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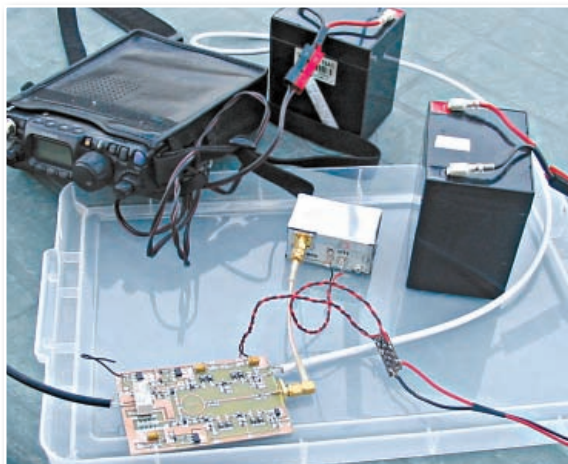
The TM-D710 GPS Add-on Reviewed!



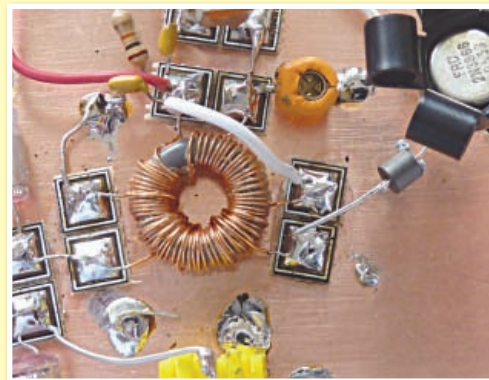
A useful little add-on for APRS users

The World of VHF

Activity on the v.h.f and u.h.f bands



Microwave Home Brew
The next band up – 2.3GHz



Practical Way

A single device transmitter

Buying Second-hand

What to look out for during the summer rally season



What Next?

Joining in the fun with Jamboree On The Air

In the Shop

Problems with older rigs

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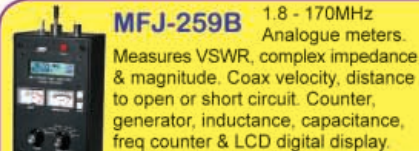


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MFJ-269 Covers 1.8-170MHz & 415-470MHz plus 12-bit A/D for improved accuracy. Reads complex impedance, magnitude PLUS parallel resistance & reactance! Read coax specs & problems. Plus acts as generator & freq. meter. N connector. **£359.95 C**



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- 3-50-LFA** 3 el. 50MHz 8.9dB gain 20dB F/B Boom 2.14m **£119.95**
- 2-LFA-28** 2 el. 10m 6.4dB gain 13.5dB F/B Boom 1.28m **£159.95**

Big or small, HF or UHF, or Exposed locations: we can provide an antenna that does the job and has a guaranteed performance. All the gain, F/B, and side lobe specifications are proven, not generated in the advertising department! If you want performance and an antenna that lasts, look no further than Essex! That's the new world centre for antenna excellence.

HF - UHF in One Box!

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

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

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

ICOM IC-7000 The most compact, high spec. HF-UHF transceiver available. With its lovely display and digital IF filters, it can handle all your needs - SSB CW and data. HF-6m 100W, 2m 50W and 70cms 35W. All in one lovely box. **IN STOCK £1189.95 D**

HF on a BUDGET!

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

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

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

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

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

HF High Performance Transceivers

YAESU FT-950 HF & 6m Transceiver



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

FT-2000 160 - 6m Transceiver

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



FT-DX5000 160 - 6m Transceiver The current Yaesu "flagship" radio, covering 160m to 6m delivering 200 Watts. **ALL IN STOCK**
FT-DX5000 Standard radio **£4635.95 D**
FT-DX5000 + SM-5000 monitor **£4939.95 D**
FT-DX5000MP + monitor & filters **£5369.95 D**

KENWOOD TS-590S 160m - 6m with superb receiver inc. dual roofing filters, Auto ATU, 32 bit f/p DSP & USB PC connection.



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

ICOM IC-7410 HF-6m Transceiver

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



IC-7600 HF Transceiver



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

TEN-TEC OMNI-VII-588 HF Transceiver



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

MFJ Auto ATUs - The BEST!

Enjoy fast, accurate & very low loss auto antenna tuning. Tunes in a second!

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 C**

MFJ-929 World's Fastest ATU

World's fastest compact auto ATU. The algorithm offers 132,072 solutions and instantly matches any antenna with near perfect VSWR. Get the best from your antenna! **£214.95 C**

MFJ-991B 300W Auto ATU

Handles 300W, fitted cross needle meter. Wide range: coax, balanced or wire. 300 Watts level matches 6-1600Ohms, 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**

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

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AL-811XCE 10-160m 600W
*1.8 - 30MHz (All Ham bands)
*Output: 600W PEP (500W CW) *Input: 50 Ohms 50W (typ) 100W (max)
*Valves: 3 x 811A *Built-in 230V AC supply
*Matches Solid State Rigs **£899.95 D**

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*1.8 - 30MHz (All Ham bands)
*Output: 800W PEP (600W CW) *Input: 50 Ohms 50W (typ) 100W (max)
*Valves: 4 x 811A *Built-in 230V AC supply
*Matches Solid State Rigs **£979.95 D**

AL-800XCE 10-160m 1.25kW
*1.8 - 30MHz (inc WARC)
*Output: 1.25kW PEP (750W CW)
*Input: 50 Ohms 70W (typ) 100W (max) *Built-in 230V AC supply *Inrush Current Protector **£2599.95 D**

ALPIN-100MKIII HF Linear Amplifier 160-6m 1kW **£2299.95 D**
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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!

QUANSHENG

High Quality - Low Prices
TG-UV2 2m/70cm Handheld

Dual band handheld, covers 136.00 - 173.995, 400 - 469.995MHz and FM broadcast 88-108MHz. Includes 7.2v 2Ah Li-ion battery, AC charger & hod, carry strap and belt clip.

Full Range Of Accessories In Stock **£84.95 D**

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KG-UV6D/L 4m/2m

4m/2m Dualband Handheld Transceiver 5W/4W SMA. **£99.95 D**

KG-UV6D 2m/70cm

2m/70cms Handheld True Dualband Transceiver 5W/4W SMA. **£94.95 D**

Handheld Transceivers

- ID-31E NEW** 70cms D-Star handheld with built-in GPS, IPX7 submersible & D-Star DV mode, SD card slot, 1252 memories & 5W output. **£349.95 D**
- TH-K20E & TH-K40E** Two new handies from Kenwood. "K20E" offers 5.5W output and rx from 136-174MHz. "K40" offers 5W out and rx from 400 - 470MHz. **£119.95 D each**
- VX-3E** 2m / 70cm Handheld Wideband receive **£169.95 D**
- VX-6E** 2m/70cms handy, 5W Wideband Receive **£214.95 C**
- FT-60E** 2m/70cms, 5W handy Wideband Receive **£129.95 C**
- VX-8GE** Dualband 2m/70cm 5W + GPS Antenna **£349.95 D**
- VX-7R** Waterproof triple band handy (silver/black) **£299.95 C**
- VX-8DE** Triple Band 6/2m/70cm Upgraded APRS **£369.95 D**
- IC-E80D** Dual band 2m/70cm D-Star CTCSS & DTCS GPS Compat. **£329.95 D**
- IC-E90** Triple band 2m 6m 70cm + wideband receive 500kHz-1GHz **£244.95 D**
- IC-E92D** Dual band 2m/70cm waterproof fitted D-Star. Rugged radio. **£387.95 D**
- TH-F7E** Dual band 2m/70cm + wideband receive inc. SSB **£236.95 D**
- TH-D72E** Dual band 2m/70cm with GPS & TNC + SIRF **£426.95 D**
- TG-UV2** Dual band 2m/70cm with CTCSS DCS & LED torch! **£84.95 D**

YouKits QRP 80-40-30-20m CW Transceiver



HB-1B QRP Transceiver

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

IN STOCK £249.95 D

VHF UHF Mobiles

- NEW 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, excellent audio clarity, and a host of advanced features.
- FT-2900E** 75 Watt 2m 3W Audio, CTCSS, DTMF mic & "WIRES" internet. **£142.95 D**
- FT-7900E** 2m/70cms mobile 50/40W CTCSS, DTMF, "WIRES" internet, wide Rx **£239.95 D**
- FT-8800E** Dualband Mobile 50W / 30W Great Value **£343.95 D**
- FT-8900R** Quad band 10/6/2m/70cm FM 50W (70cm 35W) **£389.95 D**
- FTM-10E** 2m/70cms Blue Tooth & built-in mic. **£324.95 D**
- FTM-350E** 2m/70cm Mobile Bluetooth GPS APRS **£479.95 D**
- ID-E880** 50 Watt Dual band 2m/70cm with D-Star and airband receive. **£439.95 D**
- TM-D710E** 50 Watts 2m/70cms with APRS **£445.95 D**
- TM-V71E** 2m/70cm Mobile with Echo Link **£299.95 D**

WATSON Made for Watson by MOCVO Antennas **NEW**

- 1:1-BALUN-1.5** 1.5kW 1.8-30MHz A 1:1 balun able to handle up to 1.5KW RF power. Used to feed a balanced antenna, or doublet with unbalanced feeder, reduces static on feeding. **£54.95 C**
- 4:1-BALUN-1.5** 1.5kW 1.8-30MHz A 4:1 Extra High Power 1.5KW current balun for Windom, off centre fed or folded dipoles. Reduces 200 - 300 Ohms at feed point of antenna to 50 Ohms enabling the antenna to be fed with 50 Ohm coaxial cable. **£54.95 C**
- W-LINE** 1:1 Line Isolator 400W 1.8-30MHz Removes RF from Coax. **£32.95 C**
- 1:1, 4:1-BALUN & 9:1-UNUN 400W** 1.8-30MHz Can be used as centre feed point. Each model **£32.95 C**
- MD-12HP** 12m Mono for portable fixed station 400W CW 1:1 Balun 5.77m **£43.95 C**
- MD-17HP** 17m Mono for portable fixed station 400W CW 1:1 Balun 7.95m **£43.95 C**
- LW-20** Multiband HF long wire 9:1 UNUN 80-6m inc WARC 20m long 400W **£43.95 C**
- LW-10** Multiband HF long wire 9:1 UNUN 40-6m inc WARC 10m long 400W **£43.95 C**
- HW-80HP** Multiband HF off-centre dipole 4:1 balun 80-10m 40m long 400W **£71.95 C**

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



When customers trade in £4000 + radios for a K3 it says it all! G3OJV

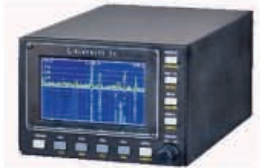
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ELECRAFT

K3 Series Transceiver

- 160 - 6m (2m*) 100W (10W*)
- SSB CW AM FM
- RTTY, PSK31 Rx & Tx
- Compact and Lightweight

- * Options
- | | |
|----------------|-------------------|
| K3/100-F Built | £1999.95 D |
| K3/100-K Kit | £1899.95 D |



P3 Panadaptor

2kHz - 200kHz live bandwidth, tap tuning, waterfall display and variable dynamics. K3 owners also need the optional KX3VA panel fitted to their transceiver - see K3 options.

The Affordable and Portable Elite Class Transceiver

Compact size weighing 3.6kg
Tuning steps to 1Hz
100 Memories
Stability +/- 5ppm
Antenna 50 Hms 50-239
Decode & Send Data Modes
Dual VFOs

Low level transvert I/O
Buffered IF out
IMD3 > 100dB typical
Blocking > 140dB typical
Image rejection > 70db
Noise blanker - adjustable
8-band Rx graphic EQ

IF Shift and Width
Tx 200mW-100W (10W*)
100% Tx duty cycle all modes
True RF speech processor
Tx audio noise gate
Tx 8-band graphic EQ
SSB Tx bandwidth up to 4kHz*

Tx speech monitor
Extensive DSP
Full and semi, silent QSK
Adjust CW rise and fall time
Adjustable CW offset & sidetone
And lots more!

When you buy a K3 the journey has only just begun. You get a top performance transceiver that is becoming the favourite for DXpeditions and contests. It has a performance that would cost much more with some other brands, and you are in good company. The data modes can be run entirely without a PC. You can add a completely separate receiver, and get the P3 Panadaptor. Add an internal 10:1 VSWR ATU and sit it beside the 500W PA. Plus more to come!

K3 Options

- P3 Panadaptor** Kit **£709.95 D** Built **£759.95 D**
Plugs into the K3 and offers bandwidths from 200kHz down to 2kHz. Point and click instant QSY. Displays right down to noise floor.
- KAT3 Internal ATU** Kit **£319.95 D** Built **£369.95 D**
100W auto tune ATU that can match up to 10:1 VSWR
- KRX3 Sub Receiver** Kit **£599.00 D** Built **£649.95 D**
A completely independent receiver board 160 - 6m
- K144XV 2m Transverter** Kit **£299.95 D** Built **£349.95 D**
10W 2m high performance transverter. (FM Requires KFL3B-FM filter)

- KXV3A Module** Built **£129.95 D**
Offers separate Rx antenna, IF out and transvert interface
- KBPF3 General Coverage** Built **£169.95 D**
Provides input filtering for general coverage rx.
- KPA500 Amplifier** Kit **£1999.95 D** Built **£2199.95 D**
500W Linear Am 160-6m 230v AC - can be used with other radios.
- KAT-500 Auto ATU** Kit **£TBA** Built **£TBA**
A 500W auto atu that will handle 10:1 VSWR - available in the Autumn

KPA500 500W Linear Amplifier



This linear requires just 40W for 500W out. It is totally silent apart from the hushed thermal triggered fan. No relays, just fast diodes. QSK up to 80 wm. Auto band switch by freq. sensing. Built-in linear AC supply. Weighs 12kg. Size 10 x 25 x 25 (cm). Works with ant rig that has PTT line.

Back In Stock!



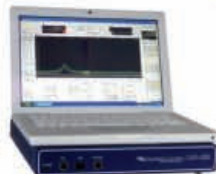
W3-BP Portable Dipole 40-2m 250W
*Frequency 40 to 2m *Power rating 250W *2x 55cm alloy dipole arms *1x dipole centre with 1/2in thread
*2x matched loading coils *Adjustable finger-tight coil taps *2x 165cm telescopic end sections *Wrap around pouch and hard case *Full instructions *7.62m (25ft) coax with balun *Packed size 68cm / 1.6kg
Note that photo shows the complete Buddipole with the optional tripod. **£219.95 D**

Flex-3000 HF - 6m Inc. ATU



Are you missing out on the revolution? 160m - 6m with internal ATU. Live spectrum display and awesome performance.

£1379.95 D



Laptop not included

Flex-1500 HF - 6m Software Defined Radio



86dB dynamic range, 48kHz receiver display, USB cable, 5 Watts output. Low Cost Transceiver with Software Defined Radio Features and Performance This is a common theme for FlexRadio Systems' software defined radios - a focus on performance and exceptional value. And the FLEX-1500 continues that tradition for a transceiver in the sub £600 price class. A QRP radio that works perfectly with your laptop and a great driver for VHF/UHF transverting. Experience the excitement and wonderment of all modes and fantastic receiver performance for such a low price.

£579.95 D

ELECRAFT

KX3 All-Mode HF-6m 10W

The waiting list for this radio is getting shorter. Phone for latest delivery estimate.



KX3-F Built **£959.95 D**
KX3-K Kit **£899.95 D**

- Internal wide-range antenna tuner (ATU) & battery options; built-in speaker
- Advanced DSP provides dual watch, noise reduction, noise blanking, auto-notch, stereo audio effects
- Software-defined radio (SDR) architecture plus roofing filters (KXFL3) for excellent dynamic range
- Operates in data modes (PSK31/RTTY) with or without a PC; includes RX I/Q soundcard outputs

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 KXP3 keyer paddle. With a whip antenna, you can even operate hand-held.



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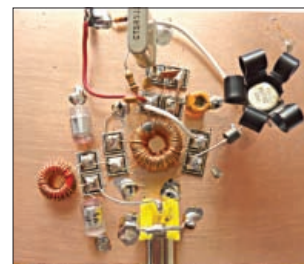
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Rob Mannion G3XFD/EI5IW's

Keylines

Rob was amused by the contents of an Ofcom announcement – but is concerned at the same time. He also has suggestions on how clubs can effectively improve publicising their activities ‘to the outside world’ and the media.

To be quite honest – I wasn't surprised to read the announcement from Ofcom the UK Regulator (see *Newsdesk* – that they were allocating some channels within the 144MHz Amateur band for use during the Olympics. Despite this admission, I must say I was amused by the somewhat ironic reminder issued by Ofcom that Radio Amateurs are only licenced to communicate with other Radio Amateurs (quite forgetting the fact that under certain conditions – we can assist the emergency services).

However, even though I did find the reminder from Ofcom to be amusing and rather unnecessary – I think they could still end up with Radio Amateurs challenging ‘intruders’ on the band. I think this is likely because there are many people active in the hobby who don't read magazines or belong to their national societies. They're often the same people who are seemingly unaware of beacon frequencies, bandplans or other frequencies or channels we are asked to avoid – indeed we'll often find them in QSO on top of the 18.110MHz beacon frequency!

I'm also rather concerned that uninformed Amateurs could then find themselves causing problems when the (often equally uninformed!) media learn of ‘Interference to the Olympics from ‘Ham Radio’. Incidentally, I apologise for the use of this (often used disparagingly) term in *PW* – but invariably it would be the (inappropriate) term used in any newspaper story.

Personally, I hope that there won't be any problems caused by Ofcom's decision – but

newspapers and the media generally pounce on ‘bad news’. Indeed – they thrive on it. So, we must try to ensure that any publicity that our hobby receives is positive!

Illuminations Under Buckets!

Last month in the August *Topical Talk* (TT) I mentioned that I think that some Amateur Radio clubs aren't very good at promoting themselves – and I mentioned the proverbial ‘Hiding lights under bushels’. However, I received several comments from readers who obviously didn't understand my use of the (what I thought was a classic saying) and I soon discovered that some younger people – and those from cultures that differ from the established culture within our group of Islands – aren't aware of the meaning.

In fact, the first feedback I had on my *TT* comments came from a keen Radio Club member who belongs to a university Amateur Radio Club in the UK and is hoping to get his licence when he returns home to the Middle East. So, I realised the term might be better explained as ‘hiding lights under buckets’! Perhaps I should have used that description in the first place as it aptly describes the situation!

Other Amateurs who are involved in club committee work (without them the all-important club scene would fail!) contacted me and I was able to offer some general advice. First, I think all clubs should appoint a Public Relations Officer/ Representative. This person should receive all news of club activities and have the ability to contact everyone in

the Amateur Radio hobby and the media – local, national and even international media, including local newspaper, radio and TV stations.

It's essential nowadays that a club PRO has access to, and can use E-mail. There's absolutely no point in sending the traditional letter because busy news Editors won't have time to write a formal letter back to the sender for enquiries, etc..

Another point – which I must admit always surprises me – is that many clubs and societies (especially when they're promoting rallies and other events) rarely attempt to provide photos or anything else that will help the Editor/ News Editor to make the most of the story. Not even a good quality club logo! Indeed, I often have to contact the sender to request they send me suitable material, including logos.

I've become so concerned at the general lack of awareness of the valuable tool that effective public relations can offer to Amateur Radio Clubs (although there are some shining exceptions!) that I'm preparing a PDF document. The document will contain as much useful and basic information I can include from my many years as a specialist writer, journalist, broadcaster – and Radio Amateur. I may not be an advertising/PR professional – but I do have a great deal of experience in promoting our wonderful hobby to the ‘outside world’ and the PDF I'm preparing will be available by request by E-mailing me via rob@pwpublishing.ltd.uk

Rob Mannion G3XFD/EI5IW

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

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



Readers' Letters

Send your letters to:

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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**.

Memories of TV - Gasometer Interference

Dear Rob

I am a retired electrician (71 years of age). As an apprentice I was involved in the installation of antenna for the start of ITV) around West Yorkshire using 405 lines on Band III. We installed a 5-element antenna (Made by Antiference) to a property near Leeds, the transmitter was Emley Moor (the original mast).

We left perfect pictures (the BBC antenna was a separate dipole in those days). Over three weeks we went back to investigate picture faults to find no pictures!

We tried all types of antennas and eventually we went with an engineer from Antiference who diagnosed the fault to a nearby gas holder! When the gasometer was 'Up' (full) there were no pictures. When it was down (empty) it caused that many 'ghosts' the picture wasn't viewable! The suggestion solution from the Antiference engineer was for the customer to move – or to place the antenna on the gas holder! Both weren't viable for the customer. Great memories!

Les Potter 2E0LAI
Wakefield
West Yorkshire

Editor's comments: *Thanks for your memories Les! The signal pathway problem from gasholders (gasometers) was quite common – it could be worse in Bands IV/V (u.h.f.). I remember one case that the Independent Broadcasting Authority investigated in Southport in Merseyside (formerly Lancashire). The area was quite flat and the main transmitter was the Winter Hill station (visible from the M6). The delayed images ('Ghosting') were so 'close in' that teletext decoders went berserk as the 'eye height' of the transmitted pulses (representing the 0s and 1s data streams) became difficult to detect!*

Out Of Band Operations

Dear Rob,

I read the letter from **Ian G4JIU** with the usual dismay I have whenever I read such comments (usually found on internet

£20 Star Letter

Doing It By Design May

Dear Rob,

Having been a short wave listener and a reader of *PW*, since the early 1960s, this is a first for me – writing a letter to the Editor! What has caused this momentous event? The answer is **Tony Nailer G4CFY's** *Doing it by Design* article in the May edition of *PW*!

I (for one) absolutely agree with Tony that we radio listeners are a neglected group amongst *PW*'s readers.

Tony's article – subtitled *Helping PW's Listening Fraternity* was very good for me personally and I am sure for the many other radio listeners out there. It was interesting, informative, stimulating and – importantly – it was written in a style I could understand. I certainly learned a lot.

From my days when I built one-valved s.w. receivers with a huge high tension battery to power them, ex-military Second World War receivers through to the 'Eddystone Years'. Then on to using modern receivers with direct frequency entry entry and all the IT gadgets – radio listening has always been my main interest in the hobby.

There are so many topics of particular interests to radio listeners Tony Nailer's article was 'spot on!' I still mourn the passing of the old format *Short Wave Magazine* and *Radio Constructor*.

I subscribe to *PW* because it is still a good read and it would be even better with a few more articles aimed at the radio listener! So, on behalf of the many *PW* readers who are mainly interested in radio listening – I issue a heartfelt request – more articles in the same vein please! Yours sincerely,

John Salmon
Dawlish
Devon

Editor's comment: *Good to hear from you John! **Tex Swann G1TEX** and I would be interested to hear from any of our listener/constructors who would like to consider writing for *PW* – as you say, there are many aspects of *PW*'s subject coverage to interest enthusiasts who don't transmit. I often meet readers like yourself John during my club visits so I know you're not alone!*

newsgroups and forums rather than in print).

Operation of these radios outside of Amateur bands is not illegal, provided you have a licence for the frequencies in use.

I hold one commercial PBR licence in addition to my Amateur licence (plus another just expired, and another in the application process at the moment). As Type Approved equipment is no longer required, any radio with a CE Declaration of Conformity and fitting the Interface Requirements for the licence can be used.

All of my equipment is capable of full range transmission – it's always better to

have it and not need it, than to need it and not have it. I regularly use my Amateur hand-helds for v.h.f. PBR, and I have no doubt that it is completely within the conditions of my PBR licence.

They're even legal for use on PMR446, according to the Interface Requirements – as long as the effective radiated power (e.r.p.) is below 500mW.

There is no justification for not allowing importation of full range transceivers – after all, most commercial rigs can cover their full range with nothing other than some re-programming. The Kenwood TK340/240 could be programmed using

nothing at all other than a button press on power up. The radio world is always changing – unfortunately, many Amateurs (and Ofcom) just aren't keeping up.

Gordon Burnett MM0YET

**Troon
South Ayrshire
Scotland**

Wonderful Wireless Museum In London

Dear Rob,

I'm writing with regard to **Malcolm Worrall's** Letter on "Old TV viewing" As a retired employee of Philips, the Dutch electronics company, I was alerted to a wonderful museum in London. I went along last year and had the most nostalgic of times. The curator is an elderly man – **Gerald Wells** – who has dedicated his house and garden (by the building of a massive array of wonderful sheds), to his collection of all things valved. Radios and TV's from the past abound. As I walked away after a stunning afternoon which included seeing old 405 line projection TVs in actual operation, I cried! Such was the emotional weight of the experience.

Now I appreciate that you're some way off London and a visit there may not be a practical consideration. Yet perhaps some other readers would find some interest in making a visit. Here are the contact details of **The British Vintage Wireless & Television Museum: Gerald Wells (British Vintage Wireless Association), 23 Rosendale Road West Dulwich SE21 8DS. Telephone (020 8670) 3667. Website is <http://bvwm.org.uk/>** {Where you can find many photos of what is there}.

The VCR97 c.r.t. mentioned by the Editor was, I think, a 6in (round) Second World War radar tube. Yes there was a post-war TV kit that used one. It had electrostatic scanning (internal plates), rather than the more usual scan coils used for magnetic deflection, and was ideal for use as the basis of an oscilloscope. Indeed I built just such an item in the late 1950s.

The connections were made through a 12-way side connection base, which I think I called a duodecal base – if that's not a contradiction in terms! Aluminising came to TV tubes of the magnetic deflection type later on and increased the brightness somewhat at the expense of glare and focus, but was accepted and demanded by the public – but not so much the purist.

By coating the outside of the tube with a graphite coating a small capacitor was made available using the glass as the dielectric. This was ideal for smoothing the 10kHz (405 line) rectified d.c. extra

Hearing Aids & Amateur Radio

Dear Rob,

I was most interested in your frank *Keylines* Editorial in August *PW* about the side effects of using DSP based hearing aids as a Radio Amateur. Having been licensed nearly 50 years ago, I too am at an age when hearing loss, accentuated by Territorial Army(TA) service, is now a problem.

In the 1960s the wearing of earplugs was banned during range practice in the TA as it prevented the hearing of firing orders. I managed to protect one ear by pushing my elbow into it. In theory the MoD will pay compensation for rifle induced hearing loss, but only if both ears are affected! These days hearing defenders are equipped with internal speakers.

My return to Amateur Radio, after 25 years off the air, coincided with a change from analogue to digital hearing aids, Unlike you, I have yet to get fully comfortable with them, and remove the aids when wearing headphones.

I was interested in your description of the importance of lip-reading as an additional input. The "need to see lips", I discovered this quite some time ago, as an instructor to overseas engineers, where English was not their first language. A snag in Amateur radio is that in a voice QSO we cannot see the operator's lips moving!

Also you mentioned the relevance of a co-operator helping with the interpretation of voice, particularly in pile-up conditions is important. Our Club Chairman in the **Itchen Valley Amateur Radio Society (IVARC)** IVARC club chairman, **Brian Jones G0UKB** though also partly aurally disabled, is particularly adept at this and my productivity leapt up when he logged for me when operating the club special event station, GB0WSL during the recent RMS *Titanic* commemoration week!

Regarding r.f. break-through, my only experience of this has been when driving my Citroen Berlingo based motor caravan. I get digital breakthrough from the dashboard electronics, which reduces if I keep as far away from the dash as possible!

My thanks for a very useful Editorial on an issue which many find embarrassing and won't discuss.73 to everyone at *PW*.

Geoff Morgan G3ROG

**Hyde
Winchester
Hampshire**

Editor's comment: Thank you for your support and comments Geoff. Please join me on the Topical Talk page for further comments.

high tension generated from the line timebase and made obsolete the need of an expensive high voltage oil-filled capacitor.

The first TV I ever saw was through a shop window in Chiswick High Road in London. It was, I'm pretty sure, made by Ferranti not EMI. It used a projection technique with lenses and mirrors with the light sourced from a small 2 or 3in tube with a very high (25kV) . This was so bright it was dangerous to look at directly and was, with such an unregulated high voltage, likely to emit X-rays! (Stand well clear then if you want any children).

Berry Greene G1ZYD (lapsed)
**Chichester
West Sussex**

Editor's comment: Thanks Berry! Gerald Well's museum is extremely well known and has featured on BBC Radio 4. I last visited the museum over 20 years ago. Gerald always says "Tea on the hour – every hour"! I recommend a visit. The VCR97 was still in use in radar equipment

in Royal Navy in 1962. It was available in various phosphors and persistence (after glow) – as many TV home-brewers discovered!

Alan Turing Special Exhibition

Dear Rob,

I'm writing because I thought you and your readers might be interested in a special exhibition that is on at the science museum in London until July 2013 about the life and work of Alan Turing and his code breaking work during the Second World War. You can check out a code breaking game on there website at <http://turinggame.sciencemuseum.org.uk> and full info can also be found at Science Museum website. Keep up the good work with the magazine and best regards from Ireland!

**Kevin Sanderson EI7GBB
Longford
County Longford
Republic of Ireland**



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InnovAntennas Sponsors 2012W – 2012 Welsh Olympic station

The **Barry Amateur Radio Club (BARS)** set out to provide a station covering h.f. to u.h.f. earlier this year which would run through the entire six weeks of the Olympic games. However, it transpired that there was no 50MHz (6m) antenna on hand for the event so potentially, 6m could be missed from the plans. The BARS Chairman **Glyn Jones, GW0ANA** decided to contact InnovAntennas looking for help, having been impressed by both antenna build quality and performance.

InnovAntennas have agreed to supply a 50MHz 5-element LFA Yagi for the band which will be used by BARS for club Special Events, etc. after the games station is completed. Member of BARS had been looking for something a little smaller. However, due to the very nice coastal position (west facing) and the time of year the operation will take place, it was decided that something with a little punch would be in order to ensure any North American openings wouldn't be missed! For more information on the special event station visit: www.2012W.com or www.innovantennas.com for details for the supplied antennas.

Justin Johnson G0KSC

InnovAntennas Limited

Tel: (0800) 0124205

E-mail: justin@innovantennas.com

Website: www.innovantennas.com



Royal Navy ARS Coventry Event

The Royal Naval Amateur Radio Society (RNARS) has organised a social event in Coventry and all are welcome. It will take place over Friday, Saturday and Sunday September 14th, 15th and 16th. The main event is a gala dinner on the Saturday evening and will include pre-dinner drinks and entertainment provided by a professional.

On Saturday a coach trip from the hotel in Coventry to the National Memorial Arboretum is also to be run as part of the event. There are many other attractions in the area and Coventry has a wide selection of main brand shops and Independent retailers. Public transport is from available outside the hotel to the centre of the city.

Membership of the RNARS is not a requirement to attend this social event. Participants may attend the dinner only, or, stay one, two or three nights in the hotel. Details are on the Society website. Tickets can be obtained from the Chairman, **Doug Hotchkiss G4BEQ**.

A special event call sign is being applied for to put the event on the air on h.f. and WARC bands from 3.5 to 28MHz using c.w. and s.s.b. and on the 144 and 430MHz bands. The RNARS operating frequencies will be used. These are also listed on the web site.

Doug Hotchkiss G4BEQ

54 Sanderling Lodge

Rope Quays

Mumby Road

Gosport

Hampshire PO12 1EN

Tel: (02392) 504096

E-mail: g4beq@btinternet.com

Web site: www.rnars.org.uk



Yaesu FT-450D Won at Yet Another Successful McMichael Rally

Martin Lynch G4HKS contacted Newsdesk saying; "The weather was kind to all that visited the **2012 McMichael Radio Rally & Boot Fair** at the Reading Rugby Football Club, in Reading Berkshire on Sunday July 15th. Pure luck some would say – it hadn't stopped raining for weeks but the pause button was pressed for the entire day.

