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ICOM IC-7800 NEW £6400 C

HF + 50MHz 200W Transceiver
Latest 'top-of-the-range' transceiver from Icom. 200W output power, built-in ATU and power supply. Two completely independent receivers, four 32-bit floating point DSP units, flexible DSP filter capability. Massive 7in wide (800x400 pixel) colour TFT LCD. Multi-function spectrum scope.

IC-7800-PACK **£6995**
Includes Rig + 17" monitor, keyboard & SM-20 Mic

ICOM IC-756 PRO II £1899 C

Pride 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 worth £219.

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 SPECIAL OFFER £589 C

START HERE!

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)

***FREE!* Icom 703 Logbook - while stocks last**

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.

BUDGET BARGAIN

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 £1099

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.

TS-2000X + 23CMS £1899

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.

RELIABLE & EASY

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-897D 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.
Now with TXCO fitted.

YAESU FT-857D NEW £729 C

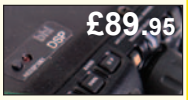
HF/50/144/430MHz Mobile Transceiver HF/6m 100W, 2m 50W, 70cm 20W. (13.8V DC) Developed on the FT-897 and FT-817 transceivers. Built-in features 32 colour display, spectrum scope, AM airband receive, built-in memory keyer, detachable front panel, DSP unit fitted.

YAESU FT-847 £1199 C

Covering 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
bhi 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 £14.95 +£1 P&P

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Starts 10am

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

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.

OTHER MODELS...

ICOM			
IC-2725E	Dual Band FM Transceiver	£269	C
IC-2100H	2m 55W FM Mobile	£229	C
YAESU			
FT-8800E	2m/70cm Mobile	£289	C
KENWOOD			
TM-G707E	2m/70cm Mobile	£289	C
TM-V7E	2m/70cm Mobile	£359	C

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

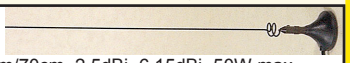
Up to 6W out with Li-ion battery and "scanner" style coverage from 100kHz to 1300MHz including SSB on receive! This is a great radio to have at all times when you are on your travels.

OTHER MODELS...

ICOM			
IC-E208	Dual Band FM Mobile	£279	B
YAESU			
VX-7R	6m/2m/70cm Handheld	£299	B
VX-2E	Dual Band FM Handheld	£169	B
KENWOOD			
TH-G71E	2m/70cm Handheld	£199	B

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-285	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

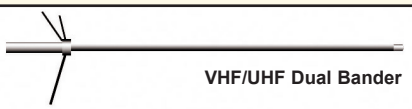
WATSON

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 2.15/6.2/8.4dB 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

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1973 — WATERS & STANTON PLC 30th ANNIVERSARY — 2003

PRICE MATCH

VERTICAL ANTENNAS

Hustler Mobiles

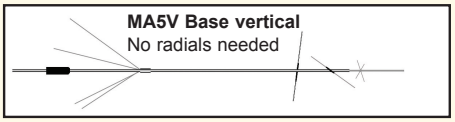
Get top performance when on the move. Purchase the **MO-3 base** (137cm) for **£24.95** or the **MO-4 base** (68cm) for **£22.95**. Then add the resonator of your choice. **RM-10, RM-12, RM-15**, all **£19.95** ea. **RM-17, RM-20 £24.95** ea. **RM-40 £26.95, RM-80 £29.95**

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



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

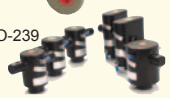
HF9V-X	80-6m 7.9m 1kW PEP	**£349.95**	C
HF6V-X	80-40-30-20-15-10m 7.9m 2kW	**£299.95**	C
HF2V	80-40m 9.75m (160m opt) 1kW	**£229.95**	C

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 Freq. 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.

WATSON BASE ANTENNAS

Unbeatable Value!

Model	Freq	L(m)	dB	Price
W-30	2/70	1.15	3/6	39.95 B
W-50	2/70	1.8	4.5/7.2	£49.95 C
W-300	2/70	3.1	6.5/9	£64.95 C
W-2000	6/2/70	2.5	2/6/8.4	£69.95 C

These antennas are solidly made of fibreglass, die-cast alloy and stainless steel. Guaranteed lowest prices in the UK.

Totally weatherproof
Pre-tuned & Unbeatable

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

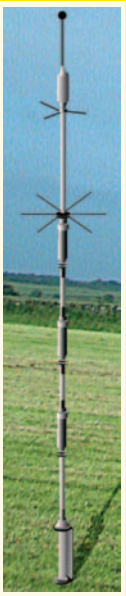
The MFJ-971 is the ideal QRP ATU to have on hand. It incorporates a cross needle SWR meter and displays forward or reflected power and SWR simultaneously.

HUSTLER ZERO SPACE DX ANTENNAS

No Space Needed!

"Ground Level Wonder"

Run full legal power - 80m to 10m
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/CU for 8-pin rigs and for RJ-45 rigs

HEIL QUALITY MICROPHONES

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
PSQP-HC4/HC5	Large H/phones with Quiet Phone	**£189.95**	B
PSQP-IC	Large H/phones with Quiet Phone	**£199.95**	B

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V-1000 BATTERY CHARGER

*Charge 4 Ni-Cad in 60 mins
*Charge 4 Ni-MH in 2 hours

Uses 230V Mains or Car 12V

Includes AC lead & Cigar Lead

£10.95 A

HORA C-150 2M HANDHELD

£79.95 B

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

BUY ONE GET ONE FREE!! ONLY £10
Carriage £2
HOCKLEY ONLY

Watson Wind-up/Solar Torch & AM/FM Receiver

*Torch/Flashlight/Siren
*AM 530 -1600kHz
*FM 88 - 108.1MHz
*Ferrite Bar Antenna AM
*Built-in FM Antenna
*Solar Power Panel
*Hand Crank Dynamo
*Spare bulb
*Fitted Ni-Cad Battery
* 3 xAA battery chamber

CHECK OUR 2004 PRODUCT GUIDE FOR MORE DETAILS OF THESE PRODUCTS

Say goodbye to annoying QRM & QRN with DSP noise cancelling solutions from..... bhi

NES10-2 DSP SPEAKER

* Noise attn: 9-35dB
*Dip switch settings for 8 filter settings
* Handles up to 5W input
* Max 2.5W output
* Requires 12-24V DC at 500mA max
* Use mobile with cigarette lighter adaptor

£99.95 B

The **NES10-2** speaker has a built-in DSP noise filter, plugs directly into 3.5mm speaker sockets and can be used with any receiver or transceiver. It offers 8 filter settings & a top-mounted on/off switch to select DSP and is equally suitable for base/mobile work.

