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Antenna Travel Tuner

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Conditions: You must be over 18 years, be in regular employment - min 16 hrs per week- or have an acceptable pension or live with an earning partner or proof of other income, and must be able to provide 3 years residential history.

ICOM IC-756 PRO II £1899 C

Flagship of the Icom range of HF transceivers. HF & 50MHz, features large colour LCD with spectrum scope, auto ATU and 32-bit floating point DSP unit.

ICOM IC-7400 SPECIAL OFFER £1299 C

HF/VHF 100W transceiver. Features large LCD with spectrum scope, auto ATU and same DSP system as IC-756PRO II. **Comes with *FREE* SP-21 Speaker & SM-20 Desk mic.**

ICOM IC-706 IIG DSP £769 C

HF/VHF/UHF mobile DSP transceiver. Its relative small size not only makes it a great mobile rig but also for fixed station use as well. HF general coverage Rx and VHF & UHF.

ICOM IC-703 NEW £589 C

HF/50MHz Transceiver 0.1-10W Portable, Mobile, Base Station. (9-15.87V DC) Designed especially for the Foundation Licence/QRP. Built-in features auto ATU, DSP memory keyer. (5W when using 9.6V batts)

ICOM IC-718 £449 C

HF 100W transceiver. Covers all HF bands plus wideband receive. C/w auto notch, dual VFO, SWR meter etc. Options include extnl ATU DSP & filters.

ICOM IC-910X with 23cm £1249 C

Icom's all mode VHF/UHF transceiver with 23cm. Large clear LCD with lots of facilities. 100W on VHF and 75W on UHF, 10W on 23cm. IC-910H version £1149

KENWOOD TS-2000 £1599 C

Top-of-the-range 100W Kenwood transceiver. HF/VHF/UHF or up to 23cm with the optional module. Built-in auto ATU, DSP and its unique TNC.

KENWOOD TS-870S DSP £1399 C

HF DSP 100W base station. Excellent all round rig great for DX working with its ability to winkle out weak stations using its true IF DSP. No filters to buy.

KENWOOD TS-570DGE £849 C

HF100W base station with built-in auto ATU. Very popular rig, excellent performance on SSB and CW. Two fitted antenna sockets - very handy.

YAESU FT-1000 MKV £2349 C

200W HF transceiver, EDSP, Collins filter, auto ATU, 220V AC PSU - Acknowledged as one of the finest DX rigs on the market. Superb tailored audio and the ability to select Class A bias for dramatic signal purity.

YAESU FT-1000 FIELD £1749 C

100W HF transceiver, EDSP, Collins filter, auto ATU, 220V AC / 13.8V DC - Building on the success of the FT-1000MkV, the Field has become a respected leader in its class.

YAESU FT-897 NEW £899 C

100W HF rig plus 2m and 70cms (50W/20W) 13.8V external supply / internal optional FP-30V AC power supply / self powered portable using optional Ni-MH pack at 20W output. Compatible with FC-30 auto ATU and ATAS 120/100 antennas. The "must have" radio for 2003.

YAESU FT-857 NEW £729 C

HF/50/144/430MHz Mobile Transceiver HF/6m 100W, 2m 50W, 70cm 20W. (13.8V DC) Developed on the FT-897 and FT-817 transceivers. Built-in features 32 colour display, spectrum scope, AM airband receive, built-in memory keyer, detachable front panel, DSP unit supplied.

YAESU FT-847 £1199 C

1.8 to 440MHz, this all-in-one transceiver offers unbeatable value. 100W on HF plus 6m, and 50W on 2m and 70cm. You get genuine RF clipping on SSB for up to 6dB gain and there are 4 seperate antenna sockets.

YAESU FT-817ND £499 C

bhi DSP Module now available!

160m - 70cms. Up to 5W output all modes. ***Now with Ni-MH battery, charger & DC lead.*** **£589 with DSP ready fitted.**

NEW DSP Module

There is NO new FT-817 DSP! The fact is that the UK manufacturers. **bhi**, (of whom we are their largest distributor), have produced a lovely 4-stage DSP module that can be fitted inside the FT-817. The module costs £89 plus a fitting charge of £25 for retro-fitting to existing models. This includes installing a mini switch and LED on top cover.

NEW FT-817 Clip on metal front support stand.
In stock now £19.95 +£1 P&P

YAESU FT-7800 NEW £239 C

Yaesu's Powerful low cost answer!

* 2m/70cms Dual Band Mobile
* High power 50W 2m /40W 70cms
* Wide receive inc. civil & military airband
* CTCSS & DCS with direct keypad mic.
* Detachable front panel
* 1000 memories plus five one-touch

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carriage charges: A=£2.75, B=£6, C=£10

ICOM IC-2725E £269 C

The Icom IC-2725E dual band FM transceiver is proving very popular. Easy to install, the controller is separated from the main unit - great where space is limited.

ICOM IC-2100H £229 C

2m 55W FM mobile. Commercial grade, rugged construction. One piece die-cast aluminium chassis. Selectable green or amber display.

YAESU FT-8800E NEW £289 C

2m/70cm Mobile *144-146MHz,430-440MHz Tx *108-520MHz, 700-999MHz Rx * 512 memories per band * 6 Hyper memories* tuning steps: 5/10/12.5/15/20/25/50kHz * Audio: 2W output * Supply: 13.8V DC *Size: 140x41.5x168mm Weight:1kg

YAESU FT-8900R NEW £339 C

Want the best of all worlds then the FT-8900R is just the ticket! A rig with four of the most popular mobile bands - 10m/6m/2m & 70cm. Detachable head. Airband Receive.

YAESU FT-2800M £159 C

The FT-2800M 2m FM 65W High Power mobile transceiver. Rugged construction, excellent receiver performance and direct keypad entry.

ICOM IC-2200H NEW £199 B

The IC-2200H is the latest version of this popular high power 2m mobile rig. It has 207 memories inc 1 call channel & 6 scan edge memory channels.

*144 - 146MHz FM *65/25/10/5W RF o/p *CTCSS & DTCS *Green/amber display *Audio: 2.4W o/p *Tx 15A (65W) *Rx 1A (max audio) *Standby 0.8A *Power 13.8V DC *Size: 140x40x146mm

KENWOOD TMD-700E £449 C

Certainly the best dual band mobile transceiver with APRS. Does not need extra high cost boards to function. The only extra if required is a compatible GPS receiver.

KENWOOD TM-V7E £359 C

A lovely cool blue display, easy with 50/35W output. 50W/35W plus 280 memos and five storable operating profiles.

KENWOOD TM-G707E £289 C

If you are looking for simplicity and low cost, here's the answer. 2m & 70cms with detachable front panel and "Easy operation mode" GREAT!

IC-E208 NEW £279 B

VHF/UHF FM Dual Band Mobile Transceiver *Freq range 144-146MHz, 430-440MHz Tx *55/50W (3 pwr steps each band) *Wideband Rx 118-173, 230-549 & 810-999MHz *512 memories *FM narrow capability *104x2 DTCS, 50 CTCSS tone squelch *16 DTMF channels *HM-133 remote control mic *Packet ready for 9600/1200bps-mini DIN or 1200bps-mic socket *Supply 13.8V

YAESU VX-7R £299 B

6m/2m/70cm handie. The case, keypad, speaker and connectors are all sealed against water damage. Wide Frequency coverage from 500kHz to 900MHz. Easy-to-read 132x64 dot matrix display + plus pictorial graphics.

Available in Silver or Black

YAESU VX-2E NEW £169 B

Dual Band Ultra Compact FM Handie. The VX-2E is unbelievably small yet provides 1.5W on 144MHz and 1W on 430MHz (3/2W with external supply). General coverage receiver 0.5-999MHz, which includes AM mediumwave & FM broadcast bands plus AM aircraft & UHF TV bands.

YAESU VX-110 £119 B

Combining the ruggedness of the VX-150 with the simplicity of 8-Key operation, the VX-110 is a fully featured 2m handheld ideal for the most demanding of applications. It has a die-cast case, large speaker and illuminated keypad.

ICOM IC-E90 £269 B

The new E-90 offers triple band coverage of 6m, 2m and 70cms. Up to 5W output and rx coverage from 495kHz - 999MHz makes this a very attractive rig.

ICOM IC-T3H £129 B

The IC-T3H 2m handheld features tough quality but with slim looks. Its striking green polycarbonate case has been ergonomically designed. The rig is capable of providing a powerful 5.5W output with either Ni-Cad or Ni-MH battery packs. Supplied with charger and rechargeable battery.

KENWOOD TH-D7E £319 B

DATA COMMUNICATOR

One of the most successful handhelds over the past few years. It has a built-in TNC for Packet use. You can also use it for APRS operation in conjunction with an external GPS unit. Plus NMEA, 200 memos, and up to 5W output.

KENWOOD TH-F7E £249 B

WITH EXTRA WIDE RX COVERAGE

- 144-146MHz Tx/Rx: FM
- 430-440MHz Tx/Rx: FM

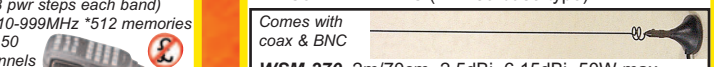
Up to 6W out with Li-ion battery and "scanner" style coverage from 100kHz to 1300MHz including SSB on receive! This is a great radio to have at all times when you are on your travels.

KENWOOD TH-G71E £199 B

If you want an excellent 2m/70cm dual-bander then you can't go wrong with the TH-G71. Fully functional with three power levels, 200 memories, CTCSS tone encoder/decoder, illuminated keypad and backlit LED.

MOBILE ANTENNAS

WATSON ANTENNAS (PL-259 base type)



Comes with coax & BNC

WSM-270. 2m/70cm, 2.5dBi, 6.15dBi, 50W max, micro-magnetic 29mm base, length 0.46m. **£19.95** A

W-2LE	2m quarter wave 2.1dBi 0.45m	**£9.95**	A
W-285S	2m 3.4dB 0.48m (fold over base)	**£14.95**	B
W-77LS	2m/70cm 0/2.5dB 0.42m	**£14.95**	B
W-770HB	2m/70cm 3/5.5dB 1.1m	**£24.95**	B
W-7900	2m/70cm 5.6/7.6dB	**£32.95**	B
W-627	6m/2m/70cm 2.15/4.8/7.2dB 1.6m	**£34.95**	B
WGM-270	2m/70cm On glass 3.7m coax 50W	**£29.95**	B

MOBILE BASES

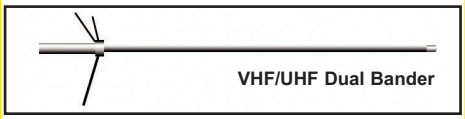
WATSON

WM-14B. Large diameter 14cm magnetic mount SO-239, c/w 5m RG-58 & PL-259

W-3HM	Adjustable hatch mount	**£14.95**	A
WM-08B	8cm mag mount, 5m cable PL-259	**£9.95**	A
WM-14B	14cm hvy duty mag mount+cable	**£12.95**	A
WSM-88V	BNC mag mount plus 3m cable	**£14.95**	A
W-3CK	5m 5D-FB cable assembly+pigtail	**£18.95**	A
W-ECH	5m standard cable kit assembly	**£12.95**	A

BASE STATION ANTENNAS

DIAMOND



VHF/UHF Dual Bander

X-50	2m/70cm colinear 6/8dB 2.5m	**£54.95**	C
X-50N	2m/70cm colinear 6.5/9dB 3.1m	**£59.95**	C
V-2000	6m/2m/70cm 2.15/6.2/8.4dB 2.5m	**£89.95**	C

CHECK OUR WEBSITE FOR FULL DIAMOND RANGE

WATSON

W-300. Very popular dualband base antenna. Supplied with u-bolts for mast fixing.

W-30	2m/70cm colinear 3/6dB 1.15m long	**£39.95**	C
W-50	2m/70cm colinear 4.5/7.2dB 1.8m long	**£49.95**	C
W-300	2m/70cm colinear 6.5/9dB 3.1m long	**£64.95**	C
W-2000	6m/2m/70cm 2.15/6.2/8.4dBi 2.5m	**£69.95**	C

WATSON W-25XM PSU NEW £99.95 B

A compact sized switch mode power supply that will run your base HF station with ease.

*Output Voltage 10 - 18V DC *Output Current 22A / 25A peak *Over current protected *Rubber Feet *Supply 230V / 115V AC 50/60Hz *Switchable dual voltage input *Size 220 x 180 x 73mm *Weight 1.8kg

WATSON W-25SM PSU £79.95 B

Very popular budget switch mode power supply. *Output voltage 13.8V DC *Output current of 22A (25A peak) *Front panel output terminals *Over current & voltage protection *Quiet operation

WATSON W-25AM PSU £89.95 C

DC power supply for the shack & esp. for use with 100W transceivers. Separate voltage and current meters. *Output voltage 0-15V DC *Output current of 25A (30A peak). *3 sets of output terminals *10A cigar socket. *Over current protection

CHECK OUR WEBSITE WWW.WSPLC.COM FOR MORE DETAILS OF THESE PRODUCTS

WATERS & STANTON

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VERTICAL ANTENNAS

Hustler Mobiles

Get top performance when on the move. Purchase the **MO-3 base** (137cm) for **£24.95** or the **MO-4 base** (68cm) for **£22.95**. Then add the resonator of your choice. **RM-10, RM-12, RM-15**, all **£19.95** ea. **RM-17, RM-20 £24.95** ea. **RM-40 £26.95, RM-80 £29.95**

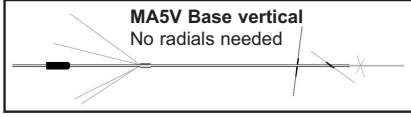
Resonator

Base section
MO-3 or MO-4

CUSHCRAFT BASE ANTENNAS

MA6V	20-17-15-12-10-6m 250W PEP	**£269.95**	C
MA5V	20-17-14-12-10m 250W PEP	**£239.95**	C

MA5V Base vertical
No radials needed



R8	40-30-20-17-15-12-10-6m 1.5kW	**£469.95**	C
R6000	20-17-15-12-10-6m 1.5kW PEP	**£329.95**	C

BUTTERNUT BASE ANTENNAS

HF9V-X	80-6m 7.9m 1kW PEP	**£349.95**	C
HF6V-X	80-40-30-20-15-10m 7.9m 2kW	**£299.95**	C
HF2V	80-40m 9.75m (160m opt) 1kW	**£229.95**	C

HY-GAIN BASE ANTENNAS

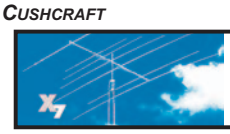
AV-640	40-6m 1.5kW, 300W 6m (PEP)	**£369.95**	C
AV-620	20-6m 1.5kW, 500W 6m (PEP)	**£279.95**	C
AV-14AVQ	40-20-15-10m 1.5kW PEP	**£169.95**	C
AV-12AVQ	20-15-10m 1.5kW PEP	**£139.95**	C
DX-88	80-10m 1.5kW, 250W 30m	**£369.95**	C

HARI High quality German traps. (Pairs)
200W 20m £44.95 40m £49.95 80m £53.95
1kW 20m £59.95 40m £64.95 80m £73.95

HARI High quality German Baluns SO-239
200W 1:1, 4:1 or 6:1 £25.95 ea.
1kw 1:1 £34.95 4:1 or 6:1 £41.95 ea

HORIZONTAL BEAMS & DIPOLES

CUSHCRAFT



Premier HF beam used around the world by serious DX'ers.

X-7	20/15/10m 7 el. Yagi 2kW	**£669.95**	D

Not got the space for a full sized HF beam antenna, then the mini beam MA-5B should be considered.

MA-5B	10-12-15-17-20m 4 el. Yagi 2kW	**£369.95**	C
A4-S	10-15 & 20m 4 el. Yagi 2kW	**£569.95**	D
A3-WS	12 & 17m 3 el. Yagi 2kW	**£379.95**	D
D-3	10-15-20m dipole element 2kW	**£249.95**	C

Don't want a wire antenna but can't fit a Yagi, then consider a rotatable dipole.

D-3W	12-17-30m dipole element 2kW	**£249.95**	C
D-4	10-40m dipole element 2kW	**£349.95**	C
D-40	40m dipole element 2kW	**£319.95**	C
TEN-3	10m 3 el. Yagi 2kW	**£229.95**	C
ASL-2010	13.5-32MHz 8 el. log periodic	**£749.95**	C

RADIO WORKS

A choice of quality wire antennas available to fit almost any circumstances.

CW-160	160-10m 76.8m long	**£129.95**	C
CWS-160	160-10m 40.5m long	**£119.95**	C
CW-80	80-10m 40.5m long	**£89.95**	C
CWS-80	80-10m 20.1m long	**£109.95**	C
CW-40	40-10m 20.1m long	**£84.95**	C
CW-20	20-10m 10.36m long	**£89.95**	C
CW-620	20-6m 9.7m (32ft) long	**£89.95**	C
G5RV PLUS	80-10m with balun 31m (102ft) long	**£59.95**	B

YUPITERU MVT-3300 SCANNER £129 B

The MVT-3300EU covers most of the useful bands in the VHF and UHF spectrum. It has 200 memories as standard with a range of band and security channels as well. It has functions normally associated with more expensive sets such as pre-setting the receiving mode and frequency step, Duplex reception with "One Touch" function, Auto-Write and Search-Pass memory functions. There is also a Decipherment function to receive certain scrambled communications.

WATSON FC-130 Frequency Counter £59.95 B

SPECIAL PRICE

The FC-130 is an ideal frequency counter for the shack, mobile or portable use. Supplied complete with Ni-Cads, charger and telescopic whip.

MFJ-993 Intellituner Auto ATU £249.95 C

Automatically tunes any balanced or unbalanced antenna. Ultra fast with 2,000 memories, it tunes 1.8 - 30MHz and has both digital and analogue VSWR meter, audible VSWR meter feature, remote control port and radio interface. 300W SSB and 150W CW.

MFJ-974 Balanced Line ATU £159.95 C

MFJ have come up with their version of the classic Johnson Matchbox balanced line tuner. Superb balance, extremely wide matching range, covers 3.5 - 54MHz, Cross Needle SWR Wattmeter. For 80m - 6m operation,can handle up to 300 Watts.
Size: 190 x 152 x 203mm

MFJ-971 QRP Portable ATU £99.95 C

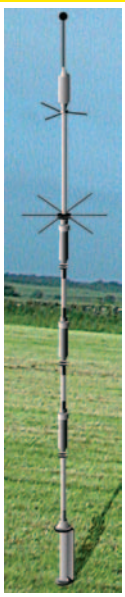
**1.8 - 30MHz *300W/30W/6W selectable *Cross needle meter *12V DC Ext. *SO-239 sockets *Tunes wire, coax, balanced line *Terminals & earth post *Size 160 x 150 x 60mm *Weight 870g*

The MFJ-971 is the ideal QRP ATU to have on hand. It incorporates a cross needle SWR meter and displays forward or reflected power and SWR simultaneously.

HUSTLER ZERO SPACE DX ANTENNAS

The answer to your HF Antenna Problem

Run full legal power - 80m to 10m - with no masts or guys.
Low VSWR 50 Ohm feed.



These HF verticals will take 1kW of power, work at ground level, and are self-supporting. A single earth rod will get you going. Add buried radials for even better results. These are rugged, well-built antennas that American hams have been using for years. Now they are available in the UK from our three stores.

4BTV		
40-20-15-10m. 6.52m high.	**£149.95**	C
5BTV		
80-40-20-15-10m. 7.64m high.	**£179.95**	C
6BTV		
80-40-30-20-15-10m. 7.3m.	**£209.95**	C

NOTE: 80m coverage limited to 100kHz on 5BTV & 6BTV

YAESU VR-120D £119 B

The VR-120D handheld scanning receiver covers from 100kHz to 1300MHz. AM/FM/WFM modes (inc. preprogrammed broadcast freqs). The VR-120D's small size and tough polycarbonate case allows you to take it anywhere -hiking, skiing or while walking around town.
Power is provided by 2 x AA batteries (not supplied). Ni-Cad batteries and charger are available as options.

RIGBLASTER-PLUS

The Adventure Begins!

~~Was £139.95!~~
£119.95
Order as RB/PL/C

New Low Price!! Explore all the new digital modes. All leads provided for computer and radio. Just connect between PC and transceiver. Plugs into 8-pin and RJ-45 radios. Internal jumpers to match your radio. Software on supplied disc for CW, RTTY, PSK-31, SSTV, Packet, AMTOR, DVkeyer, WSJT, Mic EQ, Rig CTL, EchoLink etc. Requires 12V DC

NOMIC Similar to above but no 8-pin front panel socket and no CW keyer function. Self-powered. **£59.95**
Code: RB/NO/8C for 8-pin rigs **RB/NO/RJ** for RJ-45 rigs

HEIL QUALITY MICROPHONES


HCL-5/4


GM-4/5


HST-817


PROSET +

Desk Microphones

HCL-5/4	Classic retro-look HC-5/4 desk mic	**£199.95**	B

Hand Microphones

GM-4/5	Goldline HC-4/HC-5 hand mic	**£109.95**	B

Headsets & Boom microphones

HST-YM	Traveler single side headset for FT-817	**£79.95**	B
HST-706	Traveler single side headset for IC-706	**£79.95**	B

Headphones & Boom Microphones

PRO-SET-PLUS	Large H/phones with HC-4 & HC-5	**£155.95**	B

EVEN MORE DISCOUNT!

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ICOM IC-446S SPECIAL OFFER

RUGGED PMR446 HANDHELD
Don't confuse it with cheaper models, this one is rugged! The IC-446S is ideal for a multitude of uses along with reliable operation. It is water resistant, and the antenna folds away when not in use.
**8 channels *Built-in CTCSS tone squelch *38 CTCSS codes per channel *Foldaway antenna *Large backlit display *Powered by 3xAA Alkaline batts *Water resistant*
(OFFER ONLY AVAILABLE WHILST STOCKS LAST)

SPECIAL OFFER was £99.95 now £59 B

HORA C-150 2M HANDHELD

£79.95

An amazing price for a 2m Handheld!
2W output on AA cells and 5W output on external 13.8V. 1750Hz tone, 20 memories, keypad control, 5 steps inc 12.5kHz, dial illumination receive 130 - 170MHz. You won't find a better deal! Includes flexi antenna, belt clip and instruction manual. (AA cells not included)

DMTR-21 TORCH/RADIO SPECIAL OFFER

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June 2004
On Sale 13 May
Vol.80 No.6 Issue 1167
(July Issue on sale 10 June)

Published by
PW Publishing Limited
Arrowsmith Court
Station Approach
BROADSTONE
Dorset BH18 8PW
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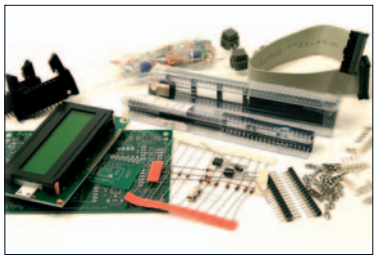
Cover subject

Cover Subject
There's a true radio feel to *PW* this month with a variable high voltage p.s.u. to build, antenna traps from coaxial cable to make and a travel tuner review to encourage you to go portable. Enjoy!
Design: Bob Kemp
Photograph: Tex Swann G1TEX/M3NGS

June features



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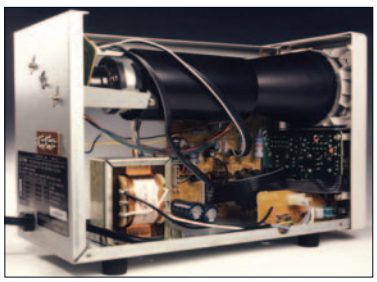

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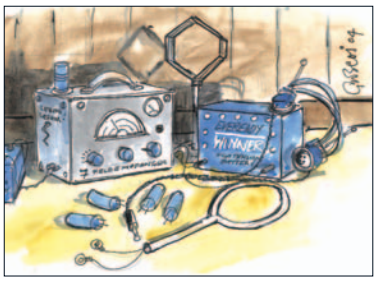

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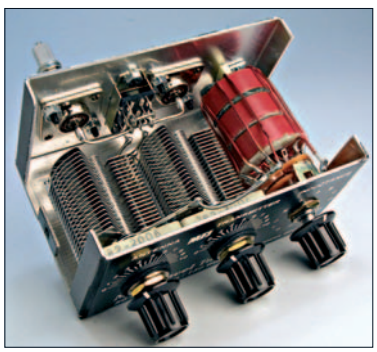

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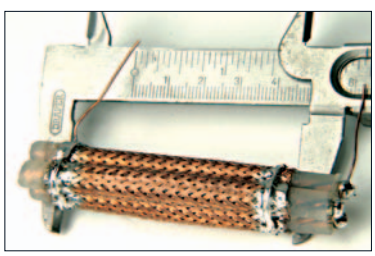

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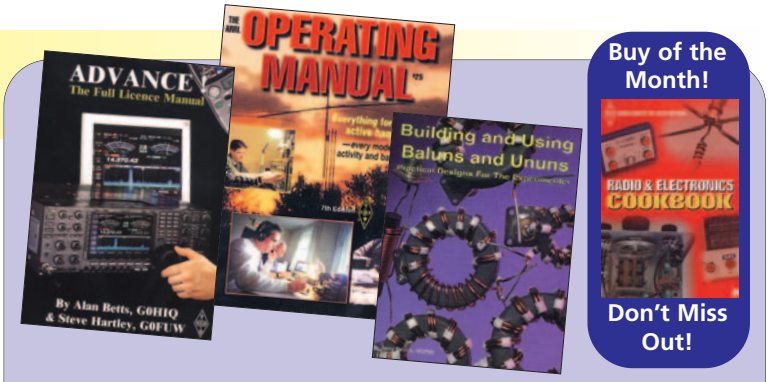

Page 70. The biggest and best selection of radio related books anywhere!

June regulars

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Published on the second Thursday of each month by PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: 0870 224 7810. Printed in England by Eclipse Imaging, Bucks. Distributed by Seymour, 86 Newman Street, London , W1P 3LD, Tel: 0207-396 8000, Fax: 0207-306 8002, Web: http://www.seymour.co.uk. Sole Agents for Australia and New Zealand - Gordon and Gotch (Asia) Ltd.; South Africa - Central News Agency. Subscriptions INLAND £32, EUROPE £40, REST OF WORLD £49, payable to PRACTICAL WIRELESS, Subscription Department. PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: 0870 224 7830.

rob mannion's keylines

Welcome to 'Keylines'! Each month Rob introduces topics of interest and comments on current news.

As I'm sat here in the *PW* offices in Broadstone - Dorset is having an extremely wet mid-April. We're also having unseasonable gale force winds. 'April showers' we don't mind (pleases the privatised water companies doesn't it?). But all is not lost - **Michael Fish** the BBC weatherman (an old friend of **Jim Bacon G3YLA**) told us on Tuesday 20 April that the rest of the week was going to be very sunny and hot. So, it might be the time to get those antenna repairs done!

It was also extremely wet and windy on Sunday 18 April as I drove the short distance between my home in Bournemouth, to Sherborne in the far West of Dorset. My early start on Sunday the 18th was to make a rare visit to the famous **Yeovil QRP Rally**, organised by the extremely active Yeovil club in Sherborne's Digby Hall, **Fig. 1**.

I'd not been able to attend the Yeovil QRP event, for quite a number of years because it's held on a Sunday and I'm otherwise occupied. The other two QRP events I can attend are held on Saturday - the **Rev. George Dobbs G3RJV** doesn't have any choice other than to arrange the Rochdale event on a Saturday!

This year I'd been invited to provide a *PW* talk for rally visitors and by re-arranging a rather busy schedule was able to do so. It was a pleasure - despite the truly atrocious weather - to visit the rally and I'm sure that the return of the wet weather was directly due to **Tim Walford G3PCJ's** return from Australia. I suggest this because Tim, **Fig. 2**, had been in VK land for a month or so providing advice on water for farmers!

Along with his experience as a qualified Electronics Engineer, Tim also farms on the historic 'Somerset Level's (famous for its Fenland-like waterways and marshes) and knows a great deal about water management. In between all these activities he manages to find time to design and produce excellent little QRP-orientated kits. A very busy man is G3PCJ.

Fig. 1: The 'Yeovil' QRP Rally - held at The Digby Hall in Sherborne, Dorset on Sunday 18 April. One of the quieter moments when most of the visitors were attending lectures.

Fig. 2: Tim Walford G3PCJ, busy on his stand at the Yeovil QRP rally. Not long back from an Australian farming visit Tim, owner of kit specialists Walford Electronics is also a PW author. He was sporting a sun-burned face and a slight 'Oz' accent (only teasing Tim!).

Meeting Readers

Meeting *PW* readers is always a pleasure and the talk (more of a 'chat' really) was well attended, with around 50 people present. However, the most important part of the session was after my talk - the time when I get valuable feed-back from readers on what we publish, and how it's received by that most important person....the reader.

It quickly became obvious that our two new authors Tim Walford G3PCJ and **Tony Nailer G4CFY** are much appreciated. The fact that both authors provide full circuit details and p.c.b. artwork, together with the option of 'ready to build' complete kits - is definitely a winning initiative.

Readers also provided ideas for Radio Basics and commented on the fictional serial *The Vectis Run*. I was delighted at the response regarding the serial, which has encouraged me to publish another radio/electronics and technology based thriller in the future. However, I don't mind telling you all - **I was very worried** that we would receive hundreds of protests! So, watch this space for more news on this topic.

However, while on this topic the Yeovil Club's **Rob Micklewright G3MYM** told me that the ARRL's *QST* magazine regularly produced fictional stories before the Second World War. So, despite my initiative - there's 'Nothing new 'under the sun' is there? Thanks for the invitation Yeovil and cheerio for now.

Rob G3XFD

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Components For *PW* Projects

In general all components used in constructing *PW* projects are available from a variety of component suppliers. Where special, or difficult to obtain, components are specified, a supplier will be quoted in the article.

Photocopies & Back Issues

We have a selection of back issues, covering the past three years of *PW*. If you are looking for an article or review that you missed first time around, we can help. If we don't have the whole issue we can always supply a photocopy of the article. See page 72 for details.

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Orders for back numbers, binders and items from our Book Store should be sent to: **PW Publishing Ltd., Post Sales Department, Arrowsmith Court, Station Approach, Broadstone Dorset BH18 8PW**, with details of your credit card or a cheque or postal order payable to PW Publishing Ltd. Cheques with overseas orders must be drawn on a London Clearing Bank and in Sterling. Credit card orders (Access, Mastercard, Eurocard, AMEX or Visa) are also welcome by telephone to Broadstone **0870 224 7830**. An answering machine will accept your order out of office hours and during busy periods in the office. You can also FAX an order, giving full details to Broadstone **0870 224 7850**. The E-mail address is **clive@pwpublishing.ltd.uk**

Technical Help

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

amateur radio waves

Make your own 'waves' by writing into *PW* with your comments, ideas, opinions and general 'feedback'.

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

Practical Wireless Testmaster

● **Dear Sir**

I have been interested in electronics since the age of about six years old. I first started buying *PW* in 1974 when I was about 10 and at the age of 11, I was introduced by a girl I went to school with to a enthusiast called **Eddy Jackson**. Eddy worked at Ferodo (famous for brake linings, based in Chapel-en-le-Frith Derbyshire), but in his spare time was into electronics as a hobby. We became friends and I went to see him every night, in fact I went so much I think at times he must have got fed up of me calling!

I used to sit and watch him constructing things and he taught me many things about electronics. The last time I saw him was about three years ago at a car boot sale and I guess he must be heading for 80 years old now. When he decided to pack up electronics about 25 years ago he gave me all of this components and test equipment and that's how I acquired the Test Master I sent you the picture of. I used this for many years through childhood and even in the late 1980s when I opened up my own shop.

I have bought *PW* since 1974 and now your magazine has shifted towards ham radio of which I have no interest, but I am not willing to break a 30 year habit and will take *PW* until the day I die. Incidentally I am only 39 years old and my specialist field is TV, video, satellite repairs and I have a high street shop. I write for a magazine called *Television* (formerly *Practical Television*, and of course once a stablemate of *PW*) - and have been writing for them for 20 years.

I am also a collector of vintage radios and have *PW* No. 1 Volume One, which I bought from an elderly gent along with many other vintage issues. A couple of years ago I built a valve amplifier from a 1964 issue of *PW* and it worked first time - my greatest pleasure comes from reading *PW* before it moved to Amateur Radio.

Michael Dranfield
Buxton
Derbyshire

Editor's comments: Good to hear from you Michael. I hope you continue to enjoy *PW*, and it seems that you were also helped by an 'Elmer'. Mine was a delightful Southern Railway Electrician called 'Ding' Coombes who helped a keen schoolboy by providing lots of bits and pieces and *PW*s. Another real radio 'Guardian Angel'!

Amateur Radio Relayers In League?

● **Dear Sir**

I have been a licensed Radio Amateur for nearly a year and I enjoy many different facets of the hobby, from building low power transceivers to v.h.f. contesting. What I haven't come across yet is the operating procedure for relaying in telephony or Morse.

For example, I would like to contact my friend **Gene WB7NGI** in Las Vegas, but cannot reach him due to poor h.f. conditions. Still, the message could be forwarded by some stations in-between. But how to find some helpful operators? By calling 'CQ QSP WB7NGI from M3CAX' as QSP is the code for 'relay'? Does anybody know the most efficient procedure or is this a lost art? If so, why not bring it back to life?

Daniel Schlieper M3CAX
Cambridge

Editor: An interesting question Daniel - and of course it's just how the American Radio Relay League started in the USA. I've often been in group QSOs where stations have 'relayed' reports for un-heard stations but have never deliberately looked for a QSP QSO. Your suggestions are welcomed readers!

In Defence Of eBay

● **Dear Sir**

Whilst I was pleased that my article about eBay (February 2004 *PW*) has generated a reaction, I was somewhat dismayed at the tone of the comments regarding eBay expressed by the Editor and within the letters published. So, I would like to reply to the points raised.

1. Postage costs: G4XBD's experience is not uncommon as postage does sometimes appear to be far too high. As with all aspects of eBay nobody is forcing you to bid on an item. If you feel the postage is unfair say so before bidding. Decide what you feel is appropriate and tell the seller. If they do not agree or reply, do **not** bid. Negotiate before bidding.

2. E-mail addresses: Yes, if you sell on eBay your E-mail address will be used in order for potential buyers to contact you. Isn't communication the main reason for E-mail? Sadly though, Spam has become a part of life on the Internet and many organisations, reputable and unscrupulous will use your E-mail address. I do not get more than one or two E-mails a week from Ebay, in fact I get more from my bank and pharmaceutical companies (normally offering to improve my sex life!) than anything else. I appreciate that others have suffered from Spam apparently from Ebay. The use of a mail washer may be the only solution. However, this is not a problem unique to Ebay.

3. Censorship: The world has gone 'Politically Correct' mad and it's perhaps not surprising that an item with a Swastika was rejected. Not surprising - but very sad. Hardly seems worth worrying about when lethal weapons from eBay USA can be purchased and imported into the UK!

4. Feedback and trust: I must disagree with M3CAX. The feedback system works. It is true that just because all previous transactions have been positive does not guarantee that the next will not be negative. However, I think it's a good indication that the individual is reliable and wishes to continue as a trader on Ebay.

Ebay can, and does ban individuals for non payment and non supply. The rules are adhered to. For example I recently purchased a mobile 'phone on eBay from a seller who had a feedback rating of about 99%. When the 'phone arrived I was disappointed and felt that it did not live up to the description. I E-mailed the seller who asked me to return the item. This I did. He felt I was being too 'picky' but he still refunded me the cost of the item. Feedback works and the majority of Ebayers value their feedback and will avoid negative feedback at all costs. As for item descriptions, if it's vague you have two choices; Don't bother bidding or ask the seller questions to get more information.

The general impression given on the *PW* letters page appeared to be that eBay as an organisation was some evil money grabbing monstrosity. It also would appear that almost all of us who sell on eBay are crooks and daylight robbers, and that those who buy on eBay are "a few sandwiches short of a picnic". That is just not the case!

I've heard many tales of woe from people who have brought at rallies and from classifieds and have been 'had'. For example, my father bought a new hard drive for his computer at a rally from a trader. It didn't work but the trader refused to refund or replace and in the end the only solution was to go through the small claims court. Fortunately, eventually my Dad got his money back. How do you check if an item is stolen or not when you buy at a rally or through the classifieds? Please enlighten me!

I have purchased items at rallies, from classified ads and on Ebay. Each one has risks and benefits. For me eBay has been great. I am disabled and live on the other side of the middle of nowhere. So, having a large Amateur Radio trading centre like eBay 'virtually available' in my own home is wonderful. If you have had a bad experience on eBay then I am truly sorry for you, but you have been unfortunate and in the minority.

Please remember eBay is not compulsory. You don't have to bid. As in all aspects of life there's good and bad on Ebay. Be sensible, get all the information you need before buying. You don't have to bid. However, if eBay is such a terrible place why do so many of us use it? Why since the publication of the article has the number of items on eBay Amateur Radio increased by nearly 25%?