"As usual and very generously Yaesu UK, with the support of Martin Lynch & Sons provided a brand new Yaesu FT-450D as a raffle prize, which was won this year by **Robert Hanstock G0LZB** from Kingston on Thames. Robert is seen shaking hands with **Richard Atcherley**, the sales manager for ML&S and **Min Standen G0JMS**, the main organiser of the rally. It was an excellent turnout with dozens of boot fair tables, traders and hot dogs!"

Martin Lynch

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Stop Press News!

Lamcom's Launches On-line Chat Facility!

Lee Marsh of Yorkshire-based LAM Communications (LamCom) contacted *Newsdesk* as *PW* was going to press. "Hi, I have some great news items for *Practical Wireless Newsdesk*. We have launched the first on line chat facility for customers. They can chat live on line on our web site whilst they are browsing www.lamcommunications.net/index.php

"We have also secured a brand new range of products under the name 'D-Original' www.lamcommunications.net/advanced_search_result.php?keywords=d-original&x=0&y=0

Regards Lee Marsh
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The RSGB's National Radio Centre Opens

The **Radio Society of Great Britain's (RSGB) National Radio Centre (NRC)** – based at Bletchley Park, near Milton Keynes in Bedfordshire – was officially opened by the **Honourable Ed Vaizey MP***, the Minister for Culture, Communications and Creative Industries on Wednesday July 11th 2012.

The RSGB states that "*The centre provides the get 'up close and personal' with the history and technology of radio communication*". (See website details below)

The Minister unveiled a plaque in the entrance hall to mark the opening of the centre, accompanied by RSGB President **Dave Wilson M0OBW** and RSGB Board Chairman **Bob Whelan G3PJT**. The many guests present included the Vice President of the **International Amateur Radio Union (IARU) Ole Garpestad LA2RR** and **Dave Sumner K1ZZ** Chief Executive Officer and Secretary of the **American Amateur Radio Relay League (ARRL)**. The RSGB also paid tribute to the many sponsors who were represented, together with those who had helped the NRC to become a reality. Website: www.nationalradiocentre.com/

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Priory Business Park
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FAX: (01234) 831496
E-mail: AR.Dept@rsgb.org.uk

Editorial note: As the Son of a Life Peer Ed Vaizey is referred to as the 'Honourable'.



The Honourable Ed Vaizey MP, the Minister for Culture, Communications and Creative Industries unveils the commemorative plaque at the NRC on Wednesday July 11th 2012, accompanied by Dave Wilson M0OBW. Photo courtesy Mike Richards G4WNC

Spotlight On London 2012L On The Air

When the whole world was invited to an event just up the road from **Cray Valley Radio Society's** base in the Royal Borough of Greenwich, London, putting on a special event station seemed a very fitting response. That station, **2012L** – Two Oscar One Two Lima (or London as it will inevitably be associated) hit the airwaves on July 25th 2012. After many months of hard work, the Society received the necessary recognition from the Games' organising committee (LOCOG) to enable use of the 2012 'Inspire' logo, signifying participation in the Cultural Olympiad and England's contribution to the London 2012 Olympic and Paralympic Games.

A similar Amateur Radio celebration is taking place in Barry, Vale of Glamorgan in Wales, where the callsign will

be **2012W** (Two Oscar One Two Whisky) is active.

Both teams are looking to make as many contacts as possible throughout the world during the Games, particularly with countries participating in the Olympics. They will be operating 24 hours a day seven days a week from Wednesday July 25th until Sunday September 9th and will be open to the public from Thursday July 26th. The London station (located at **Royal Greenwich District Scouts Activity Centre, Avery Hill Road, New Eltham, London SE9 2HE**), will be open from 10am to 4pm and the Welsh station (located on the seafront esplanade at **Whitmore Bay, Barry Island, Vale of Glamorgan**) from 10am to 5pm daily.

Both stations aim to showcase Amateur Radio to visitors and 2012L includes

an exhibition focused around getting started in Amateur Radio and the accessibility of the hobby to balance the high end demonstration station meeting the needs of Amateurs world-wide wanting to contact the station. Many local youth and community groups have already committed to visit the stations.

Commemorative QSLs will be available for both stations, QSL details are on the web site. It is hoped that *Clublog* and *LOTW* uploads will be made during the event.

For more information about the stations, operating frequencies, etc., their websites can be found

at www.2012l.com and www.2012w.com Whilst the event is in progress, the team will update **Facebook (2012L)** and **Twitter (@2012L)** on a regular basis.

Further details from **Kevin Jennings MOKSJ** via kevin@m0ksj.org.uk

25 July till 9 September 2012
10 am - 4 pm Free entry

Linking the world

2Oscar 12London

London's amateur radio special event station to celebrate the 2012 Olympic Games and Paralympic Games

From:
Royal Greenwich District Scouts
Avery Hill Activity Centre
Avery Hill Road
New Eltham
London SE9 2HE

www.2012L.com

Preston Mayor Talks To The World

On Sunday July 1st the Mayor and Mayoress of Preston in Lancashire, **Carl and Linda Crompton** paid a visit to **Central Lancashire Amateur Radio Club (CLARC)**, which is based at the **Ribble Steam Railway in Preston Docks**. Carl and Linda were visiting the club because CLARC is running a Special Event station **GB615PG** to commemorate the Preston Guild celebrations on behalf of the town. The Guild has been held in Preston every 20 years for the last 615 years (except during the Second World War). Further details about the Guild and special event station can be found at www.qrz.com/db/gb615pg

Since the special event call sign was first aired back in April, over 800 contacts have been made with most of the operating being done on 7MHz. The GB615PG station will be on the air most weekends until October 31st 2012.

His Worship the Mayor – who is also an Amateur Radio licensee with the callsign **G6MCC** – opened the new radio room (**Fig. 1**) and then went on to work several stations using the special event call sign GB615PG before signing the log and some QSL cards to commemorate his visit. After this the party were taken on a conducted tour of the museum by Geoffrey Anthony a volunteer at the Ribble Steam Railway, followed by a trip on board a steam hauled train.

The day was finished off with refreshments in the café where the party enjoyed drinks and a piece of cake (**Fig. 2**) made especially for the occasion by **Nigel Meakin 2E0NHM** – a member of CLARC. The cake was decorated with the CLARC members call signs iced all around the sides and topped with the Lancashire red rose and Preston Guild logo. The CLARC members also thanked the Mayor and Mayoress for attending and all those who helped to make the day a great success. Further information from Brian Nuttall M0OYG via E-mail nuttallbn@gmail.com



Fig. 1: The Mayor of Preston Carl Crompton G6MCC preparing to operate the Special Event call sign GB615PG. Photo courtesy of Andrew Fowler.



Fig. 2: The GB615PG Commemorative cake made by CLARC member Nigel Meakin 2E0NHM. Photo courtesy Andrew Fowler.

There's A Mountain Goat Living In Cambridge!

Tom Read M1EYP from **Summits On The Air (SOTA)** wrote to *Newsdesk* to report an unusual 'sighting' in Cambridge! Tom writes, "An unlikely SOTA Mountain Goat is **Martyn Johnson M1MAJ**. Living in Cambridge, Martyn lives in one of the flattest and lowest parts of the UK, and significantly distant from the mountainous and hilly areas of Wales, Northern England and Scotland! So Martyn, often accompanied by **Caroline Blackmun M3ZCB**, has put in a great deal of time and effort in order to attain the target of 1000 activator points.



Indeed, Martyn began his SOTA campaign in the Yorkshire Dales back in 2003, with activations of Pen-y-gent G/NP-010 and Ingleborough G/NP-005, and finally attained the prized "MG" status on Helvellyn G/LD-003. During this time, Martyn has used the special

MR1 (Royal Wedding) prefix from the summits, and learned c.w., to join the small group of sought-after M1 stations on h.f. c.w.!

Just a few weeks later, Caroline M3ZCB herself achieved Mountain Goat status for 1000 activator points. This was attained on the Welsh summit of Elidir Fawr GW/NW-005 on May 6th 2012. On this activation, Caroline operated on 7, 14 and 50MHz s.s.b., and on 144 and 430MHz f.m., logging 83 QSOs in a five hour stay. The photograph shows Martyn on the summit of Ben Ledi GM/SS-023 (Southern Scotland).

For more information about the Summits on the Air (SOTA) awards programme, please visit the website:

www.sota.org.uk

Further information from Tom Read M1EYP

E-mail: tommyread@hotmail.com

Three Lieutenants Together At Inskip Airfield

Regular *PW* author **Roy Walker G0TAK** E-mailed *Newsdesk*: "The photograph I've sent was taken at Inskip airfield, formerly the **Royal Naval Air Station HMS Nightjar** on July 2012. It's near the village



The Three Lieutenants together! Sir James Cropper (Left), Roy Walker centre and the Lord Shuttleworth on the right.

of Inskip, Lancashire, between Preston and Blackpool in north west England. The site today is still owned by the Royal Navy and is now home to DCSA Inskip, a tri-service communication centre. Most of the communications that take place here are low frequency radio communications to submarines. The current station has four 183m (600ft) high antennas and several other smaller systems.

"The occasion was the opening of Lancashire and Cumbria's **Air Training Corps (ATC)** new Wing Activity Centre by the **Lord Shuttleworth KCVO**, Lord-Lieutenant of Lancashire and **Sir James Cropper KCVO**, the Lord-Lieutenant of Cumbria. The appearance of two Lords-Lieutenant in uniform is possibly unique. Normally they will not appear in uniform outside their own area of responsibility. On this occasion because the Wing covers two counties Sir James Cropper had to seek permission from the Lord Shuttleworth to appear in uniform.

"The photograph shows Sir James Cropper (left) and myself **Flt. Lt. Roy Walker G0TAK** RAF (Retired) now an ATC Civilian Instructor and (right) the Lord Shuttleworth.

"The Wing activity centre is equipped to train Air Training Corps cadets in all the subjects in their syllabus and includes a fully fitted radio suite to cover all the ATC's h.f., v.h.f. and u.h.f. frequencies, including a v.h.f. repeater."

Further information from Roy G0TAK via E-mail: g0tak@kencomp.net

Microwave Home Brew

The next band up – 2.3GHz

John Cooke GM80TI shares the adventures he's had preparing for operations on the next band up – 2.3GHz.

Now that I'm able to use the 1.3GHz band easily (*PW* April 2012) and after successful experiments with a phase-locked loop (p.l.l.) synthesised local oscillator (l.o.) for 2.3GHz (*PW* March 2012), it was time to complete a transverter for 2.3GHz. A transverter allows us to use a transceiver at a lower frequency (normally the case for microwaves) on the required band by mixing the microwave band signal down to the transceiver receive frequency and mixing the transceiver transmit frequency up to the microwave band.

The Transverter Design

For the transverter design there were a few ideas I wanted to try. Firstly, commercial passive double balanced mixers for the microwave region are expensive, whereas I had found some integrated circuit (i.c.) mixers costing just a pound or two each. These were clearly worth trying.

Secondly, I needed some selectivity at 2.3GHz, and commercial helical filters are also rather expensive. So I thought I'd try some microstrip tuned circuits.

I had quite a few monolithic microwave integrated circuits (m.m.i.c.) on surplus boards from commercial

equipment found at rallies (although they are still easily available from suppliers), so thought I'd make use of what I had there as well. With these design ideas in mind, and having looked at other transverter designs on the web, I drew up a circuit.

The l.o. for an intermediate frequency (i.f.) of 432MHz was of course already built. I had decided that this frequency would provide easier image rejection in the transverter filters than would be the case with an i.f. of 144MHz.

Circuit Description

On the transmit side (**Fig. 1**), the signal from the transceiver is put into a 50Ω load, and attenuated to a suitable power for the input of the *Maxim* MAX2671 'up-converter' mixer. The mixer has an output matching circuit (details taken from the manufacturer's data sheet) into the 50Ω input of the first *Agilent* MSA-0686 amplifier*. The output of this m.m.i.c. is taken into the first microstrip filter, consisting of trimmer capacitors C54 and C55 and microstrip inductors Z51 and Z52.

The next amplification stage is an MSA-0486, with the output taken into an identical microstrip filter. The final stage is a *NXP* BGA6589 capable of

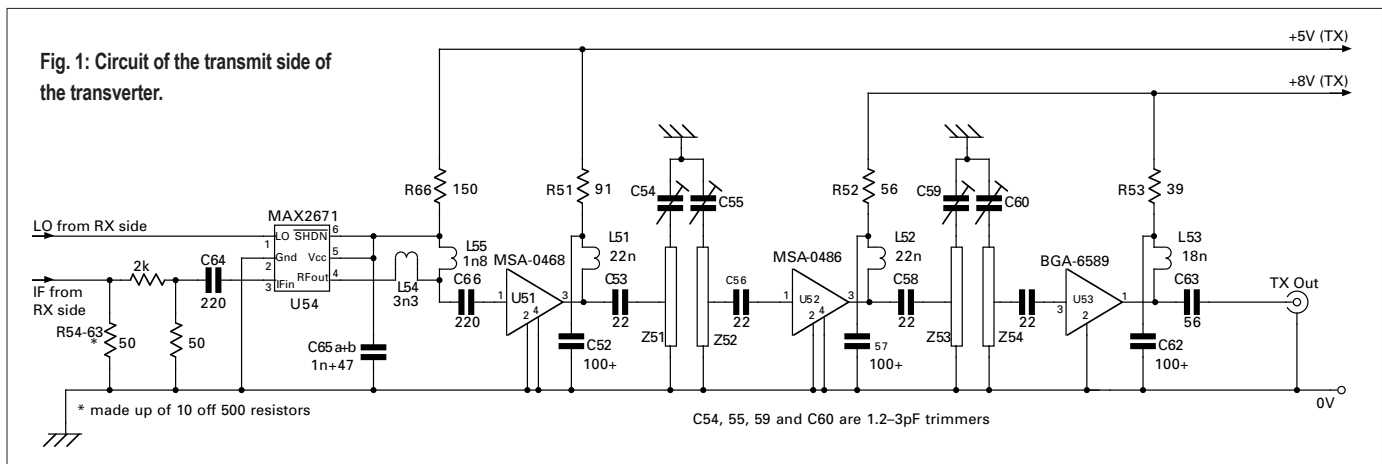
producing up to about 20dBm (100mW) at 2.3GHz.

The receive side (**Fig. 2**) takes the signal from the antenna (or pre-amplifier if used) and first amplifies it using a very low noise m.m.i.c. the MGA-71543. The output of this is fed to another identical microstrip filter (C6, C7, Z1, Z2), which feeds two MSA-0686 amplification stages separated by another microstrip filter.

The amplified signal is fed to the MAX2680 'down-converter' mixer using the required matching network, and the mixer output also requires a matching network which feeds the output to the transceiver.

The l.o. input signal power level is too high for the mixers, so it's attenuated by about 7dB using a couple of pi-attenuators (the resistor values are the closest I had in stock and could be improved to give a better 50Ω match). The l.o. signal path is split using a 'Wilkinson divider' (Z5, Z6 and R8) where the transmission lines are each a quarter wavelength of the appropriate impedance. Details of devices like this can be found, for example, in the *RSGB/ARRL International Microwave Handbook*.

The signal to and from the transceiver is switched by a relay into separate transmit and receive sections of the transverter. Power to the transmit and receive sides of the transverter is switched using a 'ground to talk' signal from the transceiver (**Fig. 3**).



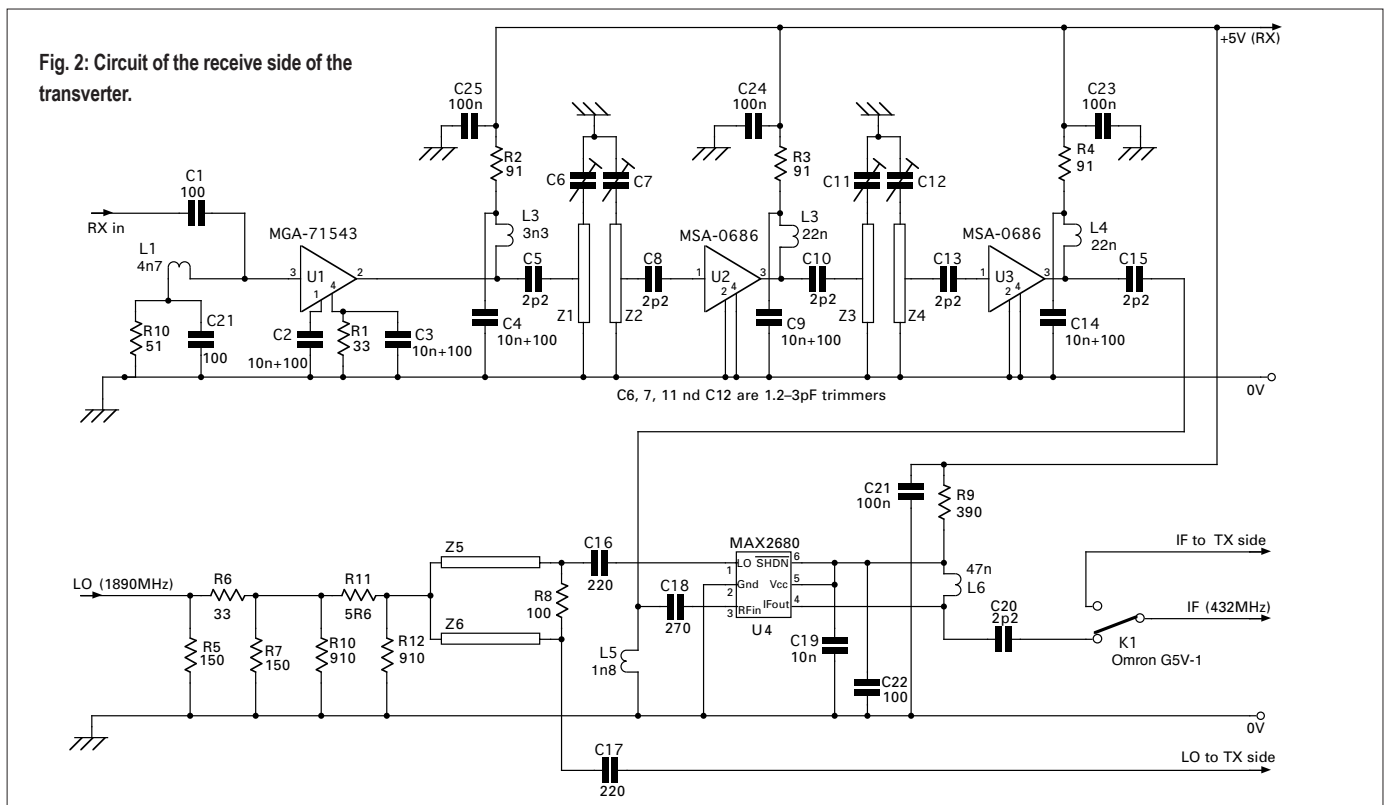
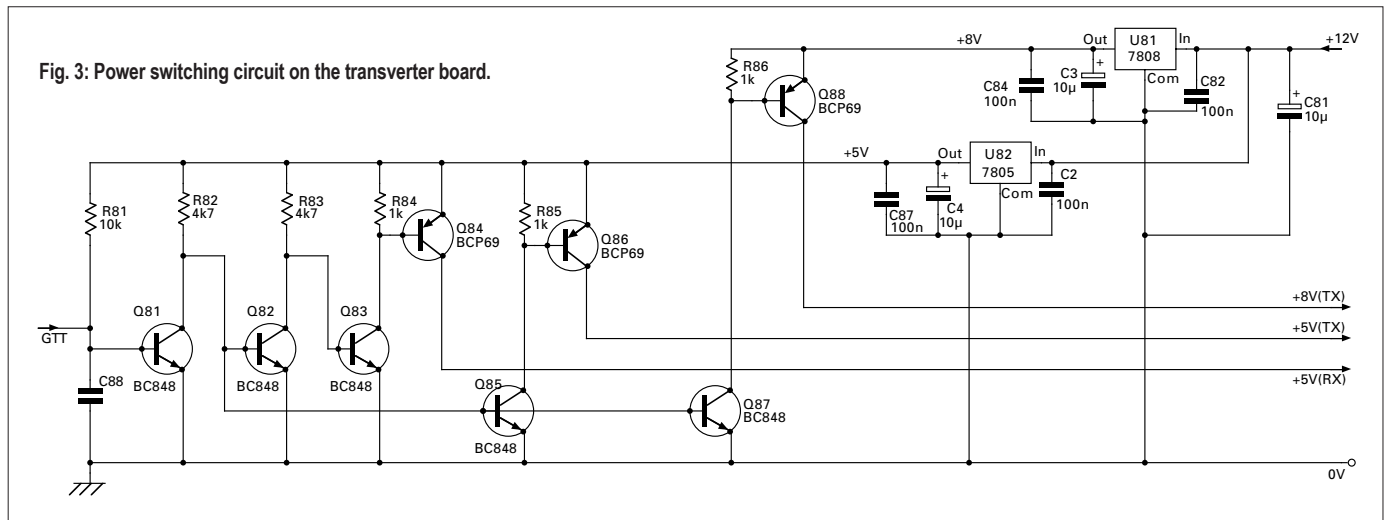


Fig. 3: Power switching circuit on the transverter board.



**Technical Editor Tex Swann G1TEX writes: This device was originally produced by Hewlett Packard but is now marketed under the Agilent brand name.*

Drawing The PCB

I used the open source PCB software (pcb.gpleda.org) to draw the layout of the transverter board, which was designed for 0.8mm FR4 printed circuit board (p.c.b.) material. The thickness is important, since the transmission lines (50Ω lines for most microwave signal paths) and microstrip inductors have to be etched to the correct width for the board material and thickness.

The p.c.b. layout (Fig. 4) shows these lines; the shape of the quarter wave lines in the Wilkinson divider is not important, I chose semicircular lines to loop round to the 100Ω resistor.

Once the receive section was soldered up, I was able to do some

testing but from home this wasn't very successful. I had set up for a Tuesday evening RSGB's SHF (2.3GHz and up) UK Activity Contest (Fig. 5), but heard no-one. However, I wasn't surprised, as my home location is far from ideal for microwaves as it's obstructed in most directions by buildings.

Fortunately, with a home brew 12-element DL6WU Yagi (Fig. 6) I was able to detect radio frequency (r.f.) 'mush' from a communications mast about 2km away, and also to detect a little 'mini beacon' set up in the garden. This is simply a 25.1750MHz block oscillator with a 30mm length of wire attached to the output pin. In practice I'm detecting the 92nd harmonic at 2316.1MHz in the 2.3GHz band!

Better Tests

For a better test, I decided that I should go somewhere with an excellent

chance of detecting an Amateur signal, providing the receiver was working as I hoped. So I set out for Cairnpapple Hill in West Lothian, which is line of sight to the GB3CSB beacon cluster.

Once the test set-up was assembled, I could hear the 2.3GHz beacon easily – even before the antenna was pointing at it. In fact, I could hear it without an antenna, nearly 30km away! This was because the transverter still wasn't boxed. With the antenna aimed at the beacon, there was a very strong signal indeed at S9+.

The beacon tone was absolutely clear, very musical in fact with the JT4G modulated signal alternating with the c.w. (Morse code) identification, so this reassured me that noise problems resulting from my use of a p.i.l. synthesised i.o. should not be too severe.

In fact, the 20MHz temperature

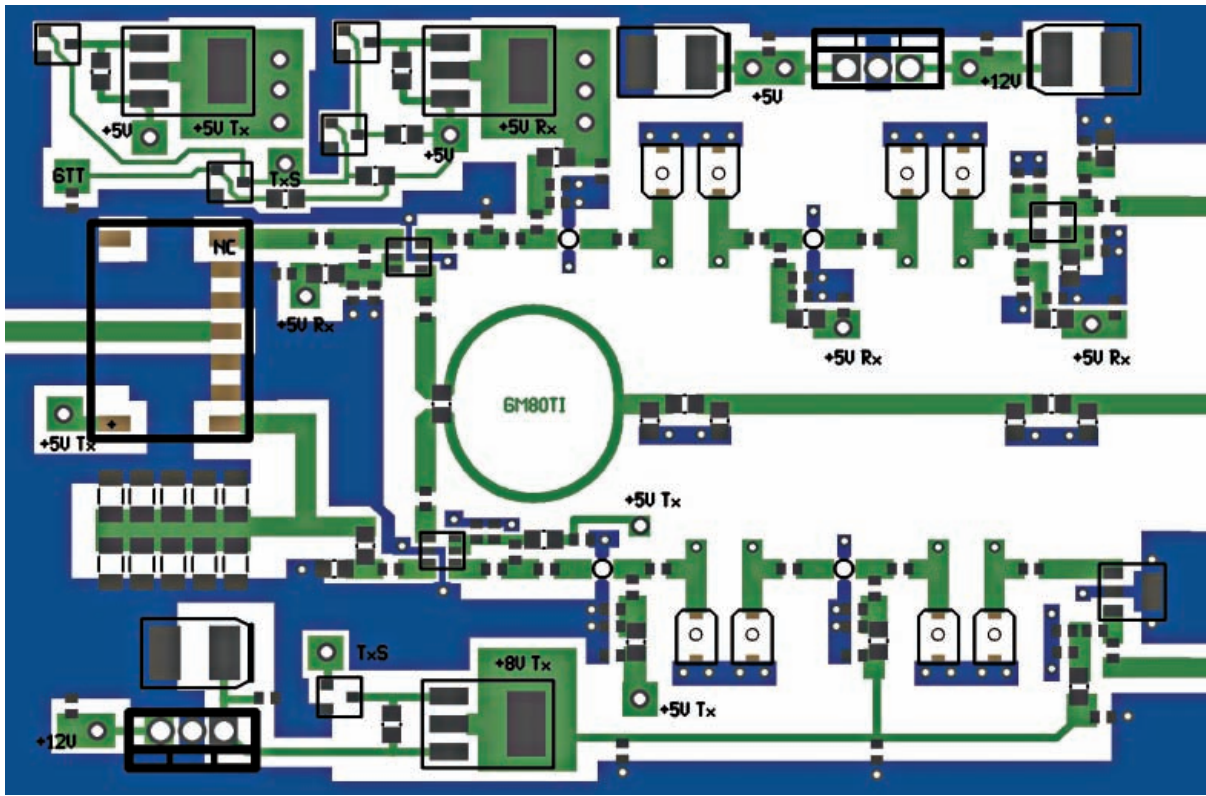


Fig. 4: The board layout for the 2.3GHz transverter drawn using PCB Designer.

compensated reference crystal oscillator module I have used in the I.o. seems to be very stable and also very accurate.

The beacon frequency indicated on my FT-817 transceiver was only about 60Hz out, not bad at 2320MHz!

Completing The Transmitting Side

The next step was to complete the transmit side and put the completed transverter board in its tinplate box (Fig. 7). The transmit side gave me rather more problems than the receive side; it seems that the microstrip filters have rather more loss than I'd expected, since the output level is not at all as high as I'd hoped.

However, given large filter losses (perhaps 6dB in each) the observed output – around 0dBm, or 1 milliwatt – (1mW) is not too surprising, given the m.m.i.c. combination I'm using. So I decided to go ahead, put everything in an enclosure, adding a salvaged commercial power amplifier board (which should have 40-43dB gain!) to see if the system worked.

Sequencer Board Controller

A sequencer board controls the main antenna transmit/receive coaxial relay (obtained at a rally) and the supply to the power amplifier

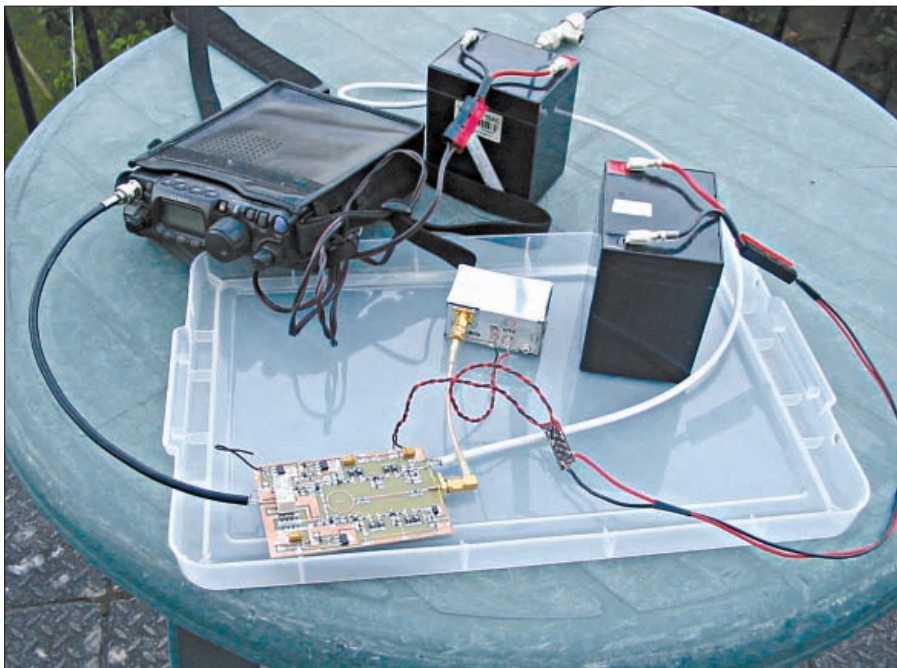


Fig. 5: The initial setup outdoors for receiving tests.



Fig. 6: The very compact 12-element DL6WU Yagi antenna.

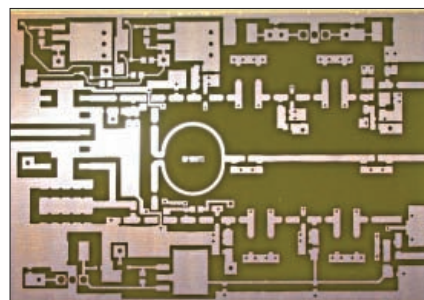


Fig. 7: The component side of the main transverter board.

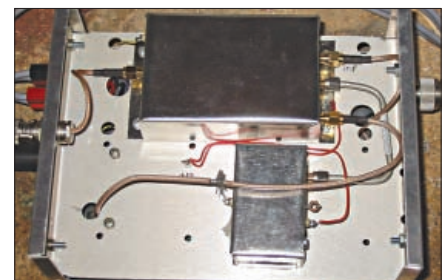


Fig. 8: The main transverter board and local oscillator are mounted on a sub-chassis in the enclosure.

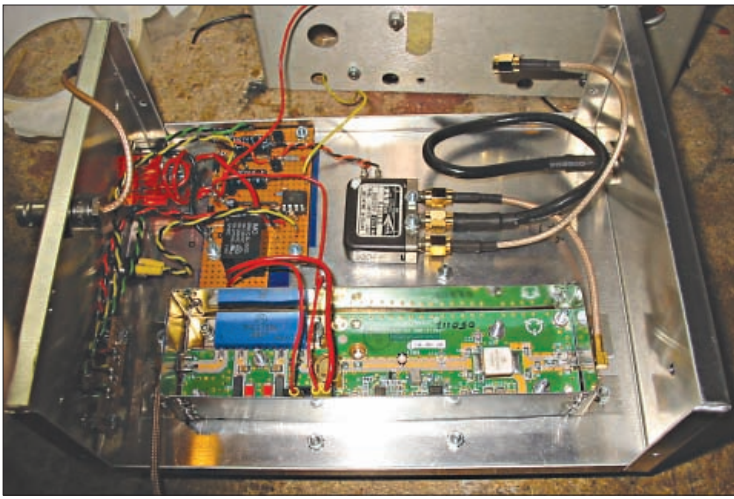


Fig. 9: The sequencer board, coaxial relay and power amplifier with screening box fitted. This is the underside of the top of the enclosure.



Fig. 10: The completed 2.3GHz transverter.

(p.a.). For this sequencer I used a *Microchip Technology Inc* PIC12F629 microcontroller to control the timing rather than the capacitor charge/discharge timed transistor switches I used in the 23cm transverter; the PIC circuit uses fewer components. Note: There will eventually also be a band-pass filter between the antenna relay and the antenna N-type connector.