Also available is the **NES-5** basic plug & go model which offers a fixed level of DSP noise cancellation with the same dramatic noise reduction, priced **£79.95 B**

Both units supplied boxed with a 1030-FPL fused DC power lead & full instructions.

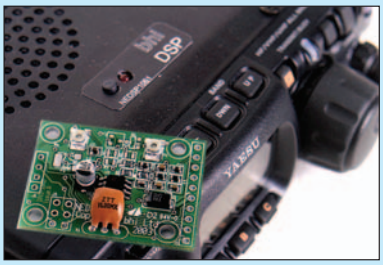
NEIM1031 NOISE ELIMINATING MODULE

The NEIM1031 noise eliminating in-line module inorporates bhi's unique adaptive DSP noise cancelling technogy.
Supplied with ALD-001 3.5mm to 3.5mm 1.2m audio plug lead and 1030-FPL fused DC power lead and full instructions.

** Noise attn - 9-30dB (typical)*
** Noise Attn levels 8*
** Audio output power 2.5W RMS max (8 Ohms)*
** Audio connections: Line level in/out (RCA Phono), Audio in/out 3.5mm mono jack*
** Line i/p impedance 10K*
** Line o/p impedance 100 Ohms*
** Line in sensitivity 300mV -2V RMS*
** Headphone socket 3.5mm mono jack*
** Headphone power 2.5W RMS max*
** Power 12-24V DC 500mA*
** Size: 170 x 85 x 34mm*
** Weight: 265g*

£129.95 B

NEDSP1061 DSP MODULE



* 4 levels of noise cancellation (11-35dB)
* Single button operation
* Low distortion to audio signal
* Visual & Audible indication of DSP level
* Input & output signal level adjustment
* Small size - 27 x 37mm

A small PCB module that allows the bhi noise cancellation technology to be fitted into existing equipment. Different DSP levels are selected with a single button, along with visual and audible indication of which level has been selected. Controls are provided onboard to set the input & ouput levels from the DSP, to allow the matching of signal levels.

£89.95 B ***This module is best fitted by us, there is a retro-fitting charge of £25 to existing models.***

Fitting instructions already available are : FT817, TS50 & Generic

1042 SWITCH BOX

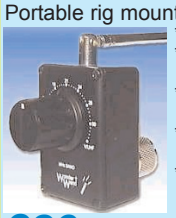
£19.95 A

No more swapping of wires! The bhi 1042 Switch Box allows up to six pieces of equipment to be connected to one bhi noise eliminating module/speaker or even to a standard extension speaker.

* 6x inputs: 3x Loaded (8 Ohms speaker level)
* 3x unloaded (headphone/line level)
* 1x output (to speaker/module) * All sockets 3.5mm mono
* includes 3.5mm mono to 3.5mm mono 1.2m lead & 3.5mm mono to 3.5mm mono 2.5m lead

WONDER WAND

Portable rig mounted antenna.



*Covers 40m - 70cm
*Easy to switch bands.
*Compact & easy to use.
*Handles up to 25 watts.
*Connects via integral PL259 connector
*Can be used with most QRP rigs.

£89.95 B

TCS

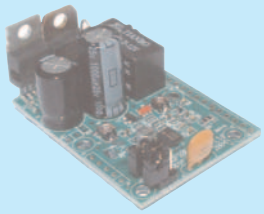
TCS - Tuneable Counterpoise for use with the Wonder Wand and other QRP Antenna

£59.95 B

SPECIAL OFFER - BUY BOTH FOR JUST £139.90

Buy the Wonderwand and TCS Counterpoise for £139.90 - a £10 saving, just order as Wwand Offer

NEDSP1062 MODULES



NEDSP1062 £89.95 A

NEDSP1062-KBD £99.95 A

The bhi NEDSP1062 amplified DSP modules provide a simple solution to adding DSP noise reduction in a wide range of applications. The modules are simply inserted into the loudspeaker path.
Basic NEDSP1062 module features:
*8 levels of noise cancellation - selectable on the PCB
*Audio bypassed when switched off or power removed
*2 Watts power output *Input impedance 22R *Supply voltage 12 - 18Vdc (500mA max) *Small size 50 x 36mm *Bandwidth 50Hz - 4.2KHz *Low distortion to signal *9 - 35dB noise attenuation *5 - 65dB tone rejection
The NEDSP1062 - KBD has the same performance as the basic module, with the added benefit of a small keyboard to operate the modules functions.

FT-STAND

FT-817 Mounting Stand, that simply clicks into the strap bracket, features non-slip feet and is fully adjustable for the optimum operating position.

£14.95 A

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Tel:01629 832375, Fax:01629 580020, E-mail:info@lowe.co.uk, Web:www.lowe.co.uk
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WATERS & STANTON

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Cover Subject
The IC-7800 'beast of radio', with a price tag to match has certainly set tongues 'wagging' among the Amateur Radio community. This month **Roger Cooke G3LDI** discovers just why this transceiver is being called a 'Super Rig'. Enjoy this issue and don't miss next month's with the free *Antennas to Go* supplement.

Design: Bob Kemp
Photograph: Courtesy Icom (UK) Ltd.