I hope my letter has redressed the balance somewhat.
Quentin Cruse GW3BV
Aberwystyth
North Wales

Please Keep DX 'Window' Clear

● **Dear Sir**
I write to you with mounting despair at the increasing use of the top 15kHz of 75 metres by non DX traffic. This lack of understanding/observation of the band plan has resulted in some very heated exchanges recently and threatens to spiral into an outright war between opposing parties.

I write to you on behalf of all the stations who use the segment, 3.775-3.800MHz for DX and I appeal through *PW* to all those not working DX, to observe the band plan. In the interest of good practice, example, community harmony and last but not least long distance antenna and propagation experiments.

Please observe the DX window! This area needs to be used carefully. Why? One very good reason being that many DX countries cannot work lower than 3.790MHz. If the 'window' becomes full of local (European) operators working non DX stations then the weak signals from JA, VK and the really rare operations will never be heard. As a result many operators will not get the chance of working these great distances on one of the hardest bands to work real DX.

Europe has a huge section available to non DX chasers and s.s.b. users enjoy some 150kHz below the DX window. The c.w. section of the 3.5MHz band is around 30kHz wide and there's a mixed mode area 40kHz wide. The DX widow itself is only 25kHz wide and when you understand that some DX countries can't go below 3.790MHz, then it's narrowed to a paltry 10kHz!

In the 20 years I have been active as a radio listener and now a DX chaser, I have never witnessed so much bad behaviour as these past few months of the 2004 DX season on 80/75m. I suppose the question must arise "What is and, what is not DX to Europeans"? That said I think it is time that all h.f. users refresh their knowledge of all the band plans. I know that bands are crowded and we could all do with more space. However, let's not sink into the law of the jungle on '80'.
John Edwards GM7NVA
Edinburgh
Scotland

Army Pal Peter Mercer GI4VIV!

● **Dear Sir**
I usually read all my *PW* cover to cover with much love. All articles are gratefully received and none more than those on old equipment, etc. which conjure up my youth. However, to my amazement the mention of **Peter Mercer GI4VIV** in the Editor's April Keylines took me back to a youth of 15 who joined the royal signals in Harrogate in 1959 and one of my cohorts was Peter GI4VIV! We spent three happy years in the same troop and of course shared barracks. You must get him to tell you of the great storm which hit our huts and how we tried to lever off our roof - hi hi!

Many thanks for re-kindling some of the happy days of my youth. I am at present an M3, but hope to add the 2E0 during the Easter week. Keep up *PW* - it's such a good publication.
Jon Blaylock M3MUW
Newcastle-upon-Tyne

Editor's comment: Let's hope you work each other on the bands soon Jon!

What Price Customer Satisfaction?

● **Dear Sir**
I write with reference the letter in the May 2004 issue from **Len Paget GM0ONX** ('What price customer satisfaction?'), he is incorrect in stating that Yaesu UK do not have a minimum order charge. I recently required a transistor from them and was informed that the minimum charge would be £5. However, for that figure they were willing to supply two transistors. This was just as well, because being somewhat clumsy and inexperienced in working with surface mount devices, I damaged the first one I fitted!
Geoff Chance M0GRC
Redruth
Cornwall

Rooster Breakfasts

● **Dear Sir**
I thought you might be interested to see the enclosed explanation of 'Rooster Breakfasts'. Maybe you can find a bit of space in 'our' magazine to give the Rooster Breakfast a bit of publicity. If any of *PW* readers are visiting the West country and are here on the first Saturday of any month, perhaps they would like to join us and meet the local operators?

It never ceases to amaze me that the breakfasts have continued for an unbroken run of more than 11 years. The April breakfast is number 139. The average attendance is 35 to 40 people with an all time record of 54, so you can that it is quite a popular event here in West Devon/East Cornwall. We range from those living in Totnes, Devon to St. Austell in Cornwall.

I'm also enclosing the April *Rooster Newsletter* to give you some idea of other happenings in the Plymouth Radio Club area. I know that the Editor occasionally come this way, so who knows, we may even see you at one of our gatherings. I can assure you of a very friendly welcome.

Enough for now, I would rather you read the enclosures than this letter! Thanks for finding the time anyway.
Bob Griffiths G7NHB and all the Roosters
Plympton
Devon

Invitation from the Editor: Please join me on page 77 where the 'Roosters' feature this month in Topical Talk.

***PW* Whitcombe 70MHz Converter**

● **Dear Sir**
May I say how pleased I am with the *PW* Whitcombe article (April 2004). I read it with interest on Thursday 11 March - the day *PW* arrived and I decided to build it. Having posted the cheque off the same day, I was surprised to receive the kit on the following Monday.

Tipping the components onto a sheet of A4 I checked and sorted them in order, cleaned the board and by the next day, it was built and working. There were no mistakes in the article or the kit, so thanks to Tony and *PW* for a very useful converter.

However, it could be even more useful if you could persuade Tony to extend the article into a transverter! I can now listen on s.s.b., f.m. and a.m. using the Alinco DX70. Thanks again Tony and yourself, not forgetting *PW*!
Ron G3TAR
Rugeley
Staffs

Edir's comments: Thanks Ron, and take a bow Tony G4CFY!

Tax On VAT - Watch Out!

● **Dear Sir**
Like a good many "old hands" I enjoy my Amateur Radio hobby. I have been licensed since 1973 and a reader of *PW* since August 1955.

Over the years I have collected several radios of various types, both mobile and fixed stations. So, it was rather distressing to find that several of

the v.h.f. and u.h.f. sets could no longer access the local repeaters. This was due to the transition to the use of CTCSS tones for access and that all newly Licensed repeaters since January 2004 must have these access facilities.

I decided to contact the Amateur Radio dealers in the area to find a CTCSS module for one or two of the rigs. Being older transceivers, the answer came back as "Sorry Sir, that's rather old and we no longer keep accessories or parts for that model". This seemed to be the stock answer.

Two of my rigs were Kenwood mobiles, so I had a brain wave and contacted Kenwood UK. They were very sympathetic to my plea for help, but again were unable to help due to the age of the sets. They did however, provide the vital bit of information that the CTCSS unit I was looking for was also used in the commercial variants of the transceivers. They suggested that I should try some PMR dealers although this too proved fruitless.

I then did a "trawl" of the internet - feeding in the key words for the Amateur part as well as the commercial part number. I was in luck ! The AES company in the USA had both items in their sales listing.

A quick E-mail to their Milwaukee branch provided a prompt reply from AES staff **Richard** and **Tom** confirming that they did indeed have the items in stock and quoted me a price plus shipping charge. I "hit the Plastic" as they say, and shortly afterwards had an e-mail to confirm that my order was on its way.

Twenty long days ticked by before the postman delivered a letter telling me that "A package that requires the payment of duty" was waiting for collection. Hoping that it was the CTCSS units I rushed down to the local Parcel Force depot, presented the letter and the packet was produced. "That's £19:81 to pay Sir"! was the demand.

Surprised, I examined the ticket; £11.81p VAT and a whopping £8 Parcel Force "Handling charge" and I had already paid post and packing with the original order, remember! I had no option but to pay and did so reluctantly.

I rushed home and unpacked the parcel and sure enough the CTCSS units were there and they were fitted to the rigs very quickly indeed. A short test later and 'Hey Presto the local repeaters responded to my call. Success!

It was good to have the use of the sets again, but it would seem expensive to upgrade an older transceiver to get it to continue to work on today's repeaters. The cost of the two CTCSS units was $US98 Shipping and insurance was $US18.60 in total (approximately £65.88), but Value Added Tax (VAT) and the huge Parcel Force 'Handling charge' bumped this up to approximately £85.

The good side is that I now have a couple of very competent radios. These will hopefully continue to give me more satisfaction and pleasure from the hobby of Amateur radio in the years to come.

Because of my experience, if *PW* readers should also consider the same, or similar routes that I trod to keep my hobby alive, I should caution them. I warn you that the tempting prices that they see on overseas price lists, do have hidden perils!

The VAT people and their friends at Customs & Excise will want a hefty chunk from your wallet as well, **before you get you eagerly anticipated parcel from abroad! No payment - no parcel!**

Enquiries made to Customs & Excise would indicate that imported good over the value of £18 and Gifts over £36 are subject to VAT and duty, where applicable. *Caveat Emptor*, as they say!! Please continue to produce the excellent *PW* every month. Regards,
Tony Hawker G4CJZ.
South Gloucestershire

Editor's comment: We've covered this problem in *PW* before Tony, and you have my sympathy. It's all down to Government and their insatiable tax appetite. Placing extra tax on an existing tax (Charging VAT on the handling charge) can only be described as a disgusting practice. Readers who subscribe to services provided from America (often via the internet) may also now receive VAT demands on their invoices from the USA. This is apparently due to some agreement between the EU states and the American authorities. Whether or not the VAT component does eventually return to Europe I can't confirm (Is it genuine - or perhaps another scam?) - but I can confirm I cancelled the subscription concerned immediately! It's bad enough paying unreasonable tax demands here at home, let alone receiving suspicious demands from abroad!

Keep your letters coming to fill *PW*'s postbag

Letters Received Via E-mail

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

amateur radio rallies

Radio rallies are held throughout the UK. They're hard work to organise so visit one soon and support your clubs and organisations!

June 6
The Anglo Scottish Repeater Group's Radio Junk Rally
Contact: Mick Barber M0AOH
Tel: (01228) 526436
E-mail: mickbarber@zetnet.co.uk
Held at Cumwhinton Village Hall, one mile east of J42 (M6) on B6263, near Carlisle. Talk-in and refreshments will be available, as will wheelchair access. Tables are £5 (bookable in advance).

June 6
The 8th Red Rose QRP Festival
Contact: Les Jackson G4HZJ
Tel: (01942) 870634
E-mail: g4hzj@ntlworld.com
To be held at Formby Hall, Alder Street (off High Street), Atherton, Manchester. This is a friendly get-together, intended to promote low power Amateur Radio operating and home construction. There will be trade stalls, club stands, low cost Bring & Buy, Morse receiving tests with certificates, refreshments and a well stocked lounge bar. Talk-in on S22. Admission is £1.50.

June 6
The Spalding & DARS Annual Rally
Contact: Ambrose M0DJA
E-mail: rally-secretary@sdars.org.uk
Website: www.sdars.org.uk
Held at Sir John Gleed Technical School, Halmer Gardens, Spalding, Lincolnshire. Doors open 1000 and entrance fee is just £2. There will be plenty of parking on site and hot snacks will be available.

June 13
The 35th Elvaston Castle National Radio Rally
Contact: Les Bagnall
Tel: (01332) 559965
E-mail: secretary@elvastonrally.co.uk
Takes place at the Elvaston Castle Country Park, near Derby. There will be all the usual traders, plus Bring & Buy, manufacturers marquee, entertainment, craft marquee, etc.

June 13
The East Suffolk Wireless Revival
Contact: Steve M1ACB
Tel: (07720) 412648
Website: www.btinternet.com/~thomassg/eswr.htm
To take place at the Suffolk Showground, Felixstowe Road, Ipswich. Doors open at 0930. There is ample car parking and the event is well signposted. The main attraction will be the radio car boot sale and in addition there will be a Bring & Buy, bookstall, Foundation Morse tests, h.f. station and local club stalls. Food and refreshments will also be available.

June 19
The Reddish Rally
Contact: John G4ILA
Tel: 0161-477 6702
E-mail: john@mckae.freeserve.co.uk
Takes place at St. Mary's Parish Hall, Reddish, Stockport, junction of Reddish Road/Broadstone Hall Road South. Admission just £1, talk-in on S22. Tables £10 each.

June 20
The Newbury & DARS's Amateur Radio Boot Sale
Website: www.nadars.org.uk
Held at Cold Ash, near Newbury. See website above for further details.

If you're travelling a long distance to a rally, it could be worth 'phoning the contact number to check all is well, before setting off.

amateur radio **news**

A comprehensive look at what's new in our hobby this month.

Rally Season in Full Swing

Make a trip to Milton Keynes

The Milton Keynes Amateur Radio Society (MKARS) Annual Rally will take place on Sunday 4 July 2004.

Taking place at St Paul's School, Chaffron Way, Leadenhall, Milton Keynes, the MKARS Rally opens its doors at 0900, with a talk-in on 145.550 and 433.550MHz.

The rally site is located three miles from J14 of the M1 and 1/4 mile from the local Maplin store. For further details E-mail **rally@bletchley.net** or contact **Malcolm Bay M0MBO** on **(01525) 874075**. Additional information can also be found at **www.mkars.org.uk**

New Licensees

Chelmsford Course Candidates

The Chelmsford Amateur Radio Society (CARS) continues to go from strength to strength with yet more new Licensees making the grade.

The recent Foundation Course run by CARS resulted in all 13 candidates passing first time. Well done to all!

Chelmsford run courses for the Foundation, Intermediate and Advanced licences and are always keen to encourage new members. For further information contact:
Clive Ward M0SIX
Tel: (01245) 224577
Mobile: (07860) 418835
E-mail: training@g0mwt.org.uk
Website: www.g0mwt.org.uk

100th Amateur

Centenary Girl

The 100th Radio Amateur to gain her 'ticket' at Harrogate Ladies' College is Katherine M3MTK.

Harrogate Ladies' College has successfully helped 100 Radio Amateurs get on the air since 1981 with the help of **Richard Horton G3XWH**. **Katherine M3MTK** is their 'centenary girl' having recently passed her M3 examination and is pictured here with **Dr Marcus Sleightholm G8HDN** who kindly donated the TS-950 transceiver to the club station **GB2HC**, with **Laura M1LAP** and **Daisy M3HZC** looking on.

Listen out for the club station GB2HC on 1 July from 1201UTC for a period of 24 hours as the station is aired in celebration of Harrogate Ladies' College's 100 years on the present Duchy of Lancaster site in Harrogate.

Calling All Coil Cohorts

Teslathon

If coils are your passion then why not join the Tesla-builders of Nottingham (TCBON) at their annual UK Teslathon.

The Tesla-coil builders of Nottingham (TCBON) would like to welcome you to the 7th annual UK Teslathon, which is being held at The Derby and District Amateur Radio Society's HQ, Carlton Road United Reformed, Derby (for full details and a site map take a look at: **www.dadars.org.uk**) on 28/29th May.

As in previous meetings of this type, all those over 16 (or 14 if accompanied by an adult) and who appreciate the dangers of high voltages are welcome.

If you want to attend the Teslathon registration is required by E-mail to **richard@g3vgw.demon.co.uk** at least one week before the event.

Entry is £3 to cover the hall hiring costs and the programme of events will include 'show and tell' demonstrations from willing delegates!

Something Different

Toys for the Boys (and Girls!)

For all you 'gadget' fans and those who are looking for something a little different - how about this?

The chic MP10 MP3 player allows you to listen to your favourite music or perhaps previously recorded broadcast station broadcasts wherever you are.

The slinky curvaceous design sits comfortably in the hand, is quick and easy to use and will run for up to 18 hours on a single AA battery cell. With a full graphical l.c.d., is also backlight and choice of 128 or 256Mb embedded Flash Memory, the MP10 is user friendly and eye catching too.

Supplied with a USB Download lead and discreet earphones, the MP10 specification is as follows:

Format:	MP3 music files playback
Memory:	128Mb Flash memory embedded
LCD:	4-line graphical l.c.d. with backlight
Data Transfer:	USB (V 1.1) - Max. 2.4Mbps
Output Power :	5mW
Freq. Response:	50Hz - 20kHz
Size :	42 X 70 X 22mm
Weight :	32g (without battery)

The MP10 is available now with prices starting from £89.99. For more details or to place an order contact:
Nevada, Tel: 023 923 3090
Website: www.nevada.co.uk

Help Out Your Fellow Readers

Help Out Your Fellow Readers

Ranjit C. Fernando 4S6RZ from Sri Lanka needs your help...

Ranjit says: "I have a very old valve communication receiver, which I want to put it back into commission. The set, a MARCONI CR100 (B28) or CR 100/2, has been owned by my father since the 1950s. I've tried hard to get the circuit diagram and the service literature but without success. I am prepared to bear any costs involved in obtaining any information.

If you think you can help Ranjit with his old Marconi favourite please contact him direct at:
Ranjit C. Fernando,
972/59 Annasiwatte Road,
Athurugiriya, Sri Lanka. E-mail: rcfern@sltnet.lk

A Spirited Club

Northampton Rises Again

Following the closure of their club premises last year the Northampton Radio Club has relocated and is back in action!

The Northampton Radio Club was founded 90 years ago and has always been very active in the community. However, at the end of last year the club was forced to close at very short notice, as they had to leave their premises. Not to be deterred the club still helped seven of its members get through the RAE some of whom had only held a Foundation Licence for 10 months.

The club quickly arranged newspaper and radio appeals in a bid to find new premises and fell on their feet when a trade club in Northampton offered them the use of four rooms upstairs in their premises, anything up to seven days a week! The only drawback was that the club had to completely gut, renovate and decorate the rooms before they could use them. In true club spirit the members joined forces working solidly in their spare time to turn the rooms into a lovely club environment.

The Northampton club now consists of a meeting/training room, two radio rooms and a storage room. There's also ample tea and coffee making facilities, a fridge, televisions and a Library - and of course there is a huge bar downstairs!

Club meetings are held on Monday evenings at 2000hours at **Reform Club, Balmoral Road, Northampton** and are currently running a Foundation Course on a Wednesday evenings and plan to follow this with an Intermediate Course. If you would like to go along and join in with the club activities you'll be very welcome. For more information contact:

Davina M0LXT
E-mail: davina.williams@ntlworld.com
Tel: (07870) 434931

Bargain Time

Tabletop Sale

Why not go along to the Chelmsford ARS Radio and Electronics table-top sale and hunt down the bargains

The Chelmsford Amateur Radio Society are holding their Radio and Electronics table-top sale on **Tuesday 3 August** from 1930 hours. The sale will be held at the Marconi Athletic and Social club in Beehive Lane, Chelmsford.

All Radio Amateurs, s.w.l.s and other electronic enthusiasts are invited to attend as sellers, buyers or just viewers. All good condition Amateur, audio, electronic, electrical, photographic, computer and associated equipment may be offered for sale.

Admission is free to buyers and viewers and tables for traders are £3.
Entry for sellers is from 1830hours and 1930 for the public. Refreshments will be available and car parking is free.
For further details contact:
Colin Page G0TRM
Tel: (01245) 223835
E-mail: colinpage@ukgateway.Net
Club website: www.G0mwt.Org.Uk

Chelmsford Scouts

Amateur Radio Fellowship

The Chelmsford Scout Amateur Radio Fellowship (SCARF) was formed in September 1999 by a group of Scout Leaders who were Radio Amateurs and had been running Jamboree On The Air (JOTA) & Thinking Day On The Air (TDOTA) stations for many years.

Assisting at many events in Essex inside and outside of scouting, SCARF get involved with everything from organising car parking at local events, JOTA, JOTI, TDOTA, Scout badge work to the Essex Scout International Jamboree, which is held every four years. In 2007 The World Scout Jamboree is coming to Essex Hylands Park just outside Chelmsford and the Fellowship hope to be there assisting in some way at this Major Scouting Event.

The SCARF group also run Novice and Foundation Courses for Leaders and Scouts and pictured here are a group of Explorer Scouts and Leaders who have just passed their Foundation Course. So far the fellowship have helped 40 candidates pass the Foundation Course examination and 11 to pass the Morse assesment.

The Lead Instructor, Chris Chapman G0IPU and District Cub Scout Leader in Chelmsford, also ran Novice courses for Scouting people of which 22 people passed. Incidentally, **Andrew Finch**, the 500th Foundation Licence holder was taught by SCARF.

To get involved with SCARF or to find out more about the Novice and Foundation courses contact **Martyn Medcalf G1EFL Instructor** via **E-mail: m3vammartyn@supanet.com**

Surfing Around

Website News

The Oldham Amateur Radio Club have a new website address, check it out...

The new website address for the Oldham ARC is **www.oarc.org.uk** and is well worth a look. The site contains details on club activities, rally news, licensing, club details and related sites.

The club meet every Tuesday at 1930 hours at the Air Training Corps, Park Lane, Royton, Oldham. The club also runs Foundation and Intermediate courses. For further information contact the secretary **Mike M1CVL** on **(01706) 367454** or via E-mail **M1CVL@thersgb.net**

Special Offer

New Products

British manufacturer, bhi are offering you a very special deal on their UK designed and manufactured Wonder Wand antenna and tuned counterpoise.

The Wonder Wand is a small portable QRP rig mounted antenna, providing switchable coverage from 7 to 430MHz. The antenna is portable, folding down to approximately 35cm (14in) and can handle up to 25W. Suitable for use with the Yaesu FT-817, as well as most other QRP transceivers the Wonder Wand is priced at **£89.95**.

A tuned counterpoise called the CPOISE is also available for use with the Wonder Wand and other QRP antennas for **£59.95**. However, bhi are offering you the chance to buy both products together under their Wwand offer at the special price of **£139.90**.

Both products are available direct from bhi via their new secure on-line shop, follow the link from **www.bhi-ltd.co.uk** or contact **Waters & Stanton** on **(01702) 206835.**

Update your records

New Awards Manager

A new Awards Manager has been appointed to The British Amateur Radio Teledata Group (BARTG).

With immediate effect the Awards Manager for BARTG is now **Phil Cooper GU0SUP** and he has now taken over the post from **Nigel G4KZZ**. Phil will handle all the BARTG awards, which includes the popular Quarter Century Award (QCA) plus the various Continental awards.
More details of the awards can be found at **www.bartg.demon.co.uk**

Advance Notice

Telford Radio Rally

Here's a date for your diary

The Telford Radio Rally takes place at the popular RAF Cosford Aerospace Museum in Shropshire on Sunday 5 September and will feature a 'Nostalgic Arena'. The Arena will give the visitors the opportuninty to look back at the transmitters, receivers, transceivers and ancillary equipment that have graced Radio Amateurs' shacks between about 1950 and 2000.

Equipment from manufacturers such as: Heathkit, Marconi, Collins, PCR, Hammarlund, Eddystone, KW, Trio, Codar, FDK, Drake, Tono, HyGAIN, Datong, Uniden, Microwave Modules, AEA, etc. will feature, as will Yaesu, Icom and Kenwood, all of which have histories going back years too. The Rally Group intend to display as many examples of these 'gems' from the second half of the twentieth century as possible, working or otherwise.

The Nostalgic Arena organiser for the Telford Rally is **Martyn G3UKV** who can be contacted on **(01952) 255416** or via E-mail at **ukv@globalnet.co.uk** Martyn would especially like to hear from anyone who can offer an example or two from their collections of radio gear. As Ex WD has been featured previously at the rally, they are not seeking ex-military equipment on this occasion.

The organisers will be taking special security measures, of course, and want **you** to see what you have hidden away deep in the recesses of your loft or shed and to share these treasures with fellow radio enthusiasts at their annual radio rally. So go on get involved!

Product News

Power Supply

Alinco launces a communications grade power supply.

Alinco UK distributors, Nevada, are pleased to announce the release of the new Alinco DM-330MVE 'Communications Grade' switch mode 12V 25A power supply. It has been designed specifically for use with Amateur band transceivers as it has extremely low noise output. But if noise does pose a problem the DM-330MVE has a patented Noise Offset circuit to move the noise frequency out of band.

The DM-330MVE's lightweight design - it weighs just 2.3kg - makes it an ideal choice for the travelling Amateur. Features include:

- large Illuminated 'Instrument class voltage and current meter
- voltage adjustment from 5 to 15V d.c.
- output voltage memory
- full protection circuits

The DM-330MVE power supply is available for **£119.95** from Alinco dealers or direct from Alinco UK distributors Nevada.

Nevada
Tel : 023 9231 3090
Fax: 023 9231 3091
Website: www.nevada.co.uk or **www.alinco.co.uk**

Kit Building

Play it Again Sam!

As the famous saying goes - 'Play it Again Sam' and that's exactly what you'll be able to do when you've built the KRC-A-6 audio adaptor.

The KRC-A-6 from the **Kit Radio Company** converts audio to a wide band frequency modulated v.h.f. signal so that you can couple it via a coaxial cable to your record deck to a hi-fi system, regardless of whether or not it has a suitable audio pre-amplifier and play all your much loved old records again. But that's not all, the KRC-A-6 can couple almost anything with an audio output to your hi-fi and even to those compact systems that have no external inputs at all. So, any audio output can receive the benefit of the graphic equalizer, good quality speakers and recording facilities that are all part of your hi-fi system.

The KRC-A-6 kit comes with a finished case, giving a professional look to your project and is built on a single p.c.b. with a printed overlay. A six page step-by-step construction guide means building this project couldn't be easier and with an estimated build time of two hours it won't be long before you'll be 'playing it again'.

Available now for **£29.99 plus £4 P&P** there is also the option of buying an a.c. adaptor for £5.99 to accompany the kit.
Kit Radio Company
Unit 11 , Marlborough Court
Westerham, Kent TN16 1EU.
Tel: (01959) 563023

SALES 01908 281705

Postage & packing UK mainland just £6.00 max per order E&OE

MOUNTING HARDWARE ALL GALVANISED

6" Stand Off Bracket *(complete with U Bolts)*.....**£6.00**
9" Stand off bracket *(complete with U Bolts)*.....**£9.00**
12" Stand off bracket *(complete with U Bolts)*..**£12.00**
12" T & K Bracket *(complete with U Bolts)*.....**£11.95**
18" T & K Bracket *(complete with U Bolts)*.....**£17.95**
24" T & K Bracket *(complete with U Bolts)*.....**£19.95**
36" T & K Bracket *(complete with U Bolts)*.....**£29.95**
Chimney lashing kit.....**£12.95**
Double chimney lashing kit.....**£24.95**
3-Way Pole Spider for Guy Rope/ wire.....**£3.95**
4-Way Pole Spider for Guy Rope/wire 1" Mast Sleeve/Joiner.....**£6.95**
1.25" Mast Sleeve/Joiner.....**£7.95**
1.5" Mast Sleeve/Joiner.....**£8.95**
2" Mast Sleeve/Joiner.....**£9.95**
Earth rod including clamp (copper plated).....**£9.95**
Earth rod including clamp (solid copper).....**£14.95**
Pole to pole clamp 2"-2".....**£4.95**
Di-pole centre (for wire).....**£4.95**
Di-pole centre (for aluminium rod).....**£4.95**
Dog bone insulator.....**£1.00**
Dog bone insulator heavy duty.....**£2.00**

5ft POLES H/DUTY (SWAGED)

Heavy Duty Aluminium (1.2mm wall)
1 1/4" single 5' ali pole.....**£7.00**
1 1/4" set of four (20' total approx).....**£24.95**
1 1/2" single 5' ali pole.....**£10.00**
1 1/2" set of four (20' total approx).....**£34.95**
1 3/4" single 5' ali pole.....**£12.00**
1 3/4" set of four (20' total approx).....**£39.95**
2" single 5' ali pole.....**£15.00**
2" set of four (20' total approx).....**£49.95**
(All swaged poles have a push fit to give a very strong mast set)

CABLE & COAX CABLE

RG58 best quality standard per mt.....**35p**
RG58 best quality military spec per mt.....**60p**
RGMini 8 best quality military spec per mt.....**70p**
RG213 best quality military spec per mt.....**85p**
H100 best quality military coax cable per mt.....**£1.10**
3-core rotator cable per mt.....**45p**
7-core rotator cable per mt.....**£1.00**
10 amp red/black cable 10 amp per mt.....**40p**
20 amp red/black cable 20 amp per mt.....**75p**
30 amp red/black cable 30 amp per mt.....**£1.25**
Please phone for special 100 metre discounted price

CONNECTORS & ADAPTERS

PL259/9 plug (Large entry).....**£0.75**
PL259 Reducer (For PL259/6 to conv to P1259/6).....**£0.25**
PL259/6 plug (Small entry).....**£0.75**
PL259/7 plug (For mini 8 cable).....**£1.00**
BNC Screw type plug (Small entry).....**£1.00**
BNC Solder type plug (Small entry).....**£1.00**
BNC Solder type plug (Large entry).....**£2.50**
N-Type plug (Small entry).....**£2.50**
N-Type plug (Large entry).....**£2.50**
SO239 Chassis socket (Round).....**£1.00**
SO239 Chassis socket (Square).....**£1.00**
N-Type Chassis scoket (Round).....**£2.50**
N-Type Chassis scoket (Square).....**£2.50**
SO239 Double female adapter.....**£1.00**
PL259 Double male adapter.....**£1.00**
N-Type Double female.....**£2.50**
SO239 to BNC adapter.....**£1.50**
SO239 to N-Type adapter.....**£3.00**
SO239 to PL259 adapter (Right angle).....**£2.50**
SO239 T-Piece adapter (2xPL 1XSO).....**£3.00**
N-Type to PL259 adapter (Female to male).....**£2.50**
BNC to PL259 adapter (Female to male).....**£2.00**
BNC to N-Type adapter (Female to male).....**£2.50**
BNC to N-Type adapter (Male to female).....**£2.50**
SMA to BNC adapter (Male to female).....**£3.95**
SMA to SO239 adapter (Male to SO239).....**£3.95**
SO239 to 3/8 adapter (For antennas).....**£3.95**
3/8 Whip stud (For 2.5mm whips).....**£2.95**
Please add just £2.00 P&P for connector only orders

10/11 METRE ANTENNAS

G.A.P.12 1/2 wave alumimum (length 18' approx).....**£24.95**
G.A.P.58 5/8 wave aluminium (length 21' approx).....**£29.95**
S27-3 3-element yagi. Freq: 27-28MHz. Length: 2.5mtrs. Gain: 8.5dB.....**£59.95**
S27-4 4-element yagi. Freq: 27-28MHz. Length: 3.8mtrs. Gain: 10.5dB.....**£69.95**

BALUNS

MB-1 1:1 Balun 400 watts power.....**£24.95**
MB-4 4:1 Balun 400 watts power.....**£24.95**
MB-6 6:1 Balun 400 watts power.....**£24.95**
MB-1X 1:1 Balun 1000 watts power.....**£29.95**
MB-4X 4:1 Balun 1000 watts power.....**£29.95**
MB-6X 6:1 Balun 1000 watts power.....**£29.95**
MB-Y2 Yagi Balun 1.5 to 50MHz 1kW.....**£24.95**

TRI/DUPLEXER & ANTENNA SWITCHES

MD-24 HF or VHF/UHF internal duplexer (1.3-225MHz) (350-540MHz) SO239/PL259 fittings.....**£22.95**
MD-24N same spec as MD-24 but "N-type" fittings.**£24.95**
MX2000 HF/VHF/UHF internal Tri-plexer (1.6-60MHz) (110-170MHz) (300-950MHz).....**£59.95**
CS201 Two-way di-cast antenna switch. Freq: 0-1000MHz max 2,500 watts SO239 fittings.....**£18.95**
CS201-N Same spec as CS201 but with N-type fittings.....**£28.95**
CS401 Same spec as CS201 but4-way.....**£49.95**

ANTENNA ROTATORS

AR-31050 Very light duty TV/UHF.....**£24.95**
AR-300XL Light duty UHF\VHF.....**£49.95**
YS-130 Medium duty VHF.....**£79.95**
RC5-1 Heavy duty HF.....**£349.95**
RG5-3 Heavy Duty HF inc pre set control box.....**£449.95**
AR26 Alignment Bearing for the AR300XL.....**£18.95**
RC26 Alignment Bearing for RC5-1/3.....**£49.95**

MOBILE MOUNTS

Turbo mag mount 7" 4mtrs coax/PL259 3/8 or SO239.....**£14.95**
Tri-mag mount 3 x 5" 4mtrs coax/PL259 3/8 or SO239.....**£39.95**
Hatch Back Mount (stainless steel) 4 mts coax/PL259 3/8 or SO239 fully adjustable with turn knob.....**£29.95**
Gutter Mount (same as above).....**£29.95**
Rail Mount (aluminium) 4mtrs coax/PL259 sutiable for up to 1inch roof bars or poles 3/8 fitting.....**£12.95**
SO259 fitting.....**£14.95**
Gutter Mount (cast aluminium) 4mtrs coax/PL259 3/8 fitting...**£9.95**
SO259 fitting.....**£12.95**
Hatch Back Mount 3/8 4mtrs coax/PL259.....**£12.95**
Roof stud Mount 4mts coax/PL259 3/8 or SO239 fitting.....**£12.95**

ANTENNA WIRE & RIBBON

Enamelled copper wire 16 gauge (50mtrs).....**£11.95**
Hard Drawn copper wire 16 gauge (50mtrs)..**£12.95**
Equipment wire Multi Stranded (50mtrs).....**£9.95**
Flexweave high quality (50mtrs).....**£27.95**
PVC Coated Flexweave high quality (50mtrs).....**£37.95**
300Ω Ladder Ribbon heavy duty USA imported (20mtrs).....**£15.00**
450Ω Ladder Ribbon heavy duty USA imported (20mtrs).....**£15.00**
(Other lengths available, please phone for details)

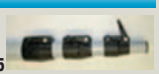
HF BALCONY ANTENNA

BAHF-4 FREQ:10-15-20-40 Mtrs LENGTH: 1.70m HEIGHT: 1.20m POWER: 300 Watts.....**£159.95**

MISCELLANEOUS ITEMS

CDX Lightening arrestor 500 watts.....**£19.95**
MDX Lightening arrestor 1000 watts.....**£24.95**
AKD TV1 filter.....**£9.95**
Amalgamating tape (10mtrs).....**£7.50**
Desoldering pump.....**£2.99**
Alignment 5pc kit.....**£1.99**

TELESCOPIC MASTS (aluminium & fibreglass options)



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

HF YAGI

HBV-2 2 BAND 2 ELEMENT TRAPPED BEAM FREQ:20-40 Mtrs GAIN:4dBd BOOM:5.00m LONGEST ELEMENT:13.00m POWER:1600 Watts.....**£399.95**

ADEX-3300 3 BAND 3 ELEMENT TRAPPED BEAM
FREQ:10-15-20 Mtrs GAIN:8 dBd
BOOM:4.42m LONGEST ELE:8.46m
POWER:2000 Watts.....**£329.95**

ADEX-6400 6 BAND 4 ELEMENT TRAPPED BEAM FREQ:10-12-15-17-20-30 Mtrs GAIN:7.5 dBd BOOM:4.27m LONGEST ELE:10.00m POWER:2000 Watts.....**£599.95**
40 Mtr RADIAL KIT FOR ABOVE.....**£99.00**

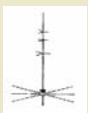
HF VERTICALS

VR3000 3 BAND VERTICAL
FREQ: 10-15-20 Mtrs
GAIN: 3.5dBi HEIGHT: 3.80m POWER: 2000 Watts (without radials)
POWER: 500 Watts (with optional radials).....**£99.95**
OPTIONAL 10-15-20mtr radial kit.....**£39.95**

VR5000 5 BAND VERTICAL FREQ:10-15-20-40-80 Mtrs GAIN: 3.5dBi HEIGHT: 4.00m RADIAL LENGTH: 2.30m (included). POWER: 500 Watts.....**£189.95**

EVX4000 4 BAND VERTICAL FREQ:10-15-20-40 Mtrs GAIN: 3.5dBi HEIGHT: 6.50m
POWER: 2000 Watts (without radials) POWER: 500 Watts (with optional radials).....**£119.95**
OPTIONAL 10-15-20mtr radial kit.....**£39.95**
OPTIONAL 40mtr radial kit.....**£14.95**

EVX5000 5 BAND VERTICAL FREQ:10-15-20-40-80 Mtrs GAIN: 3.5dBi HEIGHT: 7.30m POWER: 2000 Watts (without radials) POWER: 500 Watts (with optional radials).....**£169.95**
OPTIONAL 10-15-20mtr radial kit.....**£39.95**
OPTIONAL 40mtr radial kit.....**£14.95**
OPTIONAL 80mtr radial kit.....**£16.95**

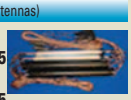


EVX6000 6 BAND VERTICAL FREQ: 10-15-20-30-40-80 Mtrs GAIN: 3.5dBi HEIGHT: 5.00m RADIAL LENGTH: 1.70m(included) POWER: 800 Watts.....**£299.95**

EVX8000 8 BAND VERTICAL FREQ:10-12-15-17-20-30-40 Mtrs (80m optional) GAIN: 3.5dBi HEIGHT: 4.90m RADIAL LENGTH: 1.80m (included) POWER: 2000 Watts.....**£319.95**
80 MTR RADIAL KIT FOR ABOVE.....**£89.00**
(All verticals require grounding if optional radials are not purchased to obtain a good VSWR)

TRAPPED WIRE DI-POLE ANTENNAS

(Hi Grade Heavy Duty Commercial Antennas)



UTD160 FREQ:160 Mtrs LENGTH:28m POWER:1000 Watts.....**£49.95**
MTD-1 (3 BAND) FREQ:10-15-20 Mtrs LENGTH:7.40 Mtrs POWER:1000 Watts..**£44.95**
MTD-2 (2 BAND) FREQ:40-80 Mtrs LENGTH: 20Mtrs POWER:1000 Watts.....**£49.95**
MTD-3 (3 BAND) FREQ:40-80-160 Mtrs LENGTH: 32.5m POWER: 1000 Watts.....**£89.95**
MTD-4 (3 BAND) FREQ: 12-17-30 Mtrs LENGTH: 10.5m POWER: 1000 Watts.....**£44.95**
MTD-5 (5 BAND) FREQ: 10-15-20-40-80 Mtrs LENGTH: 20m POWER:1000 Watts.....**£79.95**
(MTD-5 is a crossed di-pole with 4 legs)

PATCH LEADS

STANDARD LEADS
1mtr RG58 PL259 to PL259 lead.....**£3.95**
10mtr RG58 PL259 to PL259 lead.....**£7.95**
30mtr RG58 PL259 to PL259 lead.....**£14.95**
MILITARY SPECIFICATION LEADS
1mtr RG58 Mil spec PL259 to PL259 lead.....**£4.95**
10mtr RG58 Mil spec PL259 to PL259 lead.....**£10.95**
30mtr RG58 Mil spec PL259 to PL259 lead.....**£24.95**
1mtr RG213 Mil spec PL259 to PL259 lead.....**£4.95**
10mtr RG213 Mil spec PL259 to PL259 lead.....**£14.95**
30mtr RG213 Mil spec PL259 to PL259 lead.....**£29.95**
(All other leads and lengths available, ie. BNC to N-type, etc. Please phone for details)

SPX-100 'PLUG N GO'

Normally £49.95. This month **£39.95**!! Plus £6.00 P&P
6mtrs through to 80mtrs.
Change band by using a simple fly lead and socket at the base coil and fine tune with the adjustable telescopic whip.
Standard 3/8 thread 1.65mtrs fully extended.