A heat-sink is bolted to the top of the enclosure, with the power amplifier (p.a.) board underneath. The enclosure top also carries the sequencer board and antenna relay and yes....the system is built 'upside down'!

The main transverter board and I.o. are mounted on a sub-chassis (Fig. 8). This makes for a more compact overall system than my 'Mark 2' 23cm transverter. I didn't know at this stage whether or not I needed a lid on the main board box.

Under test, with the p.a. board added, I found that the system 'took off' (oscillated) under transmit with the main board open, even when using single sideband (s.s.b.) from the transceiver. A bit of anti-static foam over the tinfoil box stopped the oscillation for low levels of drive but not for higher levels. And with the main enclosure base fitted, the system wasn't stable at all on transmit.

A tinfoil lid made for the transverter board box completely cured the oscillations with the enclosure base off. With this fitted – I then felt ready for some on-air tests!

Up To The Braid Hills!

Another monthly RSGB UK Activity Contest for the s.h.f. bands was due,

so I went out onto the local Braid Hills, which are easy to access and give me a much better location than my home. This turned out to be really successful!

The **GB3CSB** beacon was audible over an obstructed 50km path, and I had four good contacts over 40 minutes (I tend to chat!) with some good signal reports, including 93km to **Jon Joyce GM4JTJ**. I thought this wasn't too bad for probably 4W (as estimated from the d.c. power input to the final p.a. stage and the device efficiency) and a 12-element Yagi antenna.

The transverter clearly worked well, except for the fact that unless it was properly enclosed, it still 'took off'! For regular portable use, any equipment has to be properly boxed to protect it from the elements and from rough handling. Obviously, I had to solve the oscillation problem.

The Oscillation Cure

With the enclosure base off, I found that by using a metal plate brought near to the output connector, I could set off the oscillations, obviously due to reflected signals. The first step, then, was to put in a proper screened output N connector. Unfortunately – this made no difference!

The second step was to box in the p.a. board, to try to prevent stray r.f. signals from the output getting near the input of this high gain board, giving positive feedback and causing the oscillation. I made up a screening box from tinfoil which fits between the enclosure top and within a few millimetres of the sub-chassis; it fits tightly round the p.a. board (Fig. 9). It's

a bit rough but I was in a hurry!

I was quite surprised and absolutely delighted when I reassembled the system to find that the unwanted oscillations had all gone away, and I could now operate the transverter with the base in place. I thought that I might need to add some braid around the bottom of the screening box, to make a better contact with the enclosure, to add a proper lid, and even add absorbing foam inside the screening box. These steps proved not to be not required.

The completed transverter (Fig. 10) has two power connectors. These allow two external 12V batteries to provide both 12V and 24V (for the p.a.).

Future Improvements?

The transverter works and gives me a few Watts output on 2.3GHz and it has been taken out on several RSGB UK Activity Contests. I still want to add a band-pass filter after the antenna relay – and the transverter would probably benefit from being tuned up again now it's fully enclosed.

I also intend to make changes to the transmit amplifier chain in the transverter, using m.m.i.c. components with a little more gain to compensate for the filter losses. In time I'm intending to build my own 2.3GHz p.a. board – and that will (eventually) be another project to share with *PW* readers!

I decided to try to move up the microwave bands one by one – so 2.3GHz comes after 1.3GHz, and 3.4GHz should be next. Whether or not I'll be able to resist jumping straight to 10GHz at some stage we'll have to wait and see!

Component Notes

The 1.2 – 3pF surface mount trimmer capacitors used to be available from Rapid Electronics; unfortunately they are no longer stocking in this value and an alternative supplier must be found, although Rapid have a 1.5 – 6pF miniature trimmer which might be suitable. At the time of writing the mixers are available from RS components. The m.m.i.c.s (like the MSA 0686) are available from both Farnell and RS Components, although there are more modern devices now available.

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SPX-200S 6 Band plug n' go mobile, 6/10/15/20/40/80m, Length 130cm, Power 120W, PL259 fitting **£44.95**
SPX-300 9 Band plug n' go mobile, 6/10/12/15/17/20/30/40/80m, Length 165cm, High Power 200W, 3/8th fitting **£54.95**
SPX-300S 9 Band plug n' go mobile, 6/10/12/15/17/20/30/40/80m, Length 165cm, High Power 200W, PL259 fitting **£59.95**
AMPRO-MB6 6 Band mobile 6/10/15/20/40/80m, length 220cm, 200W, 3/8th fitting, (great for static use or even home base - can tune on four bands at once)..... **£74.95**

MOONRAKER ZL Special Yagi Antennas

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

ZL5-2 2 Metre 5 Ele, Boom 95cm, Gain 9.5dBd **£59.95**
ZL7-2 2 Metre 7 Ele, Boom 150cm, Gain 11.5dBd **£69.95**
ZL12-2 2 Metre 12 Ele, Boom 315cm, Gain 14dBd **£99.95**
ZL7-70 70cm 7 Ele, Boom 70cm, Gain 11.5dBd **£39.95**
ZL12-70 70cm 12 Ele, Boom 120cm, Gain 14dBd **£49.95**

MOONRAKER HB9CV

Brilliant 2 element beams ... ideal for portable use

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



MOONRAKER Halo Loops

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

HLP-2 2 metre (size approx 300mm square)..... **£24.95**
HLP-4 4 metre (size approx 600mm square) **£34.95**
HLP-6 6 metre (size approx 800mm square)..... **£39.95**



MOONRAKER G5RV Wire Antennas

The most popular wire antenna available in different grades to suit every amateur All from just £24.95!

G5RV-HSS Standard Half Size Enamelled Version, 51ft Long, 10-40 Metres **£24.95**
G5RV-FSS Standard Full Size Enamelled Version, 102ft Long, 10-80 Metres **£29.95**
G5RV-DSS Standard Double Size Enamelled Version, 204ft Long, 10-160 Metres..... **£54.95**
G5RV-HSH Half Size Hard Drawn Version, pre-stretched, 51ft Long, 10-40 Metres **£29.95**
G5RV-FSH Full Size Hard Drawn Version, pre-stretched, 102ft Long, 10-80 Metres **£34.95**
G5RV-HSF Half Size Original High Quality Flexweave Version, 51ft Long, 10-40 Metres **£34.95**
G5RV-FSF Full Size Original High Quality Flexweave Version, 102ft Long, 10-80 Metres..... **£39.95**
G5RV-HSP Half Size Original PVC Coated Flexweave Version, 51ft Long, 10-40 Metres..... **£39.95**
G5RV-FSP Full Size Original PVC Coated Flexweave Version, 102ft Long, 10-80 Metres..... **£44.95**
G5RV-HSX Half Size Deluxe Version with 450 Ohm ladder, 51ft Long, 10-40 Metres..... **£49.95**
G5RV-FSX Full Size Deluxe Version with 450 Ohm ladder, 102ft Long, 10-80 Metres..... **£54.95**

Accessories

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

DIAMOND Yagi Antennas

Diamond performance from the superb Diamond factory "NEW" lower prices!

A502HB 6m 2 Elements, Power 400W, Gain 6.3dB, Radial Length 3m **£99.95**
A144S10R 2m 10 Elements, Power 50W, Gain 11.6dB, Boom Length 2.13m **£86.95**
A144S5R 2m 5 Elements, Power 50W, Gain 9.1dB, Boom Length 95cm **£47.95**
A430S15R 70cm 15 Elements, Power 50W, Gain 14.8dB, Boom Length 224cm **£69.95**
A430S10R 70cm 10 Elements, Power 50W, Gain 13.1dB, Boom Length 119cm **£52.95**

MOONRAKER HF Mobiles

Get great results with the Moonraker range of HF mobiles! ... from as little as £19.95!

AMPRO-10 28MHz, Length 220cm, 38th fitting (slimline design)..... **£19.95**
AMPRO-12 24MHz, Length 220cm, 38th fitting (slimline design)..... **£19.95**
AMPRO-15 21MHz, Length 220cm, 38th fitting (slimline design)..... **£19.95**
AMPRO-17 18MHz, Length 220cm, 38th fitting (slimline design)..... **£19.95**
AMPRO-20 14MHz, Length 220cm, 38th fitting (slimline design)..... **£19.95**
AMPRO-30 10MHz, Length 220cm, 38th fitting (slimline design)..... **£19.95**
AMPRO-40 7.0MHz, Length 220cm, 38th fitting (slimline design)..... **£19.95**
AMPRO-80 3.5MHz, Length 220cm, 38th fitting (slimline design)..... **£24.95**
AMPRO-160 1.8MHz, Length 220cm, 38th fitting (heavy duty design)..... **£59.95**
ATOM-20S 14MHz, Length 130cm, PL259 fitting (compact design)..... **£24.95**
ATOM-40S 7.0MHz, Length 165cm, PL259 fitting (compact design)..... **£26.95**
ATOM-80S 14MHz, Length 165cm, PL259 fitting (compact design)..... **£29.95**

MOONRAKER VHF/UHF Mobiles

GF151 Glass Mount 2/70cm, Gain 2.9/4.3dBd, Length 78cm complete with 4m cable and PL259 **£29.95**
MRM-100 MICRO MAG 2/70cm, Gain 0.5/3.0dBd, Length 55cm, 1" magnetic base with 4m coax and BNC **£19.95**
MR700 2/70cm, Gain 0/3.0dBd, Length 50cm, 3/8 fitting **£9.95**
MR777 2/70cm, Gain 2.8/4.8dBd, Length 150cm, 3/8 fitting **£19.95**
MRQ525 2/70cm, Gain 0.5/3.2dBd, Length 43cm, PL259 fitting (high quality)..... **£19.95**
MRQ500 2/70cm, Gain 3.2/5.8dBd, Length 95cm, PL259 fitting (high quality)..... **£26.95**
MRQ750 2/70cm, Gain 5.5/8.0dBd, Length 150cm, PL259 fitting (high quality)..... **£36.95**
MR2 POWER ROD 2/70cm, Gain 3.5/6.5dBd, Length 50cm, PL259 fitting (fibreglass colinear)..... **£26.95**
MR3 POWER ROD 2/70cm, Gain 2.0/3.5dBd, Length 50cm, PL259 fitting (fibreglass colinear)..... **£32.95**
MRQ800 6/2/70cm Gain 3.0dB/5.0/7.5dBdBd, Length 150cm, PL259 fitting (high quality)..... **£39.95**
MRQ273 2/70/23cm Gain 3.5/5.5/7.5dBdBd, Length 85cm, PL259 fitting (high quality)..... **£49.95**



GP2500 All Band HF Vertical

This is the perfect answer for anyone with limited space and requires no radials. Covering 80 through to 6M with a VSWR below 1.5:1!

Frequency 3.5-57MHz without tuner, Power 250 Watts, Length 7.13M

All at an amazing **£229.95!**

GP2500F fibreglass version of above.... **£279.95**

MFJ Magnetic Loop

MFJ-1788X

..... **£479.95**
 Frequency 7 - 22MHz (40 - 15m) • Size: <1m (36in) loop • Feeder: 50 Ohms • Power: 150W • Remote control included • Auto band selection • Dual Fast/Slow tune buttons • Built-in cross-needle VSWR/Wattmeter



MFJ-1786X **£439.95**

Frequency 10 - 30MHz * Size: <1m (36in) loop • Feeder: 50 Ohms • Power: 150W • Remote control & PSU included * Auto band selection • Dual Fast/Slow tune buttons • Built-in cross-needle VSWR/Wattmeter

MFJ-1782X **£384.95**

Frequency 10 - 30MHz * Size: <1m (36in) loop • Feeder: 50 Ohms • Power: 150W • Control box does not have SWR/PWR metering • No automatic band selection

MOONRAKER Dual and Triband Colinear Verticals

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

SQBM100P 2/70cm 3.00/6.00dBd, RX 25-2000MHz, Length 100cm SO239 **£49.95**
SQBM100N 2/70cm 3.00/6.00dBd, RX 25-2000MHz, Length 100cm N-Type **£54.95**
SQBM200P 2/70cm, Gain 4.5/7.5dBd, RX 25-2000MHz, Length 155cm, SO239 **£54.95**
SQBM200N 2/70cm, Gain 4.5/7.5dBd, RX 25-2000MHz, Length 155cm, N-Type **£59.95**
SQBM500P 2/70cm, Gain 6.8/9.2dBd, RX 25-2000MHz, Length 250cm, SO239 **£74.95**
SQBM500N 2/70cm, Gain 6.8/9.2dBd, RX 25-2000MHz, Length 250cm, N-Type **£79.95**
SQBM800N 2/70cm, Gain 8.5/12.5dBd, RX 25-2000MHz, Length 520cm, N-Type..... **£139.95**
SQBM1000P 6/2/70cm, Gain 3.0/6.2/8.4dBd, RX 25-2000MHz, Length 250cm, SO239 **£84.95**
SQBM1000N 6/2/70cm, Gain 3.0/6.2/8.4dBd, RX 25-2000MHz, Length 250cm, N-Type..... **£89.95**
SQBM223N 2/70/23cm, Gain 4.5/7.5/12.5dBd, RX 25-2000MHz, Length 155cm, N-Type..... **£74.95**



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 Open Mon-Fri 9-5:30pm



We have massive stocks in our large warehouse



We import direct from all over the world



See us at many rallies throughout the country



Cable



RG58 Standard, 5mm, 50 ohm, per metre	£0.35
RG58-DRUM-50 Standard, 5mm, 50 ohm, 50m reel	£14.95
RG58-DRUM-100 Standard, 5mm, 50 ohm, 100m reel	£24.95
RG58M Mil spec, 5mm, 50 ohm, per metre (best seller)	£0.60
RG58M-DRUM-50 new 50m reel of mil spec RG58 in a great handy size. only	£24.95
RG58M-DRUM-100 Mil spec, 5mm, 50 ohm, 100m reel	£44.95
RGMINI8 Mil spec, 7mm, 50 ohm, in grey per metre (amateur favourite)	£0.75
RGMINI8-DRUM-100 Mil spec, 7mm, 50 ohm, in grey 100m reel	£64.95
RG213 Mil spec, 9mm, 50 ohm, per metre	£1.30
RG213-DRUM-50 Mil spec, 9mm, 50 ohm, 50m reel	£59.95
RG213-DRUM-100 Mil spec, 9mm, 50 ohm, 100m reel	£109.95
WESTFLEX103 Mil spec, 10mm, 50 ohm, per metre	£1.75
WESTFLEX-DRUM-50 Mil spec, 10mm, 50 ohm, 50m reel	£79.95
WESTFLEX103-DRUM-100 Mil spec, 10mm, 50 ohm, 100m reel	£149.95
300-20M Ladder Ribbon, best USA quality, 300 ohm, 20m pack	£17.95
300-DRUM Ladder Ribbon, best USA quality, 300 ohm, 100m reel	£69.95
450-20M Ladder Ribbon, best USA quality, 450 ohm, 20m pack	£19.95
450-DRUM Ladder Ribbon, best USA quality, 450 ohm, 100m reel	£79.95

Antenna Wire

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

SEW-50 Multi stranded PVC covered wire, 1.2mm	£19.95
SCW-50 Enamelled copper wire, 1.5mm	£24.95
HCW-50 Hard Drawn bare copper wire, 1.5mm	£29.95
CCS-50 Genuine Copperweld copper clad steel, 1.6mm	£29.95
FW-50 Original Flexweave bare copper wire, 2mm	£34.95
FWPVC-50 Original clear PVC covered copper wire, 4mm	£44.95
FW-100 Original high quality flexweave antenna wire, 100m reel	£59.95
FWPVC-100 Original PVC coated flexweave antenna wire, 4mm, 100m reel	£79.95

PAM-KIT

A great portable freestanding tripod which can be extended to 4m. Perfect for field days at a perfect price



.....just **£59.95** complete

Rigging Accessories

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

PULLEY-2 Adjustable pulley wheel for wire antennas, suits all types of rope	£24.95
GUYKIT-HD10 Complete heavy duty adjustable guying kit to suit upto 40ft masts	£54.95
GUYKIT-P10 Complete light duty/portable guying kit to suit upto 40ft masts	£39.95
SPIDER-3 Fixed 3 point mast collar for guy ropes	£5.95
SPIDER-4 Fixed 4 point mast collar for guy ropes	£6.95
PTP-20 Pole to pole clamp to clamp up to 2" to 2"	£5.95
DPC-W Wire dipole centre to suit either 300 or 450ohm ladder line	£5.95
DPC-S Wire dipole centre with SO239 to suit cable feed connections	£6.95
DPC-A Dipole centre to suit 1/2 inch aluminium tube with terminal connections	£7.95
DPC-3 Dipole centre with SO239 socket with two 3/8" sockets to make mobile dipole	£6.95
DOGBONE-S Small ribbed wire insulator	£1.00
DOGBONE-L Large ribbed wire insulator	£1.50
DOGBONE-C Small ceramic wire insulator	£1.00
EARTHROD-C 4ft copper earth rod and clamp	£24.95
EARTHROD-CP 4ft copper plated earth rod and clamp	£16.95
G5RV-ES In-line SO239 replacement socket for 300 or 450 ohm ladder line	£6.95
AMA-10 Self amalgamating tape for connection joints, 10m length	£7.50

Mounting Hardware & Clamps

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

TRIPOD-HDA Free standing, heavy duty, fold away tripod, which adjusts from 50-65mm	£149.95
TRIPOD-25L Free standing heavy duty tripod to suit masts 65mm or less	£79.95
TRIPOD-20L Free standing heavy duty tripod to suit masts 2 inch or less	£74.95
TRIPOD-15L Free standing heavy duty tripod to suit masts 1.5 inch or less	£69.95
TK-36 Heavy duty galvanised pair of T & K brackets, 36 inches total length	£49.95
TK-24 Heavy duty galvanised pair of T & K brackets, 24 inches total length	£29.95
TK-18 Heavy duty galvanised pair of T & K brackets, 18 inches total length	£24.95
TK-12 Heavy duty galvanised pair of T & K brackets, 12 inches total length	£19.95
SO-9 Heavy duty galvanised single stand off bracket, 9 inches total length	£9.95
SO-6 Heavy duty galvanised single stand off bracket, 9 inches total length	£6.95
CHIM-D Heavy duty galvanised chimney lashing kit with all fixings, suitable for upto 2 inch	£24.95
CAR-PLATE Drive on bracket with vertical up stand to suit 1.5 or 2" mounting pole	£24.95
CROSS-2 Heavy duty cross over plate to suit 1.5 to 2" vertical to horizontal pole	£14.95
JOIN-200 Heavy duty 8 nut joining sleeve to connect 2 X 2" poles together	£19.95
PTM-S Pole mounting bracket with SO239 for mobile whips, suits upto 2" pole	£19.95

"NEW" SWR-270 Dual Band VSWR & Power Meter

● Frequency: 120-500MHz ● Impedance: 52 Ohms
● Power: 0-100W ● Measures forward/reflected power + VSWR ● Sockets: SO239
Brilliant small and compact VSWR meter, at an amazing price and this month only **£27.95** with free postage



Telescopic Masts

TMA-1 Aluminium mast ★ 4 sections 170cm each ★ 45mm to 30mm ★ Approx 20ft erect 6ft collapsed	£149.95
TMA-2 Aluminium mast ★ 8 sections 170cm each ★ 65mm to 30mm ★ Approx 40ft erect 6ft collapsed	£249.95
TMF-1 Fibreglass mast ★ 4 sections 160cm each ★ 50mm to 30mm ★ Approx 20ft erect 6ft collapsed	£149.95
TMF-1.5 Fibreglass mast ★ 5 sections 200cm each ★ 60mm to 30mm ★ Approx 30ft erect 8ft collapsed	£199.95
TMF-2 Fibreglass mast ★ 5 sections 240cm each ★ 60mm to 30mm ★ Approx 40ft erect 9ft collapsed	£249.95
TMF-3 Fibreglass mast ★ 6 sections 240cm each ★ 65-23mm ★ Approx 50ft erect 8ft collapsed	£299.95



20ft Mast Sets

(5ft Sections)

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

MSP-125 4 section 1.25inch OD mast set	£39.95
MSP-150 4 section 1.50inch OD mast set	£44.95
MSP-175 4 section 1.75inch OD mast set	£49.95
MSP-200 4 section 2.00inch OD mast set	£59.95
MSPX-150 4 section 1.50 inch 5mm scaffold gauge (very heavy duty)	£69.95

Portable Telescopic Masts

LMA-S Length 17.6ft open 4ft closed 2-1" diameter	£79.95
LMA-M Length 26ft open 5.5ft closed 2-1" diameter	£89.95
LMA-L Length 39ft open 7.2ft closed 2-1" diameter	£99.95
CARPLATE-HDT brilliant drive on plate with tilt - ideal to be used in conjunction with the portable telescopic masts and only	£44.95
CARPLATE-HD without tilt	£24.95



Patch Leads

PL58-0.5 1/2m Standard RG58 PL259 to PL259 lead	£3.50
PL58-10 10m Standard RG58 PL259 to PL259 lead	£8.95
PL58-30 30m Standard RG58 PL259 to PL259 lead	£16.95
PL58M-0.5 1/2m Mil Spec RG58 PL259 to PL259 lead	£4.50
PL58M-10 10m Mil Spec RG58 PL259 to PL259 lead	£12.95
PL58M-30 30m Mil Spec RG58 PL259 to PL259 lead	£27.95
PL213-10 10m Mil Spec RG213 PL259 to PL259 lead	£18.95
PL213-30 30m Mil Spec RG213 PL259 to PL259 lead	£39.95
PL103-10 10m Mil Spec Westflex 103 PL259 to PL259 lead	£29.95
PL103-30 30m Mil Spec Westflex 103 PL259 to PL259 lead	£69.95

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

Connectors

PL259-6mm Standard plug for RG58	£0.99p
PL259-9mm Standard plug for RG213	£0.99p
PL259-7mm Standard plug for Mini8	£1.25p
PL259-6C Compression type for RG58	£2.50p
PL259-9C Compression type for RG213	£2.50p
PL259-103C Compression type for Westflex 103	£5.50
NTYPE-6 Compression type plug for RG58	£3.95
NTYPE-9 Compression type plug for RG213	£3.95
NTYPE-103 Compression type plug for westflex 103	£6.00
BNC-6 Compression type for RG58	£1.50
BNC-9 Compression type for RG213	£3.50
SO239-N Adapter to convert PL259 to N-Type male	£3.95
NTYPE-PL Adapter to convert N-Type to PL259	£3.95
BNC-PL Adapter to convert BNC to PL259	£2.00
BNC-N Adapter to convert BNC to N-Type male	£3.95
BNC-SMA Adapter to convert modern SMA radio to suit BNC	£3.95
SO239-SMA Adapter to convert modern SMA radio to suit SO239	£3.95
PL259-38 Adapter to convert SO239 fitting to 38" thread	£3.95

MFJ Antenna Tuners

Now lower prices!

See our website for full details.

AUTOMATIC TUNERS	
MFJ-925 Super compact 1.8-30MHz 200W	£174.95
MFJ-926 remote Mobile ATU 1.6-30MHz 200W	£299.95
MFJ-927 Compact with Power Injector 1.8-30MHz 200W	£254.95
MFJ-928 Compact with Power Injector 1.8-30MHz 200W	£203.95
MFJ-929 Compact with Random Wire Option 1.8-30MHz 200W	£214.95
MFJ-991B 1.8-30MHz 150W SSB/100W CW ATU	£214.95
MFJ-993B 1.8-30MHz 300W SSB/150W CW ATU	£254.95
MFJ-994B 1.8-30MHz 600W SSB/300W CW ATU	£349.95
MFJ-998 1.8-30MHz 1.5kW	£664.95
MANUAL TUNERS	
MFJ-16010 1.8-30MHz 20W random wire tuner	£71.95
MFJ-902 3.5-30MHz 150W mini travel tuner	£102.95
MFJ-902H 3.5-30MHz 150W mini travel tuner with 4:1 balun	£127.95
MFJ-904 3.5-30MHz 150W mini travel tuner with SWR/PWR	£132.95
MFJ-904H 3.5-30MHz 150W mini travel tuner with SWR/PWR 4:1 balun	£152.95
MFJ-901B 1.8-30MHz 200W Versa tuner	£109.95
MFJ-971 1.8-30MHz 300W portable tuner	£122.95
MFJ-945E 1.8-54MHz 300W tuner with meter	£134.95
MFJ-941E 1.8-30MHz 300W Versa tuner 2	£144.95
MFJ-948 1.8-30MHz 300W deluxe Versa tuner	£164.95
MFJ-949E 1.8-30MHz 300W deluxe Versa tuner with DL	£184.95
MFJ-934 1.8-30MHz 300W tuner complete with artificial GND	£204.95
MFJ-974B 3.5-54MHz 300W tuner with X-needle SWR/WATT	£194.95
MFJ-969 1.8-54MHz 300W all band tuner	£219.95
MFJ-962D 1.8-30MHz 1500W high power tuner	£299.95
MFJ-986 1.8-30MHz 300W high power differential tuner	£359.95
MFJ-989D 1.8-30MHz 1500W high power roller tuner	£399.95
MFJ-976 1.8-30MHz 1500W balanced line tuner with X-needle SWR/WATT	£479.95



MFJ Analysers

MFJ-229 UHF Digital Analyser 270-480MHz	£209.95
MFJ-249B Digital Analyser 1.8-170MHz	£264.95
MFJ-259B Digital Analyser 1.8-170MHz	£269.95
MFJ-269 Digital Analyser 1.8-450MHz	£369.95
MFJ-269PRO Digital Analyser 1.8-170/415-450MHz	£389.95
NEW MFJ-266 Digital Analyser 1.5-490MHz in stock now	£339.95



LDG Tuners

LDG Z-817 1.8-54MHz ideal for the Yaesu FT-817	£119.95
LDG Z-100 Plus 1.8-54MHz the most popular LDG tuner	£134.95
LDG IT-100 1.8-54MHz ideal for IC-7000	£159.95
LDG Z-11 Pro 1.8-54MHz great portable tuner	£159.95
LDG KT-100 1.8-54MHz ideal for most Kenwood radios	£174.95
LDG AT-897Plus 1.8-54MHz for use with Yaesu FT-897	£179.95
LDG AT-100 Pro 1.8-54MHz	£199.95
LDG AT-200 Pro 1.8-54MHz	£209.95
LDG AT-1000 Pro II 1.8-54MHz continuously	£469.95
LDG AT-600Pro 1.8-54MHz with upto 600W SSB	£299.95
LDG YT-450 designed for FT-450 & FT-950 in stock now	£224.95



AVAIR SWR Meters

AV-20 (3.5-150MHz) (Power to 300W)	£39.95
AV-40 (144-470MHz) (Power to 150W)	£39.95
AV-201 (1.8-160MHz) (Power to 1000W)	£49.95
AV-400 (14-525MHz) (Power to 400W)	£49.95
AV-601 (1.8-160/140-525MHz) (Power to 1000W)	£69.95
AV-1000 (1.8-160/430-450/800-930/1240-1300MHz) (Power to 400W)	£79.95



MOONRAKER Power Supplies

PS30SWII 25A continuous switch mode PSU with variable output voltage and cigar socket also includes noise offset function. All for just	£89.95
QJ-PS30II 30A continuous, includes lovely large meter displays and large rear terminals for that thick power cable on high powered rigs. Amazing at just	£79.95
QJ-PS50II 50A continuous, same as above with lovely large displays and large rear terminals for that thick power cable on high powered rigs	£109.95



NEW 50m Coax Drums

Perfect size reels of cable at the perfect price - why have they not been available before! From stock we have the following:-

RG58 Standard	£14.95
RG58 Mil spec	£24.95
RG213 Mil spec	£59.95
WESTFLEX 103	£79.95



the new Short Wave Magazine

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RADIOUSER AUGUST

incorporating Radio Active

- **Icom IC-R2500 Wideband Mobile Receiver**
Mike Richards reviews the IC-R2500 analogue wideband receiver, with easy to use PC control
- **Scanning Scene**
Bill Robertson looks at marine SAR frequencies, an SDR handheld transceiver and at UHF SATCOM
- **Decode**
Mike Richards deals with some of the practical issues associated with networking radio equipment in the shack, including the Kinetic SBS-3
- **Competition**
Your chance to win an AirNav ShipTrax 3D
- **Military Matters**
Pat Carty reports on the American Memorial Day Observance, a parachute drop in Normandy, a B-52 Global Power Mission and Exercise Saber Strike
- **Sky High**
Godfrey Manning recommends some sources of frequency and aeronautical related information
- **DXTV**
Keith Hamer and Garry Smith bring you their roundup of interesting catches from Eastern Europe, the Middle East and South America
- **Maritime Matters**
Robert Connolly looks at SUBFACTS and GUNFACTS, the use of UHF handheld transceivers on cruise ships and the International Ice Patrol
- **Airband News**
David Smith reports on a podcast for pilots, measures to minimise congestion during the Olympics and a new craze in Japan
- **Radio Events**
- **LM&S Broadcast Matters**
Chrissy Brand brings you her roundup of readers' reports and DXing explained
- **News and Products**
The AOR LA400 magnetic loop antenna and the Etón G2 Reporter receiver
- **Spectral Analysis**
Mike Richards shows you how to use MDS Audio Spectrum Analyzer
- **Airshow & Events Guide**
- **NDB DXing**
Robert Connolly provides advice on keeping your antennas serviceable and looks at links to information on Spanish DGPS stations
- **Radio Related Websites**
Chrissy Brand's compilation includes an e-book on Chinese jammers, the Stitcher smartphone app and news of an international radio festival
- **Off the Record**
Oscar reports on the forthcoming retirement of a veteran talk show host and brings you a roundup of free radio activity in Ireland and the UK
- **Comms from Europe**
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The Green Light Labs GPS-710

Our keen v.h.f. author Tim Kirby G4VXE has enjoyed himself trying out an add-on GPS unit

As regular readers will know, I always enjoy the combination of Amateur Radio and mapping technologies. So I was thrilled with the Editor offered me the chance to review the Green Light Labs GPS-710. It's a GPS receiver which can

be readily used with the Kenwood 710 series for Automatic Packet Reporting System (APRS) applications.

The Product

Green Light Labs say about the product,



"The GPS-710 is a custom built, uncluttered, plug-and-play solution for adding a stand-alone GPS to your Kenwood TM-D710 or RC-D710 radios. It uses an excellent 20 channel SiRF-III GPS chipset (with WAAS, ENGOS, and MSAS augmentation) that can acquire GPS lock from a cold start in well under 60 seconds.

"The active internal antenna has proven to be extremely capable of maintaining GPS lock, even in very unfavourable mobile installations. The GPS remains powered even while the radio is off, and provides data immediately when the radio is powered on – instantaneous position lock. The GPS-710 draws about two-tenths of a Watt from the line, and does not present a significant stand-by drain to an automobile battery."

Practical Installation

So, having read the press release 'puff' – what about the practical installation aspects? Installation of the unit is very straightforward. It fits behind the operations panel of the TM-D710 with a piece of 'high bond' adhesive tape which the manufacturers claim is good up to temperatures of 200°C (I was unable and, indeed, unwilling to verify this!).

Two cables connect the GPS unit to the operating head, the first for the GPS connection is a jack lead and the data jumper is an RJ-45. Both those cables are supplied with the GPS unit.

The remaining lead to be connected is the RJ-45 connection between the main body of the rig and the operating head – so just disconnect that from the operating head and place it into the GPS socket so, that it's in line with the head unit. That's it!

There's the ability to connect an





external device such as a laptop through a serial connection, using a jack plug. This is in case you want to run an APRS program such as *UI-View* or *APRSIS32*.

There are details of a suitable interface on the Green Light Labs website: www.greenlightlabs.com/gps-710/PC_Interface.htm I didn't have the interface to try this out, but there should be no issue as the GPS passes through the serial connection and shouldn't alter the required PC configuration.

Data Sheet

Instructions are in the form of a data sheet provided, and are clear and easy to follow. It's nice that as the unit is specifically aimed at being used with the Kenwood APRS radios, the exact menu settings that are required are documented, so you should encounter no problems with set-up.

After set-up, the GPS found a fix very quickly, even inside – perhaps 45 seconds or so. The great thing though, is that as it's 'always on' once you've connected it up to power, your position will always be available.

In Operation

I used the GPS-710 in conjunction with a TM-D710 kindly lent by Kenwood UK. As described, the GPS very quickly found my position, even indoors, so that once the rig was turned on, the GPS indicator on the rig's display showed that a GPS fix was available.

As well as providing positional information, the GPS provides an accurate time source and this is used to set the clock on the TM-D710.

I set one of the receivers of the TM-D710 onto 144.800MHz and enabled the internal TNC. Very quickly the rig

started beeping with the APRS reports that I was receiving and as a result of the GPS being available, a distance and bearing to each station was shown (assuming that the station was sending Latitude/Longitude information).

I found that the position of the GPS unit and operating head wasn't too critical. Inside the house, it wasn't right by the window for example. If you mount it in the car, you'll want to get the operating head out in the open if you can – which of course makes sense from being able to see it in any case. I found in a quick test that it worked absolutely fine on the passenger seat as a temporary installation.

Really Enjoyed!

Like the last time I had the opportunity to review some APRS equipment, I really enjoyed the GPS-710. It's a simple and self-contained way of connecting a GPS to the TM-D710 and may well appeal if you don't want to fiddle around with interfacing a more generic GPS unit.

I loved the ability to drive around with the rig in the car sending positional information and for the information to be displayed on the APRS system (for example, the website <http://aprs.fi>) You might use such a system to transmit the position of your special event or Field Day station, or the **Camb-Hams Group** used APRS to good effect recently, displaying where they were on their journey to Mull for their DXpedition.



Overall Impression

The Green Light Labs GPS-710 did exactly what was asked of it and provides a compact and efficient way of providing GPS information for your Kenwood APRS mobile rig. My grateful thanks to **David Wilkins G5HY** for his loan of the GPS unit and for the Kenwood TM-D710 APRS rig to test it with. It's available from **LAM Communications** for £109.95 plus p&p. (See their website http://www.lamcommunications.net/product_info.php?products_id=1524)

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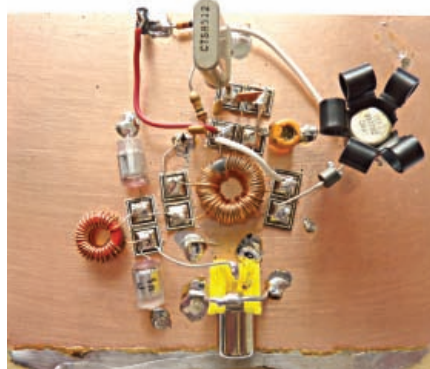


One Device Transmitters

This month the Rev. George Dobbs G3RJV describes the fun QRP operators can get from coming on air with a transmitter using a single device. But don't forget to read the (most!) appropriate quotation!

"Now, I'm aware that it's not really worth it to roll your own radio equipment anymore – but it's not about what's 'worth it'. Gardening isn't worth all the trouble and expense and weather and bugs – but millions do it every Spring for exercise, therapy, the sheer pleasure of it, and, yes, because there's something really special about food you've grown yourself".

Rick Andersen KE3IJ



"A one device transmitter can be a challenge and provide great fun!" says George G3RJV.

Welcome to *Carrying on the Practical Way (CotPW)*. Unfortunately, this year I was not able to attend the Dayton Hamvention in Ohio – the world's largest Amateur Radio event. My problem was that I had a sudden and unexpected seizure late in 2011 which meant an automatic withdrawal of my driver's licence for six months. Thankfully it has been diagnosed as a single event seizure and I now have a clean bill of health.

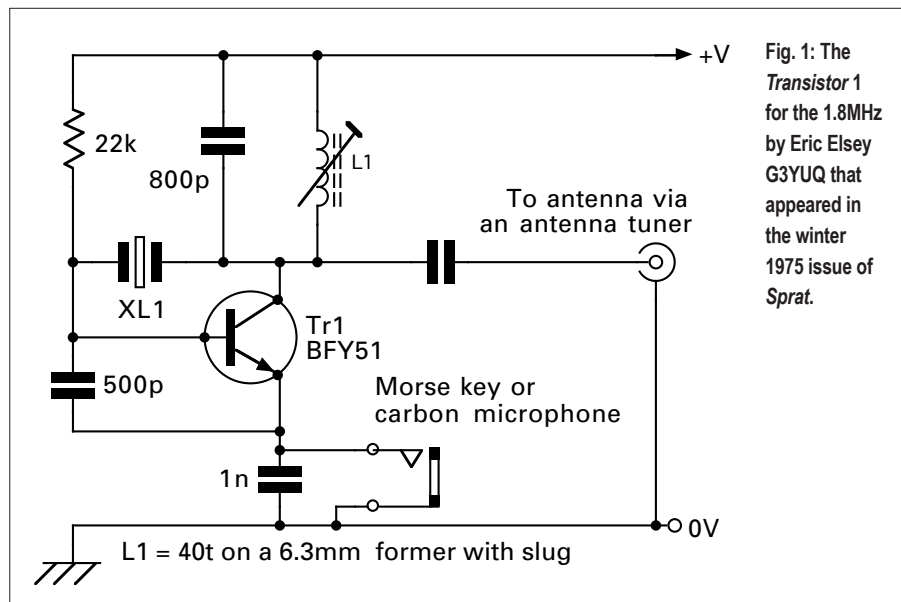


Fig. 1: The Transistor 1 for the 1.8MHz by Eric Elsey G3YUQ that appeared in the winter 1975 issue of *Sprat*.

But, as anyone who has visited the USA knows, it's virtually impossible to get around without a hire car. Quite a personal blow because I have attended the event every year for over 20 years. The real attraction for me is the associated QRP activity called 'Four Days in May' (FDIM) run by the QRP ARCI, the largest American QRP organisation.

The FDIM feature adds an extra day to the Dayton Hamvention by running a whole day of QRP seminars on the Thursday before beginning the Hamvention on the Friday. There are also special QRP events every evening in the hotel block booked by QRP ARCI.

However, being unable to attend Dayton did allow me to attend another, much smaller but nevertheless excellent, Amateur Radio event. I attended the annual meeting of the **Spanish QRP Club** in Sinarcas, about 100km from Valencia. My wife, 'Jo' attended as my driver and minder. **Nando Domingo EA5AHN**, the EA QRP Club President was our host.

It proved to be a delightful and informal weekend with lectures, a flea market and a club QRP station using home-brew and commercial equipment. **Bernie McIntosh GM4WZG** (a fluent Spanish speaker) also attended with his wife. If you fancy a laid back weekend with fellow QRPers in a lovely part of Spain, I can commend this annual event. Two days of QRP that could fit in with a holiday in this area of Spain!

I met many Spanish QRO operators and radio constructors including **Joan Morros EA3FXF**. I was especially pleased to meet Joan as he had contributed an article to the G QRP Club Journal *Sprat*, describing a novel little transceiver called *The Flea*. The project was based on an old transmitter design call the *Cubic Incher* by **Dennis Monticelli AE6C** that appeared in *QST* for July 1982. This diminutive transmitter used only one transistor and was capable of 2W of r.f. output.

Single Device Transmitters

There have been several designs published over the years for single device (transistor or valve) transmitters. One of the earliest I recall was the *Transistor 1* for the 1.8MHz (1.8 to 2.0MHz) by **Eric Elsey G3YUQ**, which appeared in the winter 1975 issue of *Sprat*. The circuit is shown in **Fig. 1**.

The circuit is a basic Pierce oscillator with the crystal (XL1) providing the feedback and frequency control. The collector load is a tuned circuit using a capacitor and home-wound coil. Eric's coil was 40 turns of 0.27mm (32s.w.g.) wire wound on 6.6mm (0.25in) inch diameter former with adjustable core (slug). The core is adjusted for best output.

The prototype used 3 PP3 batteries in series to provide 27V. With this voltage the output was some 1.5W. An interesting feature was to use a carbon microphone in place of the key in the emitter. This could generate an amplitude modulated (a.m.) signal although it gave only about half the power output and the modulation is downwards; an increase in the audio (voice) input gives a decrease in the power output.

The modulation technique reminded me of my earliest days in Amateur Radio when my equipment was a 1.8MHz valved transmitter. I keyed the 6L6 output valve in the cathode and used a carbon microphone in place of the key for a.m. transmissions. It was ideal for 'phone contacts with local stations. **Note:** 1.8MHz band crystals can be obtained through the G QRP Club.

Another example of a single device transmitter, **Fig. 2** shows the *30 metre Pen Transmitter* by **Dave Ingram K4TWJ** who was (for many years) the QRP editor of the American *CQ* magazine and the author of over 25 books on radio construction and Morse keys.

My favourite K4TWJ book is *Keys, Keys, Keys*. I remember buying this affectionate book on the history of Morse keys when I was in the USA and then leaving it on the aircraft after my flight back home then finding it was not easy to replace it in the UK. Sadly, Dave died in January 2010. His *Pen Transmitter* appeared in *Spratt* magazine or summer 1992.

The transmitter uses one 2N2222 (or 2N3904) as a simple crystal oscillator. The whole transmitter fits into a plastic pen case (albeit large), and is powered from a 1.5V cigarette lighter battery. A small push button in the end cap acts as a key and the circuit is built point-to-point 'ugly' style. The crystal XL1 is a low profile (watch style) crystal on the 30 metre QRP frequency of 10.106MHz.

Although the power output is only 350mW Dave made contacts in five American states and several countries. A novelty transmitter, it must have been great fun to build and use!

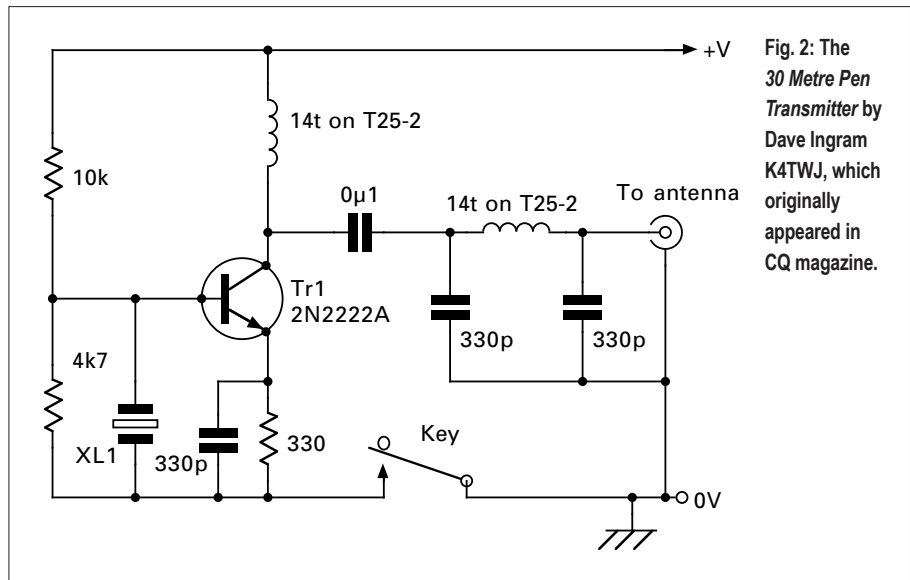


Fig. 2: The *30 Metre Pen Transmitter* by **Dave Ingram K4TWJ**, which originally appeared in *CQ* magazine.

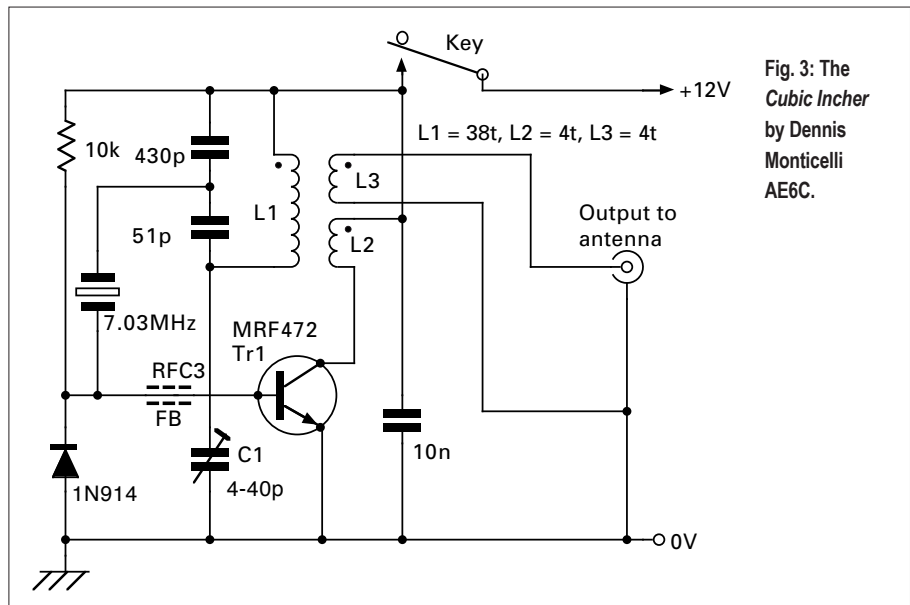


Fig. 3: The *Cubic Incher* by **Dennis Monticelli AE6C**.

The Cubic Incher

The *Cubic Incher* by **Dennis Monticelli AE6C** – based on the EA3FXF *Flea* – is shown in **Fig. 3**. The secret of this little transmitter is the careful impedance matching obtained by the transformer, T1.

The windings on T1 must be connected the correct way around to ensure phase matching. In the original article the winding diagram for T1 was incorrect as I found out when I attempted to replicate the project. Dennis AE6C used the medium power MRF472 transistor, not easy to find these days but there are several similar types.

The radio frequency choke (r.f.c.) in the base of the transistor is simply a ferrite bead slipped over the base lead. The output does require the addition of a low-pass filter for suppression of harmonic outputs. The crystal, XL1 must be a fundamental type – that is a crystal resonant on the actual frequency of the band.

Several updates of the *Cubic Incher* have appeared over the years. Indeed,

Henrik Landahl SM7ZFB produced a 3.5MHz version, amending the values of C1, C2 and T1. Having not offered *PW* readers a project for 80m for some time, I decided to use Henrik's values and build the transmitter for that band. The final circuit is shown in **Fig. 4**.

As **Fig. 4** shows, I used a 2N3866 transistor mainly because I have several of them and they are easy to obtain. This gave me a power output of just above 1W. One of the problems of these simple, single device, transmitters is that they can produce a poor quality, often 'chirpy', c.w. note. I had no such problem from the circuit in figure 4. The transistor does require a heatsink as it gets quite warm, especially if the key is held down for any long period of time.

Winding The Transformer

Winding T1 and getting the phase correct is the most difficult part of constructing the transmitter. The primary winding, L1, is 57 turns of 0.32mm (30 s.w.g.) wire wound on a T50-2 core. This winding occupies most of the circumference of

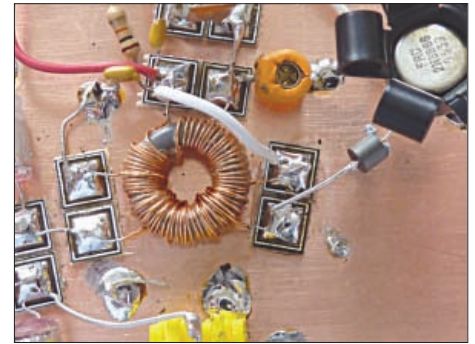
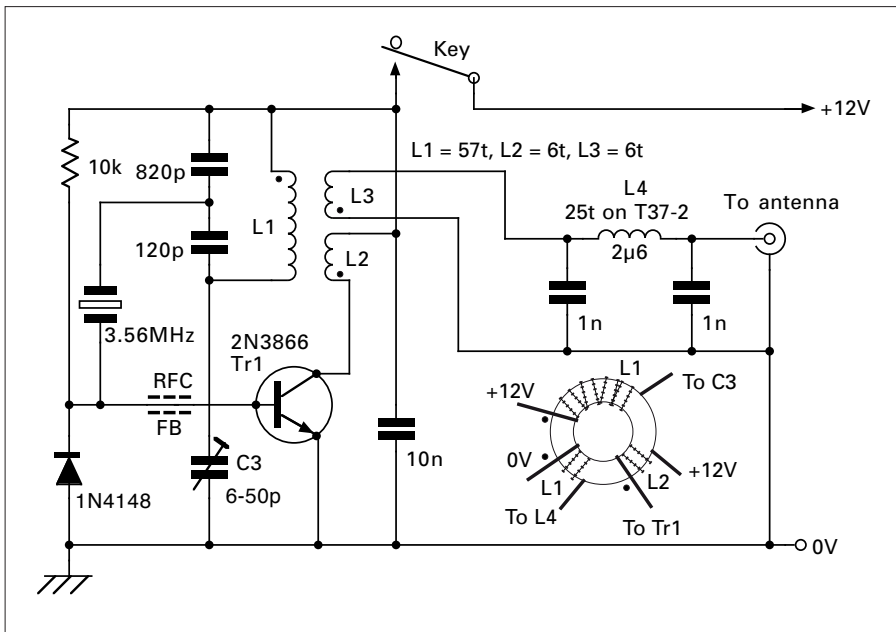


Fig. 4: Henrik Landahl SM7ZFB produced a 3.5MHz version of the *Cubic Incher*.

Straightforward Circuit

The remainder of the circuit is straightforward. The crystal, XL1, is for the 80m QRP calling frequency on 3.56MHz. The diode I used was a 1N4148 but the 1N914 (or similar) could be used. C3 is a Murata 5mm trimmer capacitor; the orange coloured version covers 6 to 50pF.

The inductor L4, in the simple low-pass filter, is 25 turns of 0.32mm (30 s.w.g.) wire on a T37-2 core. A ferrite bead slipped over the base lead of the transistor is used for the r.f.c. Any small ferrite bead will serve and I used an FB-73-101.

The 2N3866 does require a fair sized heat-sink to keep it cool. The diagram in Fig. 5 shows an alternative low-pass filter for better harmonic rejection. I've been using the W3NQN low-pass filter designs for many years with good results. The filter in Fig. 5 is one of his later designs that's especially good at second harmonic rejection.

The design has slightly unusual capacitance values and these are made up using pairs of standard value capacitors connected in parallel. The values are given in Fig. 5.

When I completed my first version of Fig. 4 it didn't work! This was because of the incorrect core winding diagram in the original article. Replacing T1 with the windings as shown in Fig. 4 solved the problem. The transmitter gave a little over 1W of r.f. output with a clean sounding signal on an adjacent receiver.

Remember that, when testing the transmitter, to connect the output to an antenna of 50Ω impedance or a 50Ω dummy load or you may damage the transistor. This is a classic circuit design and with its 1W of output could be capable of useful contacts on the 3.5MHz band. There is a special satisfaction in making contacts on the air using only one transistor!

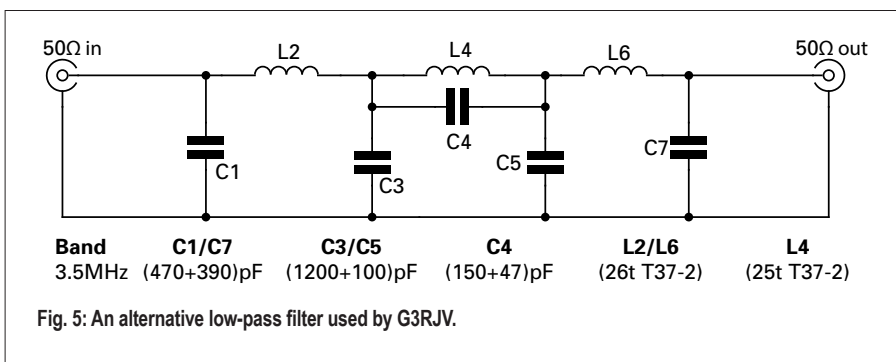


Fig. 5: An alternative low-pass filter used by G3RJV.

the core. The inductors L2 and L3 are secondary windings, wound over L1, either side of the core. The inset drawing in Fig. 4 shows the arrangement of the windings and the connections.

The leads with dots represent the start of each winding. For a right handed person, like me, I hold the core in the left hand and apply the windings clockwise. The inductor L1 requires nearly a metre of wire so care is required not to introduce kinks in the winding.

The first turn goes over the core and each pass through the core is one turn. In the diagram the beginning of L1 is marked with a dot and shown as going to "+12V". The end of the L1 winding nearly meets up with the beginning and comes from under the core; shown as "to C3".

In practice the best way to wind the coil is to keep the winding tight by holding the core firmly between the index finger and thumb and placing the turns tight alongside each other. Keep counting and hope the 'phone doesn't ring! The easiest way to retain the turns is to use bee's wax. I have advocated the use of bee's wax in coil winding for many years and keep a small block of it by my soldering station.

My usual method for securing a winding in place is to lay the wound coil on a piece of paper. Pull the turns

together so that the first and last turns are as far apart as possible and secure these with a small piece of clear adhesive tape to hold wires down to the paper.

Apply a hot soldering iron tip to the bee's wax so that molten wax drips onto the windings. This does no harm to the soldering iron tip as the surplus wax burns off and the tip can be wiped clean.

Lift the core from the paper and wipe the hot iron tip around it until the wax runs all over the windings. When the wax has cooled the windings will hold firmly in place.

An added advantage is that the secondary windings, L2 and L3 will also be held in place as they wound over L1. These windings are placed as shown in the diagram. Again they are wound clockwise, beginning of each winding marked by a dot. The beginning of L2 goes to Tr1 collector and the end goes to +12V. The beginning of L3 goes to ground and the end goes to L4 in the output filter.

A little care in winding and placing the leads of T1 should ensure that it works first time. I used 'Manhattan style' construction with insulated pads over a copper ground-plane and laid down six pads to take the wires from T1 and then built the rest of the circuit around T1.

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ACCS

<p>WONDER WAND 1.8-450MHz BNC. Whip supplied. Ideal for FT-817. Optional desk stand + 5m patch £24.99</p> <p>£129.99</p>	<p>MFJ-259B ANALYSER 1.8-170MHz</p> <p>Case 259B £29.99 MFJ-269 pro version sale £359.99 MFJ-260C 300W dummy load £49.99 MFJ-901B ATU £109.99 MFJ-969 Rollercoaster ATU (300W) £219.99 MFJ-962D 1.5kW (metered) antenna tuner our price £279.99 MFJ-994B (600W) intelli tuner £319.99</p>	<p>MFJ-269 ANALYSER 1.8-170MHz + 70cm</p> <p>SALE £325.00</p>	<p>MFJ-993B INTELLITUNER Fully automatic (1.8-30MHz). 300W SSB.</p> <p>Easy to use ATU. SALE £249.99</p>	<p>MFJ-949E Large cross needle meter</p> <p>SALE £179.99</p> <p>● 1.8-30MHz 300W ATU ● Large cross needle meter ● 30/300W PEP power meter ● VSWR ● 3-way antenna selector ● Internal balun + dummy load.</p>	<p>SGC</p> <p>SGC MAC-200 sale £239.99 SGC-239 £199.99 SGC-237 £309.99 SGC-230 sale £429.99 SGC-Smart lock £69.99</p>
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GIZMOS

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G-650C extra heavy duty rotator.....£379.99 or £429.99 with cable
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OUR PRICE £99.99

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No tuning required

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SALE £74.99 PER SET (delivery £15)
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PL-259 - PL-259	1m	£16.99
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Godfrey Manning's Valve & Vintage

63 The Drive, Edgeware, Middlesex HA8 8PS
E-mail: cgmm2@btinternet.com

A surprise find gave Godfrey a restoration project!

The Pifco "Improved" All-in-One Radiometer

Godfrey Manning G4GLM found he had a restoration project on his hands when he discovered a Pifco Radiometer – which, when they were new, few enthusiasts could afford.

Visiting a friend, he suddenly remembered my technical interest and asked me to find the fault on his wall-mounted fan heater. Confronted with a proprietary switch, series thermostats, a multi-tapped motor and wire-wound feed-forward resistor, I baulked because I couldn't even begin without a continuity tester. But I wasn't getting away lightly – he promptly opened a kitchen drawer and produced the device shown in Fig. 1.

The Radiometer (for that's what it was) didn't work (I returned another day, properly equipped and dealt with the fan heater – we Radio Amateurs are an asset in the community!). Two repair jobs for the price of one, then! Apart from being hard to read due to excess adhesive obscuring the glass, an internal battery contact was corroded. However, unlike the heater, this instrument went back to my workshop.

Provincial Incandescent Fitting Company

The Provincial Incandescent Fittings Company is better known by its contraction of Pifco. This product of theirs, looks like an early attempt at a multimeter, but the instructions show it to have one main

purpose: testing valved wireless sets. I suppose its name is the conjunction of Radio and Meter, hence Radiometer, not to be confused with a Crooke's radiometer containing black and white vanes that whirl round in sunlight, Fig. 2.

The pre-War Radiometer was in the style of round-cased 'pocket-watch' meters of that era, and had slightly different ranges. This 'improved' version is hard to date, being in a thermo-setting plastic case (some are black). It has sockets for testing a B5-based valve and no others, it is an anachronism in a surprisingly modern-looking device.

The instrument offers four ranges, 30mA, 6V, 240V and continuity (marked "Valve and Circuit Test" on the meter face). The circuit diagram that I've traced out in Fig. 3 shows 30mA and 6V terminals. Although looking sophisticatedly separate on the outside, they are connected together inside. How can these two ranges really be one and the same?

Well, if you're not familiar with test meters you're probably asking the question "what's a meter?" The answer is it's simply a resistor with an extra characteristic. Inside the Radiometer is a

meter movement having a resistance of 200Ω so, when 6V is applied to it, then, by Ohm's Law, 30mA must flow through it. That's the condition when the meter needle is at full-scale deflection, the 6V and 30mA co-exist on the resistor.

This meter then, in effect is a 200Ω resistor that happens to have the extra characteristic (via the indicating meter movement) of telling you what voltage is applied across it at any given instant.

Meter Sensitivity

This leads to another lesson about meters: sensitivity. This is measured in ohms-per-volt, which is perhaps a rather an odd-sounding concept. This meter has a 200Ω resistance and goes full-scale with 6V applied. Dividing $200/6$ gives (approximately) 33 which is the ohms-per-volt figure. What this tells us is that connecting the instrument into a circuit is more likely to upset the correct circuit operation than to find a fault!

Let's suppose one arm of a potential divider was a 200Ω resistor, correctly dropping 6V. Now, putting this meter across it would place another 200Ω in parallel and measure the voltage across the resulting 100Ω . (That's rather a big error!).

Putting it in perspective, modern moving-coil meters aim for at least $20k\Omega/V$ (a 6V range therefore having a resistance of $120k\Omega$, much greater than the 200Ω in the example and therefore hardly upsetting circuit conditions). Digital meters (and old-fashioned valve voltmeters) have vastly higher resistances.

The Radiometer isn't much use as a general-purpose voltmeter. But the instrument would tell you the voltage coming from a low-impedance source such as a power supply.

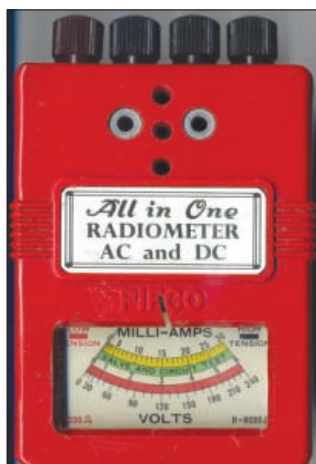


Fig. 1: The Pifco 'Improved' All-in-One Radiometer.



Fig. 2: Don't confuse the Pifco Radiometer with this – the Crooke's radiometer!

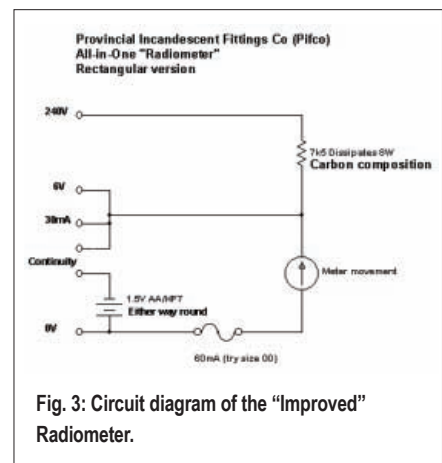


Fig. 3: Circuit diagram of the "Improved" Radiometer.

What About Current?

Let's next look what happens if we were to place the instrument in series with a resistor that's passing current. A 200Ω resistor might correctly pass 30mA while the circuit is in operation, but stick the Radiometer in series and that adds another 200Ω. This new combination of 400Ω is double what it should be and you can expect only half the required current to flow. So, the Radiometer could cause a self-induced fault in an otherwise healthy circuit!

The instructions suggest a valid purpose for current measurement. Connecting the Radiometer across a battery would cause current to be drawn and so give an indication of state of charge. A dying battery won't move the needle far (whatever you think of the meter's shortcomings). This instrument is effectively a test-load across the battery.

High tension (h.t.) batteries get a mention. The 240V range is added by the expedient of a series resistor, 7.5kΩ on the circuit diagram. It's carbon-composition and plain to see at the bottom of the internal view, **Fig. 4**.

The old 'Body-Tip-Spot' colour scheme applies and it had a 10% silver-band tolerance when new. Like most of these old resistors, it has actually 'gone high' in value with age, being a little outside tolerance and contributing to the slight under-reading on the voltage scale.

You may suggest that "7k5Ω should be better for sensitivity, shouldn't it?" That's 7500Ω plus the basic movement's 200Ω making 7700Ω per 240V, in other words 7700/240 which is about 32Ω per volt. So, we're back where we started!

The sensitivity of a meter depends on the basic movement. The series 'bobbin' type resistor merely absorbs the extra volts, on higher scales, in proportion. The dial face cheats slightly and exaggerates the 7700Ω value to 8000Ω.

At full scale deflection, the resistor drops all but 6 of the 240V (those 6V are needed to power the meter movement) and the whole thing still carries that same 30mA - because whatever current goes through the meter is also flowing through the series resistor. So the dissipation is 0.03 times (240 - 6) which is a bit over 7W. Not efficient, but a nice hand-warmer in winter!. It's the poor meter sensitivity that again causes the problem.

Operating On AC & DC

Unlike the more common and sensitive D'Arsonval moving-coil arrangements in modern meters, the Pifco meter has another unusual feature. Its movement can work on direct current (d.c.) of either polarity or on alternating current (a.c.).

I didn't want to dismantle and risk damaging a vintage item, so I can't be certain as to the type of movement, but I think it's probably moving-iron. The black plastic cylinder that makes up the bulk of the mechanism in Fig. 4, actually houses a solenoid of fine wire. This is the 200Ω resistance through which the meter current flows. Such meters are still found today in some equipment such as car battery chargers (if you can still buy one fitted with a meter, that is).

It's tempting to pop the 240V scale on the mains and I did check it through a variable auto-transformer but under safe test-bench conditions. Looking at the circuit, one of those exposed metal terminals for the B5 valve heater would be connected to the mains with just the resistor in the way. (Please don't try this at home).

Continuity Scale

The last scale is continuity and for this purpose there's an internal HP7 cell (Except that we call them AA batteries nowadays). It doesn't matter which way round it goes since the movement



Fig. 4: This internal view is dominated by a carbon-composition resistor (bottom).

is happy with a.c., but I found that it lay physically more snugly as shown in Fig. 4. Perhaps there is a tiny size difference, I had slightly to flatten the contact dimple where the negative pole goes.

With just 1.5V available, even shorting the continuity terminals won't achieve much deflection. In **Fig. 5** you see the meter doing what it's designed for, with a B5 valve, yet the pointer goes only a quarter of the way across the 6V scale.

These valves have cold heater resistances of a couple of ohms, hardly adding to the 200Ω of the basic meter movement and hence allowing close to the maximum-possible deflection from a 1.5V battery. A 200Ω resistor in place

of the valve heater halves the meter deflection as predicted.

Hot heater filament resistance is different. The PT2 valve heater draws 200mA from a 2V accumulator, that's 10Ω. Cold filaments have lower resistances and draw more current than when hot, that's why they often fail at switch-on.

Abrasive Treatment

I removed the copper positive battery terminal for a thorough going-over with abrasives, this was because the products of corrosion had formed an insulating layer. There were also various dry joints to re-solder.

The dial glass had been glued back at some time, but the adhesive practically obscured it. The resistor was also loose, presumably the 'glass-gluer' had forgotten to include the resistor leads under the screws on re-assembly. I re-glazed it, cutting a piece from thin picture-frame glass, but the original actually cleaned up after physical scraping and solvent treatment – so now that's spare.



Fig. 5: The instrument proving heater continuity of a Marconi PT2 valve.

The fuse was open-circuit, size 00 is probably the nearest available but doesn't come in 60mA. I rewired the failed fuse, heating the end-caps and applying de-solder braid to reveal the original centre-holes.

Heating the end-caps of a new 100mA glass fuse enables them to be pulled off, revealing fusewire finer than a hair. This I threaded, using a thicker guide-wire, into the meter's fuse while wearing a binocular-magnifier vision aid.

I not only enjoyed the satisfaction in restoring a period instrument, I also indulged in the nostalgia of what the practice of amateur electronics was like in those days. In other words I did a little bit of 'time travelling' with the Pifco Radiometer!

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Tony Nailer G4CFY's Doing it by Design

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More Noise!

In his *Doing It By Design* column, Tony Nailer G4CFY continues his development of the noise bridge, begun in the July issue of *PW*.

The first article about the development of the Noise Bridge in *Doing it by Design* July 2012 *PW* has stimulated a great deal of interest amongst *PW*'s radio listeners and transmitting Radio Amateurs.

In the final section of that article I referred to a number of ideas I wished to explore as alternative push-pull designs. I have tried a number of ideas but don't need to waste article space on poorer solutions.

What I did learn, and remember seeing with the conventional circuit of a couple of years ago, was that some versions were not producing smooth random noise but were clearly just 'squegging'. This is a form of oscillation extending over a wide frequency range and has harmonically related frequencies at which oscillation fails. When viewed on a spectrum analyser it is a bit like the Giant's Causeway in Ireland, only with rounded tops to the segments!

Further Development

Further development of the circuit was a little like accompanying the lady in our life to buy a posh frock! You go to a shop (where she regularly buys good clothes) and tries on a dress, which fits perfectly and looks good. Then you go from shop to shop, even going to other towns, but eventually you go back to the first shop, to buy that first dress because no other is as good! So, that pretty much summarises the progress I made on the design.

Nothing came close to the smooth distribution of noise and the output level. Turning the circuit into a product, requires thought about the case, the size of the printed circuit board (p.c.b.), connectors, the fitting of the bridge transformer and availability of suitable parts.

I tested the unit on 12V from a variable bench supply and also on a PP3 9V battery. A sketch of the noise output at the receiver port with both VC1 and VR1 at minimum is shown in **Fig. 1**. Not shown in **Fig. 1**, is that when it's in balance the noise drops below the 10µV graticule line, achieving in excess of 40dB noise reduction from 2–20MHz, and in excess of 30dB at 30MHz, and as much as 18dB reduction at 70MHz.

Practical Considerations

Having determined that the unit could be powered from a battery or from a bench supply, it's important to have a visual 'On' indication, in the form of a light emitting diode (l.e.d.). I reasoned that the 5.1V Zener noise source running from a 12V supply with a series 820Ω resistor would be passing $(12-5.1)/820 = 0.0084\text{A}$, or 8.4mA. So, why not use this current also to light the l.e.d.?

If the supply is 12V, the Zener 5.1V and the l.e.d. has a

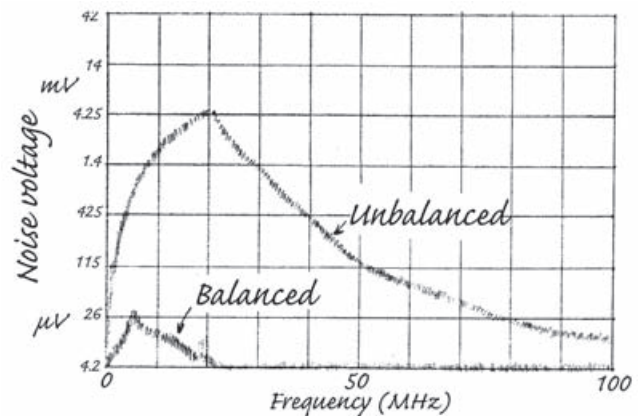


Fig. 1: A sketch of the noise output at the receiver port with both VC1 and VR1 at minimum.

nominal drop of 2V across it (as many do) the resistor then needs to have 4.9V across it with 8.4mA passing through it. The resistor needs to be 583Ω, and we can use 560Ω. So R1 was changed to this value and wired in series with a standard 5mm (0.2in) l.e.d. I was pleased it worked perfectly with no change in the observed spectrum of noise output.

I found that the bridge transformer may need to be screened from the p.c.b. in a boxed unit, even though there was no evidence of pick-up or interaction of any kind within the development model. Nevertheless I decided to provide three p.c.b. pins for connecting to the transformer and hoped that the positioning of sockets and reference variables would allow direct connection to the secondary side.

The unit has to lend itself to battery portable operation as well as fixed station use by a transmitting Radio Amateur. So, there's clearly an issue here for the Radio Amateur to have it permanently wired to between the rig and antenna tuning unit and available for instant use. To solve this I reasoned to use a three-pole two-way switch (3P-2W), configured so two poles switch antenna and radio and the other pole is used switches the supply. Suitable miniature toggle switches rated at 5A at 125V should handle this provided that the operator avoids switching while keyed up.

Remembering that $V^2/R = W$, also that $I^2 \cdot R = W$. Using a 100W rig feeding a 50Ω antenna system, $V^2/50 = 100$.

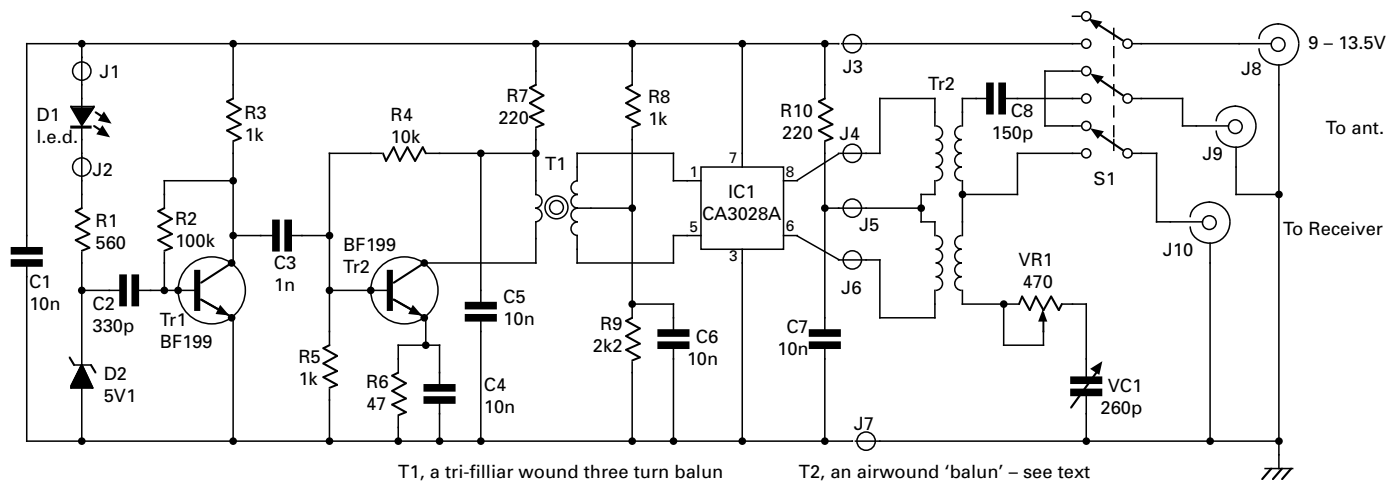


Fig. 2: The new circuit diagrams varies only a little from the original.

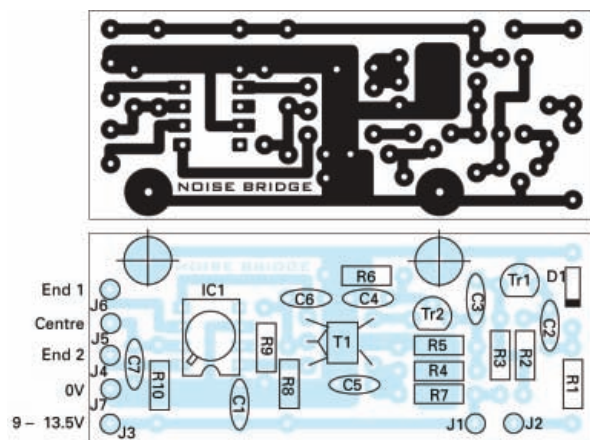


Fig. 3: The p.c.b. layout and component overlay of the noise bridge.

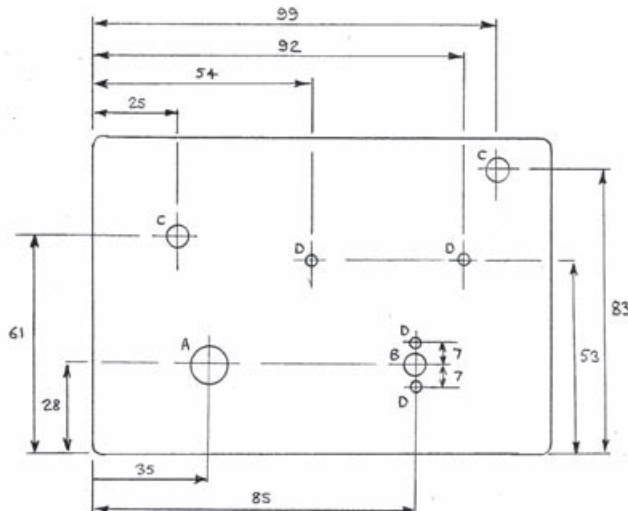


Fig. 4: Tony's sketch of drilling drawing for the front panel. Diameters for holes marked 'A' are 9.5mm, 'B' 7mm, 'C' 6mm and 'D' 2.8mm.

Therefore $V^2 = 100 \times 50 = 5000$, so $V = \sqrt{5000} = 70.7V$ rms. This will be $70.7 \times 1.414 = 100V$ peak. (The switch should cope with this).

Also then $I^2 \times 50 = 100$, so $I^2 = 100/50 = 2$. Therefore $I = \sqrt{2} = 1.414A$ r.m.s. This will be $1.414 \times 1.414 = 2A$ peak. The switch should also cope with this.

Parts Availability

The development model used a surplus 220Ω potentiometer but I am now unable to obtain them except at unreasonable prices. The best solution is to use a 470Ω potentiometer (available with a plastic spindle) from Rapid Electronics.

The polyvaricon capacitors procurement has been a nightmare. I've been trying to solve this for months now, and have only just negotiated to purchase a huge quantity of 266+266pF Polyvaricon capacitors from the Far East.

I have large stocks of the CA3028A and know where I can obtain more if required. For those wishing to build the unit themselves I will provide a kit, which includes the prepared bridge transformer.

The Circuit & PCB

I then modified the circuit to include the new value of R1 and pins for the l.e.d. and bridge transformer and new values for VR1 and VC1, as well as the 3P-2W switch. The circuit is shown in Fig. 2. A p.c.b. was then laid out and the artwork is shown in Fig. 3 with the component overlay.

Boxed Unit

Before trying to fit it into a box I had to determine if there would be feed-back or balance problems with the bridge transformer. I twisted four 300mm lengths of 0.45mm (26s.w.g.) enamelled copper wire together by having an end 'bunch' of wires secured in the bench vice and the other end 'bunch' in the chuck of a hand drill.

The crushed ends were cropped off and the wires separated with 15mm 'tails'. I carefully scraped these and then with the aid of a continuity tester positioned in-line each end as windings 1-4. The bundle was then coiled into four turns and the ends connected wires 1-2 and 2-3. This was then fitted to the assembled p.c.b. and tested. For some reason the balance was not as good as the two turn version.

Re-fitting the two-turn transformer I bent it into an oval and laid it back above the p.c.b. board but on testing it I discovered the squegging problem was there! So I then had to accommodate the two-turn transformer and minimise coupling to the early stages of the noise amplifier.

The bridge transformer was then bent into an oval standing upright from the plane of the p.c.b. On test there was no problem so this dictated a box depth of at least 40mm. A diecast box measuring 114 x 63 x 55mm (as used with the receiver a.t.u.) was tried but I found there was insufficient room for the p.c.b. and switch, l.e.d., potentiometer, polyvaricon, and scale marking well as a clear space for a PP3 battery in its holder.

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The only suitable size box to hand was a black-painted Hammond type 1590CBK measuring 120 x 94 x 55mm. I hadn't originally intended to use a painted box because of the cost – but have to say I think it looks really nice! A drilling drawing for the front panel is shown in Fig. 4.

The battery holder is positioned to the top right of the rear of the box so that it is beneath the p.c.b and l.e.d. A switched d.c. socket is positioned on the rear of the box underneath the On/Off switch.



Fig. 5: The circuit boards as fitted into the finished project box.

The Assembly

The l.e.d., 3P-2W switch, potentiometer, and polyvaricon are assembled onto the front panel. The p.c.b. is fitted onto two 6BAx 10mm screws, which have been secured through the front panel with two nuts each on the inside. The board is secured by another 6BA nut on each and with a solder tag under one of them.

The negative wire from the battery holder is connected to the switched earth terminal of the d.c. power socket. The earth terminal of the d.c. socket is wired to the 0V of the p.c.b. In this way, plugging-in an external supply breaks the negative connection to the battery.

The positive wire of the battery is wired to the centre pin terminal of the d.c. socket and a wire also from this pin connects to one pole of the On/Off switch. The corresponding way connects to the J3 (+V) terminal of the p.c.b. The other two poles of the switch are wired using 24/0.2 wires to the centre pins of the coaxial sockets.

The transformer primary is wired directly to the p.c.b. terminals. The centre tap of the secondary winding connects to the centre pin of the row on the three-pole switch, which is closest to it.

One side of the secondary then connects via a 150pF ceramic capacitor to the way of the switch closest to the potentiometer. The other transformer secondary side links to the side and centre terminal of the potentiometer. The opposite two ways corresponding to the secondary connections are linked.

Only one gang of the polyvaricon is used. That links directly to the other terminal of the potentiometer. The long earth tab then connects to earth by means of a solder tag under one of the p.c.b. fixings. The l.e.d. is wired directly to the p.c.b. pins, with the large metal blob inside it being the negative terminal.

Calibrating The Bridge

Those who obtain their own box and build the bridge will need to calibrate it. Start by plugging-in a 50Ω load in the 'Ant' socket and a receiver tuned to 15MHz into the receiver socket. Switch on and rotate first the capacitance control for a noise reduction, then the potentiometer, then the capacitor again, and the potentiometer again and the noise should disappear.

The position of the capacitor pointer is nominal 0pF and the position of the potentiometer is 50Ω. Mark the panel accordingly. Now without touching the capacitance control, substitute other resistances and re-balance using the potentiometer only, marking each point when balance is achieved.

Then substitute other capacitors one at a time for the 150pF reference, re-balance the bridge and mark the capacitance scale with the difference between 150pF and the substitute. For example a 120pF will give -30pF and 180pF will give +30pF.

Note: Anyone purchasing a kit will have the panel fully labelled and the scales already marked.

Final Remarks

I am delighted that the balanced drive noise bridge achieves balance beyond the noise floor of a spectrum analyser from DC to beyond 100MHz. This is a major step forward in the history of the receiver noise bridge. The provision of the straight through path when switched off means it can be left in circuit for transmitting Radio Amateurs. Provision of battery and external supply allows fixed station as well as portable operation.

Almost half the cost of the boxed kit is the cost of the painted box plus marking and drilling and labelling. Hopefully, sufficient information is included here for those who would be able and willing to buy their own box, mark it, drill it, and label and calibrate the unit themselves.

Kits & Bits

The p.c.b. kit is available for £11.25, and ready-built for £15.75. (p&p £1.50).

The costs Bridge transformer £5, and the 3P-2W toggle switch costs £3.

The Polyvaricon 266pF is available for £1.50 and the 470Ω potentiometer with plastic shaft £1.50. Postage on the p.c.b. kit and panel parts cost £3.50.

The boxed kit complete £63, including insured carriage. It's also available ready-built £87.50 including insured carriage.

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Test Signals, Software and Raspberries!

In this month's *Data Modes*, Mike Richards explains how he creates test signals, using the *Audacity* software, and introduced the Raspberry Pi.

Welcome to *Data Modes (DM)* and I hope you all enjoyed the waterfall images that I've been showing over the past couple of months. If there are any other modes you would like me to cover please drop me an E-mail and I'll see what I can do.

Quite Daunting!

When you're new to data modes, trying out new modes can be quite daunting as you're probably not entirely sure what the signals sound like, though, if you've followed this series, you should know what they look like from my waterfall images!

One way to get to know a signal is to try and decode a pre-recorded sample of the signal. Finding these can be a bit hit and miss so I have 'posted' a selection of modes on my website at: www.hamdata.co.uk

The signals, I've posted, are all

'MP3' files to keep the size down and the filenames also describe the mode in use. I created these files using **Simon Brown's DM780** inside *Ham Radio Deluxe* and they are all clean recordings, i.e. they haven't been received off-air. Each file contains the same standard test message which is: "the quick brown fox jumps over the lazy dog 0123456789". This is chosen because it contains all 26 characters of the alphabet in a phrase just 35 characters long!

Where possible, I've included longer than usual idle periods at the start of the signal to help your decoder synchronise with the signal. The sound files can also be analysed in a spectrum analyser where you can see if you can reproduce some of the waterfall displays I've shown recently.

If you need to convert the .MP3 files to .WAV files for your decoder, the

simplest method is to use the excellent *Audacity* software. *Audacity* is an open source project that has developed a very sophisticated audio player and editor.

The software, which has *Windows*, *Macintosh OS-X* and *Linux* versions, is completely free. The source code is also freely available for those that like to tinker and modify the program. You can get your free copy from the website: <http://audacity.sourceforge.net/>

To change a file from .MP3 to .WAV, or any other format for that matter, open the file in *Audacity* and then choose **File> Export** and select the format you require, see **Fig. 1**. It really is that simple.

Audacity also makes an excellent general audio tool to have around the shack as you can make and edit all manner of audio recordings. When I want to examine a data signal more closely, I first use *Audacity* to record a sample off-air.

Once I have a good sample I can use *Audacity's* editing tools to trim the length of the sample, 'normalise' the signal level, apply noise reduction and much more.

When it comes to playing back the recording, *Audacity* has a looping feature so you can playback the sample as a continuous loop. It's also very good for making interesting ring tones for the family from just about any audio file!

Basic Operation

To help you get started I'll take some time here to run through the basic operation of *Audacity*. I'm assuming you have *Audacity* downloaded and running okay. To make a new recording select

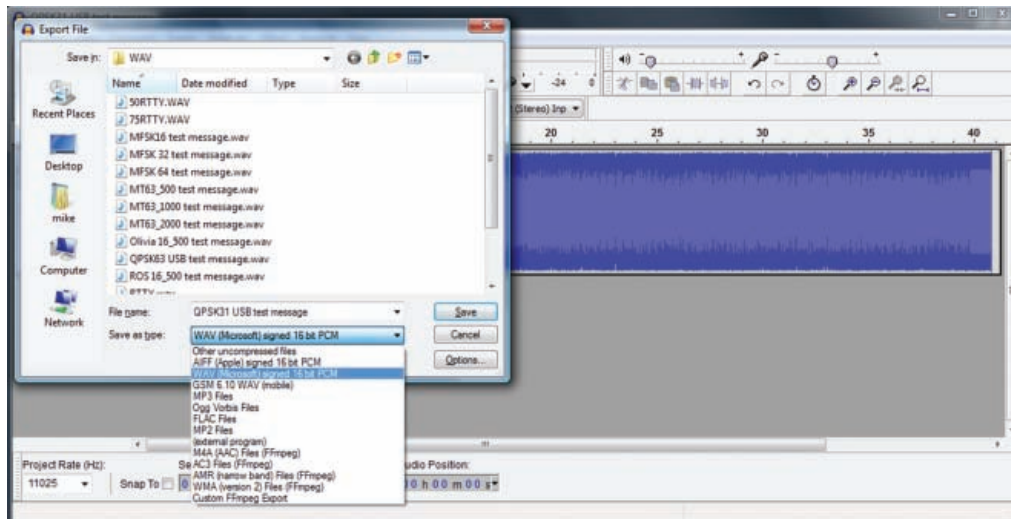


Fig. 1: Converting file formats using *Audacity*.

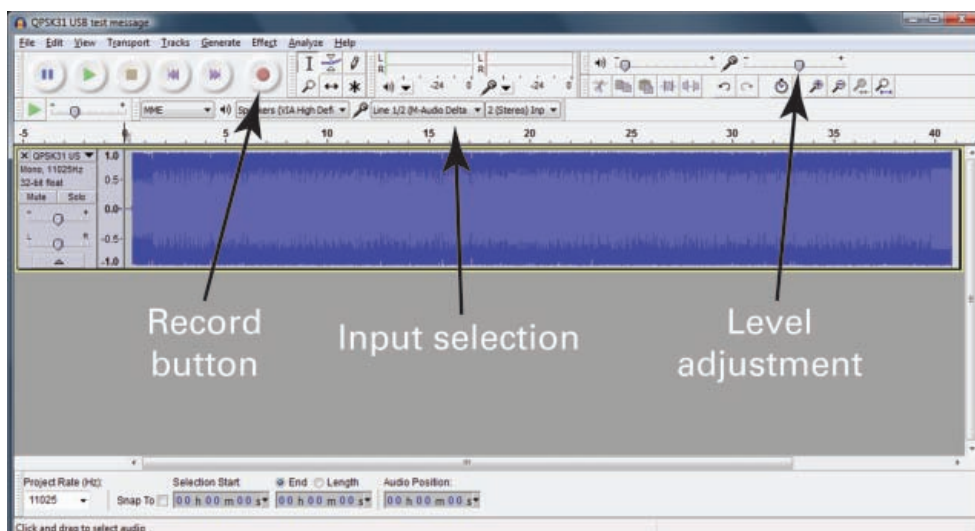


Fig. 2: The main screen for Audacity.

File>New and a new blank instance of Audacity will be created.

The next step is to choose your input source and this is done using the drop-down combo-boxes next to the microphone symbol. This is where you should find a list of recording devices (see Fig. 2).

The input volume can be controlled using the slider next to the microphone icon at the top-right of the screen. Once you're happy with the settings, you need to press the red record button by the transport controls at the top left of the screen and recording will commence. When your recording is complete, you can move on to use some of Audacity's editing tools to improve the result.

If you need to increase the overall level of the recording, the Normalise routine does a good job. Normalise is available via the **Effect** menu and you have the option to set the maximum amplitude – the default setting of -1dB is usually fine. The normalise effect will analyse the entire signal and increase the volume until the loudest peak is at a level that is 1dB below the maximum or overload point. This ensures the signal is as loud as it can be without risking overload problems.

Perhaps the most valuable facility is the selection and editing tools where you can remove unwanted sections of a recording. When I'm using Audacity to capture a signal for analysis, I usually edit the track to remove any silence at the beginning and end of the recording. To do this, use the selection tool to select the part you want to remove and hit delete icon – it's that simple.

When you've completed the edit you can use the **File>Export** option to save the track in the appropriate format. Unless I'm using a decoder that has the facility to play an audio file in a loop, I use Audacity to replay the track but in the Transport menu choose **Loop Play**.

The track will then play continuously

so you can analyse as long as you like! So that's an overview of Audacity, now on to other things.

The Ingenious Reed Solomon Scheme

The Reed-Solomon Identification (RSID) scheme, is an ingenious one. Created by **Patrick Lindecker F6CTE**, it's been designed to provide fully automated detection of Amateur data modes.

The system has been released into the public domain, so it's free for all developers to use in their software. When fully implemented, the system automates the mode selection process and can even be used to notify you of active transmissions on nearby frequencies.

The RSID system operates by including a short identification signal at the start of each transmission. This is then noted by the decoder so that it can, either auto-tune to the new signal, or advise the operator that the signal's available.

The RSID signal has a duration of 1.4 seconds and occupies a bandwidth of 172Hz. The actual RSID transmission uses MFSK (Multi-Frequency Shift Keying) with 16 possible tones spaced at 10.766Hz.

Each tone is applied for 92.88ms and the entire sequence of 15 symbols takes 1393ms to transmit. In most cases the decoding is handled using a decoder algorithm developed by **Vojtech Bubnik OK1IAK**. The algorithm uses an FFT (Fast Fourier Transform) with 2048 points and a sample rate of 11025Hz.

The RSID transmit mode and decoder combined, produce an extremely reliable combination and the output is either the correct RSID or a 'signal too weak' indicator. The chance of producing an incorrect RSID is just about nil!

The system is so good that you may find RSIDs shown in your decoder when the signal is too weak to fully decode

successfully. The range of unique values available from the RSID process is 272 and the allocation of modes to RSID numbers is controlled by Patrick.

To make use of RSID, the transmitting station needs to be configured to transmit the ID and the receiving station needs to be using RSID enabled software (see Fig.3). The mainstream programs that have RSID included are *DM780* (the data modes part of *Ham Radio Deluxe*), *FLDIGI* and Patrick's own *Multipsk*.

The great thing about all these software offerings, is that they're free! So, there's no excuses for not using them!

When you do try the software, you need to make sure that you enable RSID transmit in the Options menu as it may be turned-off. As with all attempts at standardisation, it can only succeed if everyone joins in, so check-out your data modes software and make sure the RSID option is switched on.

Raspberry Pi

The Raspberry Pi is a wonderful little computing powerhouse has attracted a huge amount of attention with demand outstripping supply. As a result, we've all had to wait a while – I ordered mine in April and it's being delivered about three months later. Now that all the obstacles are out of the way, it looks as though they may be available off the shelf by August. But you may ask, "What's all the fuss about?"

The fuss is about a product, the Raspberry Pi, part of an educational programme designed to encourage young people to get involved with computer programming. The programme has been led by a dedicated team at Cambridge University and is sponsored by many of the big names in electronics.

The Raspberry Pi board itself is around credit card size but includes a

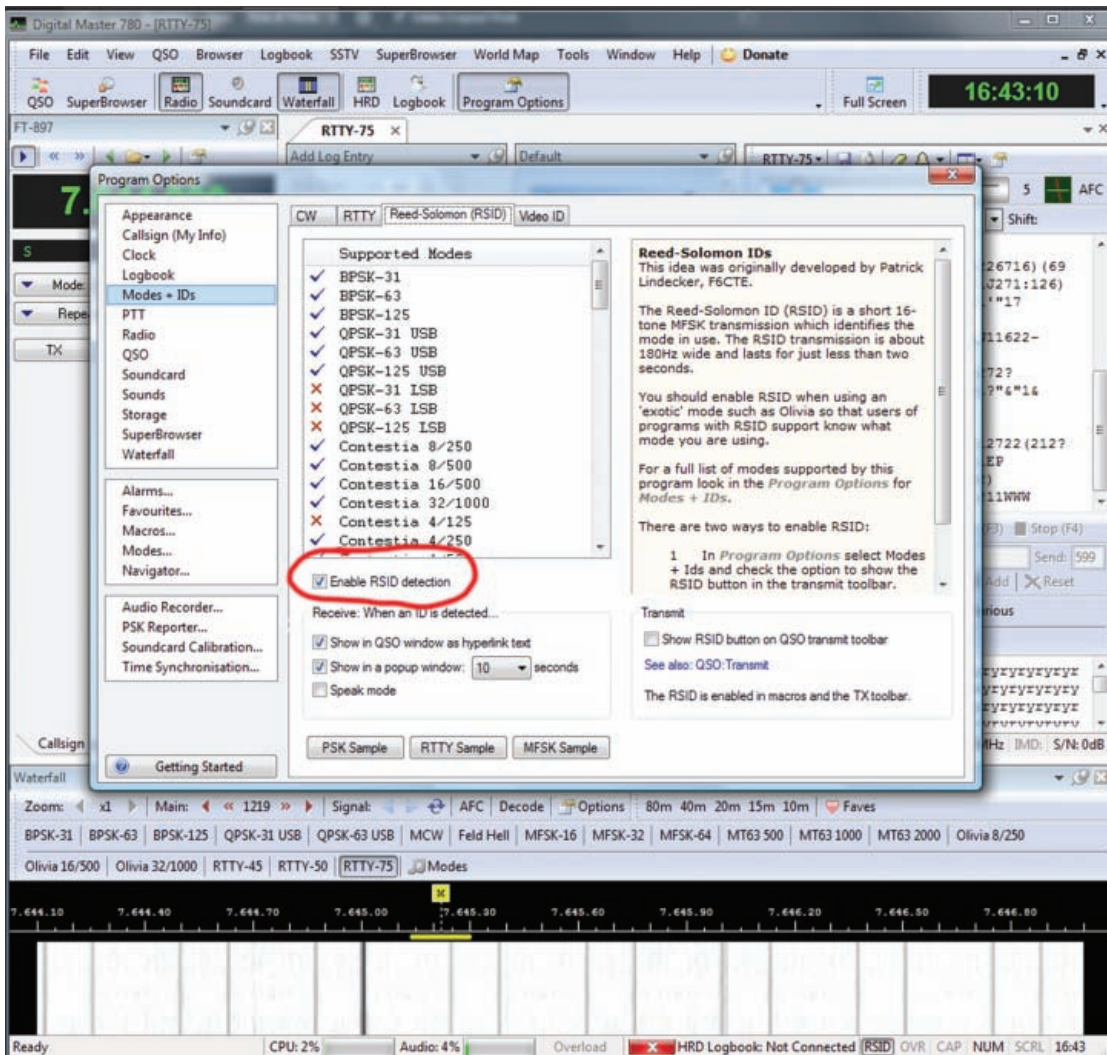


Fig. 3: RSID set-up in DM780

700MHz floating point central processor unit (c.p.u.), a graphics processing unit capable of BluRay quality along with HDMI and composite video output, two USB ports, an audio output jack and an Ethernet port (see Fig. 4)!

The system, doesn't use a hard disk, but the operating system is loaded onto an SD-card, which it uses instead. So, you can change operating systems simply by swapping the card. In addition to these connections, the board has eight general purpose input/output pins plus direct access to SPI, PWM and I²C functions.

The main programming language for the initial releases is *Python*. This is an excellent choice as this is a great language for experimenters.

There are a huge number of software libraries available for *Python* so you can create quite sophisticated programs by using these libraries do the complicated stuff. So, why am I talking about Raspberry Pi here? The answer to that question is simply, that I'm sure there will be lots of clever people out there writing software to enable the Raspberry Pi to carry-out all manner of radio related tasks.

Hopefully, we will see lots of

applications ranging from a complete software defined radio through to data decoders and encoders, etc., appearing for the Raspberry Pi.

If you know of any radio software or are developing some yourself please

drop me a line with the details. If you want to know more you can visit the Raspberry Pi website at www.raspberrypi.org and you can order from RS Components or Farnell (Element 14).

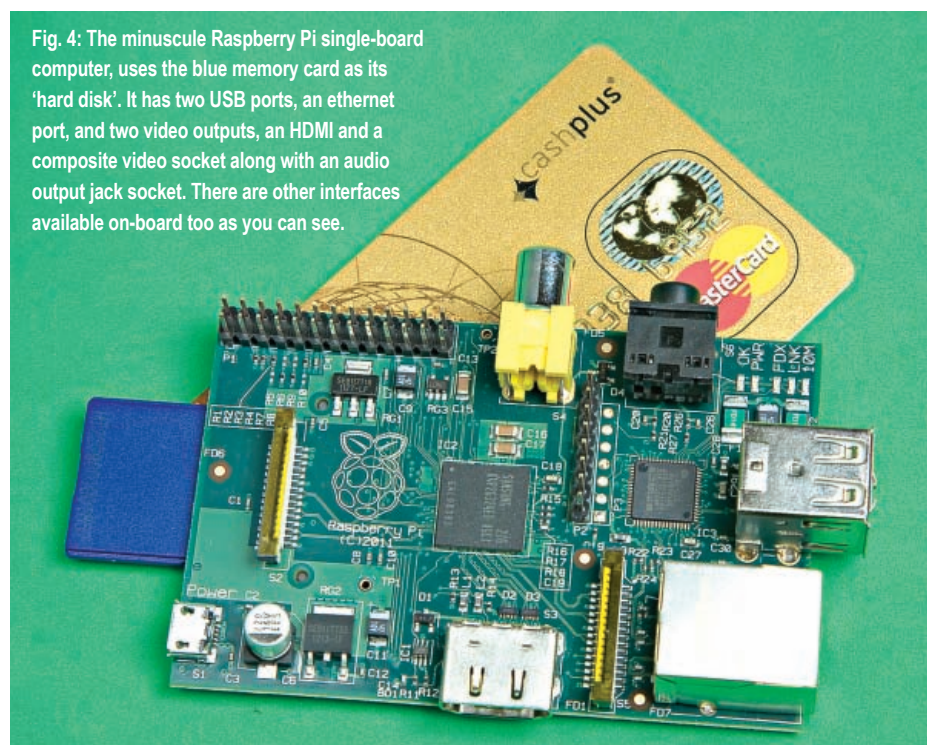


Fig. 4: The minuscule Raspberry Pi single-board computer, uses the blue memory card as its 'hard disk'. It has two USB ports, an ethernet port, and two video outputs, an HDMI and a composite video socket along with an audio output jack socket. There are other interfaces available on-board too as you can see.

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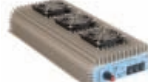


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New Midlands CRAC Group

Tim Kirby G4VXE presents his regular report of your activities on the v.h.f. and u.h.f. bands – and as usual it's fizzing with activity and enthusiasm!

Welcome to the world of Amateur Radio above 30MHz! I'm starting this month's *The World of VHF (WoVHF)* with news from **Bob Taylor G1WEX** (Birmingham) who sent details of a new group **Central Radio Amateur Circle (CRAC)**. The group is mainly based in the the West Midlands, but some members are further afield.

The group have a net on 145.375MHz f.m. each Thursday evening from around 19:45 local time. The club callsign is **MX0PPC**. Bob says that anyone is welcome to join the net and indeed, the club. Full details can be found on the web at: www.radioclubs.net/crac

Radio Clubs & Contests

Jon Joyce GM4JTJ, E-mailed me saying, "I would now like to get onto my soapbox! Scotland's density of people is quite low and I live in an area where there are only 23 people per square km. This sparsity means that there is little support for local radio clubs and yet on a wider geography we all manage to keep in touch via E-mail and mobile 'phones to arrange contacts.

"Many contest rules dictate that for club entries there must be a central meeting place which, in this day and age, seems a little ridiculous given that many communities are now 'e-communities' and there are a lot of us here in GM land, who would like to enter contests collectively but are prevented because of this rule about a common place of meeting.

"Some people up here have to drive 40 miles just to do their weekly shopping! We feel that this rule is outdated and should be revoked to allow more distant and separated communities to come together with a common purpose."

Thanks Jon – an interesting E-mail indeed! In my reply, I encouraged Jon to lobby contest organisers with his thoughts. I seem to remember that back in the mid 1980s, these sorts of rules were introduced to try and differentiate

between bonafide radio clubs and contest groups 'of convenience' being formed. However, it didn't really work, because contest groups were quite good at picking a pub in the middle of the geographical spread of their members and making that a nominal meeting point!

The 50MHz Band

Russ Scully M0WYB (Bath) just missed last month's deadline – but he'd had some nice contacts, mostly Europeans, but the most distant contact was FM5WD on May 29th. Russ uses a home brew G0KSC SC6/4/9D antenna (5-elements on 70MHz and 4-elements on 50MHz with a single feed).

Here at G4VXE – after I was lucky enough to work **Dave Olean K1WHS** on 50MHz on June 22nd – I dropped him an E-mail to ask him about his experiences in the opening. Part of his antenna farm can be seen in **Fig. 1**.

Dave says, "I am not QRV very often. As for yesterday evening, I saw a few posts on DX Summit in the afternoon here, indicating that a few USA stations were working Europe, so I quit work early and went up to my shack and was QRV at 2109 or thereabouts. What got my attention was that I was hearing stations from inland Europe and the Balkans right away. A similar opening occurred a week earlier in the ARRL VHF Contest and the 6m operator, **Arthur Hambleton K1BX**, worked a bunch of the same stations that time.

"I have included a text file outlining DX worked in the June 10th and 11th opening. I am not sure, but I think this latest opening was even better. I finally had to quit at about 0100 UTC. I was getting awfully hungry and the dog, (Beagle Bailey) was also indicating that she needed her dinner and beauty rest too!

"She has a little dog bed under the 6m operating desk. I hated to quit as the signals from the British Isles at that time were particularly loud. It's not too often

that you get 59+40 reports on such long paths! I couldn't believe that we still had propagation as it was after 1am on the continent!

"After about an hour or so from the start, at 2230UTC, the extreme distant signals dropped out, and it was almost exclusively a G/EI opening with a few ON, PA, and DL stations in there. I split my time between c.w. and then later on s.s.b. I wish I could have been on earlier as I think there were more long haul contacts to be made before 2100 UT.

"I'm including a list of some stations worked who were not on the British Isles; S51IV (JN76), 4O3A (JN92), S57TW (JN75), IK0FTA (JN61), OE9MDV (JN47), IK1EGC (JN35), CU1EZ (HM76)."

Dave continued, "Interestingly, I heard and called CT11LT late in the opening but could not get his attention on c.w.. He was quite weak as were many stations from southern Europe in EA and CT. By contrast, the Gs were loud along with a number on ON, PA and DL stations.

"Total QSOs for the evening to Europe amounted to about 130 contacts by the time I quit just before 0100UTC"

Thanks for the interesting news Dave! Incidentally readers, I was also impressed to hear that Dave can power his 100W station from solar power – but uses a 20kW diesel generator when the big amplifier (Eimac triode) is needed!

Justin G0KSC's Interesting Day!

June 29th was an interesting day too and **Justin Johnson G0KSC** was delighted to work **Lew Sayre W7EW** (Oregon, USA). The Extreme West East Es (EWEE) opening started in the middle of the afternoon and ran through to around 9pm local time. Lew W7EW runs 6 x 7element LFA Yagis mounted on a 60m (175ft) tower! He worked as far as 4X, with 105 stations in 22 countries.

Justin says that there was a good opening in the evening of the 29th, with a number of East coast US stations

worked, including K1SIX, N3DB and W3LPL.

Paul Bowen M0PNN (Newport, Shropshire) has had a good month and worked a few countries and squares including JX9JKA on June 8th, JY4NE on June 10th and 3A/DG5NFF on June 15th. Paul caught openings to the US and Canada on June 10th and 28th and worked many new squares.

Paul also reports on the GP3ZME/P expedition to Guernsey by the **Telford & District Amateur Radio Society**. They had about 200 QSOs on 50MHz including LA, SM, G, GW, EI, EA, EA6, EA8, EA9, OM, YU, UR, F, DL, SP, 9A, 5B, CT, GU, GJ, OZ, 4O and OK. The group used an HB9CV antenna for 50MHz

John Worsnop G4BAO (Waterbeach, Cambridgeshire) has had worked a few nice stations during the month including EA6FG (JM19), TF2CL (HP84), CT8/DK7LX (HM49). John runs 100W from a TS-2000X to a vertical antenna.

Mark Marment CT1FJC (Algarve, Portugal) writes, "The E season continues to be totally different from previous seasons here in IM57. Again there has been a lot of North-South, with Es favouring the north this month. It begs the question as to whether the 'jet stream' being further south this year has anything to do with it. But it has been an interesting month with a few nice surprises!

Mark continued, "After a small USA opening on the June 3rd, there was a nice opening to USA and VE on the June 8th with 22 North American stations worked, followed by a West-East into 4X4DK, UT, OK, LY, and SV5BYR/5.

"On June 12th & 13th the openings were into OH, on 16th there was some nice DX with VP2ETE, FS/K9EL and HI3TEJ worked. On June 24th the band opened again into the Caribbean with VP2V/W9DR followed by FJ/W6JKV at RST 559 on c.w. and a little later on s.s.b. at R5 and strength 6.

"On June 29th Es were mainly up in the north, but nothing much heard, until a real nice one VE7SL at 1437, on the west coast of Canada in CN88, with a distance of 8489km. We exchanges 559 reports. I had an s.s.b. QSO with K7RAT (CN79) but was not sure if the QSO was complete because of QSB. On July 1st the band was open West to East with ER, EX9T, UN3M, UR5, worked on c.w.

"A new DXCC for me, Mount Athos in Greece, I was pleased at last to work Monk Apollo SV2ASP/A on s.s.b., followed by several Ukrainian stations".



Fig. 1: The impressive 4 x 7 element 50MHz Yagi area of Dave Olean K1WHS.

Graham Boor G8NWC (Spalding, Lincolnshire) has made some nice contacts during the month. He caught an opening on June 10th when the highlight was IS0BSR/P (JM49) with OE, I, DL, SP, OK, EA and SM also being worked. On June 16th, Graham worked some tropo QSOs in the contest, G5B (IO92) and G0VHF/P (JO01) along with SP, OE, 9A, YO and HB9FX (JN37). On June 23rd he worked HA8IB (KN07) – June 24th LY1R (KO14) and EA3AYQ (JN11) and on June 25th EA6DX (JM19).

Phil Oakley G0BVD (Great Torrington, Devon) has worked plenty of Es QSOs, the highlights of which, are IS0BSR/P (JN49) on June 10th, LX1KF on June 12th, LA4KBA (JP50) and LB3RE (JP50) on June 13th. Phil worked GW2OP/P (IO71) on tropo on June 16th during the contest and then on June 24th he was delighted to work ZB2B (IM76) along with EA5RJ.

The 70MHz band

Paul Bowen reports that the Telford group's DXpedition to Guernsey GP3ZME/P was active on the band

and gave many UK stations a first contact with Guernsey. They worked G, GW, GU, EA6, EA8 and I, all using a 5-element Yagi.

John G4BAO has put up a new 4-element NBS Yagi and is trying it out. The highlights have been TF3ML (HP94) and YO8RAW (KN36) with PA, G, 9A, ON, CT, EA, OM and SP stations also worked.

Jon Joyce GM4JTJ reports that the May 70MHz UK Activity contest coincided with some good DX from Spain and Portugal. Jon says that for the first half hour or so of the contest he worked CT1DIZ, EA5DOM, EA7KB and CT1QP before the Es finished and it was back to tropo for the remainder of the contest.

Mark Marment CT1FJC continues to be pleased with the results with his new 6-element antenna. On June 8th, he worked CU3EQ (HM68), G4IZH (IO94), G8HVY (IO90), IS0AWZ (JM49) plus a number of Italian stations, SP5CCC (KO02), OK1TEH (JO70), SP3RNZ (JO92) and OK2EC (JN88).

June 13th saw the band open to EI with **John Tait EI7BA** ('Bad Apples' as



Fig. 2: The Isle of Man Amateur Radio Society's joined in during the *Practical Wireless* 144MHz QRP contest. They operated from the village of Ballaragh (east coast of IOM). The antennas were a pair of stacked 9-element Yagis constructed from the remnants of some scrap Tonna antennas and these are being assembled in the photo.

he calls himself!) and EI4DQ (IO51) and EI8IQ (IO62) worked as well as GWs in IO81 and IO83 and GM8OEG (IO86) and GM4JYB (IO88). One station, G3WZT was worked on June 23rd with another opening to Italy, Poland, Slovenia and the Slovak republic on June 24th.

The 144MHz Band

It was good to hear from **Andy Morgan GD1MIP** (Isle of Man) who wrote with some details of the **Isle of Man Amateur Radio Society's** experience during the *Practical Wireless* 144MHz QRP contest. They set up by the reservoir in the village of Ballaragh (east coast of IOM) about 200m above sea level. Antennas were a pair of stacked 9-element Yagis, constructed from the remnants of some scrap Tonnas and the rig was an FT-817ND, **Fig. 2**.

Best DX during the contest was F/ON4S but when they got home they found that they had been spotted on the island of Sardinia by IS0SWW (JN40GR). Ah well! Maybe next time!

John Worsnop G4BAO caught an Es opening on June 10th and worked IS0HQJ (JM49). **Panos Dadis SV1GRN** (Athens, Greece) reports that there was 144MHz Es in Greece on July 1st. **Giannis Giannarakis SV1MNE** (Athense, Greece) had 28 QSOs from Kea island to mainland Europe. Giannis'

rig was an FT-817 and a telescopic antenna. Great proof that you just have to be in the right place at the right time!

An exciting E-mail came from **Ron Pincho ZB2D** (Gibraltar). He reports that on July 4th he had been working on 50MHz but checked 144MHz at 1724z. To his surprise he heard EI4DQ calling CQ on Es. Ron quickly QSYed to 144.285MHz where he worked EI4DQ (IO51). EI2DI (IO51), G4LOH (IO70), G7RAU (IO90), G4KWQ (IO92), G4PBP (IO82), G0CUZ (IO82), G4TRA (IO81), G0TKJ (IO93), M0VRL (IO70), G4LOH on f.m. (IO70), 2E0JJR (IO70) and 5C13SG (IM64).

Ron also worked G4LOH on his f.m. set-up of a TM-V71E and a Diamond X-510 dual band antenna with 5/9 plus signals! Again, a great reminder that when conditions are just right – that's all you need – probably a hand-held would have done it!

The 432MHz Band

Jon Joyce GM4JTJ enjoyed the 432MHz contest on June 12th. Unfortunately, his rig developed a tuning problem so he was stuck on one frequency forcing him to call "CQ" rather than tune around for contacts. This resulted in almost 30 contacts from all over the UK and the best DX was G2KF at 687km.

Jon says that he and a number of

other GMs are using converted Dolphin Tetra amplifiers with around 200W output. These are becoming quite widely available through eBay. Jon says that he and **Dave Whitty G4FEV** (Rushden, Northamptonshire) have worked out the modifications necessary and made them available on the web at <http://g4fev.atspace.com/dolphinpa.htm>

Dave G4FEV's webpage is a very interesting single page and there are contributions from others who have modified these amplifiers – including some for bands other than 432MHz. I was interested in this myself as I know the whereabouts of a couple of units! It appears that good cooling is important otherwise some track damage can easily occur. Nevertheless, it looks a good cost efficient way of getting higher power on 432MHz. Thanks for the very interesting information Jon!

Next Month

I plan to bring you some news and results from my Software Defined Radio v.h.f./u.h.f. scanner which has cost a grand total of £13! Results so far have been very encouraging and at that price – why wouldn't you have a go!

Thank you for all the band reports and interesting information – it's very much appreciated. Until next month – 73 and have fun on the bands!



Carl Mason GW0VSW's HF Highlights

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

Carl Receives a Puzzling Question from Australia!

Carl Mason GW0VSW presents his round-up of your activities on the h.f. bands and tries to help an Australian Amateur who needs a question answered.

Welcome to *HF Highlights (HFH)* and I start off by acknowledging that we (the *PW* Editorial team and regular authors) often get requests for information – but one from **Paul Simmonds VK5PAS** has caused a few scratched heads! Paul and six other Amateurs are traveling to Kangaroo Island, South Australia this year for the International Lighthouse & Lightship Weekend (IL&LW) and will be operating from the Cape Willoughby lighthouse.

The island is Australia's third-largest, after Tasmania and Melville Island and lies 112km (70 miles) southwest of Adelaide at the entrance of Gulf St Vincent. Its closest point to the mainland is 13km (8 miles) off Cape Jervis, South Australia.

Paul wrote a short article describing the proposed trip for his local Radio club and produced a *PowerPoint* presentation for its members. As a result of this, while researching the IL&LW he has found quite a bit of contradictory material, particularly the year in which the IL&LW actually started which at this time it is thought to be 1993 or 94. From his research it seems that **Anne-Grete OZ3AE** wrote a letter to *PW* (possibly c. 1994/95*) asking if there was any Amateur Radio activity from lighthouses.

It was due to this letter that the event became international and the name changed from the Northern Lighthouse Activity Weekend to the International Lighthouse & Lightship Weekend. Paul has been unable to find or contact Anne or the issue of *PW* that the letter first appeared in. Various websites, including the **Ayr Amateur Radio Group's** website: <http://gm0ayr.org/> and the IL&LW site <http://illw.net/index.php/illw-history> have conflicting information and dates.

The Ayr ARG site says that it all began in 1993 during a wet wintry evening when two members of the AYR Amateur Radio Group in Scotland, **John Forsyth GM40OU** and the late **Mike Dalrymple GM4SUC** discussed the idea of creating an event for the summer to encourage its club members to get out on a sunny weekend and play radio. Various themes were considered including including ports, airports, historic sites in Scotland, the Firths of Scotland, castles etc. But it was finally decided that the lighthouses of Scotland would be ideal.

Paul VK5PAS would very much like to put the record straight and find out once and for all the 'accurate' details of this event and any that help you can provide will be more than welcome. If you are able to help with information then please let either the *PW* Editor or myself know so we can pass this on to Paul. This year's International Lighthouse & Lightship weekend will take place at 0001UTC August 18th to 2400UTC August 19th for 48 hours (or part thereof) and further details can be found at <http://illw.net/index.php/entrants-list-2012>

Over 285 activations have already signed up and there is still plenty of time for you to be one of them! If you take part please let us know how you got on.

**Tex Swann G1TEX (PW's 'Honorary Archivist') has discovered that the first mention in PW was in the December 1996 issue in Club Spotlight.*

The WAB Awards Group

The **Worked All Britain Awards Group** (WAB) was devised by the late **John Morris G3ABG** in 1969 to promote an interest in Amateur Radio in Britain and to sponsor a series of awards based on the geography of Great Britain and

Northern Ireland. Since its inception – and through the efforts of many individuals – it has grown and aims to create more activity on the air and so create friendships both within this country and abroad.

The WAB aims to improve and expand the geographical knowledge of Great Britain and the program has encouraged many operators to travel to the more remote parts of the country and activate squares. It has also done much to bring about an upsurge in mobile activity on the Amateur bands. The group also strives to help those less fortunate Amateurs and provides when funds allow donations to several organisations such as the **Radio Amateur Invalid & Blind Club** (which now prefers to be referred to just as the RAIBC).

The awards from the WAB are available to both Amateurs and short wave listeners (s.w.l.s). And by far the most popular is the one based on working or activating 10 x 10km grid squares and county boundaries, the WAB Grid Squares Award, which at its basic level requires you to work 300 squares. Further details of the group and all its awards can be found at <http://wab.intermip.net/Introduction.php>

Your Band Reports

On to your band reports next and it seems the band conditions have been rather up and down again this month – although there have been some reasonable openings at times. All the logbooks tell a story and the first is from **Eric Masters G0KRT** in Worcester Park, (Surrey) whose contacts included DL5JS (Germany) 2226 and TM3WQ (France) 2247 on 3.5MHz c.w. while on 7MHz he worked IW2IRP (Italy)

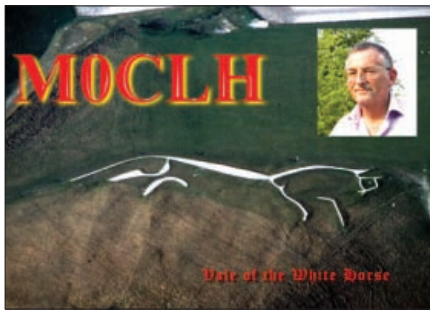


Fig. 1: Terry Martin M0CLH's QSL card

1903 and OM7JG (Slovak republic) at 2220UTC running 5W c.w. from a Kenwood TS-570 and modified W3EDP antenna tuned with an SG-230 Smart Tuner.

In Wantage, (Oxfordshire) **Terry Martin M0CLH (Fig. 1)** has been very active running the 'GQ' call which has proved very popular especially with Japan! His normal log included s.s.b. QSOs with F4ESH (France) 1634, PD0M (Netherlands) 0953, DK9BTX (Germany) 1503 and ON5ALD (Belgium) 1507UTC using an Icom IC-756PRO and home-brew 31m doublet antenna.

Terry says "In the June column you asked for comments on why there is reluctance for Foundation Licence holders to progress through the system. I generally agree with the three-tier licensing structure that we have but the fundamental problem I believe is that too many privileges are given away at this level. This inhibits the desire to progress. Chasing DX in a pile-up with 10W can be depressing and the temptation is to turn up the wick, and this is not just limited to Foundation holders! Policing Amateurs who use powers above their licence conditions is extremely difficult and a possible solution to consider is to limit the Foundation Licence to sub-bands that don't contain typical DX windows for expeditions.

"It then becomes more obvious which licence holders are transgressing their conditions and as a side benefit there may be fewer tendencies to increase power levels. Having tasted communications on the h.f. bands at 10W (which is quite adequate) there is more likely to be an incentive to chase DX and hence rise through the licence levels".

Thanks for your comments Terry. I'm sure there are many of you out there with thoughts on the subject!

The **Chorley & District ARS (www.cadars.co.uk)** in Lancashire has been active once again and its members enjoyed operating as **MX0ISN** from a tent at Astley Hall (**Fig. 2**), a museum and art gallery in Chorley. The station



Fig. 2: The Special Event station MX0ISN, operated at Astley Hall by Mark Procter G1PIE (On the microphone) with Dillon Yakub 2E0DIL logging. Photo courtesy of Terry Wright G0UNK.

comprised a Yaesu FT-920 and 40m dipole at 5.4m (18ft) – which after 45 minutes of use developed a fault which could not be repaired on site – so an alternative G5RV was hastily erected in its place.

Running the Special Event gave some new licence holders their first chance to operate on h.f. and gain some valuable experience even though band conditions were not that great. The station was popular with Inter G forming the main bulk of QSOs though stations in France, Germany and the Netherlands made it into their logbook.

The 14 & 18MHz Bands

On to the 14MHz band next and the log of **Bill Ward 2E0BWX** in Edwinstowe, Nottinghamshire who used PSK31 to work EW8OW (Belarus) 0945, F4CZV (France) 1045, IK5FKB (Italy) 1734, DL2PJ (Germany) 1837, RN1TV (European Russia) 1905, US5LPU (Ukraine) 1915. Then came LA8OOA (Norway) 2028 and JT65HF working DH4YAQ (Germany) 0954, EW1GR (Belarus) 2100UTC using an Icom IC-7400 and 25W to a Pro Whip antenna.

In Portadown, County Armagh (Northern Ireland) **Tom Ruddell 2I0TJR** used his Kenwood TS570DGE and 50W s.s.b. into a home-brew vertical antenna 3.6m (12ft) above ground and worked JT7WFF (Mongolia) 2107 (QSL via RZ0SB) and a new country for Tom, JY4CI (Jordan) at 2126 (QSL via



Fig. 4: The SN2012UEFA QSL card (issued for the European Football Championship) received by Tom Hutton G0HUT for a 14MHz PSK QSO.



Fig. 3: The QSL card sent by CO6LC after he was worked by Tom Ruddell 2I0TJR using 14MHz s.s.b.

K2AX). Then came 6O0CW (Somalia) at 2337 (QSL via IK2CIO), HP1/IQ6CC (Panama) 2339 and VE3PK (Canada) at 2341. He then worked KE4YZ (USA) in Miami, Florida at 2342, CO6LC (**Fig. 3**) (Cuba) NA-015 at 2351 (QSL via EA5GL), and finally KP4BD (Puerto Rico) at 2353UTC (QSL via EA7FTR).

It was *DigiPan2* software and a SignalLink USB interface for **Tom Hutton G0HUT** in Farnborough, Hampshire this month as he used a Yaesu FT-450AT at 30W with a Cobra vertical to work PSK31. He then logged TF3FIN (Iceland) EU-021 at 1008, CS2EPC (Portugal) 1018 (QSL via CT1BWU), EG3EPC (Spain) 1022 (QSL via EB3JT). Then came KP4MP (Puerto Rico) NA-099 at 1047, IN3GNV (Italy) 1113, and SN2012UEFA (**Fig. 4**) (Poland) 1158 (QSL via SP4ICP) and then R9CQ (Asiatic Russia) at 1324UTC.

It's a while since we heard from **Martin Addison 2E0MCA** in Finchley, London as he has been busy "doing other things" for a year or so. However, he decided to get the rig out again this month and used 10W s.s.b. to work LZ2012KM (**Fig. 5**) (Bulgaria) 0602 (QSL via LZ1BJ), EG7CC (Spain) 0722 (QSL via EA7NL), and 7U50ND (Algeria) at 0728, this was a callsign for Algerian Liberation Day (QSL via 7X2DD). Then came HG44FF (Hungary) at 0819 (QSL via HA3AU), and 9A202AA (Croatia) at 0827 (QSL via 9A2AA),



Fig. 5: The QSL card from LZ2012KM. It was a Special Event station activated by a group of members of Bulgarian Federation of Radio Amateurs to celebrate national St. Cyril (Kiril) and Methodius day – creators of the Cyrillic alphabet.

The station was worked by Martin Addison 2E0MCA using 14MHz s.s.b.



Fig. 6. The GB5LCT QSL card issued for John Wakefield's Special Event operations.

TM5FI (France) EU-095 Ratanneau Island at 0857 (QSL via F5XX) and TK/IK4RQJ (Corsica) EU-014 at 0857UTC. Martin was using a Yaesu FT-2000 at 50W and a half size G5RV antenna.

Martin also comments on the Foundation Licence saying "In my experience, Foundation students invariably have a discussion with their instructor along the lines of "What will I be able to work with just 10W?" rather than "What does it matter if I exceed my power?" I think it is important for the instructor to illustrate to new licensees that operating with 10W is an enjoyable challenge rather than a restriction to working DX. I managed 90 DX entities with just 10W in six months from getting my licence until I upgraded to my 2E0 call.

"All contacts were made on a half sized G5RV antenna just 7.6m (25ft) above the ground and not an ideal set-up. It's important to encourage the low powered operators to do exactly what the limitations of the licence are there to promote. That is, learn to operate successfully within the constraints of the licence in order to gain experience and use that to be a better operator later on. If this message is not put across

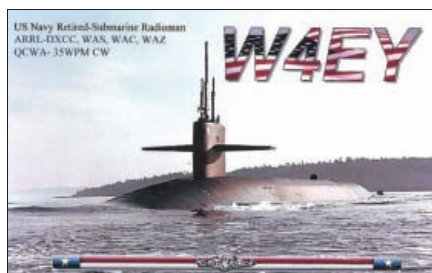


Fig. 9. The QSL card sent by W4EY when he worked Steve Wellon M0SAS on 18MHz using PSK.



Fig. 7: John Wakefield M0XIG's h.f. station for GB5LCT.

properly then it is lost and you will find that there will always be someone that breaks the rules."

Thanks for your reports and feedback Martin – welcome back to PW!

The 21 & 24MHz Bands

The 21MHz band saw another special event operation from **John Wakefield M0XIG** who used the call **GB5LCT** (Fig. 6) for Lamberts Castle Shutter Telegraph near Bridport in Dorset. The converted Mercedes van (Fig. 7) mentioned in a previous column is now the home for his (Fig. 8) Yaesu FT1000MP Mk5, Acom 1000 linear amplifier and provides welcome shelter from the rather adverse weather we have been having lately! Running between 300 and 400W and using either a Butternut HF6V vertical or a WA2NAN G5RV inverted antenna, with the centre at 10.6m (35ft) John logged 1325 contacts of which 322 were c.w. and included 39 USA states.

John's s.s.b. log shows contacts with W6LVW (USA) in Colorado at 1744, 4X4FR/M (Israel) 1808, VE7SOO (Canada) in British Columbia at 1812YO8CP (Romania) at 1821, SV8FEB (Greece) at 1835, and HZ1BH (Saudi Arabia) at 1852. Then came 9H5DX (Malta) EU-023 at 1856, FM5GB (Martinique) NA-107 at 1915, and PY3DXA (Brazil) at 1958, 9K2UU (Kuwait) 2017. Next into the log was TA2TR (Turkey) at 2040, LU2DSQ (Argentina) at 2153 and CT3FW (Madeira Island) AF-014 at 2159 and finally C6AGB (Bahamas) NA-001 at 2215UTC.



Fig. 10. The QSL card sent by ZB3R after he worked Steve Wellon M0SAS on 21MHz using PSK.



Fig. 8: John Wakefield's mobile station.

The 21MHz band was also tried by **George Davis G3ICO** in Yeovil who used his Elecraft K2 at 5W to a doublet antenna finding c.w. stations 6V7S (Senegal) at 1439 (QSL via RK4FF) and ZQ2FK (Gibraltar) at 1945. The he logged VE3CUI (Canada) 2016 and HC8SL (Galapagos Islands) SA-004 at 2105UTC.

Eric G0KRT found the 24MHz band open for a time as OD5NJ (Lebanon) 1535, EI9FN (Ireland) 1845, OM3TWM (Slovak republic) at 1856 and and he logged HB100FLP (Switzerland) at 1922UTC (QSL via HB9OCR). All contacts were s.s.b. running at 100W.

The 28MHz Band

On 28MHz **Dave Fower M0FAZ** in Leek (Staffordshire) popped out to his car parked on his drive and decided to switch on his Yaesu FT-857. It was already on 28MHz and he heard OH6RM (Finland) calling "CQ" on s.s.b. and replied with his call at 2120 with the operator **Touko Kapanen** a steady 5/7 he gave Dave a 5/5 report. It was only after he had finished the QSO that Dave realised he was using the wrong antenna and not his usual ATAS-120! It also looks like Amateur Radio runs in the family as his wife **Clare M3HRN** and son **Adam 2E1HRN** both enjoy the hobby!

Finally, the 5W c.w. of George G3ICO found 9Q6AL (Democratic Republic of the Congo) at 1328 (QSL via DF9TA), PY7RGS (Brazil) at 1947 and ZP6CW (Paraguay) at 2013 (QSL via ZP6CU) and finally P49Y (Aruba) SA-036 at 2020 (QSL via AE6Y).

While the PSK31 of Bill 2E0BWX reached CT4RC (Portugal) at 0923UTC.

Signing Off

Time to sign off! There was a lot to get in the column this time and I hope I've not missed anyone out. As usual my thanks go to all our reporters for their logbooks. Until next time I wish you all good DX. My 73 to you all. Carl GW0VSW.



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Buying Second-hand

In his *Buying Second-hand* column, Chris Lorek G4HCL offers some buying advice for the summer rally season

Right now hopefully we'll be having some fine weather and the thoughts of many readers may be turning towards portable contests, radio rallies and boot sales. And most likely thinking about outdoor antenna work – either for a home station or for portable operation.

I've covered antennas and coaxial cable from a buying second-hand point of view some time ago. So, now it's the time for some, hopefully helpful, advice on equipment to make sure these work correctly, as well as some hints on what to look out for at radio rallies.

My thanks go to the many readers who've contacted me to offer suggestions for this and future columns, I've quite a list here in my office! For the next column in this bi-monthly series I plan to look at second-hand Heathkit h.f. and v.h.f. equipment that's commonly available at bargain (and sometimes not so bargain) prices. I already have a few of these in my own shack!

Antenna Accessories

Amateur Radio enthusiasts often erect a new or second-hand antenna – whether this be a h.f. or v.h.f./u.h.f. type, and sometimes they simply 'hope for the best' that it'll work! This is usually because a v.h.f./u.h.f. vertical collinear is non-adjustable, as are many Yagi antennas.

However, h.f. antennas, typically multi-band types, are very dependent upon ground conditions and are invariably always adjustable to the required band 'centres'.

But in the case of, let's say, h.f. trapped verticals or beams, the aluminium elements may often be corroded, and trying to adjust these could be a challenge! See the feature on buying and using second-hand antennas in the May 2011 issue of *PW* for details of how to overcome this.

Using SWR Meters

Arguably the easiest way of testing an antenna system simply to check if it's



Fig. 1: An s.w.r. meter designed for Amateur Radio use.



Fig. 2: A 'cross needle' type of s.w.r. meter.

okay is to use a standing wave ratio (s.w.r.) meter. Although this may not be the easiest way of adjusting it to resonance! Simply measure the forward power from your transmitter to the antenna and the reflected power back from the antenna that indicates any degree of mismatch.

Meters are commonly calibrated in forward and reverse power levels often combined with an s.w.r. scale. For example 25% reverse power indicates an s.w.r. of 3:1, anything higher than this would suggest that you don't use the antenna at that frequency without an antenna tuning unit (a.t.u.). I'll mention these later.

In practice s.w.r. meters vary from low-cost types, typically manufactured for CB radio use on 27MHz, through to dedicated higher-specification models for Amateur Radio use, Fig. 1. These usually cover the h.f. bands (and perhaps 50 and 144MHz) in one model



Fig. 3: Bird ThruLine meter and elements.



Fig. 4: Bird sensing elements – these are important and Chris G4HCL offers important advice in the article.

and v.h.f and u.h.f. bands in another model.

Above this in terms of cost and performance are professional types such as Bird ThruLine meters, which are physically very tough and built for demanding use – although not necessarily any more accurate than Amateur Radio types.

My personal preference for an s.w.r. meter is, for either a dual meter type, i.e. with separate forward and reverse power meters – or a 'cross-needle' type, Fig. 2, where two meter needles share the same meter scale. This in my opinion is even better. These are the types I use myself both in my Amateur station and professionally.

In fact an overseas police force senior radio communications officer, who saw me using one of my preferred s.w.r. meters – when I had taken it along with me to check their antennas – instantly

asked me to supply some to them with their next radio order!

You may find that decent quality s.w.r. meters aren't often found on the second-hand market, whereas cheap CB meter types often are. The reason for this is that Amateurs usually buy a cheap type, find the limitations of this, then buy a better one and stick with it throughout the years and through different transceivers.

But I often find people may change their interests. For example, by dropping h.f. operation in favour of v.h.f./u.h.f. or vice-versa, their surplus equipment appears on the second-hand market.

Professional Bird Meter

You may very well come across a professional 'Bird ThruLine' meter, maybe at a bargain price, see the accompanying photo, **Fig. 3**. It'll probably last you a lifetime if you do buy one! However, if you're interested, do ensure that it comes with at least one but preferably a selection of plug-in elements, again see the accompanying photo, **Fig. 4**. These are essential to the meter's operation, without a plug-in for the frequency range and power you're interested in, the meter won't work at all.

You may well find that plug-in elements are more expensive than the second-hand meter itself! The frequency range and full-scale meter power is marked on the element itself, and the large 'arrow' on the element shows the direction of power measurement.

To measure the reverse power simply rotate the element to the reverse direction when it's fitted into the meter. You'll then need to work out the s.w.r. yourself, although as I mentioned earlier 25% reverse power is a 3:1 s.w.r., any more than this and you should be worried!

Dedicated Amateur Radio style meters usually have a transmit-power range switch, often in two or three stages. Cross-needle style meters besides having forward and reverse power scales. They often have an additional s.w.r. scale, to be read at the point where the meter needles cross each other. Twin meter type devices, may have an additional s.w.r. scale.

Single meter s.w.r. instruments invariably have a 'forward/reverse' switch together with a rotary sensitivity control. To use these you key your transmitter with the switch set to the 'SWR' position on forward power, and adjust the sensitivity knob for full scale reading. Then switch to 'reverse' and the s.w.r. is indicated on its own scale.

You may come across lower cost dual-meter types, which can in fact be more useful than higher cost single-

meter types, for keeping a constant watch on your antenna s.w.r. This in fact, was the very first type of s.w.r. meter I bought myself, almost 40 years ago as a young teenager, I've replaced the meters themselves just once (many years ago) due to accidental damage but otherwise it's still going strong to this day!

Testing An SWR Meter

Now forgive my scepticism – but if you see a second-hand s.w.r. meter on sale at a rally or boot sale, you may well want to make certain it works, to a fashion at least, before you part with your cash! A 'duff' meter may of course be the very reason for it being on sale in the first place!

Here's a cautionary tale! Again in my teenager days I went along to an Amateur Radio rally, my father driving me there as I was too young to have a driving licence – although my 144MHz transceiver was fitted in his car. I bought a tuneable absorption wave meter from a rally trader, this was a good example of what we needed to have under licence conditions in our station at that time to check for harmonics (I now use a spectrum analyser).

After parting with my cash I went to the car to test it. (Yes, it didn't work!). So back I went to the trader and I received a replacement, which again I tested. You might guess what I found. Yes that one didn't work either! Fortunately it was 'third time lucky' and I eventually left the rally with a working unit. It was a good job as I had an unannounced station inspection the following week!*

A very easy way to test an s.w.r.

meter you're considering buying, is to take along a hand-held rig or transportable transceiver, together with a short coaxial cable patch lead and a small dummy load (see later). Remember to take a couple of coaxial plug/socket adapters also if you need these.

To carry out the test – simply connect up, with your transceiver output fed the 'transmitter' connector on the meter and the dummy load to the 'antenna' connector on the meter. Then press your transceiver's push-to-talk (p.t.t.) and check that the meter's working.

Note, that if your dummy load is a good 50Ω type then you'll get zero reflected power indicated. If you don't have a dummy load just connect the antenna that you've disconnected from your transceiver to the meter's 'antenna' connection instead – here you'll undoubtedly that some reflected power is indicated on the display. Next, reverse the connections to the meter, i.e. antenna or dummy load to the meter's 'transceiver' connector and your transceiver to the meter's 'antenna' connector.

You should then find that the meter works in reverse, indicating what would otherwise be a high reflected power and zero or very low forward power. The reason for doing this is that it tests the meter's function in each direction and you should naturally get similar results in each direction. In other words if you get 5W power one way, reversing the connections in this way should give you around 5W power the other way. **(Those were the days! Editor).*



Fig. 5: A KW107 antenna matching unit – a very popular and 'long lived' unit.



Fig. 6: The rear panel of the KW-107.

Antenna Matching Units/ATUs

Another popular buy, for use with h.f. wire antennas at least, is an antenna matching unit. The KW 'E-Zee' Match is a classic here, matching a balanced load such as a ladder-line fed dipole or a long wire fed against earth, to a 50Ω coaxial cable match to your transceiver. A typical 2012 rally price I saw was £30 – an absolute bargain!

The KW-107 antenna tuner, **Figs. 5 and 6**, was a follow-on to match the KW-2000 line-up and has also been extremely popular over the years. A friend of mine has had his, which he uses with his KW-2000E transceiver, for over 20 years. As with a Bird s.w.r. meter, a KW a.t.u. can often last you a lifetime!

There are many other types available of course. Some are made by Japanese manufacturers to also physically match a given transceiver line-up, others by independent manufacturers.

This type of a.t.u. invariably never go wrong – apart from with misuse. Just watch out for burnt-out band switch contacts where previous users have tried to change the position of this while still transmitting. Variable capacitor and 'roller coaster' coil units – where the coil is continuously tuned, often with a 'turns counter' adjustment knob attached to the coil, are inherently very reliable.

Antenna Analysers

If you're either interested in building antennas, or getting your h.f./50/70 and 144MHz antenna to resonance, possibly a multi-band antenna, then an antenna analyser can save you a lot of time! I'm talking here of something like

several full weekends worth of work coming down to a couple of hours.

Yes, I've struggled in the past getting my h.f. three element tri-bander at the resonance points I wanted. Winding the tower up and down and tilting it over each time!

Likewise I've spent much time with a 'trapped' h.f. vertical, and I could have also spent a lot of time with my latest 1.8, 3.5 and 7MHz h.f. trapped dipole if I hadn't had an antenna analyser to hand. New models do cost rather a lot – but you can often get bargains on the second-hand market, especially on early units such as manually-tuned MFJ Antenna Analysers, **Fig. 7**, when the original owner upgrades to a more modern type.

Even PC-based analysers like the AIM-4170, **Fig. 8**, get 'upgraded' over



Fig. 7: The MFJ type of antenna analysers are often found for sale when the original owner up-grades.

time with new models, such as those covering u.h.f., users then selling their earlier models on the second-hand market. The easiest way to test one of these is – of course – to try it with a known antenna, like a 144MHz 'rubber duck' helical from your hand-held.

Dummy Loads

A final antenna accessory that's often very useful in your shack is a radio frequency (r.f.) dummy load, **Fig. 9**. Using this, you can not only tune up the power amplifier (p.a.) stages in your early second-hand h.f. transmitter without causing any interference on the air. But you can also use it along with a power/s.w.r. meter to check your coaxial cable losses for any impedance mismatch, which may have been caused by water ingress or physical damage.

Additionally, as I've described earlier, a small dummy load is very useful when you're buying a possibly suspect meter! But once you have a meter and a dummy load, you can then use these to check your transmitting equipment on all bands, not just on the bands you have antennas for.

You'll also be able to take your now-trusted meter and dummy load along with you when you're looking for a second-hand transmitter or transceiver. You can then check it's giving the right amount of power out before you part with your money to the seller!

I hope this month's column has given you a few hints and tips for summer rally hunting. I'm always interested in hearing from *PW* readers with suggestions for future buying second-hand equipment models and types of equipment, so please do get in touch!



Fig. 8: A PC-based antenna analyser – the AIM-4170.

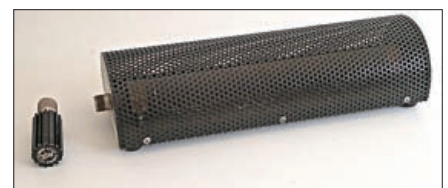


Fig. 9: A dummy load can be a very useful and easy-to-use addition to your test equipment.

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Joining in the Fun With Jamboree On The Air!

Colin Redwood G6MXL believes the Scouts' Jamboree-On-The-Air is a good way of introducing youngsters to Amateur Radio.

This month I'm looking at **Jamboree-On-The-Air (JOTA)**. This is an annual event in which Scouts all over the world speak to each other by means of Amateur Radio contacts under the supervision of Radio Amateurs. This excellent way of introducing young people to Amateur Radio has been running for 55 years (**Fig. 1**).

The JOTA event takes place each year over the third full weekend of October. It starts at 0000 hours local time on the Saturday and concludes 48 hours later at 2400 hours local time on the Sunday.

Each participating station can choose its own operating hours within this period. In practice the scale of JOTA can be anything from a couple of hours in a Scout hall on a Saturday

afternoon to a full scale weekend Scout camp. Logistical arrangements for getting antenna systems up and down in daylight will often dictate the timings.

What Do Scouts Want?

So, you'll probably ask the obvious question, "What do Scouts want out of JOTA? In answering, I think it's important to work with the Scout leaders to understand what the Scouts want out of JOTA. It can be many things – but just watching Radio Amateurs making contacts with other Amateurs is almost certainly what they don't want!

Generally the Scouts will want to talk to people on the air and perhaps have a go at construction or work towards their Communicator Activity badge. In short the Scouts will want to actively

participate in as many aspects of JOTA as they can (**Fig. 2**).

Communicator Activity Badge

The Scout movement has numerous badges to recognise skills acquired and behaviours demonstrated and these are very popular with the Scouts. One of these is the Communicator Activity Badge (**Fig. 3**), which can be a good way of gaining interest in Amateur Radio as it leaves participants with something tangible afterwards.

I think it's well worth researching the requirements of Communicator Activity Badge in advance, as there are three alternatives. Alternative A is focussed on Amateur Radio, Alternative B is centred around Morse or semaphore, whilst Alternative C is based around mobile 'phones and the Internet. Alternatives A and B, as shown in the separate panels, are very suitable for JOTA with help from radio amateurs.

Child Protection

I am sure that the instant reaction of many readers will be concerns over child protection legislation and regulations, etc. This is generally referred to (as already mentioned) as the 'CRB requirement'.

The general guidance from the Scout Association is that the Scout leadership team are responsible for safeguarding and safety of young people. Whether or not members of Amateur Radio clubs have had Criminal Records Bureau (CRB) checks or not, does not impact upon how a Scout event should be run. The Scouts, in common with other organisations that require these checks, will only recognise CRB checks that they have processed.

Planning Effort

For your first JOTA it is well worth putting plenty of effort into planning. This might involve several meetings with Scout leaders, to find out what they would like to get out of JOTA, and to explain what you can do to help.

It's very tempting to get very

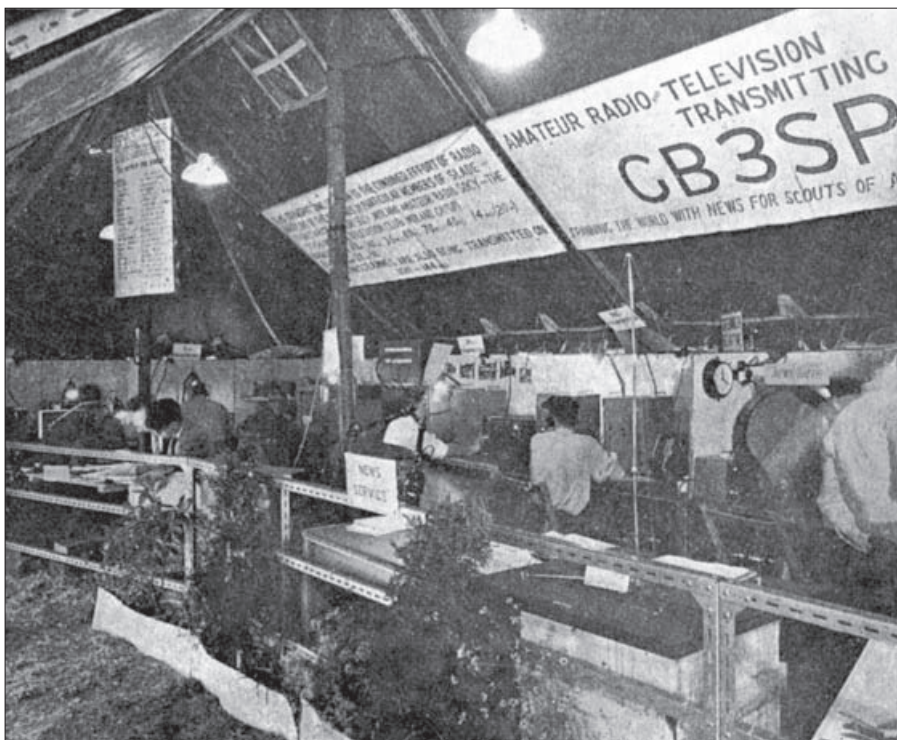


Fig. 1: An early JOTA station (from *Short Wave Magazine* page 358 September 1957).

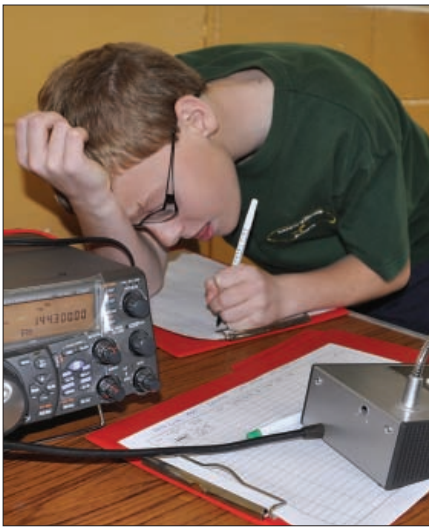


Fig. 2: Peter from the Canford Heath Scouts in Poole logs stations as part of the communicator's badge at JOTA 2010.

This will enable you to get answers to all the questions in plenty of time to post it to Ofcom.

<http://licensing.ofcom.org.uk/binaries/spectrum/amateur-radio/apply-for-a-licence/ofw287.pdf>

Note that the Special Event call sign is a notice of variation to a specific Radio Amateur's Full (Advanced) licence. This means that this Amateur must be on-site at all times when the call sign is being used on the air. Foundation and Intermediate licence holders can assist by supervising receiving stations.

Safety Important

Safety is an important consideration in any Amateur Radio event that involves members of the public. You can't take



Fig. 4: Alex, Kieran and Adam (Canford Heath Scouts) compare their logs of data mode contacts – watched over by Colin Davies G3JII.

ambitious, promising all sorts of wonderful things. However, unless you are 100% sure that you can bring them off, you'll probably do better keeping expectations realistic and perhaps exceeding them, rather than disappoint!

Special Event Callsign

I think it's a good idea to apply for a Special Event call sign. This will make your station stand out and offers the greatest flexibility in being able to operate on more than one band at a time. It also offers the greatest opportunities for Scouts to actually get on the air – although you will still need to keep control of the station.

If you are planning to get a Special Event call sign, you will need to apply for this at least 28 days in advance. I suggest downloading the application form well in advance.



Fig. 3: The Communicators Badge.

any chances with safety, especially when there are lots of adolescent youths with boundless energy and a limited attention spans involved!

Risk Assessment

In addition to your club's standard risk and safety assessment, it is well worth getting input from the Scout leaders. Sharing risk and safety assessments will help to ensure that all risks have been identified and considered.

If the Scouts are going to be involved in construction activities, consider the extra hazards that this raises. With the best will in the world, it would be surprising if – with many youngsters having their first attempts at soldering – that some child's finger didn't get too warm at some point.

So make sure that you have a first

Alternative A – Radio Communications

Log 25 different amateur radio stations, showing date, time, call sign, frequency, readability and location. Some broadcast stations may be included.

Demonstrate how to tune a simple communications receiver.

Give an example of a typical greetings message.

Explain in simple terms how radio waves travel around the world.

Know the more commonly used HF and VHF amateur frequency bands.

Know the phonetic alphabet and define at least eight international Q code signals.

Demonstrate your ability to recognise call signs from the UK and near continent.

Visit an amateur radio station.

Understand the regulations governing the use of amateur radio equipment.

Notes

A Scout who holds or gains the Radio Amateur Licence (Foundation, Intermediate or Full) or the Marine Radio Operator's Certificate of Competence and Authority to Operate or the Flight Radio Telephone Operator's Licence automatically qualifies for this Badge

Alternative B - Communication Codes

Send and receive a short message by Morse code or semaphore at a rate of five words per minute.

When sending and receiving a message, demonstrate that you know the appropriate procedure.

Know the international phonetic alphabet and define at least eight international Q code signals.

Construct a simple Morse code oscillator and send a short message.

aided on-hand prepared to treat minor burns. Many Scout Leaders will be suitably qualified.

Set-Up Early

I think it is a good idea to get set-up before most of the Scouts arrive. Erecting antenna systems and running feeder with youngsters running about is asking for trouble! Setting up takes a lot

of time, and the youngsters will soon get bored if there is nothing to do.

A very short introductory talk can be a good idea. This can cover some of the items required by the Communicator Activity Badge. If your club already runs Foundation and Intermediate licence courses, you may already have some suitable support materials that can be used as a basis for the talk.

Remember that you will need to tailor the talk to the Communicator Activity Badge. Exclude material that is not essential to the Communicator Activity Badge and JOTA – attention spans can be remarkably short and the Scouts will want to get on to the real reason they are there!

Listening Stations

It's also a good idea to have plenty of receiving stations available. For option A of their Communicator Activity Badge the Scouts will need to tune in the receivers and log at least 25 stations. This is something the Scouts can do in pairs or perhaps in groups of three. I would suggest having an adult supervising each receiving station, and who can help the scouts tune in s.s.b. stations and help out with data modes (Fig. 4).

The adult can also help the scouts identify the callsigns of the stations heard and show the Scouts how to work out the country that each station is in. Even simple things that we take for granted like band-plans, knowing when to use lower and upper side band will all be new to the Scouts. Yes this is real hands-on Amateur Radio!

Make sure that you have plenty of log sheets available. Once they have got the idea of logging stations, some of the Scouts will want to carry on logging well beyond the 25 stations they need to log for their badge. You certainly don't want to run out! I would suggest allowing enough sheets for 60 contacts per scout. If you don't use them all, they can keep for another event.

On-Air Greetings Messages

Bear in mind that Scouts aren't as tongue-tied as they used to be! The ubiquitous mobile 'phone means that nearly all scouts are used to communicating by speaking into a microphone (Fig. 5). Nevertheless, a crib card (containing name, troop, hobbies, etc.) can be a useful thing to have so that each Scout is prepared for their turn to send a greetings message.

Bands & Modes

Overall I think the best band for JOTA is 7MHz (40m). A resonant antenna on



Fig. 5: Stephen (Canford Heath Scouts) exchanges a greetings message – without doubt this is one of the highlights of JOTA.

this band will generally give plenty of strong contacts around Europe.

If there are other JOTA stations within range on 144/145MHz, then it can be a good idea to also have a v.h.f. 2m station available. This can help if the h.f. or l.f. bands get noisy or just too crowded with contest stations. The most obvious mode to use on h.f. is s.s.b. voice, although data modes can also be popular.

Blank QSL Cards

For QSL cards, my preference is to use blank cards and get the Scouts to fill out all the details (Fig. 6). This will show them the value of logging contacts, and help reinforce some of the things discussed with them during the day.

Don't forget to lodge some stamped addressed envelopes (s.a.e.s) with the relevant QSL bureau sub-manager so that the Scouts can get their incoming QSL cards. These will help to remind

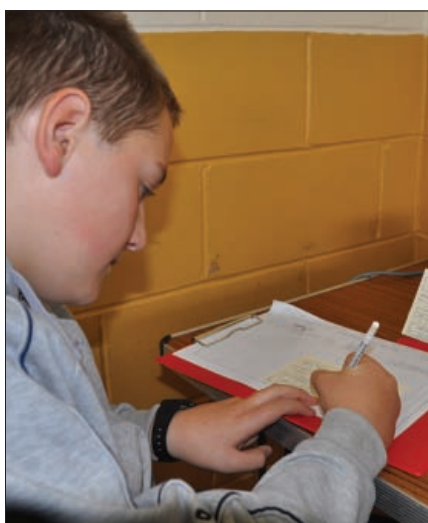


Fig. 6: Having exchanged a greetings message and logged it, David (Canford Heath Scouts) completes a QSL card to be sent to the QSL bureau.

them of JOTA and Amateur Radio, as will their Communicators badges.

Construction Project

A construction project can be a good idea. Not only will the Scouts learn how to solder, but they will get a very basic appreciation of the components they use.

Construction of a Morse oscillator is one of the items in Option B of the Communicator Activity Badge, so this is probably a good choice. Don't try to be too ambitious. Scouts will need plenty of supervision (experience suggests one adult per three or four Scouts) and even more encouragement.

Morse Code

Some Scouts may have a basic appreciation of Morse Code and may welcome the opportunity to send and receive messages using Morse for option B of their Communicator Activity Badge. The crib sheets for the Foundation Licence Morse assessment can be used. Apart from this, I would generally suggest sticking to phone and data mode contacts.

Thinking Day On The Air

Not to be undone by the Scouts, the Guides have a similar event called **Thinking Day on the Air (TDOTA)**, which takes place on the third full weekend of February each year. Readers may wish to offer support to their local Guides for this event.

By covering JOTA in this *What Next?*, I'm hoping that readers interested in helping their local Scouts will have time to make contact with the Scout Leaders and make all the necessary plans in plenty of time for JOTA 2012. This takes place over the weekend of Saturday and Sunday October 20th/21st.

Finally I must thank the Scouts, parents and Scout Leaders of **Canford Heath Scouts**, Poole for their consent to reproduce the photos included in this article, and **Samantha Marks, James Newton** and **Alison de Cort** from the **Scout Association** for their invaluable help in preparing this article.

Note: The Editor has agreed on this occasion to permit publication of partially identified Scouts in this article (surnames omitted). The normal policy of *PW* is to only publish full names and callsigns. However, to re-assure individuals who are concerned about their security – including Amateurs who are 'Details Withheld' in the callsign databases – no personal details whatsoever will appear in *PW* unless permission to publish is specifically provided.

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Harry Found That "The Answer Came Between Dreams"

This month Harry Leeming G3LLL discusses problems with older rigs and mentions that a good sleep can sometimes help find that difficult fault!

Welcome to *In The Shop (ITS)* where I look back at my busy days selling and repairing Amateur Radio and other electronic equipment in the north west of England. And I start by remembering when 'Joe' E-mailed me about his FT-101E.

Joe told me that as he was cleaning his rig, he decided to remove the 'plug in' radio frequency (r.f.) board. He had disconnected the mains supply, but when he re-inserted the board he heard a strange click which he took to be an

electrical discharge. He could see no reason for this, but when he fired it up, he could hardly get any output at all on most bands. On 7MHz (40m) he could still obtain about 50W, but the pre-selector peaked considerably wide of the correct setting. "What have I done?" he asked me.

Well, I was pleased he had E-mailed, because it was an interesting problem although I had no quick answer. But strangely – I woke up in the night and it 'clicked'! Near to the r.f. board on all the

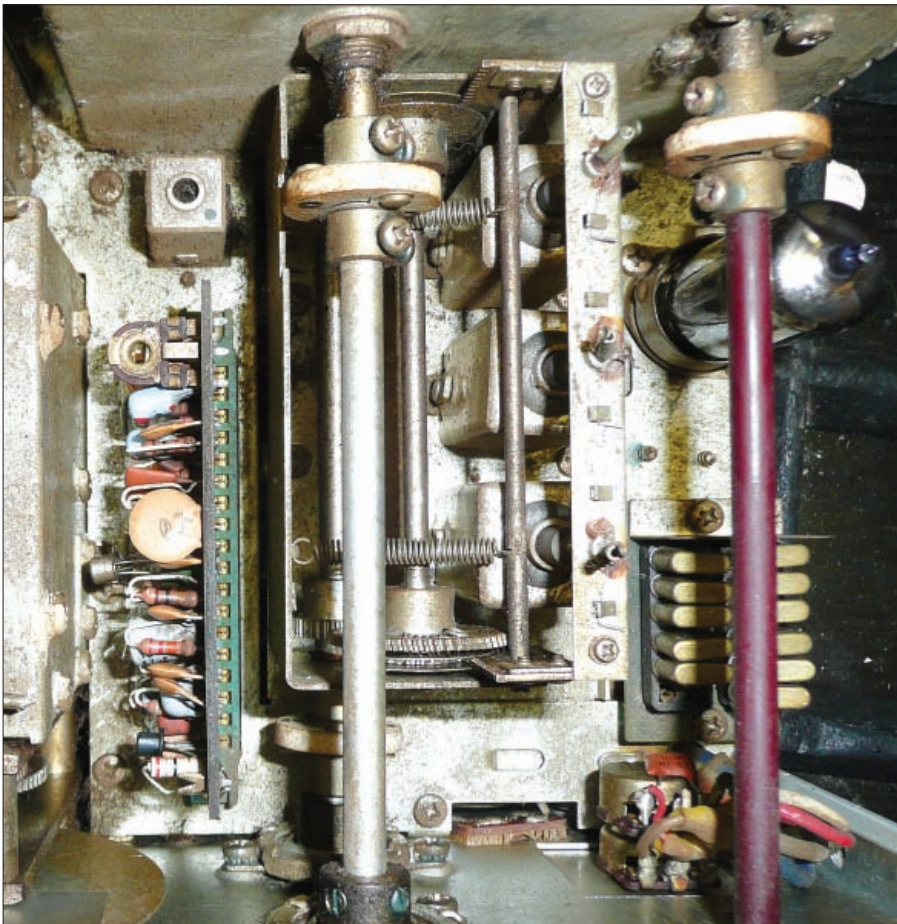


Fig. 1: A very old and grubby FT-101, without the 'plug in' radio frequency (r.f.) board. When 'Joe' decided to clean and replace the board, he caused a fault with the tuning of his FT-101E.

FT-101s, the FT-101ZD and the FT-901 series are the coils, cores, and gearing of the pre-selector tuner. See picture of very old and grubby FT-101 in Fig. 1.

I suspected that as Joe had fitted the r.f. board he had accidentally pushed down on the top of the tuner, and had caused it to 'jump a tooth' on the gearing, this being the noise that he thought was a discharge. Sure enough, when Joe straightened up the tuning mechanism and reset the cores, his rig gave full output! That was one to remember!

Too Much Drive

'Peter' decided to align his FT-101B, and while the rig was somewhat improved on several bands, it became very touchy on 7MHz. There seemed too much drive, and at some settings of the pre-selector (and anode tuning) it would burst into oscillation sending the power amplifier (p.a.) meter to full scale. It seemed as though the neutralisation was out of adjustment and yet on all other bands it was perfectly okay.

To understand this fault we have to look into the design of the Yaesu FT-101. When the rig is transmitting on 7MHz the 3.18MHz s.s.b. or c.w. signal is mixed with the variable frequency oscillator (v.f.o.) to generate a signal in the range of 5.52 to 6.02MHz in the band-pass intermediate frequency (i.f.) unit. On the r.f. board this is then mixed with 13.02MHz crystal oscillator to provide a difference frequency of between 7.5 down to 7MHz.

When the rig is transmitting on (let's say) 7.1MHz, the output of the transmit mixer stage contains not just the wanted frequency, but also the crystal frequency of 13.02MHz and the i.f. frequency of 5.92MHz. The crystal's output is easily rejected by the driver and p.a. tuned circuits, but if you don't tune up and load accurately, or the rig is a fraction out of alignment, quite a strong signal at 5.92MHz can be radiated.

In addition to the FT-101, the same i.f. and v.f.o. frequencies are used in a few other early Yaesu rigs such as the FT-DX560, FT-DX401, and FT-DX500.

'Jack', one of my customers, received a letter from 'the powers that be' advising him that when he was on 7MHz, a spurious transmission had been heard around 6MHz, and that he should immediately cease radiating in this band. So, he brought his FT-560 to me which I noted was slightly out of alignment.

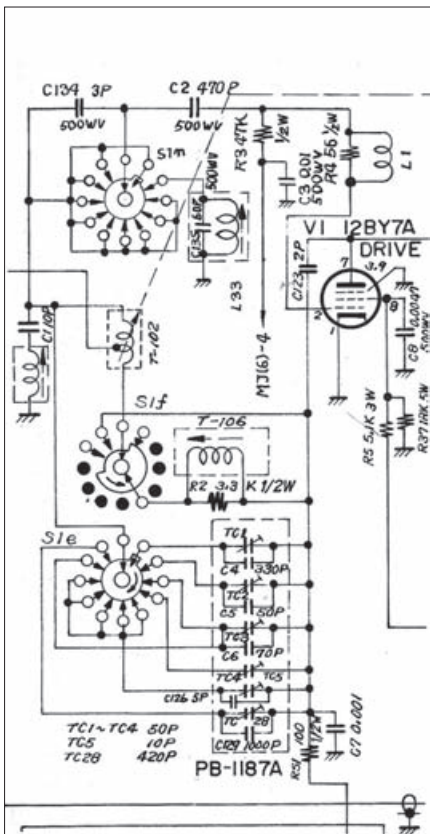


Fig. 2: The inductor L33 (left and above V1) was added in the FT-101 MK2 the FT-101B and the FT-101E, which is only switched into circuit on 7MHz, and is peaked in the centre of the band to reduce the strength of any inadvertent out of band radiation.

I found that when the pre-selector was peaked on receive, the driver stage was tuned lower in frequency (so emphasising the unwanted output). Jack also told me that he normally fed his rig straight into a 7MHz dipole, as the s.w.r. was low.

I peaked up the alignment, but advised 'Jack' that even when the s.w.r. is low, it isn't always such a good idea to feed a dipole directly. Jack took his rig home, put his antenna tuning unit (a.t.u.) back in circuit and was careful to correctly tune the pre-selector and the p.a. circuit. Thankfully he never had any more complaints.

Incidentally, an a.t.u. doesn't just match the rig to the antenna feeder, it also provides an additional tuned circuit. This helps to reject any out of band spurious radiation and (especially with the modern rigs which have broad band front ends) also 'cleans' up the receiver.

At my previous QTH I had a full size 14MHz delta loop, and on 20m when I switched my FC-902 tuner from 'Straight Through', to the 14MHz setting of the band switch the reduction in cross modulation and general background noise was quite dramatic when using an FT-757. So, a properly resonated a.t.u. is always worth having in circuit.

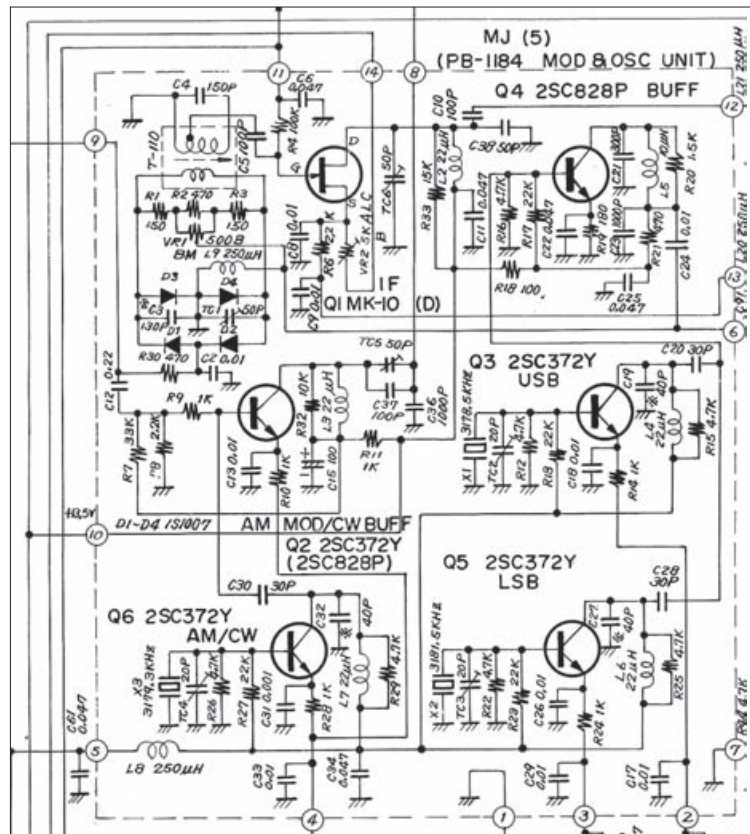


Fig. 3: A simple diode probe or an oscilloscope may be used to check the double sideband output from pin 12 of the s.s.b. modulator unit PB1184. This should peak at around 1 to 2V, when the rig is in good 'health'.

Back To The FT-101

Although the output of the early Yaesu rigs was fairly 'clean' if they were correctly aligned and used with an a.t.u., it's possible that 'Jack' wasn't the only Radio Amateur who had received a complaint from the authorities, because in the FT-101 MK2 the FT-101B and the FT-101E, the inductor L33 was added (see Fig. 2). This tuned circuit is only switched into circuit on 7MHz, and is peaked in the centre of the band to reduce the strength of any inadvertent out of band radiation.

Like many medical 'cures' however, the 'remedy' can have side effects. For example, if it's a little out of alignment the tuned circuit can cause a phase shift which upsets the neutralisation on 7MHz, hence Peter's problem. The answer to the stability problem is to peak L33 for maximum drive in the centre of the 40m band, and then if necessary to de-tune it just a fraction so that the rig tunes up without having any tendency to oscillation.

Back To The 'Scrap' FT-101B

Last time, I mentioned an FT-101B that I was trying to resurrect after it had suffered from years of neglect in the corner of a garage. Once I had cleaned up the switches controls and relays it worked in 'a sort of' fashion, but as it was very 'deaf' on receive and short of drive on transmit – I decided to go through it stage-by-stage.

The first check was the voltages and on the 13.5V rail it was only 12V and the

hum level on the speaker seem rather higher than normal. **Note:** The 13.5V line is obtained from two 10.5V taps on the mains transformer and a full wave rectifier. Investigation soon established that one of the rectifier diodes wasn't connected, as the track on the printed circuit board (p.c.b.) had melted.

Melting 'or' 'fusing' of p.c.b. tracks is quite a common fault on the FT-101 and usually happens when someone manages to short out the pilot lamps while they're swapping a bulb. Once I had soldered a links across the missing track, the hum disappeared and the voltage was back to normal.

The next check was on the stabilised 6V line for the v.f.o., it was just below 6V. This voltage is set by a potentiometer on the regulator unit and strangely, as with many of Yaesu's marked voltages, it should **not** be set as listed in the manual. All the later production FT-101s came through with the '6V' line set a 6.5V, and as they perform better at this setting, I always set them to 6.5V.

The rig would now give a fair amount of power in the c.w. mode on some bands, but there was very little on s.s.b. So, it was time for a serious attempt at alignment

A very useful quick check (On all the FT-101s from the MK 2 onwards) of the alignment of the modulator unit, PB1184, is to switch the heaters off, press the push-to-talk (p.t.t.) and whistle into the microphone. A simple diode probe or an oscilloscope should then be used to check the double sideband output

from pin 12 of the s.s.b. modulator unit PB1184 (Fig. 3). This should peak at around 1 to 2V but in this case it was very low.

To align the modulator unit requires that a steady tone from an audio generator be applied to the microphone socket, but I decided to cheat. I turned the s.s.b. carrier balance control to one end of its travel (this unbalanced the carrier) and in the transmit mode resulted in enough drive to give a few Watts output from the p.a. stage. I then tried peaking up T110.

Most Yaesu tuning slugs are sealed with wax and need to be set by a proper hexagonal trimming tool. **Note:** Don't try to make the adjustment without the correct tool or you will break the core. Before inserting the trimming tool I first melted the wax by wrapping a length of 20s.w.g. wire wrapped round a soldering iron and inserted it into the core.

The core then turned easily, and I was able to peak it, and gain considerably more output. Many coils (like T110) have two points where the core peaks, 'half in and half out'. So, as the rig had obviously been 'got at' I tried the other peak which gave even more output, but still not enough.

My next stop was C6 which peaked (but not very sharply) and only when set at maximum capacity. This type of trimmer rotates 360° (see Fig. 4), and this tended to indicate that the circuit was never reaching resonance. Possibly because the coil had been effected by poor storage conditions, or the trimmer had lost some capacity. I soldered a 10pF capacitor in parallel with the trimmer, which then peaked sharply just before maximum capacity.

A quick whistle into the microphone then produced 1.5V of r.f. on pin 6. So, after re-setting the balance control for minimum carrier and peaking TC5 in the c.w. mode, it was on to the next stage. This meant putting it back in a corner to wait, while I typed up *In The Shop!*

A New Length Of Coaxial Cable

After the initial excitement of legal CB using frequency modulation (f.m.) was over, I gave up trying to sell dedicated CB equipment. But obviously I was only too happy to part CB operators from their cash when they required accessories such as coaxial cable and PL259 plugs.

'Patrick' was suffering from poor signals and a high s.w.r. on his CB rig, and so he came in for a new length of RG213 coaxial cable. Two days later he was back complaining that the 20 metre length of cable I had sold him was faulty. Previously the s.w.r., had been

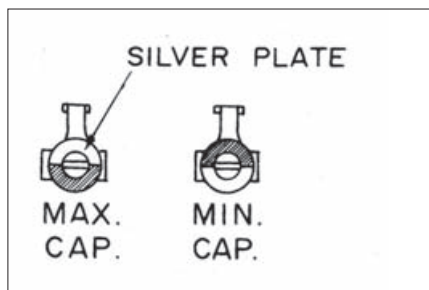


Fig. 4: The setting capacitor, C6 (on PB1184) is a ceramic trimmer version that may have altered value. After being unable to find a resonance point, Harry had to wire a fixed value capacitor in parallel to provide a cure.

2.5 to 1. But with the new coaxial cable it was 5 to 1, he wanted his money back.

Trying to explain things to people who don't have a knowledge of the subject is rather difficult (I still can't understand Stephen Hawkins book on Time!) and Patrick was very doubtful when after checking the cable with a meter, I assured him that there was nothing wrong with it.

I suggested that he attach a dummy load to the far end of the cable in place of his antenna and see what the results were then. He reluctantly did this, returned puzzled, and confirmed that when he put his dummy load on the end of the coaxial cable, the s.w.r. was one-to-one. But why had the new coaxial cable made the s.w.r. worse when used with his antenna?

An s.w.r. meter, such as the simple one shown in Fig 5, indicates two things; the power going forward towards the antenna is shown on the left hand meter, and the power that has not been radiated is shown coming back from the antenna on the right hand meter. If the antenna is faulty, or miles off resonance, most of the power will be reflected, and the meter on the right will then read almost as much as the one on the left, indicating a high s.w.r.

If however, a faulty antenna is connected by a length coaxial that's

of poor quality, or coaxial cable that has been damaged by the ingress of water, a large portion of the power that is reflected from the antenna will be lost on the 'return journey'. So it will not indicate on the meter. This gives a false impression of low s.w.r., and as 'Patrick' discovered, it is only when you replace the cable with something of better quality, that you get a true reading of the actual s.w.r.. Patrick lived not far from our shop in Blackburn – so he was advised to carefully examine his antenna for water. You may ask why did I suggest this?

During the first half of the 20th century, Blackburn was the largest cotton weaving town in the world, it attracted the cotton industry because of the damp atmosphere, which helps to stop the threads of cotton breaking, (and also its proximity to plentiful supplies of coal). As we were taught at school, the clouds come in from the west, rise to go over the Pennine range, and in the process dump their load of water over Blackburn and East Lancashire.

Patrick found that his antenna junction box was wet and corroded. However, a good clean up and dry out resulted in a low s.w.r., improved signals, and a happy customer.

Of course, now I have moved to the seaside I don't get quite as much rain. Instead, we get sea mists and a salt laden atmosphere attacking my antenna systems. We can't win! See you next month. Harry.

Problems

I like to hear about problems with older equipment, particularly pre-1990 Yaesu rigs. Please E-mail me, (add some radio related term in the subject heading, to differentiate against spam), or write and enclose a stamped addressed envelope. Remember that electricity is dangerous, if you are not familiar with safety precautions you must never work on your equipment whilst it is plugged into the mains. (Switching off at the wall socket does not necessarily make equipment safe.



Fig. 5: A simple two-meter s.w.r. meter, indicates the power going forward towards the antenna on the left hand meter, and the reflected power from the antenna on the right hand meter, which is scaled in s.w.r.

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!



Help us protect the future of Amateur Radio

Please donate online at

www.rsgb.org/defencefund

You can also donate by post by sending a cheque payable to 'The Spectrum Defence Fund' and sending it to: Spectrum Defence, RSGB, 3 Abbey Court, Fraser Road, Priory Business Park, Bedford, MK443WH. The 'Spectrum Defence Fund' is a secure and independently audited fund, the proceeds of which will only be used in defence of the radio spectrum.



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Sunday 2nd September Telford Hamfest 2012

Enginuity Centre, Coalbrookdale, Telford, TF8 7DU
 Entry £3.00 Doors open 10:30

Lecture Track: Stuart Wisher G8CYW (winner of the RSGB Ostermeyer and G3BNL trophies) on

Adventures In Optical Communications

Come and join Stuart in the conference room to discuss the practicalities of operating with optical communications

Bring and Buy **Flea Market**
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Ironbridge Gorge **Traders**
On Site Catering **Local Walks**

Visitors, Traders, Flea Market, Info: Martyn 01952 255416 or Jim 01952 684173

Talk-in: GB4THF on S22, through GB3TF on 433.200



Rallies

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

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

JULY

August 10th

The 19th Mini Rally Night

The Cockenzie and Port Seton Amateur Radio Club 19th Annual Mini Rally Night will be held in the main hall at Port Seton Community Centre, South Seton Park, Port Seton, Prestonpans EH32 0BQ. It's an opportunity to bring along your own junk and sell it yourself. The event runs between 6.30pm and 9.30pm and admission costs £2.00, tables will be available on a first come first served basis.

<http://cpsarc.com>

August 12th

The Flight Refuelling Hamfest*

The Flight Refuelling Amateur Radio Society Hamfest will be held at the Cobham Sports and Social Club Ground, Merley, Nr. Wimborne, Dorset BH21 3DA. The doors will open at 10.00am and admission will cost £3.50 (under 14s are free). There will be talk-in on S22, car parking, trade stands, a car boot sale, a licensed bar and catering will be available.

Mike M0MJS

Tel: 01202 883479

E-mail: hamfest@frars.org.uk

www.frars.org.uk

August 17th/18th

15th International EME Conference

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

www.eme2012.com

August 19th

The Rugby Rally

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

Tony G0OLS

Tel: 07759 684411

E-mail: rally@rugbyats.co.uk

www.rugbyats.co.uk

August 26th

The Milton Keynes Rally

The Milton Keynes Amateur Radio Society Rally will be held at Bletchley Park, Sherwood Drive, Bletchley, Milton Keynes MK3 6EB. The doors will open at 9.30am and admission will cost £2.00 (under 14s cost 50p).

Please note there is no on site car parking available for the rally. However, limited on street parking is available locally and there is a multi-storey car park at Bletchley Station. There will be trade stands, a car boot sale, special interest groups, an RSGB bookstall and catering will be available. Why not make this a family day and visit the Bletchley Park Museum too?

www.mkars.org.uk/mkars/rally

August 27th

The Huntingdonshire Rally

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

Clive Burchell G3NKG

Tel: 01480 810473

E-mail:

clive.burchell@btinternet.com

SEPTEMBER

September 2nd

The Andover Rally

The Andover Radio Amateur Club will be holding their autumn Radio and Computer Boot Sale at Wildhern Village Hall, just north of Andover on Grid reference SU350510, post code SP11 0JE. The doors will open at 10.00am and admission will cost £1.50. Indoor tables cost £8.00, outdoor pitches cost £6.00 and sellers will have access to the site from 9.00am. Refreshments will be available and there will be facilities for the disabled.

David G4YVM

Tel: 07749 199453

E-mail: aracsec@hotmail.co.uk

www.arac.org.uk

September 2nd

The Telford Hamfest*

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

Martyn G3UKV

Tel: 01952 255416

www.telfordhamfest.co.uk

September 9th

The Friskney Rally

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

Bren 2E0BDS

Tel: 01754 820060

Ian Donnelly 2E0XOD

Tel: 07554 362020

E-mail: felcc@btinternet.com

www.felcc.com

September 9th

The Great Muckleburgh Car Boot Sale

The North Norfolk Amateur Radio Group Great Muckleburgh Car Boot Sale will be held at the Muckleburgh Military Collection, Weybourne, Norfolk NR25 7EG. The car boot sale will open between 10.00am and 4.00pm and traders will have access to pitches from 7.00am. Pitches cost £6.00 if booked in advance and £7.00 on the day. In addition to the car boot sale, the North Norfolk Amateur Radio Group Radio Hut will be open between 10.00am and 5.00pm (with last admission at 4.00pm) and entry will be free.

www.gb2mc.com

September 15th/16th

Transmission 2012

A newly formed group, the Central Radio Amateur Circle (CRAC), has volunteered to run Transmission – an annual contest and fundraising event for the British Wireless for the Blind Fund (BWFB). All money raised will go direct to the BWFB and will help to purchase specially adapted receivers for people living with sight loss.

Martin Hallard G1TYV

E-mail: radio-circle@live.co.uk

www.blind.org.uk

September 15th/16th

The AMSAT-UK Space Colloquium

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

www.uk.amsat.org

September 16th

The Torbay Communications Fair

The Torbay Annual Communications Fair will be held at Newton Abbot Racecourse, Newton Abbot, Devon TQ12 3AF. The doors will open at 10.00am (9.30am for the disabled) and admission will cost £2.00. There will be trade stands, a Bring & Buy, an RSGB bookstall, catering and facilities for the disabled.

Mike Dixon

Tel: 01803 557941

E-mail: rally@tars.org.uk

September 22nd

The Fog on the Tyne Rally

The Angel of the North Amateur Radio Club and the South Tyneside Amateur Radio Society will be holding The Fog on the Tyne Rally at the Whitehall Road Methodist Church

Hall, Bensham, Gateshead NE8 4LH. The doors will open at 10.30am and admission will cost £1.50. There will be trade stands and catering will be available.

Nancy Bone G7UUR

Tel: 01914 770036 (Evenings)

E-mail:

nancybone2001@yahoo.co.uk

www.anarc.net

September 23rd

The Great Northern Hamfest

The 22nd Great Northern Hamfest will be held at the Barnsley Premier Leisure Complex, Queens Ground, Queens Road, Barnsley, South Yorkshire S71 1AN. The doors will be open between 10.30am and 3.00pm and admission will cost £3.00. There will be trade stands, special interest groups, an RSGB bookstall, family attractions, a licensed bar, catering and facilities for the disabled.

Ernie G4LUE

Tel: 01226 716339

www.greatnorthernhamfest.co.uk

September 28th/29th

The National Hamfest*

The National Hamfest, organised by the RSGB in association with the Lincoln Short Wave Club, will be held at the George Stephenson Pavilion, Newark and Nottinghamshire Showground, Lincoln Road, Winthorpe, Newark NG24 2NY. The doors to the main hall will be open between 10.00am and 4.00pm on both days and the outside display area will open at 9.30am. There will be free parking, trade stands, a Bring & Buy, a flea market, special interest groups, catering and facilities for the disabled. In addition, there will be a range of RSGB stalls and Morse proficiency tests will be available on demand.

www.nationalhamfest.org.uk

OCTOBER

October 6th/7th

BATC Convention

The British Amateur Television Club (BATC) Convention will be held at the Everest Community Academy, Oxford Way, Basingstoke RG24 9UP. The doors will open at noon on Saturday 6th and the programme of lectures will commence at 1.30pm. On Sunday 7th, the event runs from 10.00am to 4.00pm, with the BiAGM taking scheduled for 11.00am. Online registration for the convention costs £10.00 for the two days or £7.50 per day on the door, with a 20 per cent discount for BATC members. In addition to the programme of lectures and BATC BiAGM, there will be trade stands, a Bring & Buy, special interest groups and a test and fix area.

www.batc.org.uk/club_stuff/convention/index.html

October 7th

The Autumn Hangar Sale

The Autumn Militaria, Electronics and Radio Amateur Hangar Sale will be held at the Hack Green Secret Nuclear Bunker, Nantwich, Cheshire CW5 8AL. The doors will open at 10.00am and admission will cost £2.50. There will be civil, military and vintage radio equipment plus vehicle spares and more.

Rod Siebert

Tel: 01270 623353

E-mail: coldwatr@hackgreen.co.uk

www.hackgreen.co.uk

October 7th

The Blackwood Rally

The Blackwood and District Amateur Radio Society Rally will be held at Coleg Gwent, Risca Road, Cross Keys NP11 7ZA. The doors will open at 10.00am and admission will cost £2.00. There will be talk-in on V44 (S22), car parking, trade stands, a Bring & Buy, special interest groups, catering and a prize draw.

Dave GW4HBK

Tel: 01495 228516

E-mail: gw4hbk@talktalk.net

www.gw6gw.co.uk

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, 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.hornsearc.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 21st

The Galashiels Rally

The Galashiels and District Amateur

Radio Society Rally will be held at the 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 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 EX22 6JD.

Roger Williams

Tel: 07773 983691

E-mail: gsowter@talktalk.net

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

News

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Graham Hankins G8EMX's In Vision

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BBC's 'High Definition' Results

Graham Hankins G8EMX has some interesting comments about the BBC's 'professional' high definition TV service and make a promise he's unlikely to keep as an ATV enthusiast!

Welcome to world of Amateur Radio *In Vision (IV)* where I report on Amateur TV (ATV) but start by commenting on 'professional' high definition TV (HDTV). Indeed, I might never watch BBC1 again! Although I have had an 'High Definition (HD) Ready' TV for some time, a 'top of the range' HD receiver and a 'gold-plated' – so I'm told – £60 HDMI (High Def. Multimedia Interface) connection cable, my usual viewing has been in Standard Definition!

Perhaps (you may ask) I wanted to keep HD as a fresh novelty, or was saving the HD experience for a special occasion? Well, that 'special occasion' came with the Jubilee celebrations. But initially I was questioning – was it all in HD?

Back in the days of analogue TV and PAL (Phase Alternation Line) colour decoding, although the process was not perfect and 'colour fringing' and 'cross colour' occurred, the question broadcasters asked was "Will the average viewer notice"? Probably not – but some of us are not 'average viewers'!

On the morning of the Thames Pageant I was switching between BBC1 and BBC1HD. The BBC Breakfast studio presenters looked fine in HD – you could count the stitches in his suit, the links in her necklace. Not so, it seemed to me, some of the Outside Broadcast (OB) shots: the presenter on the riverside, or the shots of boats on the Thames.

Was I doing something wrong – or were some of the OBs not in HD? And the quality of the normal Standard Definition channels seems to be lower than when I watched them as analogue services. Has the digital version of Standard Definition been downgraded to accommodate the bandwidth or bit rate needed for the HD services? I can suspect this – but I'll probably never know!

Vintage 405 Line

Godfrey Manning G4GLM writes to ask about a long-promised, but yet to

materialise vintage 405 line transmission saying: "Unfortunately, I'm not known for ATV. However, they keep promising to transmit a heritage 405-line broadcast locally. The original plan was for low power on Band I Channel 1 from Alexandra Palace – ah, just like the old days!"

"So off I went and, at some expense, obtained one of the last dual-standard TV receivers. I made a dipole according to the dimensions in some ancient TV fault-finding guide, and even went to the trouble of obtaining a specialised 405-line modulator to prove that things were working. Then the necessary licensing permission fell through!"

Godfrey continues: "Currently, there's a further plan to transmit on an intermediate channel from another local high spot, Bentley Priory. I've checked that my receiver's bandwidth is sufficiently wide, as not to reject the off-channel transmission. However, when I ask how they're doing in arranging a schedule, all I get is that it might appear on some website at some point in the future.

"I might be their only viewer, so I'd hoped that they could at least send me a triumphal E-mail once all is set fair! You know what they say in broadcasting? Two's company and three's an audience!"

Thanks for your E-mail Godfrey! The last I heard, BATC committee member **Paul Marshall** is the man to ask about this. You can E-mail him at: publications@batc.org.uk

Great ATV Magazine

It's a great ATV magazine but what about the hobby? Discuss! The British Amateur TV Club's (BATC) quarterly magazine *CQ-TV* is, without question, superbly printed and produced – that must be 'beyond reasonable doubt' to anyone who sees it. It's A4-sized, with glossy colour photos on each side of the front and rear covers, thick shiny pages within and several very interesting articles.

When I was actually on the club's committee, many years ago, I remember its chairman, then, as now, **Trevor Brown G8CJS**, actually stating that *CQ-TV* was something "about which the club could shine". Well Trev, *CQ-TV* is indeed in tip-top condition. So why do I express concern about ATV itself?

In the June *CQ-TV*, BATC Contest Manager **Dave Crump G8GKQ** reports that he received not a single entry for the March repeater contest. Further in the magazine, **Ian Pawson** (a previous editor but no callsign quoted) writes: "A few years ago, the main benefits of joining the club were the annual convention and the ... (quarterly) magazine. Well we all know what happened to conventions – a lack of interest killed them off".

Could it also have been cost of venue hire?. If so, then move to a relatively small venue Ian! But the most worrying news is that the long-term future of the very first ATV repeater in the UK, GB3GV (Leicestershire), is now under review by its Repeater Group.

A falling membership, loss of income and lack of use have all contributed to make this necessary. **Dave Payne G8OBP** has been its keeper for over 25 years and now, understandably, wants to 'retire'. The one bit of good news for 'GV' is that **Nigel Swann M1NAS**, the repeater's current Engineering Manager, will take over. But that old adage 'use or lose' seems only too appropriate.

Before BATC members accuse me of being 'selectively negative', let's give a warm 'welcome back' to ATV repeater GB3HV (ex High Wycombe) Site rental costs meant that this repeater had to be taken off-air to seek a new location, and that, as I recall, was some years ago. It is to be installed at Woodcote, 13 km north of Reading and will receive Digital ATV (DATV) on 437MHz plus 1248MHz f.m. analogue (Hurrah – analogue is NOT dead!) and DATV.

At the moment, output will not be radiated until an application for 1308MHz has been approved. Meanwhile, the 'HV' output can be seen via the web at: www.batc.tv

Members will have the chance to voice their views of *CQ-TV* and the hobby in general, at the BATC's 2012 Convention and Biennial (that's every two years) General Meeting. This will be at Basingstoke on October 6th and 7th and on-line registration is now open:

www.batc.org.uk CU there perhaps? ●

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Maycom	AH-27	80 channel hand held cb.....	£49
Icom	IC-746	hf 6m 2m all mode base +atu.....	£699
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Yaesu	FC-20	£129
Yaesu	FRV-770 A	118-130, 130-140, 140-150MHz Converter for FRG-7700/8800.....	£59
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Icom	ic-7200	HF & 6m All Mode Base Transceiver + DSP & Gen.Cov. RX 12V.....	£629
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GMOS	70520	12V +/- & 5V PSU.....	£19
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Icom	IC-E2820	2m, 70cm FM Mobile Transceiver 50W, 35W DTMF mic + Remote Head, "D-Star" Ready.....	£399
Icom	IC-7000	HF, 6m, 2m, 70cm All Mode Transceiver + Gen.Cov.RX, DSP filters 12V DC.....	£1069
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ICOM	PW-1 HF / 6m 1KW Linear Amplifier.....	£3,750
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Kenwood	TS-2000X HF/6m/2m/70cm & 23cm Transceiver.....	£1,425
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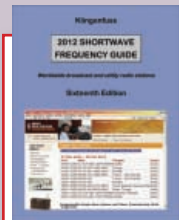
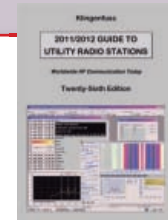

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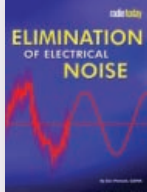
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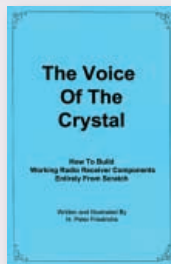
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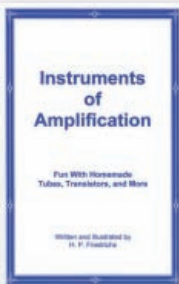
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Rob Mannion G3XFD/EI5IW's

Topical Talk

The Editor discusses topical points from this month's letters and mentions the support he's received from readers who reacted to the August *Keylines*.

As usual there were some most interesting E-mails published in *Letters* this month and several particularly interested me! For example, the gasometer interference mentioned by **Les Potter 2E0LAI** from Wakefield in Yorkshire can still be a problem in certain areas. However, I remember a trip back by train from the Emley Moor transmitter (my colleagues and I had left our IBA vehicles at the transmitter) and caught the train back to London on our way back home for the weekend.

Getting on to the train at Wakefield Westgate, we ended up chatting to the late **Sir Jimmy Saville** who was also travelling to London. It wasn't the first time I'd met someone from Jimmy's family because I had met his brother, who was a Chief Petty Officer in the Royal Navy. Small world isn't it?

On the way south Jimmy Saville (he'd not received his Knighthood then) expressed an interest in the work carried out by the **Independent Broadcasting Authority** (IBA) and mentioned that he had TV reception problems in one of his flats – caused by a gasometer. In those days he also had a Mercedes *Cotswold* motor caravan (a truly beautiful coach-built vehicle assembled on a medium sized Mercedes lorry chassis – and quite a rarity nowadays) and he liked to choose a parking site where TV reception was good. There were advantages in having a mobile home! I've never forgotten the meeting with Jimmy and I wonder if his Mercedes *Cotswold* motor caravan is still on the road (he

owned several in succession).

Another TV reception problem I've come across in various locations around the UK involved 'tidal fading' where the incoming and outgoing tides caused signal addition and subtraction of the 'direct ray and reflected ray' when the sea was visible between the transmitting and receiving antennas. A number of locations come to mind including the Rowridge transmitter on the Isle of Wight and the tidal fading suffered in some areas of Lymington, Milford on Sea, etc., from the surface of the Solent.

The Eitshal transmitter on the Isle of Lewis also produced many tidal fading episodes along the coast of Wester Ross, the Isle of Skye and other areas but I could often overcome the problems for viewers when I lived in the Highlands. Several friends ended up with 'high tide' and 'low tide' antennas!

Wonderful Wireless Museums

The helpful letter from **Kevin Sanderson EI7GGB** from County Longford in Ireland drew attention to an exhibition at the London Science Museum and website was also backed up by the interesting letter from **Berry Green** in Chichester. Berry mentions the excellent vintage wireless museum operated by **Gerald Wells** in south-east London. The 'Tea on the hour – every hour' tradition that Gerald offers is excellent – and I can recommend a visit if you are ever in London.

The Military Wireless Museum that's operated by **Ben Nock G4BXD**

(ably assisted by **Gloria** his partner) deserves a mention and if you visit the Kidderminster area (there are many reasons to do so – including the **Severn Valley Railway** and the beautiful Severn Valley itself) Ben will make you very welcome. It so happens that Ben has recently had guests from Japan (see the *News* pages) but 'local' guests from the UK are also very welcome!

To contact Ben you can E-mail him via **Military1944@aol.com** and the website is **www.qsl.net/g4bxd/introduction.htm**

Much Support From Readers

Finally this month, I must thank the readers who reacted to my *Keylines* Editorial regarding acquired hearing loss. I fully realised that deafness for Amateur Radio enthusiasts is a sensitive subject and that many of us suffer from hearing loss. However, I didn't know just how many of our readers suffer from hearing loss but I've now got a much better idea of the situation although most correspondents didn't want their letters published.

As I overcome my own difficulties I would be very pleased indeed if any reader who suffers with hearing loss is prepared to share the techniques and methods they use to overcome the problems in a *PW* article. You never know – something that you've adopted could help others. Please get in touch with me soon to share your experience.

Rob Mannion G3XFD/EI5IW

coming next month

WIRELESS

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Looking at the Elecraft K3

Phil Ciotti G3XBZ assembled an Elecraft K2 transceiver – thoroughly enjoying the experience – and has been exceptionally pleased with its performance. He's now had an opportunity to try a ready-built Elecraft K3 and presents his evaluation. How does the K2 compare with the new K3? Read Phil's evaluation to get the latest!

Power Line Adapters

Mike Jones G3UED discusses the results he's had with power line adapters. They are certainly controversial – but do they work and are they they generate as much interference as many observers claim? Mike aims to answer a few questions gained from his personal experiences.

Pitcairn Island First Call!

Charles Riley G4JQX doesn't claim his antenna is 'magic' in any way – but he did manage to work Pitcairn Island in the southern Pacific Ocean on his first call! Find out how Charles managed this DX feat (approximately 5780km/9300 miles) and try the antenna design yourself!

Connecting BNC Plugs

Do you find those awkward BNC plugs difficult to wire up correctly? If so, **Tony Scaife's** article with its advice and practical experience aims to help make the job a little easier.

The Codar AT5 Transmitter

Ian Liston-Smith G4JQT looks back fondly at a classic valved transmitter from the 1960s. Still occasionally seen for sale, these hardy little 10W or so transmitters still attract a lot of interest from enthusiasts who enjoy good quality a.m. and c.w. on 1.8 and 3.5MHz.

Plus *Technical For The Terrified*, *Data Modes*, *Carrying on The Practical Way*, *In The Shop*, the *World of VHF, HF Highlights* and much, much more in your favourite magazine!

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