example based on the '930 but a two

band receiver tuning the old Band I v.h.f. 405-lines television frequencies of 45 to 65MHz and had been used by the BBC to monitor their sound transmissions.

Unfortunately, as Les stated, the set, **Fig. 1**, has been 'modified' a little and I emphasise the word 'modified'! Internally, the front-end or tuning section had virtually been removed. On the front panel there should have been a headphone socket – where the left hand gain control now is, an **On/Off** toggle switch just to the right. Below that control, there should have been a test button just to the left of the right hand gain control and a 'magic-eye' – visible through the hole in the dial plate just below the number 55 on the dial. Other than that, the set is complete!

All joking apart though, it's nice to get an example of this little set – regardless of its condition! Indeed, that's the trouble with being a 'collector' like myself – I must collect an example of everything – **regardless**. I shall of course be undertaking some restoration work on the little set, so watch out for future updates, maybe around 2020 or so as I'm so busy!

### The PRC-320

Although I have had an example of the PRC-320 British Clansman military man-pack for several years now, I recently obtained another couple of examples. This seems to be because there's been a release of quite a

number of these lately by the Army stores and they are available at quite reasonable costs.

The PRC-320 (the set itself is actually an RT-320) while the PRC designation refers to the complete station equipment. The literature on the equipment quotes it as a "lightweight h.f./s.s.b. radio station covering 2 to 30MHz, providing 20 to 30W p.e.p. output and operating on modes: J3E upper sideband (u.s.b.), H3E amplitude modulation (a.m.), A1A telegraphy (c.w.) with 100Hz spacing giving some 280,000 apparent channels."

The PRC-320, **Fig. 2**, can be used as either a back-pack, as shown here in the photograph mounted on its lightweight carrying frame. Alternatively, it can be used as a vehicle-mounted radio with a variety of different antennas for different circumstances and needs. It can also be used in a ground station role with the likes of a dipole antenna attached for longer range communication.

The PRC-320 features a built-in antenna tuning unit (a.t.u.) unit, **Fig. 3**. This is used for tuning the radio into either a whip or wire antennas, while a BNC socket on the rear can be used to feed directly to any 50Ω line, such as a dipole antenna.

There are two versions of the set, the more common version, **Fig. 4**, runs u.s.b., a.m. and a wide and narrow c.w. option. However, there's another version – harder to find – that does away with the narrow c.w. position and offers lower sideband (l.s.b.) instead. Obviously, this version is more usable on the 3.5 (80m) 7MHz (40m) Amateur Radio bands.

While it's interesting to play with the PRC-320 type of sets, they do have their drawbacks. For a start, it's equipped with a dial-up frequency selection, and requires six knobs to select the frequency required – great for the spot frequency using military frequencies but hardly useful in tuning around the Amateur bands!

**Fig. 1:** The 'Special' 930 type Eddystone receiver, which was once used by the BBC for monitoring Band I (v.h.f.) 405-line TV sound transmissions.





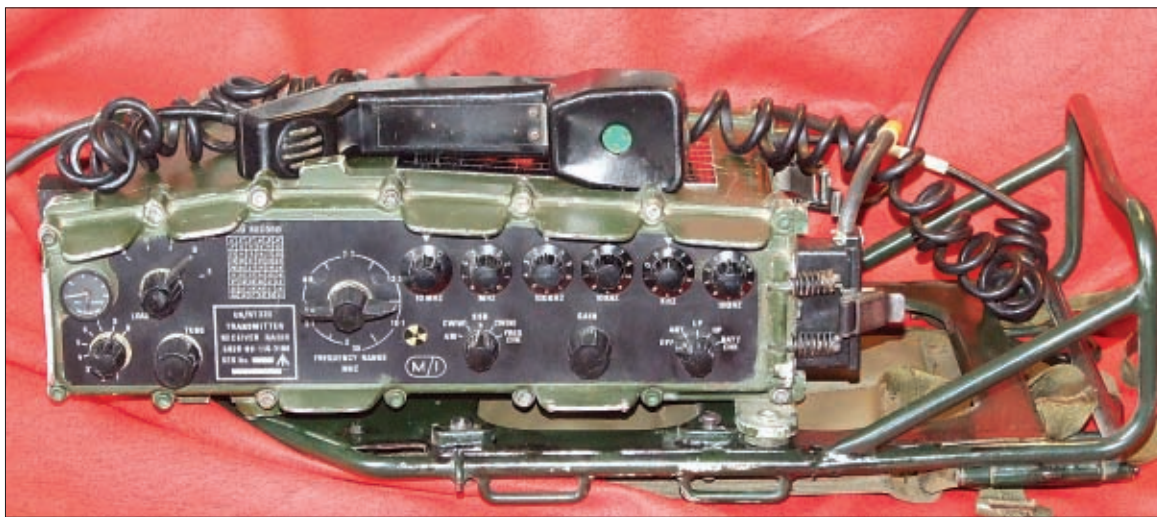


Fig. 2: The PRC320 h.f. military man-pack station.



Fig. 3: The a.t.u. section of the PRC320.



Fig. 4: Showing the mode selections available on the PRC-320.

Weight is another consideration, although called a man-pack the PRC-320 is really heavy, nothing like an FT-817 say. Batteries can also be a problem as most of the batteries are quite old and many are dated from the 1980 era. Replacing the D cells inside them, whilst it's not an impossible task, is indeed quite a hard job and can be quite an expensive one too!

However, there are various ways that a non l.s.b. model can be modified. The crystal sideband filter in the set can be changed, or the local oscillator can be moved to the other side of the existing filter – but this does alter the frequency readout with regard to the knob setting.

The individual owner can simply replace the existing local oscillator or add a second oscillator and switch between them from some point. One modification I have seen used a connection to a pin on the audio plug and a relay inside. Alternatively, it can be done by using the mode switch in either the c.w. narrow position or the calibrate position, again with a relay inside. Note: Both these methods can be found detailed on the web.

With the built-in a.t.u. the PRC-320 is very versatile for both portable or home use. Portable operations can use a whip or end fed wire and to help with antenna

lengths, there's a plate attached to the top of the set that provides wire lengths and tuning settings for various frequencies. When being used at home the rear socket can be used to feed to the main station antenna directly, or through a tuner via a coaxial cable. Using this method the other morning recently, I worked a W4 station on 14MHz and sat listening to a ZL station!

### The Clansman PRC-349

Another set that has been sitting on the shelf here for some time is the Clansman PRC-349 small lightweight man-pack transceiver, which was used for close-quarter communications down to platoon level. The Clansman PRC-349, Fig. 5, is a relatively modern synthesised very high frequency (v.h.f.) frequency modulated (f.m.) transceiver with a frequency coverage of the 10MHz segment between 37 to 47MHz in 25kHz spaced channels, with a maximum output power of around 250mW.

The operating frequency is selected by three small thumb wheel knobs on the side of the radio. These were designed so that they can be operated even while the operator was wearing gloves, as in cold conditions, or in the dark by simply counting the knob turning clicks from the end-stops.

The little transceiver even has a squelch function and a 'whisper mode' – this is where the microphone gain is increased so the operator can talk quietly if they're near an enemy. Complete with a battery saving function, the set operates from 12 to 15 volts using re-chargeable type batteries, or 10 type AA batteries in a case mounted on the bottom of the set.

There seems to quite a few of the PRC-349 sets being offered for sale on the web these days – but condition and functionality can be a problem. You should clearly check before buying regarding the working condition or otherwise of such sets as they are very difficult to work on. Also the headsets are of a moulded type and quite difficult to repair if a headphone or microphone insert is faulty.

The transceiver was intended for personal communication in combat conditions and can be mounted on the shoulder, chest or back of the soldier with adjustable quick release holster or carried inside a back pack or pocket of a combat jacket. Using a fixed 500mm whip or a 4 section 1m whip antenna, a range of 2 to 3km could be expected from set to set. The problem now is to find the relevant circuit details and see if the frequency coverage can be shifted

slightly into the 50 to 52 MHz (6m), so that the sets are actually usable in the Amateur band.

### Places Of Interest

I would like to thank **Tony Smith G4FAI**, **Bob Finch G0HYZ** and the other members at the **North Norfolk Amateur Radio Group (NNARG)**, located in the "Radio Hut" at the Muckleburgh Collection, a privately owned military museum at Weybourne near Sheringham a for a very warm welcome to myself and **Gloria** when we visited their boot sale in September.

The NNARG have a very nice collection, which is open to the public of vintage radios and other communications equipment dating back to before the Second World War. The Group has the call signs **GB2MC** and **G6HL**, and their website is at: [www.gb2mc.co.uk](http://www.gb2mc.co.uk)

I would also like to thank **Keith Matthew G0WYS**, **Dave Wall 2E0GSD/M3CLQ** and other members of the **Poldhu Amateur Radio Club (PARC)** in Cornwall for an equally warm welcome to us when Gloria and I called into the Marconi Centre in October. The club is located on the spot where Marconi had his transatlantic station set up for the first radio contact across the Atlantic back in 1901.



Fig. 5: The PRC-349 with headset and throat microphone, carry-case and whip antenna.

It was a funny feeling standing on that very historic spot I can tell you! The club has the **GB2GM** call sign and can be found at: [www.gb2gm.org](http://www.gb2gm.org) Both locations are well worth a visit should you find yourself in those parts of the country. Thank you guys.

### And Finally

Once again, a very happy New Year to you all. For more pictures visit my website at [www.qsl.net/g4bxd](http://www.qsl.net/g4bxd) and as always I can be contacted via E-mail at [military1944@aol.com](mailto:military1944@aol.com) Cheerio for now!

PW

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A Judicial Review would likely cost in the region of £75,000 but could be a lot more as we'd be taking on organisation with almost unlimited funds to defend their corner who could, if they so desired, play a very long game that in turn we'd have to match. If every amateur in the UK pledged £10 to the Spectrum Defence Fund we'd probably have enough to fight the case and so we need your donations (no matter how small) to help us meet the threat.

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**X-tals** 100kHz-250MHz. Std 10.106, 10.245, 10.7, 11.155MHz @ £1.50. Callg 3.56, 7.030, 14.060, 28.060MHz @ £1.50. 1.7468MHz X-tal Clansman 321 ex-stock p.o.a. 10.7MHz 10kHz filter @ £5.75, 1.4MHz SSB filter p.o.a. P&P £1.50 + VAT. IQ Electro  
Tel: 0208 391 0545.  
E-mail: vincentvoy@hotmail.co.uk

**ANTENNA ANALYZER WE-030A**  
0.3-30MHz, graphical, fast, small and hand-held. £195.  
www.rfequipment.co.uk

## Aerials

**GAREX ELECTRONICS** VHF/UHF accessories and aerials, TVI Filters, 4m & 6m Transceivers.  
Tel: 07714 198374  
www.garex.co.uk  
PO Box 52, Exeter EX4 8WX

To advertise on this page see the booking form below.

## QSL cards

**FULL COLOUR QSL CARDS** for all your QSL needs. Shirts and caps with call signs and also ham cartoons by GW3COI. For free samples contact Chris M0DOL.  
E-mail: qslers@aol.com  
P.O. Box 184 Northampton NN3 9JH.

## Courses

**TRANSMITTING LICENCE - £25!**  
The Verulam Amateur Radio Club (St Albans) is running Foundation Amateur Radio Foundation training courses for just £25 (incl books and exam fee).  
Call Ralph (G1BSZ) 01923 265572) to book a place.

## Valves

**VALVES AND ALLIED COMPONENTS IN STOCK** Ring for free list. Valves/ books/magazines wanted. Geoff Davies (Radio).  
Tel: 01788 574774.

## TOP PRICES PAID

for all your valves, tubes, semi-conductors and ICs.

## Langrex

Unit 4, Daux Road, Billingshurst,  
W. Sussex RH14 9SJ

TEL: 01403 785600. FAX: 01403 785656.

[www.langrex.co.uk](http://www.langrex.co.uk)

## Repairs

**REPAIRS TO ALL AMATEUR AND VINTAGE Rx/Tx** Cost effective service. Phone or call in for details. Kent Rigs, 52 Salisbury Road, Chatham, Kent ME4 5NN. Tel: 07903 023437.

**RELIABLE REPAIRS** for all amateur and vintage equipment. Professional service, reasonable rates.  
Tel: 01807 580376.  
E-mail: radiorepairs@btconnect.com

Whilst prices of goods shown in advertisements are correct at the time of going to press, readers are advised to check both prices and availability of goods with the advertiser before ordering from non-current issues of the magazine.

Please ensure that and cheques or postal orders are made out to PW Publishing Ltd.

## ORDER FORM FOR CLASSIFIED ADS PLEASE WRITE IN BLOCK CAPITALS

The prepaid rate for classified advertisements is 42 pence per word (minimum 12 words), box number 70p extra. Semi-display setting £13.90 per single column centimetre (minimum 3cm). Please add 20% VAT to the total. All cheques, postal orders, etc., to be made payable to PW Publishing Ltd. Advertisements, together with remittance, should be sent to the Classified Advertisement Dept., Practical Wireless, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: 0845 803 1979, Fax: 01202 659950.

Please insert this advertisement in the ..... issue of *Practical Wireless* (if you do not specify an issue we will insert it in the next available issue of *PW*) for ..... insertion/s. I enclose Cheque/P.O. for £..... (42p per word, 12 minimum, please add 20% VAT to total).

Name: .....

Address:.....

.....

.....

.....

Telephone No:.....

**Box Number @ 70p: Tick if appropriate**

**Category heading:**.....

Please photocopy this form or write on a separate sheet if you prefer


# BARGAIN BASEMENT

## BARGAIN BASEMENT RULES

Only £5 per advert. Subscribers FREE!

Please write your advert clearly in BLOCK CAPITALS up to a maximum of 30 words, plus 12 words for your contact details on the form provided and send - it together with the dated corner flash and your payment of £5 (subscribers can place their advert free of charge as long as they provide their subs number or mailing label and corner flash), cheques should be made payable to PW Publishing Ltd., credit card payments also accepted.

Send your advert to **Bargain Basement, Practical Wireless, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW** or E-mail your advert

to [peter@pwpublishing.ltd.uk](mailto:peter@pwpublishing.ltd.uk) (If you don't want to include your credit card details on your E-mail, just phone us on 0845 803 1979).

Please help us to help you by preparing your advert carefully. Any advert which contains ?? marks indicates that the advertising dept. could not read/interpret the wording.

**Please avoid FAXing your advert - it could delay publication.**

Advertisements from traders or for equipment that it is illegal to possess, use or which cannot be licensed in the UK, will not be accepted.

No responsibility will be taken for errors and no correspondence will be entered into on any decision taken

by the Editor on any of these conditions.

You should state clearly in your advert whether equipment is professionally built, home-brewed or modified.

The Publishers of *Practical Wireless* also wish to point out that it is the responsibility of the buyer to ascertain the suitability of goods offered for purchase.

As of the February issue of *Practical Wireless*, Bargain Basement adverts will cost £5 per advert (subscribers still free) and will also be published in *RadioUser*, our sister magazine, unless requested otherwise.

## FOR SALE

**CLASSIC EDDYSTONE RX 730/IA** serial No. BH0181 with manual and round Eddystone speaker, £140. Also, several high resistance headphones 2000Ω Marconi SG Brown types. Buyer collects.  
Tel: Nigel 01844 353823 (Oxon).

**ICOM IC-7000** HF, VHF, UHF transceiver, in original box with manuals, mic, remote kit and LDG AT7000 automatic ATU all in mint condition. LDG is not in original box. £780 plus P&P. Tel: Colyn 0762 4413036.

**KENWOOD TS-570DGE** boxed, mint, £450. Yaesu FT-817ND, 6 months old, boxed, £320. Icom IC-R100 receiver, boxed, £100. Mydel MP-250 PSU, £45. MFJ-1040C pre-selector, 1.8-54MHz, boxed, £60.  
Tel: John G4XYY  
01937 844197 (West Yorks).

**ROTATOR** advertised by main dealers as AR-300XL or AR788 for VHF/UHF and small HF beams. Bought new July. Used only three weeks. Cost £80, sell £60 including P&P. Tel: John G3EGC 01204 301502 (Bolton).  
E-mail: [jvhoban@02.co.uk](mailto:jvhoban@02.co.uk)

**YAESU FT-950** £1000. Nissie 30A PSU, £100. Both items new, boxed and unused. MFJ-949E deluxe PSU, £100. New condition, boxed morse key, £25. Data interface, as new, £45. All plus carriage.  
Tel: Ian 01745 570538 (North Wales).

## WANTED

**DRAKE MN-4, MS-4** KW-77 circuit + handbook. Original or good copy. Drake R-4C, T-4XC, spares, AM filter.  
Tel: Tibbert 01248 722041 after 6:00pm (Anglesey).

**KENWOOD TS-850** preferably one owner from new. Tel: Ian 01745 570538 (North Wales).

**OLD HALF INCH FERRITE RODS** must be half inch, 12.7mm, in diameter and be six inches long or more. Will pay very good money for the rods. Tel: Peter Tankard 0114 2316321 between 9am and 9pm (Sheffield).

**RECEIVER TYPE R-1155** preferably suffix N or L. Also, J type aerial switch. Write to Mr F W Hall, 38 Elmbank Way, Hanwell, London W7 3DG.

**VIBROPLEX** single lever paddle. Tel: G3MCK QTHR 01572 756444 before 10:00pm (Oakham).

**YAESU ROTATOR G-250** in good working order, complete with control box. Tel: 07595 332101 (Kent). E-mail: [lawrence007@ntlworld.com](mailto:lawrence007@ntlworld.com)



## Bargain Basement order form

Please make any cheques or Postal Orders for advertisements payable to PW Publishing Ltd.

Please insert this advertisement in the next available issue of Practical Wireless.

For Sale       Wanted       Exchange

**PLEASE NOTE:** as a security measure, you must include your house number and postcode.

Name ..... PW & RU

PW & RU

Address .....

PW ONLY

..... Post code .....

Telephone Number .....

CARD NUMBER

.....

Signature..... Security number     

LAST THREE DIGITS ON THE BACK OF THE CARD

Switch issue number (if on card) .....

Start date of card..... Expiry date of card.....

My Subs Number is..... (or send mailer label)



			(30)

**CONTACT DETAILS FOR ADVERT.** Please only write in the contact details you wish to be published with your advert, ie. do you want your name & address, or just your telephone number? Your advert, you decide! **PLEASE - No FAXed Ads!** (12)


B.B. Feb '11

# TRADERS TABLE

The equipment for sale on this page is secondhand or ex-demonstration

## Disclaimer

Advertisements from traders for equipment that is illegal to possess, use or which cannot be licensed in the U.K, will not be accepted. While the publishers will give whatever assistance they can to readers or buyers having complaints, under no circumstance will the magazine accept liability for non-receipt of goods ordered, late delivery or faults in manufacture.

## NEVADA

023-9231 3090

### TRANSCIVERS

ALINCO DJ596 D/BAND H/HELD.....	£89
ALINCO DJC7 HANDHELD TX .....	£99
ALINCO DJV17 VHF/FM H/HELD .....	£99
ICOM E91 DUALBAND HANDHELD.....	£169
YAESU VX3E DUALBAND HANDHELD.....	£110

### HAND-HELD SCANNERS

ALINCO DJX2 AM/FM/WFM RADIO .....	£79
ALINCO DJX30 SCANNER .....	£119
BEARCAT 72XLT H/HELD.....	£80
BEARCAT 3500XLT SCANNER .....	£169
GRE PSR200 HANDHELD SCANNER .....	£59
ICOM R5 HANDHELD SCANNER .....	£145

### RECEIVERS

ETON MINI 300 PORTABLE .....	£13
YAESU VR5000 WITH DSP.....	£435

### CB RADIO

KERNOW BETA 5100 CB RADIO .....	£39
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### ACCESSORIES

ALINCO EJ47U DIGITAL BOARD.....	£46
AOR VI8200 VOICE INVERTER.....	£40
DAIWA CN101L .....	£59
GLOBAL AT2000 .....	£59
JIM M75 SCANNER PREAMPLIFIER.....	£54
KENWOOD AT230 ATU.....	£99
KENWOOD MC85 MICROPHONE.....	£79
PALSTAR AA30 .....	£69
TOYO SA450 ANTENNA SWITCH.....	£17
UNIROSS CHARGER & BATTERIES.....	£12
YAESU FC30 ATU .....	£165
YAESU MH35A2B SPEAKER MIC .....	£19
INTELLIGENT DIGITAL MULTIMETER.....	£25
CLAMP ON DIGITAL MULTIMETER.....	£10

### B-GRADE ITEMS

ALINCO DJV17 H/HELD TRANSCIVER.....	£99
BEARCAT UBC800XLT SCANNER .....	£259
BEARCAT UBC92XLT H/HELD SCANNER .....	£90
ICOM R5 HANDHELD SCANNER .....	£179
MAGICBOX KITCHEN DAB .....	£39
MAGICBOX H/HELD DAB .....	£39
ETON E5 PORTABLE SHORTWAVE RADIO .....	£69
ETON G3 PORTABLE SHORTWAVE RADIO.....	£69
ETON S350 RED PORTABLE RADIO .....	£59
ETON G8 PORTABLE SHORTWAVE RADIO.....	£39
ETON E100 PORTABLE SHORTWAVE RADIO .....	£35
MIDLAND 38 MOBILE CB RADIO .....	£49
NEVADA SINFONIE 11 DAB .....	£50
TEAM ROADCOMM MOBILE CB RADIO.....	£89
YAESU VX8 HANDHELD TRIBAND TX.....	£279

## SHORTWAVE SHOP LTD

01202 490099

### TRANSCIVERS

YAESU FT-900 .....	£595
YAESU VX-3E .....	£95
YAESU FT-108M/E.....	£95
ALINCO DJ-V5.....	£200
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
STANDARD HX260E MARINE H/H NEW .....	£99

### RECEIVERS

RCA AR-88 WITH MATCHING SPKR .....	£POA
JRC NRD 345 .....	£395
JRC NRD 525 .....	£725
JRC NRD 535 .....	£795
AOR 8200 MK3 DEMO MODEL .....	£349
YAESU FRG-9600 .....	£225
YUPITERU MVT 7300 .....	£99
UNIDEN UBC-800XLT EX DEMO/SOFTWARE.....	£265
BEARCAT UBC-278 BASE EX DEMO .....	£139
REALISTIC PRO 2005 .....	£80
REALISTIC PRO 50 .....	£25
AMI DIGI SAT RX ASR WS201.....	£129
ALINCO DJX3.....	£70
WORLD RECEIVER WVR2100 .....	£80
GOODMANS GGD200 DAB SPECIAL PRICE .....	£50
BPL WORLD SPACE .....	£25

### ACCESSORIES

HI-MOUND HK-708 STRAIGHT KEY .....	£35
AIR MINISTRY 1940 STRAIGHT KEY .....	£45
MILITARY STRAIGHT KEY CIRCA 1940.....	£35
BHI NEIM 1031 .....	£55
BHI NOISE AWAY ANEM .....	£55
ICOM AH7000 DISCONE .....	£85
CB SIGNAL MASTER LARGE S METER .....	£28
CREATE CLP 5130 LOG PERIODIC NEW .....	£250
ICOM HS-51 SPECIAL BULK PRICE .....	£27
YAESU MD1 B8 DESK MIC.....	£50
YAESU XF-110CN FILTER .....	£55
YAESU XF-110S FILTER .....	£55
YAESU YSK-900 SEPARATION KIT .....	£65
AKD WA3 ABS WAVE METER .....	£25
AEA PK-88 PACKET CONTROLLER.....	£35
WATSON HUNTER FREQ COUNTER .....	£50
CG SB-2000 DATA CONTROLLER .....	£75
DAIWA CN620A 1KW POWER/SWR .....	£65
DAIWA PS-304 30A PSU .....	£65
ZETAGI HP1000 SWR METER .....	£65
MFJ 1278B DATA CONTROLLER .....	£65
WELZ SP-220 SWR/PWR METER .....	£65
PM-2000 2KW PWR METER.....	£70
VARIOUS CB PSU'S FROM.....	£10
LOWE FX-1COMPLETE.....	£75
TRAILER MOUNTED SCAM 40 PUMP UP MAST.....	£750

# WATERS & STANTON

01702 206835

Icom	IC-A3E	Airband H/Held + NAV/COM 50ch Alphanumeric.....	£180
Ameritron	AL-82X	10-160m 1.5kW Linear Valve Amplifier with 2x 3-500 Tubes.....	£1,599
Microset	PT-110	12V Stabilized 10A PSU with Over V / A protection.....	£69
Nevada	PSDL	50ohms Dummy load Dc-3000MHz max 15W.....	£30
Heil	AD-1-Y4	Cable for pro set and yaesu 4 pin round.....	£10
Midland	SWR-25	3.5-150MHz SWR / Power Meter 100W.....	£29
Roberts	R-862	HF/VHF receiver AM/WFM 0.15-0.281 / 0.522-1.62 / 4.6-21.95 / 87.5-108 MHz 3 VDC (2*R6 / AA).....	£49
Alinco	DJ-X3E	100kHz-1300MHz AM, FM, WFM Hand Held Receiver 700Ch + 8.33kHz step.....	£95
Optoelectronics	Model-2810	10Hz-3GHz Frequency Counter.....	£145
Academy	CB-34	3-way SWR Bridge and Field Strength Meter 25W (3.5MHz) 15W (7MHz).....	£15
Microset	PM-110	10Amp 13.5V PSU with inbuilt Speaker and Transceiver Frame.....	£110
Microset	RU-45	70cm 3-15W in,45W out Linear + GaAsFET Preamp 12V.....	£149
Microset	PT-107	12V Stabilized 7A PSU.....	£39
Kenwood	BC-10	Desk Charger for PB-5, 6, 7 & 8 Ni-Cd's with PB-6.....	£29
Roberts	R-861	Portable 150kHz-30MHz SSB, FM stereo RDS.....	£139
Microset	VUR-30	2m & 70cm 1-6W in, 20/30W out Max FM + GaAsFET Pre-amp 12V.....	£179
Moonraker	FA-5000	80ch 4w UK/CEPT CB Mobile Transceiver.....	£49
	Moorse Prac	Home Made Morse practice oscillator.....	£10
Timewave	DSP-59	Multi-mode Audio Noise Filter with Gain Control 12V DC.....	£89
MFJ	MFJ-940A	28-30MHz 10m Mobile ATU + meter 150W.....	£39
AirNav Systems	Radarbox	Real-time Aircraft Virtual Radar using ADS-B + Internet Networking via USB.....	£249
Hi Mound	HK-706	Standard Straight Morse Key + Cover.....	£39
AOR	LA-350	High Performance active loop aerial.....	£99
Win-Radio	WIN-108	108-136MHz Airband Hand Held Receiver 20Ch.....	£79
Yaesu	CD-24	12V DC Charge Adapter for FT-897D Ni-MH.....	£69
Yaesu	PA-26U	AC Adapter for FT-897 CD-24 Charger.....	£39
Win-Radio	WR-G305i	9kHz-1800MHz All Mode PCI Internal Computer Controlled Communications Receiver.....	£399
Midland	Alan-78Plus	Multi 40ch 4w CEPT CB Mobile Transceiver.....	£59
Uniden	UBC-60XLT	66-512MHz (with gaps) FM Hand Held Receiver 80Ch. 4 x AA cells.....	£59
Alinco	DJ-175T	2m FM H/Held Transceiver + DTMF keypad & CTCSS.....	£55
MFJ	MFJ-784B	Tunable DSP Audio Filter with Noise Reduction 12V.....	£189
Yaesu	FT-60E	2m/70cm FM Mil. Spec. 5W Hand Held Transceiver + Full CTCSS & DTMF keypad.....	£119
Shure	526T	Dynamic Desk Microphone + Mic-lock VOX & Amplifier 1x PP3.....	£59
LDG	AT-1000	1.8-54MHz Automatic ATU 6-800 ohm 1000W max (100W 6m) + X-Needle Meter 12V at 1A.....	£279
Icom	IC-7800	HF+ 6m All Mode Deluxe Base Transceiver + Dual RX's, RTTY/PSK31, ATU & Gen. Cov. RX mains.....	£5,499
MFJ	MFJ-933	5.3-30MHz 150W Compact Loop Antenna Tuner.....	£129
Adonis	AM-708E	Base Microphone + Amp, Compressor & 2 inputs.....	£99
Alinco	DJ-V17E	2m FM Palm Transceiver 5W, DTMF keypad & CTCSS.....	£99
Realistic	PRO-2004	25-520,760-1300MHz AM, FM, WFM Base Scanner 300Ch.....	£79
Uniden	UBC-800XLT	25-1300MHz (+gaps) AM,FM,WFM Mobile Scanner,6000ch,"close call)Gps Input, Pc Control 12v+psu.....	£179
Watson	WM-2000	Desk mic + Amp, Compressor & Graphic Equalizer.....	£79
Yaesu	VX-2E	2m/70cm FM Ultra Compact Hand Held Transceiver + Full CTCSS & Wide RX.....	£79
Icom	PS-55	12V 20A Matching PSU.....	£99
Alinco	DJ-V17E	2m FM Palm Transceiver 5W, DTMF keypad & CTCSS.....	£99
Yaesu	FT-1802E	2m FM Mil. Spec. Mobile Transceiver + CTCSS & DTMF mic 50W.....	£75
Kenwood	SP-430	Matching Extension Speaker 1W 8ohm 300Hz-5kHz.....	£49
Yaesu	FC-20	1.8-30,50-54MHz Auto ATU 100W 50ohm.....	£129
Alinco	DR-M06SX	6m FM Mobile Transceiver 10W.....	£69
Yaesu	FT-90R	2m,70cm FM Mobile Transceiver 50W,35W (Remote Head).....	£179
Icom	IC-32E	2m/70cm FM Hand Held Transceiver Full Duplex keypad + CM-35 Desk Charger & Headset.....	£69
Icom	IC-E90	6m,2m,70cm FM Hand Held Transceiver + DTMF keypad CTCSS & wide RX.....	£159
Kenwood	TS-711E	2m All Mode Base Transceiver 25W mains.....	£249
SEM	Tranzmatch	160, 80, 40, 20 & 10m Antenna Tuning Unit.....	£89
Diamond	SX-200	1.8-200MHz SWR,PWR meter 200W.....	£59
Microset	SR-100	2m 4-25W in,100W out all mode + GaAsFET Pre-amp.....	£169
SW	7-11	10W Mobile Speaker 8ohm.....	£19
Watson	DPS-2012	12V Variable 25A (max) PSU + Meters.....	£59
AOR	AR-2002	25-550,800-1300MHz AM,FM,WFM Receiver 20Ch. 12V.....	£149


# RADIOWORLD

01922 414796

IC-756PRO-MKIII Icom HF + 6m Trx.....	£1,699.00
AR-5000A AOR Wide band all mode Receiver.....	£1,199.00
Icom IC-R8500 Receiver.....	£1,099.00
Icom IC-2KL All-mode HF linear amplifier.....	£999
IC-7400 HF, 6m & 2m transceiver.....	£999
Kenwood TS-2000 All Mode Multiband Transceiver.....	£999
SG-500 SGC SmartPower Cube.....	£899
Icom IC-7400.....	£899
Icom IC-756Pro HF / 6m Transceiver.....	£899
IC-7400 HF, 6m & 2m transceiver.....	£899
Yaesu FT-736R 6m, 2m & 70cm Base.....	£799
Kenwood TS-790E 2/70 Base.....	£750
TS-480S / AT.....	£599
Icom IC-706MKIIG with DSP.....	£599
Yaesu FT-450AT.....	£575
Yaesu FT-897D Multiband Portable Transceiver.....	£559
Kenwood TS-570DG/E.....	£549
Kenwood R-5000 Communications Receiver HF.....	£549
Icom IC-821H Dual Band transceiver.....	£549
AOR AR8600MkII.....	£499
R-30CC HF PALSTAR HF Rx.....	£499
Icom IC-718 HF All Band Transceiver.....	£459
AOR AR-3000A Wideband Receiver.....	£450
Icom IC-R75.....	£449
Alinco DX-70TH HF & 6m transceiver.....	£399
Icom IC-R72 Receiver.....	£399
ICOM IC-E2820 dual-band mobile transceiver.....	£369
AOR AR-3000 Wide Band Receiver.....	£350
AOR AR-8200Mk3 Scanner.....	£349
Kenwood TM-255E 2m Mobile.....	£349
MTU-30/20 RF u-tuning Unit C.....	£300
MTU-80/40 RF u-tuning Unit B.....	£300
Kenwood AT-300 Automatic ATU.....	£299
Sidekick-black Compact Motorised Mobile HF Antenna.....	£299
Kenwood R-2000 Receiver Inc Converter.....	£299
Yaesu FRG-8800.....	£299
Yaesu FRG-100 HF Receiver.....	£299
Icom IC-271E 2m multi mode.....	£299
Kenwood TM-D700E Dual Band Mobile.....	£299
AirNav Radarbox 2009 version.....	£299
MFJ-994B 600 Watt IntelliTuner Automatic Antenna Tuner.....	£275
Yaesu FT-690R II.....	£275
Ten tec RX-320 PC COMMUNICATIONS RECEIVER.....	£275
Kenwood TR-751E 2m Multi-mode transceiver.....	£275
Yaesu FT-690R II 6m transceiver.....	£275
Yaesu FTV-901R 2m / 70cm Transverter.....	£275
Icom IC-R3 Hand held Scanner.....	£250
Icom IC-490E 70cms Mobile.....	£250
Kenwood TM-V7E 2m/70cm FM Mobile Transceiver.....	£249.95
MFJ-1278b DSP Multimode Data Controller.....	£249
Kenwood TH-D7E Dual Band Handheld.....	£240
Yupiteru MVT-9000 MK2 Scanner.....	£240
DR-635E Alinco 2m/70cm FM Dual Band Mobile T.....	£230
Kenwood TM-741E - VHF/UHF transceiver 144-146 / 430.....	£229
Icom AT-180 AUTO ATU.....	£225
SGC MAC-200 Antenna Controller Auto-Tuner.....	£220
Yaesu FT-8100R 2m / 70cms Mobile Transceiver.....	£220
Yaesu FT-480R 2m Transceiver.....	£220
MFJ-784B DSP Filter.....	£219
UBC-785XLT Uniden-Bearcat Base Scanner 25-1300MHz.....	£209
Vectronics VC-300D Tuner with LED PEP Meter.....	£199
NATO Morse Key.....	£199
AOR AR-2002 Receiver.....	£199
Yupiteru MVT-9000 Scanner.....	£199
MFJ-993 Automatic ATU 1.8-30MHz 300W SSB, 150W CW.....	£189
Yaesu VR-500 Receiver.....	£189
ICOM IC-2200H 144?146.....	£189
Bearcat UBC-9000 Scanner.....	£179
IC-RX7 - Wideband Handheld Receiver.....	£179
Yaesu FV-901DM VFO.....	£175
Yaesu FC-30 Antenna Tuner Unit.....	£169
Kenwood TS-271E.....	£165
Icom PS-85 Icom 20A 13.8V Switch Mode.....	£159
Kenwood PS-52 DC Power Supply.....	£159
BNOS LPM432-10-50 70cm 50W linear amp.....	£149

# THE PW PUBLISHING RADIO BOOKSTORE


## New 2011 titles now in stock!



**NEW IN STOCK NOW**

**NEW KLINGENFUSS GUIDE TO UTILITY STATIONS 26th**..... £43.00  
**NEW KLINGENFUSS SHORTWAVE FREQUENCY GUIDE 2011**....£35.00  
**NEW KLINGENFUSS SHORTWAVE FREQUENCIES CD 2011**..£26.00


**RADIO LISTENER'S GUIDE 2011 EDITION**  
**Frequencies and transmitter information for all BBC and commercial radio stations, plus DAB digital transmitter details.**  
 Radio Reviews - Independent reviews of analogue and DAB digital radios.  
 News from BBC and commercial radio stations.  
 Analogue Radio switch-off - The latest information about plans for FM and medium wave switch-off.  
 Digital Radio (DAB) - The latest news and information.  
 Sky, Freeview and Freesat radio information and channel lists.  
 Advice shows you how to get the best from your radio.



**ONLY £5.95**

**NEW IN STOCK NOW**

**WORLD RADIO TV HANDBOOK 2011 EDITION**  
**The best selling directory of global broadcasting on LW, MW, SW and FM.**  
 The Features section has an account of the history of Radio St. Helena, reviews of the latest equipment, an intriguing look back at some classic 80s and 90s receivers, a visit to AFN in Florida and much more, including the regular *Digital Update*.




**ONLY £23.00**

The remaining pages are, as usual, full of information on:

- National and International broadcasts and broadcasters
- Clandestine and other target broadcasters
- MW and SW and DRM frequency listings
- Equipment reviews and articles
- Terrestrial TV by country
- Extensive Reference section and much more!

**NEW IN STOCK NOW**

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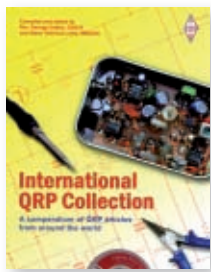
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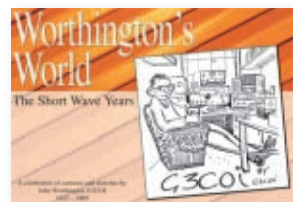
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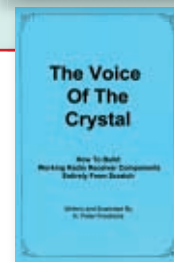
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Rob Mannion G3XFD/EI5IW's

# Topical Talk

The Editor reflects on comments aired in this month's letters pages and mentions problems caused by illegal broadcasters on Band II.

It has been some time since I last heard from **Jonathan Kempster M5AEO**. We just missed each other during the *PW* 144MHz QRP Contest in 2009. Let's hope for better conditions next time! However, back to the present because – in *Letters* this month – Jonathan raises an aspect of Band II f.m. radio reception – interference from illegal broadcasters (IBs) in our large cities.

In fact, IBs were also a real nuisance during my time in broadcasting (30 years ago!). Then, as now, they made a mockery of the carefully planned and allocated frequencies that each broadcaster is assigned for reliable reception.

Ofcom (the UK's regulator) is quick to point out in press releases that illegal transmitters can cause interference to 'essential services' – including ambulance, fire service and air radio communications, as justification for their closure. However, I think the loss of reception for the 'silent majority', the general public, is justification enough for such actions – official broadcast radio is that important in my option!

Incidentally, I'm hesitating to use the popular term 'Pirate' that's often used whenever the criminals operating the transmitters are highlighted in the media. I think the term is totally inappropriate because it's claimed that many of the modern IBs found in the UK's larger cities are operated by professional criminals. Additionally, because the non-informed media often consider what they call 'Radio Hams' as amateur

broadcasters (they don't understand the difference between communicating and broadcasting) – legal Amateur Radio is sometimes associated with illegal broadcasting when small scale 'back bedroom' transmitters are closed down

It's claimed that many organisations behind the unwanted Band II transmitters are drug-related. In fact, it's often alleged by officials that have the (extremely difficult) job of tracking them down that the transmitters are often set-up to maintain the supply the sale of narcotics via advertised 'pay as you go' unregistered mobile 'phone numbers.

I really sympathise with Jonathan M5AEO and anyone who lives in one of our larger cities who have their broadcast reception spoiled by the continual (I think the politically correct term is 'Ethnic music') 'thump, thump, thump' of 'Reggae' and similar music originating from the Caribbean over the top of BBC Radio 3 or 4. Incidentally, the Radio 3 service is often chosen because there are many quiet passages in classical music.

In the past, one of the favourite places for the siting of illicit transmitters used to be on the tops of blocks of flats. Nowadays though, the operators often have access to a great deal of money and can afford some cleverly designed equipment. Gone are the (often home made) 10W f.m. transmitters. Instead, well-made and powerful transmitters (I've seen photos of some originating from Italy) provide reliable service and some innovative designs can even

climb ready-made 'masts'! These 'clamp on' transmitter units can be attached to the slim and tapering 'hi-mast' (up to 30m or 100ft high) lighting systems we see at road junctions, roundabouts and shopping centres, etc.

The self-contained and crawler wheel equipped transmitter then climbs its way to a position clear of the lights. It can then operate for perhaps as long as a week or two and is then discarded by the user as in effect it's 'clamped' in position. A microwave link can provide the programme feed and remote control. Yes, they can be that sophisticated!

Inform Ofcom if you spot what appears to be an IB set-up. We can help reduce the nuisance by keeping the IBs off the air – and help listeners such as Jonathan M5AEO.

## Weather Problems For Subscribers

Unfortunately, it seems that the recent extremely cold weather has disrupted the already fragile Royal Mail postal service in the UK. **Only readers who receive *PW* through the post** have seemingly been affected and I'm afraid that it has been completely out of our control.

My apologies go to significant number of readers who have been annoyed by the non-arrival of *PW* and who have seen the magazine for sale in local newsagents! The ludicrous situation has even led to postal subscriber readers in Australia and New Zealand getting their copies before UK readers! Hopefully, the Royal Mail 'service' will sort itself out very soon.

**Rob Mannion G3XFD/EI5IW**

# coming next month

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### Review – The Kenwood TS-590

Our keen c.w., RTTY and DX chaser and highly experienced author **Roger Cooke G3LDI** presents his evaluation of Kenwood's latest rig. And you can be sure – that amongst the technicalities you'll certainly be in no doubt of Roger's opinion of this transceiver!

### Getting the most out of your Kenwood TH-D72 transceiver

Following the review in the February *PW*, our 'hand-held transceiver specialist' **Richard Newton G0RSN** was so impressed by the many truly remarkable features of Kenwood's latest hand-held – he's found time to further explore its comprehensive abilities. So, if you've purchased a TH-D72 yourself, or are considering investing in your own rig – don't miss this essential article!

### Doing it By Design

**Tony Nailor G4CFY** describes further developments on the *DiBD* 5W power amplifier design and then discusses the design process required that leads on to the next stage to produce a practical and robust amplifier proving 30 to 50W output.

### In Focus

#### The Weston-Super-Mare Radio Society

It's the turn of the Somerset seaside-based **Weston-Super-Mare Amateur Radio Society** to step into the spotlight this month. This busy and friendly club – in the same way as their famous re-built seaside pier – is building on enthusiasm and membership is growing month-by-month.

Plus the *World of VHF*, *Carrying on the Practical Way*, *In The Shop*, *HF Highlights* and much, much more in the UK's favourite and friendly Amateur Radio hobby magazine!

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