ALL PICTURES ARE FOR REFERENCE ONLY

Fort On The Air

A new exhibition of radio equipment and special Amateur Radio Station, GB2NFM, was recently opened by the Admiral of the Fleet Sir Henry Leach.

Sunday 25 April was the culmination of 15 months volunteer work by Sussex Radio Amateurs to display the lifetime radio collection of the late **Cyril Fairchild G3YY** and restore an old signals room at Newhaven Fort Museum. The room, high up overlooking the Channel, now houses the collection and is an operational radio station, which will make contacts world-wide.

Sir Henry inspected local Sea Cadets who piped him aboard and formed a guard of honour. He went on to tour the Fort and meet local people including one Lewes man who had served with him on board ship.

Sir Henry, who has local links via St Dunstan's, explained that Cyril G3YY had been an interceptor during the Second World War listening in and reporting enemy Morse code transmissions to Bletchley Park where the intelligence gathered had a major impact on winning the war. Cyril's great-grand daughter, ten year old **Scarlett Paine** assisted Sir Henry in unveiling a plaque commemorating the opening.

Newhaven Fort Museum is now open to the public seven days a week and members of the Worthing and District Amateur Radio Club who carried out the work at the Fort will be on hand to talk to visitors and to air the station.

For more information on the Worthing club activities and membership contact **Roy G4GPX** on:
Tel: (01903) 753893
E-mail:
roy.bannister@ntlworld.com
Website: www.wadarc.org.uk

Errors & Updates

Doing It By Design *PW* May 2004

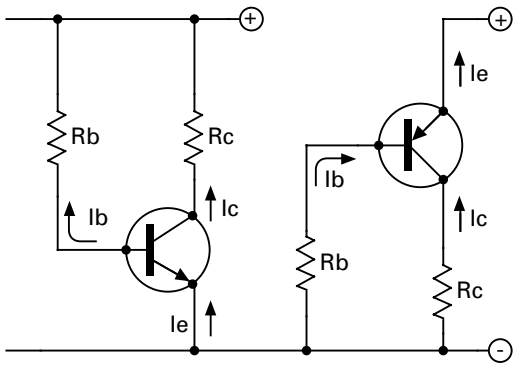
On page 18 of the May 2004 issue of *PW*, the gremlins have made their mark again with confusing arrows representing current flow in the illustrations of Fig. 1 and Fig. 2 on that page. The new illustrations shown here should be used to replace those on page 18 of the May issue.

In reality all current is a flow of electrons from the most negative point to the most positive point in any circuit. In all junction transistors, of either *npn* or *pnp* types, the emitter current (Ie) is always the sum of the collector (Ic) and the base (Ib) currents (Ie=Ic+Ib).

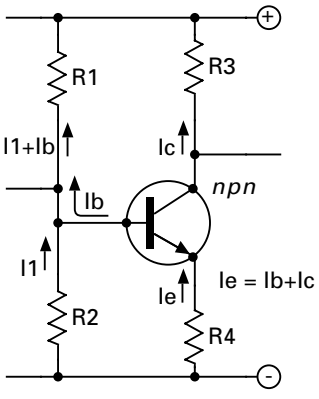
In the illustration of Page 18 of the May issue, it also wasn't clear enough that the current flowing through R2 was the standing bias current I1. The current flowing through R1 though will be I1 plus the base current (Ib) of the transistor itself as described in the right hand column of the text.

My apologies for these errors. Editor

WST2368



WST2369



amateur radio clubs

Keep up-to-date with your local club's activities and meet new friends by joining in!

BERKSHIRE
Bracknell Amateur Radio Club
Tel: (01344) 425666
Website: www.g4bra.org.uk
Members of the Bracknell Club meet on the second Wednesday of every month at the Coopers Hill Youth and Community Centre, Crowthorne Road North, Bracknell, Berkshire. Meetings generally start at 2000hours and go on to 2200hours. Meetings cover a wide range of topics of interest and visitors are always welcome.

At the recently held Annual General Meeting the following committee was elected for the 2004/2005 year. Chairman: **John Ellerton G3NCN**; Secretary: **Simon Poysden G1BND**; Treasurer: **Dave Sergeant G3YMC**; Minutes Secretary: **Elaine Poysden M1KDA**. Co-opted Members are: **Steve Baugh G4AUC** - Newsletter Editor and **Richard May G8IBP**.

CHESTER
Chester & District Radio Society
Contact: Chris Wild MW3TWI
Tel: (01244) 683629
Chester & District Radio Society meet each Tuesday (except the second Tuesday of the month) at the Burley Memorial Hall, Waverton. Everyone welcome. For more details contact Chris MW3TWI, details as above.

DORSET
Bournemouth Radio Society
Contact: Chris Ellis M5AGG
Tel: (01202) 893126
Website: www.brswebsite.freeserve.co.uk
Bournemouth Radio Society meet on the 1st & 3rd Friday of every month at 1930 hours at the Kinson Community Centre, Millhams Road, Kinson, Bournemouth. Why not go along to one of their meetings? **May 21:** Talk on 'Astronomy' by **Rob Hatch G6CQG**; June 4: Discussion - SWR and **18th:** TBA.

ESSEX
South Essex ARS
Contact: Betty Maynard G6LUO
Tel: (01268) 695474
Website: www.southessex.ars@btinternet.co.uk
The South Essex Amateur Radio Society meet at 2000hours at The Paddocks, Community Centre on the 1st & 3rd Wednesday of each month. The club takes part in several contests each year and run a special event station. Many aspects of Amateur Radio are supported by the members, including Packet, Radio, c.w. and s.s.b. If you are interested in Amateur Radio, computing, electronics. etc., then go along and join in.

KENT
Dover Radio Club
Contact: David Harding G0DQI
Website: www.DARC.org.uk
The Dover Radio Club meet every Wednesday at 1930 hours during term time the Dover Boy's Grammar School. The club is a centre for the Foundation Course, the Intermediate course as well as Morse training. Listen out for the club call **GB6OFS** on **June 5 & 6th** when the club will be putting on a special event station from Dover Castle to commemorate the D-Day Landings 60 years ago.

STAFFORD
St. Leonards Amateur Radio Society
Contact: Derek Southey G0EYX
Tel: (01785) 604904
E-mail: g0eyx.derek@ntlworld.com
Website: www.slars.org.uk
The St. Leonards Amateur Radio Society meet every Thursday at Alstom Protection & Control, St. Leonards Works, Stafford at 2000hours. Forthcoming events include **May 20:** Committee meeting and shack night; **27th:** Earth Potential by **John G8HWI**; **June 3:** Shack Night & **6th**: 60th Anniversary of 'D' Day Landings (special event station). Why not go along and join?

Keep those details coming in!

SHOWROOM & MAIL ORDER:
Unit 1, Thurrock Commercial Centre,
Purfleet Industrial Park,
Juliette Way, Aveley, RM15 4YA
TEL: 01708 862524 FAX: 01708 868441
Open: Mon-Fri, 8.30am-4.00pm.
Sat: 8.30am-12.00pm.

HAYDON Communications

W. MIDLANDS SHOWROOM
Unit 1, Canal View Ind. Est., Brettel Lane,
Brierley Hill, W. Mids. DY5 3LQ
Open: Mon-Thurs, 9.30-4.30pm.
Fri: 9.30-3.30pm. Sat: 9.30-1.00pm
TEL: 01384 481681
NO MAIL ORDER TO MIDLANDS BRANCH

PRICES SUBJECT TO CHANGE WITHOUT PRIOR NOTICE. PLEASE VERIFY BEFORE ORDERING. E&OE.

Mail order: 01708 862524

NEXT DAY DELIVERY TO MOST AREAS, £10.00.

All items sold subject to our terms & conditions - available on request

CUSHCRAFT BARGAINS

MA5V	New vertical 10, 12, 15, 17, 20m	SPECIAL ~~£229.95~~	£199.00
MA5B	Mini beam 10, 12, 15, 17, 20m	~~£389.00~~	£329.95
A3S	3 ele beam 10, 15, 20m	~~£499.95~~	£379.00
A4S	4 ele beam (10-20m)	~~£599.95~~	£449.99
R-6000	Vertical 6, 10, 12, 15, 17, 20m	~~£349.95~~	£315.95
R-8E	Vertical (40-10m) "special"	SPECIAL ~~£499.95~~	£399.99
X-7	7 ele 10, 15, 20m	SPECIAL ~~£699.95~~	£599.95

MOBILE PENETRATOR

1.8-30MHz (200W PEP) mobile antenna – no ATU required. Length 102" (52" collapsed). Fits 3/8 mount (SO239 feed point)
OUR PRICE **£139.95** delivery £10.00

New improved 'Wire Penetrator' 1.8-60MHz end-fed wire antenna (45ft long) £159.95

Q-TEK PENETRATOR

"WE'VE SOLD 100s ALL OVER EUROPE"

★ 1.8 - 60MHz HF vertical ★ 15 foot high ★ No ATU or ground radials required ★ (200W PEP).
ONLY **£179.95** delivery £10

SEND SAE FOR LEAFLET

Q-TEK COLINEARS (VHF/UHF)

P&P £10.00

X-30 GF 144/70, 3/6dB (1.1m) glassfibre £39.95
X-50 GF 144/70, 4.5/7.2dB (1.7m) glassfibre £54.95
X-300 GF 144/70,6.5/9dB (3m) glassfibre £69.95
X-500 GF 144/70, 8.5/11dB (5.4m) glassfibre £149.95
X-627 GF 50/144/70, 2.15/6.2/8.4dBi (2.4m) £69.95

Q-TEK YAGIS

Delivery £10.00

2m	5ele (boom 63"/10.5dBd)	£49.95
2m	8ele (boom 125"/13dBd)	£64.95
2m	11ele (boom 156"/13.5dBd)	£94.95
2m	5ele crossed (boom 64"/10.5dBd)	£79.95
2m	8ele crossed (boom 126"/13dBd)	£99.95
4m	3ele (boom 45"/8.5dBd)	£56.95
4m	5ele (boom 128"/11.5dBd)	£69.95
6m	3ele (boom 72"/8.5dBd)	£59.95
6m	5ele (boom 142"/11.5dBd)	£79.95
70cm	13ele (boom 76"/14.9dBd)	£46.95
70cm	13ele crossed (boom 83"/14.9dBd)	£79.95

DELUXE G5RV

P&P on either full/half size £6.50

Multi-stranded heavy duty flexweave wire. All parts replaceable. Stainless steel and galvanised fittings.

Double size - 200ft (160-10m) £84.95
Full size - 102ft (80-10m) £42.95
Half size 51ft. (40-10m) £36.95

Choke Balun — Inline balun for G5RV ..... £24.95 P&P £3

STANDARD G5RV

Full size 102ft (now includes heavy duty 300Ω ribbon) ..... £28.95 P&P £6
Half size 51ft (now includes heavy duty 300Ω ribbon) ..... £24.95 P&P £6

Q-TEK INDUCTORS

80mtr inductors + wire to convert ½ size G5RV into full size. (Adds 8ft either end) ..... £24.95 P&P £2.50 (a pair)

DIPOLE CENTRE PIECES

Open wire £5.99
SO-239 ..... £5.99

300Ω HEAVY DUTY FEEDER

5m length ..... £5.00 P&P £3.00
10m length ..... £10.00 P&P £3.00
300m roll "club special buy" ..... £135.00 P&P £10.00

BALUNS & TRAPS

1.1 Balun			£25.00 P&P £4
4.1 Balun			£25.00 P&P £4
6.1 Balun			£25.00 P&P £4
40 mtrs	Traps	(a pair)	£25.00 P&P £4
80 mtrs	Traps	(a pair)	£25.00 P&P £4
10 mtrs	Traps	(a pair)	£25.00 P&P £4
15 mtrs	Traps	(a pair)	£25.00 P&P £4
20 mtrs	Traps	(a pair)	£25.00 P&P £4
5.35MHz	Traps		£25.00 (a pair)

1kw Handling

REPLACEMENT POWER LEADS

DC-1 Standard 6-pin/20A fits most HF £20.00
DC-2 Standard 2-pin/15A fits most VHF/UHF £10.00

CAROLINA WINDOM

CW-160S	(160-10m) 40m long	£129.95 P&P £8.50
CW-160	(160-10m) 80m long	£119.95 P&P £8.50
CW-80	(80-10m) 40m long	£89.95 P&P £8.50
CW-80S	(80-10m) 20m long	£109.95 P&P £8.50
CW-40	(40-10m) 20m long	£84.95 P&P £8.50

MOBILE ANTENNAS

P&P £8.50

DB-770M	2m/70cm (3.5 - 5.8dB) 1m PL-259	£24.95
DB-7900	2m/70cm (5.5 - 7.2dB) 1.6m PL-259	£39.95
PL-62M	6m + 2m (1.4m) PL-259	£19.99
PLT-20	20m mobile whip (56" long)	£24.95
PLT-40	40m mobile whip (64" long)	£24.95
PLT-80	80m mobile whip (64" long)	£24.95
PLT-259	PL-259 converter for above	£5.95

NEW NOISE FILTER!

A superb TDK 'snap fix' ferrite clamp for use in Radio/TV/ Mains/PC/Phone etc. *Simply close shut over cables and notice the difference!* Will fit cables up to 13mm diameter. Ideal on power supply leads/mic leads/audio leads/phone leads.
On thin cable simply wind cable round clamp 1-to-2 times. Simple yet effective!
OUR PRICE: **2 for £10** (p&p £2.50)

DOUBLE THICK FERRITE RINGS

A superb quaility ferrite ring with incredible properties. Ideal for "R.F.I". Width 12mm/OD35mm.
6 for £12.00 12 for £20.00
P&P £3.50

COAX BARGAINS

Genuine high quality coax
MILITARY SPEC

RG-213 Mil spec x 100m.
ONLY **£69.95** P&P £10
RG-58 Mil spec x 100m.
ONLY **£35.00** P&P £10.00
Coax stripping tool (for RG-58) £4.50

PHASING HARNESSES

A2 6m 2-way 6m	£25.00	A4 2m 4-way 2m	£30.00
A2 4m 2-way 4m	£25.00	A4 70cm 4-way 70cm	£30.00
A2 88MHz 2-way 88MHz	£20.00	A2 23cm 2-way 23cm	£30.00
A2 2m 2-way 2m	£25.00	A2 137MHz 2-way 137MHz	£20.00

LOW LOSS PATCH LEADS

£2.50 P&P

Connectors	Length	Price
PL-259 - PL-259	0.6m	£5.99
PL-259 - PL-259	4m	£9.99
BNC - BNC	1m	£6.99
BNC - BNC	5m	£10.00

COPPER ANTENNA WIRE ETC

Enamelled (50m roll)	£12.95 P&P £5
Hard drawn (50m roll)	£13.95 P&P £5
Multi-Stranded (Grey PVC) (50m roll)	£11.95 P&P £5
Flexweave (H/duty 50 mtrs)	£30.00 P&P £5
Flexweave H/duty (18 mtrs)	£15.95 P&P £5
Flexweave (PVC coated 18 mtrs)	£18.95 P&P £5
Flexweave (PVC coated 50 mtrs)	£40.00 P&P £6
Special 200mtr roll PVC coated flexweave	£99.00 P&P £10
Copper plated earth rod (4ft)	£13.00 P&P £6
Copper plated earth rod (4ft) + earth wire	£18.99 P&P £6
New RF grounding wire (10m pack) PVC coated	£12.50 P&P £5

NISSEI PWR/SWR METERS

RS-502 1.8-525MHz (200W) ..... £79.95 P&P £5
RS-102 1.8-150MHz (200W) ..... £59.95 P&P £5
RS-402 125-525MHz (200W) ..... £59.95 P&P £5
RS-3000 1.8-60MHz (3kW) Incls mod meter £79.95 P&P £5
RS-40 144/430MHz Pocket PWR/SWR ..... £34.95 P&P £2
DL-30 diamond dummy load (100W max) ... £26.99 P&P £3

COAX SWITCHES (P&P £4.50)

2 way CX-201 (0-1GHz) SO239 ..... £19.95
2 way CX-201 'N' (0-1GHz) 'N' £24.95
4 way CX-401 (0-500MHz) SO239 ..... £69.95
4 way CX-401 'N' (0-500MHz) 'N' £79.95

NEW EASY FIT WALL PULLEY

Pulley will hang freely and take most rope up to 6mm. (Wall bracket not supplied).
PULLEY **£8.99** + P&P £2.50
Wall bracket, screws not supplied. Simply screw to outside wall and hang pulley on
WALL BRACKET **£2.99** P&P £1.00

MAST HEAD PULLEY

A simple to fit but very handy mast pulley with rope guides to avoid tangling. (Fits up to 2" mast).
£8.99 + P&P £2.50

30m pack nylon guy rope (4.4mm) £12.50
132m rol nylon guy rope (4.4mm) £40.00

ALUMINIUM POLES

All measurements approx

2" x 2.4m length — 2mm wall thickness ..... £19.99 P&P £10
2" x 20' — Collection only 2mm thick .... £39.99 P&P N/A

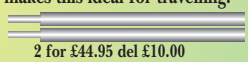
TELESCOPIC MASTS

Approx lengths

6 section telescopic masts. Starting at 2½" in diameter and finishing with a top section of 1¼" diameter we offer a 8 metre and a 12 metre version. Each mast is supplied with guy rings and steel pins for locking the sections when erected. The closed height of the 8 metre mast is just 5 feet and the 12 metre version at 8 feet. All sections are extruded aluminium tube with a 16 gauge wall thickness.
8 mtrs **£109.95** 12 mtrs **£149.95** *Carriage £12.00.*
Tripod for telescopic masts £89.95

CAR BOOT MAST SET

Once they've gone, they've gone! 5 section (15') 4.5m 1¼" slot together mast set. Collapsed length 0.92m (3') makes this ideal for travelling.
£24.95 Del £10.00



2 for £44.95 del £10.00 — 3 for £64.95 del £10.00

SWAGED MAST SET

4 x 5' lengths of approx 2" extruded (16 gauge) heavy duty aluminium, swaged at one end to give a very heavy duty mast set.
OUR PRICE **£44.95** Del £10

2 for £79.95 Del £12.50
3 for £109.95 Del £15.00

NEW 20' SLEEVED MAST SET

A heavy duty-sleeved, mast set that will tightly slot together. 4 x 5' (2" dia) 16 guage heavy duty aluminuim tubes. (Dimensions approx).
£49.99 Del £10.00.

YAESU REPLACEMENT MICS

MH-IC8 8 pin Yaesu mic (8-pin round) £22.50
MH-4 4 pin fits older HF, etc. (4-pin round) £15.00

METAL WORK & BITS

P&P available on request

2"	Mast base plate	£12.95 P&P £5
6"	Stand off	£6.95 P&P £5
9"	Stand off	£8.95 P&P £5
12"	T&K Brackets	£12.00 P&P £8
18"	T&K Brackets	£18.00 P&P £8
24"	T&K Brackets	£20.00 P&P £8

10mm fixing bolts (needs 8mm hole) ..... £1.40 each
U bolts (1½" or 2") ..... £1.20 each
8 nut universal clamp (2" - 2") £5.95
2" - 2" cross over plate £10.95
3-way guy ring £3.95
4-way guy ring £4.95
2" mast sleeve £9.95
1½" mast sleeve £8.95
Standard guy kits (with wire) ..... £24.95 P&P £6
Heavy duty guy kits (with wire) ..... £29.95 P&P £6
Ground fixing spikes (3 set) powdered coated £24.00 P&P £8
30m pack nylon guy 4.4mm/B/load 480kg ..... £12.50 P&P £3
132m roll nylon guy (4.4mm) ..... £40.00 P&P £7.50
Self amalgamating tape (roll) £6.50
'Nylon' dog bone insulators ..... £1.00 each
Chimney lashing kit £12.99

SHOWROOM & MAIL ORDER:
Unit 1, Thurrock Commercial Centre,
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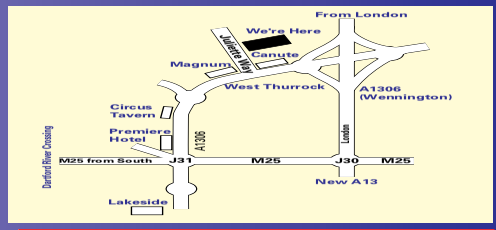

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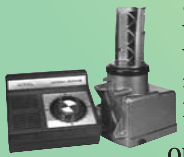

Quality rotator for VHF/UHF. Superb for most VHF-UHF yagis, 3 core cable required. 3 core cable 50p per mtr.

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KM-08 Kenwood modular lead....................£9.95

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UK VERSION

HF digital SWR analyser + 1.8-170MHz counter/resistance meter.

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ADSP-2 PCB unit (goes in-line with speaker feed)......£89.95

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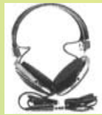

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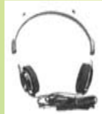

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Yaesu VR-120D....................our price £115.00

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we've always been known for short wave

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The short wave receiver for the true enthusiast. Includes free PSU.
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★ Superb performance SW receiver ★ 0.2-30MHz (all mode) ★ Selectable tuning steps (down to 100Hz) ★ 240 or 12V ★ Digital S-meter ★ Attenuator ★ Key pad entry ★ 160 memories ★ Noise blanker.

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SANGEAN ATS-909

A superb performance all mode synthesized world receiver with true SSB and 40Hz tunning for ultra clean reception. The same radio is sold under the Roberts name at nearly twice the price. Other features include RDS facility, 306 memories and WFM.

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NEW! Wins Dutch "Automobile" award. Excellent small short wave receiver (digital). 0.15-30MHz (AM, SSB, CW, WFM). 88-108MHz FM stereo. Includes carry case.

Optional 240V Power Supply £9.95

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Tropospheric Propagation -Part 2

Gordon King G4VFV carries on from the April issue with his look at tropospheric propagation.

As discussed in Part 1 (*PW* April 2004), the linearly decreasing refractive index of the troposphere causes the path of v.h.f. and higher frequency radio waves to curve results slightly round the Earth. This result's in the radio horizon distance exceeding the optical horizon distance by an amount equivalent to the Earth's radius being increased by 33%, assuming straight line wave paths. The idea is illustrated in **Fig. 1**, where at (a) the Earth's radius is given as r and the optical horizon distance between the tops of the transmitting (TX) and receiving (RX antenna as d. At (b) the radius has been increased by 33%, increasing distance d by 15%, which now represents the radio horizon distance.

Approximations of the optical and radio horizon distances respectively, can be calculated from √(1.5h) and √(2h), where the distance is in miles and the height h in feet above sea level. These two little equations are based on the radio horizon distance being about 15% greater than the optical horizon distance in a homogeneous troposphere.

Of course, communication doesn't suddenly cease. It becomes progressively less reliable as the radio horizon distance is exceeded. With commercial v.h.f., u.h.f., s.h.f. and microwave communication links something approaching 99.9% reliability is essential, but as radio is our hobby and a self-training base, beyond-the-horizon propagation should really add to our interest, especially during periods of dramatic lift.

The temperature, pressure and humidity of the troposphere can vary from point-to-point over relatively short periods. This is why very short wavelength communication reliability diminishes as the radio horizon distance is exceeded.

Such fluctuations about the mean value may suddenly result in the brief reception of a station, which has been beyond the radio horizon distance. However, there are other times, commonly related to disturbances in the weather, when changes in the index are much more dramatic and hold for longer periods. It's during these times when quite exciting, but viable DX challenges are presented.

Long-distance 144MHz band contacts from my Brixham location have included tropospheric paths during lift conditions over most of the UK, to Scotland in the north, Norfolk in the east and Dublin in the west,. This is in addition to numerous paths into various parts of Europe using little more than 10W of r.f. into seven- and ten-element Yagi arrays. Experiments

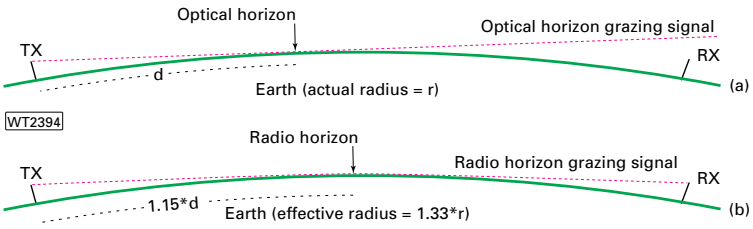


Fig. 1: The nominal refractive index of the troposphere is equivalent to the Earth's radius being increased by 33% when the wave path between the tops of the transmitting (ht) and receiving (hr) antennas is given as a straight line. (a) shows the path length over a normal radius Earth and (b) when the radius is increased by 33%, the path length now being 15% greater.

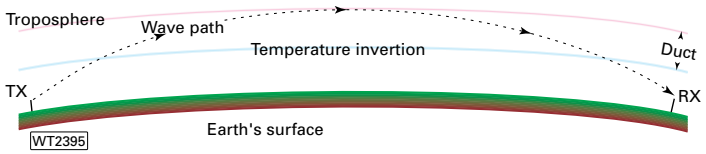


Fig. 2: When there is a discontinuity in the standard temperature gradient of the troposphere, waves at v.h.f. and above might become trapped between the boundaries of the discontinuity and undergo relatively long-distance 'ducting'.

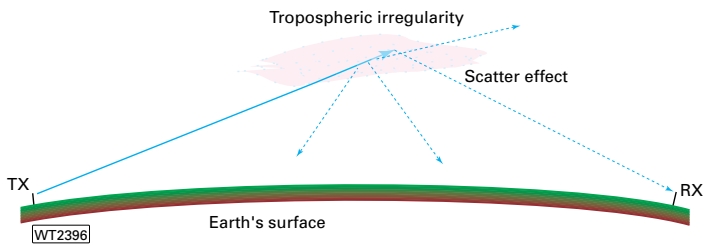


Fig. 3: Signal scatter due to random tropospheric irregularities can result in propagation over distances greater than normal refraction alone.

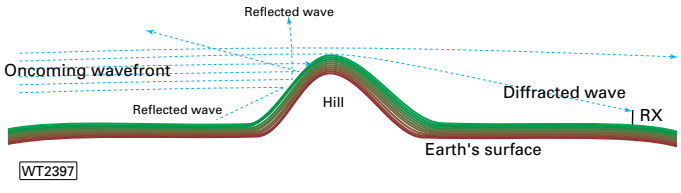


Fig. 4: Signals at v.h.f. and above can sometimes be received in shadow zones due to diffraction over the obstruction.

with Amateurs in an early 'Horizontal FM Group' (sadly, now defunct) revealed that a DX edge was sometimes achieved with horizontal and circular polarisation, (but that's another story!).

Over The Horizon

The potential for over-the-horizon propagation is substantially increased when there's a glitch in the troposphere, which causes the temperature to increase suddenly with height before resuming its normal rate of decrease (see Part 1). When this happens at relatively high altitudes the signal may either be reflected back to Earth over distances well in advance of the radio horizon, or become 'trapped' between the boundaries of the discontinuity and then guided round the curved Earth, often over remarkably long distances, as shown in **Fig. 2**.

The effect is known as 'ducting' and is the kind of propagation that becomes more prevalent at very short wavelengths. Random irregularities, virtually anywhere in the troposphere, can also be responsible for sporadic contacts beyond the radio horizon, even at locations, which are shielded by tall buildings or rising ground. The more elevated the irregularity, the greater the distance over which the signal is likely to be scattered, as indicated in **Fig. 3**.

Diffraction

Another quasi-optical function that makes the reception of very short wavelength signals possible in the radio shadow area of rising ground is diffraction. For example, when an advancing wave skims the peak of a hill, diffraction will cause the wave to deflect downwards resulting in the presence of a signal field at some distance within the radio shadow side of the hill, as illustrated in **Fig. 4**.

Clearly, the way in which both the troposphere and terrain can influence the propagation of very short wave signals are diverse and not readily predictable, making it difficult to stipulate any hard and fast rules. Which is one of the reasons, of course, why operating in the very high frequency bands can be so interesting!

It's also worth noting that while the field strength over urban and hilly terrain can be severely diminished owing to shadowing, scattering and absorption by hills, buildings and trees, a small amount of terrain irregularity may sometimes enhance the field strength by screening the destructive interference of the ground-reflected wave!

Within the radio horizon distance there may be areas of abnormally high field strength resulting from a hill or other obstruction shielding the destructive ground-reflected wave from the receiving antenna, the antenna then responds to the significantly higher field strength of the direct-wave alone. In engineering circles this is referred to as 'obstacle gain'.

Much More To Explore

Yes, indeed, there's still much to explore on the very short wavelengths, but I can't help feeling sad that the v.h.f. and u.h.f. amateur bands seem to be far less used for experimental projects of recent times. Although it's that much easier now to get an h.f. ticket, letís not desert these bands completely, or exploit them merely for repeater contacts. Anyway, whatever you do always strive to achieve the utmost from our remarkably diverse and interesting hobby! Cheerio and happy days to you all. **PW**

Club Spotlight Magazine Competition 2004

It Could Be You!

It's time to turn the Club Spotlight on again as we invite you to enter your club magazines into the *Practical Wireless* & Kenwood Club Spotlight Magazine Competition.

It's very simple to enter the Club Spotlight magazine competition. All you need to do is to send us the **three most recent paper copies (no E-mailed copies please)** of your magazine along with a covering letter. The covering letter should make it clear **which category of club you would like to enter your magazines into**. For example, the **Radio Officers' Association Radio Society**, winner of the 2003 national award - can only enter in the national club section, whereas the **The South Dorset Amateur Radio Society** - last year's winners, have to specify that they are a local club.

Local clubs entering will be competing for the magnificent original trophy - kindly donated by Kenwood - and **national clubs** will be competing for Bert's Bell, the award, which was instituted in 1997 in tribute to the late **Bert Newman G2FIX**.

National Or Local?

For either category (national or local) your covering letter should provide the following details: How many people there are on the Editorial team and the type of job they do/or did (if retired); how long the magazine has been established; how it's produced (on your computer or text supplied to 'outside' printer for professional printing, etc.) and whether or not the publication is 'sponsored', the number of copies printed and membership size of your club. It would also help the judging panel if you could provide some historical details on your club.

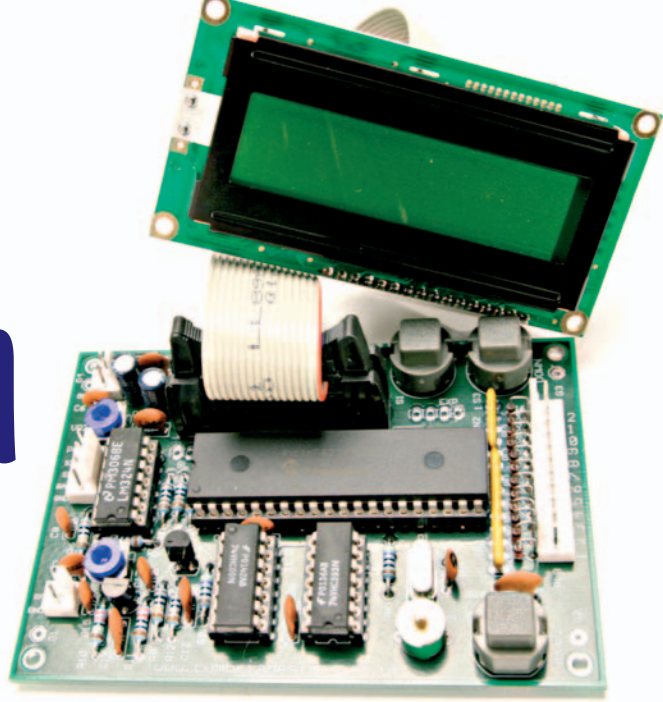
The judging panel comprises of **John Goodall G0SKR**, **David Barlow G3PLE**, **David Wilkins G5HY** and **Rob Mannion G3XFD**. Entry to the competition is open now and all entries should be at the *PW* offices in Broadstone no later than **Monday 2 August 2004**. This is so the presentations can be made at the Leicester Show in September and members of the judging panel live in places as far apart as Cornwall, Dorset, East Anglia and Greater London, so it will not be possible to consider late entries! So, make sure your club's entry reaches us in good time!

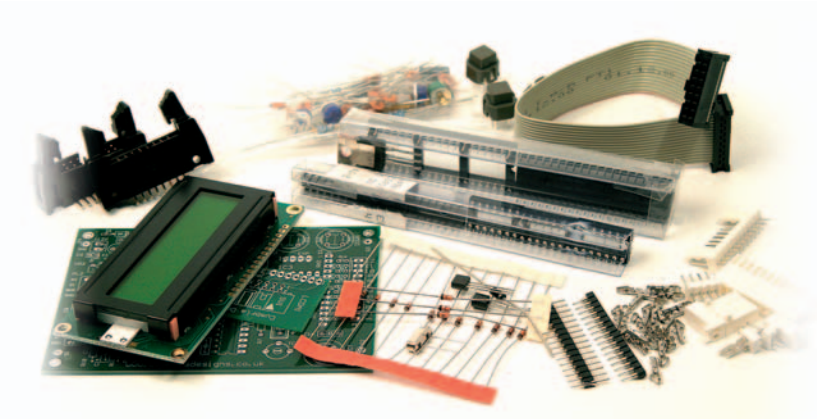
The Editor's decision (as head of the adjudication panel) is final and no correspondence will be entered into. **Good luck** and we look forward to reading **your** magazine!

All entries should be sent to: **Donna Vincent G7TZB/M3TZB, Club Spotlight Magazine Competition, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.**

More Chances To Win!

Kit Competition





Win an FD-01 Kit worth over £50!

As promised in the April 2004 issue of *PW* where **Tex Swann G1TEX/M3NGS** reviewed the Cumbria Designs FD-O1 Frequency Display Kit - it's now your chance to win one, kindly donated by **Ron Taylor** of Cumbria Designs.

In his review of the FD-01 Tex summarised the kit as being "A very professional created kit. The project should be suitable for all but the absolute beginner and is at a price that is affordable". For the full review see the April issue (back issues available at £3.45 from the PW Book Store).

To be in with a chance of winning a ready-to-build FD-01 Kit worth **£59.95** all you have to do is find the **10** words in the wordsearch grid on this page and send your completed entry, with Corner Flash (photocopies accepted with original corner flash), to: **FD-01 Comp, PW June, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.** Closing date for entries is **9 June 2004.** The Editor's decision on the winner is final and no correspondence will be entered into, the winner will be notified by post.

So, what are you waiting for? Post your entry today - Good Luck!

B	F	G	E	T	M	T	N	P	N	F	B	H	S
H	F	S	W	X	L	I	O	U	I	Y	L	Y	N
Y	A	D	C	K	E	V	I	N	Q	C	D	H	G
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U	E	P	Y	H	O	P	V	C	J	O	I	T	Y
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FD-01 Kit Comp PW June

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Over the last 40 years Icom have produced market-leading base-station, mobile, handheld transceivers and communications receivers to the highest standards. Our background photograph features the vintage IC-700R and IC-700T, two separate HF receive and transmit units produced even before the name Icom was born! Today, Icom's reputation for creating cutting-edge, innovative radios culminates with the IC-7800 - the HF transceiver that like all other Icom products, delivers the very best to all radio Amateurs.

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Count on us!

radio basics

This month Rob Mannion G3XFD does his best to encourage you to install an oscilloscope in your workshop. Rob's also anxious to explain that you won't necessarily need a top price 'super-duper' instrument as you can get excellent results from a 'Bargain Basement' oscilloscope!

Rob Mannion G3XFD tries really hard to persuade you not to be overawed by a modern oscilloscope. Rob says "Don't be put off by the apparent complexity". Instead, he says it can be a powerful friend on the workbench. This photograph shows a Beckman Industries 20MHz bandwidth 'scope.

I can easily imagine some Radio Basics (RB) readers flinching when they first read the to this month's column. They might even remark.... "An oscilloscope in my shack? Surely that's a step too far - and too quickly for me"?

Well, if I heard anyone reacting in that way I'd soon do my level best to persuade them that they would be keeping a potentially extremely helpful workbench assistant at bay! Nowadays, oscilloscopes are reliable – and even an older model can provide you with an exceptionally useful tool. The idea of this article is to clearly explain to you that there's no need to be frightened at the array of controls and switches as shown in **Fig. 1**. They're not enemies - instead they're powerful allies on your bench.

Another piece of advice I can pass on to you is that to start with - you won't need that 'super duper' 100MHz bandwidth 'scope. No Sir or Madam, indeed not – and as usual I speak from experience. This is because my first 'scope was a Second World War model (possibly even a pre-war type) which struggled to cope with frequencies up to 1.5MHz. Despite this it worked very well and I could use it for fault finding on 455kHz intermediate frequency (i.f.) strips, and for all audio tests.

In fact, the £1 or so I paid for my old 'scope was soon recovered as I was able to track down the low radio frequency (low r.f.) bias oscillator's fault on a tape recorder for one of my school teachers. The 'scope enabled me to prove immediately that the magnetic tape bias oscillator wasn't working. Although in my schooldays I knew very little indeed about audio oscillators and 'scopes - I could check out the various waveforms, such as 50Hz 6.3V a.c. filament windings and upwards in frequency and voltage. So, finding the bias oscillator and the problem wasn't difficult.

The old 'scope - which used a 6K25 gas-filled thyratron valve to generate the timebase was still working when I passed on to a friend many years later. It's probably still working now- because there was so little to go wrong with it!

The 'Scope In Your Workshop

We're very fortunate indeed that in the early 1990s the late **Fred Judd G2BCX** wrote a fascinating series entitled *The Oscilloscope In Your Workshop,* which was published in the April, May, July and August 1991 issues of the magazine. I'd suggested the series to Fred because I considered he was the best person for the job - and that he could produce just what was needed. I'm delighted to say that I wasn't disappointed!

Although we no longer have the relevant magazines available for readers to buy, I'm pleased to say that with the help of **Clive Hardy G4SLU** from the PW Publishing Book Store, we've been able to prepare a complete set of photocopies to encourage readers. Available for £5 (including postage) the 14-page four part series is in fact a condensed self-instruction manual for 'scope users. With its aid the complete beginner can learn enough, and (with confidence) to use a basic 'scope. (**Please see the separate information panel for details on how to get the photocopies**).

In the series of articles Fred G2BCX provided some excellent photographs and illustrations. He takes the reader through the basic steps required to enable anyone to use a 'scope, and rounds off the series by taking a look at specialised uses of the 'scope - including simple spectrum analysers (spectrum monitors in this case). The series comes with my strongest recommendations, and I hope readers take full advantage of

the facility because even after so many years- the series is as fresh and useful as it was when Fred prepared it for *PW*.

Scope For Explanation!

Some readers might be wondering about oscilloscope and what it does- so there's a little 'scope (forgive the deliberate pun!) to start explaining the basics. And to start - you can really consider the first oscilloscope to be an ancestor of the modern television receiver!

In fact, the analogy between television receivers and the modern oscilloscope isn't as strange as it seems. I say this because I knew a keen constructor in the 405 line days who specialised in converting old monochrome television receivers into useful basic oscilloscopes for himself and friends.

Basically speaking, the simplest 'scope comprises a cathode ray tube (c.r.t.) which uses a chemical (usually referred to as the phosphor - which emits light when it's scanned by an electron beam. The beam is produced by a stream of electrons, which are accelerated towards the internal anode by a high voltage - this can vary between about 3kV upwards to around 8kV or so. However, the voltage can vary tremendously with specialised tubes.

A proportion of the accelerated electrons fly by the c.r.t.'s anode and strike the phosphor coating. The phosphor then emits visible light. Often, with 'scope tubes this can be green or a blue-grey colour although the most popular seems to be green.

You may have noticed that when a television set is switched off (best seen in a darkened room) the screen continues to glow. Many of us will remember seeing the famous 'little white spot' in black and white TV days gradually fading out! This effect is known as the 'afterglow'.

The afterglow is a very useful feature of a phosphor, and it will help if we now take a look at something which we all see (without realising it on most occasions) every time we watch television. This is because in television receivers the phosphors used are made to produce a very short afterglow - just long enough for a 625 line picture to be scanned. In television receivers* **(see note below)** the spot (if you could see it!) starts 'scanning' the c.r.t. from the top and works it's way down the tube face.

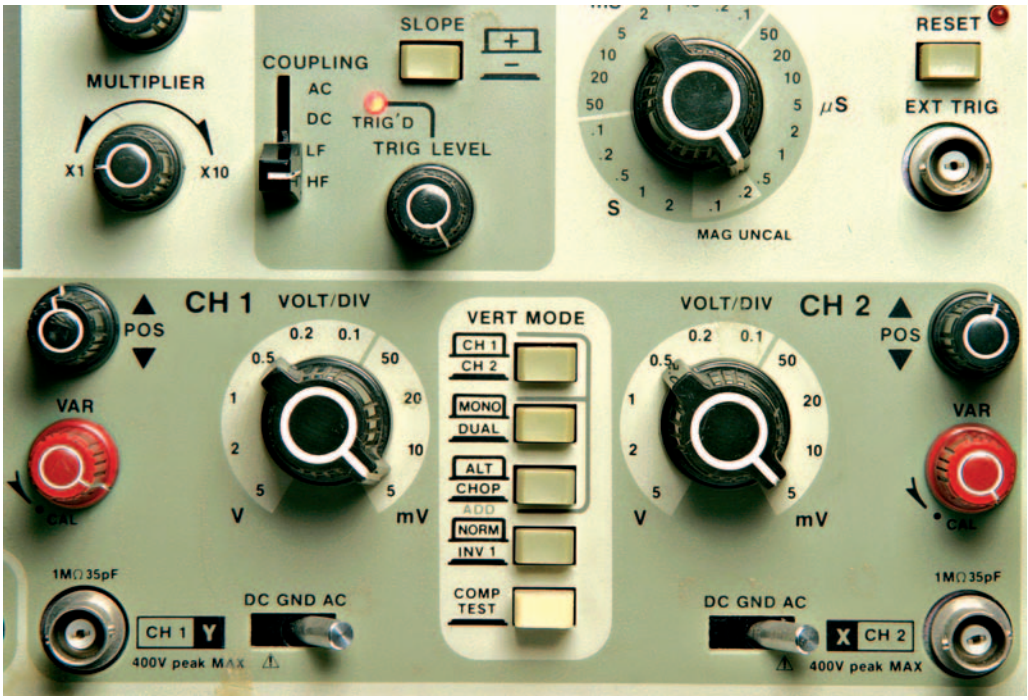
***Note:** *For simplicity in this article I'll only consider a monochrome (black and white) TV receiver). It becomes rather more complex when the colour system has to be understood).*

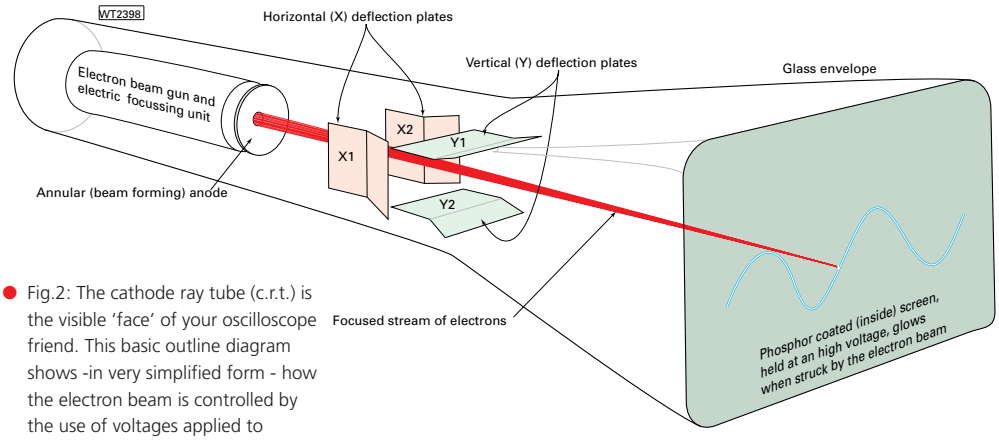
The first or topline is then scanned across the phosphor. This is controlled by a circuit called a 'timebase' or scanning circuit. Once at the end of the line the spot zips back to start line 3 (puzzled? Don't be - all will be revealed!). The action of the electron beam returning quickly to the start to begin line 3 is given the apt name of 'fly back'.

The process continues all the way down to the bottom of the screen to line 312 and a half. The scanning electron beam (which is causing the phosphors to emit the visible light we're to view) then zips back to the top under the control of its scanning/timebase circuit. Incidentally, this scanning is controlled by electromagnetic coils in a modern TV set, and by electrostatic plates in a 'scope tube. More on this important factor later).

The electron beam then starts it's journey again - by scanning lines 2, 4, 6 and so on down to the bottom again to complete the complete picture. In fact, 25 complete pictures are completed every second. But - you may be wondering- how do we see a steady picture with no flicker if the picture we're viewing is made up from all those separate lines? To answer any questions, let's look

● Fig.1: At first glance the front panel controls on your 'scope might seem rather daunting. However, Rob G3XFD encourages the first time 'scope owner to tackle them one by one. They're provided to help you - not to intimidate!





● Fig.2: The cathode ray tube (c.r.t.) is the visible 'face' of your oscilloscope friend. This basic outline diagram shows -in very simplified form - how the electron beam is controlled by the use of voltages applied to electrostatic deflection plates. Note that the horizontal deflection of the electron beam is controlled by the X plates, and the vertical deflection by the Y plates.

at what goes on - with some useful analogies provided by the ubiquitous bicycle wheel!

Optical Illusions

The images we see on the oscilloscope and our television screens are optical illusions. (Don't worry, I'm not going to comment on any illusions the programme makers or advertisers claim!). And to provide you with a foundation of understanding on the c.r.t. let's now take a look at an ordinary bicycle wheel!

I've no doubt that most readers will have at one time or another had to work on a bicycle wheel, with the machine upside down and resting on the saddle and handlebars. Mostly this would have been to repair punctures, or to replace a chain which had slipped off the sprocket drive.

You'll no doubt have noticed that the wheel spokes which are very definitely present - seem to disappear when the wheel revolves and reaches a certain speed. In fact, if you didn't know they were there you be easily fooled (please don't do this!) enough to feel with an inquisitive finger to solve the mystery. However, if your finger survived meeting the still physically present spoke - the question is - what's happening?

The main* **(see note)** phenomena demonstrated by the apparently disappearing wheel spokes is called 'Persistence of Vision'. Put simply this effect caused by the human brain's visual section being unable to process repeating visual images above a certain speed (frequency). This is because the visual image which ends up on the retina - this in mammals roughly corresponds to the charge coupled device (c.c.d.) which the now ubiquitous video camera uses to record images.

● Fig.3: This Kenwood CO1305 5MHz bandwidth single beam oscilloscope would credit any workbench. It's an ideal 'starter' instrument. It's attractive, easy-to-use and reliable.

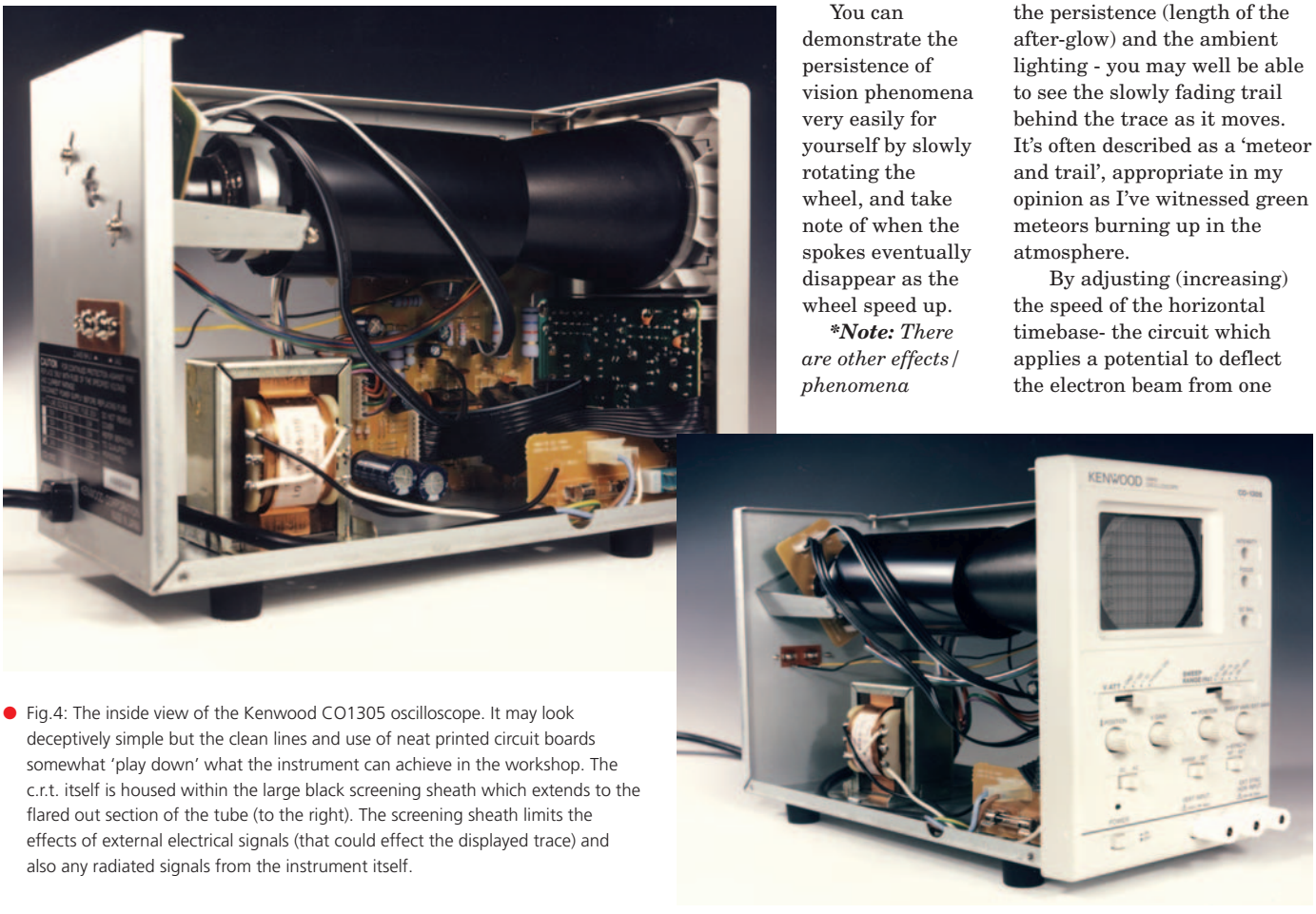
You can demonstrate the persistence of vision phenomena very easily for yourself by slowly rotating the wheel, and take note of when the spokes eventually disappear as the wheel speed up.

***Note:** There are other effects / phenomena demonstrated by this method (including the stroboscopic effect) particularly if viewed in artificial light. They are however, ignored for the purpose of RB.*

If you already have access to an oscilloscope you can also demonstrate the effect on the c.r.t. All you have to do is to select the horizontal timebase speed where the spot - which traces across the tube face and provides the glow from the phosphor- appears to be just creeping along.

When it reaches the end of it's journey across the c.r.t. the spot disappears, only to re-appear at the other end to re-trace its pathway again. Depending on the persistence (length of the after-glow) and the ambient lighting - you may well be able to see the slowly fading trail behind the trace as it moves. It's often described as a 'meteor and trail', appropriate in my opinion as I've witnessed green meteors burning up in the atmosphere.

By adjusting (increasing) the speed of the horizontal timebase- the circuit which applies a potential to deflect the electron beam from one



● Fig.4: The inside view of the Kenwood CO1305 oscilloscope. It may look deceptively simple but the clean lines and use of neat printed circuit boards somewhat 'play down' what the instrument can achieve in the workshop. The c.r.t. itself is housed within the large black screening sheath which extends to the flared out section of the tube (to the right). The screening sheath limits the effects of external electrical signals (that could effect the displayed trace) and also any radiated signals from the instrument itself.

Fig.5: Although not commonly seen on the Amateur Radio market - the Thurlby-Thandar portable liquid crystal display (l.c.d.) 'double beam' oscilloscope is very useful. You'll be fortunate to see one for sale at a rally as they're in demand by engineers who 'work in the field' - requiring a full function 'scope which can work from a battery power supply.

side of the tube to the other - the green spot will in turn complete its journey much faster. As the speed increases the separate travelling traces (in reality of course it's always the same spot) will disappear- turning into a flickering green line at lower speeds. Eventually however, the spot will be travelling so fast across the face of the 'scope's screen that it will appear as a fainter (because it's on each grain of phosphor for a shorter time), but flicker free green line. This is persistence of vision working to our advantage. It's the basis of television and it's the reason wht we see the complete picture on the screen. It's also why we can say that TV recievers and oscilloscopes and other c.r.t. monitor displays share the same ancestry.

Note: *At this point I think it's worthwhile mentioning that the very first home-made television receiver I was able to watch as a young schoolboy used a VCR97 radar set c.r.t. Built from a* PW *design, the receiver's Second World War surplus tube had a green phosphor, although other colour tubes were produced, and I was able to watch - albeit briefly - the 1953 Coronation of our present* ***Queen, HRH Queen Elizabeth****. As those who've heard the old 'PW Past, Present & Future' club talk - I delight in sharing the story of "Little green horses pulling a green state coach, passing green policeman controlling green crowds of people. (So much for 'black and white television, eh?). My Junior School Class - all 40 of us- were allowed to watch for a few seconds each two-by-two. It was a great treat*!

Horizontal & Vertical

Now we've looked at the horizontal aspect of the oscilloscope's c.r.t. display, it's time to consider the vertical deflection side of things. And here, by placing a voltage on the vertical deflection plates (see **Fig. 2**) the electron beam can be electrically 'steered' by making one plate more positive.

As you can see from Fig. 2, the convention adopted when discussing oscilloscopes is to refer to the plates effecting the horizontal control of the beam, as the 'X' plates. Those which effect the vertical control of the beam are referred to as the 'Y' plates.

Incidentally, I realise that most readers will already be aware of the use of electromagnetic scanning circuitry in television receivers. Here, the familiar scanning' Yoke' of especially formed and wound enamelled copper wires produce magnetic fields to achieve the same results as the X and Y plates. This method is mentioned here in passing to inform readers of the main difference in scanning methods used in TV receivers and oscilloscopes. All references in this article will only refer to electrostatically controlled c.r.t.s.

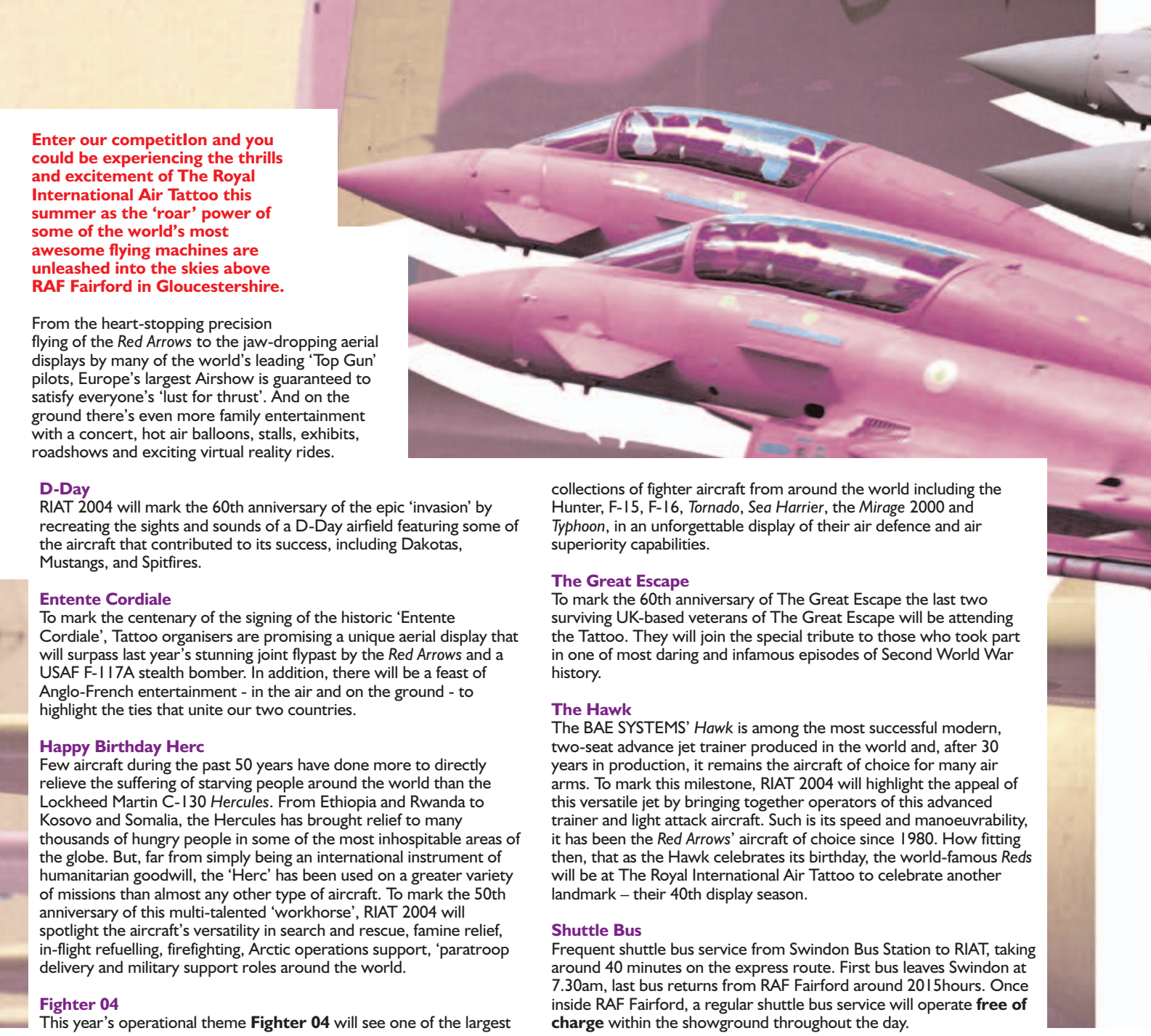
Next time I'll chat more about 'scopes, and provides some ideas and circuits which can be used as you familiarise yourself with your new 'friend on the workbench. You are going to buy one aren't you? I hope you do! **PW**

Photocopy Service & Further Reading

Further reading: Photocopied re-prints of the Fred Judd G2BCX series *The Oscilloscope In Your Workshop* are available from the PW Publishing Book Store for £5 including postage. Please contact Clive Hardy G4SLU on 0870 224 7830 with credit card orders. By post address orders to: **PW Publishing Ltd., Book Service** (marking envelope **'Radio Basic Scope Re-prints'), Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW**.

Recommended books: Regular RB readers will be aware that the title I recommended to accompany this series is the ARRL's *Understanding Basic Electronics* (Available from the Book Service). There's an excellent, short section on the cathode ray tube (c.r.t.) display and timebases in Chapter 30, section 9. The diagrams are very good.

Scroggie's Foundation of Wireless & Electronics, 11th edition published 1997. (Softback). This superb, 'classic' text book (first published in 1936 as *Foundations of Wireless)*, is legendary. It's been continually up-dated and I thoroughly recommend it to readers. The publishers (Newnes, part of Butterworth-Heinemann nowadays) for some reason only promoted the book outside the UK for a number of years. Fortunately however, common-sense prevailed and it's now available as a 293 page soft-back book (In stock at the PW Book Service). Occasionally available second-hand in older editions (buy a copy of the hard-back if you see one - although obviously the older books will carry less on semiconductor technology), this book comes as very highly recommended and in the 11th Edition, Chapter 23 'Electronic Imaging: Video' is very good indeed. Your bookshelf should have a copy!



Enter our competition and you could be experiencing the thrills and excitement of The Royal International Air Tattoo this summer as the 'roar' power of some of the world's most awesome flying machines are unleashed into the skies above RAF Fairford in Gloucestershire.

From the heart-stopping precision flying of the *Red Arrows* to the jaw-dropping aerial displays by many of the world's leading 'Top Gun' pilots, Europe's largest Airshow is guaranteed to satisfy everyone's 'lust for thrust'. And on the ground there's even more family entertainment with a concert, hot air balloons, stalls, exhibits, roadshows and exciting virtual reality rides.

D-Day

RIAT 2004 will mark the 60th anniversary of the epic 'invasion' by recreating the sights and sounds of a D-Day airfield featuring some of the aircraft that contributed to its success, including Dakotas, Mustangs, and Spitfires.

Entente Cordiale

To mark the centenary of the signing of the historic 'Entente Cordiale', Tattoo organisers are promising a unique aerial display that will surpass last year's stunning joint flypast by the *Red Arrows* and a USAF F-117A stealth bomber. In addition, there will be a feast of Anglo-French entertainment - in the air and on the ground - to highlight the ties that unite our two countries.

Happy Birthday Herc

Few aircraft during the past 50 years have done more to directly relieve the suffering of starving people around the world than the Lockheed Martin C-130 *Hercules*. From Ethiopia and Rwanda to Kosovo and Somalia, the Hercules has brought relief to many thousands of hungry people in some of the most inhospitable areas of the globe. But, far from simply being an international instrument of humanitarian goodwill, the 'Herc' has been used on a greater variety of missions than almost any other type of aircraft. To mark the 50th anniversary of this multi-talented 'workhorse', RIAT 2004 will spotlight the aircraft's versatility in search and rescue, famine relief, in-flight refuelling, firefighting, Arctic operations support, 'paratroop delivery and military support roles around the world.

Fighter 04

This year's operational theme **Fighter 04** will see one of the largest collections of fighter aircraft from around the world including the Hunter, F-15, F-16, *Tornado*, *Sea Harrier*, the *Mirage* 2000 and *Typhoon*, in an unforgettable display of their air defence and air superiority capabilities.

The Great Escape

To mark the 60th anniversary of The Great Escape the last two surviving UK-based veterans of The Great Escape will be attending the Tattoo. They will join the special tribute to those who took part in one of most daring and infamous episodes of Second World War history.

The Hawk

The BAE SYSTEMS' *Hawk* is among the most successful modern, two-seat advance jet trainer produced in the world and, after 30 years in production, it remains the aircraft of choice for many air arms. To mark this milestone, RIAT 2004 will highlight the appeal of this versatile jet by bringing together operators of this advanced trainer and light attack aircraft. Such is its speed and manoeuvrability, it has been the *Red Arrows*' aircraft of choice since 1980. How fitting then, that as the Hawk celebrates its birthday, the world-famous *Reds* will be at The Royal International Air Tattoo to celebrate another landmark – their 40th display season.

Shuttle Bus

Frequent shuttle bus service from Swindon Bus Station to RIAT, taking around 40 minutes on the express route. First bus leaves Swindon at 7.30am, last bus returns from RAF Fairford around 2015hours. Once inside RAF Fairford, a regular shuttle bus service will operate **free of charge** within the showground throughout the day.

Royal International Air Tattoo 2004

Win tickets worth over £700!

Entry Form

To be in with a chance of winning one of ten pairs of tickets to RIAT 2004 simply find the words listed below in the wordsearch to reveal a missing word. Then enter the missing word on the entry form, together with your name and address and post it along with the Corner Flash (as proof of purchase) to ***PW* June, RIAT Comp, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW by 25 June 2004.** The Editor's decision on the winner is final and no correspondence will be entered into, winners will be notified by post.

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Good Luck!

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Hercules
Hurricane
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Sky
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Tornado

How to Book

Admission, Aviation Club, Jubilee Garden, Public Grandstand, FRIAT membership and Park & View tickets may all be purchased via, Tel: **0870 758 1918 (**Calls charged at national rate at all times) or web: **www.airtattoo.com**

Admission tickets available from branches of Waitrose, selected branches of the Nationwide Building Society and Tourist Information Centres.

Admission Charges

Advance Adult:	£29.95
On-the day Adult:	£35
Children 15 and under:	FREE
Car Parking with an admission ticket	FREE
Coach & Driver	FREE

Event timetable July 17-18 2004

Gates open:	0730
Flying Display:	1000 & 1800
Evening Concert:	1800-2015
Airfield Closes:	2130

PW Jun '04 RIAT Comp

The Vectis Run Part 6

By Rupert Templeman

It's January 1939. Travelling Wireless Technician-Salesman Alan Edwards' monthly visit to the Isle of Wight, 'The Vectis Run', has turned into a close shave with death. He's now deeply involved in espionage and is being briefed by 'Mr Jones'.

Once Alan's head injuries had been attended to by the Doctor, and he'd changed into dry clothes, 'Mr Jones' reluctantly provided more information. Both Alan and Mike Coley were extremely puzzled why the Secret Service had gone to the trouble of placing one of their men on the Island – and in particular at Clarke's Wireless and Television repair workshop in Shanklin.

"The fact is Alan", said Mr Jones, "our precautions were fully justified. You and Mike were just about to make the connection between the mystery televisor interference and the railway tunnel, together with the highly secret wireless installation in the hillside above. Our intelligence was that you were so close to making the connection that we'd have to act very soon indeed - but unfortunately for you – we didn't act quickly enough.

"Early on in the tests with the new device it was realised that the wavelengths involved - and the types of transmissions being used - would attract the attention of Wireless Amateurs. So, the Radio Society of Great Britain were asked - without the secret being compromised – to ensure questions about the strange signals near the ten metre Amateur band weren't published. Nothing much could be done about Amateurs talking about it themselves - but behind the scenes it was made sure nothing appeared in print.

"Unfortunately for us, the new television service was catching on, and despite there being only one BBC transmitter in service - we quickly found out that 'Lookers in' were keen to get the service – and managed to do so far from London, indeed as far as the Island".

Mike and Alan furtively smiled at each other as Mr Jones used the clumsy term 'Looker in'. It made Mike's 'viewer' seem much more appropriate.

Mr Jones' continued, unaware of the light relief. "The number of televisors sold in the south and west, together with the activities of yourselves, Arthur Cotton and other amateur-professionals made it imperative we watch the situation closely. That's why Lake and our other colleagues were based on the Island. Obviously we couldn't stop your work, or stop the sale of televisors, but we had to ensure not too much attention was drawn to the new installation which – as you know - was built near an existing Air Ministry telegraphy station".

Alan interrupted: "Of course, you were caught out by the fact that the television receivers, operating on very low strength v.h.f. signals from London were prone to interference from the secret equipment's signals on or around 28 megacyles weren't you Sir"?

Mr Jones nodded – although he didn't fully understand the technical terms.

Mike then joined in the conversation. "As news of the interference on the Island spread within the trade - you must have really got worried. Mr Lake must have heard me talking about it, and the various messages coming from Arthur Cotton in Freshwater often came via Mr Lake" he added.

Focal Point

"Yes" Mr Jones replied, with resignation showing in his voice; "Everything seemed to come to a head very suddenly. As the Ventnor installation was so very important - we even had to install one of our men in Freshwater. However, the focal point came when – much to out surprise - we suddenly realised the Dutch registered Citroen was involved. Of course, the vehicle had been recorded as entering the country via the Hook of Holland to Harwich ferry, but when it appeared on the same Lymington ferry…we really began to wonder if you were directly involved Alan"!

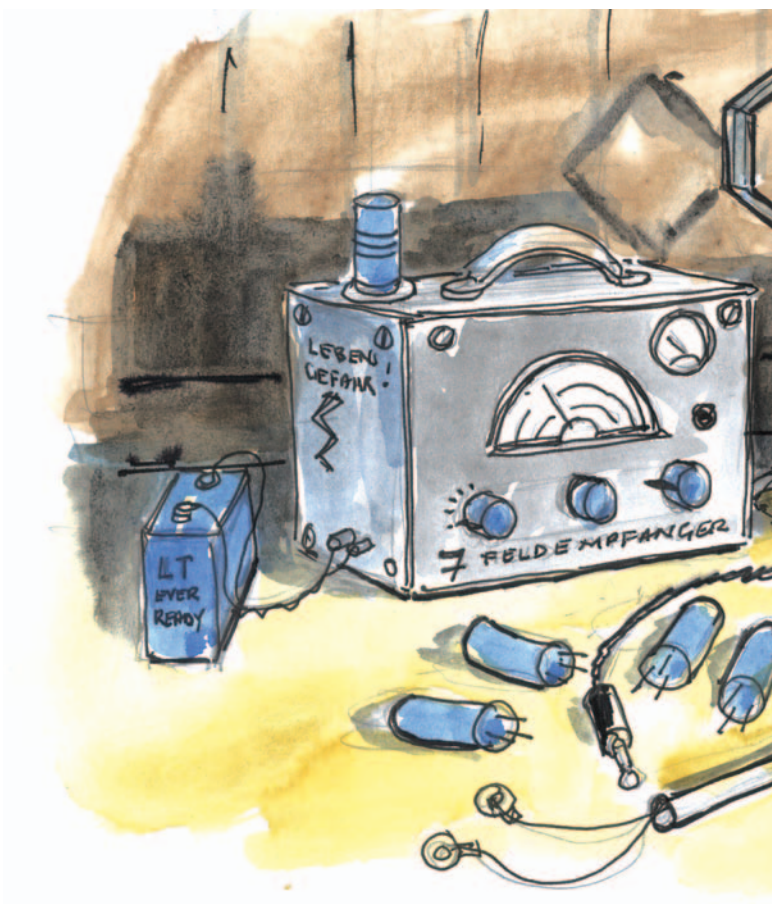
It was the turn of Mr Jones and his companions to smile, at the friends' reaction. Momentarily they'd both felt very uncomfortable, but all the same it did seem a tremendous coincidence. They were all agreed on that!

Jones continued. "However, we soon realised that by chance Alan had stumbled across an espionage mission. We don't think that the leader knows you were at the Philips' factory in Eindhoven at the same time. But we soon saw that he was suspicious, and our own man saw your van being sabotaged.

"Do you mean it was they who damaged the van's tyres"? Despite his startled reaction…Alan wasn't sure which was more surprising, the sabotage or being watched by the Secret Service!

Now looking extremely serious and choosing his words carefully, Mr Jones continued. "Yes, we think the agent was so concerned that the mission had been rumbled, he panicked a little and slashed the tyres to delay you so that he could get in quick, do his observations and then leave the Island before he'd been noticed by others.

However, their biggest mistake as you realised, was appearing out of season. But, to them the risk is worth it because the information he's got, or is about to get - we don't know which – is crucial.



"We're not sure if he knows the connection between the telephone and the tunnel security. Spotting Pat Dunne was bad luck for everyone – as the agent remembered Pat from Military Intelligence. From then on he knew he was on to something big".

Mike spoke again, an equally serious look on his face: "The agent doesn't know for sure Alan is on to him does he? And another thing, Alan mentioned the girl - quite a stunner so he said - and the other man. How do they come into it, what are they up to"?

Diving Deep

Mr Jones didn't mince his words when replying. "We don't know what the others are doing and we're going to ask Alan to dive in deep. So deep we can't guarantee you'll not get hurt further…but I promise that we'll not be far behind" he said.

"The German agent won't know what happened to you on the track. He had to make himself scarce. There've been no reports in the press of another man being killed or injured at the tunnel. So, he is – to coin an appropriate phrase - completely in the dark. So, we're going to ask you to get back on the road in your van, head for your next customers in Newport and West Cowes - and we'll hope that he'll notice you're about. We already know he's bought batteries for a portable monitoring receiver".

Alan and Mike looked at each other - their almost synchronised raised eyebrows signalling to Mr Jones that he had - albeit extremely reluctantly again - to tell them more.

"Okay Gentleman! You've asked for it - I am going to tell you more. You obviously want to know about how we've learned about the receiver don't you"? He said, looking directly at the pair.

The friends nodded simultaneously.

Mr Jones looked past them towards the Doctor. "Okay Doctor, you can go out now - but please don't leave altogether, Mike may need some more attention to his injuries. The Doctor nodded, and left the room.

"Not strictly necessary - he is one of ours" said Mr Jones unnecessarily. "However, the man I'm to tell you about isn't really involved with the secret installation, or our Government, but he's a scientist in exile.

Alan broke in excitedly. "I think that scientist is the owner of Ventnor Wireless. He's something special isn't he - I've always wondered about that chap. He certainly goes through an enormous amount of Ever Ready *Winner* high tension batteries and dry cells - especially for someone who doesn't seem to have many customers"!

Recomposing himself, but clearly showing he wasn't used to being caught out by someone discovering a closely guarded secret, Jones answered. "Yes Alan, it's your friend at Ventnor Wireless. In actual fact he's a very skilled scientist who had to leave Germany in 1933 not so long after the National Socialists came to power. He'd been working on the nature of ultra short wavelength wireless signals and how they might be effected over long distances by the atmosphere.

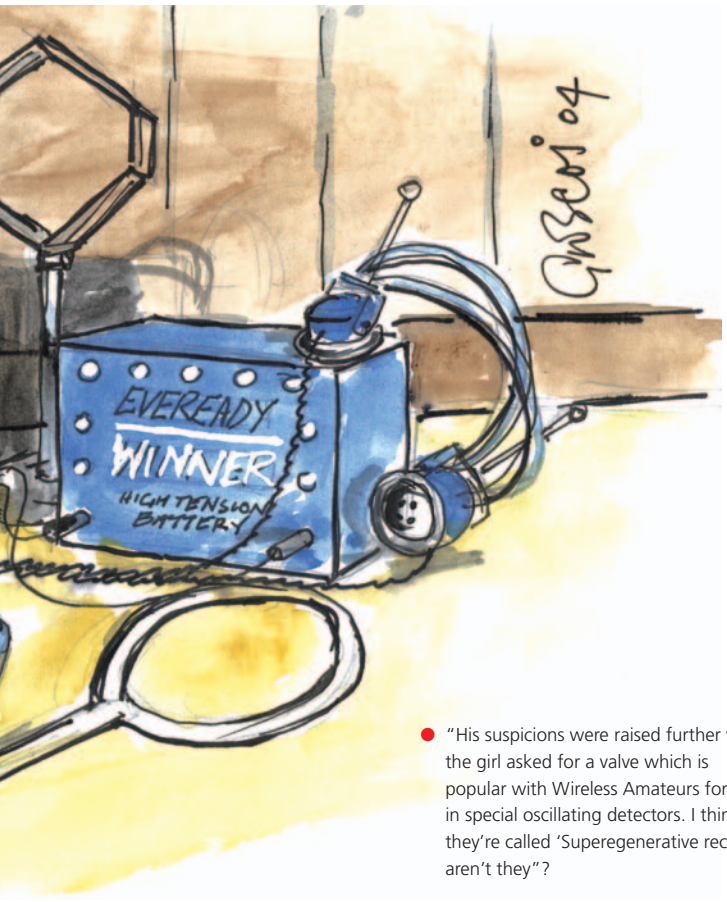
"That's why he chose Ventnor – high enough above the sea to carry on with his work and earn a little from his shop to fund his research. Another exiled colleague based on the Portuguese Island of Madeira operated a special ultra short wave wireless transmitter which was monitored here. That's how he first discovered the television signals were being interfered with. He mentioned this to another scientist in Cambridge who was sharing the research. That same scientist in Cambridge then spoke to others, who were involved in the new highly secret technique".

There was a sharp intake of breath before Alan spoke again. "I knew there was something really special about Karl Rhiebach". Speaking quietly, almost to himself he continued; "Karl Rhiebach's eyes always seemed to be very intent whenever I spoke about television and techniques for use above thirty megacycles".

"That knowledge" replied Jones, "has been very helpful because the German agents have been trying to get a replacement valve for a receiver. They also wanted a high tension battery and dry cells earlier today. Obviously their receiver has developed a fault, and by asking for a particular valve, Rhiebach has been able to hint at what sort of receiver it is, plus the fact it's portable".

Mike joined in; "Surely the man himself didn't go into the shop and ask for spares"? His tone of voice emphasising the doubt in his mind.

"No", Jones replied, "he's not that stupid - he sent the girl in to the shop. However, a stranger with a slight foreign accent and wearing continental style clothes alerted Rhiebach. His suspicions were raised further when the girl asked for a valve which is popular with Wireless Amateurs for use in special oscillating detectors. I think they're called 'Superegenerative receivers aren't they"?



"His suspicions were raised further when the girl asked for a valve which is popular with Wireless Amateurs for use in special oscillating detectors. I think they're called 'Superegenerative receivers aren't they"?

The Receiver

The mention of the superegenerative detector led Mike and Alan chatting in such an animated way that Jones was sidelined for a moment or two. The friends were wondering exactly what wavelengths the German agent was listening into.

"You see Mr Jones", Mike explained – "The super-regen as we call them - can cause interference on the frequencies being tuned into - especially if it's a single valve receiver directly connected to the aerial. So, we think he must be using it very carefully to locate your special transmitter and identify what it's sending. We don't think he used it on the BBC Alexandra Palace sound or vision frequencies - the interference we picked up was different from the other transmissions which seem to be coming from your secret installation".

Jones reached beside him and pressed a button. Within seconds a thin, bespectacled man in a white workshop coat came in carrying a really small haversack. Opening it, he revealed a miniature transmitter - complete with a flexible ribbon dipole aerial. Only two controls were visible on the control panel. The man quickly showed Alan how to connect the aerial and turn it on, before leaving them.

"That's only a transmitter", explained Jones; "It's crystal controlled and can't go off frequency and has enough battery power to automatically transmit a beacon signal for about six hours. Karl Rhiebach and Arthur Cotton – will monitor the frequency on special receivers after you've hopefully been captured by the agents. We can then track you to the hide-out they must have on the Island, capture them and rescue you. You will do it for us…do it for your country won't you Alan"?

Hesitating, an extremely shocked and frightened Alan stammered his reply towards the steely eyes above the clipped military style moustache. "I will…Sir"!

To be continued….

THOSE GLORIOUS SURPLUS DAYS!

Rob Mannion G3XFD knows from the PW Editorial 'club visits' that there's still a tremendous interest in the period when the magazine pages were packed with 'War Surplus' bargain ads. He invites you to join him in the archives for a nostalgic 'peek'.

Even though I've now 'retired' the *PW* 'Past, Present & Future' talk, which I provided for many years during 'Club Visits', I realise many Amateurs and Short Wave Listeners like to look back over the years. The original presentation which included much historical detail has now been replaced by 'The Changing Role of the *PW* Editor'. And 'boy oh boy' - how it has changed over 72 years...even in my relatively short tenure (short when compared to the life of *PW*).

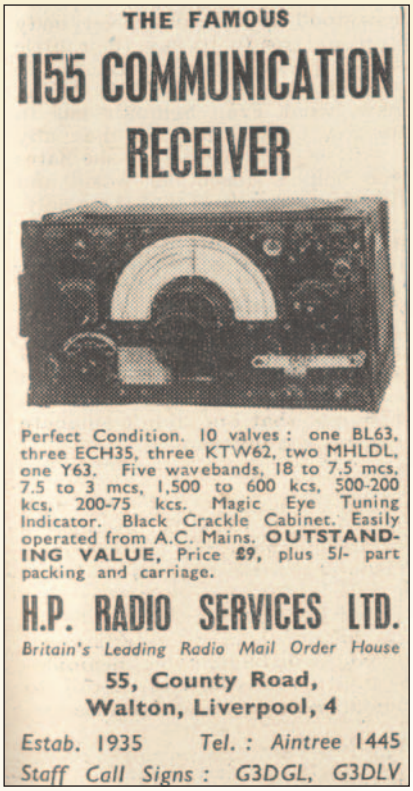
It's rewarding indeed to chat about the latest projects in *PW*, and then find the same group of people are just as interested in what's been published in our favourite magazine over 50 years ago. I often find the audiences are fascinated with the old adverts. In my opinion it's a healthy sign to be very much in the present, looking forward to the future - while enjoying a glimpse of what came before us in the hobby.

Question & Answer Session

Even though my 'Club Talks' tend to over-run (they're unscripted and often change course to suit the audience when a particular question diverts me) I always make time for a 'Question & Answer' session. This is usually where things can really 'take off'! It's also where the two-way chat often turns towards the days when *PW* was packed from cover to cover with adverts promoting 'War Surplus' equipment – from around 1946 until the end of the 1950s.

One of the reasons why we often end up discussing the 'hey day' of the war surplus adverts is directly due to the travelling archives which I've arranged to be circulating around the room. They include some truly vintage issues of *PW,* with some dating back to the very early 1930s when the magazine was first published. These issues, which were in pristine condition when they were donated for this very purpose, are always extremely popular.

I usually joke with the audience as I begin that they're welcome (and indeed encouraged) to read the magazines during the talk. I often raise a laugh when I tell them that when I see everyone is absorbed in the magazines - I'll stop talking and join them!



● Fig. 1: An advert from the October 1949 issue of *PW* and it features a truly classic surplus receiver - the R1155. This receiver has featured in *PW* many times since (see text).

However, I've also discovered that some of the older members of the club's I've visited start discussing a special issue they've spotted. This often features a project they've built, or it's written by someone they knew. Obviously it's then time for me to stop talking and listen to them!

Sometimes I'm forced to talk louder because the 'old timers' are hard of hearing – and they raise their own voices to talk to each other. The simplest thing - rather than cause embarrassment - is to stop the main talk and incorporate the two (or three) old friends into the discussion themselves. Very often I then end up learning something new and everyone enjoys the event.

Occasionally something really remarkable occurs, such as the time when I was truly privileged to give way to the late **Harry Hardisty G0HHL** (**H**arry **H**ardly **L**ingers as he described his callsign). It was during my thoroughly enjoyable visit to the **Central Lancashire Club** in Leyland, Lancashire, where the turn-out was exceptionally good.

Harry G0HHL was obviously aware that during the *PW* talk I would mention watching a home-brew TV receiver using a VCR97 radar tube showing the 1953 Coronation of **HM The Queen**. The event (by coincidence I mention it in Radio Basics this month) remains bright in my memory as I clearly recall seeing "little green horses pulling a tiny Royal State Coach – passing tiny green people, kept under control by tiny green policemen".

It was at that point that Harry G0HHL spoke out saying; "I was one of those little green policemen". We then spent a good 20 minutes thoroughly enjoying Harry's memories of his time – as a City of Salford Policeman – camping out in Hyde Park for the Coronation. What a Privilege it has been to meet Radio Amateurs like Harry!

Note: *I'm planning to feature the home-brew designs for TV receivers as published by PW between 1946 and 1954 in a separate article. As usual, if you built such a design - I would be pleased to hear from you.*

There have been many incidents during my club visits on behalf of *PW* when I've had to step aside (so to speak), as someone with important memories has had something very interesting to share. It's something I encourage because unless these memories are shared they're likely to go

unrecorded and eventually be lost, which is a terrible tragedy in my opinion. So, please don't hesitate to share your special memory if you ever meet me at a show or club – I'll be pleased to meet you and listen.

The Surplus Shops

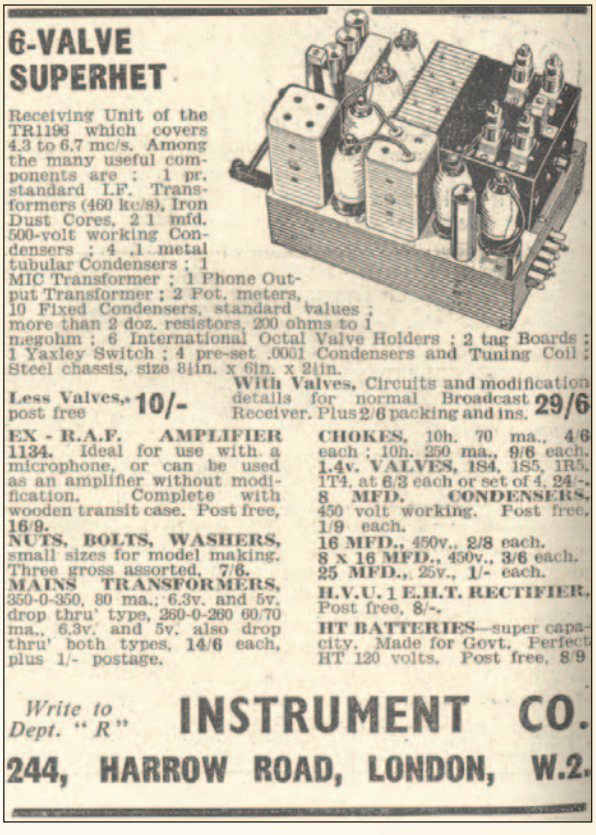
Invariably during the *PW* club visits 'Q&A' sessions the conversation turns towards the famous Surplus Shops- particularly in the London area. Most of us over the age of 50 or so have memories of the Tottenham Court Road, Lisle Street and Edgware Road shops (I'll be featuring these and their adverts/equipment in another article*) but this time I'm concentrating on shops and adverts which were advertising in *PW* from 1946 onwards.

***Note:** I encourage readers with memories they'd like to share to contact me so I can include them in the next article. What did you buy? How did you use the equipment? Where did you travel from? I'm sure you'll have much to share so get writing please!*

The first advert literally leaped out of the page when I was delving into the archives. The advert, **Fig. 1**, is from the October 1949 issue of *PW* and features a truly classic surplus receiver - the R1155. The 1155 featured in the advert was available for £9 plus 25p post and packing. And although it seems a bargain now - £9 a week was a good wage for many radio enthusiasts at the time.

No doubt the advertiser - **H. P. Radio Services** of County Road in Walton, Liverpool, would have offered hire purchase to their customers. Interestingly, the staff of this company included **G3DGL** and **G3DLV** (neither of these callsigns were listed in the 1982 RSGB *Callbook*, the oldest available in my library. Perhaps you knew them?).

I've looked through the *PW* archives from 1947 right up until the 1970s and hardly a year went by without some mention of the famous R1155. It deserves its place in the Hall of Fame doesn't it? My dream – when at school – was to own an R1155N (the Marine version with 'Top Band') but I never found one. Did you?



● Fig. 2: The second wartime surplus receiver advert, shows the ex RAF TR1196. It appeared in the November 1949 *PW*. Tuning from 4.3 to 6.7MHz, this receiver section of a transmitter-receiver unit was available for £1.50 plus carriage (see text).

The RAF TR1196

The second wartime surplus receiver advert, the ex RAF TR1196 is shown in **Fig. 2.** and appeared in the November 1949 *PW*. Tuning from 4.3 to 6.7MHz, this receiver section of a transmitter-receiver unit was available for £1.50 plus carriage. Designed for aircraft communications, I never saw one of these working as it was designed to do – in an aircraft. In fact, I never saw one working as a receiver either. Instead, they seemed to be rebuilt into other equipment, or just broken down for spares.

However, I do remember the late **Tom Martin G3CTM** – a great old friend of mine - telling me he used one as a tuneable intermediate frequency unit (i.f.). Despite this, Tom (a Strawberry Grower) ended up preferring his much loved 'Panda Cub' transmitter and CR100 (B28) receiver combination, and whatever receiver he had under modification at that time. The American BC348 receiver was a particular favourite of his, and I eventually managed to get one for myself (from Smith's in Lisle Street in London).

Finally, in this introductory article on the subject I must mention the advert, **Fig. 3**, from *PW* December 1949, featuring the London Central Radio Stores in Lisle Street. This short street was famous for its 'Blue Cinemas' and a hospital specialising in tropical disease - but was a magnetic attraction for Radio Amateurs who of course avoided the other 'diversions' or perhaps not!

The advert in Fig. 3, shows what was on offer - including a No.25 receiver chassis. This unit is unfamiliar to me - so information from readers would be most interesting. However, the VCR97 tubes and airborne indicator unit 162 were still on sale when I discovered the shop in the late 1950s.

It's strange isn't it - in those days a trip to London from the South and West was seen as a very special long distance trip. Just think - 40 years or so later Radio Amateurs from our Islands were enjoying 3000 miles plus trips to Dayton, Ohio in the USA for the HamVention!

Reader Feedback

I'm hoping that the occasional series, which this article is launching will generate much feedback from readers and possiblly lead to other articles covering projects which were built. For example, what memories do you have of the surplus shops in the regions? Who remembers Padgetts' Radio Store in Cleckheaton in Yorkshire for example? With EF91s on sale at 9d each - many ended up in my workshop!

By working together, I'm sure they'll be a host of memories for everyone. Keep them coming!

PW

● Fig. 3: From *PW* December 1949, this advert features the London Central Radio Stores in Lisle Street. The advert in shows what was on offer - including a No.25 receiver chassis (see text).

The MFJ-902 Travel Tuner

Taking your Amateur Radio equipment on holiday? If so, Rob Mannion G3XFD suggests that the MFJ-902 hand-sized antenna tuning unit could be just right for you! However, before looking at the new a.t.u. - he was reminded of his trusty MFJ-945E.

● The MFJ-902 Travel Tuner. It's small enough to be carried in the hand, works well with low power (QRP) and will cope just as well with high power.

Regular readers will of course know that I'm a keen owner of an MFJ-945E Mobile Antenna Tuner, **Fig. 1**. It's travelled all over the UK, Ireland and into Europe with me and has proved to be an excellent performer.

In fact, since I damaged my main shack a.t.u. I had (the AEA model I was searching for a replacement meter unit via the pages of *PW* last year), by repeatedly dropping it - my fault for not packing my car properly - on a trip to EI last year - the '945E is my main a.t.u.

Because of my liking for the older '945E I was offered the opportunity to try the newer a.t.u. from the same company- namely the MFJ-902 Travel Tuner. And although I thought it was the type of accessory which would be better reviewed towards Springtime (especially as it's ideal for the keen /P operator (QRP and QRO) - I've already had opportunities to use it working from home and /P my car since March.

First The MFJ-945E

As I shall be comparing the new MFJ-902 with the older '945E, I think it's a good idea to describe the mobile tuner so that readers can get a broader picture of what's on offer. Direct comparisons of equipment for review can often be very confusing in my opinion - unless it's possible to compare similar equipment from the same manufacturer. The ideal situation has now arrived and I can relax my strict 'no direct comparison' rule for once.

I first reviewed the MFJ-945E in the April 1999 *PW* and readers who still have their copies of that issue can read the full review (photocopies are also available from the *PW* Book Store). However, I'll repeat the last few paragraphs of the 1999 review as I think they summarise what I thought (and still think) of the '945E.

Under the cross-heading of '*Quality & Finish*' I wrote: "*In past reviews I've commented on the poor quality of finish on some MFJ items. There have been many occasions where despite their innovative approach to Amateur Radio equipment this manufacturer's wide range of products has been let down by the sharp, unfinished edges on equipment cases, front panels and boxes.*

"However, I'm pleased to say that this problem does not occur on the a.t.u. under review because it has rather neat plastic end panels and soft resilient 'feet'. Well done MFJ!

Needless to say, I've actually been very impressed by the a.t.u. and apart from it not having 'peak hold' facilities on the meter (which I can live with) I was happy to buy the review unit itself".

That's enough from the first review of the '945E for now. I chose the paragraphs to highlight two main points, but I'll also be providing some other comparisons between the two a.t.u.s as I go along. Hopefully this technique will help you decide which one you prefer, although I'll also mention my final opinion resulting from the opportunity of using both a.t.u.s.

● Fig. 1: Don't be misled - the MFJ-945E is not being reviewed in this article! Instead, Rob G3XFD has selected a photograph of the older unit because he's comparing the newer MFJ-902 Travel Tuner with the MFJ-945E Mobile Tuner he's owned for five years or so.

What's On Offer?

So, what's on offer with the MFJ-902? Let's take a look to see what the a.t.u. can do. Firstly, MFJ don't provide a list of specifications. Instead, information on the technical capabilities of the unit are contained in the text on an instruction sheet packed with the tuner.

The MFJ-902 is described as a fully functional 3.5 to 28MHz a.t.u. based on a T-match circuit. The manufacturers suggest it's an ideal manual a.t.u. for the Icom IC-706MKIIG, Yaesu FT-100D and FT-817 and other small transceivers.

Two air-spaced variable capacitors and three 'stacked' iron powder toroids form the heart of the a.t.u. It's 'beefily' constructed and the manufacturer's state in their production information that it will handle up to "150W input".

There's also a rotary switch, used to select the amount of inductance. Immediately obvious is the lack of any form of metering to indicate the v.s.w.r. In their equipment leaflet MFJ explain their reasoning for this approach... "The a.t.u. has no v.s.w.r. meter, but most modern radios have them built in".

Using The ATU

Looking inside the MFJ-902 a.t.u. I was impressed with what I saw - it really did look quite 'beefy' - and the time to try it out on the air beckoned. It's ideal for use working /P and I decided to work on 7MHz, running at the full 100W from my car-dedicated Alinco DX-70TH on c.w.

In practice I found it was very easy to select the inductance required and tune up when using my Pro-AM h.f. mobile antennas. It's an easy way (as I've often said

in the past) of extending the tuning range of a mobile antenna. On the key I got good reports from all over Europe.

However, I felt happier using the MFJ-902 in conjunction with an in-line v.s.w.r. meter. Many rigs do have a v.s.w.r. meter built-in, but when using an external a.t.u. my personal preference is to have a meter built in to the a.t.u. or have one very close to it.

Having stated my preferences, I've got to say that the MF-902 is in effect more versatile than the MFJ-945E Mobile Tuner, as the newer unit will quite happily work with the 'proverbial long wire' antenna. I quickly proved this one day when travelling home on the way from work.

I always carry several lengths of wire in my car - one to use as a trailing counterpoise, the other (around 20 metres long) as the 'long wire' for 7MHz and above. The MFJ-902 quickly proved itself able to tune this 'make and mend' antenna, providing me with many QSOs.

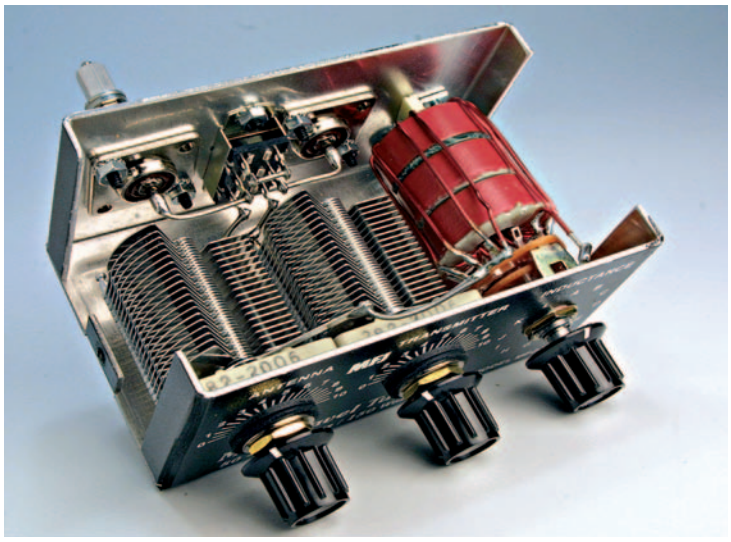


Fig. 2: An inside photograph of the MFJ-902 Travel Tuner clearly demonstrating the compact nature of the unit, along with the air spaced variable capacitors and toroidially wound inductances (see text).

Fig. 3: The rear panel of the MFJ-902. Note that MFJ provide a plug-terminal connection (this can be seen inserted into the antenna socket) to enable a single wire type antenna to be used. The entire unit reflects MFJ's improved attention to finish and general presentation.

Your Choice!

In this 'real world' of ours you'll have to make your own choice which a.t.u. will suit your purposes. Although the MFJ-902 worked well and proved to be versatile - perhaps more versatile than my existing MFJ-945E - I prefer to have some form of v.s.w.r. monitoring handy or close by.

On the other hand, and to be fair to the Travel Tuner - it's smaller than the Mobile Tuner. Incidentally, as it has no internal meter, the Travel Tuner is also cheaper than the Mobile Tuner. Personally, I imagine that the MFJ-902 would probably be chosen by a keen QRP type because they tend to use especially constructed low power measuring v.s.w.r. meters.

However, if I were to buy one of the MFJ-902s - (let's say to use with the *PW* 'Picnic Pole' portable station context (front cover project, *PW* August 2001) I would undoubtedly find it a very useful unit.

Altogether I was impressed with the MFJ-902. The example I had on review was well constructed, neat and easy to use. The attention to details and the thoughtful 'little extra' SO-239 centre connecting pin supplied for single wire use pleased me. A simple thing of course, but it shows an understanding of what we need. I look forward to the next innovation MFJ! And whatever choice you make - I think there's bound to be an MFJ a.t.u. suitable for your purposes.

PW

Product

The MFJ-902 Travel Tuner

Company

Waters & Stanton PLC

Contact

Tel: (01702) 206835/204965

Pros and Cons

Pros: Versatile, easy to use, nicely finished portable unit.
Cons: No v.s.w.r. metering (see text, and also options below)

Price

Basic MFJ-902 (no v.s.w.r. indicating meter) £74.95 plus P&P

Summary

Altogether I was impressed with the MFJ-902. The example I had on review was well constructed, neat and easy to use. Whatever choice you make - I think there's bound to be an MFJ a.t.u. suitable for your purposes.

Supplier

My thanks go to Waters & Stanton PLC for the loan of the review a.t.u. For further details on MFJ products contact them at: **Spa House, 22 Main Road, Hockley, Essex SS5 4QS. Tel: (01702) 206835, FAX: (01702) 205843. E-mail: sales@wsplc.com**

MFJ Antenna Tuner Options
MFJ-902H with 4:1 balun & terminations £99.95.
MFJ-904 like 902 but with cross-needle meter £109.95
MFJ-904H like 902H but with cross-needle meter £129.95.
For comparison the MFJ-945E costs £119.95.

● The author's finished product. It's ideal for the keen valved equipment constructor/renovator.

Building A Variable High Voltage Bench Power Supply

David Sylvester G3RED has been busy in his workshop making a useful bench power supply. He describes it as "A project aimed at the experienced constructor and people who are familiar with working with higher voltages".

Nowadays a lot of valve based equipment can be found on the surplus market and also at junk sales, mobile rallies and car boot sales etc. all at bargain prices. However, a lot of this gear has not been powered for many years and also could have faults.

Using your test meter on the 'Ohms' range allows catastrophic faults to be found, but this technique is of no use for finding faults that occur when high voltages appear. Just powering up some of this old equipment and hoping for the best can lead to disaster, as I have found to my cost! Another approach is required.

The bench power supply I've developed allows valve gear to be brought back to life much more safely. (The applications section of the article will give a few pointers on just how useful it can be).

There's still a lot of interest in valve circuits and many articles appear in the various magazines. And think power supply that can be used to try the circuits will make life a lot easier.

My featured bench power supply has an output voltage range of 50V to 300V stabilised with a current limit of around 70mA and is short circuit proof. Additionally, an a.c. heater voltage of 6.3V at 1A is also provided. An isolation switch for both the high tension (h.t.) and filament supplies is provided, and a large bright warning lamp illuminates when the output terminals are 'live'.

The heater winding on the transformer is left 'floating'. Either side can be grounded. (The grounding can take place at the unit to be powered).

If different heater voltages, or a higher available current are required, then additional windings on the mains transformer if available could be brought out to extra terminals. Alternatively you can use a separate filament transformer.

Take Care!

The high d.c. voltages produced by this power supply are dangerous and can be lethal. **So, great care must be taken when using the supply**. Under no circumstances should there be third parties in contact or near the unit or the connected units being powered.

Warning note: Please don't attempt to connect or disconnect circuits to the output terminals when the **'Live'** indicator is illuminated, or the isolate switch is in the **'Connect'** position. My advice is that only skilled and experienced people should work on units when they're 'live'.

Editorial comment: *Nowadays many of us are often very much aware - and sometimes annoyed with the widely promoted and quoted 'Politically Correctness' approach to modern life - but in this case common sense does demand a careful approach. However, in my opinion potential constructors shouldn't be put off by the higher voltages. Instead, and in supporting him, I suggest that you carefully follow the author's experienced suggestions and proceed carefully. My own advice is that you should always regard something as being potentially 'Live' until you've checked it out with a voltmeter, discharged any capacitor and ensured there's no chance of the equipment being switched on accidentally while you're working on it. Finally, I thoroughly recommend you use a totally isolated (double wound) mains isolating transformer. I bought one at a rally in 2003 for less than £20, and with a rating of 250W it will be adequate for most work on my bench.* ***G3XFD***.

The Circuit

The diagram, **Fig. 1**, shows the whole circuit diagram. A mains neon illuminates when the **On/Off** switch is closed, and the transformer T1 is energised via the 2A fuse F1.

For safety, a transformer with a copper foil screen should be used. This is grounded, adding extra safety by preventing mains from getting through to the secondary windings.

The four-pole two-way switch (S1a to S1d) the **Isolate/Connect** switch. From the circuit diagram, you'll see that the valve rectifier 5V filament winding on the mains transformer T1 is instead used to power the bright warning lamp.

The diodes D1 and D2 provide full wave rectification of the 250V windings on T1. Capacitors C1 and C2 help protect the diodes D1 and D2 from voltage surges when turning the 'mains' switch **On** or **Off**.

A d.c. voltage of approximately 350V appears across the smoothing capacitor C3. Notice that the negative of C3 and the transformer centre tap via fuse F2 are not directly connected to ground. As can be seen from the Fig. 1 circuit, they form the common negative connection to the control circuit.

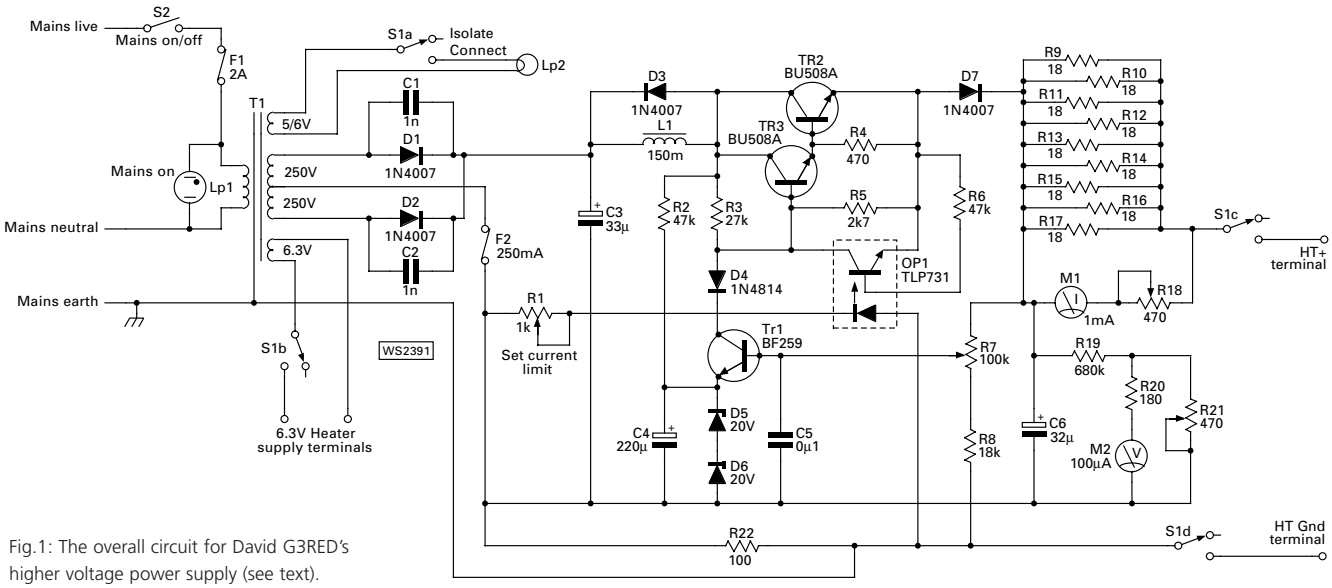
A 100Ω resistor R22, connects between the negative common and ground. When the external circuit is powered up by turning the switch to operate, almost all the circuit current flows through R22. A very small amount of current is taken by the voltage-sensing circuit R7 and R8.

The inductor L1 is quite small and is there to reduce the rate of change of current giving time for the current limit circuit to operate, the diode D3 quenches the back e.m.f. produced by the inductor L1. The rate of change of the current in a circuit after the output terminals is not effected until the current limit is reached.

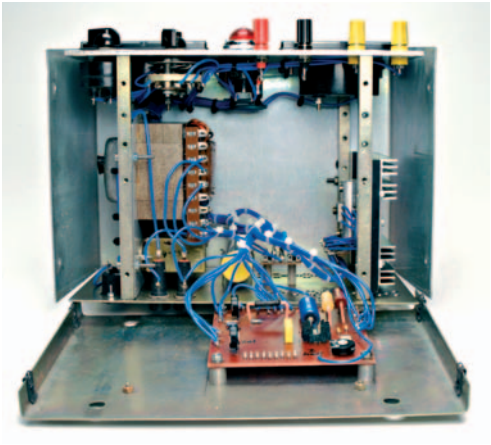
Two 20V zeners D5 and D6 are connected in series to provide a voltage reference. A single 40V zener could be used. Capacitor C4 is used for extra smoothing. The resistor R2 supplying the zener current. The emitter of Tr1 is directly connected to the reference voltage.

High voltage power transistors BU508A Tr2 and Tr3 are used to form a Darlington pair, forming a series regulator. These transistors are used in many TV sets and are easy to find. Diode D7 prevents the BU508As from becoming reverse biased if a voltage higher the set point appears on the output terminals.

The base connection of Tr3 is connected to R3 and then via D4 to the collector of Tr1. The diode D4 prevents Tr1 from becoming reverse biased if its collector goes



● Fig.1: The overall circuit for David G3RED's higher voltage power supply (see text).



● Fig.2: Viewing from the underside of the completed higher voltage p.s.u.

below the emitter voltage.

The output voltage adjustment pot R7 has its slider connected to the base of Tr1. Any variation in the output voltage or adjustment causes the collector current of Tr1 to change. This in turn changes the voltage on the base of Tr2 causing the output level to alter and settle at the set point. Capacitor C6 is to reduce high frequency noise pulses, etc., that may be generated by the C6 circuit being powered, from altering the output voltage.

The output has a smoothing capacitor C6. And the output voltage meter circuit consists of R19, 20 , M2 and R21. In series with the positive output terminal is a current meter circuit consisting of R9 to 17, M1 and R18.

Opto-Isolator

An opto-isolator OP1 is used in the current limiting circuit. The Current limit potentiometer R22 is in series with the opto isolator's light emitting diode (l.e.d.), and in parallel with R22.

The voltage across R22 is proportional to the current flowing in the external circuit being powered. As this voltage increases the current fed to the l.e.d. increases to a point where the photo transistor in the opto isolator conducts. The photo transistor is connected across R5. The current being fed to the base of Tr3 is thus diverted, preventing the output current from increasing further.

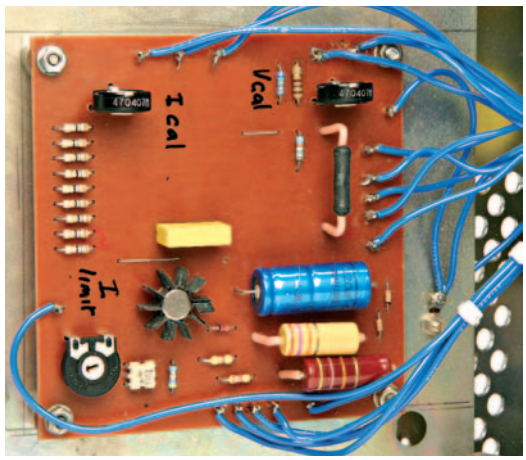
The Cabinet

The cabinet used in my prototype measured 250mm wide, 140mm high and 200mm deep. It was originally an old Venner mechanical counter unit - it's always a good idea to keep a look out for junk that can be recycled! The heading photograph shows the front panel layout

The photograph **Fig. 2**, shows the insides of the prototype. On the rear panel are also mounted the two fuses and an IEC chassis mount mains plug. The dual electrolytic capacitor, C3 and 6, is mounted on the inside surface of the panel. **The external case of the dual capacitors must be insulated from the panel**.

On the left-hand side of Fig. 2, there's is a steel plate that holds the mains transformer and inductance L1. On the right-hand side is the heat sink for both the BU508As, a tag strip with D7 mounted.

The heat sink is mounted on two blocks of insulating material completely isolating it from the metal work. A printed circuit board (p.c.b) holding all the control circuits is mounted on the base. The photograph, **Fig. 3**, provides a clearer view. The foil pattern and component layout together with pin-out connections for the printed circuit board is given **Figs. 4** and **Fig. 5**.



● Fig.3: A close-up view of the main regulator p.c.b.

The printed circuit board is single-sided and approximately 100mm square. Four screws were used to mount the board on 12mm brass spacers.

Components Elusive

Some of the components may appear to be elusive and not so easy to find. However, there are a number of dealers that specialise in 'vintage' electronics who can offer the difficult-to-get components (see *PW* ads).

The mains transformer I used was an old RS Components 'HT Transformer'. Suitable transformers can be found in surplus valve test gear, old radios etc. On safety grounds a transformer with a 'screen' connection (if provided they are clearly labelled as such) should be used.

The transformers aren't that difficult to find - even nowadays. It's a case of scanning adverts and looking at 'junk'.

Higher Voltages

If a transformer with a higher voltage h.t. winding is used, for example 300V-0-300V, then the d.c. across C3 would be about 420V. The maximum voltage across transistor Tr1 would then be about 380V. This is above the safety level for the BF259 used and another device would be needed. In this case it would be feasible to use another BU508A as they are quite inexpensive and there would be no need to use a heat sink.

The inductor L1 can be a

continued on page 42

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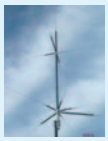

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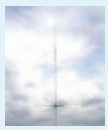

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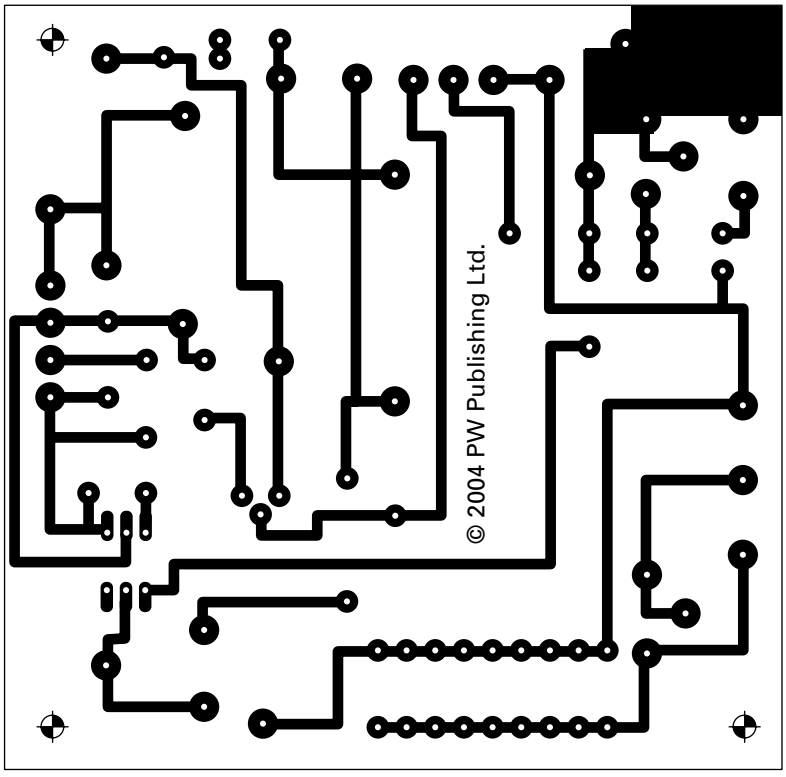
CONTINUED FROM PAGE 39

Fig.4: The p.c.b. track pattern



higher inductive value, smoothing chokes that have inductance between 7H to 10H can be found. What's required is one that has a low d.c. resistance of around 100Ω. The higher the resistance of the choke, the lower the maximum output voltage will be depending on the current taken by the circuit being powered. The inductor I used came out of an old switch mode power supply.

Note: High voltage electrolytic capacitors are not difficult to find. A number of advertisers in this and other magazines regularly advertise these capacitors.

Meters Used

The meters used for showing the output voltage and current are readily available values. However, the metering circuits have been made fairly universal so other meter currents can be used by the simple change of resistor values.

Setting Up

Before any setting up is undertaken, you should adjust trim-pot R1 to minimum resistance, and R21 and R18 to maximum resistance. You should set R7 to about half way.

Note: It must be verified that d.c. voltages (to 'ground') of around 350V is present at the collectors of Tr2 and 3. A d.c. voltage of around 40V is present at the emitter of Tr1.

Make sure that the terminal switch is turned to the **Isolate** position before connecting anything to the terminals. Next, connect a voltmeter on the h.t. output terminals that's capable of measuring 300V d.c. Then you should turn the **Isolate** switch to the **Connect** position (check that the **Live** indicator is illuminated.

Next, you should rotate the **Set Output Voltage** potentiometer. This should give a range from 50V in the fully anti-clockwise position to at least 300V in the fully clockwise position. If it's the other way round, then switch off - wait, then swap over the outside connections of the pot.

Proceeding onwards you should then set the output voltage on the external voltmeter to exactly 300V. Adjust R21 so that the internal voltmeter indicates 300V. Now check the external meter against the internal meter for other voltage points (I suggest multiples of 50V) set by R7. If a voltmeter of a different current is used then adjustments of the resistors R19 and 20 will be needed.

Turn the switch to the **Isolate** position and set the output voltage to 50V. Connect an external 100mA or so current meter across the h.t. terminals. Turn the switch to the **Connect** position and the indicated voltage on the internal meter should fall to zero, with a small current indicated on the external meter.

Next adjust R1 for an indicated current on the external meter of 70mA, and R18 can then be adjusted such that the internal current meter also indicates 70mA. If you have high power resistor - let's say a 2kΩ 10W, this can then be placed in series with the external ammeter, and by adjusting R21 different currents can be set and the two ammeters compared.

Once again, if the internal current meter has a different base current than 1mA (for full scale deflection), then different resistor values for R9 to R18 will be required. The value of R18 may possibly also have to be changed. When everything is set-up and working, place the p.s.u. in the enclosure you've chosen and it's then ready for use.

Some Applications

Now you've built your version of the p.s.u. - let's take a look at some of the applications. Firstly, I've found that mine has been quite useful in reforming

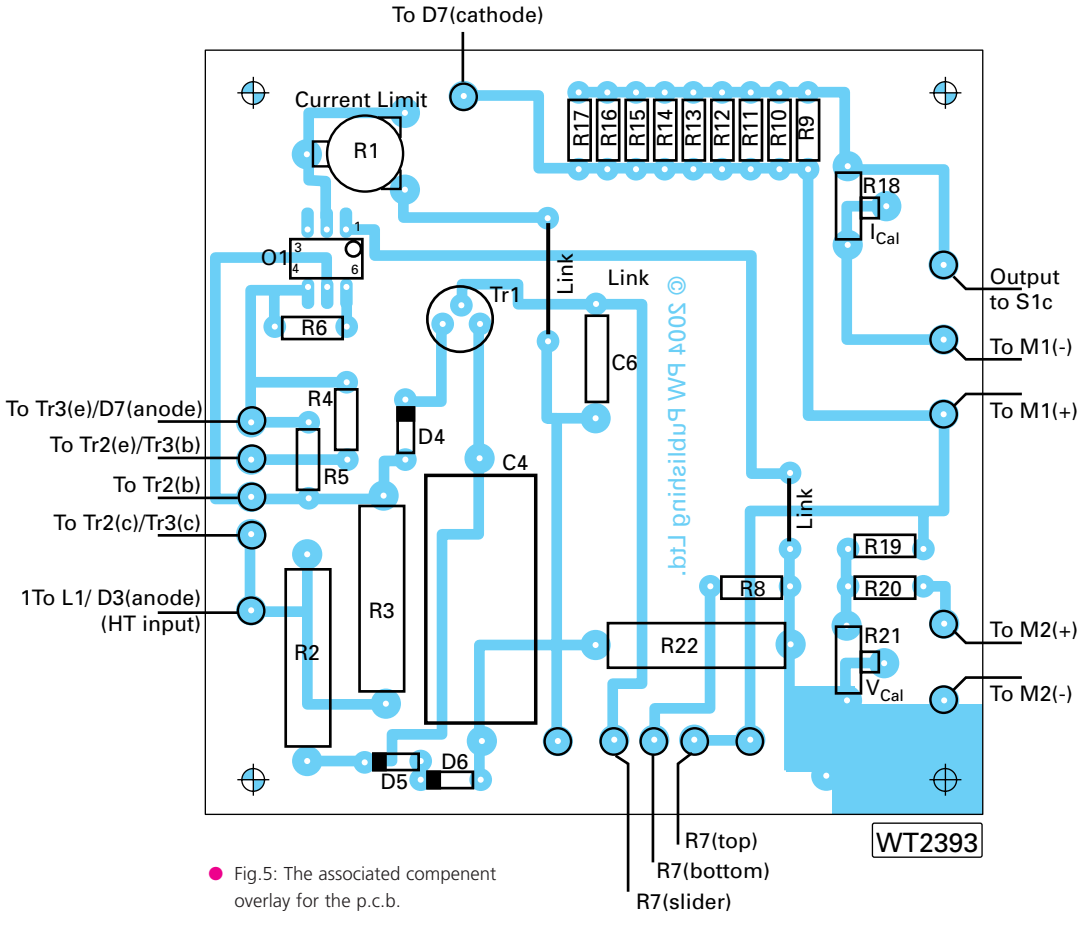


Fig.5: The associated compenent overlay for the p.c.b.

electrolytic capacitors. This is because old high voltage electrolytic capacitors - especially those that haven't been used for many years - tend to become leaky* (**See note below**) and also their value seems to decrease.

Safety note: *In practice, my personal experience has proved it's best to regard all high voltage electrolytic capacitors as potentially 'leaky' and that they require the sensible treatment suggested by the author.* ***Editor***.

If you try to measure the suspect capacitors on an a.c. bridge, the results can be misleading, depending on the amount of leakage the capacitor has. So, in order to restore them safely for re-use, it is well worth 'reforming' the component.

Note: Capacitors that are truly faulty (rather than just requiring 'reforming', cannot be repaired).

Reforming Process

The reforming process is simple: To start, you should connect a 1kΩ 1W resistor to the positive terminal of the electrolytic. A 'discharging switch' is also connected, as in **Fig. 6**. Then connect it to the indicated terminals on the p.s.u. Set the output voltage to 50V and turn the switch to the **Connect** position. The milliammeter should then show a current of about 50mA briefly, although the current will die away quite quickly unless the capacitor is leaking badly.

Leave the p.s.u. running for about five minutes or so, by then the current hopefully will have fallen to negligible amounts. Then, take note of the working voltage marked on the capacitor. If it's (for example) marked as '250V DC WKG' then turn the output voltage of the p.s.u. in 50V stages increasing towards the working voltage, leaving it for about five minutes at each increment.

Finally, turn the isolation switch to **Isolate** and move the discharge switch to the **Discharge** position for one minute. You can then disconnect the capacitor. If you have a component bridge - and all has gone well - the capacitor will measure as 'Okay' and it's ready for use..

Other capacitors like the old paper types can be checked for leakage as in the case above.

Note: Be aware if you find leaky paper capacitors - they tend to stay that way.

Reviving Valved Equipment

Reviving valved equipment with the help of your p.s.u. is very possible. For instance, I was given a Racal RA17L receiver that was substantially complete but in bad condition. It had laid around for many years with the odd component removed. In fact, this can be used as an example of the procedure to follow. However, a circuit diagram of the unit you're to work on is essential for logical work to be achieved.

Note: Be careful you're not looking at series parallel resistor networks as they'll give false readings. The capacitors can be easily checked for short-circuits.

Note: 'In circuit' value testing of capacitors with an a.c. bridge is possible with care.

Determine from the circuit diagram of the unit you're working on the h.t. positive and negative connections. Next, temporarily connect a wire to each of these points to the terminals of the p.s.u.

Then set the output voltage to 50V and turn the switch to the **Connect** position. Use a voltmeter with negative terminal on the negative h.t. rail and with the positive probe check each valve's base pins. Make sure you take a note of each voltage reading.

Once you've got the measurements, turn the p.s.u. switch to **Isolate** and then analyse the voltage readings made by referring to the circuit diagram. If for example, the screen grid pin of one valve bases showed (let's say) 35V and looking at circuit it can be seen that a single resistor was connected to the h.t. rail and a de-coupling capacitor to earth.

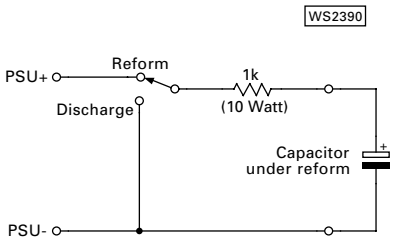


Fig.6: When the p.s.u. is used for reforming electrolytic capacitors, a few additional components are required (see text).

Components List

Resistors, power rating as shown.

R22	100Ω	2W
R2	47Ω	2W
R3	27Ω	2W
R4	470Ω	2W
R5	2k7Ω	2W
R6	47kΩ	2W
R8	18kΩ	2W
R19	680kΩ	2W
R20	180Ω	2W
R9 to R17	18Ω	2W

Pre-set variable resistors

R1	1kΩ
R21	470Ω
R18	470Ω

Potentiometers

R7	100kΩ linear track

Capacitors

C1, C2	1nF 1000V	C4	220µF 63V
C3	32µF 450V	C5	32µF 450V

Semiconductors

Tr1, 2	BU508A
Tr1	BF259 (With a clip-on heat sink)

Diodes

D1, D2, D3, D7	1N4007
D4	1N4148
D5, D6	120V zener (400mW)

Opto coupler

OP1	TLP731

Meters

M1	1mA f.s.d. (0 to 100 scale)
M2	100µA f.s.d. (0 to 300 scale)

Transformer & Choke

Primary 240V, secondary 250-0-250 100mA, 6.3V 1A, 5V or 6V 0.5A (for indicator supplies). Choke (L1) 0.15H (see note).

Miscellaneous

fuse holders (20mm), F1, 2A fuse, F2 20mm 250mA fuse. S2 mains toggle switch, Mains neon, 6V MES lamp and large lens holder, S1 is a 4-pole two-way rotary switch (1A rating) Note: Most rotary style switches don't have their rating marked. Choose one with fairly 'beefy' contacts - avoid using switches recovered from low current consuming transistorised equipment). Terminals for h.t. (one black one red). Heater terminals - two white terminals. Two knobs for the control shaft. (isolate/connect & set output voltage) Heat sink for BU508As (105mm * 105mm with 15mm fins). One 5-way tag strip and heat sink for BU508As.

It's then reasonable to deduce that the capacitor is faulty. With it disconnected, and the p.s.u. turned to **Connect** again you can re-check voltage. Incidentally, this type of problem occurred on one of the RA17 units!

However, when disconnecting the capacitor, the voltage reading remained the same. In the end (working by elimination) I found it was a tag strip which had become faulty. The problem was caused by 'the muck of ages' which had caused a carbon track to form across the tag strip insulation, providing a resistive pathway to ground.

If all seems well then the voltage can be increased and unit re-examined by the voltmeter. If all seems well then the valves can be inserted (with the exception of a rectifier). The filament supply can now be connected and the unit energised.

Valve Testing

Valves can be tested by wiring up a valve base, providing a resistor to the screen grid in the case of a pentode and grounding the suppresser grid. The control grid bias can be supplied from a variable d.c. supply or grounding the control grid and placing a variable resistor in series with the cathode.

The p.s.u. milliammeter will show the overall current and by changing the grid bias by 1V and observing the current change will indicate the mutual conductance of the valve under test. I wish you success in building your version, I think you'll find the p.s.u. just as useful as I do! **PW**

The 21st Annual Practical Wireless 144MHz QRP Contest

0900-1600UTC, 13 June 2004

Once again it's time for Neill Taylor G4HLX - the originator and adjudicator of the 'friendly contest' to announce the rules for 2004. And the most import thing to remember is that this year it's a week earlier than usual!

Editorial Announcement: Each year it's my pleasure to thank Dr. Neill Taylor G4HLX for all his hard work organising the 'friendly contest' we all enjoy so much. You do a great job Neill. Thank you!
Rob Mannion G3XFD, Editor.

With Summer just around the corner, it's that time of year again, when v.h.f. enthusiasts will take to their favourite hill-top for a day of QRP operation that promises to bring the 144MHz band alive. Whether you are a complete newcomer to v.h.f. contests, or part of a well-established group, or maybe just a QRP operator who'd like the chance to work some long distances.

The *PW* 144MHz QRP Contest has something special to offer. The 3W output power limit makes it easy to compete effectively, and year after year operators are amazed by the distances they achieve with low power.

There are no significant changes in the rules this year, but even if you're a regular entrant, **please be sure to read them thoroughly**. If you are a newcomer to contesting, you will be particularly welcome, and you can find advice about getting started in this exciting aspect of our hobby on the *PW* QRP contest website **www.contest.org.uk**

However, the real reward of operating in this event is the fun of taking part and the good QSOs that hopefully you'll get in your log. And to recognise the achievement of everyone who takes part, we are again offering a special certificate to every station that sends in an entry - to claim yours, be sure to send the corner flash coupon below with your entry (see rule 6 for more about this). These certificates have again been sponsored by **Chris Rees G3TUX**.

So, there are certificates for everyone who enters, and they will include endorsements for special achievements, such as the highest placed station in each locator square. And of course, for leading stations there are the coveted trophies and additional prizes.

The outright winners will receive the *PW* QRP Contest Winner's Cup. The leading Scottish station will be awarded the **Tennamast Trophy in Memoriam to Frank Hall GM8BZX**, and the leading station in Eire or Northern Ireland will win the **PW EI/GI Trophy Clock**.

A Week Earlier!

The scheduling of the contest this year **is a week earlier than it has been in the past**. Ever since its inception in 1983 the PW 144MHz QRP Contest has been held on the third Sunday of June. This has avoided clashes with other events, and since the **RSGB** introduced the **Backpackers' Contests** in 1995, the second 144MHz Backpackers' session has been co-ordinated to coincide with the first four hours of the *PW* event.

This year however, the IARU have moved the Region 1 50MHz contest, which runs in many countries, to the same weekend. Naturally, the RSGB 50MHz Trophy contest, which is co-ordinated with the IARU event, and the 50MHz Backpackers' Contest too, have also been moved to the third weekend of June. I was alerted to this by **Andy Cook G4PIQ**, chairman of the RSGB VHF Contests Committee, and we agreed that it was necessary move the *PW* QRP Contest, as well as the co-ordinated 144MHz Backpackers' session, to the second Sunday of the month, **13 June 2004**, to avoid a conflict.

Some people may prefer the new timing, others may not - but at least it now avoids the clash with Father's Day. Some entrants have complained about in previous years (while others admit that Father rather likes to spend his Day playing with radios!).

Good Preparation

Don't forget that it's good preparation that makes for a successful contest station, and the date is approaching fast! So get the portable gear out and dust it off, or check out your base station antennas if that's what you'll be using.

I look forward to receiving your log, by E-mail if at all possible (see the rules), although paper entries sent by post are also acceptable. And you can look forward to seeing your callsign in the contest results, to be published later in the year in *Practical Wireless*.

Keep an eye on the website, **www.contest.org.uk**, for other information. Let's hope we enjoy some good propagation and, of course, fine weather. Good luck and good DX!

Neill Taylor G4HLX

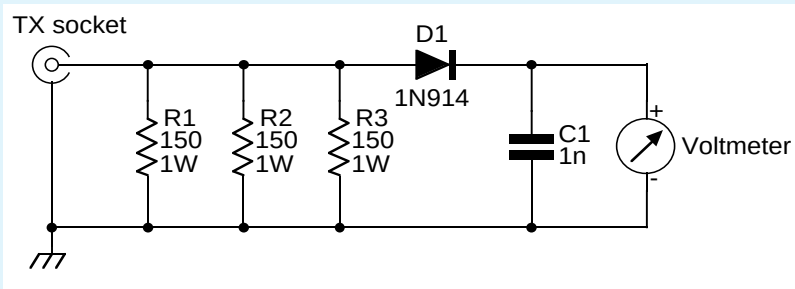


Fig.1: A simple power measurement circuit (please see text).

QRP Contest June 2004

Contest Rules 2004

1. General: The contest is open to all licensed Radio Amateurs, fixed stations or portable, using s.s.b., c.w. or narrow band f.m. (n.b.f.m.) in the 144MHz (2m) band. Entries may be from individuals or from groups, clubs, etc. The duration will be from 0900 to 1600UTC on 13 June 2004.

All stations must operate within the terms of the Licence. Entrants must observe the band plan and must keep clear of normal calling frequencies (144.300MHz and 145.500MHz) even for CQ calls. Avoid frequencies used by GB2RS during the morning (144.250MHz and 145.525MHz) and any other frequency that is obviously in use for non-contest purposes. Contest stations must allow other users of the band to carry out their activities without hindrance.

The station must use the same callsign throughout the contest and may not change its location. Special event callsigns may not be used.

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

(i) callsigns of both stations
(ii) signal report, standard RS(T) system
(iii) serial number: a 3-digit number incremented by one for each contact, starting at 001 for the first
(iv) locator (i.e. full 6-character IARU Universal Locator for the location of the station).

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

If a non-competing station is worked and is unable to send their full universal locator, the location may be logged instead. However, for a square to count as a multiplier (see rule 4), a full 6-character IARU universal locator must have been received in at least one contact with a station in the square. **Contacts via repeaters or satellites are not permitted**.

3. Power: The output power of the transmitter final stage shall not exceed 3W p.e.p. If the equipment in use is usually capable of a higher power, the power shall be reduced and measured by satisfactory means. The simplest way is often to apply a (variable) negative voltage to the transmitter a.l.c. line, reached via the accessory socket.

The output power can be accurately measured using the simple circuit of **Fig. 1**. Connect this to the 50Ω output of the transmitter and adjust the output power so that the voltmeter does not exceed 16.7V on a good whistle into the microphone.

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

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

Only one contact with a given station will count as a scoring contact, even if it has changed its location, e.g. gone /M or /P. If a duplicate contact is inadvertently made, it must still be recorded in the log, and clearly marked as a duplicate.

5: Logs: Logs may be submitted by E-mail or by post. In either case the log must consist of columns showing:

(i) time UTC
(ii) callsign of station worked
(iii) report and serial number sent
(iv) report and serial number received
(v) locator received (or location).

A log sent by post must be clearly written on one side only of A4 sized paper (210 mm width x 297 mm height), ruled into the columns listed above. Underline or highlight the first contact in each of the locator squares worked.

At the top of each sheet, write:

(a) callsign of your station
(b) your locator as sent
(c) sheet number and total number of sheets (e.g. "sheet no. 3 of 5").

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

A log sent by E-mail may be a file generated by logging software. (provided it contains all the information listed above). It can also be a file in any other suitable format (plain text is fine) which, if printed, would be equivalent to a paper-based entry. Preferably give the file a name including the station callsign (e.g. g4hlx.log), and send as a standard E-mail attachment - all common encodings can be accepted. If there is any problem with your entry you will be contacted by e-mail.

6. Entries: In addition to the log, the following information must accompany each entry;

(a) name of entrant (or of club etc. in a group entry) as it is to appear in the results table and on the certificate
(b) callsign used during contest (including any suffix)
(c) name and address for correspondence
(d) details of location of station during contest
(e) locator as sent
(f) whether single- or multi-operator (a single-operator is an individual who received no assistance from any person in operating the station, which is either his/her permanent home station or a portable station established solely by him/her); if multi-operator, include a list of operators' names and callsigns
(g) total number of contacts and locator squares worked
(h) list of the locator squares worked
(i) a full description of the equipment used including transmit p.e.p. output power
(j) if the transmitting equipment is capable of more than 3W p.e.p. output, a description of the methods used (i) to reduce and (ii) to measure the output power
(k) antenna used and approximate station height a.s.l.

For an entry sent by post, this information must be written on a separate sheet of A4 sized paper. For an E-mail entry it should be written in the message sent with the log or, preferably, using the on-line form provided on the contest website, **www.contest.org.uk**, which also provides more information about sending entries by e-mail.

Send Your Entry!

The entry should be sent, with the log sheets, by post to: ***Practical Wireless* Contest, c/o Neill Taylor G4HLX, 46 Hunters Field, Stanford in the Vale, Faringdon, Oxfordshire SN7 8LX**, or by E-mail to **entry@contest.org.uk**. Entries must be postmarked or sent by E-mail **no later than 28 June 2004**. Late entries will incur a heavy points penalty or may be disallowed altogether.

Any other general comments about the station, the contest and conditions during it are welcome, but should be written on a separate sheet of paper. Photographs of the station are also invited (but please note that these cannot be returned); if these are not available by the time the entry is submitted they may be sent later, by E-mail or post, to arrive by 14 August 2004.

A summary of the results will be published later this year in *Practical Wireless*. The full detailed results list will be available on the contest Web site soon after publication in *PW*. (If you would like to receive this list by post, please enclose a s.a.e. when sending your entry).

A certificate will be sent to every entrant who encloses with the entry the corner-flash coupon on this page (**photocopies will not be accepted**). If you are sending your entry by e-mail, to claim your certificate you must post the coupon to the contest entry address with a note giving the callsign of your station in the contest. **Please make sure that we have the address to which the certificate should be posted**.

7. Miscellaneous: Note that the conditions of the Foundation and Intermediate Class Licences permit only the Licensee personally to operate the station. Thus, only single-operator entries are possible under Foundation or Intermediate callsigns. Of course, Foundation and Intermediate Licence-holders may be operators of Full Licence multi-operator stations (including club stations) when supervised by a Full Licence holder.

When operating portable, obtain permission from the owner of the land before using a site. Always leave the site clean and tidy, removing all litter. Observe the Country Code.

Take reasonable precautions to avoid choosing a site which another group is also planning to use. It is wise to have an alternative site available in case this problem does arise.

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

8. Adjudication: Points will be deducted for errors in the information sent or received as shown by the logs. Unmarked duplicate contacts will carry a heavy points penalty. Failure to supply the complete information required by rule 6 may also lead to deduction of points.

A breach of these rules may lead to disqualification. In the case of any dispute, the decision of the adjudicator will be final. **PW**

coaxial trap capacitors

Capacitors for antenna 'traps', must handle high voltages. John Share G3OKA, shows you how to make eminently suitable traps from coaxial cable.

In recent years the construction of traps for a 'Trap dipole' has become quite difficult due to the shortage of suitable fixed capacitors. It's well known that coaxial cable can be used as a capacitor and its voltage rating is also known, for example RG8U has a capacitance of 100pF/m (30.5pF per foot). The insulation properties are also quite good, as it has an insulation breakdown of at least 5kV. However, the lengths of coaxial cable required would seem to preclude exploiting this idea.

As a rule of thumb trap capacitors have a value of 1.5pF per metre of wavelength of the desired band. So, a trap for the 24.9MHz (λ=12m) band would require a capacitor of about 18pF. If this capacitance value is to be made from RG8U coaxial cable, its length would be 180mm (18/100 in metres) or a little over seven inches when using imperial measurements.

Similarly to create a suitable version for the 18.1MHz (λ=17m) the capacity needed for the trap, would be 25pF. To create this capacitance value some 250mm of RG8 cable is needed. Both of these physical lengths are rather long to make into an effective and small trap. But there's no reason why the capacitor cannot be made up from a number of much shorter identical lengths connected in parallel.

Let's now look at how to produce, say, a 6pF capacitor, which would need 60mm of cable. Firstly, cut a 100mm length of RG8U coaxial cable. Then strip away 20mm of the outer insulated covering and tin the screen. Using a craft knife, or perhaps a small plumber's pipe-cutter, trim back the tinned screen to leave about 5mm of the inner insulator exposed. (Make sure to trim the inner conductor flush with the end of the insulation).

Remove the remainder of the jacket and tin the screen about 55-65mm from the first end, then cut through the tinned screen so that overall it's 60mm in length. The illustration, **Fig. 1**, shows the completed 18pF version. Finally cut the centre insulator back to about 10mm in length. These dimensions do not need to be exact, a steel ruler will be sufficiently accurate.

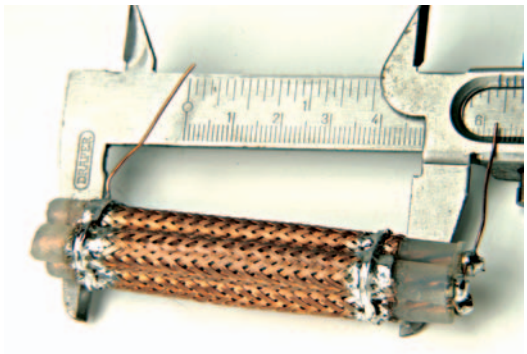


Fig. 1: Three short lengths in parallel make up the 18pF capacitor as described by John G3OKA. This 'capacitor' has been tested to a d.c. voltage of 12kV.

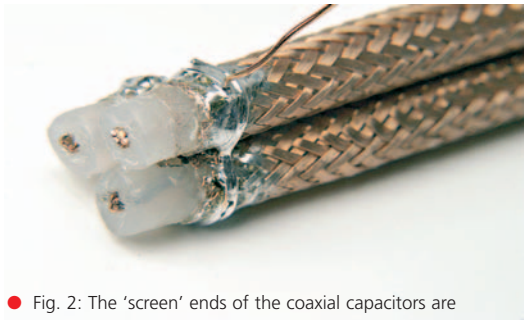


Fig. 2: The 'screen' ends of the coaxial capacitors are soldered together, note that the inners are extended by 5mm or so.

Using bare copper connecting wire (fuse wire works well) bind the sections together as shown in **Fig. 2** and then check that they will fit inside the plastic tube. Solder a short length of heavy wire (that from domestic power cable will be suitable) to the screens. Now you can solder the other tinned ends of the screen together. A further heavy wire connects the centre conductors together as shown in **Fig. 3**.

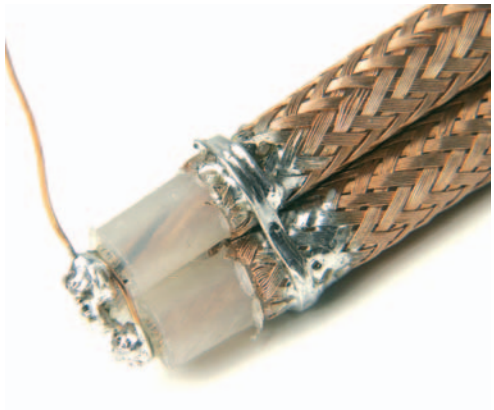


Fig. 3: At the 'inner' ends the screens are soldered together. The inner conductors are connected together separately.

The coil former, **Fig. 4** was made from scrap plastic tube 27mm outside diameter, and with a wall thickness of 2.5mm. A groove of 2.5mm per turn (10 turns per inch) was cut using a lathe to ensure that the coil winding did not move and change the value of the inductance when subjected to the elements. (There are alternative techniques).

I use enamelled copper wire, or bare 1mm or 1.5mm wire stripped from house wiring cable to wind the coils. Insulated connecting wire could be used in an extreme case, but I find that it tends to be too thin. The trap should be temporarily assembled with the capacitor inside the tube, and the maximum number of turns of scrap wire wound onto the former and held in place with some adhesive tape. Solder the coil and capacitor ends together to create a temporary parallel tuned circuit.

A grid dip oscillator (g.d.o.) is then used to find the resonant frequency of the trap and the number of turns reduced until resonance is achieved in band centre. Note the number of turns for resonance at the desired frequency, then drill two small holes in the former at the correct place. This 'test' winding is discarded and a new permanent one is created using the same number of turns.

Before waterproofing is applied, it's an idea to recheck the resonance of each trap. It's essential that the traps are made waterproof, rainwater will find the smallest opening and ruin hours of work. There are many sealants but some will attack copper. Servisol Silicone Adhesive Sealant (from RS Components, Farnell and CPC) is widely used for sealing electrical connections against water penetration. One tube will be more than sufficient for around half a dozen traps.

By using this method, I've made traps for 28, 24, 21, 17 and 14MHz bands. All of which have performed fully to expectation and handled a typical 100W transceiver with no obvious signs of distress. Try it yourself!

PW

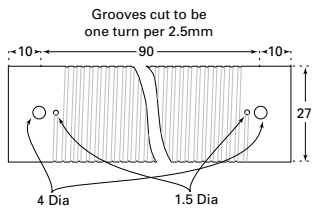


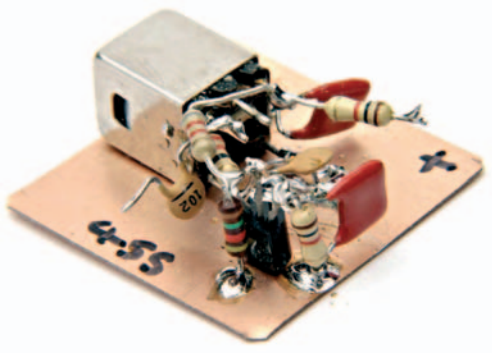
Fig. 4: The trap inductor former, made from 27mm outside diameter plastic tubing. The grooves keep the winding firmly in place, see text for more details

practical way

"Creativity often consists of merely turning up what is already there. Did you know that right and left shoes were thought up only a little over a century ago"?

Bernice Fitz-Gibbon

This month the Rev. George Dobbs G3RJV tackles the problem which often confronts owners of simple h.f. broadcast receivers - modifying them to resolve c.w. and s.s.b. After you've read the quotation of course!



This month's project - an external beat frequency oscillator - will turn a budget priced h.f. broadcast radio into a capable c.w. and s.s.b. receiver.

From time-to-time I've been involved in providing components, kits and radio equipment to Radio Amateurs in poorer parts of the world. Often those of us, who live in situations where the cost of new or used Amateur Radio equipment in relation to income is such that we are able to gather a radio station at home, do not realise that for many poorer people this is just not possible.

A typical case is someone in a poorer country training to work as a technician, coming into contact with Amateur Radio in a college situation, and gaining their own Licence. After training, their income as a technician may be relatively high in local terms but not high enough to buy Amateur Radio equipment. The cost of such equipment is roughly the same throughout the world and is governed by the standard of living in wealthier countries.

Local Ingenuity

A common outcome from such a dilemma is local ingenuity. In the years I have edited ***Sprat***, the journal of the **G-QRP Club**, some of the most innovative practical projects we've published have come from people in poorer countries making use of what they can obtain.

I remember well a picture sent to me by **VU2NGB** of his radio station. The set-up was a home constructed 7MHz transmitter built using valves and running low power on c.w. (Morse) and a.m. (amplitude modulation).

The receiver was a modified domestic 'all-wave' a.m. receiver, the main modification being the addition of a beat frequency oscillator (b.f.o.) to enable the reception of Morse and single sideband signals. This simple arrangement was the entire Amateur Radio station. Looking at the photograph took me down memory lane, as I recalled doing something similar as a schoolboy in order to listen to local c.w. signals on 'Top Band' (1.8–2MHz).

These days a whole range of short wave a.m. receivers are available at cheap prices. For example, I picked up a small multi-band receiver at a car boot sale for £2 to take on my travels and listen to BBC World Service broadcasts.

Additionally, many of the electrical chain stores sell surprisingly cheap synthesised multi-band receivers. I replaced my £2 radio with one. Such receivers are ideal for carrying around on trips to monitor short wave broadcast stations, although usually the cheaper models are only equipped to receive a.m. and f.m. signals. However, with the addition of a simple b.f.o. they can also be used as a basic Amateur Radio receiver.

Phone & CW

Nowadays, most Amateur Radio stations use telephony (voice) signals in a single sideband, suppressed carrier (s.s.b.) mode or c.w. (Morse) signals. This requires a receiver with a product detector or a beat frequency oscillator to re-insert the missing carrier or produce a beat note on the c.w. signal.

The beat note is usually inserted at the intermediate frequency (i.f.) of the receiver. In the majority of commercial a.m. receivers, this is at 455kHz.

So, the requirement is for an oscillator producing a 455kHz signal which can be picked up in the 455kHz i.f. stages. This is no drastic modification to a piece of commercial equipment! The b.f.o. can be a small self-powered unit that doesn't require direct connection to the receiver. There are many such circuits, so let's now have a look at a few of the simpler ideas.

What's required for a tuned frequency oscillator is some method of positive feedback to maintain the oscillation. Additionally, some form of tuning circuit to maintain the frequency of that oscillation.

The diagram, **Fig. 1**, shows a very common type of circuit used to make a simple b.f.o. A bipolar transistor is used in conjunction with a tuned circuit at 455kHz. The obvious choice is to use a 455kHz i.f. transformer and in this case an i.f. transformer with a link winding is used to provide the feedback.

The signal induced in the tuned circuit of the transformer at the transistor collector is picked up by the link winding. It's then coupled back to the base of the transistor via the 1nF capacitor.

Note: Some care has to be taken to ensure the correct phasing between the tuned winding and the link winding. The feedback must be positive. The circuit diagram indicates the way to wire the link winding.

In practice, the easiest way is to build the circuit and if it does not oscillate, reverse the connections to the link winding. Almost any 455kHz transformer will work in the circuit, although the turns ratio of the transformer will probably be best if a final i.f. transformer is used.

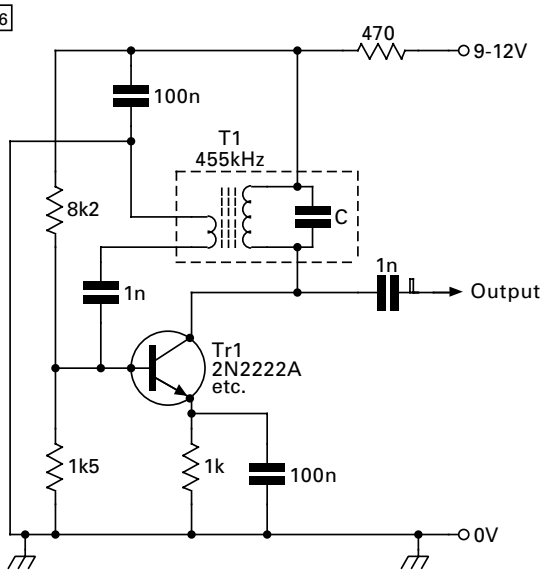
The G3RJV Version

The version I built was constructed around an i.f. transformer I found in my salvaged 'inductors' box. To identify the required pins on a unknown 455kHz i.f. transformer, you have to look at the pins at the bottom of the transformer.

There should be 3 pins on one side and 2 pins on the other side. For the tuned winding use the outer pins on the 3 pin side; the tuned winding will have a tapped winding for impedance matching. As the active device the link winding will be the two pins. I used a 2N2222A transistor (as I once bought a big bag of them) but any similar device will serve, such as the BC107, BC108, BC182, etc.

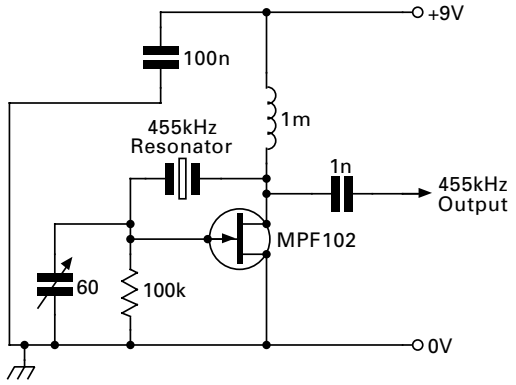
The output of the oscillator does not require a direct connection to the receiver. In most cases a short length of wire (about 30mm or so) placed on the output will radiate enough signal for the purpose. Depending upon the placement and gain of the i.f. stages this can be draped around the radio or placed near the i.f. stages. Then you should adjust the core in the transformer to a suitable injection frequency for c.w. or s.s.b. signals.

WS2386



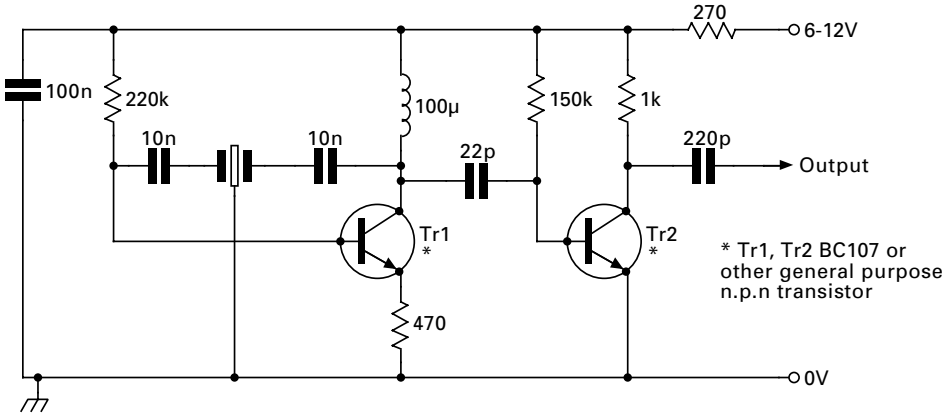
● (left) A very common type of circuit used to make a simple b.f.o. A bipolar transistor is used in conjunction with a tuned circuit at 455kHz (see text).

WS2387



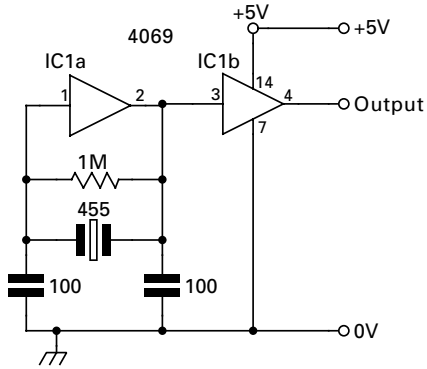
● (above) The diagram shows a b.f.o. circuit using a field effect transistor (f.e.t.) and a 455kHz ceramic resonator. These are very cheap substitutes for a frequency resonant crystal (see text).

WS2388



● The diagram, shows a very similar circuit to that in Fig. 2, this time using a 455kHz ceramic filter rather than a resonator. Again this forms the feedback path for the oscillator but input and output coupling capacitors are required for the filter (see text).

WS2389



● This month G3RJV wants to keep you busy and suggests another, very simple, fixed frequency oscillator at 455kHz. It uses a ceramic resonator and two of the inverters from a 4069 chip (see text).

The diagram, **Fig. 2**., shows a b.f.o. circuit using a field effect transistor (f.e.t.) and a 455kHz ceramic resonator. These are very cheap substitutes for a frequency resonant crystal.

In this circuit the resonator itself provides the feedback path between the drain and the gate of the f.e.t. It's easy to 'pull' the frequency of the resonator by adding some series capacitance.

In Fig. 2, a small trimmer capacitor has been added to adjust the frequency for reception of c.w. or s.s.b. Another option is to use variable capacitor instead of a trimmer. This would give a variable b.f.o. front-panel control to aid careful tuning of s.s.b. signals.

A b.f.o. 'pitch' control was a feature of several early receivers I owned. In use I found that some adjustment of the b.f.o. frequency could be useful in the fine tuning of signals.

I used the MPF102 device, again because I have them in stock. The more common 2N3819 f.e.t. should work in this circuit.

The 1mH choke in the drain of the f.e.t. is an axial moulded inductor and provides an r.f. load for the output. Again, in this circuit the output can go to a short length of wire to radiate the 455kHz signal close to the radio.

Similar Circuit

The diagram, **Fig. 3**, shows a very similar circuit, this time using a 455kHz ceramic filter rather than a resonator. Again this forms the feedback path for the oscillator but input and output coupling capacitors are required for the filter. These are 3legged devices, the centre pin going to ground.

The circuit uses bipolar devices and has a simple buffer amplifier after the oscillator. A whole range of common bipolar transistors would work in this design.

The main disadvantage with this version is that it's difficult to change the frequency of the filter and the frequency is fixed. So, this circuit is less useful than the two previous designs. An astute constructor might like to take the buffer amplifier section and add it to the design in Fig. 2.

Circuit Ideas

To ensure that *PW* readers are not short of circuit ideas in this month's column, I've added that shown in **Fig. 4**. This is another, very simple, fixed frequency oscillator at 455kHz using a ceramic resonator and using two of the inverters from a 4069 chip.

The 4069 is an expensive chip which contains six CMOS inverters of which only two are used. One for the oscillator and one for a buffer amplifier and it's a very simple way to generate a 455kHz signal.

Well, this time there's a whole range of circuit ideas to help you convert that cheap a.m. radio to a simple Amateur bands receiver. It's worth trying!

A small circuit board, a PP3 battery and a short length of wire could wheedle c.w. and s.s.b signals from the cheapest of short wave radios. To start...all you need to do is switch that soldering iron on!

PW

Antenna Workshop

Peter Dodd, G3LDO looks at the Hentenna - a strange antenna that 'hatched' from a new kitchen. It's not surprising really as 'hen' means 'strange' in Japanese.

It has been a difficult couple of weeks here at the G3LDO QTH. The 'station manageress' has, for some time, been pressurising for a new kitchen and eventually got her way. In the course of this operation I made a fair amount of changes to the plumbing arrangements and found myself with some excess plumbing material once the job was completed.

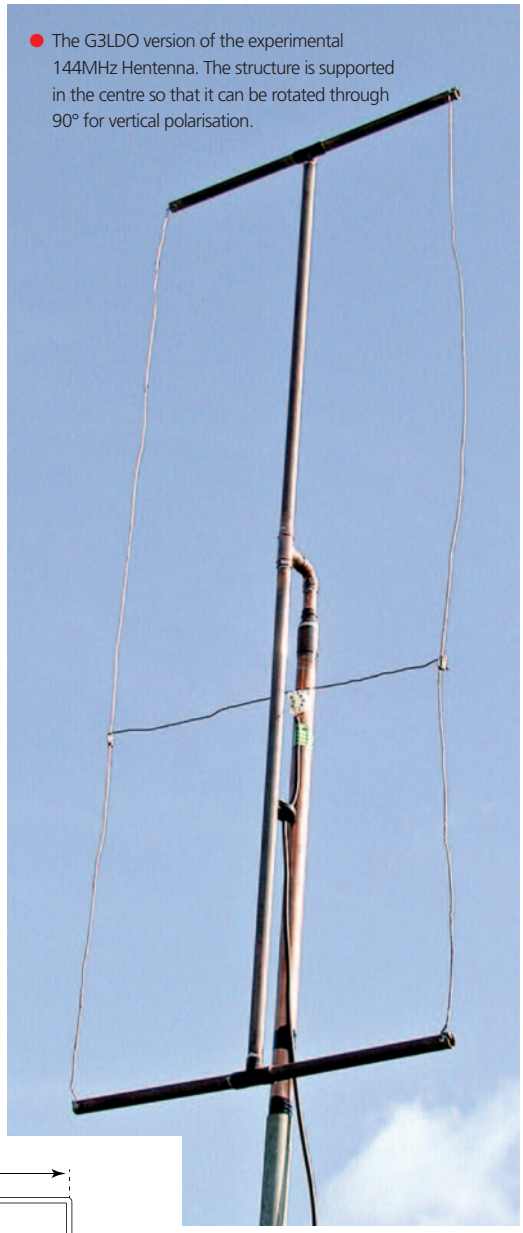
I always look at any pieces of metal as material for constructing an antenna and had been considering a v.h.f. antenna for 144MHz that had gain, yet was not too directive. One such antenna that I had seen before but never tried is the Hentenna. Could be a candidate for my plumbers delight project?

This antenna under discussion originated in Japan and according to *The ARRL Compendium, Vol. 5* was conceived by **Mr Someya, JE1DEU**. The prototype consisted of two quad type loops fed in phase. The design was further developed by **Tadashi Okubu JH1FCZ**, and others, to the form shown in **Fig. 1** and christened the 'Hentenna'. The word 'Hen' in Japanese means strange, odd or curious, and was used presumably because of the unusual way which was found necessary to match it to 50Ω coaxial cable.

You won't find the antenna featuring much in English language publications but it's very popular in Japan. Hardly a month goes by without seeing one in some form or other in one of the Japanese radio magazines, such as the example of a 144MHz model that's shown in **Fig. 2**.

Standard Model

I decided to build the standard model as in Fig. 1. A computer model was 'built' and it predicted maximum current in the centre of the short horizontal sections as shown in **Fig. 3**. From this I assumed that it could be supported at these points without insulators. A variation on the construction method is described by **JR1TTQ** and uses wires for the vertical elements in a 50MHz design. The construction of my antenna would follow this design.



The G3LDO version of the experimental 144MHz Hentenna. The structure is supported in the centre so that it can be rotated through 90° for vertical polarisation.

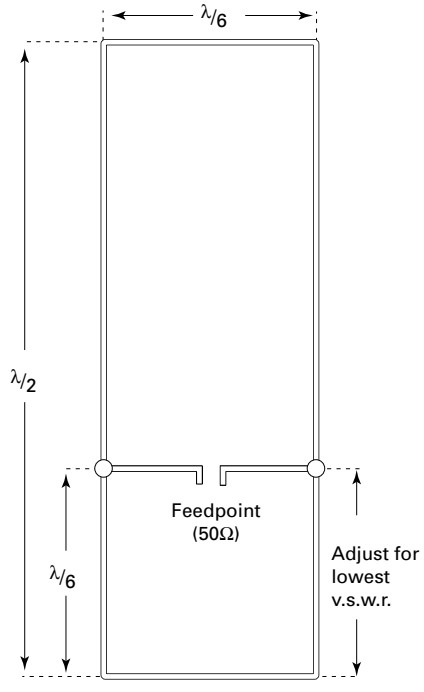


Fig. 1: The basic Hentenna. With the orientation shown the antenna is horizontally polarised. From *The ARRL Compendium, Vol. 5*

The support structure comprises 15mm copper tubing 1160mm long, with a plumbing T-piece in the centre as shown in the photograph. This centre point is then soldered to a vertical 22mm pole via a 90° bend and 15 to 22mm adapter, which can be seen more clearly in **Fig. 4**. The 380mm horizontal elements are fixed to this vertical support pole, also using T-pieces. Note that the vertical support pole and the horizontal elements have to be cut in the centre to solder to T-pieces together.

The connections, from the tips of the horizontal elements and the feeder connections to the antenna are made using 2mm stranded copper wire. The wire is fixed to the copper tube elements by drilling a 2.5mm hole in the copper tube, threading the wires through and soldering in place.

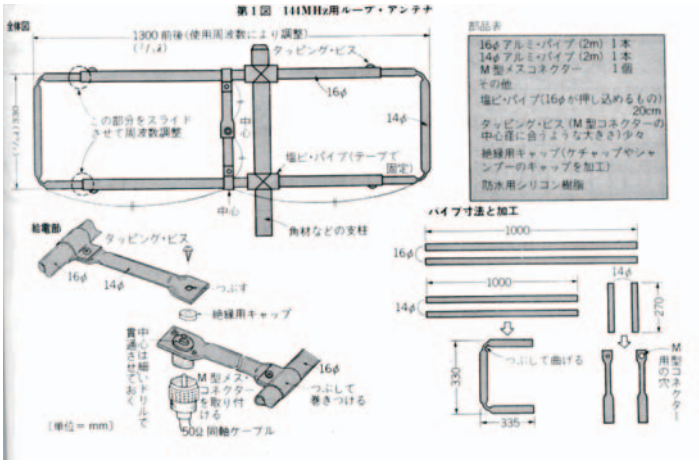


Fig. 2: A vertically polarised Hentenna for 144MHz by JH4LZS. This model uses different dimensions to the standard shown in Fig. 1 and has computed a free-space gain of 5.1dBi. Scanned from *CQ Ham Radio* (with acknowledgement and permission).

The antenna is fed directly with 50Ω coaxial cable through a connector block and connected to the vertical wires by short lengths of 2mm stranded copper wire. Brass inserts from connector blocks are soldered to these feed wires and the inserts

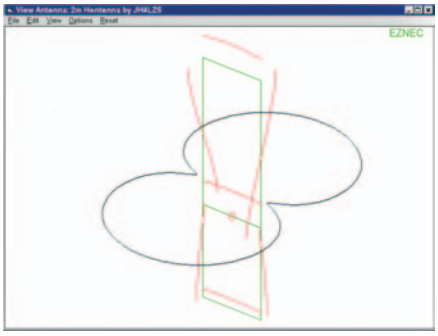


Fig. 3: Computer model of the Hentenna. The antenna elements are shown in green, the antenna currents in red and a two-dimensional azimuth section of the antenna polar diagram is shown in black. The model predicts a free-space gain of 4.8dBi.

Fig. 4: Detail of the construction method. The antenna is fed directly with 50Ω coaxial cable via a connector block and connected to the vertical wires by inserts from connector blocks. This enables the connection points to be adjusted for minimum s.w.r. See text for more detail.

threaded on to the vertical wires prior to being fixed to the horizontal tube elements. This arrangement allows the connection points to be adjusted for minimum s.w.r. and tightened up by the insert screws when the optimum point has been found.

Ideally, the coaxial cable should be connected to the antenna via 1:1 balun. In practice the current choke arrangement shown in Fig. 4 removed the ill effects of coaxial cable feeder antenna currents. This is described later.

All plumbing connection surfaces must be cleaned with emery cloth or wire wool and smeared with flux. The joint is heated with a blow torch until applied solder runs freely and runs into the joint through capillary action. **Note**: Most large d.i.y. stores have leaflets on how to make good plumbing joints.

Performance Qualities

One of the noticeable performance qualities of this antenna is that the dimensions and s.w.r. adjustments are not critical. The feeder connections to the vertical wires were very easily adjusted particularly if you have one of these active s.w.r. instruments such as the MFJ-259.

The frequency of lowest s.w.r. is determined by adjusting the position of the feeder connections up or down the vertical wires. The s.w.r. measurement must be made with operator standing at least three or four metres from the antenna and the lowest part of the antenna should be about over two metres from the ground.

The lowest s.w.r. on my antenna was around 1.1:1 minimum. But if you find that the s.w.r. reading changes when the meter, coaxial cable or connectors are touched, it means that there are antenna currents on the outside of the feeder. These extraneous currents can be minimised by using a current choke with the coaxial cable feeder looped through a ferrite ring, as shown in Fig. 4.

Initial receive tests indicate that the polar diagram is very similar to that shown in Fig. 3. From the top of Highdown (a local highpoint here in West Sussex) using the FT-817 I could hear a DL s.s.b. net along with the GB3VHF, F5XAM and PI7CIS beacons. And this was under fairly flat band conditions. Although none of these signals were strong enough to move the S-meter they were mostly well clear of the noise.

When the antenna was rotated end on to any station the signal disappeared into the noise. This null is very sharp and the antenna would seem ideal for direction finding or 'fox hunting'.

The computer model of this antenna in Fig. 3 shows that the currents in the vertical wires are anti-phase so radiation from them cancels - they can be thought of as open wire transmission lines connecting the horizontal elements. Note also that the currents in the horizontal sections are in phase; this is how the antenna obtains gain. The model predicts a free-space gain of 4.8dBi.

In *The ARRL Compendium, Vol. 5* it states that the feed impedance is determined by the width of the antenna, Fig. **5**, and that λ/6 gives a 50Ω feedpoint impedance. My computer model indicated that λ/6 gives 75Ω and to get 50Ω the antenna should be narrower and longer. This seems to be confirmed by the dimensions of JH4LZS's antenna in Fig. 2. However, it has to be said that my 'standard' Hentenna gave a very low s.w.r. when correctly set up. Interestingly, a computer model of JH4LZS's antenna gives greater gain of 5.1dBi.

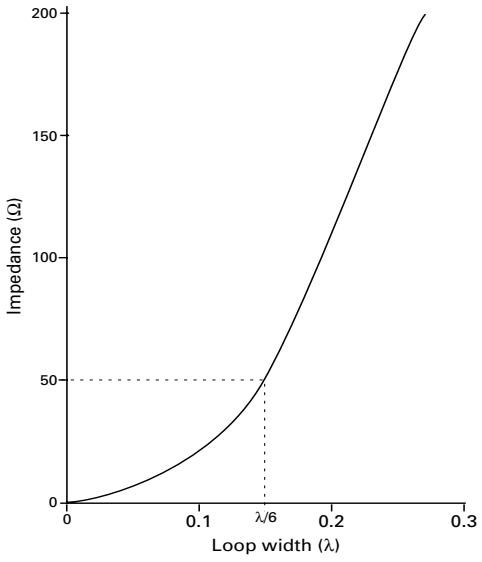


Fig. 5: Impedance versus antenna width graph for the Hentenna at resonance. From The ARRL Compendium, Vol. 5

In May 1990 a two-loop turnstile Hentenna for 50MHz, designed and built by **Masayoshi Eguchi JI6KGZ**, was installed at **JA6YBR**, the Miyazaki University Radio Club, located in southwest Japan [1]. Throughout Cycle 22, JA6YBR's signal was reported throughout the Pacific, South America and the west coast of America. So, the antenna may be strange - but it's efficient. Why not hatch one of your own? **PW**

REFERENCES

[1] The Hentenna - The Japanese "Miracle" Wire Antenna by Shirow Kinoshita, JF6DEA/KE1EO, The *ARRL Compendium, Vol. 5*

[2] 144MHz Hentenna by JH4LZS, *CQ Ham Radio* (Japanese publication)

[3] 50MHz Hentenna by JR1TTQ, *CQ Ham Radio* May 1979 (Japanese publication).

valve & vintage

The *Eagle* comics and copies of *Radio Times* from the 1950s and 1960s, tell us it's Phil Cadman G4JCP who's in charge of the 'wireless shop' this month. Now that he's put his brown dustcoat on...is that a 6V6 valve he's holding?

Greetings, potential audiophiles! Welcome to my June offering. Having concentrated on receivers in recent Valve & Vintage columns, I thought a drop in frequency might make a welcome change. But first, as they say, I want to cover some points arising from last time.

Firstly, my thanks go to **Nigel Ambridge G4FRL**, for suggesting that the old glass resistor pictured in my last column might be a Loewe resistor. He found a matching description in the *Newnes Wireless Constructors Encyclopaedia*, edited by the inimitable F. (Fred) J. Camm - founding Editor of *PW*. I too have a copy of the Encyclopaedia, but it's a much later edition and unfortunately, there's no mention of Loewe resistors.

Next, those little Mullard data books. Both **Ian Pryde GM8JJN** and **Ian Walker** have editions from 1979/80 but no later. So it may be that the 1979/80 edition was indeed the last to be published.

Shortly after I wrote my March V&V, **John Reeve G8ATS** sent me a copy of a 1951/52 edition, which at that time was called the *Mullard Valve Data Booklet*. Thanks very much, John!

I've since come across a 1950/51 edition, so it seems these little booklets were around in one form or another for 30 years. I wonder if anyone has a full set? Thank you everyone who wrote to me with answers to the questions I posed last time.

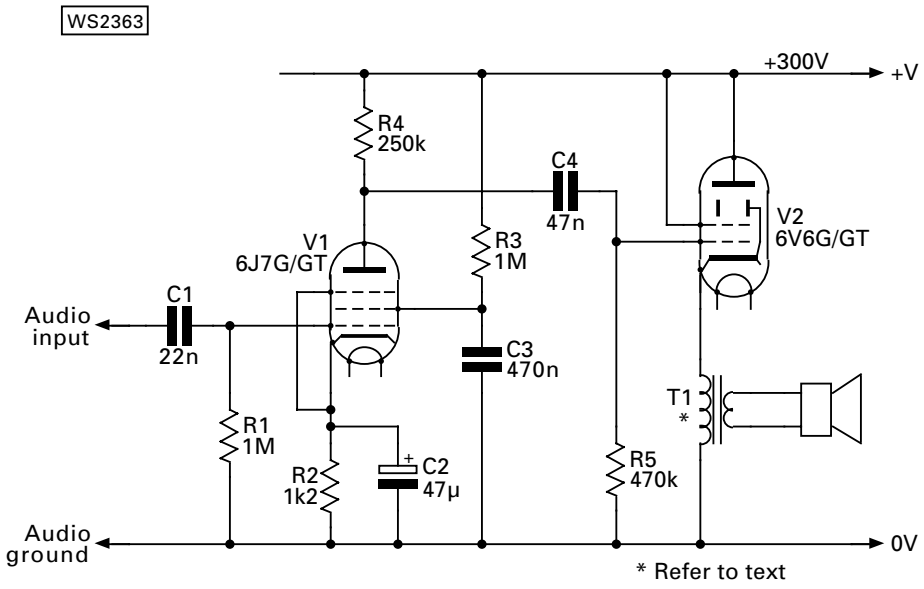


Fig. 1: An interesting valved amplifier built by Ken Draper last year has a cathode follower output stage (see text).

Battery Ideas

I've recently received two letters from **Godfrey Manning G4GLM**. In his first letter he mentions the MN21, 12V battery (equivalents are the GP23 and V23GA), often found in remote control key fob transmitters. They're very small; about the diameter of an AAA cell but slightly shorter. Godfrey suggests that seven or eight of the batteries would make a really compact, if low capacity (30-38mAh, depending on manufacturer), 90V h.t. battery. With a little care, AAA-size battery clips can be used to make a holder. The batteries are inexpensive, providing you buy them from one of the big electrical distributors.

While undoubtedly useful as a compact and portable power supply, I thought the MN21 type batteries would also be an ideal power source for a clandestine, valved h.f. transmitter. A sub-miniature wire-ended valve, such as the DL71 or DL72 could be used, powered by three of these batteries in series, plus an AAA cell for filament power.

The whole transmitter could easily fit into a tobacco tin or large matchbox. Why not even include a built-in Morse key?

Germanium Transistors

In his second letter, Godfrey asks whether anyone else has found that four terminal germanium transistors, such as the AF117 and OC170, have a high reverse base/emitter leakage. Godfrey has found a linear component to the leakage current which suggests the junction has a linear resistive element associated with it.

Has anyone else found anything strange with this type of transistor? If so, let's hear from you!

Valved Amplifiers

And now for something completely different. Readers will remember I've mentioned my 'pen friend' **Ken Draper** before in the Valve & Vintage column. Having re-discovered valves a few years ago, Ken has since built and modified several valved amplifiers.

One interesting amplifier Ken built last year has a cathode follower output stage. As this output arrangement is unusual, at least in a power amplifier, I thought I'd feature it here.

The basic circuit of the amplifier is shown in **Fig. 1**. However, Ken used equivalent B9A based valves - a 6BR7 and a 6BW6 - instead of the Octal based valves indicated in Fig. 1.

As you can see from Fig. 1, the input stage is a conventional pentode voltage amplifier, but the 6V6G/GT output stage has the output transformer connected in the cathode circuit. Why do this? Well to answer the question, let's first see what's wrong with the traditional pentode output stage, where the output transformer is in series with the anode.

Basically, a pentode has a very high anode resistance. Unless negative feedback is used, the amplifier will have an unacceptably high output impedance (the impedance characteristic of the loudspeaker will greatly influence the sound the amplifier produces).

Significant Distortion

Pentodes also produce significant amounts of third harmonic distortion. This is audibly more unpleasant than

the mainly second harmonic distortion that triodes produce.

Triodes also have a much lower anode resistance than equivalent tetrodes or pentodes. So, power amplifiers with triode output stages tend to sound better when no negative feedback is used. Unfortunately, triode output stages are significantly less efficient than pentode and beam-tetrode output stages.

By connecting the screen grid to an intermediate tap on the output transformer primary (the so called 'ultra linear' connection) you can achieve a much lower output impedance while retaining most of the efficiency of a normal pentode/beam tetrode stage. But if you want a very low output impedance - and very low distortion - you either need lots of feedback or a cathode follower output stage.

Pre-amplifiers often use a cathode follower output stage in order to secure an output impedance low enough to drive long connecting leads. The actual output impedance of a cathode follower is approximately 1/gm; the reciprocal of the valve's mutual conductance.

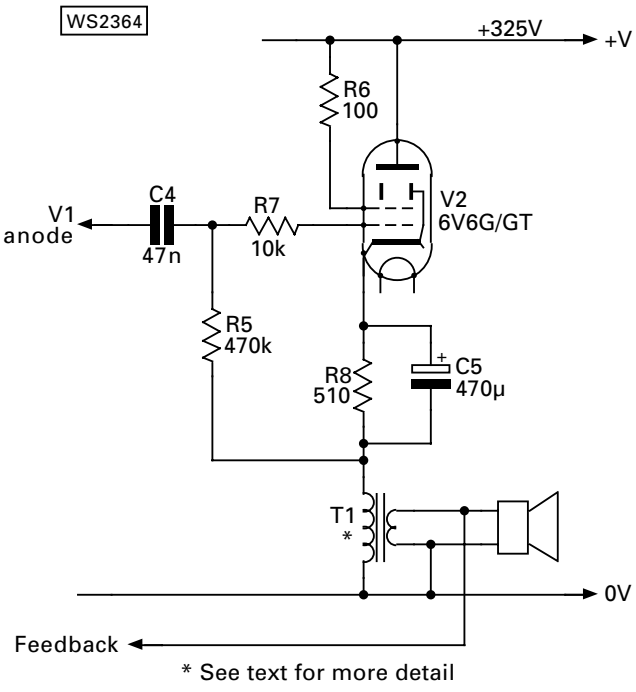


Fig. 2: Notice that in this circuit the cathode bias resistor (R8) is completely separate from the output transformer primary. It's bypassed with a large electrolytic capacitor, and the lower end of the grid resistor (R5) is connected to the lower end of R8 (see text).

For instance, the ECC82 - which I mentioned last time - has a gm of 2.2mA/V. Used as a cathode follower, the ECC82 should have an output impedance in the region of 450Ω.

A 6V6 pentode connected output stage can produce around 4.5W; the valve having a gm of around 4mA/V. You'd think, therefore, an output impedance of 250Ω could be expected when the valve is used as a cathode follower. Well, it turns out it's even lower, around 200Ω. (This is because if you look at Fig. 1 again, you'll see that the 6V6 is actually triode connected!).

Having removed the output transformer from the anode circuit, the screen grid is now connected to the same place as the anode. Hence the valve behaves just like a triode.

The good news is that the gm is higher when triode connected - 5mA/V - but the efficiency is now poor; we can only expect 1.65W output even with a 300V h.t. rail. So what else can go wrong? The answer is lots!

Automatic Bias

In Fig. 1, you'll notice that the automatic (cathode) bias for the valve is provided by the primary 'd.c.' resistance of the output transformer. In most cases, you'll be lucky if the primary resistance is even close to the required value. But as the primary resistance is usually lower than what's needed, a resistor sufficient to make up the difference can be wired in series with the transformer. (It must be bypassed with a capacitor though).

Worse is to come! Looking at the published figures for a triode connected 6V6 output stage, the primary reflected load impedance should be 4,800Ω. Assuming a power output of 1.65W, the signal voltage across the transformer primary (at maximum output) will be 89V r.m.s. That equates to 126V peak, or 252V peak-to-peak.

Cathode followers have a voltage gain of slightly less than unity, so the drive voltage at the grid of V2 will need to be greater than 252V peak-to-peak (p.t.p.); in our case, close on 290V p.t.p. A mere 25V p.t.p. is all that's needed to drive a 6V6 to full output (4.5W) when pentode connected; we need almost twelve times that drive voltage to get a measly 1.65W!

It's very difficult to generate the magnitude of drive voltage without significant distortion. One thing we certainly need is a high supply voltage, but there's also another thing we can do to help.

Please take a look at **Fig. 2**. Notice that the cathode bias resistor (R8) is completely separate from the output transformer primary. It's bypassed with a large electrolytic capacitor, and the lower end of the grid resistor (R5) is connected to the lower end of R8. Resistors R6 and R7 are parasitic 'stoppers' which are fitted close to the valve base.

The valve only 'sees' the bias voltage dropped across R8, and so the d.c. resistance of the output transformer can be anything we like. More importantly, R5 now appears - as far as V1 is concerned - to be much higher in value than 470kΩ. That reduces the a.c. load on V1 and allows the valve to produce a larger output.

Understanding Why

To understand why, compare the voltage that appears across R5 in Fig. 1 and in Fig. 2. In Fig. 1, all the drive voltage appears across R5, but in Fig. 2, only the difference between the a.c. drive voltage and the a.c. voltage at the cathode of V2 appears across R5. About 40V p.t.p. in our case.

Consequently, the a.c. current through R5 is only about 16% of the Fig. 1 value, and so its effective resistance - as far as V1 is concerned - is 100 over 16 times its physical value; that's almost 3MΩ!

In the circuit shown, the indicated 325V h.t. will not allow a 6J7 to drive V2 to full output. But it will allow you to get a very good idea of what a cathode follower output stage sounds like. However, if you want to get serious, V1 needs a separate h.t. supply in the order of 500V to keep distortion within acceptable limits.

Even better, V1 could be replaced by a 6SN7 double triode with the two halves connected in cascade. With a 500V h.t. supply, the anode load resistors should be 50kΩ, and the cathode bias resistors need to be around 2,100Ω.

Try to get a little over 250V on the anodes. This is pushing a 'vanilla' 6SN7 somewhat; a 6SN7GTB is a better choice if you can find one. **Note:** If you do feel inclined to run the driver stage at these high voltages, please remember to take all appropriate precautions.

In Right Mind?

Just in case you think nobody in their right mind would build a serious amplifier with a cathode follower output stage, take a look at *Volume One of Audio Anthology* (Marshall Jones Co. ISBN 0-8338-0195-3). In there you'll find a 20W design which uses eight 6V6GTs in parallel push-pull. The driver valve is a 6SN7 which operates from a 700V h.t. supply. Ouch!

One final point. At full output, there'll be an audio signal of 252V p.t.p. on the cathode of V2. This may well cause the heater/cathode insulation to break down. So, it's best to use an isolated heater supply for V2 and connect one side of the heater to the cathode. Years ago, very low capacitance c.r.t. heater transformers were produced* (see note below), and they're ideal for this application.

These low capacitance transformers were made for television c.r.t.s which had developed a full or partial heater cathode short. As the video drive (which has frequency components in the MHz range) is fed to the cathode, the heater winding had to have a very low capacitance to ground. Otherwise the picture would lose all fine detail.

Ah! Talking of getting lost, I'd better get lost too. Please send your comments and letters to me, either via E-mail to: **phil@ezlxq.freeserve.co.uk**, or by mail to: **21 Scotts Green Close, Scotts Green, Dudley, West Midlands DY1 2DX**. More valve audio topics next time!

***Note:** Most common were the Radiospares versions and these are often still available at rallies and junk sales. **Editor**.* **PW**

VHF DXER

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REPORTS & INFORMATION BY THE LAST SATURDAY OF EACH MONTH.

Propagation during the first quarter of the year was generally quite poor with very little DX being reported on any of the v.h.f. and u.h.f. bands. Hardly any tropospheric (tropo) openings were reported, although there was a glimmer of enhanced propagation during the period January 20-21 when the Spanish stations of EA1CRK (IN73), EA1DDU (IN73) and EA2KP (IN83) were heard making s.s.b. contacts on the 144MHz band with stations in central England and Wales. Around midday on January 21 the EA1VHF beacon (144.404MHz) was heard by MM0CEZ (IO75) with signals peaking to 599 over the 1420km path.

There were a number of minor auroral back-scatter openings (nine in January and two each in February and March) but you really needed to be in the far north of the UK to make anything of them. The only DX worthy of note on the 50MHz band were the stations of LA8AV, LA8BCA (Norway), OH3XA (Finland), SM5BMB and SM7FJE (Sweden).

Stations in northern England and Scotland reported making c.w. contacts on the 144MHz band with ES6RQ (Estonia), OH1NOR, OZ0JD, OZ1DD, OZ9PP (Denmark), SM5CUI and SM6ENG. Other than that most contacts were restricted to short-range inter-UK traffic.

Only two Sporadic-E (Sp-E) openings were reported on the 50MHz band, these occurring on January 6 and 17. Contacts on s.s.b. were reported by operators in southern and central England with the stations of CN8KD, CN8MC (Morocco), CT1EEB, CT1FJC (Portugal), EH9IB (Ceuta), I0WTD, IH9GPI (Italy), IS0GQX, IS0YTA (Sardinia), YU1DG and YZ1EW (Yugoslavia). Two extremely brief openings into Africa were reported on March 23 and 26 to the stations of 9Q0AR (Republic of Congo) operating on 50.110MHz and ZS6AXT (South Africa) heard on 50.105MHz. These were probably a mixed-mode path of Sp-E plus trans-equatorial propagation.

The most consistent mode for working DX on the v.h.f. bands during the 'lean' months is meteor scatter (m.s.) and many operators are now realising that *WSJT* software written by **Joe Taylor K1JT**, coupled with a computer, a simple interface and a low-power s.s.b. transceiver enables contacts to be made with stations around 1000-1500km away on a daily basis.

The name of the computer program (available at **www.vhfdx.de/wsjt/**), which currently supports three principal modes: FSK441, JT6M and JT65. FSK441 is *WSJT* and is designed for meteor scatter communication using the very brief 'pings' from meteor trails in the ionosphere. The JT6M mode is also used for meteor scatter, but is specifically optimised for meteor reflections that occur on the 50MHz band. JT65 is not used for 'intermittent' m.s. propagation, but is designed for extremely weak but slowly varying signals such as those found on troposcatter and Earth-Moon-Earth (e.m.e.) paths. (Earlier program versions also supported a mode called JT44 which was similar to JT65.)

To show how effective both JT6M and FSK441 machine generated modes (m.g.m.) are for m.s. work, I'll pick out some contacts that were reported during the month of February. The reason that I've chosen February is because it has the lowest count of sporadic meteors during the year and it's the only month that doesn't contain a major meteor shower.

Some typical m.s. contacts made on the 50MHz band using JT6M include HB9BZA (Switzerland), IW5DHN (Italy), LA1TV (Norway), OE3MWS (Austria), OH6YF (Finland, OK1KRY (Czech Republic), OZ1DJJ (Denmark), SM0TSC (Sweden), SP6GWB (Poland) and S59F (Slovenia). Incidentally, there's no specific calling frequency allocated for JT6M within the 50MHz band.

The IARU Region 1 band plan shows 50.200MHz as the m.s. centre of activity, but this is intended for c.w. and s.s.b. usage. FSK441 has been allocated a sub-band 50.260-50.280MHz, but FSK441 isn't generally used on 50MHz. However, many operators are now using 50.230MHz for JT6M, although this isn't recognised as such in the band plan. There's much more activity on the 2m band with operators using FSK441 on and around 144.370MHz.

Here's just a very small selection of stations worked during February. It includes the stations of EA7AJ (Spain), ES6DO (Estonia), HA5OV (Hungary), I6WJB (Italy), LA5KO (Norway), LZ5UV (Bulgaria), OE3FVU (Austria), OH1FA (Finland), OK2YT (Czech Republic), SM5CUI (Sweden), SP6IWQ (Poland), S57LM (Slovenia), TK5EP (Corsica) and 9A2AE (Croatia).

The months of May and June are quite good for meteor scatter propagation. The sporadic meteor count (that is the daily input of random meteoric material) reaches a peak during June and during this period there is also one major meteor shower and three minor streams.

DAVID G4ASR REPORTS THAT SPORADIC-E PROPAGATION SHOULD HAVE RETURNED TO THE VHF BANDS

The *Arietids* meteor shower occurs between May 13 to June 18 peaking around June 8. The shower rises at 0300 and sets at 1600UTC. From the UK the best direction will be north-east at 0700UTC, east at 0900UTC and south-east at 1100UTC.

The minor showers are the *Piscids* peaking on May 7, the *Nu Piscids* with maximum activity on May 12 and the *Zeta Perseids* peaking on June 8, the same day as the *Arietids* shower. These three streams have similar rise and set times being above the horizon between 0200-1800UTC. Activity will be found on high speed c.w. around 144.100MHz, on s.s.b. around 144.200MHz, on FSK441 around 144.370MHz and on JT6M around 50.230MHz.

SPORADIC-E

It's that time of year again when stations located in northern temperate latitudes experience the joy of sporadic ionisation of the E-layer during daylight hours. Yes - Sporadic-E is back! During the summer months between May to August discrete patches of the E-layer can become ionised strongly enough to enable reflection of radio waves in excess of 200MHz.

The summer period is an excellent time to be active on the 50MHz band with low power and a small antenna. Signals can be rock-crushingly strong and it is very easy to make dozens of contacts with very low power. Generally the propagation will encompass all of Europe with single-hop contacts between

1000-1500km being easily made. The direction of propagation will vary daily, sometimes on an hourly basis.

Openings will occur during daylight hours often extending into the evening period. During May there could well be 50MHz Sp-E openings on a daily basis and this will extend up to the 70MHz band enabling European DX contacts to be made on this band with stations in Croatia (9A), Denmark (OZ), Faroe Islands (OY), Gibraltar (ZB) and Slovenia (S5).

Propagation during June will become very intense and multi-hop paths will form enabling contacts at 50MHz to be made into the Middle East and North Africa. One of the most exciting multi-hop paths is across the Atlantic Ocean to North America. These events normally occur between 1800-2200UTC, sometimes earlier, sometimes later. Openings on the 50MHz band will continue through July before petering out sometime in late August.

To show you how easy it is to make Sp-E contacts on the 50MHz band take a look at this report from **Robin Burrows-Ellis M1DUD** (Suffolk JO02). Last year he made over 440 contacts with stations in 34 countries and 154 locator squares. Robin doesn't have a particularly big station nor did he spend each and every day looking for DX. In fact, he used just 2W from a Yaesu FT-690 transceiver and a 5-element Yagi only a few metres above ground.

The first Sp-E opening of 2003 at his QTH was on April 16 with a short opening around noon into Croatia (9A) and Yugoslavia (YU). Four more openings were caught on April 17, 19, 25 and 26. The opening on April 25 was a classic two hour event between 0930-1130UTC with propagation shifting from Southern Italy to Sardinia and across the Mediterranean to Spain and back again to Italy.

An opening on April 26 between 1040-1130UTC was confined to Bulgaria (LZ) and Yugoslavia and was characterised by deep fading. Despite this it provided the best distance for April with the station of LZ3RX (KN12) at 1943km. Robin wasn't active during May, but in the following month he worked 272 stations located in 30 countries. Contacts, mainly on s.s.b. included the stations of IT9RZR (2002km), YO3JW (2013km), LZ1A (2019km), YR4R (2063KM), 9H6M (2073km), 9H1DE (2077km), LZ1CY (2079km) and best DX of the month, 9H1YZ at 2085km.

On June 26 Robin found a mid-morning opening into Sweden. The maximum usable frequency (m.u.f.) had risen above 70MHz and there was a distinct scatter point above the North Sea, near Helgoland and the Frisian Islands (JO34). The skip-distance on the 50MHz band had shortened considerably and contacts were quickly made with the stations of SM7WT (JO65) at 882km, SM7CMV (JO75) 915km, SM7WOC (JO66) 919km and OZ4ADX (JO75) at 943km.

Only 26 QSOs were made in July, but this total did include ZA1B (Albania) and UT36W (Ukraine) who replied to Robin's CQ call on c.w. A further 41 Sporadic-E contacts were completed in August, 34 of these being on c.w. The best DX were the stations of 9H1AW (Malta) at 2066km and LZ1AG (KN22) at 2074km. And don't forget that all these contacts were made with only 2W output power!

SPECTACULAR EVENTS

Last year in 2003 the Sp-E season was spectacular and will probably be remembered as one of the best for some time. Throughout June and July numerous DX contacts were made on the 50, 70 and 144MHz bands via Sporadic-E propagation. Indeed this mode produced some remarkable results on the 50MHz band with contacts made throughout Europe and also into Africa, Asia, North America and South America at distances approaching 8000km or so.

The transatlantic path to Canada and the USA was reported to be open on over 30 occasions. This was an unusually high number as normally one can only expect to record 10 or fewer openings to North America during the summer. Contacts made via Sp-E on the 144MHz band were equally spectacular with 20 events being recorded in the UK during June and July. Again this was a very high number compared to other years.

● Fig. 1: The antenna array at the station of Joze Herman S51ZO.

Many stations reported contacts with stations around 2000km away and a few even managed to make Sp-E contacts with stations over 3000km away. Probably one of the longest distance contacts made from the UK in 2003 was between the stations of G8VHI and RB6BN at 3032km. Elsewhere in Europe other long-distance contacts in excess of 3000km were made and one Bulgarian station LZ3NY even managed to hear CT3AN over a path of some 3652km.

The way I catch openings on the 144MHz band is by listening to the intensity of openings on lower frequencies. If the opening on the 50MHz band is particularly strong there's every chance that it will appear on the 144MHz band. At 144MHz there should be at least ten days during the period when an opening occurs whereas at 50MHz the chances are very high, maybe two out of every three days with a lengthy opening.

Catching events on the 144MHz band though is relatively difficult and needs a fair bit of dedication. You really do need to 'haunt' the band if you want to catch the elusive DX openings. At 144MHz the expectations are that most Sp-E openings will occur during June and July, with a bias for the month of June. Openings peak between 0800-0900, 1200-1400 and 1600-2000UTC.

If an event occurs around midday there's a reasonable chance of another opening later in the day. Most openings are to countries located south or south-east of the UK in the range 1700-2200km. Just keep your receiver tuned to 144.300MHz and then move to a more convenient frequency away from the s.s.b. calling frequency when the band opens up.

DEADLINES

That's it again for another month and I hope you manage to make many Sporadic-E contacts on the v.h.f. bands. If you do then please send me your reports to the address and by the date given at the top of the column. Good luck with the DX, see you again next month.

73 David G4ASR

DX contacts mentioned in this column are made using either Morse (c.w.) or s.s.b. telephony in the appropriate sub-bands for each mode. On v.h.f. and u.h.f. this equates to contacts being made in the bottom 200kHz or so of each band.

HF HIGHLIGHTS

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REPORTS, INFORMATION AND PHOTOGRAPHS TO ME PLEASE BY THE 15TH OF EACH MONTH.

Although the bands have not been in good shape this month I hope that many of you have managed at least one contact with the 3B9 DXpedition to **Rodrigues Island**. The Mega DXpedition was using the callsign **3B9C** and worked hard to provide as many contacts as possible to Amateurs all over the world.

In March the **ARRL Colvin Award Committee** announced that the latest Colvin Award was being made to the DXpedition. This financial award has made an invaluable contribution to the expenses incurred in mounting the operation. The award has been used to help cover the logistical cost of shipping four tonnes of equipment by container from the United Kingdom to the Island and back again.

Members of the 3B9C team are delighted that the ARRL Colvin Award Committee has seen fit to give this prestigious award to them. It is understood that one of the reasons that they were selected was that they were specifically aiming to reach to a much wider audience than the more 'usual' DXpedition and are using 3B9C as an opportunity for education and training in respect of h.f. propagation, antennas and new modes, etc.

The Colvin Award is a result of an endowment gift made to the ARRL by Lloyd Colvin on his death in 1993. **Lloyd W6KG** and his wife **Iris W6OL**, who passed away in 1998, visited and activated over 100 DXCC countries during the 1960s and early 1990s. If you worked them, a direct QSL request should go via **FSDXA, PO Box 73, Church Stretton SY6 6WF, UK**. Bureau cards go via the RSGB. You can also send a request electronically via **www.3b9c.com**

DX NEWS

It looks like the planned April DXpedition to **Clipperton Island (FO)** has once again been postponed until 2005. Current reports indicate that weather may have played a major part in this decision. This delay will at least give the organisers more time to find other operators for the planned operation. If any of you would like to join the team or require further details about going to Clipperton in 2005, then send an E-mail to **K4SV2@Charter.net**

Operators from **Chilean Radio Club CE1FA** will be on the air as **3G1E** from Peninsula del Alacran Lighthouse (CHI-061) starting 0000UTC on June 5 to 1600UTC on June 6. The suggested frequencies to find them will be **s.s.b.** - 7.050, 14.270, 18.145, 21.270, 24.930 and 28.370MHz and **c.w.** - 3.530, 7.030, 10.010, 14.030, 18.070, 21.030, 24.895 and 28.030MHz. Activity will also include PSK31 and should you work the team you can obtain a QSL via **Radio Club CE1FA, PO Box 71, Arica, Chile**. Check out their website at:
http://www.geocities.com/ce1_3g1e

Ian Coverdale G8WVW and his family are now new residents of Ascension Island AF-003 and will be there until the end of March 2006. He has been allocated the callsign **ZD8I** and will be active using s.s.b. on all the h.f. bands from 3.5 to 28MHz excluding 10MHz.

An Icom IC-2KL will be arriving on the island this month together with an Optibeam OB9-5E for h.f. and a 6-element Tonna for 6m. He suggests you listen on or around 3.737, 7.077, 14.237, 18.137, 21.337, 24.937 and 28.537MHz and operating times are as work and family commitments allow. The QSL Manager is **M. Coverdale G4LTI, 1a Halton Close, Westhead, Ormskirk, Lancashire L40 6JR**.

Further information can be found on the web at **www.zd8i.net** Ian is also expecting to visit the Falkland Islands occasionally with the first trip being at the end of this month. Don't be surprised if you hear him as a **VP8** though as his callsign is not yet known. He will be active using an Yaesu FT-817 and dipole antenna.

AWARD NEWS

Do you have questions regarding the popular DXCC award program? Well, if you have, you can always visit the DXCC website at **http://www.arrl.org/awards/dxcc** where you can find all the program rules, the current and deleted DXCC lists together with all of the forms needed to participate. If, after reading the information here you still have questions regarding the program, you can ask for this via the relevant link on the opening page.

TIPS TO THE TOP

There is a new publication which may be of interest to both new and old DXers who are trying to reach the top of the DXCC Honor Roll. The 32 page book *Tips to the Top from DX Pros* is written by **Devere 'Dee' Logan W1HEO** and contains details of a survey conducted among 100 leading DX operators listed in the DXCC Honor Roll, Worked All Zones and CQ DX Awards rankings, plus key DXpeditioners.

The book provides a summary of tips, tactics and secrets for reaching the top of the DX heap from those who have made it. The book's content deals with subjects such as what makes a good DXer, station equipment, favourite DX antennas, stalking the rare DX and success in the pile-ups. It also contains subjects on logging memorable DX QSOs, QSLing and a listing of some helpful DX tools that are available to you. If you want something that is very 'helpful' as well as 'quick and easy read' this book is for you. The book cost $9US plus P&P and is available from **DX Book, 9901 Cypress Cir., Mentor, OH 44060, USA**. With an exchange rate currently in our favour it could well be a valuable addition to your library.

AWARDS, DX NEWS AND MUCH MORE THIS MONTH FROM CARL GW0VSW

IOTA TOOL

For the island chasers amongst you **Tim Makins EI8IC** has just provided a new tool, which you just might find useful. You can enter your 6-digit Grid Locator code on Tim's web page and it will generate a short path, long path and distance list from your QTH to each of the current IOTA reference numbers. You can find the page at either **www.qsl.net/ei8ic/iota/iota.php** or the mirror site **www.mapability.com/ei8ic/iota/iota.php**

NEW QSL CARD

Practical Wireless author **Henryk Kotowski SM0JTF** sent me a QSL card for a 24MHz c.w. contact we had in November last year. I worked him while he was in The Gambia where he was using an Icom IC-706, AH-4 auto tuner and random wire antenna to provide many UK stations with their first **C56** contact!

If you look closely at his QSL card you can see that his other rig, an Icom IC-746,

appears to have found a new home. I am not sure I would be happy allowing my rig to be carried in such a manner! Incidentally, Henryk sent a large number of his new QSL cards to the *PW* offices and these have now been dispatched to the appropriate bureaus.

QSL INFORMATION

Randy Becnel W5UE is now acting as QSL Manager for **HC8L** including all past and future activities. New cards have been ordered so you can expect a slight delay in processing your requests. As with other stations he manages direct requests with s.a.s.e. or s.a.e. will be answered directly and all others will be answered via the bureau system. QSL status for HC8L and other stations Randy manages can be found on his web page at **www.datasync.com/~w5ue/qsl-w5ue.html**

YOUR REPORTS

Onto your reports now and first off this month is **Ted Trowell G2HKU** on the Isle of Sheppy in Kent who says "It has been quiet a good DX month even though the bands were in pretty poor shape. Some aurora was noticeable with some very 'fluttery' signals which are not normal for this time of the year". His 7MHz contacts were made using a Ten-Tec Omni 5 and 70W into a G5RV included PJ5NA (St. Maarten) NA-145, 7X4AN (Algeria) and TK5EF (Corsica) EU-014, between 2010 and 2200UTC.

THE 14 & 18MHz BANDS

Onto 14MHz where **Tom Kelly EI2AJ** in Dublin used an Icom IC-706 with 50W to a half-size G5RV and c.w. to find PY2TCJ (Brazil), LU7WAH (Argentina), YV1CNX (Venezuela), ZA1FD (Albania), PM6/PA0RS (Indonesia) and JR1LFT (Japan) between 0745 and 1525UTC.

In Newtonabbey, County Antrim, Northern Ireland **Peter Lowrie MI5JYK** has been 'tinkering' with his 14MHz ground mounted vertical antenna. It now has four quarter wave radials and appears to be working well as Peter managed to work over 20 US stations between 1310 and 1645UTC. Pick of the bunch was K7RL in Ayden, North Carolina at 1442 and all contacts were made using an MFJ-9420 s.s.b. QRP transceiver and 5W output.

Operating /Mobile from his car was **Mark Taylor G0LGJ** in Dereham who is chasing a target of 200 DX countries using his Yaesu FT-100 and Pro-AM whip antennas. 14MHz was in 'reasonable shape' this month as his logbook lists some very nice DX. 100W s.s.b. contacts here include VK3JMB (Australia) in Laylor, Victoria at 0715, JY3HX (Jordan) 0737, JA7AYE (Japan) 0756, ZL4IR (New Zealand) OC-134 at 0830, VK9NB (Norfolk Island) OC-005 at 1008, 3DA0TM (Swaziland) 1617, VU2PEP (India) 1643, 9K2YM (Kuwait) 1653, 5N9NDP (Nigeria) 1744 and PA3GIO/HI9 (Dominican Republic) at 1922UTC. It just goes to show what can be achieved with a relatively simple station as Mark's total now stands at 186 countries!

Meanwhile, **Martyn Medcalf M3VAM** was operating on 18MHz between 1419 and 1522UTC finding s.s.b. stations EW3EW (Belarus), T94M (Bosnia-Herzegovina), W2QN (USA) in West Cornwall, Connecticut and TK5IH (Corsica) EU-014 using a battery powered Yaesu FT-897 and Buddipole antenna from his home in Chelmsford, Essex.

● Recently received QSL card for a 24MHz c.w. contact from Henryk Kotowski SM0JTF.

THE 21 & 24MHz BANDS

Having 'A bit of a lean month' was **Rob Hastings M3AHH** in Chelmsford, Essex who worked PA3GIO/HI9 (Dominican Republic) 1603 and UR9IDX (Ukraine) at 1620UTC on 21MHz using his Kenwood TS-50S, MFJ-945E tuner and 10W s.s.b. into an inverted Carolina Windom 80 Special.

Also on this band was **Billy Clayton 2E1WHC** in Liverpool who found IK7RKE (Italy), YO5DND (Romania), UA0SE (Asiatic Russia), RK3DY (European Russia) and 4X4BO (Israel) between 1040 and 1350UTC using a Kenwood TS-570 and Cushcraft MA5V antenna.

In Tongue, Sutherland **Gary Macleod MM3SCO** enjoyed an afternoon session here and despite poor band conditions worked FM5GU (Martinique) NA-107, VP8LP (Falkland Islands) SA-002, W7LW (USA) in Boise, Idaho, ZC4TS (UK Sovereign Bases on Cyprus), P40G (Aruba), VE3WYK (Canada) and HC2FN (Ecuador) between 1448 and 1723UTC using a Kenwood TS-50, MFJ-948 tuner and a converted CB antenna.

In Dumfries **Jim Pedley GM7TUD** worked the 24MHz band but did not find much activity. Those s.s.b. stations that did make his logbook include 9Y4/DJ8VC (Trinidad & Tobago) SA-011 at 1423, VP8LP (Falkland Islands) and C6AMM (Bahamas) NA-080 at 1622UTC using a G5RV antenna.

THE 28MHz BAND

Welcome now to new reporter **John Yarnell M1AUN** who uses a Yaesu FT-107M and a half-size G5RV for his h.f. activities from his home near Wolverhampton. His 100W s.s.b. contacts this month include PY1LJ (Brazil) at 1625 followed by LU1ECZ (Argentina) at 1645UTC. John found conditions poor but still received reports of 5/9 from Rio-De-Janeiro and Buenos Aires.

● Ready to operate - Colin Topping. Colin suggests you can support the column by sending a picture of your station!

SIGNING OFF

That's about all there is space for and as usual my thanks go to all our reporters and to **Tedd Mirgliotta KB8NW** Editor of the *OPDX Bulletin* for the DX information. Until next time have a good DX filled month.

73. Carl GW0VSW

DATA BURST

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I had some interesting feedback from the last Data Burst in the March *PW*. **Ted Double G8CDW**, was pleased that I featured him with his old Creed 7B. I also had several comments from the local radio club regarding packet, which has resulted in a few more users and a lot more interest and is very pleasing to me.

Regular *PW* author **Phil Cadman G4PCJ** wrote to me and we had several long exchanges, the first of which were E-mails and then I managed to convince Phil to get back onto packet. He was sufficiently enthused to embark on some new lateral thinking regarding the network, so I'm now waiting with baited breath for his next communication!

Then **Ian G3SEK**, wrote to me and as a result of that exchange of mail, I now have a PC320 board, which will serve very nicely as my Packet Cluster link TNC for GB7RDX. All-in-all, a very successful outcome from all points! Many thanks to all.

BARTG DATACOM

Another contact was via telephone and was very scathing about *Datacom* magazine. No names, no pack-drill, but he has a very valid point. He had not been on RTTY for some time, so he thought he would join BARTG. This he did, only to be very disappointed with the content of the magazine. His comment was to the effect that *Datacom* was just a contest rules and results posting.

Whilst the comment is valid, in fairness there have been other articles besides the contest reports, but not quite as frequent. The reason for this is that most RTTY is now PC software based, very few Teletype machines are used and so little technical servicing and building is needed. However, it would be a good idea to have a few articles on setting up a station and information on various software programs.

I use *Writelog* and *MMTTY* for my RTTY contesting, but with the introduction of the Club Cumulative Contests, it's handy to be able to switch modes very rapidly. For those data events I use *MIXW* (and very good it is too). However, so far I have managed to foul up my logging each time! I guess it's the inevitable 'G3 syndrome', or as I would argue, a lack of practice with that particular program.

Pre-contest practice is essential and although I start with good intentions, I invariably have limited time and end up setting up the program about 15 minutes prior to the contest. This is not conducive to efficient operating and the air has been quite blue on occasions at G3LDI. I should also take the telephone off the hook, because if it is going to ring, it will always do so between 2000 and 2100 hours.

If you haven't taken part in these events, then please consider doing so. It really is a useful way to prove your station, operating skills, and meet with friends in a laid-back contest. The time is just about right too, just 90 minutes! I cannot contemplate a 48-hour event, nor can I normally spare the whole weekend and so the Cumulative Contests (CC) are very nice.

One aspect that has already been commented on is the fact that the CC should be a **club** event. By this, I would assume that it would be a Radio Club from a certain city or area, not purely a **contest** club. If the contest groups do enter, perhaps it would be an idea to have a special category for them and one for general Clubs, to give more incentive to the newcomers to contesting.

Obviously general clubs will have their share of contest operators, but at least they won't all be in one. What do you think? Regardless, it's still a good idea and one that's gaining popularity.

HAM-POST

Take a look at: **http://www.softsci.com/hamradio/opt_page.asp** There you'll find the first issue of a quarterly produced newsletter by **KF6VSG**. This contains very useful data oriented information on setting up a station for the various data modes, together with other technical information. You can subscribe by sending your E-mail address and you will receive each issue, either in Word or PDF format. I thoroughly recommend you subscribe and have a read.

NEW THOUGHTS ON PACKET

I have been exchanging mail and thoughts with Phil Cadman G4JCP as I mentioned in my opening paragraph. Since writing that, Phil has written to me with some lateral thinking. He is setting up a website with these ideas set out and hopes that there will be a lot of interest. Take a look at it and see if it lights your fire!

The URL is **www.armaps.org** Phil is busy with this new project and has let me pass on the news. The following is taken from his first contact with me and might be just what's needed to rejuvenate the interest in packet radio, or as Phil puts it "It's packet radio, but not as we know it".

NEW CONCEPT

Amateur Radio Messaging and Paging System (ARMAPS) is a new packet data communication system introduced by Phil G4JCP to encourage further experimentation in Amateur data communications and to assist in the development of new applications for Amateur data communications. The ARMAPS is designed to complement, rather than compete with, existing AX25-based packet systems and introduces messaging and paging to Amateur Radio data transmission.

Basically, the system works by both messaging and paging using numbered but unconnected packets. Messaging employs packets, which are directed to a single recipient who acknowledges each received packet. Paging uses packets, which are not acknowledged and so, may be directed to any number of possible recipients.

The ARMAPS will use two new protocols: MX25 for messaging and PX25 for paging. The messaging hardware will be based on industry-standard 8032 micro controller devices. An Am85C30 will handle much of the packet formatting, generation and checking.

The amount and type of memory required will be flexible so as to accommodate both simple and more complex applications. Similarly, the support hardware may be extended far beyond the minimum requirement necessary to implement the MX25 protocol.

While the messaging hardware will be more than capable of implementing the PX25 protocol, in most paging applications much simpler hardware will be far more appropriate on cost, size and power requirement grounds.

ROGER G3LDI REPORTS ON FEEDBACK FROM READERS AS WELL AS PROVIDNG UPDATES ON CONTESTS

The Microchip PIC family of micro controllers, already widely used by Amateur Radio and electronics enthusiasts, are ideal candidates on which to base PX25-protocol hardware.

Software for the project will be 'Free Software', licensed under the GNU General Public Licence. Once the basic MX25 and PX25 protocols have been implemented in software and released under the GNU GPL, individual Amateurs can easily add their own specific software modules to provide whatever additional functions they require.

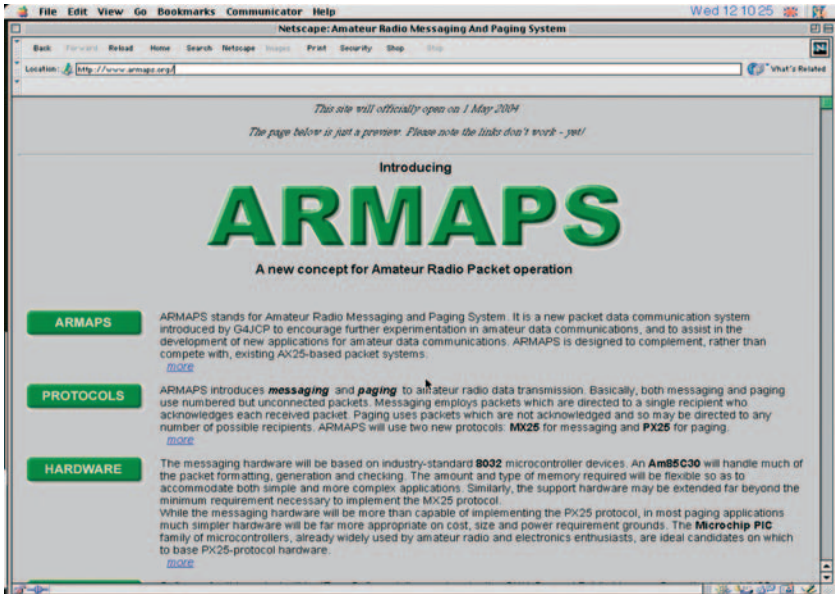
Serving the Amateur population, AX25 has been around for about 20 years, but commercial stand-alone TNCs are expensive and low-cost TNCs require a computer to function. Neither type of TNC is easy to modify and even a stand-alone TNC needs an attached computer or micro controller to perform anything other than basic data communication.

The AX25 protocol itself is relatively complex and inflexible and does not encourage experimentation. To allow the development of new data communications applications, less restrictive and less complex protocols are necessary, thereby allowing simpler, less expensive - yet far more flexible - hardware platforms to implement them. Of course, there is nothing to stop anyone implementing the AX25 protocol on the messaging hardware described above and I sincerely hope this becomes one part of the ARMAPS project.

The underlying philosophy behind the ARMAPS project is that the system should be simple yet expandable. Both the hardware and software needed to implement the MX25 and PX25 protocols should be made as simple as possible, so long as the efficiency of the system is not impaired, nor its potential for expansion compromised. Indeed, the system needs the ability to expand so it can continue to grow and develop, which is where Phil wants to know if there is any interest: Look at his website **www.armaps.org** and let him know. The website should be up and running by the time you read this.

I would like to know who would be interested in supporting the Project. You may only want to build a kit, or use a ready-made board, pre-programmed and ready to go. That's fine, most Amateurs will be just like you. But I still want to know that you're interested.

If anyone can help with either hardware development or software development, then please tell me which part of the Project you would be interested in supporting. Ideally, small groups of like-minded amateurs could concentrate on one aspect of the system, and develop it from concept to fruition.



● Amateur Radio Messaging and Paging System is a new packet data comms system.

● 'Ham Post' - a useful data site

NEW CONTEST

A new contest was introduced this year - the Makrothen. Not another one I hear the anti-contesters cry! Well, at least it was on a weekend when there was also an s.s.b. contest, so you could take your pick! It must be very frustrating for those out at work all week to come home looking forward to a few normal contacts, only to be bombarded with the hue and cry of 'CQ contest'.

I was very keen on contesting at one time, entering all the major annual events from GB4ANT here in Norfolk. Even in those days, I wrote several letters to the ARRL and RSGB, advocating a change in the rules to limit the frequency range in which contesters can operate. It would allow others to enjoy a normal contact. It seems to be getting worse these days and there are very few weekends free of contests now.

In the early days of RTTY - in the 1960s - we were lucky if we made 100 contacts in a weekend contesting. I have seen scores now well over 1000 and listening to the QRM, so it's difficult to see how the bandwidth for RTTY can be limited during a contest. If you look back at one of my earlier columns where I discussed the actual 'gentleman's agreement' regarding data segments and then listen during a major contest, you will see what I mean!

Anyway, the new contest is the Makrothen. Introduced by **Waldemar DK3VN**, The name Makrothen is taken from old Greek and means great or long distance. The idea is to work as many stations as possible as far away as possible, the scoring reflecting the distance.

There were a lot of participants in the Makrothen and some rather good scores. **Frank ZL2BR** claimed a score of 2.2 million with an average distance per contact of 14.476km. He had to work hard for 21 hours to make 154 contacts, or about 7.5 an hour. For some hours, it was but two QSOs. He must be a patient guy!

Phil GU0SUP, on the other hand, had almost the same number of calls as Frank (164) but scored only 7 million. So, the distance multiplier really does add a new dimension to a RTTY contest, the first new idea in quite a few years.

I managed to put in a reasonable amount of time this year into the BARTG Spring h.f. contest. The weekend fell just right for me. The weather was blowing a gale and raining so I couldn't get into the garden. I managed 735 contacts and lost my dipoles in the Sunday gales, but enjoyed it, working quite a lot of DX, including **HK0**, San Andres on all bands except 3.5MHz.

That's all for this time, so cheerio for now, see you in the September issue.

Roger G3LDI

IN VISION

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GRAHAM G8EMX REPORTS ON DIGITAL AMATEUR TV AND THE LATEST DEVELOPMENTS FROM THE BATC

In an E-mail to the British Amateur Television Club (BATC) committee, BATC Chairman **Trevor Brown G8CJS** has taken delivery of five Digital Amateur TV (DATV) pairs of modules for evaluation by club members. This came as a great relief to Trevor because the BATC had ordered (yes, this means paid for!) these units from Germany several months ago. Each pair consists of a PAL to MPEG2 converter and an MPEG2 to r.f. modulator. Two pairs of DATV units have been passed to BATC members to trial, two committee members have first option to buy a set and the fifth was to be on demonstration at the BATC General Meeting at Shuttleworth.

Digital television is, of course, a complex computing and compression process where you will encounter abbreviations such as OFDM (Orthogonal Frequency Division Multiplex) and CODFM (Coded Orthogonal Frequency Division Multiplex) - I think I can safely state that explaining these is outside the scope of In Vision!

At its most basic, digitalising a moving television image is all about sampling, predicting likely changes, interpolating between samples, compensating for wrong 'guesses' then compressing - very quickly indeed. The DATV modules are expected to enable a Video CD quality picture to be transmitted on 70cm (430MHz) with a bandwidth of just 2MHz and on higher Amateur bands via transverters. Trevor Brown says: "I believe in a digital future and hope the road we have taken will allow investigation and the adoption of technology to secure ATV some sort of future".

Ian Bennett G6TVJ describes a COFDM DVB-T DATV system in the current BATC magazine *CQ-TV* (Ian used a borrowed professional modulator, home-built up-converter to 13cm and a particular digital set-top box that could receive a DATV signal) and very concisely explains many of the acronyms. Digital Video Broadcasting–Television (DVB-T) is the European specification for terrestrial digital TV ie. other than satellite or cable, while COFDM is a very sophisticated method of digital modulation, with many parameters all capable of adjustment depending on application and how robust the received data is required to be. The most robust setting is required for DATV use.

LOGJAM CLEARED

Meanwhile, the analogue ATV repeater network has endured a long period where no fresh licences were being cleared. Now, the 'Logjam' appears to be moving and five new licences have been approved by the Office of Communications (OfCom).

The new licences are: **GB3WV** Cornwall (24cm), **GB3FT** near Newbury, **GB3DH** near Derby and **GB3TZ** near Luton (all ATV on 2.4GHz). It has just been announced (I found it on Yahoo Mail!) that **GB3FV** in Wisbech, Cambridgeshire, should be operational on 1 May, with an input of 2.390GHz, transmitting on 24cm at 1.312GHz.

Amateur analogue TV might persist long after the broadcast analogue service has ceased. While the government has announced an analogue switch-off when 95% of homes can receive digital – probably between 2005 to 2010, the Digital Television Group and some broadcasters have proposed a phased analogue switch-off from 2007, beginning with BBC2. The suggestion of a staggered start in 2007 is to encourage a faster public take-up of digital TV.

REALLY SIMPLE SYNDICATION

Ian Pawson, editor of *CQ-TV*, is also Webmaster for the BATC website - **http://www.batc.org.uk** and he has recently added an RSS newsfeed to the club's home page. So, what is RSS? The RSS Info page is headlined "A whole new way to get news" explaining that RSS stands for Really Simple Syndication or Rich Site Summary. Reading the rest of the page, it appears that RSS will keep track of new content from favourite sites – in effect automatically 'surfing' the web for you. To use the facility you will need to download an RSS reader, there are many around and they are freeware.

The RSGB has replaced the h.f., v.h.f and microwave committees with a new 'Spectrum Forum' to handle band planning and allocation of the Amateur Radio spectrum. Representing ATV interests on the Forum will be BATC committee member **Graham Shirville G3VZV** who is very experienced in these matters. Many new ATV repeater proposals on 24, 13 and 3cm have been waiting a long time, so it's hoped that the Spectrum Forum will work successfully with the OfCom team to enable ATV matters to progress once again.

COMMITTEE MEETING

The BATC committee held a physical meeting on Sunday 28 March (most of the discussions through the year are conducted by distributed E-mail) and I asked that the situation for newcomers into ATV be put on the agenda. Availability of transmitters, antennas and receivers, how to find any local activity, how to use an ATV repeater – these are the questions that anyone coming into ATV asks. I will let you know how the BATC committee responds to this situation.

One of the items on the committee agenda was publicity and membership. Now over the past few years I have visited radio clubs - a few of them some distance away - to give talks on Amateur TV, complete with sample hardware. But there are lots of radio societies, unfortunately too many for personal visits, so if any society secretary would like to receive a BATC ATV information pack to show their local membership, please E-mail a postal address to me at: **g8emx@tiscali.co.uk**

The Digital ATV boards purchased by the BATC for trial and evaluation. Vision/Sound to MPEG2 encoder on left, digital modulator and transmitter on the right.

The BATC also announced that they are going to introduce 'cyber' membership as an option, initially to overseas members. Cyber membership means that the magazine will be sent out electronically as a pdf attachment to overseas members who are willing to receive their magazine in this way, ultimately instead of the paper version, at a reduced BATC subscription.

That's all for now, might see you at a rally during the year!

Graham G8EMX

Trader's Table

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The equipment for sale on this page is secondhand or ex-demonstration

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topical talk

Rooster Breakfast

Fig. 1: The 'Rooster Breakfast' group pose for the camera. Ray Gardener (third from left wearing grey trousers) was the instigator, following a visit to Devon by George Sallet KD4DSB and his wife Patti from Florida in the USA (see text).

The interesting letter (see Radio Waves on page 10) from Bob Griffiths G7NHB chatting about the popular 'Rooster Breakfast' in the Plymouth area provides the subject for this month's 'Topical Talk'. Rob Mannion G3XFD was intrigued and asked Bob to expand on his letter.

When the letter from **Bob Griffiths G7NHB** first arrived on my desk - I was intrigued. Although we've publicised the West Country 'Rooster Breakfasts' in *PW* before, it's some time since news of this interesting 'get together' has been mentioned. So, I asked Bob to send me more details and a photograph. The result is this month Topical Talk subject!

Following our telephone conversation Bob G7NHB kindly sent in the photograph in **Fig. 1**. As can be seen from the picture the Rooster Breakfasts are very enjoyable occasions. So, let's find out a little bit more about them from Bob himself.

Bob wrote; *"You'll realise that identifying everyone in the photograph is difficult but I must mention **Ray Gardener G0KZQ** (third from left in Fig 1). Ray and his wife Gwen were very friendly with **George Sallet K4DSB** and his wife **Patti** from Florida in the USA. The first breakfast - similar to meetings held in America, was arranged on their behalf.*

The next breakfast meeting we held occurred almost by chance - but here we are almost 11 and a half years later...still going strong. As can be seen from the photograph, many wives and other members of families are present- showing the wide appeal of the breakfasts. The April 2004 breakfast is number 139, and the average attendance is 35 to 40 people with an all time record (so far) of 54. They are all held in the Plymouth area on the first Saturday of every month. The groups are 'loosely' associated with Amateur Radio - and I say 'loosely' because many of the wives and families who attend are Radio Amateurs themselves. We meet at 0845 for a 0900 start. Not too early!

A 'full' breakfast isn't mandatory - you can enjoy a tea or coffee if you want. All that's required is an urge to meet and make friends. The famous Windy Ridge Eating House is a real favourite with most f the 'Roosters' and as we often meet in Teso and Sainsbury's cafès you could do your shopping too!

We got the name 'Roosters' because George KD4DSB used to take part in a commuting to work net on the GB3WD repeater. He said 'You get up early and crow'! So 'Roosters' we have been ever since! And the breakfast style meeting came about because when it was time for George and Patti to return to Florida - the early morning was the only time available.

*So, there you are - you've got the idea - why not join us when you're in the West Country on holiday please feel free to call me on **(01752) 343177** and if you can't join us - perhaps you could start your own flock of 'Roosters' eh"?*

Thanks for that Bob. What a clever idea - if you don't mind getting up before 10am on a Saturday morning! Let's hope the idea catches on elsewhere. Let me know if you're thinking of doing this in your area - I'd be pleased to hear from readers. **PW**

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