October features

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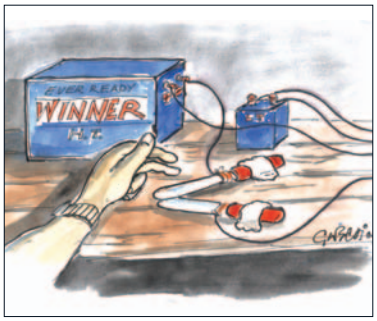

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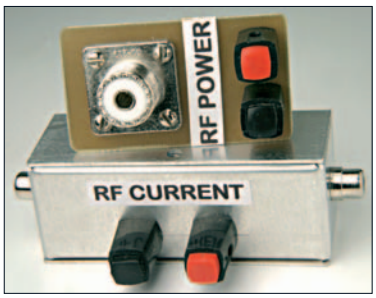

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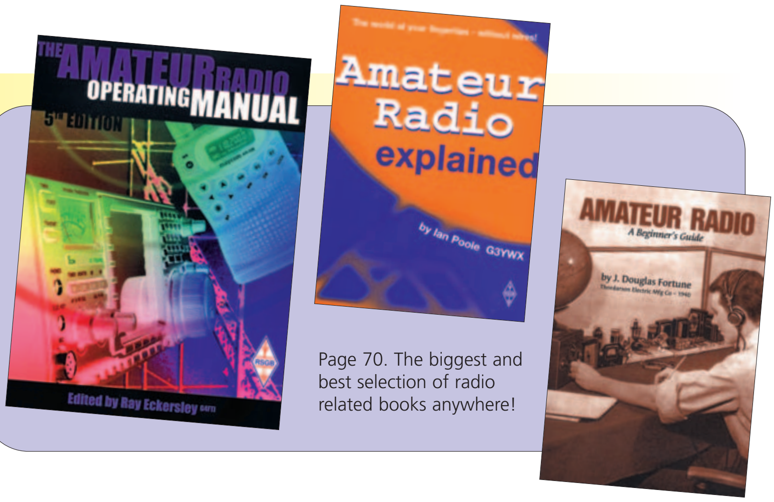
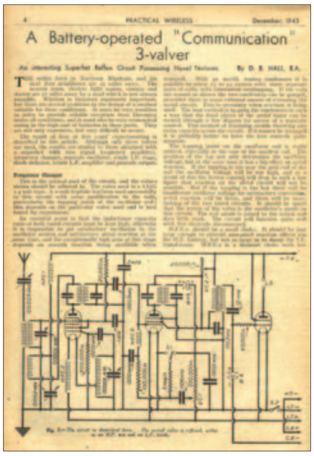
October regulars



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



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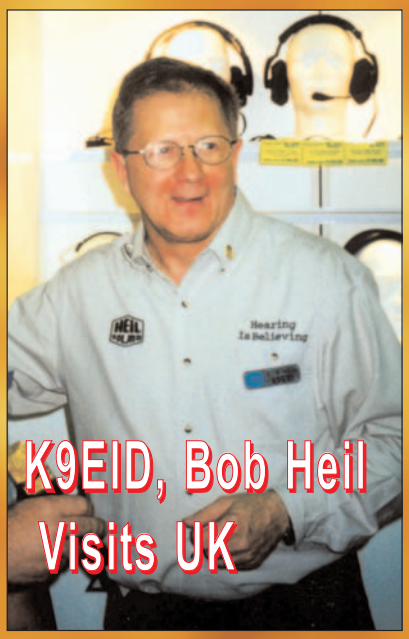

MEET BOB HEIL, K9EID, IN PERSON

On our stand at Donington 1st & 2nd October

SPECIAL DEALS ON THE DAY

HEIL SOUND

Bob Heil has spent a life-time in the sound and music business. As musician, sound engineer and radio ham, Bob realised many years ago that the factory supplied microphones that come with transceivers are cheap low quality items. So he set about designing his own range. And what better advert for the result than the excellent signals to be heard from around the world from the fast growing number of users who are changing to Heil micro-phones and headsets. You can meet Bob Heil in person on our stand at the Donington Rally on 1st and 2nd of October and hear his lectures on the art of sound technology in ham radio. If you take a pride in your station, the biggest improvement you can make to your transmitted signal is to discard that cheap plastic factory microphone and invest in Heil technology. .

QUIET PHONES

The ambient noise reduc-tion Heil 'Quiet Phones' were a huge hit at Hamvention 2003. Many years of research and development has now allowed the wizards at Heil Sound to bring you this unique active noise cancelling technology using two small mics placed deep inside the headphones that listen to the outside ambient noise as well as high quality program information.

Quietphones £99.95 B

PRO-SET PLUS HEADSET

- *Comfortable and Lightweight*
- *Acoustically tuned speakers*
- *Speaker reversal switch*
- *Spatial widening sound field effect*
- *Self adjusting headband*
- *Dual Microphone inserts HC-4 & HC-5 selectable*
- *Mic boom swings for left or right use*
- *Spkr impedance 200 Ohms (works on most rigs)*
- *Requires AD-1 series mic adaptor .*

Pro-Set-Plus £169.95 B
Pro-Set-Plus-IC for Icom rigs **£179.95 B**

PRO-SET QUIETPHONES

- *Standard Dual Earpiece headset with QuietPhone™ technology*
- *Padded Earpieces - 2.5m cable*
- *Two washable ear cover pads*
- *Adjustable headband*
- *Speaker phase reversal system*
- *2K Ohm Cardioid dynamic mic*
- *DX insert HC-4 available*
- *IC electret insert available*
- *Fully adjustable boom*
- *Earphone - 1/4in stereo jack*
- *Mic - 3.5mm plug (matches AD-1 adaptors)*
- *Soft Touch PTT*

Pro-Set QP with HC-4/HC-5 **£169.95 B**
Pro-Set QP wi/Electret (Icom) **£179.95 B**

CLASSIC MICROPHONE

Broadcast Quality Just Flick a Switch!

You can switch from the amazing dynamic cardioid "broadcast" element to the Heil communications element of your choosing.

Plus voucher for Call Letter Transfers on top of MIc.

- *Dual element mic inserts*
- *"Studio One" insert Plus HC-4, HC5 or HCLiC element*
- *Soft-touch back panel switch*
- *Removable base*
- *Complete with your callsign*
- *Requires CC-1-I adaptor*
- *Includes base stand*

HCL5, HCL4, HCLic £239.95 B
HCLZ Studio One & HCL5 el. + XT-1 Transformer **£259.95 B**

GOLDLINE HAND MICROPHONE

Heil Studio One Insert plus choice of HC4 or HC5 - switchable on mic.

- *High quality Stick Microphone*
- *Zinc die-cast body*
- *Heavy-duty gold cylindrical screen*
- *High quality Studio One Insert*
- *Additional Inserts - HC-4 or HC-5*
- *PTT switch - non latching type*
- *Requires CC-1 adaptor*
- *Includes stand threaded adaptor.*

GM-4, GM-5 £129.95 B
GM-V Vintage Goldline **£159.95 B**
TB-1 Base Stand **£27.95 A**

PRO-SET HEADSET MODELS 4 & 5

Choose:
HC-4 for DX
HC-5 for normal
IC for Icom

Pro-Set-4 £129.95 B
Pro-Set-5 £129.95 B
Pro-Set-IC £139.95 B

- *Standard Low impedance Dual Earpiece headset*
- *Padded Earpieces - 2.5m cable*
- *Adjustable headband*
- *2K Ohm Cardioid dynamic mic*
- *Normal or DX inserts available*
- *Fully adjustable boom*
- *Earphone - 1/4in stereo jack*
- *Mic - 3.5mm plug (matches AD-1 adaptors)*
- *Requires AD-1 series mic adaptor.*

AD-1 8-PIN & MODULAR INTERFACE LEADS

Cables for PRO-SET-PLUS, PROSET 4/5, Lightweight and Kenwood, Icom, Yaesu modular type connections.

AD-1-K8 Kenwood 8-pin **£16.95 A**
AD-1-I8 Icom 8-pin **£16.95 A**
AD-1-Y8 Yaesu 8-pin **£16.95 A**
AD-1-KM Kenwood Mod **£16.95 A**
AD-1-IM Icom Modular **£16.95 A**
AD-1-YM Yaesu Modular **£16.95 A**

CC-1 8-PIN & MODULAR INTERFACE LEADS

Cables for the GM4/5 & HM-10-4/5/DUAL and Kenwood, Icom and Yaesu modular or 8-Pin sockets.

CC-1-KM Kenwood Mod **£27.95 A**
CC-1-IM Icom Modular **£27.95 A**
CC-1-YM Yaesu Modular **£27.95 A**
CC-1-K8 Kenwood 8-pin **£27.95 A**
CC-1-I8 Icom 8-pin **£27.95 A**
CC-1-Y8 Yaesu 8-pin **£27.95 A**

HAND MICROPHONE

Your Callsign Deserves a Decent Microphone Heil has The Answer!

- *Convenient Stick Microphone*
- *Choice of Inserts - DX or normal*
- *Dual version has both inserts switchable.*
- *PTT switch - non latching type*
- *Requires CC-1 adaptor*
- *Includes stand threaded adaptor.*

HM-10-4, HM-10-5 £129.95 B
HM-10-Dual Both Inserts **£159.95 B**
TB-1 Base Stand **£27.95 A**

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WATERS & STANTON

ANOTHER PACKED ISSUE

rob mannion's keylines

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

As regular readers know, throughout 2004 I've taken a bold step in deciding to run an especially adapted fictional story in *PW*. And although my decision to publish *The Vectis Run* was not taken lightly (I'd deliberated over it for many years)...on the whole I've been delighted with the response.

Technology-based thriller serials aren't actually a new idea in radio hobby magazines however! I surprised to find out recently that several American magazines regularly published especially commissioned, serialised fictional stories before the Second World War.

There are times when an Editor such as myself must be prepared to raise slightly more than the top of their head above the parapet! The result was the *Vectis Run*.

However, the time has now come to decide what to do in the future **and to do this we need your help please!** I would be most grateful for as many of you as possible to write in (postcards please - no letters) saying clearly stating either '**Yes**' to another fictional serial or '**No**' to further fiction in *PW*. You're also welcome to E-mail me via **rob@pwpublishing.ltd.uk** and placing either the wording **Fiction Yes** or **Fiction No** in the subject line to help me categorise them. Please also state your preference clearly within the E-mail.

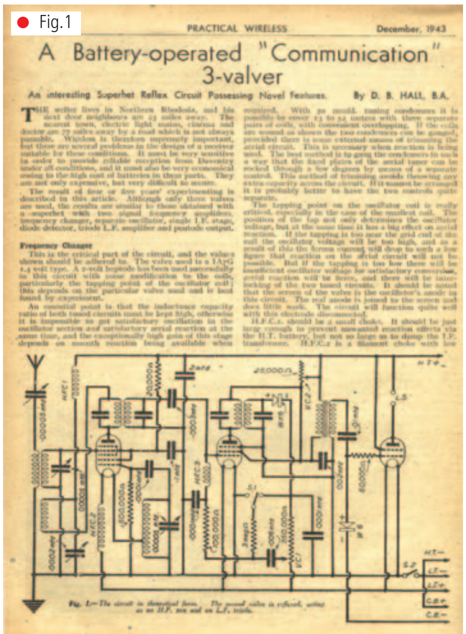
If we do run another serial in *PW*, the next one will be an especially written late 'Cold War' thriller, involving Amateur Radio, set in the late 1970s. Whether we do so however, is up to you the reader. **So please vote - and to do so ensure we receive it on or before Monday 11 October**.

Douglas Hall Circuit

As mentioned in the Topical Talk section of this month's issue, a number of readers have pointed out to us that the project and circuit published as 'A Short Wave Reflex Receiver' - presented in *PW* September 2004 was originated by the late **Sir Douglas Hall Bt**. In the article the author **David Allen** asked readers to help in determining who was responsible. And, as usual, our readers came up trumps!

The first to contact me to confirm the original author, was **Martyn Lindars** who telephoned and was promptly given the task of writing an article about Sir Douglas. Martyn seemed the ideal person to get the job because he had been in regular correspondence with Sir Douglas for many years! We look forward to presenting this article as soon as Martyn has sorted through 400 or so letters! Good luck to you in your endeavours Martyn.

While on the subject of Douglas Hall's work I'm pleased to say that once again readers came to the rescue on my behalf. This was a direct result of my request (in an 'Editor's Comment' under the letter headed as 'Obituary - Sir Douglas Hall Bt') asking readers to let me know if Sir Douglas had ever written for *PW*. My own research had missed the fact the he'd actually published in the December 1943 issue of the magazine. I thank everyone who replied so helpfully on this matter.


PRACTICAL WIRELESS December, 1943

A Battery-operated "Communication" 3-valver

An interesting Superhet Reflex Circuit Possessing Novel Features. By D. B. HALL, B.A.

Fig.1

As a Second World War issue, the December 1943 magazine is a rarely found copy. But despite that, 52 readers contacted me to say that the 'Battery-operated 'Communication' 3-valver, could be seen on page 4. The reproduced page, **Fig. 1**, is presented for interest only - it's rather small to work from. However, I can guarantee that the ingenuity, which the late Sir Douglas (the article was published before he received his Knighthood of course) became famous for is clearly evident). Thanks for your help readers, and I've no doubt that many of you will be looking forward to the article on Sir Douglas when it's published. It should make fascinating reading!

Club & Rally Visits

My club visit schedule, disrupted by family illness, is now being re-organised. So, I'm pleased to confirm I'll be attending the **Otley Club** in West Yorkshire on **Thursday 7 October**. This is closely followed by my annual visit to the **Rochdale G QRP Club Convention** in Sudden, Rochdale on Saturday 9 October. I hope to meet you at either venue.

Due to the later date for the **Leicester Amateur Radio Show (LARS)** this year (1st-2nd October) it's going to be a busy week or so! But I hope you can make it to the LARS, Otley or Rochdale.

Finally, if you visit the *PW* stand during the LARS on Saturday 2 October - don't forget to join in my birthday treat! Come and share a drink and a slice of cake with me - you'll be very welcome.

Rob G3XFD

practical wireless services

Just some of the services *Practical Wireless* offers to readers...

Subscriptions

Subscriptions are available at £32 per annum to UK addresses, £40 Europe Airmail and £49 RoW Airmail. Joint subscriptions to both *Practical Wireless* and *Short Wave Magazine* are available at £61 (UK) £75 Europe Airmail and £92 RoW Airmail.

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

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

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

August Cover & My Memories

● **Dear Sir**

Walking through my local WH Smith's store I saw the picture of the 1963 copy on the August 2004 *PW* cover, and thought 'I've got that mag in the loft at home!', probably even the blueprint. I must have bought it when I was about 10, so I bought the magazine. I've not had a *PW* in ages, in fact, and I didn't know you were still on the go.

Those blueprints were nice, but if you re-folded them more than a few times they used to crease and tear badly. Is it possible to get full size copies? I never did get around to becoming a Radio Amateur, despite having long time friends who were, one very good one in particular who still reckons I ought to get on the air.

Nice to see that side of the electronics hobby is still alive and kicking, I've been in the design side of the industry for many years and although I still enjoy it there was surely more fun when you could probe the individual components with a 'scope and 'see' what was going on.

Anyhow you've cheered me up no end, I'm recovering from a long illness that's stopped me working (at 50) and it's time I got my fingers into something practical again, I just might have a go at the SW Regen Receiver. I've got some EF183s somewhere, I wonder - with maybe an ECL80 audio output stage - perhaps a bit of chassis bashing would do me good! I'll let you know if it works. Best Regards.

Peter Hague
Portsmouth
Hampshire

Editor's comments: Thank you for your letter Peter, and I hope you'll really get' stuck in' to your project. There has been much valuable feedback and interest in 'classic' projects such as the 1963 designs. We're planning (occasionally) to reproduce the blueprint projects and whenever possible we'll also offer modern reproductions when they are featured. I hope that now you've seen that *PW* and the hobby are still very much 'alive and kicking' you will take the plunge and get your licence...after finishing your receiver of course!

Take A Bow Kenwood UK!

● **Dear Sir**

I recently purchased a Kenwood TS-480SAT and although I really studied the instruction book there was something when setting up the radio I was not getting to grips with, so I telephoned Kenwood and spoke to the technical dept but the person who could give me advice was not available, but would ring me back, which they did within half an hour.

I had quite a long talk with them and was given all the information that put me on the right track and this person also gave me his Dept. telephone number so that I could speak to him direct if I needed any more advice.

I thought I would write to you as I was very pleased with the service I got from Kenwood, although I did thank them for their help. I am very pleased with the TS-480SAT - it performs very well. Also, I look forward to receiving *PW* and the articles are also very interesting to read. Thank you all.

K.H. Howard G0PDD
Coleford
Gloucestershire

Editor's comments: Thank you for your letter, and it's good to hear about 'service where it counts' Mr Howard. I discovered it was Dave Wilkins G5HY who'd been pleased to help you. Dave's helpful attitude reflects his own passion for the hobby and personally I find it's very pleasing, when telephoning UK dealers, to know that I can usually end up talking to another Radio Amateur who knows the subject, what they're selling and can directly assist. Other industries please take note!

Memories From Singapore

● **Dear Sir**

Many thanks for doing such a good job at the *PW* Offices and I am delighted at the latest copies of the magazine, which I always look forward to. Just the fragrance of the new print copies and its printing style is enough for me, not to mention the highly interesting contents. However, perhaps I should just include a bit of background about me and you will know why *PW* means so much to me.

I started reading *PW*, together with your sister magazines *Practical Electronics* (*PE*), *Radio Constructor* (*RC*) and *Wireless World* (*WW*) from 1967 onwards when I was a mere teenager growing up in Singapore. I recalled being so enthralled by these magazines that I had to literary make many visits to the Times Publishing House in Singapore who was the agent for most magazines from abroad, especially the UK.

I had befriended a few people there who helped me to trace and locate older copies dating back to 1963 such as the Beginner's Short Wave Two which you republished last month - boy, that brings back memories as it was one of my first 'experiments'. More successful projects follow such as the low cost Hi-Fi amps of W Cameron in December 1967 and one of the first transistor QRP transmitters by D L Gibson in the same issue using the BFY51.

I especially recall the hard work one of my best friends **Mr Tan** (now a Singapore Airlines Engineer) and I put towards building the Digital Frequency Counter project of September 1971. I was able to do so much with the latter including using it to design various experiments that was a part of my undergraduate studies, which eventually got me my BSc from London.

Now a PhD with some 30

years experience, I would encourage all youngsters to read *PW* in order to preserve the skills and heritage of our forefathers going back to Maxwell.

Unfortunately over the years, having left home since 1977 my mother (now deceased) had long since consigned my precious collection of useful information to the tip. I was able to occasionally find one or two copies that I still treasure as part of my early development from rallies, etc., but yes a CD-ROM collection of *PW* would be most welcome.

I wonder if your reprinting of old *PW* classics is restricted only to valve sets. I am most interested in the 5 stager article of Jan 1968 onwards. This is an excellent communications receiver that starts off simple and grows into something quite professional. If not, I would appreciate yourself or another reader could help me locate a complete set of these articles which I recall used Denco coils and the OC and AF transistors which I am sure have better modern day equivalents.

To finish off, thanks again and also for the interesting news about **Rob Vincent's** achievements on page 14 - headlined as *Radio Amateur Invents New Antenna Technology*, without *PW* I would not have known about it - thank you.

Tuck Choy M0TCC/VK3CCA
Manchester

Editor's comments: I have had the pleasure of meeting Tuck for a number of years at the GQRP Club's Rochdale Convention. This busy, friendly rally and mini-convention provides a superb meeting place. I hope to meet him and other readers at this year's Rochdale event on Saturday 9 October (one week after the Leicester show!). See you there? I hope so!

Editor Living In The Past?

● **Dear Sir**

The Editor's comments about the decline in the numbers of independent newsagents and the subsequent loss of shelf space for *Practical Wireless* has some merit (Keylines editorial, page 9 August issue). However, I don't think it's that alone that accounts for the slow decline in direct sales of *PW*.

To read the August 2004 issue you would think the average age of its readers lies between 60 and 100 years with it's heavy emphases on the past, reproduction of obsolete and vintage projects and fiction articles irrelevant to a magazine such as *PW*. Whilst a few readers will write to the Editor saying they enjoy these projects, it's now starting to dominate the magazine and those not interested in this avenue of the hobby will soon vote with their feet and stop buying *PW* altogether. An issue like August 2004 has little of no interest to the average modern Radio Amateur regardless of their age and would certainly not attract many first time buyers.

We need to temper the near obsession with things of the past with more modern radio related projects like the IPB receiver or GDO Dipper. A trawl of the Internet will revel dozens of unpublished projects from potential authors of far more relevance to the modern Radio Amateur than a review of an AR88 or Edison receiver.

Len Paget GM0ONX
Ayrshire
Scotland

Editor's comments: Thank you for your comments Len. In reply I should point out that all Editorial decisions regarding content and contents 'balance' are taken after due consideration of feed-back from readers whether by face-to-face contact at club and show, or via letters and E-mails. Another valued source of feedback is the 'Club Visits Comments' book, which I take where ever I go. Some of the best articles in recent years have been published directly due to suggestions and feed back from readers. It's extremely important for you all to keep us informed of what you require. Obviously, what we publish will never completely satisfy everyone- but we do try our best! As regarding articles on the internet - I'm afraid there are legal problems here because they have been published....by being placed on the web. Unless it's very special indeed, we try to avoid re-publishing articles, which have appeared elsewhere (apart from our own archives) and far prefer original, unpublished work from authors who have contacted us directly. We also have to ensure - for ethical, legal and copyright reasons - that the person offering us publishing rights - is the legal holder of the copyright. In practice this is extremely difficult to do with much of the material 'published' without considerations of the copyright implications, on the internet. However, as preparing *PW* is an all consuming - but enjoyable - task for me, and there aren't enough hours to 'surf the web' during the working day your help would be appreciated. I would be very pleased if *PW* readers (when they discover such talent) discover a potential author's work - that they invite the author to contact us directly. If we then get a number of recommendations for a potential author...it could be good news for everyone! But whatever happens - please keep us informed of what you'd like to see in YOUR magazine and the editorial staff will do their best to oblige. Please see Keylines - page 9 - regarding the fictional serial and a special invitation for readers to comment on the subject.

Oscilloscope Articles

● **Dear Sir**

I have thoroughly enjoyed the last two Radio Basics articles on oscilloscopes in *PW*. The encouragement to keep a good look out for a 'scope bargain is wise advice and reminds me of my own good fortune.

A few years back I went along to the Rainham Radio Rally near Gillingham in Kent with my two sons, **Peter** and **Philip**. My boys thoroughly enjoyed touring the second-hand tables for bargains. In rallies past we have come away with old software, a *Biggles* Teddy and a working cuckoo clock, and that's before the radio bits!

On one table situated in a bottleneck around the main hall, we found a stack of Hewlett Packard 'scopes on sale for £25 each. The were several versions on offer and we really did not know which to choose. The boys sat on the floor and helped twiddle the knobs of working 'scopes. Then as fortune would have it - and Amateur Radio is full of these coincidences - a recently retired engineer came by, spotted our predicament and set to work to help us. He swapped the various modules between base units and finally pronounced a suitable combination consisting of a 4 channel 50MHz module fitted to an HP 1800 base unit.

Over 30 minutes had passed and by then (perhaps in desperation) the retailer had dropped the price to £10! We then shook hands, thanked our new engineer friend and carried the 'scope back to the car. Needless to say, the boys wanted their share of the £15 saving we had made! To this day the 'scope is absolutely rock solid and has been an invaluable tool. I don't know who the 'retired engineer' was...but he did us proud!

Should it be of interest to readers, the website of BK Precision - **www.bkprecision.com** - includes a detailed 43 page advanced guide to using an oscilloscope. The file is in Adobe format and can be downloaded. Be aware it is 2.7Mb! It is very good and I found out about it from a correspondent in *Sprat* the G-QRP Club magazine. And of

course...I look forward to the next ''scope instalment in *PW*.
Steve Seabrook M0ECS
Sittingbourne
Kent

Editor's comments: Your letter provided me with much encouragement Steve! I'm pleased that both your sons enjoyed the 'scope buying expedition. In the past I've also had much needed advice provided by complete strangers - and have to thank these anonymous advisors. The most recent advice came from a helpful leader who (on hearing me discussing spares for a semi-professional reel-to-reel tape recorder), promptly provided the name of someone who serviced that particularly brand (Revox). By now Steve, I hope you'll have seen the September issue of *PW* and the good news regarding the 1CP1 miniature oscilloscope tube. And, although I'm not wishing to labour the point too much - I'm confident the proposed one inch 'scope project will provide valuable constructional experience for our readers.

Teaching Q-Code Speak?

● **Dear Sir**
Other than what I've read within *PW*, I know little of the content of the Foundation Licence course. However, judging from what I've heard on the bands, a large part of the course must be how to talk in Q code.

As I type, two newly licensed stations that are conducting a conversation via a nearby repeater almost entirely in Q code with a mix of CB jargon. The Q code was derived initially to assist marine and other commercial operators to pass traffic efficiently in Morse code. Other than the odd Q code on s.s.b. for the purpose of clarity, is there a genuine need for high volumes of Q code on v.h.f./u.h.f. f.m.?
Colin Topping GM6HGW
Newport on Tay, Fife

Warning From Ofcom

● **Dear Sir**
The August issue of *Practical Wireless* contained an article on pages 24 and 25 on how to construct a KRC-A-6 wide-band f.m. unit, produced by the Kit Radio Company. The article explains that the KRC-A-6 is a wide-band f.m. transmitter and can re-transmit the output of a modern v.h.f. radio on a frequency that old f.m. sets can tune to.

Please note that use of the f.m. broadcast band to transmit a radio signal is illegal. Your readers may well be aware that there are many devices on the market such as MP3, iPod, CD players and attachments for mobile telephones, which similarly transmit to the Band II v.h.f. f.m. broadcast band. Such use, despite the relative short range involved - is subject to licensing under Section 1 of the Wireless Telegraphy Act 1939. As the f.m. broadcast band is allocated for the exclusive use of licensed broadcasters, no other systems are permitted to operate within the band. Use of these systems therefore constitutes an offence. Also, radio equipment must be compliant with the Radio Equipment and Telecommunications Terminal Equipment Regulations before it can be paced on the market or taken into service. Many of the broadcast band devices that we have investigated are not compliant. We have seized hundreds of such devices and have prosecuted suppliers.

I am sure you will wish to warn your readers that they will be acting illegally if they use the KRC-A-6 to transmit on the f.m. band.
Doug Raynes
Operations
Enforcement & Interference Policy
Ofcom
London

Editor's comment: Readers will be fully aware that the *PW* Editorial policy is to encourage - in every way possible - full compliance with licensing conditions and the law. Normally, I would have published a warning note with the article mentioned by Doug Raynes but on this occasion I forgot, and take full responsibility for not doing so. However, at the same time I'm sure that anyone building the project would prefer to use the unit in conjunction with a coaxial cable r.f. feed.

'Scope Needs A Good Home!

● **Dear Sir**
Having read your Radio Basics article on the Oscilloscope in the August edition of *PW* it occurred to me that my Heathkit 5MHz Oscilloscope Model IO-4105 might be of interest to some young person or other. Although like the writer said it is old, it still functions well and I still have the Heathkit manual to go with it. So, servicing should be no particular problem and of course the manual provides a good insight into the construction and working of a 'scope. I ended up with a 30MHz 'scope to aid me in building a TX/RX from a *RadCom* design. I don't want any money for it, but I should like to think it had a 'good home' so to speak (a club perhaps?). So, should anyone think the 'scope could be put to good use at your club, etc, perhaps they would let me know at your convenience. My telephone number is **(01303) 863117**, E-mail: **kr.bolton@btinternet.com**
Ken Bolton G0SEK
Folkestone
Kent

Editor's appreciation: What a kind gesture Ken - in the true tradition of our hobby. Thank you for the generous offer and I look forward to hearing that it's found a new home.

Foundations Of Wireless

● **Dear Sir**
In answer to **Edward Summers M3GVZ** (Letters, pages 10 and 11 September *PW*) and the Editor's reply to him I would like to make the following observation. We have all been at the point that Mr. Summers has reached, when knowing that V=IR seemed quite an achievement. But when we look at the variety of facts to be absorbed before, for instance, **Tony Nailer G4CFY's** articles can be fully absorbed, regular articles in a monthly magazine seem to be an awfully slow way of soaking up the necessary knowledge. Much better for Mr. Summers to by a book and , having read *PW* cover to cover, dig his nose into it.

Having studied Scroggie's *Foundations of Wireless,* in Edition 2 in 1939, Edition 8 in 1960 and the current edition, (No.11, Scroggie having passed on and the book now called *Foundation of Wireless and Electronics* edited by S W and R S Amos, obtainable from RSGB or any good book shop). I can fully recommend it for anyone in his position. By the time that he has read the first six or seven chapters he will be following Tony's articles and understanding what they are all about. Incidentally, I have no connection, except as a satisfied customer, with Newnes the publisher.
Richard Dawson
Charmouth
Dorset

Editor's comments: Thank you for your recommendation Richard - *Foundations of Wireless (FoW)* - both the older books and the later editions - have become true radio classics. The book has a fascinating history and doesn't appear to have ever been out of print. Despite this, for a number of years the publishers seemed to concentrate sales of the modern softback volume in countries other than the UK (Readers in Africa often mention that it's the most easily obtainable radio textbook). However, since *FoW* has been featured by various writers and authors working in Amateur Radio,

and also in Radio Basics where it's a recommended title, I'm pleased to say it's easy to obtain a copy, and copies can be ordered from the *PW* Book Store.**

The EF50 - Nostalgia Rules Okay!

● **Dear Sir**

I'm writing concerning the letter from **R. Williams** of Dyserth, Denbighshire, published in the July issue of *PW* because I have a parallel tale to tell. I too am older, building my TV set in 1955 using a kit of parts from 'Premier Radio' from London. And of the 18 valves in the circuit, six were EF50s at 5/- (25p) each. Like Mr Williams, when first switching of after completion, my picture too was upside down, as the wires to the scanning coil on the neck of the tube being reversed. The similarity does not end there as also I had to struggle to get a signal of sorts - eventually requiring a two stage pre-amplifier on the antenna input.

The transmissions I was trying to receive were from North Hessary Tor in Devon, from a temporary and experimental station. This I believe consisted of a 250W transmitter in a caravan, feeding an antenna with a gain of four on a 100 foot temporary mast providing an e.r.p of approximately 1kW. When attempting to watch football, you might spot the players as their shirts or shorts were bigger blobs of white than the ever present 'snow' (noise) I live near Lands End, I suppose approx 100 miles from the old transmitter.

Alas, the TV is no more. With the coming of 625-line colour TV and the ceasing of 405-line monochrome transmissions, my trusty and well used servant had passed its 'sell-by' date and is now 'Resting In Peace'. However, I'm pleased to posses the first TV licence to have been issued from the local Pendeen Post Office. I took my full RAE 42 years later (1997) so I must have been a 'latent amateur operator' for many years.

With reference to all I have written concerning TV, it should not be surprising that of the many facets to Amateur Radio, the one that appeals to me in this absorbing hobby is SSTV on 144MHz. I've not yet ventured into h.f. Finally, please may we have more articles and pictures of SSTV?

Martin Kevern M1BKS
Pendeen
Cornwall

Editor's comments: Fascinating memories Martin! Regarding your interest in SSTV, there are some articles in the editorial pipeline - but we do require a few more. Anyone keen to write should contact the *PW* offices for an *Author's Guide*.

Through Losses on ATU

● **Dear Sir**

I'm writing to remind readers that antenna tuning units (a.t.u.s) can cause a loss of power...and I speak from experience! Recently, using my trusty KW 107 a.t.u. I tuned into its dummy load setting output of transmitter to 50W. I then changed to the a.t.u. proper and meter then read 40W, representing a 20% drop of output power.

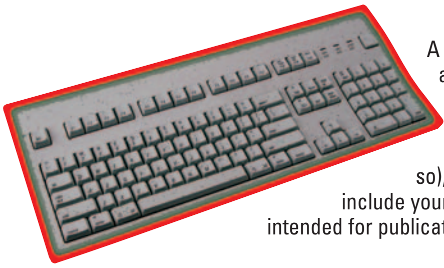
Next, I changed to my MFJ a.t.u. and applied 50W into the dummy load, and then switched to the a.t.u. and there was no perceptible drop in power. So, I advise that you look at your a.t.u. with caution!

Ross Bradshaw G4DTD
Saint Austell
Cornwall

Editor's comment: Wise advice Ross! However, although there can be significant 'through losses' in an a.t.u.'s circuitry there could be a specific fault on your KW unit. In physics nothing comes free - if we carry out a process using filters, or any passive circuitry there's bound to be a loss somewhere. I learned a valuable lesson years ago when (to overcome a TVI problem) I fitted a high-pass filter on a neighbour's coaxial cable download. The resultant noisier picture didn't please him - and I ended up fitting a channelised distribution amplifier with good filtering (the amplifier's gain compensated for the through loss caused by the necessary filtering). It cost me £20 but it cured the problem.

● 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 provide their postal address. I have to remind readers that although we will not publish a full postal address (unless we are asked to do so), we require it if the letter is to be considered. So, please include your full postal address and callsign with your E-Mail. All letters intended for publication must be clearly marked 'For Publication'. **Editor**

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.

September 12
The Vintage Valve Technology Fair
Tel: **(01274) 824816**
Website: **www.myciunka.supanet.com/VVTF2003**
To be held at Haydock Park Racecourse, Near Wigan, Merseyside WA12 0HQ, on the A49, five minutes from M6 Junction 23 & A580. Why not clear your shed, shack, cellar or garage of those unwanted radios, valves, gramophones, etc.? Over 200 stalls available, everyone welcome. Public entry charge only £2 per person! Car parking for up to 5000 cars free!

September 19
The Lincoln Shortwave Clubs' Annual Hamfest
Contact: **Baz Matthews**
Tel: **(01636) 612440**
E-mail: **m3dmv@btopenworld.com**
Website: **www.hamfest2004.secretbunker.org.uk**
Taking place at the Showground, Newark, Nottinghamshire. Doors open 1000 and entrance is just £2 per person. There will be all the usual radio rally attractions, plus craft stalls, classic cars and a 'fly-in' from a Second World War Auster V reconnaissance aircraft. Lots to see and do for all the family.

September 26
The Worthing & District Amateur Radio Club's Mini Rally
Tel: **(01903) 753893**
There's a mini rally taking place at Newhaven Fort Museum from 1030 till 1600. The main purpose of this rally is to raise funds for the Museum by selling excess equipment which has been donated to the club, but is not suitable for display. Tables are provided at £10 for individuals or £15 to traders - a number of whom have already agreed to attend. The charge includes admission to the Fort, with all its usual attractions, including the display of vintage radio equipment, etc.

September 26
The Suffolk Data Group - SDG Radio & Computer Rally
Contact: **Peter**
Tel: **(01473) 631313**
E-mail: **peter@sdgrally.org**
Taking place on the raceway centre green at the Foxhall Stadium, Foxhall Road, Ipswich, Suffolk IP4 5TL. Traders and booters admission from 0800 where there will be plenty of boot pitches, pay on the day, and only £5. Doors open at 0930 and the entrance fee is just £1 - accompanied under 14s go free. There will be a large free car park adjoining the stadium and hot refreshments will also be available. Talk-in on S22. