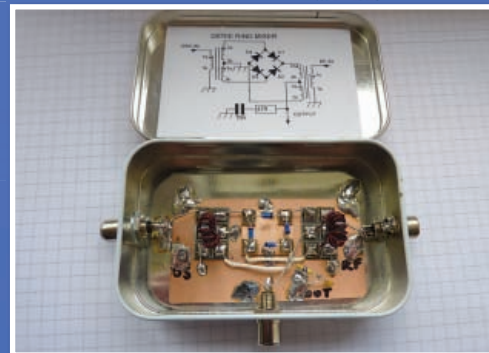


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Practical Wireless
144MHz contest?



Practical Way

More weekend projects

In the Shop

Don't lose your switch
connection drawings!

What Next?

Getting started on 3.4GHz



Easy SDR

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

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The IC-7600 HF/50MHz transceiver is enhanced with some of the main features tried tested on the flagship IC-7700/7800 models. It is highly regarded by Amateur operators world-wide. Features inc a double conversion superheterodyne system, dual DSP units & 3kHz IF (roofing) filter. **IN STOCK £3519.95 D**

IC-7700 HF Transceiver



The IC-7700 HF/50MHz 200W transceiver shares many features with its "big brother", the world famous IC-7800. With two independent DSP units, a +40dBm 3rd order intercept point and ultra wide dynamic range to name but a few of the features. **IN STOCK £6364.95 D**

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buttons.

IN STOCK £279.95 D including software

New Kenwood TS-990S

The New FlagShip Radio From Kenwood



The new radio from Kenwood covers
160hm to 6m and has an output of 5-200W.
The AC supply is included and the rig even
features PSK-31. It's a big desktop design
and the US\$ price is expected to be \$5K
- \$8K. So it is at the top end of the price
range. There are no firm delivery dates
yet, but it is hoped to have one working at
Newark in October. PX welcome!

VHF UHF Mobiles

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TM-281E 2m FM 65/25W Mobile **£169.95 D**

On or off the road, Kenwood's TM-281E is a mobile you can count on.
This MIL-STD compliant transceiver delivers powerful performance,
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KENWOOD

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The most compact, high
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it can handle all your
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FT-450D
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MFJ

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MFJ-969 300W Roller Inductor



160 - 6m, it will match wire, coax or balanced. It reads true PEP (requires 12v DC or internal cell). Filled cross needle meter and, Dummy load, and QRM-Free Pre-Tune. **£219.95 C**

MFJ-941E 300W 1.8-30MHz



Great value, has cross-needle meter, 1000v balun and 8-position selector switch. A great ATU at budget price. **£144.95 C**

MFJ-948 300W Roller Inductor



Very similar to the MFJ-949 above, but without the dummy load. The same 300 Watts and the same great design. This tuner will meet all your needs and your antennas. **£164.95 C**

MFJ-945E 300W 1.8-30MHz



Designed particularly for coax mobile systems. Now you can move around the band so much easily. **£134.95 C**

World's Most Popular AUTO ATUs!

MFJ-993B IntelliTuner Auto ATU 300 Watts 1.8-30MHz



This tuner lets you tune any antenna; long wire, coax cable or balanced feed. You get both analogue cross-needle metering & LCD data display! MFJ's exclusive IntelliTuner Adaptive Search and instant recall algorithm gives you ultra fast tuning with 20,000 memories! Beat that! Select 300 Watts for 6-1600 Ohms matching or 150 Watts for ultra wide 6-3200 Ohms. Versatile antenna selection and pre-used setups are found in milliseconds! This tuner matches virtually anything you throw at it. **£254.95 D**

MFJ-925 Ideal For IC-7000/FT-857D



This compact auto ATU sits nicely under the IC-7000 or FT-857D. It's all you need for a complete automated station that will match any antenna! **£174.95 D**

MFJ-991B 300W Auto ATU



Handles 300W, fitted cross needle meter. Wide range: coax, balanced or wire. 300 Watts level matches 6-1600 Ohms, or 150 Watts with wider range of 6 - 3200 Ohms. **£214.95 C**

MFJ-928 Econo 300W Auto ATU



Here's a very economical Auto ATU. No metering, but lightning fast tuning with 20,000 memories and wide matching range. Leave it in-line and just forget about it! **£203.95 C**

1.5kW Handling Power! MFJ-998RT 1.5kW Remote Auto ATU



MFJ's 1500 Watt remote automatic antenna tuner is built into a weather-tight ABS plastic cabinet top with a stainless steel bottom. Includes MFJ-4117 Bias Tee Power Injector to send DC/RF down the coaxial line. When you key your transmitter, MFJ's InstantRecall checks to see if that frequency has been used before. If so, tuning is instantaneous. Measures 13 3/4" x 6 3/4" x 17 1/2" inches. It's the true fit and forget Auto ATU for those using linear amplifiers. **£779.95 D**

MFJ-994BRT 600W Remote Auto ATU



As you're ragchewing, contesting or DXing, your MFJ IntelliTuner is learning! to operate in milliseconds! We've made this tuner to suit the UK market, so that those with linear amplifiers can enjoy the benefit of auto ATU. Includes coax DC feed. **£449.95 D**

MFJ-926B 200W Remote Auto ATU



MFJ-926B Automatic Antenna Tuner covers the entire HF band and will match a random wire or coax-fed antenna 1.8-30 MHz at a full 200 Watts SSB/CW. Matches impedances 6-1600 Ohms (SWR up to 32:1). **£299.95 D**

MFJ-655B All in one Transmit Audio Console



It gives you all the capabilities you'll ever need... 8-Band Equalizer - Downward Expansion noise gate - Clean Compressor - Smooth Limiter - Low noise Preamp - Universal Microphone Interfacing - Impedance matching - Level Control & RF/audio isolation. **£223.95 C**

MFJ-1026 Noise and Interference Killer



It's more effective than a noise blanker because interference much stronger than your desired signal can be completely removed without affecting your signal. It works on all modes - SSB, AM, CW, FM, frequencies from CCB to lower VHF. **£204.95 C**

MFJ-267 1.5kW Dummy Load and VSWR Meter



1.5 kW Dry Dummy Load has built-in precision, true peak-reading SWR/Wattmeter switchable to external antenna! Range DC - 60M Hz. **£162.95 C**

MFJ-250X Oil Cooled 2kW Dummy Load



The MFJ-250X VersaLoad KW Wet Dummy Load lets you tune up fast! You can run 1KW CW or 2 KW PEP for 10 minutes. Or run 1/2 KW CW or 1 KW PEP for 20 minutes. Run continuous duty with 200 Watts CW or 400 Watts PEP. Requires transformer oil. **£56.95 C**

ELECRAFT

K3 A Serious Transceiver for 160-6m

The K3 uses in-board SDR Technology



Part Exchange Welcome

K3/100-F 100W Built £1999.95 D

K3/100-K 100W Built £1899.95 D

K3/10-F 10W Built £1599.95 D

K3/10-K 10W Built £1499.95 D

K3 STANDARD FEATURES

- 160-2 meter ham-band coverage (2 m requires the K144XV option) • 100-W or 10-W (upgradeable) models • 32-bit I.F. DSP (dual DSPs with sub receiver installed) • All modes: SSB, CW, AM, FM, Data • Built-in PSK/RTTY decode (and also send by using your CW keyer paddle)

RECEIVER

- Down-conversion architecture • Narrow ham-band filtering • Switching-mode first mixer for superior close-in dynamic range • Switchable preamp and attenuator for extreme conditions • Optional subreceiver with performance identical to main receiver • 1 Hz tuning resolution IF filters to 200 Hz, AF filters to 50 Hz; 8-band RX/TX equalizers • Automatic and manual notch filtering • Adjustable DSP noise reduction • Hardware & DSP noise blankers with individual level controls • Center tuning indicator for CW & data modes

TRANSMITTER

- Adjustable output, 0.1 to 10 W+ or 100 W+ (with KPA3 option) • DSP I.F. speech processor with noise gate for maximum DX punch • Fast, silent, PIN-diode T-R switching - no relays • 8 band Equalizer tailors the radio to your voice and microphone

OTHER FEATURES

- K144XV option adds 144-148 MHz 10W all-mode operation • Internal CW keyer and message recorder channels • One-click firmware upgrades via the web (with free PC software) • Isolated soundcard interface for data modes and remote control • 100 general-purpose VFO memories, plus 4 'quick memories' per band (plus a free memory editor utility for use on your computer) • Spectrum and Waterfall Displays (split or full screen) • Superior Sensitivity for weak signal work • Select and Tap QSY tuning of the K3

KX3 Transceiver 160 - 6m 10W All Modes + PSK31

Tested best receiver front end of any tested ham radio transceiver!

See: www.sherweng.com



Now Available From Stock!

The revolutionary Elecraft KX3 puts the world in the palm of your hand! Despite its small size, it covers all amateur bands from 160-6 meters, operates in all modes, and has DSP-based features usually found only on larger radios. The KX3's unique form-factor allows you to operate from anywhere. Fold out the rear tilt-feet for use on a desktop or picnic table, or add our rugged mobile mount bracket for vehicle use. For extreme portability, you can add the internal wide-range ATU, 8-AA cell battery pack with NiMH charger, and adjustable KXPD3 keyer paddle. With a whip antenna, you can even operate hand-held. In receive mode, current drain can be as low as 150 mA - about one-half to one-third that of competing all-band portables. Transmit efficiency is also excellent, further improving battery life. This item is currently subject to a back order list and customer should check estimated delivery when ordering.

Built £959 D Kit £899 D

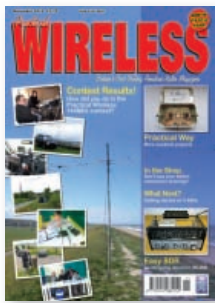
KPA-500 Linear 500W 160-6m - 4 inches high



A 500-watt solid-state amp that's so well integrated, you'll think it's reading your mind. The KPA-500 features 160-6m coverage, instant RF based band switching with any radio, alphanumeric status display, bright LED bar graphs, and a rugged, built-in linear supply. The amp's manual band switches can also be used to change bands on the K3. Also the K3 can even select per-band amplifier drive levels automatically when the amp is placed into operate mode, so you'll rarely need to adjust power output. But the KPA-500 is not just limited to use with the K3 - It is fully compatible with most radios. The KPA comes with a 230V AC built-in PSU. Time for a change!

Built £2199 D Kit £1999 D

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



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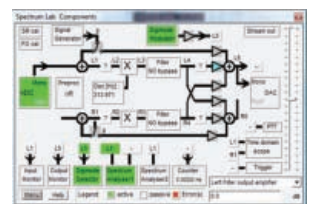
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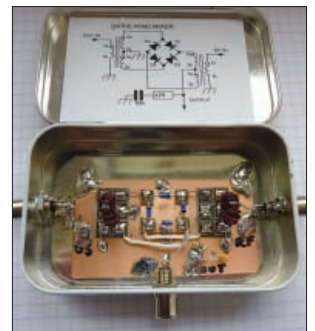
Front cover design by **Steve Hunt**.



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Please note: Due to circumstances beyond our control the review of the Wouxun KG-UV920R has been held over until December. My apologies.
Editor.



Rob Mannion G3XFD/EI5IW's

Keylines

The Editor discusses his new antenna system and the advantages of the ability of switching between antennas. He's also enjoying the improving conditions on 21MHz!

I recently mentioned in *Keylines* that I was looking forward to having an antenna diversity switching system at G3XFD. I'm pleased to say that my new **Tennamast 9.2m Lightweight** mast (with the tilt-over option fitted) was installed in August with the willing help of **Phil Ciotti G3XBZ** and **Tex Swann G1TEX**.

The new mast is a delight to use and I can now lower the telescoping section by myself and then tilt the lowered telescoped system to a convenient height for me to work on – so that I can then sit on a high stool. This is much safer because I then don't have to concentrate on keeping upright on the grassy ground surrounding my shack!

The new mast is approximately the same height of my original two-section, guyed alloy scaffold pole system. I transferred the cantilevered 'cross tree' that carried my 70MHz vertical and the combined 50/144MHz vertical antennas to the new mast. A pulley and cord system mounted at the top of the new mast enables me to pull my main 3.5 to 28MHz dipole up to the top and I can very quickly lower the inverted V dipole for maintenance, etc.

Vertical Antenna

Installing a vertical wire antenna to provide the diversity system was a priority – but I needed the assistance of my two grandsons **Freddie** (13) and **Louis-Paul** (9) to install the ground-plane type radials behind our driveway, along our driveway wooden panel fence and through dense

bushes around the perimeter of our garden. It was an ideal job for the two very agile youngsters who quickly ran the necessary wires out for me!

The total length of the single wire vertical – including the lead into the shack – is approximately 12m (39 ft) and it's tuned by my MFJ roller coaster antenna tuning unit. The system loads up extremely well on all bands from 7 to 29MHz. However, I didn't expect it to work so effectively on 40m but it did – a real bonus!

The necessary switching between the two antennas and their respective a.t.u.s (I use an MFJ-947 balanced antenna tuner for my balanced feeder fed main dipole) is achieved by using a two-way Comet coaxial cable switch. After I've tuned up both antennas to the same working frequency, I can then switch between the vertical and the dipole very quickly.

On The Air

Fortunately, the improving propagation conditions on the higher h.f. bands – particularly 18 and 21MHz – have assisted my on the air tests. As I have mentioned before in *Keylines*, I have noted that a large majority of European Amateurs using PSK31 on the h.f. bands use vertical antennas and they always seemed (to me anyway!) to be working DX I couldn't detect on my computer screen.

Although 18MHz (17m) has been 'open' a great deal in late August and early September, 21MHz (15m) has been far busier – but

it's only on rare occasions that I've found that my vertical has provided a better report from the DX station being worked when I have switched between antennas. But the evaluation continues and I'm already seeing some interesting results over non-DX QSOs!

Running approximately 30W and using PSK31 on 21MHz I've recently worked PY (Brazil), mid western USA and into British Columbia (Canada) with the dipole providing the best results. And although I didn't work them (I was 'trampled on' by many other Amateurs who were also calling!) I've received Indonesian stations for the first time – and an Amateur working from an Island in Thailand.

Now that I'm Editing *PW* from home I can get more 'shack time' and I'm enjoying my afternoon breaks listening for the DX. It's difficult to explain the thrill I experience when I can hear another Amateur who is more than half a world away – received using a simple antenna system. It's even more exciting when I achieve a contact using low power and after 50 years plus in the hobby – I'm finding it increasingly enjoyable!

Obviously, my vertical-versus-dipole comparison evaluations must be carried out over a much longer period of time to provide a sensible opinion. But in the meantime – if you have the space for a dipole and a vertical – you can perhaps try a diversity antenna system yourself.

Rob Mannion G3XFD/EI5IW

Practical Wireless

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

Directors: Stephen Hunt & Roger Hall

Tel: 0845 803 1979
Fax: 01202 659950

Editor (c/o PW Publishing Ltd.)
Rob Mannion G3XFD/EI5IW
rob@pwpublishing.ltd.uk

Technical Editor (c/o PW Publishing Ltd.)
NG (Tex) Swann G1TEX/M3NGS
tex@pwpublishing.ltd.uk

Art Editor
Stephen Hunt
steve@pwpublishing.ltd.uk

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

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

Finance Manager
Alan Burgess
alan@pwpublishing.ltd.uk

Book Orders
bookstore@pwpublishing.ltd.uk

PW Publishing Website
www.pwpublishing.ltd.uk

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Brook Street
Tring
Hertfordshire HP23 5EF
pw@webscribe.co.uk
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In general all components used in constructing PW projects are available from a variety of component suppliers. Where special, or difficult to obtain, components are specified, a supplier will be quoted in the article.

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We have a selection of back issues, covering the past three years of PW. If you are looking for an article or review that you missed first time around, we can help. If we don't have the whole issue we can always supply a photocopy of the article. See the Book Store page for details.

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Technical Help

We regret that due to Editorial time scales, replies to technical queries cannot be given over the telephone.

Any technical queries by E-mail are very unlikely to receive immediate attention either. So, if you require help with problems relating to topics covered by *PW*, then please write to the Editorial Offices, we will do our best to help and reply by mail.



Readers' Letters

Send your letters to:

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

E-mail: rob@pwpublishing.ltd.uk

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

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

Scout Jamboree Station GB3SP 1957

Dear Rob,
I'm writing with reference the photograph of the Scouts' Jamboree Station in 1957 (reproduced from *Short Wave Magazine*, September issue page 358) on page 52 of the September issue of *PW* in **Colin Redwood G6MXL's** *What Next?* article. Back in 1957, I was in the Scouting movement in Plymouth and we went to the Jamboree in Sutton Coldfield in the Midlands. Unfortunately however, the Plymouth contingent stayed in Lichfield and not the main jamboree site in Sutton Park.

After reading in one of the radio magazines prior to going to the jamboree that there would be a Amateur Radio station operating from Sutton Park I decided to attempt to construct a portable receiver (using an acorn valve) so that hopefully I could hear the station in Sutton Park. But regretfully for some reason I never managed to get the receiver to work.

If I remember correctly it was a Saturday that we went by coach to the main jamboree site in Sutton Park. I recall reading in the magazine that it would be easy to locate the tent which the Amateur Radio station would be set up in, by four 80ft aerial masts.

On arrival at the Park I could see the four masts in the distance and eventually arrived at the marquee. All the bands from 160 to 10m were in operation and the equipment as I remember was made by Hammarlund – except for the 160m rig which was a home-made transmitter.

While standing next to the 80m equipment I heard the operator call "CQ", (I couldn't hear the reply because all the operators were using headphones) but then I heard an operator said "G3LSD this is GB3SP... sorry I cannot understand your name or your QTH". (Due to heavy QRM).

I then managed to attract the attention of the operator and informed him that G3LSD was in Plymouth and his name was Ellis. Needless to say the operator was somewhat confused –

£20 Star Letter

Motorcycle Mobile From The 1970s

Dear Rob
After reading *Keylines* in the October 2012 *PW* I thought you might be interested in this photo from my collection. I took it in July 1971 at the Scarborough Mobile Rally. **Cyril Ginders G3XHA** (now a Silent Key) was acting as our onsite information station on Top Band.

My first mobile set-up was on 144MHz a.m. with a Microwave Modules transmitter, an Eddystone EC10 as a tunable i.f. and a Sentinel 2m converter. The antenna was a halo. In those days I remember you had to have a separate mobile licence! Many thanks for *PW*. I have it on subscription and look forward to it every month. Best wishes to you and the *PW* team.

David Mappin G4EDR/G8HWQ

Filey

North Yorkshire



Editor's comment: Thanks David – what an unusual and interesting set-up. Even nowadays motorcycle mobile is quite rare and most activities seem to be on v.h.f.

until I explained that I was a short wave listener from Plymouth and that I knew Ellis through the Plymouth Radio Club. Some days later I learned that an article appeared in the local press regarding the radio contact from the Jamboree.

Finally, just to remind you I purchased the G2DAF rack from the Dorset Silent Key Sale!

John Fallon G3SGV

Carkeel

Saltash

Cornwall

Editor's reply: *Thanks John – thanks goodness demonstration stations rarely use headphones now! Please join me on the Topical Talk page for further comment.*

The Importance Of Publicity & PR For Amateur Radio

Dear Rob,
Your recent *Keylines* editorial about the value and importance of Publicity and Public Relations for Amateur Radio really resonated with me. When I was

just getting started with the hobby, *Practical Wireless* was one of the magazines that I read eagerly from cover to cover. I well remember picking up a copy on holiday and really poring over it (it had a Yaesu FT-757 review – I really wanted one at the time!).

In a nutshell, I think this is what is so important about *PW* – someone with a grain of interest in the hobby can pick it up in their newsagent and learn more – hopefully a first step towards becoming licenced and active.

We can all do bits of 'Amateur Radio outreach' though. Recently, I was going through my bookshelves, having a bit of a clear out of books that I no longer needed, ready to take them to the local Oxfam bookshop. I came across a couple of introductory Amateur Radio titles from when our eldest child took a (sadly, brief) interest in getting a Foundation Licence. I put them into the box with the hope that someone will see the books on the shelves in the High Street and want to learn more. If readers have got any introductory Amateur Radio titles that they no longer

need, I'd like to encourage them to recycle them in the same way!

With the decline in larger bookshops on our high street – it's harder for people to 'accidentally' come across information about our hobby. It struck me that this was a fun and simple solution, which also has benefits to your favourite charity. With kind regards.

Tim Kirby G4VXE

**Bow Bank
Longworth
Oxfordshire**

***Editor's acknowledgement:** Excellent idea Tim! Please join me on the Topical Talk pages for further comments.*

The Elecraft Experience By G3XBZ – A Good Read!

Dear Rob,

I enjoyed reading **Phil Ciotti G3XBZ's** *The Elecraft Experience* article in the October issue. Like Phil, I built my K2/10 first and I then added the integral 100W amplifier and audio DSP boards after a few months. I built it when I was a 2M0 and I hope that might encourage any of the Intermediate Licence holder readers to have a look at doing something similar!

I then built – well in reality I assembled it – my K3/100 some years later. It's a far superior rig to the K2, especially the receiver performance and I use it for most of my QSOs. However, it's my K2 which I always look fondly on because I built it from scratch and learned an awful lot in the process. If I were only allowed one rig, it would be my K2. 73 to you all at *PW*.

Bob Towers MM0RKT
Hamilton
South Lanarkshire
Scotland

Operating in the USA

Dear Rob,

Thanks to the CEPT arrangement with the USA I have been able to use my UK callsign during visits. However, there sometimes seems to be a shyness of US Amateurs when replying to a general call on simplex or through a repeater with the UK callsign.

So, I made enquiries as to whether I as a foreigner could take the US exam, as well as how I should go about it. I owe a great deal of thanks to **Steve Hooper K7ACS** and **Robert Spencer KE8DM**, who by chance happened to be the FCC representative in Yuma. My first appointment to take the exam was

End Of An Era For MKARS At Bletchley Park

Dear Rob,

On January 1st 2013, the 18-year association of the **Milton Keynes Amateur Radio Society** (MKARS) and **Bletchley Park** will finally come to an end, due to MKARS having to vacate their current clubhouse on the estate.

The main reasons for Bletchley Park serving notice on MKARS are due to; The building currently occupied by MKARS as their clubhouse, being required to make way for the creation of a new park entrance and access road to the coach park.

No additional space being available on the estate which MKARS could occupy.

It has been deemed that the Milton Keynes Amateur Radio Society will not fit into the future World War II profile of the Bletchley Park Museum.

Having attained Museum status, Bletchley Park will eventually have regular opening and closing times after which there will be no public access.

I'm writing to inform you that the MKARS and its members regard themselves as both privileged and proud to have been associated with the world-renowned Bletchley Park, its history, its outside events and its place in the public consciousness. By representing the voice of both Amateur Radio and Bletchley Park to the world, the call sign **GB2BP** has made the MKARS friends in many countries, creating interest in the amazing work that was carried out within Bletchley Park during the Second World War.

However, although GB2BP may no longer be in residence on Bletchley Park after January 1st, 2013 it will re-appear occasionally as a Special Event station supporting public events on Bletchley Park. Further details will become available on the MKARS website, just visit www.mkars.org.uk/

Roy Walker G8RCK

Aspley Guise
Bedfordshire

***Editor's comment:** Your news causes me great concern Roy. Please join me on the Topical Talk page for further comment.*

one Saturday at the town of El Centro which happens to be in California (we are based three miles from the Arizona and California border) however, this regrettably had to be cancelled. Two weeks later much to my pleasure the exam was arranged to take place in Yuma. I spent some time reading the 'book of words' in preparation for the exam, whilst the technical questions are the same (that's after you have learnt to read American) the rules and regulations are quite different.

Exam day arrived and I arrived at the Yuma Sheriff's office where the exam was being carried out in the training room, US Amateurs receive a great deal of assistance from Government departments. There was a panel of five Amateurs present with three candidates, I was directed to a seat well-spaced from the other candidates. We were all informed that should we leave our seat to go to the 'restroom' (toilet) or to get a coffee then our paper would be void.

There are 35 questions relating to Amateur Radio, they are all covered in the 'book of words' the exam is marked straight away, jointly by the panel and I

was informed within ten minutes that I had passed. My result was 31/35 which I was very pleased with.

Should you decide to follow my example then there are one or two subjects you might like to study, the first is the 50MHz (6m) allocation for Amateur Radio control models, also the differences in the v.h.f. and u.h.f. allocations.

Some ten days later my callsign appeared on the FCC web site as KF7WHJ, I was then informed by Steve K7ACS that the US has a vanity callsign system similar to the vehicle registration number system (my US car registration is G6NYH) the cost to apply was \$14 and you have to give three options. So, I applied for K6NYH, W6NYH, WG6NYH as according to the FCC web site all were available. Two weeks later I was allocated K6NYH. The exam experience in general was very enjoyable and it may just be me but I now seem to receive more replies on the US repeaters!

Gary Austin G6NYH/K6NYH
Semilong
Northampton
Northamptonshire



News & Products

Send your info to:

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Stop Press!

Bob G3ORY First British ARDF World Champion!



A delighted **Geoffrey Foster** from the RSGB's **Amateur Radio Direction Finding (ARDF)** group contacted *Newsdesk* as *PW* went to press. Geoffrey reported, "**Bob Titterington G3ORY**, from Lutterworth in Leicestershire has triumphed and the ARDF and the RSGB have their first World Champion! Fantastic isn't it? – and on 3.5MHz (80m) too! Further information from me. Regards **Geoffrey Foster**. E-mail: geoffreyardf@btconnect.com Website: www.rsgb.org/radiosport/ardf/

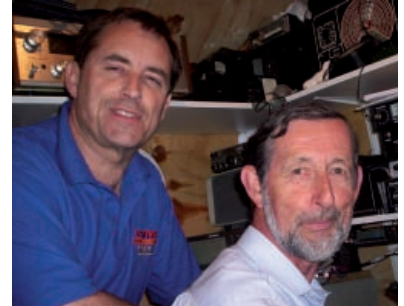
South Essex Double Up On Air For JOTA

Dave Speechley G4UVJ from the **South Essex Amateur Radio Society (SEARS)** contacted *Newsdesk* with news of their activation of two Jamboree On The Air stations – **GB2CIS on October 20th from Canvey Heights** with the **1st Canvey Sea Scouts** and (callsign not confirmed as yet) either **GB0RS or GB1RS on October 21st** from Rayleigh in Essex with the **1st Rayleigh Scouts**. This extremely busy club meets 1900hrs on the Second Tuesday of the Month at the **Island Yacht Club, Point Road, Canvey Island SS8 7TX**. Dave reminds members and interested visitors that "we are on the ground floor for disabled

Celebrating *Practical Wireless's* 80th Anniversary In Style!

The Editor reports: "Thursday September 13th saw the actual 80th anniversary of the first publication of *Practical Wireless* in September 1932 and all-day operations of GB80PW from my home QTH in Bournemouth. For most of the day – from 0930 until around 1630 hours, **Phil Ciotti G3XBZ** and I – backed up by **Tex Swann G1TEX** – were extremely busy during the morning into the early afternoon on 7MHz (40m) operating on s.s.b.

From 1630 until 1800 hours I then tried PSK31 on 14MHz (20m) but conditions were appalling. So, I then abandoned operations until later on in the evening when I continued on 3.5MHz (80m) PSK31 until 2300 hours, with successful QSOs over most of the UK".



Tex Swann G1TEX managed to snap Jim G4AEH and Phil G3XBZ in a brief pause in QSOs on Saturday. They were really enjoying themselves chatting to *PW* readers!

Saturday Operations With Jim Lee G4AEH

"**Jim Lee G4AEH** wasn't able to join us on the Thursday operation due to his commitments on BBC Radio 4, but he was more than keen to come down from London by train – swapping many thousands of Watts on various long wave, and v.h.f. transmitters for 70W or so the day from my Alinco DX-SR8 on Saturday September 15th!

"Jim and Phil did most of the operating on 7MHz and we were exceptionally busy – with fairly good conditions (for once!) on the band. It was also a beautifully clear and very sunny day in Bournemouth and we were able to enjoy a picnic lunch – between operating schedules – on the lawn outside my shack. My wife **Carol** made sure we had an excellent table laid out for us (thanks Carol!). We all agreed it would have been rather a tight squeeze for all four of us in my shack had it rained!

"Jim G4AEH left us at 1530 complete with one of my freshly baked loaves of wholemeal bread as a special 'thank you', to catch his train home to Nuneaton. Jim had thoroughly enjoyed his visit and sessions on GB80PW – but later told me that when he arrived at Coventry to change trains to Nuneaton – it had been cancelled. He then faced a 70 minute delay while a bus was arranged!

"Despite his travel problems Jim told me it had been a wonderful day and even though the higher bands were 'dead' later in the evening, we had managed – with the help of a large number of readers – to celebrate the *PW* 80th year in style. Thank you everyone for being so patient during the pile-ups and we look forward to working more of you in October, November and December!" **Rob G3XFD**.

You can see YouTube videos of Jim G4AEH and Phil G3XBZ in action at www.youtube.com/watch?v=WfzvUGloGtK and <http://www.youtube.com/watch?v=WfzvUGloGtK>

visitors and with full size comfortable chairs, and with good and safe car parking and a great view out to the Thames Estuary."

November 13th brings the AGM, and on December 11th there's the annual

Christmas Social Evening. Further details from:

Dave Speechley G4UVJ

Tel: (01268) 697978

E-mail: g4uvj@btinternet.com

Website: www.southessex-ars.co.uk

New Remote Control System Launched By Icom UK

Newsdesk received an interesting Press Release from Icom regarding their newly-launched remote control system: Their release states, "Icom UK Releases Innovative RC-28 IP remote control system for its range of h.f. Amateur Radio Base Stations.

Icom UK is pleased to launch the RC-28 IP remote control system that allows a user to control selected Icom h.f. Amateur radio transceivers through an IP Network. This new system includes remote control software together with remote control USB encoder which provides users with a radio operator's style interface for controlling this new software product.

"The new system remotely controls compatible Icom transceivers features low voice latency to simulate the same operational experience of using an actual radio. The software element of this system comprises two components: a system configuration application to manage settings such as IP address and audio sampling rate; and remote control software that provides a user interface similar to a

radio's front panel. Memory channels, i.f. filter settings, interference rejection and most radio functions can be controlled through a home network or over the Internet.

"The remote control USB encoder provides control of this system. Utilising the same quality tuning knob and encoder as used on Icom h.f. radios, the accessory provides a radio operator's interface to complement the IP remote control software. The remote control features a sturdy push-to-talk and two user-programmable function keys."

Ian Lockyer, Marketing Manager of Icom UK writes, "The RC-28 IP remote control system is a perfect addition to an h.f. operator's arsenal allowing them to operate their radio from another part of their house. The product will require an understanding of computer networking to set up, but once installed will

provide a new level of flexibility to your radio operation."

He added, "To illustrate the system's capability in conjunction with the USB encoder, demonstrations were given at the National Hamfest (28th-29th September 2012.) This system is compatible with Icom's IC-7200, IC-7410, IC-7600 and IC-9100 with a USB cable, and with the IC-756PROIII, IC-7000, IC-7400, IC-7700 and IC-7800 with a RS-232C cable. Suggested retail price for the RC-28 IP remote control system is £282.00 inc. VAT."

Icom UK Ltd

Blacksole House

The Boulevard

Altira Park

Herne Bay

Kent CT6 6GZ

Tel: **(01227) 741741**

FAX: **(01227) 741742**

E-mail: **marketing@icomuk.co.uk**



Nevada Announce New Alinco Power Supply & Midland Catalogue

Mike Devereux G3SED the Managing Director of Nevada in Portsmouth contacted *Newsdesk*, "We are delighted to announce an new Mark II version of the Alinco DM-330MW popular switch mode power supply. The Alinco DM330MW II had been upgraded to add an extra layer of filtering, making it even quieter for radio communications use and probably the quietest switch mode power supply on the UK market! Delivering 30A maximum the unit is ideal for home, travel or DXpedition use and will power a 100W h.f. radio with ease. We are selling it at an introductory price of £99.95"



New Midland Catalogue Celebrates 40 Years



Mike also went on to say "I'm also pleased to announce the release of the new Midland 40th Anniversary catalogue. The 80-page catalogue shows the ever growing range of Midland products from Amateur, PMR446 and CB radio, to communications equipment for sports and action. Readers can obtain a copy free upon request from Nevada, the UK distributors".

Mike Devereux G3SED

Managing Director

Nevada, Unit 1 Fitzherbert Spur

Farlington, Portsmouth

Hampshire PO6 1TT

Tel: **(02392) 313090**

FAX: **(02392) 31309**

E-mail: **sales@nevada.co.uk**

Website: **www.nevadaradio.co.uk**

Jersey ARS & Repeater Group October AGM

"Calling all Jersey ARS GJ3DVC members and Repeater Group Supporters" is the loud cry coming from **Rob Luscombe MJ0RZD/**

F4VPJ. Rob issued his call via *Newsdesk* to encourage everyone to attend the joint AGMs on Friday October 19th 2012 at 8pm. The Venue will be the Old Signal Station at La Moye. "Please make a diary note and it would be great to see you on the evening!" 73 de Rob Luscombe F4VPJ/ MJ0RZD

Tel: +44 (0) 7797 923916
mj0rzd@robluscombe.com
www.robluscombe.com/radios/



New Heil Headphones From Waters & Stanton

Essex-based Waters & Stanton PLC have announced a new product from Bob Heil in the USA – the Pro-Set 3 headphones. The headphones are a professional style suitable for studio or Hi-Fi use. The specification frequency response is 10Hz to 22kHz and the headphones are provided with a corded lead complete with a 0.25in jack plug and a 3.5mm adaptor. They are priced at £109.95 retail including VAT and are in stock now.

Further information from;

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

Tel: 01702 204965 FAX: 01702 205843



Celebrating 10 Years of Noise Reduction With bhi

The Digital Signal Processing (DSP) noise cancellation specialist company **bhi** have announced in a press release – from **Graham Somerville** – that they are, “Celebrating 10 years in business and would like to thank all our customers, dealers and suppliers for their continued support over this period. The release continues, “We launched our first product – the NES10-2 amplified DSP noise cancelling speaker at the Epsom radio rally in June 2002. And 10 years later we have full range of DSP noise cancelling products to suit most applications, There are three DSP noise cancelling speakers, the NES10-2MK3, 10 watt DSPKR and Desk Top Noise Away. We also produce have two in-line units, the NEIM1031MKII and the compact ANEM MKII, plus the NEDSP1061-KBD low level audio DSP printed circuit board (p.c.b.) module that retrofits into many transceivers and receivers and the NEDSP1062-KBD amplified DSP noise cancelling p.c.b. module that can be retrofitted into an extension speaker.

The company also sell a range of associated products and accessories for the Amateur Radio market and a range of DSP noise cancelling products for use in commercial radio and voice communication markets. To celebrate their 10 year anniversary bhi will be running a sales promotion with discounted prices on their range of DSP noise cancelling products. The promotion runs from the National Hamfest at Newark in Nottinghamshire on September 28th and 29th to December 31st 2012. For more information check out the contact one of bhi’s authorised dealers, or bhi direct.

Blue LED Scrolling Message Badges

The press release continues, “bhi have been selling their red light emitting diode (l.e.d.) scrolling message badges at various radio rallies around the UK and in Europe for a long time now. Many Amateurs use these type of badges to display their call sign and other messages. For many years we have been asked for blue scrolling message badges, and have been unable to get any until recently. We now have stock of blue l.e.d. scrolling message badges.

The badges have the following features:

- Resolution 7 x 21 (147dots)
- Manual programming from rear of badge
- Programming via PC using optional PC kit
- Up to 8 messages in memory (<2000 characters)
- 8 Different scrolling speeds
- 4 Different brightness levels (25%,50%,75%,100%)
- Strong magnetic clip for mounting on clothing
- Powered by 1 x CR2032 battery
- Supplied with 1 x CR2032 spare battery and instructions
- Badge size: 83 x 41mm



The blue l.e.d. badge retail prices are as follows: Blue badge, order code BBBP £15.95, CD software and USB lead, order code KIT-LEDBADGE £4.95, and the complete kit, order code BBBP-KIT £19.95 (The kit includes the blue LED badge, PC CD software and a USB programming lead). The badges can be purchased direct from bhi or via their website.”

Further details from;

Graham Somerville, Managing Director bhi Ltd

Tel: (01444) 870333 FAX: (0845) 217 9936 Mobile: (07973) 232040

Skype: bhi-sales E-mail: sales@bhi-ltd.com Website: www.bhi-ltd.com

Registrations Have Started For The SOS Radio Week 2013



The next SOS Radio Week will start at midnight a.m. on **Saturday January 19th 2013**, and finish nine days later at midnight p.m. on Sunday January 27th January.

Derek Hughes G7LFC, Chairman of the **Lifeboat Amateur Radio Society (LARS)** writes, “The 2012 event saw us raise over £2,900 – a tremendous effort. Remember – every penny we raise is a valuable contribution to the RNLI’s running costs.

“Please register for the 2013 event on the website and start planning your event. Don’t forget, SOS Radio Week is for individuals and groups and you can just as easily enjoy the event from the comfort of your own shack, as from a Special Event station

“The LARS was formed on the October 1st 2010 and will be two years old in just a few weeks. During that time members have run special event stations to highlight the work of the RNLI and raised several thousand pounds. We’d like to think that together we’ve made a difference.

“We need a venue to hold our AGM. Somewhere that’s not going to cost an arm and a leg, somewhere that the majority of us can get to. If you know of a suitable easily accessible venue near you, then please let us know!”

**Derek Hughes G7LFC Chairman
Lifeboat Amateur Radio Society
86 Colinmander Gardens
Ormskirk**

Lancashire L39 4TF

Tel: (01695) 573870

E-mail: info@lifeboat-amateur-radio.org.uk

Email: info@sosradioweek.org.uk

Website: www.sosradioweek.org.uk

Trying out those controversial power line adapters!

My Opinion!

Mike Jones G3UED has tried out powerline adapters at his Bedfordshire QTH and provides the details and his personal opinion, gained from his own experiences.

During a telephone conversation with *PW's* Editor, **Rob Mannion G3XFD**, our discussion moved onto the subject of noise levels being generated by the power line adapters that are finding their way into many homes. I had said, during our conversation, that although I have one of these very close to my high frequency (h.f.) rig and computer, I had experienced no interference to either.

However, the conversation spurred me into doing a few tests and it transpires that I do suffer some interference but hadn't realised it previously. The interference is mainly apparent when I'm listening using amplitude modulation (a.m.) on 3.5, 14, 18 and 21MHz. With narrower filters, single sideband (s.s.b.) and c.w. (for Morse) present much less of a problem, and this is the reason I had not previously noticed the interference.

Tests On My Problem Devices

My adapters are labelled 'Comtrend Power-line Ethernet Adapter with Filter'. They provide a feed from my BT Broadband wireless router, located in my shack, to my BT Vision box in another part of the house.

My initial tests, across all the h.f. bands, were based upon only the shack-end adapter with the remote end switched off. However, under these conditions the interference seems to be more pronounced, presumably because the adapter output power level is at its highest when there is no response from the other end of the link and at its lowest when communications has been established. But this is merely a guess as I have no way of knowing exactly how these devices operate.

If I'm guessing correctly, my tests show the worst-case scenario of two adapters operating over a long distance. For example, when tuned to 18.1MHz, my S-meter reads S2 when both adapters are on and S6 when the

shack-end adapter only is switched on.

I have documented my simple tests in **Table 1** which show my perceived interference levels from this one adapter on my ICOM IC-718 connected to my outside 7MHz mobile whip antenna, in each case, with the internal noise blanker switched off (although the internal noise blanker has virtually no effect on the interference level).

These tests are, of course, subjective and not scientific. They are dependent upon my particular receiver and BT Vision installation and are my perception of how the adapters work.

Further Tests

I carried out a further series of tests. My radio is connected by a home-made interface to my Laptop computer running some radio decoding programs (*DigiPan* for PSK31 and *MMSTV* for Slow Scan TV on the h.f. bands).

So, I thought it would be interesting to use this interface to examine the interference waveform on my Laptop.

Looking around the internet I came across the freeware programme **Oscilloscope 2.51** (See Web Address at end of text). So I set this up with the receiver set to 18 MHz a.m., where the Amateur band interference is at its worst. This program presents a basic oscilloscope display on the PC screen. It has limited functions but it seems quite good at displaying the waveforms of sounds received through the PC sound card.

I then took screen shots of the oscilloscope display under various conditions, using my Photo Editing software (ACDSee for Pentax) – **Fig. 1** – shows the background noise level with both Powerline Adapters switched off. The illustration (**Fig. 2**) shows the interference level, superimposed on the background noise, when both Adapters are switched on and (**Fig. 3**) shows the increased interference level when only one Adapter is switched on.

The photos are not intended to provide specific measurements, but they do show the relative levels of interference in each case. They also show that the interference is very spiky in nature similar to engine ignition noise. The result of this is radiation over a very wide frequency spectrum.

The results prompted me to check across the whole h.f. spectrum from 3–30MHz and I found extremely high levels of interference outside the Amateur bands. The photo, **Fig. 4**, shows this when both Adapters are

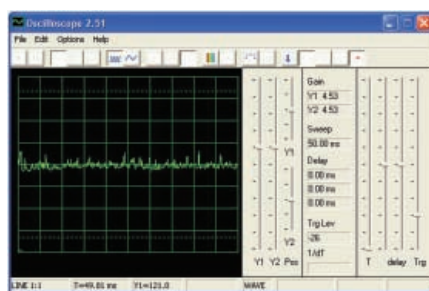


Fig. 1: Background Noise level with both Powerline Adapters switched off.

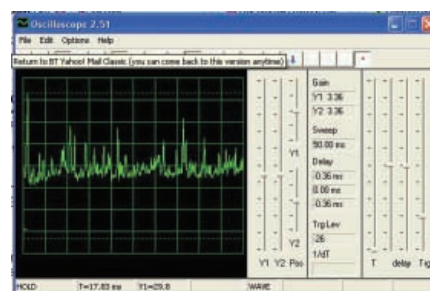


Fig. 2: Interference level superimposed on the background noise when both Adapters are switched on.

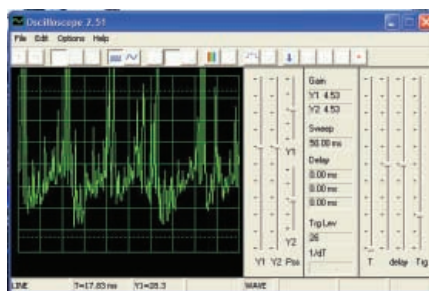


Fig. 3: Increased Interference level when only one Adapter is switched on.

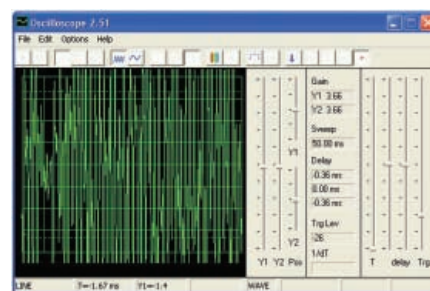


Fig. 4: Noise level on 13.5MHz when both Adapters are switched on.

switched on and the receiver is set to 13.5MHz, but this level is typical everywhere except the Amateur bands.

In fact every h.f. broadcast band, except 3.9 – 4MHz (the 75 metre band), is very badly affected with S-meter readings generally between S8 and S9+10dB. This renders these frequencies unusable for general a.m. listening in the shack!

I've also noticed that the interference level varies during the day and this caused me some confusion during my initial tests. I initially assumed it was due to the BT Vision box communicating with the BT server. However, it seems to be independent of the BT Vision box, or whether the TV is switched on, or even whether the Ethernet connection to the Router is made!

It might be that varying mains loading changes the line impedance seen by the adapters, which then change their output to compensate. Whatever the reason, it becomes difficult to identify what makes the devices radiate the most.

Another interesting point is that this interference is only apparent when the antenna is connected. If I remove the antenna connection and short-circuit the antenna socket on the radio, the interference disappears completely! This shows that the interference is being radiated over a wide area (my antenna is coaxial cable fed and some 4m away from the house).

As far as I know, my immediate neighbours don't have these Powerline Adapters, otherwise, I might have had difficulty isolating the interference levels generated by my own devices. Whether any of my neighbours listen to short wave broadcasts, I do not know, but they would likely suffer significant interference from my Powerline Adapters!

My Conclusions

Following my tests, the resulting conclusions are that the interference level I suffer from my Powerline Adapters is not too significant when operating s.s.b. or c.w. on the amateur bands. However, on 18MHz reception of weak signals would certainly be affected.

Outside the Amateur bands, however, interference is extremely high. Although the level of interference seems to vary with time, I couldn't identify why that was and can only assume it to be due to the internal control of the digital channel between the Adapters. The nature of the waveforms shown confirms that radiation from these devices covers a very wide spectrum.

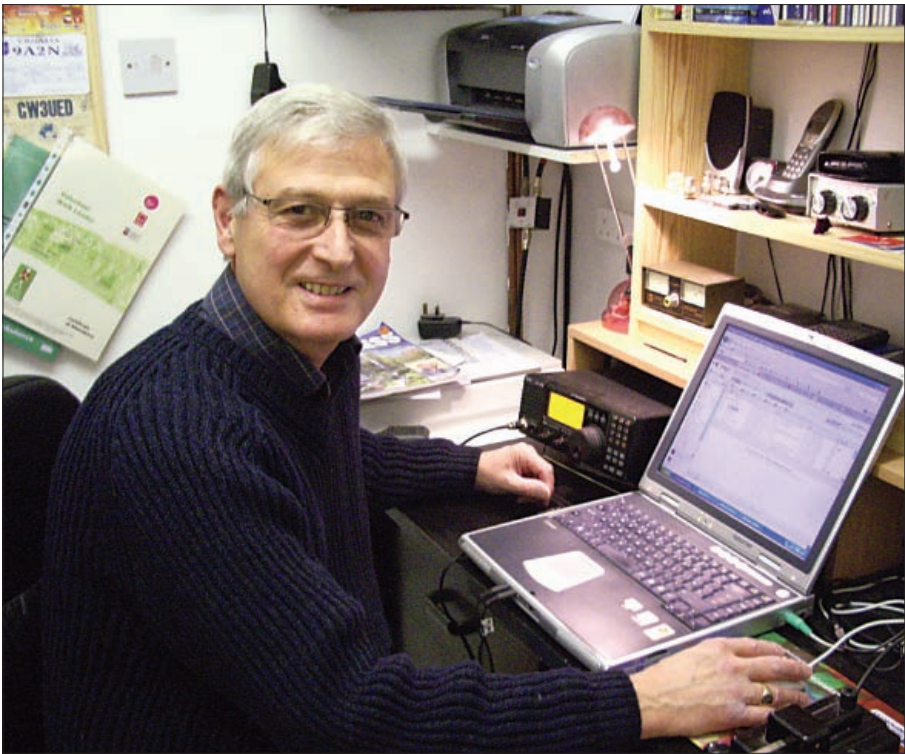


Fig. 5: G3UED – In the Shack!

A Great Deal Of Concern

There's currently a great deal of concern about the radio interference generated by Powerline Adapters. Following considerable lobbying of BT and OFCOM by the RSGB we may (in time) see new equipment becoming available that will reduce, hopefully, eliminate this problem, but I fear this will take some time to achieve. ●

Table 1

Freq (MHz)	Mode:	QRN Level
3.5	a.m.	Weak (< S1)
	I.s.b.	Zero
7	a.m.	Zero
	I.s.b.	Zero
10	a.m.	Zero
	u.s.b.	Zero
14	a.m.	Weak (< S1)
	u.s.b.	Just perceptible (<< S1)
18	a.m.	Strong (S6)
	u.s.b.	Just perceptible (<< S1)
21	a.m.	Just perceptible (<< S1)
	u.s.b.	Zero
24	a.m.	Weak (< S1)
	u.s.b.	Just perceptible (<< S1)
28	a.m.	Zero
	u.s.b.	Zero

Perceived Worst-case level of Interference from One Powerline Adapter (< S1 is less than S1 and << S1 is much less than S1).

Web Address

For *Oscilloscope 2.51* (Freeware) by Konstantin Zeldovich:
<http://madan.wordpress.com/2006/06/25/pc-based-oscilloscope-winscope-251/>
Then follow the link to download it.

Mike Jones G3UED can be contacted via e-mail: jmike.jones@btinternet.com

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Hexbeam – A Multi-Band Antennna

Steve Hunt G3TXQ describes the development and construction of a new version of the Hexbeam. It trades a modest increase in turning radius for a very significant improvement in performance bandwidth.

The classic Hexbeam is an attractive antenna for anyone with limited space. It offers reasonable five band (14-28MHz) performance in a lightweight package, and has a small turning radius. What's more, if you prefer to make your own rather than buy the commercial version, it can be built at low cost without needing specialist tools.

The defining feature of the Hexbeam is its shape: the driver and reflector elements of this 2-element parasitic beam are bent into a 'W' shape to conserve space, **Fig. 1**. Unfortunately this has the effect of raising the element Q (from 10 for a linear element, to 30 for the 'W' shaped element) and so reducing the performance bandwidth.

The increase in Q also produces a feed-point impedance that is only a moderate match (2.1:1) to 50Ω at the frequencies where the front-to-back ratio (F/B) and forward gain peak. If we define the performance bandwidth of the antenna as the range over which it exhibits a F/B > 10dB, an s.w.r. < 2:1, and forward gain > 2dBd, the classic Hexbeam manages just 120kHz of the 14MHz (20m) band.

Modelling the antenna shows that the performance bandwidth is almost entirely dependent on the Q of the reflector - the Q of the driver has little impact. I spent many hours modelling, and testing on a 10m prototype, various reflector constructions designed to have low Q.

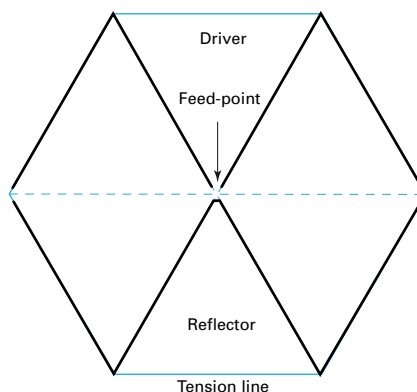


Fig. 1: The 'classic' Hexbeam based on a hexagonal shape is formed from two 'W's.

Fatter Wires

The variations I tried included 'fatter' wires constructed from coaxial cable, commercial ladder-line and 'caged wires', and also modifications to the shape. As is often the case, the simplest idea turned out to be the most effective. 'Straightening' the reflector as much as possible, within the bounds of the hexagonal shape, **Fig. 2** had a dramatic effect on its Q, reducing it from 30 to about 14.

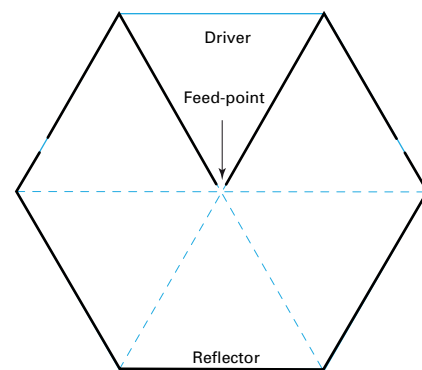


Fig. 2: Changing the shape of the reflector has advantages of performance, with minor increases in the turning circle.

The lowered Q, translates to a performance bandwidth which now covers the whole of each of the bands 14 to 24MHz, and a 1MHz slice of the 28MHz (10m) band. The penalty is a modest increase in turning radius from 2.9m to 3.3m for a 14MHz version.

It turns out there's no point making the same change to the driver. Keeping the 'W' shape avoids a further increase in turning radius, retains the convenience of a feed-point that can be supported by a

Classic vs Broadband Hexbeam Free Space 20m performance

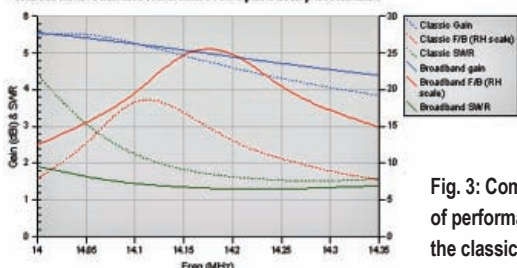


Fig. 3: Comparison of performances of the classic and the modified Hexbeam.

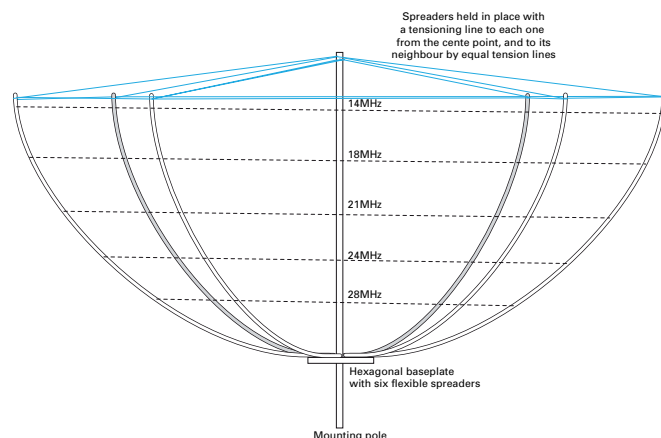


Fig. 4: A cross-section view of the tensioned spreaders, and the relative placings for each band. (Not to scale).



Fig. 5: A closer look at the centre bracket on Steve G3TXQ's prototype.



Fig. 6: Steve made up tie-point rings to be put into the ends of each spreader, making tying off easier.



Fig. 7: Two 'tie-wraps make a good 'P'-clip, A few layers of insulated tape wrapped around the spreader. keep it from moving.

centre post, and provides a better match to 50Ω. In fact, the driver length can now be adjusted to set minimum s.w.r. to coincide with peak F/B performance.

The modelled free-space 14MHz performance of the new design compared to a classic Hexbeam is presented in **Fig. 3**, and clearly shows its advantages:

Incidentally, we should notice that the s.w.r. of the classic Hexbeam is much better at frequencies where its F/B performance is mediocre. This helps explain why constructors who are tempted to tune their classic Hexbeams for minimum s.w.r. are invariably disappointed by its performance!

As with the classic Hexbeam, better peak F/B figures can be achieved on the broadband version by increasing the end spacing between the tips of the Driver and Reflector elements. However this always causes some deterioration in the s.w.r., and often the high F/B figures are illusory - they result from deep but narrow 'notches' at the rear of the azimuth pattern. A closer look at the pattern often shows a front-to back performance that is little improved, and not worth the trade-off with s.w.r.

Self Resonant

The performance presented above is typical of an antenna whose reflector and driver are self resonant 0.7% below, and 0.7% above, the frequency of peak F/B respectively. Corresponding physical dimensions for a mono-band antenna

Table 1

	14MHz	18MHz	21MHz	24MHz	28-29MHz
Driver (half-length)	5.88m	4.52m	3.9m	3.28m	2.71m
Reflector (half-length)	5.55m	4.33m	3.7m	3.13m	2.76m
End spacing	610mm	470mm	406mm	343mm	305mm
Hexagon side dimensions	3.46m	2.67m	2.3m	1.94m	1.71m
Vertical distance from 10m wires	965mm	381mm	229mm	127mm	–

constructed from 1.6mm (16s.w.g.) wire are shown in **Table 1**, or calculated as below:

Corresponding physical dimensions for a mono-band antenna constructed from 1.65mm (16s.w.g.) wire are:

Driver (half-length) = $78.36/f$ (m)

Reflector (half-length) = $74.04/f$ (m)

End spacing = $8.64/f$ (m)

Where f is the frequency in MHz of peak F/B ratio. When choosing this frequency, notice that the F/B performance falls more rapidly at frequencies below the peak than above it, so pick a frequency about one third the way into your band of interest.

Don't be alarmed on spotting that drivers are longer than reflectors - this is a consequence of their differing shapes! What matters is not their length, but where they resonate.

The 'traditional' and elegant way to construct a multi-band Hexbeam is to build a lightweight support structure comprising six radial fibreglass spreaders. The spreaders are 'bowed' to create a 3-dimensional structure within which the various band elements can be stacked vertically **Fig. 4**.

With care, the various bands can be fed with a common feedline with little detriment to performance. The trick is to feed it at the top of the array – the lowest frequency band – and to interconnect the feed-points with 50Ω coaxial cable rather than a higher-impedance line.

Minor Adjustments

Compared to mono-band dimensions, minor adjustments have to be made to the drivers to optimise the impedance match, and to the reflectors to compensate for

the de-tuning effect of adjacent wires.

There is a particular problem with interaction between the 28 and 24MHz elements because the shallow angle at the bottom of the typical support structure often results in little vertical separation between these wires. A combination of EZNEC modelling, and optimisation on a prototype antenna, produced the set of dimensions, shown in Table 1 for a 14–28MHz array:

There are probably as many ways of building a Hexbeam as there are constructors out there in *PW* land! I started with a 6mm thick hexagonal aluminium baseplate that I attached with U-bolts to a suitable fibreglass centre-post using two brackets formed from aluminium channel **Fig. 5**. The centre post need to extend about 1.3m above the baseplate, and far enough below it to suit your rotator fixing arrangements.

I chose to attach the spreaders by bolting some aluminium tubing to the baseplate and slotting the spreaders into them. Use U-bolts if you prefer, but be sure not to over-tighten them and crush the spreaders.

I've found that spreaders made of cheap telescopic fishing poles stand up to UK weather conditions pretty well. However, if you live somewhere less benign you may want to invest in something more substantial. The spreaders will need to extend about 3.9m from the centre post to produce the required 3.5m horizontal radius at the top of the array after 'bowing' – but **please check this with the materials you've chosen** - yours may 'bow' a different amount than mine!

If you go the fishing pole route, buy

long enough ones that you can throw away the top 'whippy' section. It's nearly always too thin and flexible to be useful.

The spreaders are held under tension in the required shape by a combination of the 14MHz wires and extra support cords at the top of the array **Fig. 6**. To get fixings for them I pushed plastic wall plugs into the ends of spreaders and then inserted stainless self-tapping screws. Wires for the other bands sit lower down and can be strung more loosely.

Right Shape

It's much easier to mount the 14MHz wires if you first get the structure into the right shape. This can be achieved by tying the spreader tips to the centre post with six 3.5m radial cords, and then tying their tips together laterally with six more 3.5m circumferential cords. Then – because all the cords are the same length – you must end up with a regular hexagon.

Once the 14MHz wires are in place and under tension you will find that two of the radial cords and five of the circumferential cords are redundant and can be removed. Depending on the stiffness of your spreaders and how tightly you've strung wires for the other bands, you may find you need one more lateral cord between the mid-points of the 21MHz (15m) drivers to retain the shape.

To get fixings for the other bands I made small loops out of plastic tie-wraps and fixed them to the spreaders with a second tie wrap **Fig. 7**. A few turns of insulating tape prevents any tendency for them to slide along the spreader.

At the feed-point, the driver wires are fixed to terminal posts comprising brass screws bolted through the centre post. I soldered brass 'dome nuts' onto the driver wires which then screw onto the terminals, but using 'spade terminals' would have been easier! An extra nut and pair of washers on each terminal post allows for the inter-band coaxial cable connections.

If you use particularly long terminals, remember to take account of them as

part of the wire dimensions. The feed-points for each band are interconnected with 50Ω coaxial cable running down the outside of the centre post, and the antenna is fed at the 14MHz position with 50Ω line. Be sure to keep the braid of the interconnecting cables always connected to the same side of the array.

The end-spacing between the tips of the drivers and reflectors is formed with a length of Dacron cord. I used brass terminal blocks to clamp the wires to the cord and allow easy adjustment of the spacing. These terminal blocks add a significant amount of 'capacity loading' which has been taken into account in the 5-band dimensions given in Table 1.

When fully assembled, I measured the F/B performance and input impedance of the prototype antenna with the baseplate at a test height of about 6m. Note that, at this height the 14 and 18MHz F/B performance is enhanced over its free space value, and the 24 and 28MHz performance is suppressed. My findings are shown in **Figs 8 – 12**.

My modified Hexabeam isn't a 'magic' antenna and it will not outperform a full-size Yagi design. However, if you are looking for useful directivity for 14-24MHz, plus a good slice of the 28MHz band, in a lightweight, low-cost, package with a turning radius less than 3.6m, this new broadband Hexbeam design should be high on your list of options. Try one yourself and let me know how you get on!

References

If you'd like to know more about the Hexbeam - classic and broadband versions - including more constructional ideas, take a look at my web site: www.karinya.net/g3txq/hexbeam/

Note: Leo Shoemaker K4KIO has an excellent site with step-by-step building instructions: www.leoshoemaker.com/hexbeambyk4kio/general.html

There is also a very active and helpful Yahoo Hexbeam group: <http://groups.yahoo.com/group/hex-beam/>

And finally, the classic Hexbeam is still available commercially from **Mike Traffie**: www.hexbeam.com/

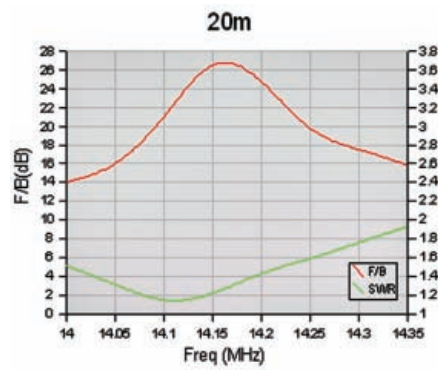


Fig. 8: Performance on 14MHz.

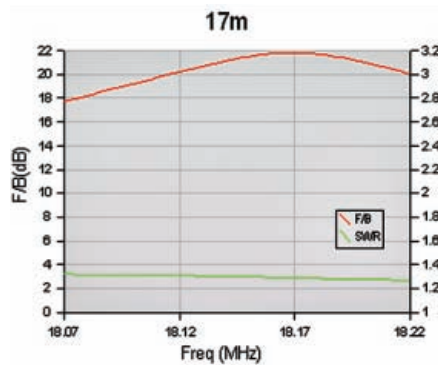


Fig. 9: Performance on 18MHz.

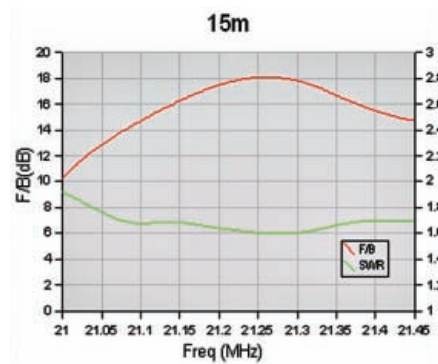


Fig. 10: Performance on 21MHz.

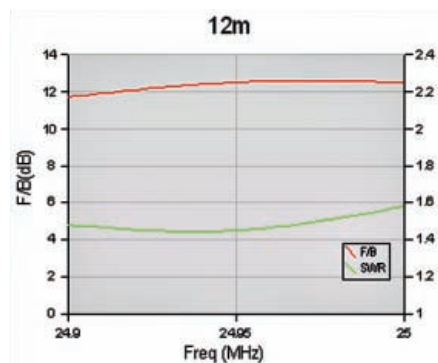


Fig. 11: Performance on 24MHz.

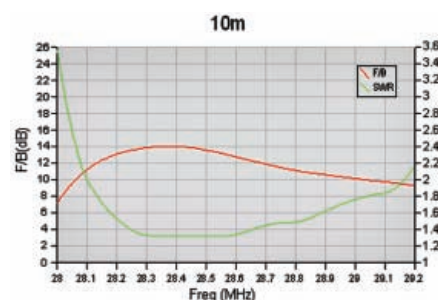


Fig. 12: Performance on 28MHz.

It's not a 'magic' antenna but Steve G3TXQ has made some improvements!

How well did you do this year?

The 2012 Results

Colin Redwood G6MXL presents the 2012 *PW* 144MHz QRP Contest Results – and the infamous weather conditions reduced the number of entries this year.

The 55 entrants to the 29th *Practical Wireless* 144MHz QRP contest on Sunday June 10th 2012 made a total of 2369 valid contacts with stations in 37 different squares (Fig. 1). The weather certainly played its part in reducing participation, particularly from South-West England and the Channel Islands. Contrary to the weather forecast, it was generally better elsewhere.

Radio conditions were variable. Some entrants worked some good distances whilst others reported heavy QSB in certain directions. A few stations reported Sporadic

E propagation either before the contest or during the contest from Sardinia, Bulgaria, the Czech Republic and Malta (some only noticed this after returning home and looking at the DX cluster). However, no contacts attributable to Sporadic E actually made it into the contest logs.

The 2012 Winners

The overall winner, leading single operator station and leading English station is **Erik Gedvilas** who operated the **Warrington Contest Group's** station **M0SDA/P** single-

handed from a site at 450m asl in IO93AD, near Leek. Erik used a Kenwood TS-850 with an SSB LTS2 transverter with 2x17 M2 antennas at about 17m above the ground fed with LDF450 feeder. He used a Hatfield attenuator to reduce the power from the transmitter to limit the output of the transverter to 3W, and confirmed this with a Bird 43 power meter.

In second place overall and leading multi-operator station is the **SADGITS** station **G4RLF/P**, operating from Win Green in Dorset in IO80XS. The **leading Welsh** station is **Dave Hewitt GW8ZRE/P**, who operated from IO83JA. The **leading Isle of Man** station is **John Dowling GD0TFG/P**, operating from IO74PC.

The **leading Scottish** station is the **Cockenzie & Port Seton Amateur Radio Club** **MM0VTV/P**, operating from IO85OR.

The **leading Irish** station is **Paul Knockner M10AYR/P** and his team, who operated from IO74BN and came fourth overall – an extremely impressive result.

The **leading overseas** station is **Dylan Van Poucke F/ON4NS** and his team in JO00UV Northern France.

Full details of the results can be found in the tables in this article. As usual certificates will be sent to all the leading stations and leading station in each square.

A checklog was received from **Roger Piper G3MEH**. I also submitted a checklog for a period of operation in North Dorset.

That Weather!

Although the weather was generally better than forecast, a number of stations did not venture out as a result of the forecast. This year the bad weather seemed to be mainly confined to the South West. Not a single contact was made with stations in Cornwall, the Channel Islands or northwest France.

Dave Hewitt GW8ZRE/P, reported, "Good weather - warm with occasional sun. Sporadic E before start of contest (Italy and Malta heard) but it did not last for contest. Only EU station worked was F/ON4NS in JO00UV. Many squares missing this year (e.g. JO03, IO95) and only one EI worked no others heard".

The good weather was confirmed by other entrants including the **Bolton Wireless Club** **G1ONE/P**, who reported a bright, sunny day on Winter Hill in IO83 square.

David King G6KWA submitted the **Cambridge & District Amateur Radio Club** **G2XV/P** entry and said that this year the weather was kinder than last year.

Colin Stewart MM1APS, on behalf of the **Galashiels & District Amateur Radio**

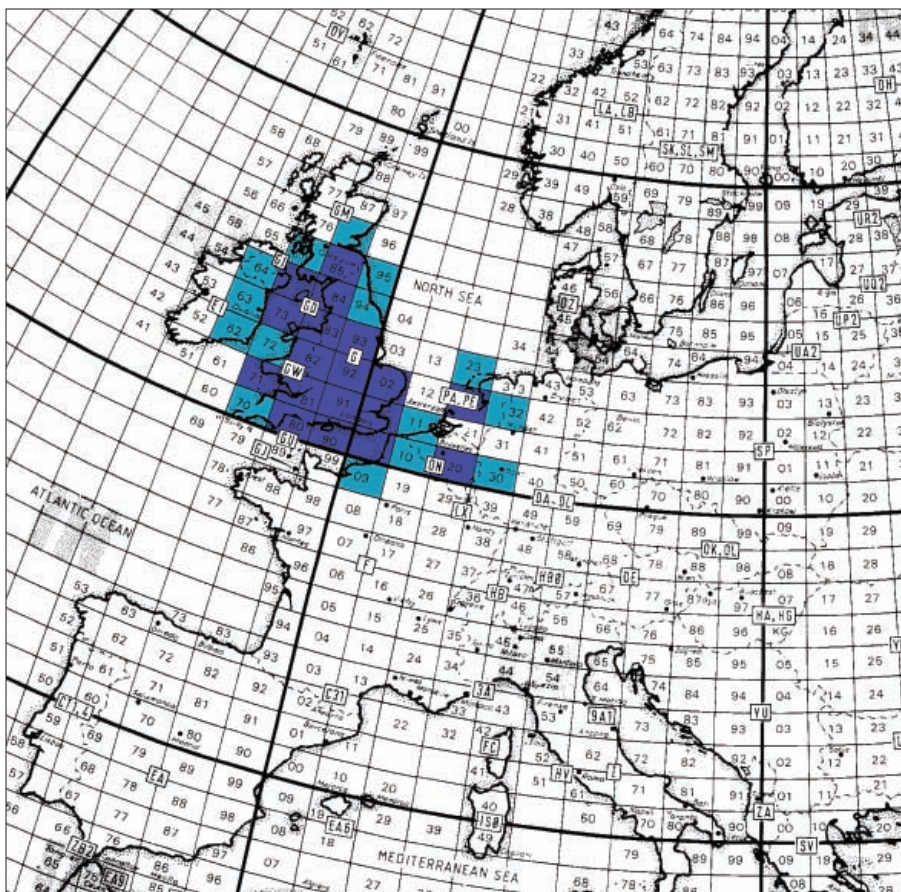


Fig. 1: Map showing locator squares of stations that entered (in dark blue) and other stations worked (light blue).

Society was even complimentary about the rain, "At least the rain, when it arrived, was warm!"

John Dowling GD0TFG reported a mainly sunny day with only gentle breezes from the upper slopes of Cronk ny Arrey Laa (Hill of the Day Watch) on the Isle of Man.

Andy Morgan, on behalf of the **Isle of Man Amateur Radio Society** reported, "One occurrence I really enjoyed was a sudden sea mist rolling in below us. It was like being in an aeroplane looking down at the clouds. For that period from about 1000 to about 1045, we got most of our longer distance contacts to our south east. Reading about this sort of event is one thing, but being there and experiencing it is better and one reason why we should all get out more". (I couldn't agree more Andy!)

Encouraging Newcomers

It was really good to hear a number of leading stations encouraging newcomers. I heard several taking time to explain serial numbers to stations they worked. This is really excellent practice and will help to ensure active participation in future years.

One keen youngster – 11-year old **Matthew Wheeler M6XBX (Fig. 2)** made 41 out the 68 contacts for the **Cheltenham Club G3VRE/P**. Matthew did an extremely good job, with superb support and encouragement from others in the team. This is a perfect example of a club nurturing newcomers after they have passed their exam.

Relaxing Day!

Colin Stewart MM1APS submitted the Galashiels & District ARS entry. He E-mailed me, reporting, "We had a very relaxing day in the country after all the hectic preparations. We couldn't access our intended site because of the wet ground conditions, however the gamekeeper found us a suitable site with very open take-off, so we probably didn't lose out too badly and were at least below cloud-base all day. Many thanks to Buccleuch Estates, whose assistance was invaluable.

"We had very little activity in the first hour and the last three hours, but heard lots of operators who couldn't hear us. Still, there was lots of wildlife to keep us entertained.

"Conditions stayed pretty flat most of the day, even the overhead aircraft flight-path which sometimes helps things along a bit seemed deserted with only one instance of flutter, which usually affects almost all signals to some extent, being heard."

First Attempt

For **Paul Stott G0HEU/P** and his team, the 2012 event was their first attempt as a contest station. Paul says, "We prepped the antenna and worked out the best way to mount the antenna against the car, we



Fig. 2: Matthew Wheeler M6XBX made 41 out the 68 contacts for the Cheltenham Club G3VRE/P.



Fig. 3: The Cwmbran and District Amateur Radio Society MC0YAD/P used a van to house their station. Sadie Ezard 2W0SEZ is operating, with Mark Gray MW0MKG observing.

ended up getting an old netball mounting plate, two poles and making a joining section from wood on a wood lathe and set-up guys for the antenna. It worked very well rotating and standing up to the wind and rain we had. The radio was mounted on the dashboard of the car and the computer for logging moved between operators".

"Generally the day went well, considering it was our first 'real contest', best DX was IO80WX and JO02NW. There was not a lot of local activity even though we had a couple of contacts between ourselves on the local 70cm repeater talking about the contest and we were hoping to get a few locals. We found it a bit frustrating working the southern station with counts of over 100. When the southern station turned the beams north we were able to work them with no real problems.

"It was a good day and enjoyed by all, we are already starting to think about next year."

Operating From IO71 Square

Simon Gosby GW8OVZ/P was only able to take part in the first four hours. He was pleased to receive comments about his activation of IO71 square. He reports that, "the weather was reasonable – only one shower – yet my wife who was only 20 miles away said that it was wet for a lot of the day, I think I was lucky!"

Lessons Learnt

Stuart Tweddle MW0GCT who operated with **Barry Jones MW1DOU** on Anglesey, said that, "the weather was better for us this year and we certainly learnt our lesson from last year, and we sealed our antenna

'properly' this year. It was just a shame that there didn't seem to as many stations operating as there has been in the past, but maybe this was due to the weather forecast for the day".

Stuart added, "it was interesting to watch the maintenance being carried out on the Llanddona TV mast by helicopter – the skill involved in the operation was unsurpassed". Thanks for the report Stuart (He also said they are looking forward to next year's contest).

Well Supported

The Isle of Man Amateur Radio Society's station GT1IOM/P was well supported, with **Peter Morgan MD6IOM**, **Mike Webb GD6ICR**, **Stuart Hill GD0OUD**, **Dave Cain 2D0YLX**, **Mike Rodgers MD0BJM** and **Andy Morgan GD1MIP** all assisting. As you may have seen in the September issue of *PW*, the team ended up with a pair of stacked 9-element Yagis constructed from the remnants of some scrap Tonnas and with a Yaesu FT-817ND transceiver, all lashed to the side of a container and rotated by hand.

Andy Morgan GD1MIP, says, "The picnic was very civilised. We ended up by the reservoir in the village of Ballaragh (east coast of IOM) about 200m above sea level. We gave up just after 1400 UTC two hours before the end, simply because all we could hear were those stations we had contacted much earlier. From 0900 to 1200 we logged probably 95% of our contacts. After that things dried up. I got the impression people packed in early".

Van Shelter

Several stations used vans to keep provide shelter from the elements, including the **Cwmbran and District Amateur Radio Society MC0YAD/P (Fig. 3)**. A very wise idea!

Contest Challenges

Every year I receive stories with the logs of how the contest has spurred stations to get on the air. This year was no exception, with **Keith Bareham G1RRR** surely getting the award for the most challenges overcome to get on the air!

Keith E-mailed me, "The suggestion that an entrant could just spend a few hours from home prompted me dust off 15 years of dirt from boxes in the loft to find my old 2m equipment. What should have been an easy re-install of the radio and antenna turned into weeks of preparation! Replacing the rotary encoder on the IC-290 was just the start, when the previously working radio would tune upward but not downward, which was slightly inconvenient! Then the microphone cable fractured internally during power testing and the transmitter audio disappeared!

With the radio fixed, my attention turned to my old 5-element Yagi which was stored outside by the garage. Unfortunately this had suffered terminally due to a freak lawnmower 'incident', so another was ordered. With this on its way, the rotator was checked and new control cable run to the new mast location. The antenna arrived on Friday, just in time to install on Saturday in readiness for Sunday!

"Except that on Saturday the rotator was now jammed solid. So with no time to get a replacement, Saturday afternoon was spent with gears all over the bench. Finally the rotator moved again, but with one tooth now missing from a positioning sensor gear. The antenna was finally up on Saturday evening. So on Sunday morning with no testing at all but with great relief I made the first contact of the contest!"

Keith concludes, "Thanks for the opportunity to participate in this. It resurrected my interest in the hobby and made me realise that just getting a working station together from boxes of old and unused equipment can be as much fun as making a serious attempt on the contest points!"

Logs E-Mailed

This year most of the logs were sent in by E-mail. The contest spreadsheet was used by many participants. Other entrants used a variety of contest logging software, with the REG1 format being popular.

Every entrant that had entered their cover sheet details on the contest web site

Table 1: Leading stations

Description	Name/Team	Callsign
Overall Winner	Warrington ARC	M0SDA/P
Runner Up	S.A.D.G.I.T.S.	G4RLF/P
Leading Fixed Station	Rick Amos & Joe Hobbs	M0ZAV
Leading Single Operator	Warrington ARC	M0SDA/P
Leading Multi-Operator	S.A.D.G.I.T.S.	G4RLF/P
Leading English Station	Warrington ARC	M0SDA/P
Leading Welsh Station	Dave Hewitt	GW8ZRE/P
Leading Scottish Station	Cockenzie & Port Seton ARC	MM0VTV/P
Leading GI/EI Station	Paul Knocker	M10AYR/P
Leading Overseas	Dylan Van Poucke	F/ON4NS

at www.pwcontest.org.uk also sent in a log.

Cover Sheets

I have strong suspicions that one station made a fundamental error with their locator, as the majority of their contacts showed a different locator in the logs of the stations they contacted. When I queried the locator with the station in question they were adamant that the locator they entered was correct. Unfortunately, that station has lost a large number of points. Otherwise there were few problems with cover sheets.

Problem Logs

Where an entry has a systematic error affecting most or all contacts, such as incorrect formatting of data, I usually try to correct this. In all, logging standards were generally higher this year.

Where errors affect an individual contact, the extent of the loss of points varies, with incorrect callsigns (including missing /P) or incorrect locators resulting in

the contact not getting any credit at all. The latter can also impact the multipliers if this is the only contact in the square.

Missing Stroke P

Missing or inconsistent /P on the end of callsigns continues to be one of the most enduring problems with logs, although this was much less prevalent than in previous years. One station I worked omitted the /P from several overs and didn't mention that they were /P until they started to call "CQ" for their next contact.

Transcription Errors

Several stations lost points and multipliers as a result of mis-keyed locators. For example, one station mis-keyed IO83 as 1083. Other station mis-keyed JO00 as JOOO and others as J000. Using a contest logging program should prevent this from happening.

There were a number of examples of apparent errors in transcribing from the original log to the finally submitted log (in

Table 2: Overall results Table, Practical Wireless 144MHz QRP Contest 2012.

Pos	Call	Name	Single	QSOs	Squares	Score	Locator	Transceiver	Antenna	Ht. asl
1	M0SDA/P	Warrington Contest Group	S	179	24	4654	IO83AD	ANT 2 X 17 M2(USA) AT 55FT+HIGHTSSB LTS	2 X 17 EL M2 AT 55 FT TOWER	456
2	G4RLF/P	SADGITS		124	24	2976	IO80WX	"Trio TS770 + Processor,LNA masthead amp"	6-ele Jaybeam Quad	277
3	GW8ZRE/P	Dave Hewitt	S	114	20	2280	IO83JA	Yaesu FT817.	7-ele ZL Special.	561
4	M10AYR/P	Paul Knocker		100	20	2000	IO74BN	Yaesu FT290	9-ele Tonna	200
5	G3NFC/P	Burton -upon-Trent ARC		108	18	1944	IO93BA	Icom IC275E 3W.	2 X 14-ele J-Beam .	24
6	G4ARI/P	Tim Raven	S	110	17	1870	IO92IQ	Yaesu FT817	MET 14-ele Yagi	237
7	M0GVG/P	Tall Trees Contest Group (Team GVG)		88	21	1848	IO83XG	ICOM IC275E	16e +2LFA	476
8	G4ZOI/P	Dene Hunsdale	S	80	20	1600	IO84TF	Yaesu FT817ND	5-ele SOTA Beam	736
9	GD0TFG/P	John Dowling	S	61	20	1220	IO74PC	Yaesu 290 RII	9-ele portable Tonna	410
10	G1ONE/P	Bolton Wireless Club	S	75	16	1200	IO83RO	TR9130	7-ele ZL Special	335
11	GT11OM/P	Isle Of Man Amateur Radio Society		60	19	1140	IO74TF	Yaesu FT817ND	Pair of 9-ele Yagi's stacked	250
12	G2AS/P	Sheffield A R C		55	18	980	IO93FL	Icom IC251	10-ele homebrew Yagi	320
13	G01POS/P	Jon Page	S	57	17	969	IO81RU	Yaesu FT817	8-ele long Yagi. Home Brew.	290
14	MW6OXO/P	L.B. JONES	S	69	14	966	IO83JF	Yaesu FT290	DK7ZB 10-ele	240
15	MW1LCR/P	Adrian Rees	S	53	16	848	IO82KW	Yaesu FT221	9-ele Yagi	400
16	F/ON4NS	Dylan Van Poucke		56	15	840	JO00UV	Kenwood TR751E	17-element Yagi	80
17	G0OVA/P	Tony Crake	S	54	15	810	IO91QI	IC706 Mk2G	9-ele Tonna	70
18	G3VRE/P	The Chippenhams & District ARC		64	11	704	IO91AI	Yaesu FT817ND	17-ele Tonna Yagi	8
19	M0ICK/P	Mick Heywood	S	45	15	675	IO83XP	Icom 7000	6-ele DK7ZB	250
20	G4BZ/P	Roger Bracey	S	49	13	637	IO83WE	Icom IC202E unmodified	3-ele SOTAbeam Yagi	384
21	G4XBG/P	Downland Radio Group		45	12	540	JO00BT	Icom IC706 Mk11g	17-ele Tonna	167
22	G4TJE/P	Halstead Contest Group	S	38	14	532	JO01BH	Yaesu FT817	9-ele Yagi	175
23	GW8PVK/P	Gwil Jones		48	10	480	IO83LC	Yaesu FT290R	4-ele home made Yagi	290
24	GW8OVZ/P	Simon Gosby	S	33	14	462	IO71OW	Yaesu FT817	6-ele home made DK7ZB design	536
25	MW0GCT/P	Stuart Twiddle & Barry Jones		33	12	396	IO73WH	Yaesu FT290R Mk11	15-ele 2BCX Beam	164
26	G0NWT/P	North Norfolk Amateur Radio Group		28	14	392	JO02NW	ICOM IC211E	8-ele beam	10
27	G4RUL/P	Ad Hoc Contest Group		34	11	374	JO00EX	IC202 and FT817 (not at the same time!	10-ele Powabeam Yagi	188
28	G0OIW/P	Mark Palmer	S	28	13	364	IO91MP	Icom IC25 + Cambridge Kits speech compre	5-ele Yagi	250
29	M0HCY/P	Blackwater Contest Group		30	11	330	JO01KQ	Yaesu FT817	9-ele Tonna	38
30	2E0ZPA/P	Paul Archer	S	29	11	319	IO93EI	Yaesu FT897	Sotabeam 2m Yagi	498
31	MC0YAD/P	Cwmbran & DARS		35	9	315	IO81LQ	Yaesu FT897	9-ele Yagi	307
32	G2XV/P	Cambridge & District Amateur Radio Club		22	13	286	JO02AD	Yaesu FT290 plus mutek board fitted	9-ele Tonna	15
33	G0VIM/P	Malcolm Rivers	S	21	13	273	JO01HH	Yaesu FT817	7-ele Yagi	196
34	M0ZAV	Rick Amos & Joe Hobbs		19	14	266	IO92UL	Yaesu FT817	homebrew 5-ele cubical quad	4
35	G0FTD/P	Andy Foad	S	24	11	264	JO01MH	Yaesu FT817ND	3 ELE Yagi ON CAMERA TRIPOD.	150
36	G3JUD	Mr. Graham Bloor	S	26	10	260	IO83WD	Yaesu FT817ND	5 EL. ZL special	350
37	MM0VTV/P	Cockenzie & Port Seton ARC		19	13	247	IO85OR	Yaesu FT1100	Cushcraft 10-ele	330
38	G08GPO	Balldock Radio Station	S	19	10	190	IO92WA	Yaesu FT1100	4-ele Yagi	90
39	M3NFL/P	BROMSGROVE BUNCH		21	9	189	IO82XI	Yaesu FT897	9-ele Tonna	200
40	GM4YEQ/P	Galashiels & District ARS		15	11	165	IO85NM	Kenwood TM255E	7-ele QUAD BEAM	353
41	G4SRS	Cotswold Amateur Radio Group		18	9	162	IO81VR	Trio TS711E	12-ele ZL Yagi	195
42	G0AGO	R White	S	16	10	160	JO01BR	Yaesu FT290	8-ele Yagi	100
43	2E0NTT/P	John Richards Naylor	S	12	9	108	IO84VF	Yaesu FT817	9-ele Tonna	56
44	M0WEM	THE MAN FROM WEM	S	17	6	102	IO82PU	Yaesu FT290R MK2	2 X 7 ELE ZL SPECIAL + W300 VERTICALS	80
45	G4RYV	David Rumbold	S	12	8	96	IO91OI	Icom IC706 Mk1	9-ele Tonna	68
46	G0HEU/P	Paul Stott		8	10	80	IO94BS	Yaesu FT857D	Tonna 14-ele beam	467
47	G0CER	Dave Harris	S	11	7	77	IO82RV	Yaesu FT817	7-ele Yagi	21
48	M0BQE/P	Chris Margetts	S	9	7	63	IO82UH	Yaesu FT817ND	Quarter wave whip	180
49	PH4LK/P	Contest Group Alkmaar		9	6	54	JO22HO	IC706MKII	9-ele Tonna	16
50	M0SWZ	Ian Swindells	S	13	4	52	IO83XX	Yaesu FT817ND	Homebrew portable 3-ele Yagi	120
51	ON7PX/P	UBA-LVN - Radio Club Leuven	S	7	6	42	JO20HU	Yaesu FT817	9-ele Tonna	85
52	M0GXZ	Malcolm Richardson	S	8	4	32	IO92PA	Yaesu FT817D	Diamond 5-ele in loft	90
53	MX0STB/P	Burnley Radio Club		3	7	21	IO83WT	Yaesu FT817	12-ele ZL Special	538
54	GW0EY/P	G0EY	S	4	4	16	IO82LP	Yaesu FT290 mk1	Moxon 2-ele beam	342
55	G1RRR	Keith Bareham	S	3	3	9	IO90CU	Icom IC290E	5-ele Yagi	30

Table 3: Leading multi-operators

Pos	Call	Name	QSOs	Squares	Score	Locator	Transceiver	Antenna	Ht. asl
2	G4RLF/P	SADGITS	124	24	2976	IO80WX	"Trio TS770 + Processor.LNA masthead amp"	6-ele Jaybeam Quad	277
4	M0AYR/P	Paul Knocker	100	20	2000	IO74BN	Yaesu FT290	9-ele Tonna	200
5	G3NFC/P	Burton -upon-Trent ARC	108	18	1944	IO93BA	Icom IC275E 3W.	2 X 14-ele J-Beam .	24
7	M0GVG/P	Tall Trees Contest Group (Team GVG)	88	21	1848	IO83XG	ICOM IC275E	16e +2LPA	476
11	GT1IOM/P	Isle Of Man Amateur Radio Society	60	19	1140	IO74TF	Yaesu FT817ND	Pair of 9-ele Yagi's stacked	250
12	G2AS/P	Sheffield A R C	55	18	990	IO93FL	Icom IC251	10-ele homebrew Yagi	320
16	F1ON4NS	Dylan Van Poucke	56	15	840	JO00UV	Kenwood TR751E	17-element Yagi	80
18	G3VRE/P	The Chippenham & District Amateur Radio Club	64	11	704	IO91AI	Yaesu FT817ND	17-ele Tonna Yagi	8
21	G4XBG/P	Downland Radio Group	45	12	540	JO00BT	Icom IC706 Mk11g	17-ele Tonna	167
23	GW8PVK/P	Gwil Jones	48	10	480	IO83LC	Yaesu FT290R	4-ele home made Yagi	290
25	MW0GCT/P	Stuart Tweddle & Barry Jones	33	12	396	IO73WH	Yaesu FT290R Mk11	15-ele 2BCX Beam	164
26	G0NWT/P	North Norfolk Amateur Radio Group	28	14	392	JO02NW	ICOM IC211E	8-ele beam	10
27	G4RUL/P	Ad Hoc Contest Group	34	11	374	JO00EX	IC202 and FT817 (not at the same time!)	10-ele Powabeam Yagi	188
29	M0HCY/P	Blackwater Contest Group	30	11	330	JO01KQ	Yaesu FT817	9-ele Tonna	38
31	M0VDAD/P	Cwmbran & DARS	35	9	315	IO81LQ	Yaesu FT897	9-ele Yagi	307
32	G2XVP	Cambridge & District Amateur Radio Club	22	13	286	JO02AD	Yaesu FT290 plus mutek board fitted	9-ele Tonna	15
34	M0ZAV	Rick Amos & Joe Hobbs	19	14	266	IO92UL	Yaesu FT817	homebrew 5-ele cubical quad	4
37	MM0VTV/P	Cockenzie & Port Seton ARC	19	13	247	IO85OR	Yaesu FT100	Cushcraft 10-ele	330
39	M3NFL/P	BROMSGROVE BUNCH	21	9	189	IO82XI	Yaesu FT897	9-ele Tonna	200
40	GM4YEO/P	Galashiels & District ARS	15	11	165	IO85NM	Kenwood TM255E	7-ele QUAD BEAM	353
41	G4SRS	Cotswold Amateur Radio Group	18	9	162	IO81VR	Trio TS711E	12-ele ZL Yagi	195
46	G0HEU/P	Paul Stott	8	10	80	IO94BS	Yaesu FT857D	Tonna 14-ele beam	467
49	PI4ALK/P	Contest Group Alkmaar	9	6	54	JO22HO	IC706MKII	9-ele Tonna	16
53	MX0STB/P	Burnley Radio Club	3	7	21	IO83WT	Yaesu FT817	12-ele ZL Special	538

Table 4: Leading single operators

Pos	Call	Name	QSOs	Squares	Score	Locator	Transceiver	Antenna	Ht. asl
1	M0SDA/P	Warrington Contest Group	179	26	4654	IO93AD	ANT 2 X 17 M2(USA) AT 55FTHIGHTSSB LTS	2 X 17 EL M2 AT 55 FT TOWER	450
3	GW8ZRE/P	Dave Hewitt	114	20	2280	IO83JA	Yaesu FT817.	7-ele ZL Special.	561
6	G4ARU/P	Tim Raven	110	17	1870	IO92IU	Yaesu FT817	MET 14-ele Yagi	237
8	G4ZOI/P	Dene Hunsdale	80	20	1600	IO84TF	Yaesu FT817ND	5-ele SOTA Beam	736
9	G00TFG/P	John Dowling	61	20	1220	IO74PC	Yaesu 290 RII	9-ele portable Tonna	410
10	G1ONE/P	Bolton Wireless Club	75	16	1200	IO83RO	TR9130	7-ele ZL Special	335
13	GQ1POS/P	Jon Page	57	17	969	IO81RU	Yaesu FT817	8-ele long Yagi. Home Brew.	290
14	MW8OXO/P	L.B. JONES	69	14	966	IO83JF	Yaesu FT290	DK7ZB 10-ele	240
15	MW1LCR/P	Adrian Rees	53	16	848	IO82KW	Yaesu FT221	9-ele Yagi	400
17	G00VA/P	Tony Crane	54	15	810	IO91QI	IC708 MK2G	9-ele Tonna	70
19	M0ICK/P	Mick Heywood	45	15	675	IO83XP	Icom 7000	6-ele DK7ZB	250
20	G4BZJ/P	Roger Bracey	49	13	637	IO83WE	Icom IC202E unmodified	3-ele SOTAbeam Yagi	384
22	G4TJE/P	Halstead Contest Group	38	14	532	JO01BH	Yaesu FT817	9-ele Yagi	175
24	GW8OVZ/P	Simon Gosby	33	14	462	IO71OW	Yaesu FT817	6-ele home made DK7ZB design	536
28	G00IW/P	Mark Palmer	28	13	364	IO91MP	Icom IC25 + Cambridge Kits speech compre	5-ele Yagi	250
30	2E0ZPA/P	Paul Archer	29	11	319	IO93EI	Yaesu FT897	Sotabeam 2m Yagi	498
33	G0VIM/P	Malcolm Rivers	21	13	273	JO01HH	Yaesu FT817	7-ele Yagi	196
35	G0FTD/P	Andy Foad	24	11	264	JO01MH	Yaesu FT817ND	3 ELE Yagi ON CAMERA TRIPOD.	150
36	G3UD/P	Mr. Graham Bloor	26	10	260	IO83WD	Yaesu FT817ND	5 EL. ZL special	350
38	G08GPO	Baldock Radio Station	19	10	190	IO92WA	Yaesu FT100	4-ele Yagi	90
42	G0A0G	R White	16	10	160	JO01BR	Yaesu FT290	9-ele Yagi	100
43	ZE0NTT/P	John Richards Naylor	12	9	108	IO84VF	Yaesu FT817	9-ele Tonna	56
44	M0WEM	THE MAN FROM WEM	17	6	102	IO82PU	Yaesu FT290R MK2	2 X 7 ELE ZL SPECIAL + W300 VERTICALS	80
45	G4RYV	David Rumbold	12	8	96	IO91OI	Icom IC706 Mk1	9-ele Tonna	68
47	G0CER	Dave Harris	11	7	77	IO82RV	Yaesu FT817	7-ele Yagi	21
48	M0BQE/P	Chris Margetts	9	7	63	IO82UH	Yaesu FT817	Quarter wave whip	180
50	M0SWZ	Ian Swindells	13	4	52	IO83XK	Yaesu FT817ND	Homebrew portable 3-ele Yagi	120
51	ON7PX/P	UBA-LVN - Radio Club Leuven	7	6	42	JO20HU	Yaesu FT817	9-ele Tonna	85
52	M0GXZ	Malcolm Richardson	8	4	32	IO92PA	Yaesu FT817D	Diamond 5-ele in loft	90
54	GW0EY/P	G0EY	4	4	16	IO82LP	Yaesu FT290 mk1	Moxon 2-ele beam	342
55	G1RRR	Keith Bareham	3	3	9	IO90CU	Icom IC290E	5-ele Yagi	30

whichever format). Some would appear to be a result of misreading, such as the letters U and V, D and O (very common), A and H, I and J, N and M, T and C, C and L, W and N, V and W, M and V.

Poor Signals

In most cases complaints of poor signals were resolved promptly during the contest when the station in question was made aware of the problem. Two Welsh stations closed down early on receipt of poor signal reports, one of which was attributed to low battery voltage with no alternative supply available. This responsible approach is very much to be commended and I thank everyone concerned

I received complaints from two very well-sited stations less than 100km apart with high-gain antennas, each complaining about the other. It appeared that they were both trying to operate about 10kHz from each other and to have taken little, if any, action such as checking their receivers or changing frequency to try to resolve the problem during the contest as required in the rules (see Page 27 of the June 2012 issue of *PW*). Furthermore, they both suggested the other was running excessive power.

No other station complained about the signals from either station in their logs. During the contest I worked one of the stations in question and found their signal to be clean at over 300km away. I can't help

Table 5: Square Winners

Square	Name	Call	No. entries
IO71	Simon Gosby	GW8OVZ/P	1
IO73	Stuart Tweddle & Barry Jones	MW0GCT/P	1
IO74	Paul Knocker	M0AYR/P	3
IO80	SADGITS	G4RLF/P	2
IO81	Jon Page	GQ1POS/P	3
IO82	Adrian Rees	MW1LCR/P	6
IO83	Dave Hewitt	GW8ZRE/P	10
IO84	Dene Hunsdale	G4ZOI/P	2
IO85	Cockenzie & Port Seton ARC	MM0VTV/P	2
IO90	Keith Bareham	G1RRR	1
IO91	Tony Crane	G00VA/P	5
IO92	Tim Raven	G4ARU/P	4
IO93	Warrington Contest Group	M0SDA/P	4
IO94	Paul Stott	G0HEU/P	1
JO00	Dylan Van Poucke	F1ON4NS	3
JO01	Halstead Contest Group	G4TJE/P	5
JO02	North Norfolk Amateur Radio Group	G0NWT/P	2
JO20	UBA-LVN - Radio Club Leuven	ON7PX/P	1
JO22	Contest Group Alkmaar	PI4ALK/P	1

feeling that it is not reasonable to operate within 10kHz of another station in these circumstances without expecting problems with anything but the very best receiving equipment. The 144MHz band is big enough to allow stations to move well apart in frequency.

On checking the specification equipment being used at each station, I find it hard to convince myself that a popular 144MHz transceiver with a manufacturer's specified

Date For Your Diary
The date for the 2013 PW 144MHz QRP Contest is **Sunday June 9th 2013**. As usual the event is arranged to run alongside the RSGB 144MHz Backpackers' contest for the benefit of entrants to both contests. Keep an eye on *Practical Wireless* and the *PW* Contest web site at <http://www.pwcontest.org.uk/>

output power of 2.5W can run 25W (as claimed by one station) or that an h.f. only transceiver can run excessive power on 144MHz (as claimed by the other)! I would however remind everyone that the maximum 144MHz power output for the contest is 3W measured at the point where the feeder to the 144MHz antenna is connected to the transmitter or transverter (not at the feed-point of the antenna).

Thanks For Your Support

As usual, many entrants expressed thanks to other stations taking part or giving points away. I would also encourage stations that perhaps packed up early or did not operate due to the weather forecast in 2012, not to be discouraged from trying again in 2013.

Finally, I must take this opportunity to thank all the entrants in 2012, and **Neill Taylor G4HLX**, for devising what is without doubt one of the most widely supported single-band contests in the v.h.f. calendar.

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Very heavy duty. Available:- S0-259

or 3/8 - specify.....**£44.99**



LDG FT METER

External analogue meter for Yaesu FT-857/FT-897 (includes connection lead).

£44.99 (Post £5)

COAX BARGAINS

True military spec real UK coax

RG-58 Military spec x 100m.

£49.99 or 2 for **£90.00**

Coax stripping tool (for RG-58).....£8.99

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£149.99/100m or 2 for **£260.00**

WESTFLEX 103 (100m).....**£159.99**

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Amazing performance. Twin folded dipole. 2-30MHz - and it really works. No ATU required (25m long). Supplied with 30 mtr PL-259 feeder - ready to go. If you want great transmission, look no where else. Japanese quality made product

WOW £249.99

NEW DIAMOND BB6W



2-30MHz (250W) 6.4m long. End-fed wire antenna. Includes matching balun. Sling up & away you go.

BEST BUY £209.99

W-8010 DIAMOND SHORTENED DIPOLE



80-10m & only 19.2m long! (Up to 1.2kW) Includes 1:1 Balun. Bargain. Superb Japanese quality antenna system.

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★ 1.8 - 60MHz HF vertical ★ 15 foot high ★ No ATU or ground radials required ★ (200W PEP).

SEND SAE FOR LEAFLET

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(with up/down). Many amateurs (over 4000) have been pleased with it's performance. Includes 8-pin round Yaesu mic lead. Icom/Kenwood & other leads available. Phone (£22.99 each). Replacement foam windshield £3.00 + P&P.

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£99.99

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4 way CX-401 'N' (0-500MHz) 'N'.....£89.95

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CX-SW4PL DC-800MHz (5 x S0-239).....£59.95
CX-SW3N DC-1.5GHz (4 x N).....£49.95
CX-SW3PL DC-800MHz (4 x S0-239).....£45.95
CX-SW2N DC-3GHz (3 x N).....£32.95
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DC-3 Fits Yaesu FT-7800/8800/8900, etc.....£17.50 P&P £4
DC-4 Fits new Yaesu FT-950/450, etc.....£22.99 P&P £4



Mike Richards G3WNC's Data Modes

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

Spectrum Analysis A Follow Up

Following on his explanation of spectrum analysis software in last month's *Data Modes*, Mike Richards G4WNC brings you tips for *Spectrum Lab* and suggests you try another one.

Welcome to my *Data Modes (DM)* column where, following-on from last month's introduction to spectrum analysis programs, this time I have some more tips for getting the best from *Spectrum Lab* plus describing another analyser for you to try out.

Spectrum Lab Tips

While it's great fun experimenting with spectrum analysers, it's also very easy to get into a 'pickle', especially if you change lots of settings, then decide you don't like the results that you've created! To help get you out of this predicament, *Spectrum Lab* includes a facility to save its settings to your hard drive.

On first running *Spectrum Lab*, as soon as you've got the software running successfully, I suggest you

save the settings so you can always return to your original start point if you do end-up in a mess. To save the settings go to the File drop-down menu and select 'Save Settings As' and you will be prompted to enter a suitable file name. Make sure your file saves as a '.usr' file and I suggest using the pre-selected Configurations directory.

To return to those settings at a later time, use the 'Load Settings From' option to load your saved preferences file. As well as using this facility to store a start point, you can use this to store your favourite configuration settings so you can quickly change the measurement parameters. You'll also note that there are many saved configurations already in the default directory for you to experiment with.

Another rather good feature of

Spectrum Lab is the 'Component Window' that shows an interactive block diagram of the processing blocks available. You can activate the Component window by clicking 'Show Components' in the Component menu. As you will see, this is a well implemented idea that makes using a complex analyser so much easier.

Typical Set-up

I've shown a typical set-up screen in Fig. 1, where you can see that a number of boxes are highlighted in green. This colouring is used to show the components that are currently active. Not only does this system make it easy to see what's available but you can also spot all the active components and see exactly where they are connected in the processing chain.

The settings for any of the component blocks can be changed by clicking on the appropriate block. When using the analyser you will note that frequency and level readings appear right next to the cursor. These are a measurement of the frequency and signal level of the trace that is immediately below the cursor and are very useful for gathering vital information about the signal – see Fig. 2.

If you want to take a closer look at the displayed spectrum, simply left-click-hold and draw a selection

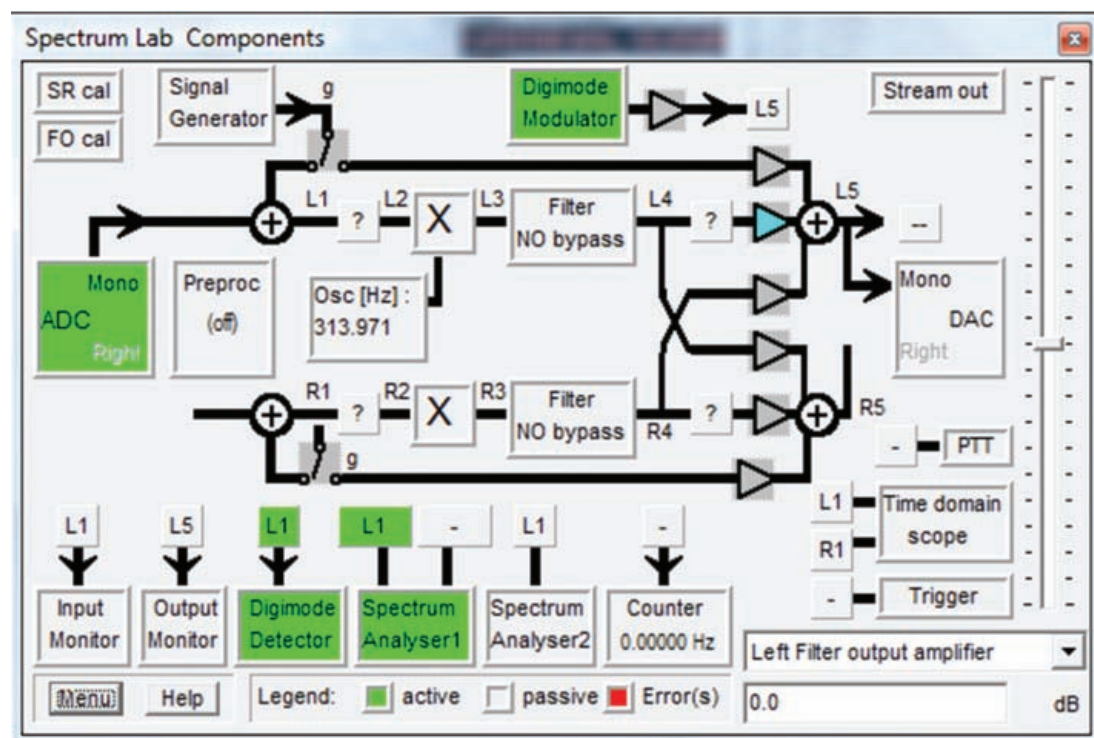


Fig. 1: *Spectrum Lab*'s useful component window.

rectangle around the area you want to examine. You will also see that an option box appears as soon as you've finished and clicking the first option (Zoom into selection) causes that section to be magnified so that it fills the screen. You need to be careful not to overdo this as the trace will quickly become very 'blocky' and pixelated if you use too much magnification.

When it comes to taking measurements of a particular signal, the process becomes much simpler if you press the 'Pause' button on the left hand control panel. This freezes the display so you can take your time to make all the measurements you need.

Alternative Analyser

For pure analysis work I've found the *MDS Audio Spectrum Analyser* from Aidiga to be very good. It's still available free of charge and is packed with advanced features. I covered this briefly in a previous *Data Modes* so this time I'll bring you up to date.

The one downside of the software is its unconventional interface controls so you need to set some time aside to learn how to use it. Though learning the interface isn't a difficult or lengthy process, if you try to use the software without learning the interface you'll probably become very frustrated very quickly.

I'll run through the basics here, but everything you need is also documented in the program's help file. To help you find your way around I've highlighted the most important areas in **Fig. 3**. First step is to download a copy of the software and you can find it at: **www.aidiga.com** where you should select 'Downloads' from the menu.

At the time of writing, the *MDS Audio Spectrum Analyser 116* was at the top of the list of downloads. Click the download button for the program and when complete, run the '.msi' file to start the installation.

Software Configuring

Once installation is complete, it's time to start configuring the software. One limitation of this analyser is that it doesn't have a facility to select the soundcard to use for its input. The program just uses whatever is set as the default recording device. However, this limitation is easily overcome by making the required soundcard the default recording device in *Windows*.

Depending on your version of *Windows*, setting the default soundcard can be changed by right clicking on the speaker icon at the bottom right of your main screen and selecting 'Recording

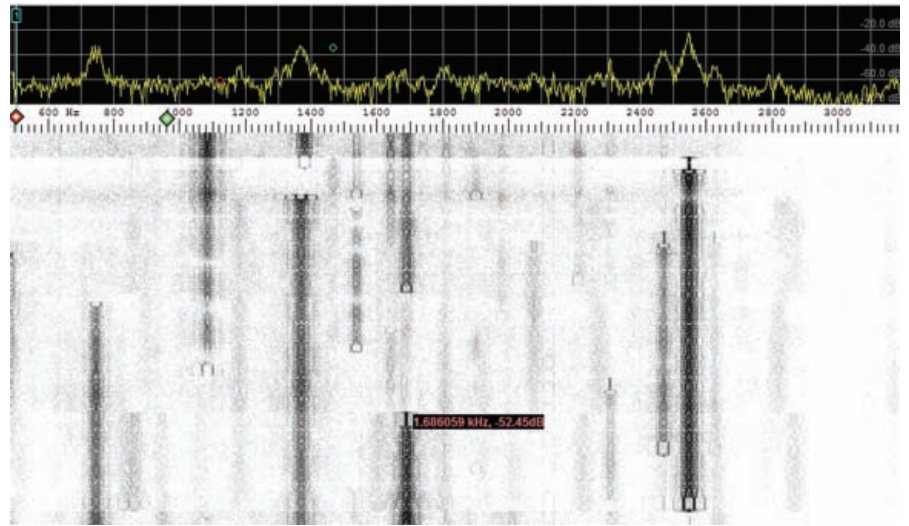


Fig. 2: *Spectrum Lab's* measurement cursors.

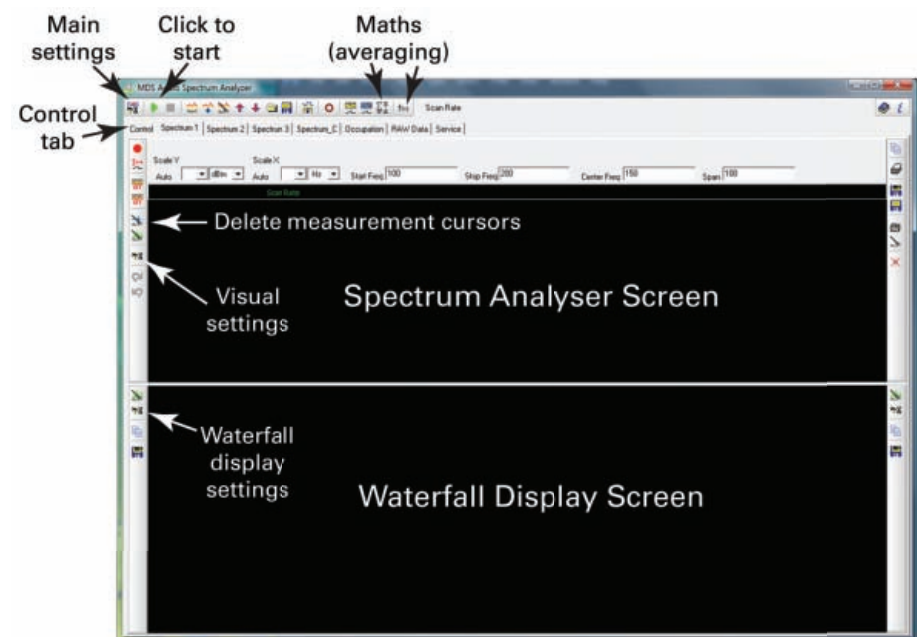


Fig. 3: The *Windows* default sound device settings.

Devices'. From the following popup window, select your soundcard and click the 'Set Default' button – see **Fig. 4**. Don't forget to re-start the spectrum analyser program after making this change as it only checks the recording device on start-up.

Signal Monitoring

The next step is to adjust the configuration settings for radio signal monitoring. You may have noticed that there are a row of tabs just below the menu icons that provide access to several spectrum analysers and other tools.

If your processor tends to struggle with digital signal processing (DSP) applications then it's worth stepping through all these screens, by finding the 'hammer and pliers' symbol and un-ticking the 'Channel Active' box on all screens except Spectrum 1. This

will shut down the other displays and reduce the processor load.

The next step is to set-up the analysis parameters for radio monitoring. To do this, click the Control tab and set the start frequency to 0.3kHz, stop frequency to 3kHz. The centre frequency and span settings will be calculated automatically but the resolution needs to be set manually with some care.

As I explained in last month's *Data Modes*, the finer the Fast Fourier Transform (FFT) resolution, the slower the display update. The large number of data points in a high resolution display also increases the processor load significantly. For most analysis work, 5Hz resolution is fine and you can always increase to 1Hz resolution if you have some critical measurements to take or you're dealing with a very narrow band signal.

There's one final area to check – open the main settings from the hammer and pliers icon at the top left of the main screen. In this section you need to make sure that 'Simulate Digitizer' is un-ticked, the other settings should be fine for now.

Something Interesting

Now is the time to tune into something interesting, press the green arrow button at the top left of the main screen and you should see activity in the spectrum and waterfall screens. If the traces are not the way you want them, you can use the navigation controls to alter the scales and positions to get the desired result.

It's at this point that the control of the display becomes a bit quirky! To reposition the spectrum display, 'right-click-hold' and then 'drag the trace' to the desired position. **Note:** this is 'right-click' not the more usual 'left-click'!

You'll also note that the waterfall display tracks the change so you only have to do this once. To move the trace from side to side, place the cursor over the main part of the trace and scroll the mouse wheel.

You can also use the mouse scroll wheel to make changes to the amplitude scale. Place the mouse cursor at the extreme right edge of the display and then rotate the scroll wheel. If you press harder to click the mouse wheel during these operations you can compress or expand each scale.

Probably the most useful navigation tool is the zoom and this operates fairly conventionally. To zoom-in on a section of the display simply 'left-click-hold' and draw a selection box around the section you want to zoom in on.

Please Note: You must draw from left to right for this to work. When you let go, the selection expands to fill the display area. To zoom back out just 'left-click-hold' and move to the left to draw a second box of any size.

Cursor Based

One of the reasons that I particularly like the *Aidiga* spectrum analyser is that it's a cursor based measurement system. To get the best from the systems a couple of additional settings are required. In the settings panel for the spectrum analyser, make sure that 'Show Diff Marker Lines' and 'Show All Diff Marker Lines' are both ticked.

To place a marker, 'double-left-click' on the spectrum screen and two annotated markers will appear, one for frequency and the other for level. If you don't want the level line, or any other

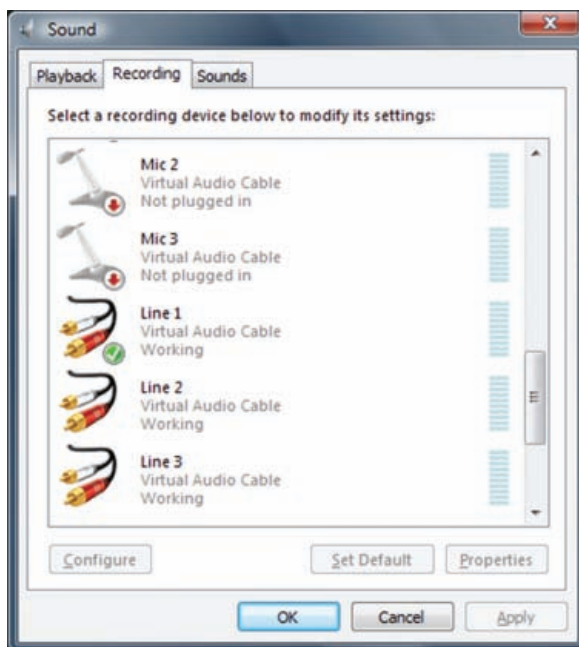


Fig. 4: The *Aidiga* spectrum analyser main screen layout.

line for that matter just 'double-click' on it and it will disappear.

To clear all the lines from the display hit the button on the left with a 'broom and lines' symbol. If you put a second measurement cursor on the screen the display will automatically add difference markers, **Fig. 5**, to make accurate measurements

When taking measurements, it's best to stop the display updates using the green stop button at the top of the screen. You can then take as many measurements as you like. I've found this system particularly useful for

analysing MFSK signals as you can easily measure the overall bandwidth and even the spacing between individual tones.

In some cases it might be helpful to average the FFT display and you can do this via the Maths buttons on the main menu. The left hand button is used to set the type of averaging or peak hold whilst the right-hand button toggles to effect on and off.

Well, I've run out of space again, so I have to leave any more to next time. See you next month!

Measurement
cursors

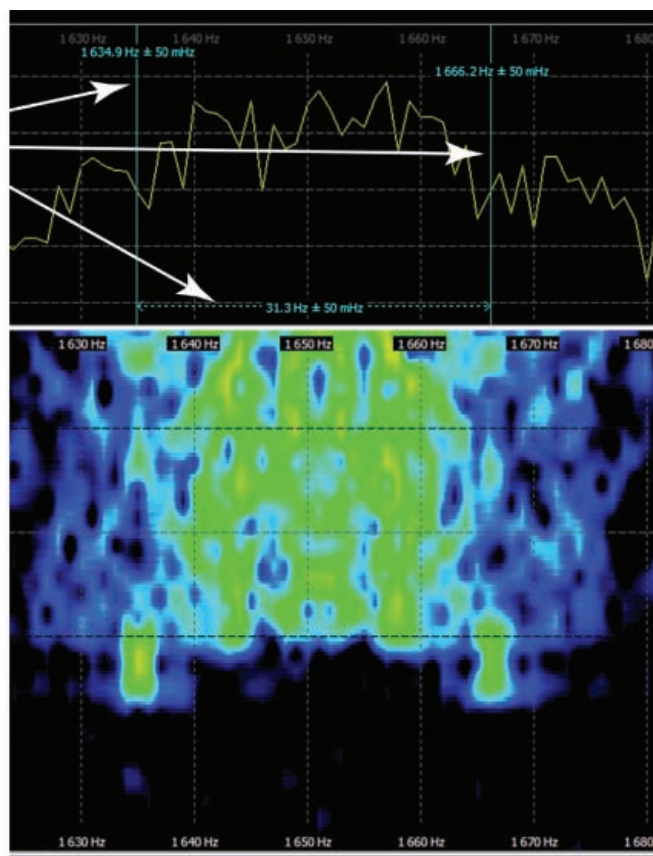


Fig. 5: Showing the *Aidiga* detailed measurement cursors.



Rallies

Send your rally info to:

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E-mail: newsdesk@pwpublishing.ltd.uk

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.

OCTOBER

October 12th/14th

The RSGB Convention

The RSGB Convention will be held at Horwood House, Little Horwood, Nr. Milton Keynes, Buckinghamshire MK17 0PH.

www.rsgb.org/rsgbconvention

October 14th

The Hornsea Rally

The Hornsea Amateur Radio Club Rally will be held at the Floral Hall, 7 The Esplanade, Hornsea, East Yorks HU18 1NQ. The doors will open at 10.30am. There will be car parking, trade stands, a Bring & Buy, special interest groups, RSGB bookstall, RAFARS, a prize draw, a licensed bar, catering and facilities for the disabled.

Rick M0CZR

E-mail: R106221@aol.com

Duncan G3TLI

E-mail: g3tli@hotmail.co.uk

www.hornsearac.co.uk

October 20th

The Rishworth QRP Convention

The Rishworth QRP Convention will be held by the G-QRP Club at Rishorth School, Rishworth, Sowerby Bridge, West Yorkshire HX6 4QA. The doors will open at 10.00am and admission will cost £2.50. There will be talk-in on S22, on site car parking will only be available for the disabled but plenty of on street parking is available locally. There will be trade stands, surplus junk, a Bring & Buy, lectures on QRP related subjects, a large social area and catering (with the famous pie and peas) will be available all day.

www.gqrp.com/rishworth.htm

October 20th

The Carrickfergus Rally

The Carrickfergus Amateur Radio Group Rally will be held at Downshire School, Downshire Road, Carrickfergus BT38 7DA. The doors will open at 12.30pm and admission will cost £3.00. There will be car parking, trade stands (access for traders from 10.00am), a Bring & Buy, special interest groups, RSGB bookstall, Morse tests, catering and facilities for the disabled.

Tim M10TBL

E-mail: carg@hotmail.co.uk

www.radioclubs.net/carg

October 21st

The Galashiels Rally

The Galashiels and District Amateur Radio Society Rally will be held at The Volunteer Hall, St Johns Street, Galashiels, Scottish Borders TD1 3JX. The doors will open at 11.30am (11.15am for the disabled) and admission will cost £2.50. There will be trade stands, a Bring & Buy, a prize draw and catering will be available.

Jim GM7LUN

Tel: 01896 850245

E-mail: mail@gm7lun.co.uk

October 21st

The RADARS Rally

The Ripon and District Amateur Radio Society Radio Rally and Surplus Equipment Sale will be held at the Hugh Ripley Hall, Ripon, North Yorkshire HG4 2TP. The doors will open at 10.30am and admission will cost £2.00 (under 16s are free). There will be talk-in, a Bring & Buy, a prize draw and catering will be available.

E-mail: rally@ripon.org.uk

www.ripon.org.uk/content/radars-rally-2012

October 27th

The Radio Astronomy Group

The British Astronomical Association Radio Astronomy Group General Meeting will be held at the National Space Centre, Leicester LE4 5NS. This is an all-day event featuring keynote presentations, members' papers, displays of equipment and results. Admission costs £15.00 (£12.00 for BAA members) and includes a buffet lunch, tea/coffee during the day and entry to the National Space Centre. Car parking is free.

Paul G4CSD

Tel: 01256 470135

www.britastro.org/radio

October 28th

The Llandudno Rally

The Llandudno Rally will be held by the North Wales Radio Society at the John Bright School, Maesdu Road, Llandudno LL30 1LF. The doors will open at 10.00am and admission will cost £4.50. There will be car parking, trade stands, a Bring & Buy, special interest groups, catering and facilities for the disabled.

Gordon MW0GBR

Tel: 07733 531766

E-mail: rally@nwrs.org.uk

www.nwrs.org.uk

NOVEMBER

November 4th

The Holsworthy Rally

The Holsworthy Amateur Radio Rally will be held at Holsworthy Community College, Victoria Hill, Holsworthy, Devon EX22 6JD.

Roger Williams

Tel: 07773 983691

E-mail: gsowter@talktalk.net

November 4th

The Foyle Rally

The Foyle & District Amateur Radio Club Rally will be held at the White Horse Hotel, 68 Clooney Road, Londonderry BT47 3PA. The doors will open at 11.30am and there will be trade stands, a Bring & Buy, special interest groups, the IRTS, an RSGB bookstall and a prize draw.

Philip Hosey M10MSO

E-mail: mi0mso@yahoo.co.uk

November 10th

The Rochdale Rally

The Rochdale & District Amateur Radio Society will be holding their Traditional Radio Rally at the St Vincent de Paul's Church Hall, Caldershaw Road, off Edenfield Road (A680), Norden, Rochdale OL12 7QR. The doors will open at 10.30am (10.15am for the disabled) and admission will cost £2.50 (with concessions for the under 12s and the over 65s). There will be talk-in on S22, a Bring & Buy and catering will be available.

Dave G0PUD

Tel: 01706 346517

E-mail: dave.shaw1@sky.com

www.radars.me.uk

November 11th

The Kempton Rally

The West London Radio & Electronics Show will be held at Kempton Park Racecourse, Staines Road East, Sunbury-on-Thames, Middlesex TW16 5AQ. The doors open at 10.00am (9.50am for the disabled) and car parking will be free. There will be talk-in, trade stands, a flea market, a Bring & Buy, special interest groups, lectures, a prize draw, catering and facilities for the disabled.

Paul M0CJX

Tel: 08451 650351

E-mail: info@radiofairs.co.uk

www.radiofairs.co.uk

November 17th

The Halton Radio Rally

The Halton & District Amateur Radio Rally will be held at The Heath Business and Technical Park, Heath Road South, Runcorn, Cheshire WA7 4QX. The doors will open at 10.30am (10.15am for the disabled) and admission will be free. There will be car parking, trade stands (pitches free), a Bring & Buy, special interest groups, catering, a cash machine and facilities for the disabled.

George G0RLF

Tel: 01928 897591 (Daytime Only) or 07919 935725

E-mail: g0rlf@talktalk.net

November 25th

The CATS Radio & Electronics Bazaar

The 34th Coulsdon Amateur Transmitting Society (CATS) Radio & Electronics Bazaar will be held at the headquarters of the 1st Coulsdon Scout, Richmond Hall, Lion Green Road Car Park, Coulsdon CR5 3BP. The event will run from 10.00am to 1.00pm and admission, which includes a cup of tea, will be £1.00. There will be free car parking, a Bring & Buy, catering and facilities for the disabled.

Glenn G4FVL

E-mail: chairman@catsradio.org

November 25th

The Plymouth Rally

The Plymouth Radio Club Rally will be

held at Harewood House, The Ridgeway, Plympton, Plymouth PL7 2AS. The doors will open at 10.00am and admission will cost £2.00. There will be talk-in, car parking, trade stands, a Bring & Buy and catering will be available.

E-mail: g7nhb@hotmail.co.uk

DECEMBER

December 2nd

The Bishop Auckland Rally

The Bishop Auckland Radio Amateurs Club Rally will be held at the Spenymoor Leisure Centre, County Durham DL16 6DB. The doors will open at 10.30am (10.15am for the disabled) and admission will cost £2.00 (under 14s are free). There will be talk-in on S22 (V44), car parking, trade stands, a Bring & Buy, family attractions, catering, a licensed bar and facilities for the disabled.

Mark G0GFG

Tel: 01388 747497

December 8th

South Lincs Radio Rally

The South Lincs Amateur Radio Club will be holding their inaugural Radio Rally at the Bickershaw Labour Club, Bickershaw Lane, Bickershaw, Wigan WN2 5TE. The doors will be open from 10.00am (9.30am for the disabled) to 2.30pm and admission will cost £1.50, with concessions for those in receipt of the State Pension. There will be car parking, trade stands, a Bring & Buy, displays, special interest groups, catering and facilities for the disabled. A limited number of 2 x 2 metre pitches will be available (£8.00 if booked in advance or £10.00 on the day and stallholders will have access from 8.00am).

Allan 2EORAG

Tel: 07533 970841

E-mail: a2e0rag@yahoo.co.uk

JANUARY 2013

January 13th

The Red Rose Radio Rally

The Red Rose Winter Radio Rally will be held at the George H Carnall Leisure Centre, Kingsway Park M41 7FJ (M60 Junction 9, opposite the Trafford Centre). The doors will open at 11.00am and there will be free car parking, trade stands, a Bring & Buy, special interest groups, an RSGB bookstall, catering and facilities for the disabled.

Steve

Tel: 07502 295141

www.wmrc.org.uk/carnall.htm

January 20th

The Dover Rally

The Dover Amateur Radio Club Rally will be held at Whitfield Village Hall, Sandwich Road, Dover CT16 3LY. The doors will be open between 10.00am and 1.00pm and admission will cost £2.00. There will be an auction at 12.30pm.

www.doverradiorally.com

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G4CFY TRAP DIPOLE for 80/40/20/15&10m. 106 feet long. Very low noise & low TVI. 600W continuous rated. Supplied with 20m 100Ω twinfeeder. 2 S-points quieter than G5RV with same feeder length. Regular duty £146.50, carriage £10. Strong duty £164.50m carriage £10.

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



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

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7.1MHz & 14.175MHz epoxy coated traps. Coax wound on 34mm diameter pressure pipe. Terminated with 6mm nickel plated brass screws and nuts. Supplied singly or in pairs matched to within 5kHz. **£30.00 each £3.00 P&P singly, or £3.50 P&P a pair.**



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

SLIM G 144-146MHz TRANSMIT & RECEIVE AERIAL. Previously called the GAREX JIMP and is a portable version of the Slim Jim. Gain is 1.8dB over a vertical dipole. The main element is 300 Ohm twin feeder with a matching section in a plastic housing 18cm long. Overall length is 1.55m (61") and there is 4m of coax cable which can be supplied with either a BNC or PL259 connector. **Price £20.00 plus £3.50 P&P.**



VHF/UHF FLEXIWHIPS. Up to 12dB higher gain than short rubber ducks. 50cm long with loading coils for centre frequencies 68-137MHz. 47cm long loaded 144/432MHz. Shorter unloaded ¼ wave flexiwhips for centre frequencies 145-432MHz. **Loaded whips £25, Unloaded whips £15, including UK & EU P&P.**



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



RX AERIAL TUNING UNIT

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

Diecast box size 114x64x55 mm. Supplied with terminals for aerial

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

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Tony Nailer G4CFY's Doing it by Design

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Doing it By Design

This month Tony Nailer G4CFY continues the development of the h.f. pre-selector he first presented earlier in 2012.

Welcome to *Doing it By Design* (DiBD)! In the May *DiBD* I presented a simple three-band active pre-selector that I had designed 3.5, 7 and 14MHz (for 80, 40, and 20m). The circuit is shown in Fig. 1 and comprises a dual gate m.o.s.f.e.t. amplifier with tuned input and output.

However, the circuit didn't work quite as expected and in the laboratory only gave 15dB of gain of 3.5MHz but 23dB on 7 and 14MHz. Some readers who bought and built the kit found even lower gain on 3.5MHz.

The reason for the low gain seems to have been that the amplifier section was oscillating at some very high frequency. It didn't do it on my test bench – probably because I was driving the unit from a Hewlett Packard signal generator providing a solid 50Ω source. Presumably, when it was driven from a non-resonant wire antenna (providing a high impedance source) it went into oscillation.

Higher Gain

Active devices usually have higher gain at lower frequency, which steadily tails off, dependent upon the internal capacitance of the device. Dual gate m.o.s.f.e.t.s have quite low feedback capacitance from drain to the gate – but have a high forward gain factor specified as forward transconductance, Gfs.

The gain factor of f.e.t.s are similar to that of valves (and (fore valves) was given the notation Gm and was specified in mA/V. It was derived from the graph of anode current against grid voltage, which was in effect negative resistance. In more recent times this was printed as an upside down Ω symbol, or as the word Ohm reversed, as mho, or in System International notation as Siemens with a symbol S. Where 1S is one A/V

The gain of the stage is approximately the Gfs times the dynamic resistance of the drain circuit. Dynamic resistance is the reactance of the coil (or the capacitor) at the resonant frequency multiplied by the Q of the circuit. If the device has a very high output resistance and the capacitors are low loss, then the Q will be close to that of the coil.

The obsolete TOKO coils and the Spectrum replacements have Qs of the order of 80. In the case of the previous tri-band preselector it used 5.3μH coils at input and output. On 3.6MHz the reactance $X_L = 2\pi f L$.

$$X_L = 2\pi \times 3.6 \times 10^6 \times 5.3 \times 10^{-6},$$

the powers of 10 cancel, so

$$X_L = 2\pi \times 3.6 \times 5.3 = 119.9\Omega. \text{ Call it } 120.$$

With a Q of about 80 this will give a dynamic resistance about 9600Ω.

The 3N201 device has a range of Gfs from 8 to 20mmhos (8–20mA/V) and has a typical value of 12mmhos, or 0.012mhos. When used with a load of dynamic resistance 9600Ω, gives a gain of $9600 \times 0.012 = 115.2$. This is a voltage

gain of 41dB. I achieved only a gain of 15dB on 3.6MHz, so it was obviously not functioning properly.

On 7.1MHz using the same coil,

$$X_L = 2\pi \times 7.1 \times 10^6 \times 5.3 \times 10^{-6},$$

Again the powers of 10 cancel, so

$$X_L = 2\pi \times 7.1 \times 5.3 = 236\Omega.$$

With a Q of 80, $R_d = 80 \times 236 = 18880\Omega$. Using a Gfs of 0.012mhos gives a gain factor of 226.6, or 47dB. On this and 14MHz a gain of only 23dB was achieved.

Gain Too High?

Perhaps the problem was that the amplifying device had a gain factor that was too high? This is a problem now using modern m.o.s.f.e.t.s that have gain factors

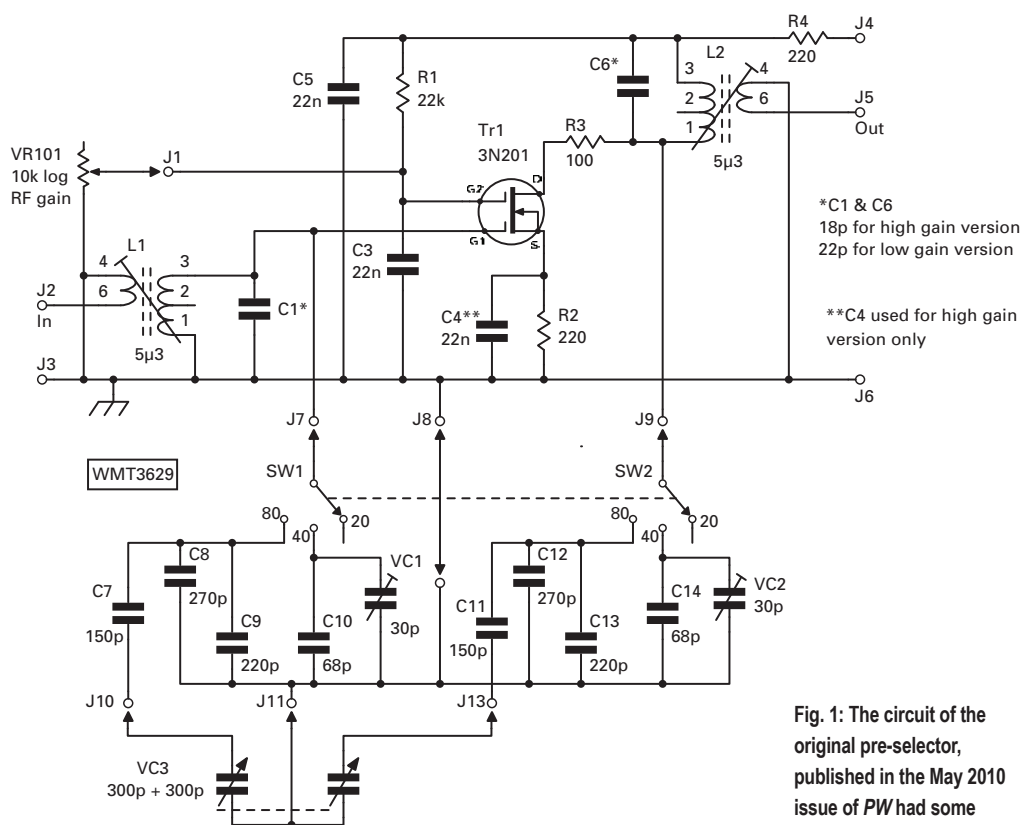


Fig. 1: The circuit of the original pre-selector, published in the May 2010 issue of *PW* had some unexpected peculiarities.

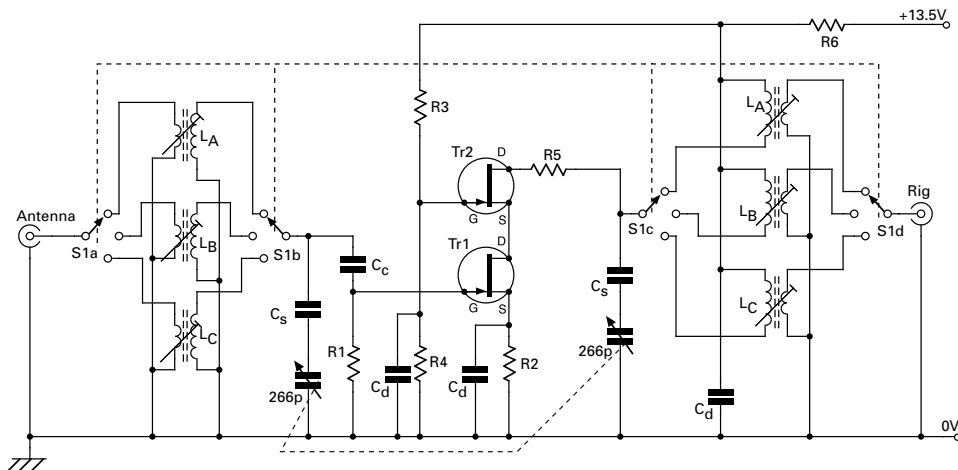


Fig. 2: The preliminary re-design using lower gain j.f.e.t.s in a cascode configuration.

in excess of 24mmhos. So, I decided to use a pair of junction field effect transistors (j.f.e.t), the BF256B with a forward transconductance of about 4.5mmhos.

The j.f.e.t.s would be arranged with the first one as a common source amplifier and the second as a common gate stage. This arrangement is referred to as a cascode stage, with the devices in series between supply and 0V.

The drain of the first device feeds the source of the second device, which looks low impedance. The first device has little or no voltage gain but provides full drain current changes related to gate input voltage variations.

The second device has the gate voltage set at a level ideally to make its source voltage about half supply rail. Gain is set as with the dual-gate m.o.s.f.e.t., by the product of the Gfs of the second device and the dynamic resistance of the drain tuned circuit. The resistor, R5, has a value of 100Ω or less to put resistance in the path between the capacitance of the f.e.t and the tuned circuit to prevent resonance at a high frequency, and possible oscillation.

Recent Purchase

I have recently purchased a large quantity of polyvaricons with a capacitance range of 10pF to 266pF. This represents a 26.6:1 capacitance change, which could achieve a 5:1 frequency change with a single inductor. My first choice was to consider a 4:1 frequency range in three bands, 0.5-2.0, 2.0-8.0, and 8.0-32.0MHz.

Assuming the lowest capacitance of the tuner is 10pF the required inductance at 2.0MHz can be calculated by $L = 1 / (39.5 \times F \times F \times C)$.

$$L = 1 / (39.5 \times 2 \times 10^6 \times 2 \times 10^6 \times 10 \times 10^{-12}),$$

Now the powers of 10 all cancel out to leave,

$$L = 1 / (39.5 \times 40) = 0.000633\text{H, or } 633\mu\text{H}.$$

The closest component to this is the 11098 TOKO 455kHz i.f. transformer with a nominal 623μH primary coil and an internal 180pF capacitor. By removing the capacitor it would be ideal.

At 0.5MHz the required tuning capacitance is $C = 1 / (39.5 \times F \times F \times L)$.

$$C = 1 / (39.5 \times 0.5 \times 10^6 \times 0.5 \times 10^6 \times 633 \times 10^{-6}),$$

one of the 10^6 cancels with the 10^{-6} leaving,

$$C = 1 / (39.5 \times 0.5 \times 0.5 \times 633 \times 10^6) = 0.00016 / 10^6, \text{ (which is } 160\text{pF).}$$

So, the maximum value of the polyvaricon of 266pF has to be reduced by placing a capacitor in series with it so the total is 160pF. Though a formula can be transposed to determine this directly, it's possible to get close by experience. For example, a capacitor of 266pF in series would give a total of 133pF (quite

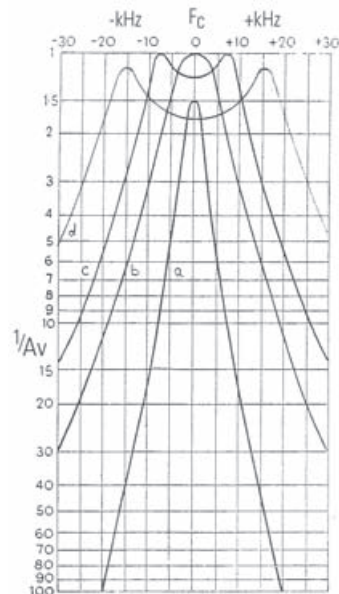


Fig. 3: The effect on band-pass coupling characteristics with variation of the top coupling capacitor.

close). Continuing, I next tried 330pF (which was too low) then 390pF, which gave 158pF total – close enough! By repeating this process for 2–8MHz provided an inductance of 38.9μH. Similarly for 8 – 32MHz provided an inductance of 2.43μH.

Dynamic Resistance

Assuming the coils all had a Q of 80, the 633μH would have a dynamic resistance of 156kΩ at 500kHz and 624kΩ at 2MHz. Similarly, the 39μH would be 39kΩ at 2MHz and 156kΩ at 8MHz, finally the 2.43μH coil would be 9.75kΩ at 8MHz and 39kΩ at 32MHz.

At 500kHz the gain theoretically could be $156\text{k}\Omega \times 4.5\text{mmhos} = 702$ times, and with the same coil at 2MHz 2808 times. With the second coil on 2MHz gain is 175 times and at 8MHz is 702 times. With the smallest inductance at 8MHz gain is 44x and at 32MHz it's 175 times.

Clearly the gain varies wildly with inductance and frequency and is really unacceptable. Additionally, the high gains are likely to cause oscillation, either due to the ratio of feedback capacitance to input capacitance being less than the forward gain ratio, or because the two gangs of the polyvaricon aren't sufficiently isolated.

Another Scheme

Having shown that the new amplifier arrangement had serious shortcomings I thought of another scheme. This one would use top coupled switched band-pass filters followed by an amplifier with resistive load to set the gain.

Realising that it would not be possible to use a top coupling scheme over too wide a frequency range I opted for a 2:1 frequency range requiring a 4:1 capacitance swing. The total range of the pre-selector also had to be reduced, otherwise it would need five switched bands.

I selected 2-4MHz, 4-8MHz, 8-16MHz, and 16-32MHz. Choosing the smallest inductance at 0.6μH would mean the others are 2.4μH, 9.6μH, and 38.4μH. All these can be achieved using coils from the Spectrum coil series, 0u6L, 2u6L, 11u0L, and an old TOKO type 3426R or a Spectrum 45u0L.

Calculating the capacitance minimum and maximum as before revealed 40.7-162.8pF. At minimum this requires about 30pF of padding capacitance plus the 10pF of the minimum of the polyvaricon. At maximum it required the 30pF padding capacitance plus 132pF from the polyvaricon and series capacitor.

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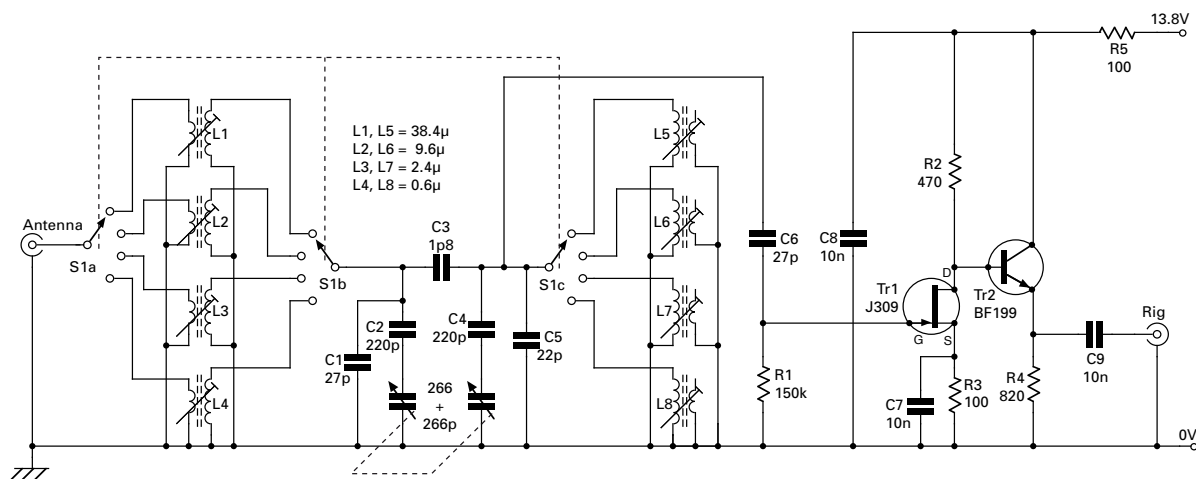


Fig. 4: Final arrangement with band-pass coupled circuits and high input impedance – low output impedance buffer amplifier.

determine the value of the top coupling capacitor. Its value is proportional to the Q of the coils and the value of the tuning capacitors. However, over the years I have found that one fifteenth of the tuning capacitor is a good starting point.

With years of practice – I've now worked out a rule of thumb formula that seems to be very accurate. The coupling capacitor C_C can be calculated directly from the tuning capacitor C_T and the Q by the formula $C_C = (3.7 \times C_T) / Q$.

The effects of different coupling factors for a 465kHz bandpass coupled circuit are shown in **Fig. 3**, scaled in voltage gain reduction ($1/A_v$) and frequency. The frequency scale would be much greater values for higher frequency coils and actually smaller values for lower frequencies and higher Qs.

Curve 'a' is under-coupled where the capacitance is too small. Curve 'b' is where the capacitance has been increased until the response reaches a peak and before it starts to spread too far with a dip in the middle – referred to as critical coupling. Curve 'c' is over-coupled where the response has been spread to the point where the two peaks start to fall from maximum. Finally, curve 'd' is severely over-coupled and is usually best avoided.

In the present application, if critical coupling, curve 'b' is achieved at the high frequency end of the range (when the tuning capacitance is just 40pF) then at the low frequency end of the range where the tuning capacitance is 162pF, it will be under-coupled, as curve 'a'. The effect will be measurably lower gain at the low end of the range but high Q and a narrow pass-band.

Development Model

I then assembled a pair of 2u6L coils with the polyvaricon on a blank piece of printed circuit board (p.c.b.). With the calculated padding and series capacitors and evaluated using a Marconi TF2370 spectrum analyser and tracking generator.

The circuit was optimised to achieve a slight overlap of the range 8-16MHz and the values found to be 27pF for the padders, 220pF for the series ones with the polyvaricon, and a top coupling capacitor of 1p8.

I also tried the 0.6μH coils and they worked correctly over the range 16-32MHz. The 11u0L coils were then also tuned to work correctly on the 4-8MHz range. At the bottom of each range (when they're under-coupled) the bandwidth is very narrow – but the gain is about 8dB lower than at the top of each range.

New amplifier

This amplifier is one I had developed for a new range of active antennas and is a common source f.e.t with a 470Ω collector load. This is followed by an emitter follower current amplifier to provide a low-impedance output. The maximum gain of this two-stage amplifier is 14dB at about 20MHz.

The amplifier is interfaced to the band-pass filter by switching it to the primary winding of the second tuned circuit. This has the benefit of extracting the stepped-up signal and also overcomes mismatches, which occur at the outputs of the secondary windings over the wide tuning ranges.

The f.e.t. has an input capacity of somewhere around 5pF, so it was necessary to reduce the padder to 22pF and put a series capacitor to the gate. The result of my tests using this configuration gave gains of 12dB at the band edges and 15dB in the middle of each range.

The arrangement is now not affected by any small coupling between the gangs of the polyvaricon. Neither is there any feed-back problem in the amplifier, so it's inherently stable.

As the secondaries of the output coils are no longer switched, there are only three poles of switching required. This means a low cost three-pole four-way rotary switch can be used.

Gain Control

I tried using a pair of diodes as voltage controlled resistors at the antenna input – but at such a low impedance point there was virtually no effect. It then occurred to me to reduce the drain current of the f.e.t. and then use a 1kΩ log law potentiometer in place of the 470Ω resistor. Using a resistance switch box I found that increasing the source resistor to 270Ω reduced the drain current to 5mA.

Next, as the base terminal of the BF199 would be driven from the wiper of the potentiometer – I knew that the transistor would then need its own separate base bias. Again, by using the resistance box I found that 47kΩ base to collector set the emitter to about 5.6V, meaning that it was drawing 6.8mA.

The wiper of the potentiometer was then linked to the base of the transistor via a 10nF capacitor. On test I found that the unit worked as before regarding gain and range and bandwidth. The gain could also be adjusted smoothly from +14dB down to the noise floor at -30dB.

Very Useful!

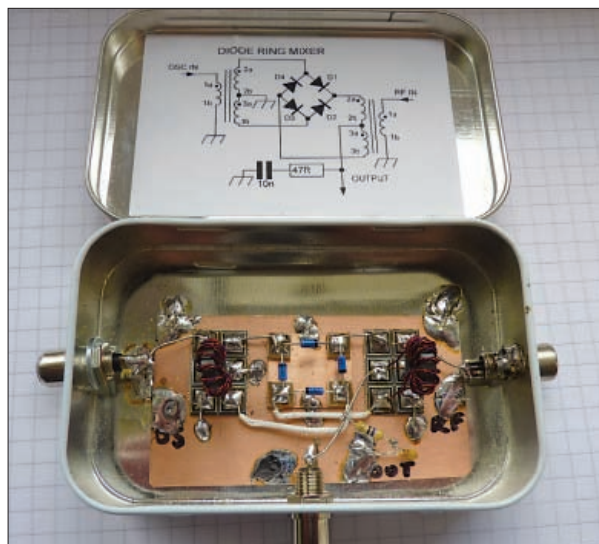
The breadboard part of the design is now complete and I think that the frequency range from 2-32MHz is very useful. The gain constant (within 2dB over each of the ranges) is also quite unexpected – a nice little bonus!

Sufficient details have been provided in circuit and text form for the design to be successfully reproduced. So, in the next *Doing It By Design* (due in the January 2013 issue of *PW*) I'm planning to provide a production p.c.b. lay-out together with the finished circuit diagram, hardware details and assembly pictures. Cheerio for now and don't forget that I'm always pleased to hear from *DiBD* readers.



George Provides Some More Weekend Projects!

This month the Rev. George Dobbs G3RJV presents a practical v.f.o. and other ideas for using a diode ring mixer. Plenty to keep you busy after reading the appropriate quotation!



George G3RJV describes how you can use the diode ring mixer.

"Discovery consists of seeing what everybody has seen and thinking what nobody has thought."

Albert Szent-Györgyi 1893 – 1986
(Hungarian physiologist and Nobel Prize winner 1937)

In last month's edition of *Carrying on the Practical Way (CotPW)* I detailed the building of a double balanced mixer (d.b.m.) using a four diode ring. The circuit is shown in **Fig. 1** and the whole mixer module was mounted inside an *Altoids* mint tin. A double balanced diode ring mixer has two unbalanced to balanced transformers and a diode ring. There are three terminations, usually called 'ports'.

The ports are two inputs, r.f. and oscillator and an **output**. The impedance at all three ports is 50Ω. The article also outlined a simple receiver using the mixer module, including a suitable basic audio amplifier. This month I will describe further circuitry that could be used with the diode ring mixer module.

Readers who have not built, or do not want to build, the mixer module

described last month could use one of the commercially available ring diode mixer modules. The main advantage of a home-made ring diode mixer is cost; the commercial versions are all quite expensive. What's required for the circuits described here is a 'Level-7' mixer. That is a mixer that uses +7dBm of local oscillator drive.

Most Common Mixers

The most common types of level-7 mixers are the TUF-2, TUF-3, TFM-2 and the older SBL-1 types. These are all manufactured by Minicircuits in the USA but are reasonably common in the UK. Connections for these modules are shown in **Fig. 2**. Note that the TUF and TFM types are smaller (approximately 12 x 4 x 6mm) than the SBL-1 (approx. 20 x 10 x 10mm). My photograph shows an SBL-1 alongside a TUF-2.

Both of the mixers shown in **Fig. 2** were culled from surplus boards found at a radio rally. Incidentally, it's worth looking at surplus printed circuit boards (p.c.b.s) at rally stands to see if they have any expensive parts in with the usual collection of resistors and capacitors.

Look in those cardboard boxes often found beneath the stall; that is how I located these mixer modules. The SBL-1 is one of four I found on a single p.c.b. that cost me 50p!

All of the mixer modules described above use +7 dbm of local oscillator drive – that's 5mW or 1.4V peak-to-peak. **Note:** Anyone who has seen inside one of these modules will know the transformers are wound with very thin wire. It is possible to damage them by using too much drive.

The absolute maximum local oscillator drive quoted by the manufacturers is 50mW or 4.5V peak-to-peak and the data sheet cautions about using any more than this level. On the other hand, the homemade version is far more rugged and very difficult to damage. I would also advise adding the simple 10nF capacitor and 47Ω termination on the output shown in **Fig. 1**.

The Simplest Receiver

The diagram, **Fig. 3**, shows about the simplest receiver that can be built using a diode ring mixer. This is a direct conversion (DC) receiver; it converts incoming radio frequency signals

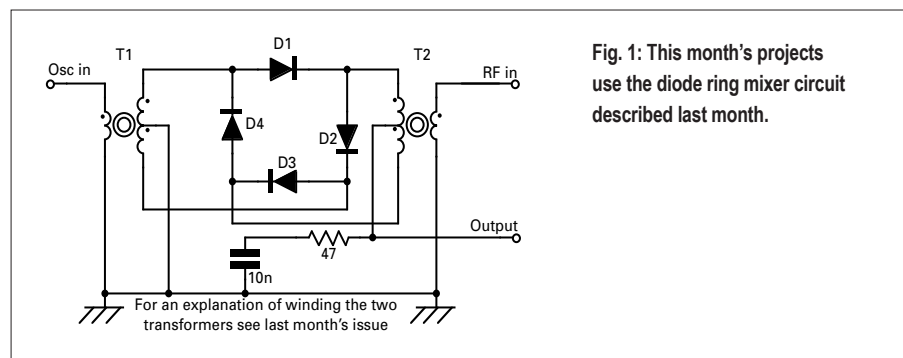


Fig. 1: This month's projects use the diode ring mixer circuit described last month.

directly into audio signals in a single mixing process. The incoming r.f. signal is injected into one port and a tunable oscillator signal is injected into the other port. The oscillator signal is at almost the same frequency as the desired r.f. input signal.

When the oscillator frequency is just above, or just below the r.f. signal, an audio frequency (a.f.) 'beat note' is generated which corresponds to the audio information contained within the r.f. signal. Musical readers will know all about beat notes. When one instrument is being tuned against another (say a guitar against a tuning fork) and the two tones are close in pitch, but not yet identical, the difference in frequency generates a beating effect whose rate is the difference between the two frequencies.

So, in a DC receiver the audio signals are heard both above and below the exact frequency of the r.f. input signal. As can be seen from Fig. 3 additional bits of circuitry are required to produce a viable receiver. The audio output from the mixer will require amplification to a usable volume.

The input r.f. signal requires filtering or tuning so that the wanted signals are stronger than adjacent signals. I have also added an input attenuator to control the amount of r.f. signal entering the receiver. This helps to ensure that strong broadcast signals do not overwhelm the much weaker Amateur Radio signals. The a.f. amplifier can be run at full gain with the input attenuator acting as the receiver volume control.

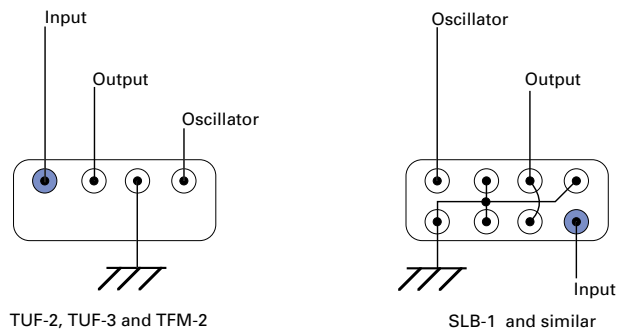
The a.f. amplifier provides all the gain for this receiver. Some losses occur in the mixer, so a high gain audio amplifier is required. I leave the choice to the reader. Many such amplifiers have appeared in previous editions of this column including the example in last month's *PW*.

The diagram, **Fig. 4**, shows the input filter and attenuator circuit. This simple filter uses an off-the-shelf axial inductor of 4.7 μ H. Capacitive dividers allow for a low impedance input and output and form part of the tuned circuit with a trimmer capacitor for fine tuning. A 9.8 to 60pF Murata trimmer (coded – brown) will peak signals at the required frequency.

The attenuator is just a linear track



Fig. 2: Looking at the pins of the two commercial types of balance diode ring mixers



potentiometer to control the amount of signal entering the receiver. This simple arrangement works quite well, although the Z Match tuner between in the input and antenna doubtless helped in my case. Some readers might like to build a better bandpass filter. (A suitable circuit appeared in the August 2012 *CotPW*).

The Local Oscillator

The most difficult part of the receiver is the local oscillator. This receiver is for the 7 MHz (40m) band so the requirement is a stable, variable frequency oscillator for that band. A

variable frequency oscillator (v.f.o.) can be tricky and an alternative is a variable crystal oscillator (VXO).

A suitable VXO is shown in **Fig. 5**. This is a circuit derived from a joint presentation I did many years ago at the Dayton Hamvention with the late **Doug DeMaw W1FB**. I turned to this circuit because I already had one built on a p.c.b. The circuit could be replicated using any method of construction.

The circuit for the VXO is a bipolar transistor oscillator followed by a bipolar tuned buffer stage. My prototype used 2N2222A transistors for both Tr1 and

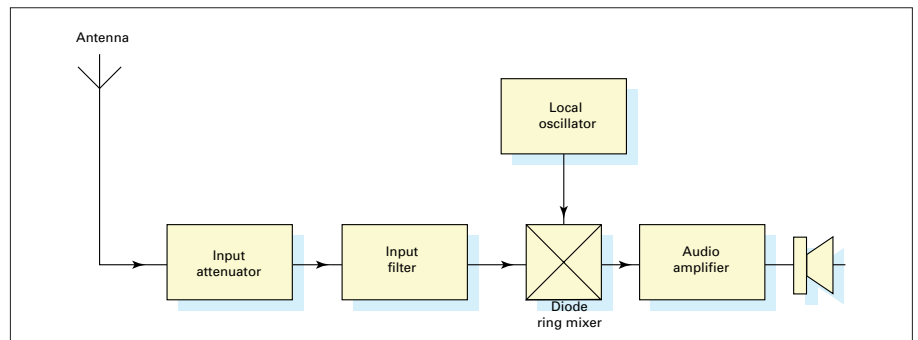


Fig. 3: Several other stages have to be added to make a diode ring mixer into an effective radio receiver.

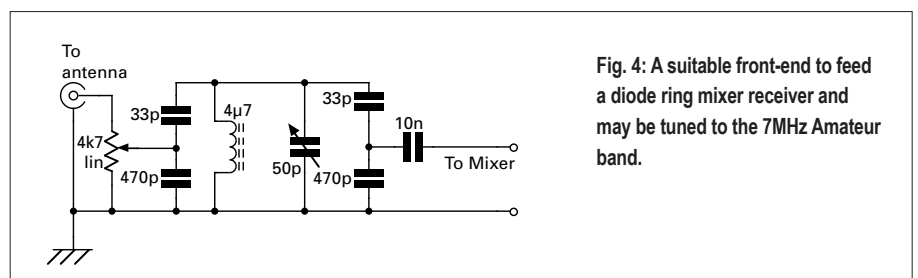


Fig. 4: A suitable front-end to feed a diode ring mixer receiver and may be tuned to the 7MHz Amateur band.

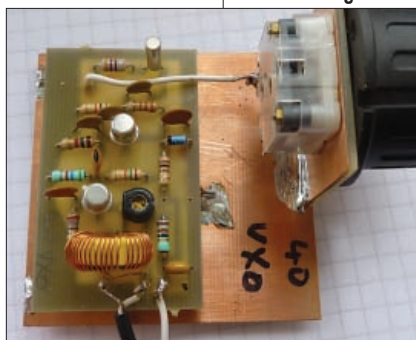
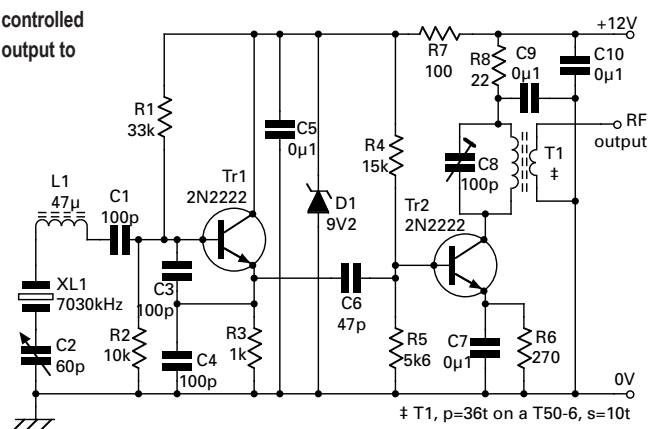


Fig. 5: A variable crystal controlled oscillator with sufficient output to drive the ring mixer.



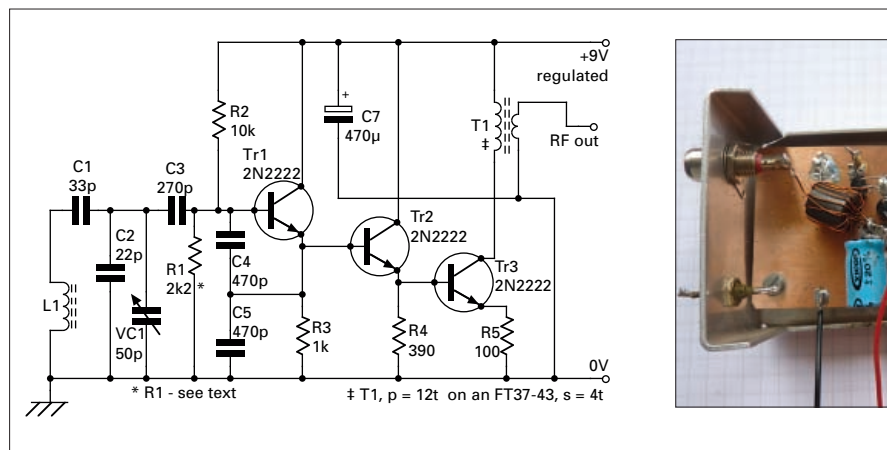


Fig. 6: A suitable v.f.o. to cover the whole 7MHz band, uses a Spectrum 2u6L coil and 60pF for C2

Tr2 but many similar types would work. I used 2N3904 devices in an earlier version.

The oscillator is based on the popular Colpitts circuit. The capacitive feedback is via the capacitive divider provided by C3 and C4.

By using an inductor, L1, and a variable capacitor, C2, the crystal should pull slightly above and below its nominal frequency. The amount of frequency shift will depend upon individual crystals but should be several kiloHertz (kHz). A tuned circuit, C8 and T1, in the collector of Tr2 peaks the output. The capacitor C8 is a Murata 5mm ceramic 10 to 120pF trimmer, colour coded black. The VXO works well but only gives very limited frequency coverage.

A far better alternative is to build a v.f.o. to cover the whole band. The stability of a v.f.o. depends partly upon the rigidity of the construction and the use of high quality parts especially in the tuned circuit. Usually a good quality air-spaced variable capacitor is advised and these are difficult to find and expensive to buy.

I wanted to see what sort of stability is possible with a common polyvaricon variable capacitor and a commercial coil. Two gang polyvaricon capacitors with a value of 140pF and 60pF are easy to obtain and in recent times the **Spectrum Communications** 10mm 10K coils have offered inductance ranges right across the shortwave spectrum.

Temperature Stabilised VFO

In the **G QRP Club's** journal *Sprat* number 141 (Winter 2009) **Bozidar Pasaric 9A2HL** submitted an article entitled *A Temperature Stabilised VFO*. Bozidar had been reading a paper *Multipurpose VFO for your rigs* by an Indian radio amateur **N. S. Hari Sankar VU3NSH**. Incidentally, the VU3NSH

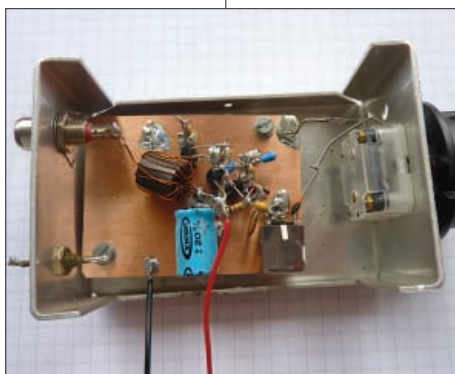
article ends with the quotation I've used at the head of this month's column.

The article says that high frequency (h.f.) oscillators using bipolar transistors are considerably more stable if they work in Class A – that is if their base voltage is positive in relation to their emitter voltage by about 0.3 to 0.5V. Bozidar offered a circuit to illustrate the point. The diagram, **Fig. 6**, is a modified version of that circuit. **Note:** I changed the values to suit 7MHz and added an extra stage to give more drive for the mixer.

Once again it is a Colpitts oscillator, C4 and C3 providing the capacitive feedback. The transistors are 2N2222A although any similar device, like the 2N3904, would do the job. The inductor L1 is a Spectrum 2u6L coil and VC1 is the 60pF section of a 140+60pF polyvaricon variable capacitor. The advantage of the Spectrum coil is that the frequency range can be adjusted using the core of the 2u6L coil.

The frequency determining capacitors, C1, C2, C3, C4 and C5 should be n.p.o. or polystyrene types to assist frequency stability. The oscillator needs to be built in a manner that ensures that the components are rigidly mounted. My prototype uses "ugly construction" which a good method for v.f.o. building.

Two critical parts are the resistors R1 and R2 that form a voltage divider to set the voltage on the base of Tr1. The value of R1 should be adjusted until it is such that the voltage measured between the base and emitter of T1 is in the range 0.3 to 0.5V. I began with a 5kΩ preset resistor and



adjusted the value until the voltage measurement, as shown in the diagram, was in the desired range.

I then removed the pre-set and measured the resistance. I then selected the nearest standard preferred value of resistance added as R1. In my

case this was 2.2kΩ. The transformer, T1, matches the output to 50Ω and is 12 turns of 26 s.w.g. wire on an FT37-43 ferrite core with a 4-turn link winding.

The photograph shows an alternative version wound on a large ferrite bead but this proved to give less output than the FT37-43 version. Note that the oscillator calls for a stable 9V supply. A PP3 battery is fine but – as I discovered – it must be a new battery. I found that older batteries [(slightly down in voltage) gave poorer stability.

I was pleasantly surprised by the results I obtained from the v.f.o. The frequency stability was better than I expected from an oscillator using a polyvaricon capacitor and a coil with an adjustable core. Upon switch-on there was some slow drift but once the transistors were up to temperature the v.f.o. was surprisingly stable. The real test came when tuning single sideband (s.s.b.) stations on the band. Once adjusted for clear speech reception, the signals remained stable.

I can commend Bozidar's circuit, with the voltage adjustment, for building a v.f.o. project. For those who wish to try other bands **Table 1** suggests possible values for three more bands. These are only 'ballpark' figures and may require experimentation. VC1+C2 is the combined capacitance of the fixed and variable capacitance in the tuned circuit.

The ratio of fixed and variable capacitance will depend upon the band and will need experimentation. Note that C3 in the v.f.o. of Fig. 6 is a series capacitor to reduce the tuning range and a similar capacitor may not be required for larger bands. Also – good luck if you try 14MHz – it's at the top end of stable homemade v.f.o. construction!

Table 1

Band	L1 coil	VC1+C2	C3	C4 & C5
1.8 MHz	11u0L	200pF	1000pF	2200pF
3.5 MHz	5u3L	120pF	510pF	1000pF
14 MHz	1u2L	30pF	120pF	250pF

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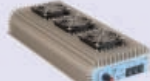
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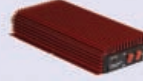
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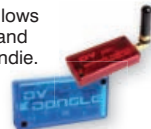


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Eddystone Radio & SDR?

An Intriguing Idea From M0JXM!

Dennis Easterling M0JXM describes his approach to an Easy Multi-Band Software Defined Radio



The Eddystone EB35 MkII with the SDR addition mounted in its screened box attached to the top strut at the rear of the receiver.

I recently picked up an old Eddystone EB35 MkIII radio from a junk sale. I had no immediate need for it, but remembered as a young man lusting after one, with its beautiful smooth tuning and clearly calibrated analogue dial. However, I realised that this particular model wasn't designed for transmitting Amateurs or commercial work – but aimed at short wave listeners.

As well as the f.m., i.f. and m.f. bands, it has three short wave bands covering 1.5 to 22MHz, although the Amateur allocations look very cramped. It originally had no provision for s.s.b., c.w or digital working and so a previous owner had fitted a neat single frequency beat frequency oscillator (b.f.o.) in the intermediate frequency (i.f.) chain, but resolving these signals proved very tricky indeed.

A glance though the radio journals revealed an advert for a modern commercial receiver, providing I-Q outputs as well as working in a conventional way. These outputs, connected to the stereo input of a computer's sound card, allow the radio to

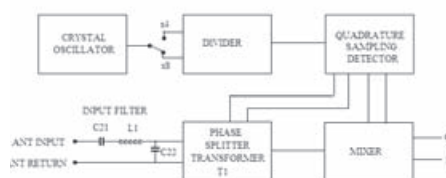


Fig. 1: The block diagram of Tony Park KB9YIG's 'Softrock' SDR receiver supplied with the kit.

be used in a similar fashion to a software defined radio (SDR). The advantages are panoramic display with easy selection and resolution of s.s.b., c.w., digital signals and filtering opportunities using the appropriate software.

An SDR Adaptor For The Eddystone?

I then wondered – would it be possible to fit a suitable SDR adaptor to the Eddystone? A good start seemed to be one of the SDR kits designed and supplied by **Tony Parks KB9YIG**. These were a cheap introduction to SDR working as well as surface mount construction techniques.

I had already made the KB9YIG

3.5MHz (80m) kit, which was unused but still in working order. I thought it could be an ideal SDR adapter, so, I modified it to operate at the i.f. frequency and, connected it to the input of the Eddystone 2nd i.f. transformer.

The first task was to review the circuit and construction of the Eddystone. I was lucky in having a circuit diagram and service manual to hand, and quickly established that the i.f. was 455kHz, with a +9V power rail.

The SDR kit instructions state the 9 to 12V power requirement should be no greater than 40mA, in fact my kit only takes a measured 17mA – well within the capability of Eddystone 9V power supply unit (p.s.u.), which can even be called upon to light the dial lamps. The previous owner had already installed an on/off switch for the b.f.o., which I removed to provide space for the switched supply for the SDR.

The next job was to remove the Eddystone case and see how easy it would be to install the SDR. Before that, it was necessary to remove the power unit from the back panel. This model was supplied with either a battery power unit or a mains driven type.

To avoid touching bare tags connected to the mains voltages behind the power unit, it's very important to ensure that the receiver is first disconnected from the mains supply. Also note that the Eddystone **On/Off** switch controls both mains and the +9V d.c. rail, so care must be taken during any test and measurement procedure when the case is removed. (See heading picture)

Having undone the two screws holding the power unit onto the back plate, I carefully supported it while easing off the connector at the rear. Note that the connector is reversible, so I was very careful to insert it the correct way round later. (Indicated by the yellow dots on the connector and adjacent housing) Also the connector tags are easily bent and may short out and so they were inspected carefully after insertion.

The Eddystone case could then be removed by releasing the four corner screws on the back panel. I then saw that the receiver uses a single p.c.b. with easy access to both sides, although mounted upside down so that the components are on the underside while the tracks are on top.

The heart of the receiver is a TBA570 integrated circuit (i.c.), that provides the i.f., demodulator and a.f. amplifier stages, while discrete semiconductor stages provide the local oscillator, mixer and output functions. In common with receivers of this vintage, a separate sealed module feeds f.m broadcast

signals at 10.7MHz to the TBA570 i.c.

It seemed to me that there was plenty of room to make minor modifications to the Eddystone and to house the SDR, which could be secured to a strut adjacent to the loudspeaker. Access to the 2nd i.f. transformer was easy, as it is already brought out to Test Point 2 on the p.c.b.

To avoid loading the i.f. tuned circuit and reduce the possibility of feedback from the SDR, I wired a simple transistor buffer amplifier across the appropriate tracks leading to the TBA570 i.c. A screened lead taking the output to the SDR.

The SDR Unit

Let's now turn back to the SDR receiver. I can show only the block diagram in **Fig. 1** due to space limitations, but the r.f. input is tuned by L1 and associated capacitors before passing to transformer T1.

The secondary of T1 feeds the quadrature sampling detector IC4. The output joins the incoming signal at the mixer i.c. U5 to provide the I-Q feed to a PC sound card for final processing.

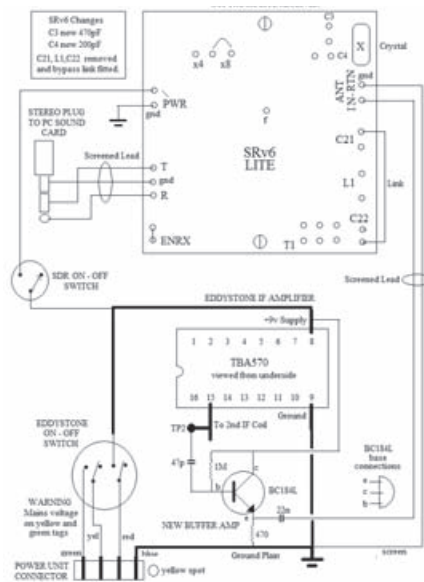
The QSD sampling frequency is controlled by a crystal oscillator comprising transistors Q1 and Q2 together with dividers U2 and U3, with the final frequency normally set at the centre of the required receiver band. A link allows either divide by 4 or divide by 8 to be set.

It seemed therefore, that only a few simple modifications were required to the SDR receiver. All I had to do was by-pass the existing input tuned circuit C21, L1 and remove C22, as this function would be provided by the Eddystone IF transformer. Then I had to rewind T1 to take into account the lower input frequency, making the primary 20 turns and the secondary 2 x 10turns bifilar wound. (Later this modification was found unnecessary).

Finally, I made the switch frequency fed to the QSD i.c. U5 close to the 455kHz Eddystone IF. The place to check the final frequency is the eyelet shown (**Fig. 2**) as point f just above the 'v' in the SRv6 legend.

The crystal table supplied with the SDR kit suggests a crystal frequency of 3.5600MHz divided by 8 for 455kHz working. My nearest available crystal was 3.57945MHz (let's consider it as 3.58MHz) which divided by eight produced a sampling frequency of 447kHz. This is 8kHz lower than the centre of the i.f. response, but well within the possible range afforded by my soundcard sampling rate of ± 48 kHz.

The panoramic display range would then be determined by the Eddystone i.f. response, and is of the order of 15kHz, while I found the annoying highlighted



pulse caused by the SDR function sat nicely at the far side of the display. Working at this frequency, the value of two capacitors on the SDR board had to be increased to ensure reliable operation. (The capacitor C3 is now 470pF and C4 becomes 200pF).

Having completed the modifications, I mounted the SDR in a standard 4 x 3 x 1in metal box. I arranged it with short leads coming out to a tagboard for ground, +9V supply, provided from the Eddystone i.f. stage and I-Q outputs for the PC.

Having installed the SDR box in the Eddystone, I made connections to the new buffer amplifier and +9V rail. Finally, a twin screened lead was fitted running from the SDR I-Q tags to a new stereo connector on the receiver back panel. I then arranged twin screened lead to connect this to the stereo microphone input on the computer.

Software Packages

There are various software packages that can be used with the arrangement I've described. One that I use, is

Fig. 2: Interfacing the Softrock receiver into the Eddystone receiver (based on the SDR kits supplied overlay – Note there are later versions of the Softrock receiver with differing lay-outs).

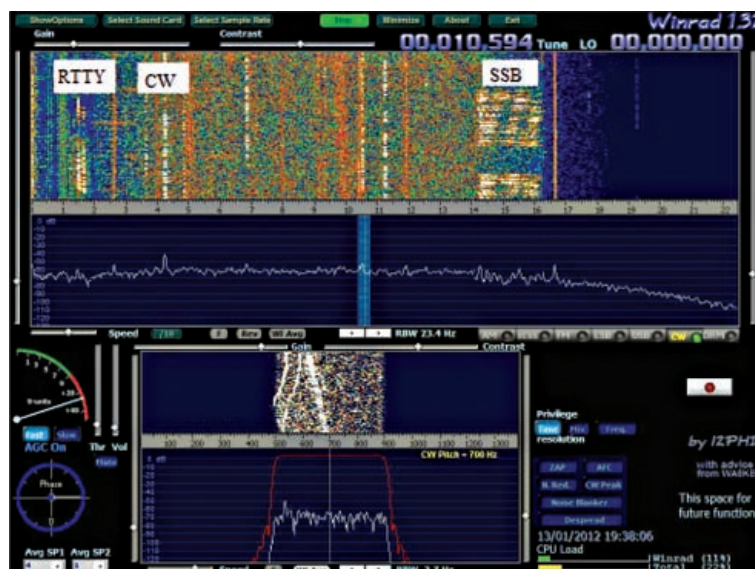
Winrad, available free from the Internet like many of the SDR software packages. The obvious question is – was the installation of the SDR adaptor worth while? The answer is a definite **yes!**

First and foremost, it has the effect of bandspread, so that an Amateur band presented on the dial as 10mm or so now becomes several PC screens wide! Secondly, the modulation mode (c.w. s.s.b., RTTY, etc.) is easily recognised and resolved.

I can simply tune the Eddystone to an appropriate part of the band and I'm presented with a PC display showing perhaps half a dozen c.w. or s.s.b. stations, when a click of the mouse will bring the selected signal loud and clear to the PC loudspeaker. There was just one oddity using the Eddystone in this way – upper sideband (u.s.b.) signals appear as lower sideband (l.s.b., and vice versa for l.s.b.).

Although the Eddystone lends itself to this type of modification, solid state radios of a similar vintage should work just as well. The arrangement could also work for valve operated radios, though it would then be best to power the buffer stage and SDR adaptor from a separate low voltage supply.

Nowadays, service manuals and circuit diagrams are often available over the internet, and a quick survey will indicate the feasibility. Many of these little SDR receivers have been built and perhaps languishing on a shelf in someone's shack, dying to be put to good use. So, try it out for yourself!



A typical SDR screen.



Ben Nock G4BXD's Valve & Vintage

c/o PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW
E-mail: ben@radiomuseum.plus.com

Ben Invents 'Shed Surfing'!

This month Ben Nock G4BXD – as a direct result of his new 'sporting' activity of 'shed surfing' – rediscovers an interesting Eddystone receiver and this sets his thinking back to the early 1970s and a shop filled with Eddystone products.

A very big welcome from the Curator of the **Military Wireless Museum** in

Kidderminster – as it's my turn once again to man the *Valve & Vintage* shop.

It's been an interesting few months since we last met, mainly wet it has to be said – but at last the sun is out as I write this so things are looking up.

There have been quite a few visitors to the collection, both domestic and International and several new items obtained. I've also spent a lot of time simply sorting through the numerous boxes still in storage!

New Sport Invented!

Next, I've got some exciting news – I have invented a new sport. It's called 'Shed Surfing'! You just throw open the door of the shed and then you launch yourself into the interior. Cardboard boxes fly left and right, giant spider's webs clog the airways and hair and knuckles get banged on sharp bits sticking out. But, it's great fun!

On one such 'surfing' experience I found a large box, wrapped tightly in plastic and taped up. Exiting to the fresh air I proceeded to unwrap the catch to discover it was a rather nice Eddystone EC-10 Mk I receiver still in its original sales box.

The box, **Fig. 1**, contained the receiver, the small handbook, a leaflet advertising the set and mains pack and some leads that someone had made for the antenna connection. I expect many of you will have had an EC10 at some stage in the hobby. It was and is one of the more common Eddystone sets found on Radio Amateur's shelves.

Eddystone started their transistor era with the *Stratton Portable*, in 1961. It was believed by Eddystone that a market for such existed but it was over-priced for the specialist niche it was aimed at – and apparently only three examples were ever made.

The next year Eddystone produced the Type S960. This was basically a model S940 with the valves replaced with transistors. This tuned 500kHz to 30MHz, ran off an internal 12V battery



Fig. 1: The original Eddystone box the sets were sent in.



Fig. 2: The EC-10 receiver, nice big tuning scale.

and had an internal speaker.

The performance of the 960 never matched that of the 940 and after two years production stopped. By this time, learning from the previous models sets, the EC-10 receiver had been designed and put into production.

The EC-10 series was indeed one of the most successful ever produced by Eddystone. The original EC-10 production ran from 1963 to 1969. The early sets had single coloured smooth control knobs with later sets having the now familiar two-tone wedge shaped knobs.

The receiver, **Fig. 2**, was (and still is) a delight in design. Only 305mm (12in) wide with a tuning scale the width of the set the receiver was light and sturdy. The tray at the rear could be fitted with a battery holder or a mains power pack and the set has an internal speaker fitted.

The example in the photo appears to be in good condition. And despite the Germanium transistors used in the set, OC171, OC71 and OC83 (which are known to deteriorate after 30 or 40 years) when I applied 12V, the set burst into life with vigour using just a short length of wire antenna.

I recall visiting London with a good friend back in the 1970s and finding a shop selling Eddystone sets. Shelf-upon-shelf of gleaming sets along with the EC10 (the Mk II by then). I commented to my friend that though it was nice looking it was of no use to Radio Amateurs due to the tight tuning range. Hearing this, the salesman threw his arms up and ranted something about "blasted radio hams and their pathetic needs!" Needless to say we beat a speedy retreat to the street and the other bright lights of London town!

Internally this example of the set is very clean, **Fig. 3**, and looks free from any modifications or repair. There's a slight crackling from the volume control and the push-button switches – but as the set has not been used for over 10 years that's probably not surprising. I do have the earlier (smooth knob version) as well, but this will be a nice addition to the Eddystone shelf.

The Semiconductor Age

The arrival and success of the EC10 in the Eddystone stable brought forth a whole series of 'transistorised' sets. The 'C' in the model number is supposedly for 'Communications' variants but in 1965 the EB series started with the EB35, a 'B' for broadcast style set and having no beat frequency oscillator (b.f.o.) and is designed for listening to domestic broadcast stations only.

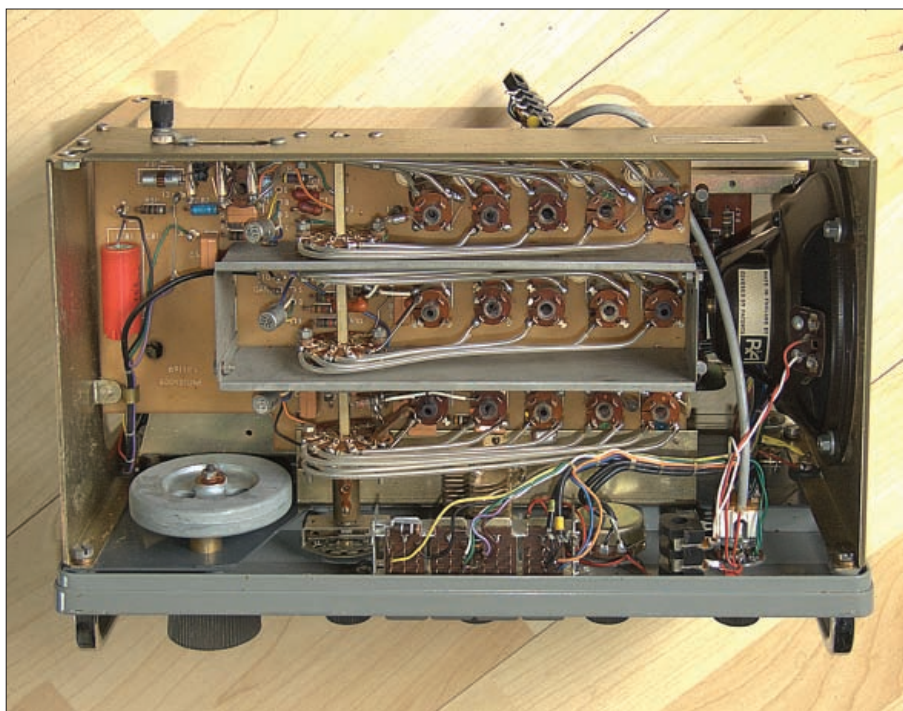


Fig. 3: The EC-10 coil pack and switching, very clean.



Fig. 4: The EB36 and EY11 sets above an early EC10.



Fig. 5: The UHF 990S above the VHF 990R receiver.

The EB35 tuned Long, Medium and Short waves up to 22MHz and the Band II broadcast band of 88 to 108MHz. In 1970 the EB35MkII/S was produced which had a stereo decoder fitted which could be used to drive an external Hi-Fi amplifier. In 1976 the EB35 Mk III 'Statesman' came out with the new silicon transistors of the time and even an integrated circuit!

But back in 1966 the EB36 also appeared, this was very similar to the EB35 with the exception of the Band II band (the 'f.m.' band) with a special version, the EB36A appearing in 1969. This had a narrow intermediate frequency (i.f.) amplifier with ceramic filters fitted. The three sets illustrated, **Fig. 4**, are the EB36 at the top, the rather rare EY11 in the middle and an early EC10, with the round moulded knobs at the bottom.

The EY11 is something of a special set. Even though this example looks like an EC10 MkII (same style case, etc.) there are only two examples of the EY11 known. The original example is in an even smaller cabinet, around 25mm (1in) narrower than normal EC10 case.

Eddystone were very keen on making numerous 'one offs', and trials of sets for 'this or that market' and to customers' requests. The EY11 was originally intended as a Yachtsman's Navigational receiver using the Consol method of position fixing around at the time.

Incidentally, The Consol method of position-fixing was actually a technique 'appropriated' from the Germans during

the Second World War. Their system, called Sonne or Elektra-Sonne was a long distance – working up to hundreds or even a thousand mile range – system, which allowed German U-Boats to get a fix on their position way out in the middle of the Atlantic ocean.[1]

Just the one example, the original design model, was thought to exist until I found the second set at a radio rally some years ago. I saw it on the bring and buy stall and sent my partner, **Gloria**, off to inspect and purchase it.

However, it was not until later in the day – while I was sitting resting from all the walking around – that I actually got to look at the set and then I noticed it wasn't an EC10. It differs to the standard EC10 in frequency coverage and the fact that a directional antenna can be used to give bearing details to allowing position-fixing to take place.

High Frequencies

The earlier 1953 valved model 770R and the 1955 valved model 770U, the very high frequency (v.h.f.) and ultra high frequency (u.h.f.) receivers respectively were revamped in the late 1960s into transistorised forms as the 990R and 990U.

Shown in **Fig. 5**, the 990R, is the lower of the two sets. It's a single conversion superhet design with 38 transistors and it covers 27 to 240MHz in four bands and can resolve amplitude and frequency modulated (a.m. and f.m.) signals and even has a b.f.o. for Morse Code reception.

The 990U has 42 transistors and tunes 230 to 870MHz in two bands. It's mains a.c. or 12V d.c. powered, it has a tuning meter, a built-in loudspeaker and a crystal calibrator fitted. It's a single conversion set with an i.f. of 36.5MHz with a selectivity bandwidth of 1MHz on f.m. and 1 or 6kHz on a.m. modes. The full width tuning scale and smooth flywheel tuning does indeed make operating and listening a delight on these sets.

A great deal of very interesting information on Eddystone sets can be found at the **Eddystone User Group** web site with articles on restoration, manuals and circuits for most of the sets. There's also a downloadable *Quick Reference Guide*, which details a lot of history of the company and the sets produced. It's well worth downloading and taking a look.

And Finally

Well, its time to close the shop but may I remind you that visitors to the Military Wireless Museum collection are always welcome. As usual with this issue, as it's my last before Christmas, I will wish you all "a very Merry Christmas and a prosperous New Year". There are more pictures at www.militarywirelessmuseum.co.uk As always I can be contacted via ben@radiomuseum.plus.com Cheerio for now!

[1] Further reading on Consol: <http://jproc.ca/hyperbolic/consol.html>

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The World of VHF – 50MHz and Up!

Tim Kirby G4VXE, pays tribute to Bryn G4DEZ, has good news for all you TV dongle owners and presents your latest v.h.f. reports

Welcome to the *World of VHF (WoVHF)* and I start this month by saying that I was sorry to learn of the death of **Bryn Llewellyn G4DEZ** on August 17th, following a suspected heart attack. Bryn's callsign will be well known to to many readers of the column and to members of the v.h.f./u.h.f. community worldwide.

Bryn's signal was a beacon from JO03 and I can't count the number of times that I heard him working stations across the North Sea on 144 and 432MHz that I couldn't hear a sniff of! Bryn was a keen supporter of RSGB v.h.f./u.h.f. contests and at one stage had been the VHF Contests Committee Chairman, taking the reins in 'interesting times' in the mid 1980s.

Like many others, I shall miss Bryn's activity on the bands and I am sure you will join me in sending sympathy and condolences to his family. He'll be much missed!

Scanning With The TV Dongle

If you saw the item in last month's column about the use of the TV/DAB USB dongle as a bargain SDR receiver, you may be wondering what else you could do with it. Using the *SDR#* software, the one thing I found missing, was the ability to scan various memory channels.

However, **David Robinson WW2R** (Dallas, Texas) alerted me to the version of the *SDR#* software from **Abed Benbrahim K5DEV**. Abed has built the ability to scan across memories – and has a video showing these facilities on his website: www.k5dev.com This looks powerful and easy to set-up, so if you have your dongle working, all you should need to do it is to install the new version of the *SDR#* software (which doesn't need to replace the old version

– so, you can just install it in a different folder).

The 50MHz Band

Paul Bowen M0PNN

(Newport, Shropshire) reports a bit of a mixed month with a decline in the number of Es openings, but still some interesting contacts. The highlights of Paul's interesting log are August 1st; YU7AS (KN05), HA3HX (JN86) via Es as well as 2O12L on tropo, August 5th Es to SP/9A, August 7th Es to YU, I and F/PA2M (JN14). Paul made some JT6M QSOs during the Perseids meteor shower on August 12th, working PA6FUN and EI9E/P.

The highlight of the month though was working PY1NX and PY1RO on the evening of August 12th – possibly a combination of Es and trans-equatorial propagation (t.e.p.) perhaps? Paul followed that up with another JT6M meteor scatter QSO with S50L later that evening. There was Es to E7 on August 13th and then to OK on August 21st with OH5XO worked by Es on August 30th. Fewer big openings perhaps – but plenty of interest and to reward frequent activity on the band.

It's funny how perceptions of the Es season differ. For me, I would say that 2012 has proved quite a good and interesting Es season, particularly on 50 and 70MHz. But when **Ernie Stagnetto ZB2FK** (Gibraltar) checked in, I felt it had been one of the poorer years!

Experience in previous sunspot cycles has been that Es is often poorer towards the top of the cycle. However, I'm not sure that I have ever seen a scientific proof to back up (or disprove!) my rather anecdotal suggestion!

The other variation for this season, suggested by some (with good reasoning I feel) has been the different

location of the jetstream for much of the summer. For me, this is one of the fascinations of radio propagation and the nuances and variations keep things interesting, year after year.

It was good to catch up with **Mark Marment CT1FJC's** (the Algarve, Portugal) news for July and August. Mark had found that in general July was a disappointing month compared to some previous years, but all the same there were some nice QSOs including 1A, ER, EX9T, UN3M and a very nice surprise was SV2ASP/A (Mount Athos in Greece) for a new DXCC entity.

Mark says that August has been a little slow, but that t.e.p. into Africa and the Indian Ocean has made up for that. The best DX was a c.w. QSO with D64K (LH18) in the Comoros islands – a new country for Mark and much enjoyed.

Mark also says that it was difficult to break the European pile-up to work him but he waited and waited until the propagation had moved west of the main centre of activity that evening (Italy). And just before propagation moved to the west of Mark, he was able to make a 599 QSO both ways.

Other nice QSOs have been with C5YK, worked on s.s.b. who has been heard on several evenings since as has V5/DK2UU who Mark has worked on both c.w. and s.s.b. – Mark says openings have been quite short. There have also been some t.e.p. openings into South America starting up, which will hopefully develop over the coming weeks.

Graham Boor G8NWC (Spalding, Lincolnshire) also noticed that the Es were slowing down somewhat, but he found a nice opening on August 18th, working YL2LW (KO26), LA1UW (JP52), LY1R (KO14) and YL2GP/P (KO07). Graham says that he has really enjoyed being active on 50MHz this year and that the Moxon antenna that he made (for a cost of 50p!) has proved a big improvement on the dipole.

John Worsnop G4BAO

(Waterbeach, Cambridgeshire) got back on 50MHz at the end of August after a long break. He particularly enjoyed some interesting meteor scatter contacts using WSJT's ISCAT mode which John thinks is significantly better than JT6M.

John worked EA2ARD (IN93), EA5/G3XGS (IM98) and S58P using ISCAT. A nice QSO on tropo during the contest

on August 28th was G4OBK (IO94). He runs a Kenwood TS-2000X with around 80W to a YU7EF 50/70MHz dual-band Yagi antenna, which has 5-elements on both bands.

Peter Goodhall 2E0SQL (Oxford) enjoyed the RSGB UK Activity Contest on August 28th, with the highlights being M1MHZ (IO92), 2O12L (JO01), G1XOW (IO93), M0WAF (IO92) and G7RAU (IO90). Pete is now using an HB9CV antenna for the band.

Here at **G4VXE** I was pleased with an unusual QSO on August 11th. I saw a tweet from **Ken Powell G0PPM**, who was located on a mountain top near Abergavenny in Wales, operating as GW0PPM/M. We were able to exchange weak c.w. and s.s.b. signals for an interesting 'ground wave'/tropo QSO.

I found an Es opening to Scandinavia and the Baltic on August 18th, with SM, YL, LA being worked. I also achieved a very interesting QSO with GB0BL (IP90) operating from Bressay Light on Shetland during the Lighthouses on the Air weekend. I also heard EA6SA (JM19) and worked him briefly on August 20th with EA1EJ (IN62) and CT1EUB (IM67) worked on August 22nd and EA7DUD (IM76) on August 26th.

The 70MHz Band

On 70MHz, John G4BAO has had a good time. During Es on July 1st he worked several SP stations as well as YO8RAW (KN36) and OM3CLS (JN99). During the Aurora on July 9th, John worked GM4JYB (IO88). A highlight by Es on on July 13th was SV5BYR (KM46) over a distance of around 2800km. Another Aurora on July 15th provided QSOs with GM4DIJ (IO85) and G4ASR (IO81).

The RSGB 70MHz contest on July 22nd was interesting with the best DX being GM4SIV/P (IO75) at 515km, but G4TSW in the south-west, a good distance at 301km. John had just one QSO during August, OZ1JXY (JO46) worked by Meteor Scatter on August 29th.

Mark Marment CT1FJC (Algarve) found a couple of openings, the best of which was on July 28th when he worked 15 QSOs in I, 9A, PA, G and ON, including 2O12L. On August 4th, Mark caught another opening to the UK, working G0JLO, G4IZH (IO94) and G3WZT (IO90).

The 70MHz log at G4VXE is a little more sparse this month, but I made some f.m. QSOs including several through the MB7FM 'parrot' located at Tring. I also managed ES1CW (KO29) who I worked by Es on August 18th.



Fig. 1: Panos Dadis SV1GRN operated at the fire observatory of Pikermi, where with a Yagi antenna supported on a lightweight guyed temporary vertical mast. What glorious weather for a day out!

The 144MHz Band

Reg Woolley G8VHI (Nuneaton) thought August was a very productive month for him, with eight new squares worked over the month, all using the WSJT meteor scatter mode FSK441. Reg's log includes; August 5th EA4EHI (IM68), August 8th OK2PWY, HA6VV/P, SP6NVN. August 11th HA500, August 12th LA9DFA (JP60), OE1IKW/3 (JN77), 9A5RJ (JN86), UW8SM/P (KN39), UT5ST/P (KN30), UT5DL/P (KO18), EW/UR5GO (KO42), YT3N (KN04), SP4K (KO03), S51AT, I5TWK/8 (JN70), IV3NDC (JN68), August 13th R1BMS (KO48), EW/UY5HF (KO32), EW1CD/2 (KO34), HB9FAB.

Reg uses a Kenwood TS-2000X with 300W output to a 2 x 9-element DK7ZB Yagis. A nice log – very interesting!

Although I didn't make any QSOs during the Perseids meteor shower at G4VXE, I did leave my receiver running on 144.370MHz for a couple of evenings to see what could be heard, with the computer set-up to de-code the FSK441 signals. Results were good and

the highlights were EA3AXV, YU7TRI, IN3FFN, S50C, YO2LAM, SP2HMR, SP2OBQ, SP4K, I8KEV, DL0HOF and S51AT.

My antenna system used for this was a lot smaller than Reg's as mine is a single 5-element Yagi antenna. However, it shows that effective Meteor Scatter doesn't require an enormous antenna system.

With the changing conditions as we moved from Summer to Autumn, I noticed more tropo on 144MHz, particularly in the mornings. On August 19th I worked F6CRB through the FZ2VHC repeater located at Le Havre on f.m.

The RSGB 144MHz trophy was quite an eventful one for me! On September 1st I worked a number of G portable stations as well as TM2K (JO10), PA6NL (JO21), ON4WY (JO11) – in fairly flat conditions. Next day September 2nd I heard and worked F5OAU/P (JN27).

Unfortunately, as conditions weren't that good, I 'overcooked' the drive to the



Fig. 2: Peter Goodhall 2E0SQL operating as 2M0SQL/P in Scotland, successfully making QSOs through the SO-50, FO-29 and AO-27 satellites from IO87IR square.

power amplifier (p.a.) and the gamma match on my 5-element antenna failed – so the antenna is going to need to come down! However, the good news is that I am looking forward to trying a 6-element LFA Yagi from the Innovantennas range. To add insult to injury, it looks like the 4CX350A valve in the amplifier failed at the same time as the Yagi. Perhaps I will stick to the barefoot rig for a while!

Of course, with the beam out of use conditions improved! As I was leaving home for the station on September 7th, I switched on the mobile rig and the first station I heard on 145.650MHz was the ON0WV repeater at S7, followed by a French repeater all before the local GB3WH repeater in Swindon transmitted its identity signal!

On the morning of September 8th from my home station, I worked the station from the Manchester Olympic venue GB2012MV on f.m. simplex – a fair haul from Warrington to Oxfordshire. Next morning September 9th, conditions had deteriorated somewhat, but I was still able to work M0RZF (Portsmouth) and M6DOA (near Chester) on f.m. simplex.

Paul M0PNN was delighted and a little surprised when F8IQS (IN99) came back to a c.w. CQ on 144.050MHz on August 18th. As Paul says, “you never know who’s listening!”

Panos Dadis SV1GRN (Athens, Greece) had planned to be active from the summit of Mount Parnitha, at around 1200m during the Region One field day

on September 1st and 2nd. However, owing to high winds and because of a high risk of fire, access to the summit was denied by the authorities. Instead, Panos operated from the fire observatory of Pikermi (KM18xa) at around 300m and he was able to make some nice QSOs using the FT-817 and 6-element Sandpiper Yagi including; SV9/SV1MNE/P (KM27), SV1NJX/P (KM17), SV3PLJ/P (KM17), SZ3P/P (KM08), SV3/SV1JGW/P (KM18), SV1BJY/P (KM18), SV3/SV1IEG/P (KM17) and SZ8L/P (KM08). It’s also good to read that there is such good 144MHz portable activity in Greece.

Mark Marment CT1FJC caught a quick Es opening to F, ON and G on July 4th with the best DX being ON5AEN at 1832km. Mark was pleased to work R1BMS (KO48) via moonbounce on July 21st.

Terry Gabriel M0VRL (Delabole, Cornwall) found an interesting tropo opening to the south west on September 1st and 2nd working EA8CTK, EA8TX and CT1ANO on the evening of September 1st. The CU8DUB/B beacon from the Azores was heard weakly to start with, but later in the evening Terry worked CU3EQ and CT8/K0RUI as well as EB8BRZ and EA1YV.

The conditions were short lived though as by the morning of September 2nd CS3BTM/B and ED8ZAA/B beacons were both heard at S7-S8 but within an hour they were gone. That path to the south-west to EA1, EA8, CU and D4 is

such an interesting one! Surely it is the European equivalent of the fascinating California to Hawaii path which provides such interest on the VHF/UHF bands.

Graham G8NWC was pleased to work F8BRK (IN99) during the UK Activity Contest on August 1st.

Nigel Booth M0CVO (Grantham) worked PD4HDB during the opening on September 8th running just 4W from his Yaesu FT-817.

Rob Law MW0DNK (Anglesey, North Wales) was pleased to make a D-STAR simplex QSO using his IC-E92D handheld from Anglesey to a mobile station near Lancaster with excellent quality signals. That’s the nice thing about D-STAR and digital signals in general, as long as you have sufficient signal strength, the quality is great.

Perhaps it is worth a reminder that the Digital Voice (d.v.) simplex calling frequency on 144MHz is 144.6125MHz and on 438MHz it is 438.6125MHz. In fact, QSOs on these frequencies are getting much more frequent than they used to be, so if you are active on D-STAR it is well worth calling “CQ” on these frequencies from time-to-time.

The 432MHz Band & Above

Not many reports for the higher bands! Here at G4VXE, the GB3OV (Ouse Valley) and GB3SK (Canterbury) repeaters were heard on the morning of September 8th. Additionally, weak signals but no positive identifiers were heard on some of the Dutch repeater channels around 430MHz.

Rob Law MW0DNK (Anglesey) enjoys 23cms f.m. operation and was pleased to work into the GB3SE repeater near Stoke on Trent whilst he was working near Oswestry on September 8th.

Satellite Operations

An interesting log as always from **Peter Goodhall 2E0SQL** (Oxford). Peter was active using his portable set-up when he was in Scotland, operating as 2M0SQL/P successfully making QSOs through the SO-50, FO-29 and AO-27 satellites where his activity from IO87 was very welcome.

From home in Oxford, Pete has been operating as 2O0SQL, the highlights of which are; August 17th UA9CS (MO06) via FO-29 and R3MW (KO97) via VO-52. Pete worked UA9CS again on August 30th as well as OM0AAO (KN09) along with several French and Italian stations. OH5LK was also worked on August 30th, using the VO-52 satellite. See you next month – keep writing!



Carl Mason GW0VSW's HF Highlights

2 Golwg-y-Bryn, Woodland Road, Skewen, Neath, Port Talbot SA10 6SP

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Don't forget – all reports to Carl by the 15th of each month please!

A New Zealand Amateur's Approach to Earthing!

Carl Mason GW0VSW presents his monthly round-up of your h.f. activities and Peter Leng ZL4TE shares his earthing experiences. Please send all your reports to Carl by the 15th of the previous month.

Welcome to this month's *HF Highlights* (HFH). We have mentioned 'earthing systems' in the column before and the advantages and disadvantages they can have on our antenna systems. Lower frequency operation usually benefits from a good ground or radial system but this does not necessarily help when we are using higher frequencies. Regular *PW* reporter **Peter Leng ZL4TE** in New Zealand wrote in to say he has begun what was to be last year's 'Spring' project.

A broken leg and a bad dislocation

of his ankle followed an almost perfect judo throw in a competition late last year, which delayed any major outside work his QTH! That was actually good news for Peter as it turns out that Mrs Leng wanted a patio and seemed a little taken aback when he was all for the idea and even threatened to do all the clearance work himself!

The potential for an upgrade to the earthing system of his antennas was an opportunity too good to miss so for the past few weeks he has been clearing an area approximately 7m x 5m x 10cm

deep and cut channels into the earth so that feeder pipes for coaxial cables and earth wiring, etc., can be laid. See Fig. 1.

At the moment it's winter in New Zealand though the temperature in the North Island where Peter lives is still around 15°C, which is not too bad for the time of year and has enabled work to continue with little discomfort.

However, the ozone layer 'hole' is above the Island and 'burn' times in the sun can be as low as 10 minutes so you do have to be careful. Coaxial cable can be **very** expensive and Peter was worried about the effects of exposure to UV on the coating of the cables so burying as much of it as possible seems to be the answer.

The intention is to run about 250m of thin wire as an earth cut into the lawn with a turf cutter and to ultimately move his Cushcraft AV-3 vertical antenna to the roof of his double garage. This is conveniently covered with galvanised steel which should act as a good ground plane.

Running both full power and QRP and with the nearest country, Australia, around 2000km away Peter's efforts should maximise the efficiency of his antenna system. Peter has promised to keep us up to date on his progress and what effects the system has had on his antennas.

Remember, an r.f. ground can be used as a safety ground but a safety ground often makes the worst kind of r.f. ground. Multiple ground rods usually cover the most area and consequently make the best sort of grounding system.

However, using rods is not always possible and if the ground is so rocky or hard that installing them is difficult then a screen or web of wires on or just below the ground surface can work just as well. (Fig. 2). If you have experience of this or have experimented with earth systems for your antennas – please let us know how you got on.

The DX News

On to some DX news and to Diego Garcia AF-006 which is a tropical coral atoll located south of the equator in the central Indian Ocean. It's from here that the US Navy operates Naval Support Facility (NSF) Diego Garcia, a large naval ship and submarine support base, military air base, a communications/space-tracking facility and anchorage.



Fig.1: Peter Leng ZL4TE has been busy preparing to install an extensive r.f. earthing system.

And US Navy Radio Electronics Officer (REO) **Jim Clary ND9M** has returned to Diego Garcia until mid-November and will operate in his spare time when he can.

The Amateur Radio shack on the base was closed for maintenance during Jim's absence from the Island and he doesn't know yet when it will be re-opened. In the meantime he will operate as **VQ9JC** from two different locations on the island both of which are in recreational parks. He said "I bring all my gear including rig, power supply, antennas, power and coaxial cables, keyer, laptop and tools, about 40lbs in total, with me in two backpacks.

"There's no shortage of trees – but I can only get the antenna up about 25 feet because of the high density of the palm trees". Jim told me that he has to set up the station and then break it down each day, which limits his operating times to around 1230-1615UTC. He runs 100W into single-band dipoles and operates mainly c.w. with some s.s.b. but no digital modes will be available for the time being. The QSL route is via ND9M.

Next, I'm turning to an operation from Bear Island EU-027 – the southernmost Island of the Norwegian Svalbard archipelago in the western part of the Barents Sea and lies approximately halfway between Spitsbergen and the North Cape. Bear Island was discovered by the Dutch explorers Willem Barents and Jacob van Heemskerck on June 10, 1596 and was named after a polar bear that was seen swimming nearby.

Despite its remote location and barren nature the island has seen commercial activities that have included coal mining, fishing and whaling. However, no settlements have lasted more than a few years and Bear Island is now uninhabited except for personnel working at the Island's meteorological station Herwigamna. Along with the adjacent waters it was declared a nature reserve in 2002 and it is from the meteorological station that **Erik Sommerseth LA2US** is now active as **JW2US** until November. He will

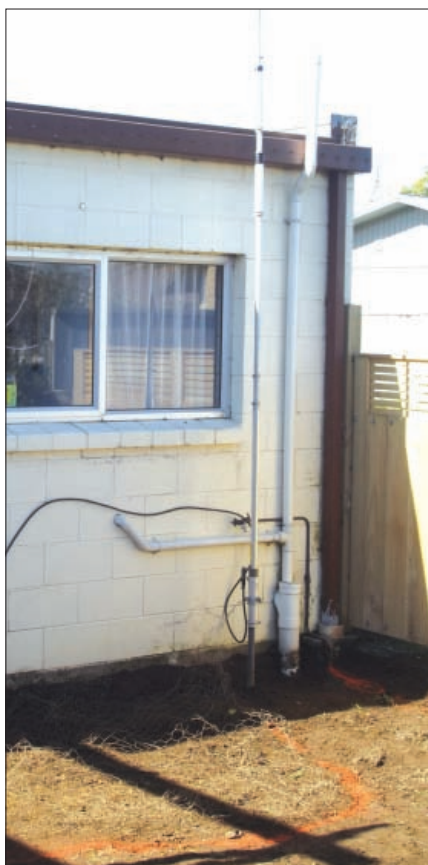


Fig. 2: Installing an r.f. earthing system can be difficult. Carl GW0VSW would like to hear from readers who have had installed their own systems.

be using mostly s.s.b. and some c.w. on all bands 7-28 MHz using a Yaesu FTDX-5000MP and 200W to a Carolina Windom antenna.

Your Reports

On to your reports and the first is from **George Davis G3ICO** in Yeovil whose 7MHz log contained c.w. contacts with TM0HQ (France) 1504 and DQ775BLN (Germany) – **Fig. 3** – at 1820UTC using his Elecraft K2 at 5W to a doublet antenna.

In Cumbria **Roy Walker 2E0RAF** fired up his old QRP Plus to operate from his garden as both his Yaesu FT-817 and HB-1B (**Fig. 4**) have developed faults. Using 5W c.w. to an end-fed wire Roy enjoyed several QRP contacts that included **Joe Taggart G14GNT** EU-115 in Ballykelly, Northern Ireland at 0848, **Peter Palin MM0CYR** in Caithness,

Scotland at 1020 and Special Event stations **GB2NFM** based in Newhaven Fort Military Museum at 1048 and **GB0YAM** at the Yorkshire Air Museum at 1227UTC.

Also on the 7MHz band in Finchley, London was **Martin Addison** operating as **200MCA** who used s.s.b. to work TM210VH (France) 0633 with a call celebrating 210 years of Victor Hugo's birth, a French poet, novelist, and dramatist who was the most well-known of all the French Romantic writers QSL via F4GFE, DL5EBG (Germany) 0854 and ON/PA3FYG/P (Belgium) at 1133UTC plus a large number of UK special event stations using a Yaesu FT-2000 running 50 watts to a half-size G5RV.

In Dunfermline, Scotland, **John Hilton GM1ZVJ** (**Fig. 5**) got back on the air in early July and is enjoying operating h.f. once again. Using a Yaesu FT-1000MP, Heil Proset with HC4 insert and 100W into a Carolina Windom 80 Special antenna he logged V47JA (Saint Kitts & Nevis) NA-104 at 0212 (QSL via W5JON), and HK1T (Columbia) 0221 (QSL via EA5KB direct only). Then came GJ6YB on Jersey EU-013 at 1126 (QSL via G3SWH) and 5C13EAI (Morocco) at 2335UTC. This was celebrating the 13th anniversary of the crowning of **His Majesty Mohammed VI**, the King of Morocco (QSL via 6K5YPD).

The 7MHz band also provided **Eric Masters G0KRT** in Worcester Park, Surrey with a 5W c.w. contact with DJ1MN (Germany) see **Fig. 6**, at 1559 using a Kenwood TS-570 and modified W3EDP antenna tuned with an SG-230 Smart Tuner. Moving on to 10MHz he worked HG6BOD (Hungary) 1805 and EA3NT (Spain) a few minutes later at 1808UTC.

The 14M & 18MHz Bands

On the 14MHz band **Bill Ward 2E0BWX** in Edwinstowe, Nottinghamshire used an Icom IC-7400 and around 25W to a Pro whip antenna and using PSK31 logged DM5MK (Germany) 0939 (QSL via DM1RG), SV2HJQ (Greece) 0955, IW7ARL (Italy) 1022, TF5B (Iceland)



Fig. 3: George Davis G3ICO received this QSL DQ775BLN after a 7MHz QSO.



Fig. 4: Roy Walker 2E0RAF uses this newer YouKits rig or an older QRP Plus to operate from his garden.



Fig. 5: John Hilton GM1ZVJ got back on the air in early July and is enjoying operating h.f. once again.



Fig. 6: Eric Masters G0KRT received DJ1MN's QSL card following a low power 7MHz QSO.



Fig. 9: George G3ICO used QRP on 18MHz to work YQ0BIKE.

EU-021 at 1043, R6DD (European Russia) see Fig. 7, at 1822 and UX4LX (Ukraine) at 1904UTC.

The 14MHz band was also chosen by **Terry Martin** operating as **MO0CLH** in Wantage, Oxfordshire to work s.s.b. stations SQ5PTW (Poland) see Fig. 8, at 1804, UR4LBL (Ukraine) 1807, UA9CGL (Asiatic Russia) at 1812. Then came OZ1CJS (Denmark) at 1813, SM7ACN (Sweden) at 1815, and OK7WA (Czech republic) at 1818. Then he worked HA2MM (Hungary) at 1823, JE4CIL (Japan) AS-007 at 1824, EW6AF (Belarus) at 1825, S57GB (Slovenia) at 1827, and OM8FR (Slovak republic) at 1830 and LZ2PL (Bulgaria) at 1835UTC. All QSOs were achieved using an Icom IC-756 Pro at 100W to a home-brew doublet antenna.

Having one of his best ever operating periods on the band and using **G3WIM** – the callsign of the **Wimbledon & District ARC** – was Eric G0KRT who listed s.s.b. QSOs with JA1FNO (Japan) AS-007 at 2056 and VK3MO (Australia) OC-001 in Victoria at 2111. (QSL via WA9BXXB). Then came VU2PHD (India) 2112, 9A/S56CW/P (Croatia) 2127 and IZ1REP (Italy) at 2141. Then came VE1TV/M (Canada) in Sambro, Nova Scotia at 2202 and CT3NG (Madeira Islands) AF-004 at 2208UTC. Eric was using an Icom IC-735 and 400W to a 3-element 3-band Yagi from a campsite near Reigate.

The 18MHz band was in reasonable shape for George G3ICO who used QRP once again, finding plenty of stations to work including YQ0BIKE (Romania) – Fig. 9 – at 0804 (QSL via YO6KNE). Note – if you work the station on three different bands or using two



Fig. 7: Bill Ward 2E0BW received RV6DD's QSL card following a 14MHz QSO.



Fig. 10: George G3ICO, received this QSL card after working OX3XR on 18MHz.

modes you can claim an award. Next into the log was WA6TLA (USA) in Manhattan Beach, California followed at 1544 by 5C13YR (Morocco) at 1921 (QSL via 6K5YPD). George also worked LZ1822MIT (Bulgaria) 1945, the station was honouring Bulgarian Saint Martyr Ioan Tyrnovski. Next came 6Y5WJ (Jamaica) NA-097 at 1955, OX3XR (Iceland) - see Fig. 10 – NA-018 at 1916 (QSL via OZ3PZ). Then George worked VE1VAS (Canada) operated by the Sydney ARC from the Marconi site at Table Head, Nova Scotia at 2022 and finally he worked CO8LY (Cuba) NA-015 at 2022 (QSL via EA7ADH).

The 21 & 24MHz Bands

In Biggleswade, Bedfordshire **Owen Williams G0PHY** heard EY8/UA4WHX (Tajikistan) on 21MHz calling "CQ" and managed to work him first call at 1542UTC running just 20 watts s.s.b. from a Yaesu FT-2000 and a dipole antenna.

Back in Scotland John GM1ZVJ logged s.s.b. stations CU7MD (Azores) EU-003 at 1707, 9A20NA (Croatia) 1740, CX3TQ (Uruguay) 1946 QSL via IK2DUW, PY3BSG (Brazil) 1948 and 7X4AN (Algeria) at 2142UTC and is enjoying working DX on the band where he says "it is not as popular as 14MHz, so 21MHz gives you the chance to work the DX without some of the major pile ups."

The 24MHz band was open for a time although not always in good shape. However, George G3ICO managed QRP contacts with CT3AS (Madeira Islands) AF-014 at 1458, TK/IZ3DBA (Corsica) EU-014 at 1559 and later CO8LY (Cuba) at 2022UTC using c.w.



Fig. 8: Terry Martin MO0CLH worked SQ5PTW on 14MHz.



Fig. 11: Terry M0CLH logged the station of OH0X transmitting from the Aland Islands on 28MHz.

The 28MHz Band

The 28MHz band was not the best according to our reporters but there were still a few short openings depending where you were. Although the band was "virtually dead" for most of the time John GM1ZVJ still managed OH6RM (Finland) 0721, SG7A (Sweden) 1219 and F4FQZ (France) at 1316 while George G3ICO worked TK4LS (Corsica) on c.w. later at 1934UTC.

With 400W s.s.b. available Eric G0KRT used the G3WIM call again finding PU5IK (Brazil) at 1729, OE3WBA (Austria) 1953 and IZ5WTC (Italy) at 2104. Terry using his normal callsign M0CLH managed TK5EP (Corsica) 1519, YL4HQ (Latvia) the HQ station of the LRAL in Riga at 1528. Also logged was SX0HQ (Greece) with a callsign for the **Radio Amateur Association of Greece** at 1609 and OH0X (Aland Islands), Fig. 11, EU-002 at 1632 (QSL via OH2TA).

Sign Off

Well that's it for this month – time to sign off. There were relatively poor conditions again with some occasional good DX to be found and all reporters managed to work outside of Europe. As winter fast approaches I wonder if h.f. conditions will actually show major signs of improvement or will we be plagued with the rather sporadic openings we have had of late. Only time will tell!

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

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Harry Leeming G3LLL's In the Shop

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Don't Lose Your Switch Connection Drawings!

Harry Leeming G3LLL writes, "To illustrate last month's column I hunted up a picture of the underside of the Yaesu FT-480, and this started my memory ticking!"

Welcome to *In the Shop (ITS)* where I look back at my time running Holdings the Amateur Radio and Hi-Fi shop in the north west of England. And I remember that one day a lady came to me with a receiver, which used a switch similar to the blue mode switch used by the FT-480 as shown in shown in **Fig. 1**.

The switch had been noisy and intermittent, and a 'boyfriend' had removed it and obtained a replacement. Either something had gone wrong with their relationship, or he had lost the sketch he had made of the wiring – but now all she had was the new switch and a lot of disconnected leads! "Nothing much needs doing" she said with a bright smile, "I would just like you to fit the switch, and solder the leads on".

The lady was somewhat shocked when I told her that I had not the slightest idea as to which tags on the switch the leads went to, and that to trace them all out would cost far more than the receiver was worth. I could also have told her that almost certainly, the old switch wasn't faulty, but that it had just needed a little cleaning fluid applying, but I didn't want to rub salt in the wound!

My only suggestion was that if she could find someone with an identical receiver, I might be able to copy the wiring. Even this held no certainty though, as manufacturers sometimes alter wire colour, and switch types during a production run.

The type of switch in question often becomes intermittent, is used on several pieces of Yaesu kit – and at first glance looks sealed and impossible to clean. I have received many requests for replacement switches over the years, but when repairing equipment myself I have

never found one that actually needed replacing.

The secret, as shown, is to lever away the plate on the rear of the switch a fraction with a penknife and then to squirt cleaning fluid down the gap. I've never known this to fail, and it is certainly a lot easier and more cost effective than swapping the switch!

Unfortunately crystal balls and magic wands weren't included in my tool kit, but it's amazing how many people thought that somehow I would know where leads went. It wasn't unusual for the retaining nut on switches to work loose and at this point any sensible person would remove the knob and tighten the nut up.

Rigs however, arrived in my workshop that the owner had carried on using until the control turned round twisting the leads off. When the item was a popular piece of equipment, I could sometimes copy the connections from another sample, but otherwise I had to leave them with the problem of finding a friend with a rig to copy the right connections from.

Seized Fan Bearings

A few months ago I mentioned that fan



Fig. 1: Easing away the back-plate of a sealed switch, allows switch-cleaner to be squirted in.

bearings often seize up. **Chris Smith** has contacted me to let me know that many cheap oils tend to thicken with time and that in his experience good quality sewing machine oil is the best long term answer. Thanks for the tip Chris!

The Scrap FT-101B Saga

Next, I'll return to the saga of the scrap FT-101B. The old series of FT101s, from the MK1 to the E, were originally developed using the Toshiba 12BY7A valve as a driver. As this is now out of production, there's no option but to use an alternative, and I normally fit a General Electric (GE) valve.

However, when the GE valve is used, sometimes it's difficult to squeeze enough drive out to give full power on all bands. Even when all the checks, replacements, and alignment that I've described over the last few months has been carried out.

Fortunately, there are a few more tricks, each of which can add that little extra if you are struggling. But, before trying to trace a non-existent fault, you should note that it's quite normal for there to be 'only just enough drive' on 1.8 and 28MHz on (160 and 10m).

Here's the check list: Resistor R22 on the r.f. board in the emitter circuit of Q5, **Fig. 2**, was originally 56Ω. This can be reduced to 22Ω for a little extra drive, Yaesu did this modification on the last production versions of the FT-101E. Once you have swapped this turn VR1 on the r.f. board, to the point that just gives the maximum available drive. **Note:** don't go beyond this point or you may increase the spurious output of the rig.

There are fixed capacitors in parallel with the driver and r.f. stage trimmers, if the drive on a particular band is low, try replacing this capacitor with a good quality silver mica item.

Check R5 the 5.1kΩ screen resistor, and R40 the 1.5kΩ anode feed resistor on the 12BY7A, **Fig. 3**.

Check the alignment of the crystal oscillator trimmer on any band that is short of drive. Set the trimmer for the maximum drive that you can get, but note that at some point the crystal will stop oscillating. When you think you have found the correct setting, double check that the oscillator will still start up when the rig is cold.

The capacitor C13 can be increased to 120pF. Use a 3000V disk ceramic, but only do this if you are really desperate as this will upset the alignment and will not increase the drive on 1.8MHz.

If all the other bands are okay, but 28MHz is a little down in power, try adjusting the neutralising capacitor very slightly. Sometimes this will give a slight increase of drive whilst still leaving the output stage perfectly stable.

The above modifications and replacements will seldom make much difference on their own. But when they're done together they should result in a real improvement.

Using A Transverter

Most early Yaesu h.f. rigs, were fitted with a valved power amplifier (p.a.) stage, and had installed an 11-pin auxiliary socket on the rear panel. Into this socket was (normally) fitted an 11-pin plug, and on this plug pins 1 and 2 were shorted together with a wire link, this link completed the heater circuit to the p.a. valves.

Once the plug was removed the rig wouldn't transmit on h.f. but various transverters could be plugged into the socket. The socket on early production models provided bias, heater, and high tension (h.t.), for a valved transverter, such as the 70 and 144MHz (2m and 4m) units made by **SEM** in the Isle Of Man.

Later units, such as those made by **Microwave Modules** in Liverpool, were fully transistorised. They didn't need the h.t. and bias but still utilised the socket to obtain access to the transmit-receive relay switching.

In all cases the transmitter drive was obtained from a small capacitor that was connected to the grid of the p.a. valves, C16 in the circuit of the FT-101B, shown in **Fig. 3**. With the SEM 144MHz unit, when the h.f. rig was tuned (to let's say 29MHz), the transverter would convert and amplify this, and then deliver about 40W to the antenna on 145MHz.

On receive a 145MHz signal from the antenna would be converted to 29MHz, and then delivered to the rig's h.f. antenna socket. When the transverter was activated, the h.f. rig would therefore transmit and receive over the full 144MHz band using the 28 to 30MHz range and whatever mode was selected on the h.f. rig. There was however a catch, that not everyone realised existed!

Joe & His Transverter

'Joe' brought his transverter in for repair, with the complaint that it was almost completely 'dead' on receive. When I examined it, I found that the r.f. stage field effect transistor (f.e.t.), and several parts round it had been 'fried'.

As I didn't want to repair the unit, and have it come back again with the same fault, – I phoned 'Joe', and asked him

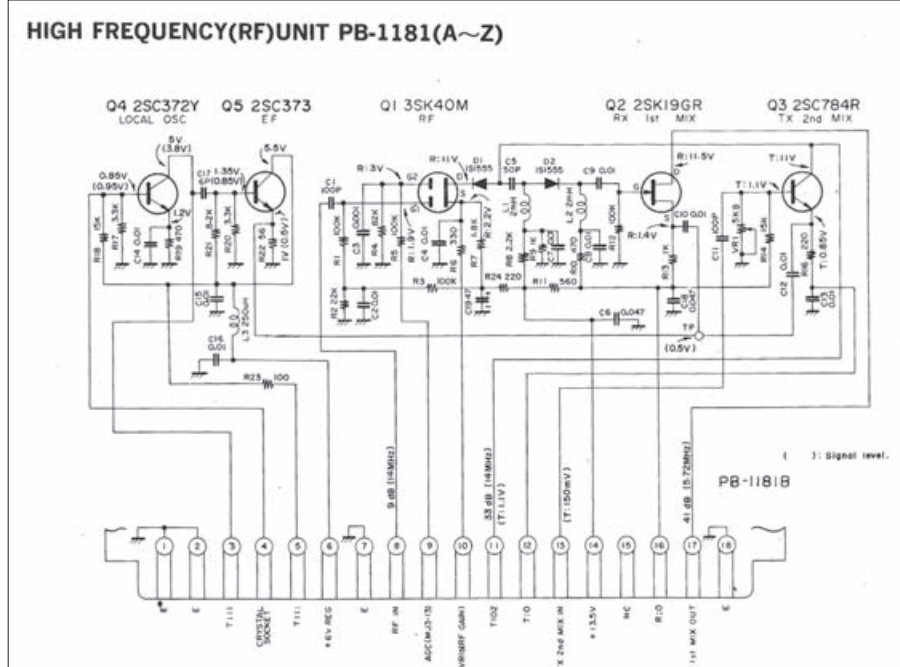


Fig. 2: Circuit of the Yaesu FT-101B r.f. unit.

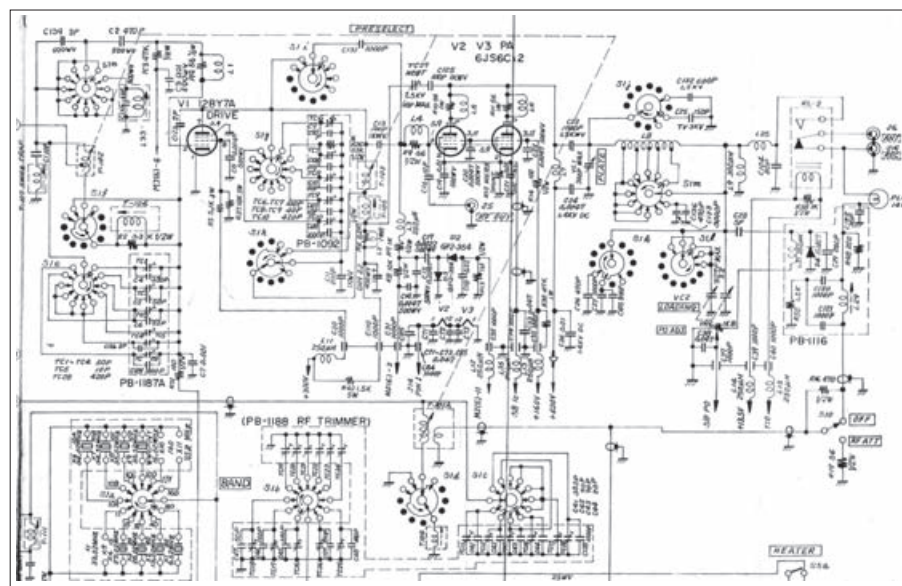


Fig. 3: Main r.f. circuitry of the Yaesu FT-101E.

what had happened. He explained that had been on 28MHz, and heard a local station say that there was an opening on 144MHz, and that the DX was pouring through.

Hearing the news Joe had quickly activated his transverter and put out a call near the 2m calling channel. He heard nothing, the receiver was dead. Joe's problem was that he had been in too much of a rush. When he plugged in and fired up his transverter, this disconnected the heater supply to his h.f. rig's p.a. valves – but the cathodes were still hot. So, when he went over to transmit approximately 100W of r.f. were fired into the front end of his transverter, hence the burned out parts!

Please learn from Joe's mistake! If you ever use a transverter that's fed from the

main antenna socket of a valved h.f. rig, **allow a couple of minutes** for the p.a. valves to cool, after you have killed the heater supply before transmitting. Even better, just to be on the safe side, wire a 6V 100ma pilot lamp in series with the centre core of the coaxial cable to act as a fuse.

One more point, note that on the early Yaesu rigs such as the FT-200 FT-101, '101ZD and '901, the 11-pin socket has 900V on one pin, mind your fingers!

Feed-back From G4IPZ

I always welcome feedback, and **Dale (Slim) Haines G4IPZ** has kindly passed on the following details of his terrifying experience!

Slim wrote, "Whilst reading the recent '20A fuse gone in a trice' episode of



A very clean-looking Yaesu FT-101B, with one of Harry's commercial projects, created when he was running Holdings' shop, sitting on top of it.

In *The Shop* June, I was reminded of how lucky I am to still be here. The memory was jogged by your mentioning the **'Never turn equipment over... when connected to the mains..'** rule. I learnt this the hard way – but luckily I'm still here.

"Around 40 or so years ago when still in my teens, I was working on the bench in my family's Radio & TV shop, repairing a Japanese domestic stereo system. It was of the type with the main p.c.b. bolted to the chassis but with the underside visible through an opening in the bottom of the metal case to allow for service work.

"I was about to measure some suspect resistors and had simply thrown the panel mounted mains switch to 'Off'. I had already noticed that the mains connections to the switch were nicely insulated, both to each connection and there were also sheaths over all four wires.

"What I hadn't noticed was that the switch was wired such that, when turned off, the mains voltage was switched through to two non-insulated bare tags on the back of the switch.

"The next part of the sin was that, at the time I usually wore a wristwatch with a metal strap on my left wrist. I inverted the amplifier and laid it against my left arm whilst holding the earthed chassis with my right hand. My wristwatch strap made contact with the bare (now live), connections on the switch.

"I cannot to this day be sure if I heard an incredible *'Whooooomph'* as well as simply felt it, but I was next aware lying on the floor, shaking violently from the shock having flown backwards through the air, over and clearing my work stool, twisting round and crashing shoulder first into our heavy (and old) Avo valve tester on its metal stand.

"I also learned at this time to **never** trust fuses as it wasn't the 3A in the plug top, or the 5A in the bench board – but the 15A at the fuse board which blew. I was lucky as either the force of my rapid vertical take-off and landing and/or the shock could have been fatal.

"To give you some idea of the force involved, the amplifier took off vertically and hit the ceiling, some 16 or so feet above the bench, since the speed at which it was shot skywards actually ripped the mains lead clean out of the plug and smashed the top off it at the same time."

Thanks Dale, fortunately you lived to tell the tale. While learning by experience may often be helpful, in this case **it would better if PW readers were to take note and learn by your lucky escape.**

Computer Program Problems

Years ago a customer, who worked for a national DIY business, told me about a problem they had had with their computer system. It was very new 'Hi Tech' and as automatic as possible; all new goods arriving were scanned in and

automatically added to stock, and as items were sold, keying them in at the till removed them from the stock list.

If any goods were obtained locally the invoice could be entered into the system with full details, and the delivery note number. They thought that they had catered for every eventuality, even for stock 'shrinkage' if goods were stolen. What they had not allowed for however, was for the stock increasing!

Some of their stores sold pets, and if you put two rabbits in a cage, sometime later there may be a few extra. As mummy rabbit couldn't be persuaded to provide a delivery note and an invoice number, this messed up the whole computer system, and so it was back to the drawing board!

See you next time! Harry.

Problems

I like to hear about problems with older equipment, particularly pre 1990 Yaesu rigs. Please email 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).

Radio Spectrum under threat!

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

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

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

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

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



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Getting Started on 3.4GHz!

Colin Redwood G6MXL, shows how easy it is to get started on the 3.4GHz band.

This month in *What Next?* (WN?) I'm looking at how easy it is to get started on the 3.4GHz (9cm) microwave band. I'll be the first to admit that this is not the most popular Amateur band. My reason for choosing this band is mainly that it presents a challenge, both in getting on the air and then in making contacts.

It also illustrates the challenges faced by anyone wanting to operate on the 2.3GHz and 3.4GHz bands and shows how they can be overcome.

Having done some initial research, I mentioned the idea to *PW*'s Editor towards the end of 2009, as I was aware that Rob was keen to include

some microwave articles in *PW*.

I've been operational on both the 1296MHz (23cm) and 2320MHz (13cm) bands for some years, but I've never tried the 3.4GHz (9cm) band. My aim was to try to get on the 3.4GHz band with minimal construction on my part.

As the more observant readers will note, this is actually possible with just a few soldered connections, all at the 12V d.c. level! I think this makes the project suitable for many more Radio Amateurs than might initially have considered it. Much of what I discovered will also apply to the 2320MHz band and to a lesser extent to other microwave bands.

I should remind Foundation Licence holders, that the 1296MHz, 2320MHz and 3400MHz bands are **only available** in the UK to Radio Amateurs with either Intermediate or Advanced Licences.

Table 1 – Summary of the specification of the Kuhne Electronics MKU 34G3 3.4 GHz Transverter with 144MHz i.f.

Frequency range (r.f.)	3400 – 3402MHz
Frequency range (i.f.)	144 – 146MHz
Output power	400mW (typ.)
IF input power	5W (max.), adjustable (0.5 – 5W)
Noise figure @ 18°C	0.9dB (max.)
Receive gain	20dB (min.), adjustable
Supply voltage	+12 – 14V d.c.
Current consumption	0.4A (TX) (typ.)
PTT voltage (to the i.f. connector)	+3 – 14V d.c.
Coaxial connectors/impedance	SMA-female, 50Ω
Dimensions (mm)	150 x 55 x 30
Weight	190g (typ.)

Sourcing Transverters

I've never seen an Amateur transceiver designed for the 3.4GHz band, so I knew that I would need to look at transverters. I quickly established that there are two commercially available designs. One comes from **Downeast Microwave** in the United States, and the other comes from **Kuhne Electronics** (DB6NT) in Germany. Both are available as a kit of parts or ready made.

As I've had no experience with a construction project using Surface Mounted Devices SMDs (the ultra-small components used in much modern equipment), I really didn't fancy learning on expensive microwave devices,

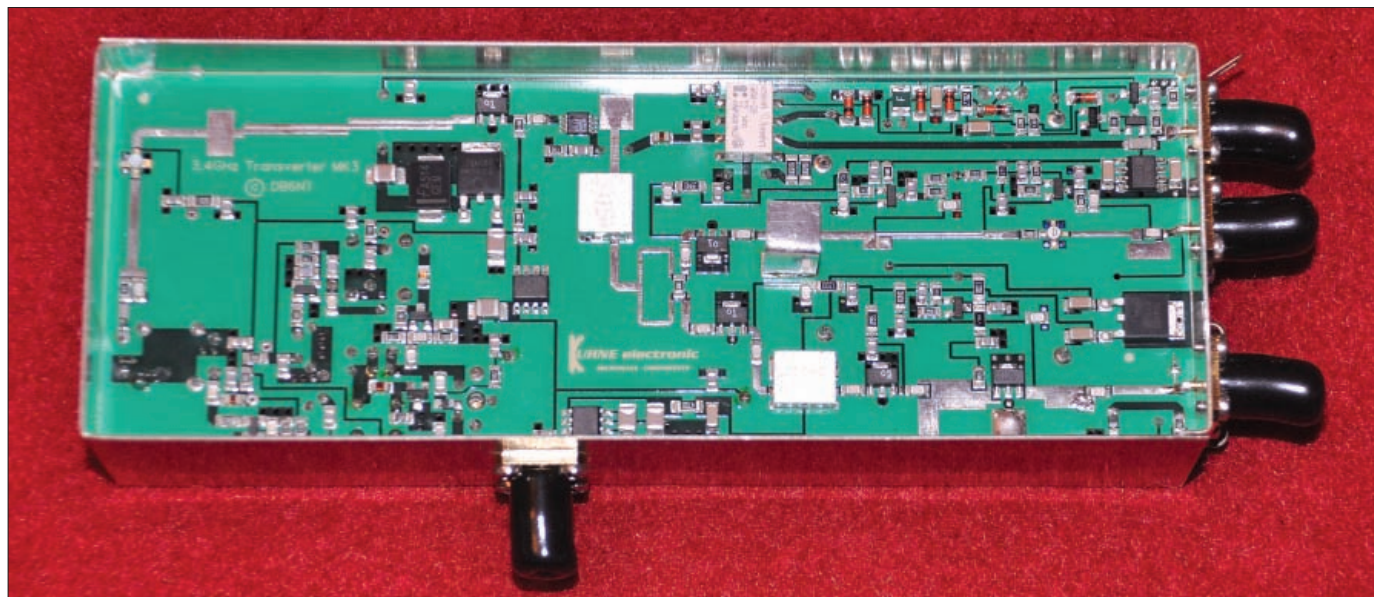


Fig. 1: Inside the Kuhne 3.4GHz transverter. Note the small surface mounted components.

where I had limited test equipment to diagnose any problems (Fig. 1). I therefore, chose to go for a ready-built solution as close to ready to go on the air as I could. In this respect the Kuhne Electronics transverter was the closest I could find.

There are many models in the Kuhne range. They make models for the European (3.400GHz) and US bandplans (3.456GHz), so you will need to specify which when ordering. Likewise, you will need to specify whether you will be using 144MHz or 432MHz as your intermediate frequency (i.f.) and what power level your i.f. transceiver will be using (from 500mW to 5W) for 144MHz or 432MHz.

I opted for 144MHz. I have summarised the specification of the 3.4GHz transverter with the 144MHz i.f. in Table 1. You'll also need to decide whether to build from the kit or buy ready-built.

Either way I recommend downloading the full handbook/kit assembly instructions (available in both English and German) for reference and a better understanding of the operation of the transverter. The illustration, Fig. 2, shows the most basic configuration of the Kuhne transverter.

Intermediate Frequency Switching

Having decided on the transverter, you'll need to consider switching arrangements between transmit and receive at both the i.f. frequency (144MHz in my case) and the 3.4GHz operating frequency. The Kuhne Electronics transverter doesn't provide for r.f. sensed switching. However, it does have two built-in ways of switching, both using pin diodes between transmit and receive on the 144MHz i.f.

The first is to ground a terminal (a solder tag on the outside of the unit) when transmitting. Many transceivers support this approach via an accessory socket. The second way is by detecting the presence of a positive d.c. voltage on the coaxial cable feeder from the 144MHz transceiver.

I chose to use the d.c. voltage on the feeder approach as it would mean one less lead to forget to connect and also guarantee that under no circumstances would 144MHz r.f. be applied without the switching. It's also the method used for switching my 10GHz transverter between receive and transmit. Unfortunately, this is something that the Yaesu FT-817ND I intended to use, does **not** provide as standard.

However, all is not lost, as there

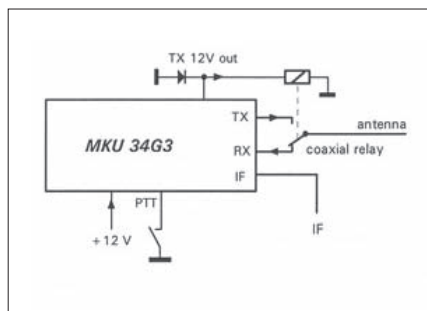


Fig. 2: The most basic configuration of the Kuhne 3.4GHz transverter from the original documentation.



Fig. 4: The chassis-mounted antenna N-Type to SMA adaptor socket used by Colin G6MXL. Note the SMA connector which prevents any r.f. leaving the socket inside the case.



Fig. 3: The SMA connectors on the Kuhne 3.4GHz transverter are protected with black plastic covers during transit.

are a number of well documented solutions, some of which require a very simple modification to the FT-817. Which you choose depends on whether you use the FT-817's front or rear antenna socket when using it with the transverter. I chose the front BNC socket, a solution that is described in German at www.bergtag.de/download/ft817.pdf The Kuhne web site includes a similar modification for the rear socket.

I'm not an advocate for modifying transceivers without purpose or to get extended receiver or transmit coverage. But this simple modification is well proven and provides a really useful facility without any noticeable performance degradation.

If you really don't wish to modify your FT-817, there are other ways to tackle switching, although I haven't tried them. One well documented solution can be found on Peter Day's web site at www.microwaves.pwp.blueyonder.co.uk/FT817%20interface%20v%202.pdf

If you have a Yaesu FT-290R, you will be pleased to know, that no modification is needed, as it already provides a d.c. voltage on the centre of

the coaxial connector. It also provides a 'ground-on-transmit' option.

If you're using another transceiver, you'll need to explore what options are available. The ground-on-transmit option is common on many transceivers, but I suspect a similar d.c. voltage on the feeder on transmit modification could also be researched by more adventurous readers.

Switching At 3.4GHz

While Kuhne Electronics transverters provide switching the i.f. between transmit and receive, they don't handle receive-transmit switching at the final operating frequency (3.4GHz in my case). All is not lost though – as the transverter does provide a 12V d.c. output, present only on transmit, for switching relays. But finding a suitable relay takes some researching if you're not going to end up paying over £50 for it.

The relay needs to be able to switch 3.4GHz with a good level of isolation between the transmit and receive sockets, so that almost none of the transmitted power finds its way back into the receive side of the transverter. It also needs ideally to operate with 12V d.c. and be non-latching.

Unfortunately, 24V d.c. latching varieties seem to be far more common on the surplus market. I suggest readers refer to *PW* November 2011 where I discussed relay specifications.

Note: Don't forget to fit a diode to protect the transverter from the 'back e.m.f.' when the relay is switched.

I've also found that many manufacturers of suitable relays have been taken over multiple times – so that it's very difficult indeed to establish the specification from a model number. I have also failed to find a really comprehensive web site to convert model numbers to current equivalents. All I can suggest is to be patient, and keep digging on the internet. If you find a suitable relay abroad, the good news is they are light enough to be posted without requiring a mortgage!

Relay Connectors

Just as Kuhne transverter modules use SMA connectors (**Fig. 3**), it's likely that the relay will have SMA sockets for the r.f. paths. This will mean that short SMA-to-SMA leads will need to be made-up or bought to go between the transverter and the relay.

A further lead will be required between the common r.f. port of the relay and the antenna socket. I was able to pick up all three leads at a local rally. They already had suitable connectors fitted which made life easier.

I initially thought that the type with 90° plugs at both ends would be ideal. However, I found that in practice this didn't turn out to be the case, and I ended up buying a type with 90° at one end and straight at the other. I wished that I had bought versions with straight

connectors at both ends. Buying made-up leads can be as cheap as buying the connectors and suitable feeder. It also saves soldering connectors!

The 3.4GHz Antenna Socket

It might be tempting to just use a normal N-type chassis socket and solder the centre of the coaxial cable to the centre pin, and the screen to a solder tag on one of the four screws. Whilst this technique works fine at lower frequencies, at 3.4GHz with a wavelength of around 90mm, short tails of just some 20mm or so, are almost a quarter-wave in length, and are thus a sort of dipole on the band!

So, to ensure that the r.f. gets to the feeder and hence to the antenna, I used a chassis mounted N bulk-head socket with an SMA socket on the rear (**Fig. 4**). I obtained mine for a few pounds at a local rally. A few specialist firms list these at prices that will probably put most readers off the project. So again this is one to hunt out at the rallies and on the internet.

Testing The Relay

As the relay is such an important element of the design it makes sense to test it – especially if you have bought it second-hand. The approach I took was to use a variable voltage, current limited power supply and to monitor both the voltage and current drawn by the relay.

With the relay I tried, I could see that current was drawn and continued to be drawn when I applied approximately 12V. I could also hear the relay clicking over. So from an initial check the proposed relay was showing promising signs.

I did some further checks to make

sure that the switching action was as I expected. Finally, I did some checks to understand how low the voltage applied to the coil could go and the relay still function correctly. Having done all this, I was satisfied that the relay was suitable for my purposes.

I don't have test equipment to check the isolation. Despite this I figured that if it passed all my tests, it was reasonable to assume that the relay would be okay for my QRP requirements.

Sourcing Components

To help readers find the relevant parts, I have summarised possible sources in **Table 2**. Please note that it assumes that you are buying the transverter module pre-built.

More Power

I should caution readers who may want to go for more output power or a pre-amplifier, when more complex switching arrangements using a sequencer will be needed. A sequencer switches various parts of the transmit/receive chain in sequence to ensure that no high power gets transmitted into anything other than the antenna even for a fraction of a second.

At present I have decided to stick to just the basic 400mW output power using the basic configuration (**Fig. 2**) until I have had a few 3.4GHz QSOs.

The Antenna

Next month I will describe the antenna that I decided to use, and explain why I chose not to use a dish design, but a loop Yagi design instead. In the meantime please E-mail me if you have any queries. ●

Table 2 – Suggestions where to obtain the various parts

Part	Source	Comments
Transverter MKU 34 G3	Kuhne Electronics	Either kit or ready-built
Relay with SMA	Rally, eBay or Supplier	
(connectors plus protection diode)	Must be 12-15V DC coil	
SMA Leads	Rally, eBay or Supplier	One end must be SMA for transverter, the other end must suit relay
SMA 50Ω dummy load	Rally, eBay or Supplier	
Antenna	Directive Systems	
Box	Rally or Supplier	To enable testing of the switching without risking the transverter
N-socket to SMA socket	Rally, eBay or Supplier	
Transverter to Antenna Feeder + Connectors	Supplier	
Fuse-holders and Fuses	Any component supplier, Rally, eBay	
Other connectors and interconnecting feeder to suit	Rally or Supplier	

Kuhne Electronics: www.kuhne-electronic.de

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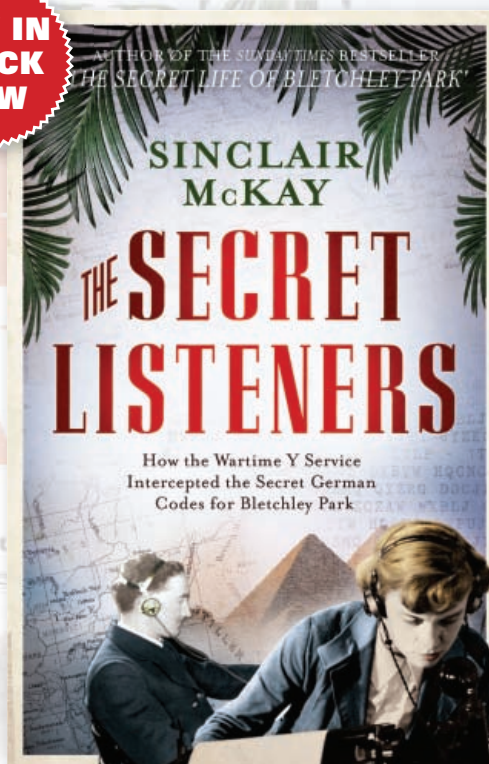
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Graham Hankins G8EMX's In Vision

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In Vision

Graham Hankins G8EMX waxes lyrical about his Solent 1.2GHz ATV transmitter, and brings some disturbing news of possible encroachment on ATV bands.

Welcome to this month's *In Vision* (IV) – where we explore the world of Amateur TV (ATV). I've had an enquiry from an *In Vision* reader, who was thinking about getting some 24cm (1.3GHz) ATV gear, but wasn't sure if there was any local activity in his area (Coventry in the West Midlands).

I replied that there used to be an ATV repeater in that city, but local activity was unknown and from where would any 24cm ATV kit be obtained these days? He replied that he had just been outbid anyway, so presumably some kit had been for sale at an on-line auction.

Here at the G8EMX QTH I have the opposite situation; three 24cm ATV transmitters and two receivers! I confess – I've not been actively using ATV for some time! (Now I feel better. hi!) So, maybe it's time to power them up ready for some portable activity next year – but do they all still work?

The Solent 24cm ATV transmitter kit was designed and produced by the **Solent Club for Amateur Radio and Television** (SCART) back in 1984. The kit included everything needed, with the component layout of all the discrete components, which were easily soldered onto the board.

Final Frequency

Designed with a 'final frequency' oscillator without multiplier stages, mine worked first time. Of course you had to be careful to keep all leads short, this was 1.3GHz after all. Some kits failed to work, and were sent back to the SCART club. "Some of them look like they'd been built using a blowtorch instead of a soldering iron" the club commented!

As 24cm ATV is a relatively wide-band mode, the frequency adjustment control wasn't critical, but a small optional phase-locked loop p.c.b. would lock the oscillator to either 1249MHz (ATV

repeater inputs) or 1255MHz for simplex (station-to-station) working. Basic output was 1W – enough for local contacts or repeater access, but again an easily built

'black brick' power amplifier (p.a.) raised this to a more useful and more easily measured 10W.

So, did mine still work after many, many years? With a counter probe dangled over the final stage, it was switched on! And

1248.9950MHz immediately appeared and the power meter indicated a small output – I always feed a 'dummy load', even at low powers. Success! But I will check my G8SUY 2W transmitter and the Comtec receiver next time!

Testing the kit is easy – using it is more difficult. It takes two to make a contact but there has never been much ATV activity in Birmingham, or even an ATV repeater – It's too close to the aviation radar at Cleve Hill (Shropshire), I'm told. But we do have a local 'high spot' at Barr Beacon, north of the city and before the local authorities closed the Beacon off at night, there was much portable Amateur Radio (and other nocturnal activity) going on up there.

I could certainly receive GB3RT (ex-Coventry), GB3LE (Leicester) and GB3UD (Stoke on Trent) from up there. So, during the British Amateur Club's ATV Repeater Contest I plan to go up there again!

The Contest will be from 1800 on December 8th until 1200 on the 9th, so it runs early evening on the Saturday until mid-day on the Sunday. Why it starts at 6pm, I've no idea – ask the BATC! I'll try to be on air for a few hours on the Sunday morning with 24cm analogue ATV and talk-back on 144.750MHz.

If I can't see any repeaters I may stay up there into the afternoon to work any other ATV stations. If any readers of *In Vision* can be on air and within range, I look forward to 'working' you too!



More Concerns

Contributor to '*In Vision*' **Bill Shepherd EI4KB/PA3FDK/G0KPR** urges everyone to become more concerned about protecting our precious spectrum space. When he wrote, "More and more Radio Amateurs come under pressure from commercial demands being made on the spectrum. The latest news is that Global Navigation Satellite Systems (GNSS) systems are making further demands on the v.h.f./u.h.f. sector.

"If this is successful ATV will have to live with these systems which leave only gaps of 1MHz at 1240MHz and 1259MHz. See www.microwavejournal.com/articles/17568-global-navigation-satellite-systems-and-their-applications"

Bill continued: "Amateur Radio and ATV is not well represented in the current allocation of spectrum. We contribute to technical education and self-training and thus make a valid contribution to the 'Big Society' but little account of this is taken when it comes to sharing spectrum. The military is said to be considering releasing/sharing space to other users but so far the possible room would be of little use for ATVers.

"It would be good if we had more freedom on 70cms since we share this band with so many other sections of the Amateur service. (Amsat, e.m.e. etc.) The IARU has proposals to extend our allocation in the 430-440MHz Band but faces competing demands from the Earth Exploration Satellite lobby." Bill also mentioned that details were available at the webpage:

www.iaru-r1.org/index.php?option=com_content&view=article&id=191&Itemid=144

Bill recommends raising any issues and concerns directly to national government and individually to our representative MPs and says that we should put our case firmly and frequently e.g at the www.gov.uk website.

In the next *In Vision* there should be a report of the BATC's Convention and Biennial General Meeting back in October, after the deadline for this '*In Vision*'. At the time this was promising seven talks, live demonstrations, specialist traders and the BATC Shop. The confirmed demonstrations were to be the 24cm and 70cm versions of the Digilite receiver, ATV antennae and Digital ATV up to 76GHz. So I'll let you know what I found!

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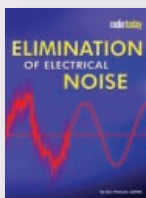
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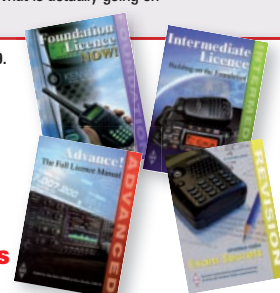
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Rob Mannion G3XFD/EI5IW's

Topical Talk

This month the Editor reflects on topics raised in this month's *Letters*. Rob starts off by discussing the unfortunate news that the Milton Keynes Amateur Radio Society has been asked to leave Bletchley Park.

I have known **Roy Woollard G8RCK** for many years and I was saddened when he wrote to me (see *Letters* this month). He wrote to say that the **Milton Keynes Amateur Radio Society** (MKARS) had been asked to leave the historic Bletchley Park (BP) the base for the Second World War's secret 'Ultra' decoding centre, in Bletchley, Buckinghamshire (now a constituent part of Milton Keynes). The club has to leave by January 1st 2013.

Several years ago I was privileged to visit the MKARS and guests from other clubs at BP to provide a *PW* club talk. It was an extremely well-attended evening and Roy G8RCK and friends made me very welcome. This was to be expected because Roy himself is totally dedicated to Amateur Radio. The membership is made up of a wide range of age groups and they were obviously very proud of where their club was located and very much aware of the unique history and the privilege of being located at BP.

The MKARS are a well behaved group and carry out their hobby with dignity – which is appropriate for this historical location. However, the large number of reasons drawn up by the BP Management make it abundantly clear that the MKARS isn't wanted at the site. One statement from the letter (quoted verbatim) says, "*It has been deemed that the Milton Keynes Amateur Radio Society will not fit into the future World War II profile of the Bletchley Park Museum*" leads me to feel that the BP Management aren't fully aware of how

Radio Amateurs served their country in the Second World War.

Everyone within the hobby is aware how Amateur Radio provided Britain with huge numbers of technically aware service men and women during the conflict. Additionally, the **Radio Society of Great Britain's** truly excellent handbooks provided technical reference material throughout the Second World War and beyond – indeed they were still in use in the Royal Navy in the 1960s!

I'm not forgetting the activities of the 'Secret Listeners' either! **Ray Fautley G3ASG**, a regular *PW* author for many years, wrote about his input to BP – although he didn't discover much about 'Station X' for many years because it was so secret!

In the past I've supported BP and its activities with the willing help of **Caroline Murdoch**, who improved the Public Relations for BP in a most effective way. Recently however, Caroline has handed over to an 'in house team' and she has tried to put me in contact with the new staff. At the time of writing *Topical Talk* contact has not been made – but you can be sure I will do my best to make sure that the Management of BP know that MKARS and GB2BP are worthy and appropriate 'tenants'.

John Fallon G3SGV & G2DAF Equipment

In his letter (published this month) John Fallon G3SGV reminded me that he purchased a very heavy rack of G2DAF equipment at a Silent Key sale organised at **Tex Swann G1TEX**

and myself on behalf of the family of a Silent Key near Blandford Forum. I remember that John's small van left the sale heading for Plymouth with its front wheels seemingly barely touching the road surface because of the weight of the equipment!

Have you got any stories regarding Silent Key sales? If you've ever organised one yourself and are willing to share the story – please contact me.

Memories of the **Southampton RSGB Group's** annual Amateur Radio demonstration station at the Southampton Show in the 1960s came flooding back when John G3SGV mentioned how the operators had their backs to the viewing public. This was (and still can be!) a problem and apart from offering the audience a 'side on view' there was little we could do to improve the 'viewing' aspect.

Publicity & Promotion

I appreciated **Tim Kirby G4VXE's** E-mail (published this month) regarding the importance of publicity and promotion of Amateur Radio. Tim took time off preparing his *World of VHF* column to write.

Tim's letter also reminded me that I have to thank everybody who has requested the PDF document I'm preparing – which is aimed at helping clubs with Publicity and PR. It's not yet finished, but I hope to complete it very soon. Thanks for your patience!

Rob Mannion G3XFD/EI5IW

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The 2012 PW 70MHz Low Power Contest Results

The *PW* Contests Adjudicator **Colin Redwood G6MXL** presents the results of the 2012 contest – did you take part despite the windy and weather? If so – take a look at how you got on this year.

Valve & Vintage

Phil Cadman G4JCP takes a nostalgic look back to the days when amplitude modulation ('ancient modulation' was the normal mode for mobile operation on the Amateur Bands. Phil also has news about his mystery photograph and all will be revealed!

Emerging Technology

Chris Lorek G4HCL looks into the very near future in the column that has the knack of being 'spot on' with new developments in radio and communications. So, don't forget that you've glimpsed the future first in *Emerging Technology*!

Roger G3XBM & The Fredbox For 50MHz

Roger Laphorn G3XBM is very well known for his keen approach to the hobby and here he looks at the *Fredbox*, which helped him and many others to join the fun on 50MHz (6m).

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Amateur Handhelds



KT-930EE

2/70cm 5w very solid dual band transceiver, 128ch, dual frequency, dual display, dual stand-by, 50 CTCSS/108 DCS tones, 1750Hz repeater tone and includes an amazing 2200mAh battery as standard all for an amazing.....**£79.95**

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2/70cm 5w quality transceiver with 199 channels, dual channel, dual frequency readout and 1750 Hz repeater tone**£89.95**



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HR-200S & HR-400S

Rugged construction with diecast aluminium chassis, 60W for 2m & 45W for 70cm, with 200 memory channels, 50 CTCSS and 1024 DCS tones and wide LCD display and 7 digit full frequency readout – in stock now
HR-200S 2m version.....**£139.95**
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HR-5500

Frequency range 28.000 - 29.700 MHz HF 10 Meter Band 25.615 - 30.105 MHz (HR-5500EX version only) AM/FM/SSB/CW, Back lighted LCD Display (amber colour) with 7-digit frequency readout 2-Digit Channel Number readout, 6 Frequency Bands, 60 Channels (programmable) in each band, RF Power max 12W AM/CW, 40W FM, 40W SSB, Digital S/ RF Meter, RG Gain control, RF Power control, Scan/SC List, Dual Watch, EMG, RB, NB/ANL, LOCK ... **all for just £149.95**
D-056 Programming cable for above.....**£12.95**



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BCL-3000

Portable receiver HF/SW 1.8-28MHz.....**£79.95**

PL-660

Portable receiver for HF/SW/ MW/LW and AM aircraft**£99.95**



S2000

All mode shortwave receiver + VHF airband.....**£299.95**

Scanner Receivers



AR-109

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ultra compact size multi-standard mobile.....**£59.95**



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multi-standard mobile with RF gain and auto squelch**£64.95**

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multi-standard mobile with Roger bleep and front speaker**£69.95**



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multi-standard mobile with large blue display with RF meter.....**£74.95**

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multi-standard mobile with wide LCD with speech processor.....**£89.95**



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multi-standard mobile with brilliant safe drive option**£59.95**

"New" M-899

multi-standard mobile with safe drive feature plus lovely large blue display ...**£109.95**



M-490 PLUS

multi-standard mobile with advanced features inc DW, LOC, SCAN, PA, and many more.....**£99.95**

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multi-standard mobile with speech processor, scan, dual watch and orange LCD**£99.95**



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multi-standard mobile with option plug in Echo board and great old style signal meter.....**£109.95**

M-495 POWER

multi-standard mobile with extra large amber LCD and 50 CTCSS tones.....**£119.95**



CB Handhelds

H-512 PLUS

CB Multi-Standard programmable handheld radio with advanced hardware and software design. Back lighted LCD display with 3-digit band/channel reading and battery level meter. AM/FM modes (depending on country) with Hi-Low transmitter power for battery saving, powered with 6 x Alkaline or Ni-MH batteries.**£89.95**



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SPS-8040

3amp switch mode power supply unit A light and compact size package delivers a high output current. Suitable to provide regulated DC power supply to CB, VHF/ UHF mobile transceivers. Automatic electronic protection against over-loading and short circuits.....**£37.95**



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10amp switch mode power supply with high stability and protection against radio frequency. Suitable to provide regulated DC power supply to VHF/UHF mobile transceivers with automatic electronic protection against over-loading, over-temperature and short circuits. Standard terminals and lighter socket.....**£79.95**



SPA-8230 as above but 23 amps.....**£89.95**

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Full Kit includes radio, ready to go cigar lighter plug and magnetic antenna**£79.95**



M-130 PLUS

Full Kit includes radio, ready to go cigar lighter plug and magnetic antenna**£84.95**

M-799 PLUS

Full Kit includes radio, ready to go cigar lighter plug and magnetic antenna**£89.95**



PMR446 Walkie Talkies

i-TALK T30

Pair of 8ch handie with automatic channel scan and double desktop charger**£34.95**



i-TALK T40

Pair of 8ch handie with power save circuit, battery indicator and LED torch**£29.95**



i-TALK T90

Pair of 8ch handie with 38 CTCSS tones and auto scan, CTCSS and squelch.....**£59.95**



SL-02

Pair Ultra slim dual band 8ch PMR/69ch LPD with 38 CTCSS tones, dual watch and VOX...**£69.95**



MT-3030

Pair of good quality dual band 8ch PMR /69ch LPD with 38 CTCSS tones, hi-low power and roger bleep**£79.95**



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DOLPHIN

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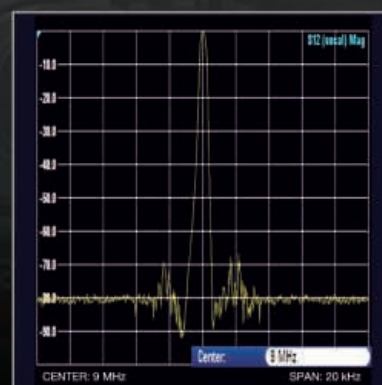
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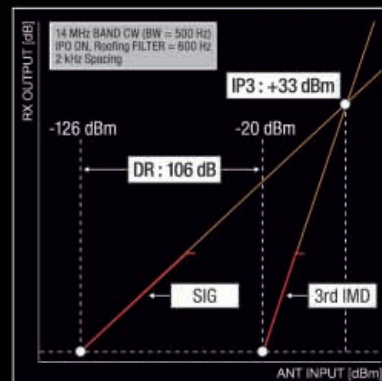
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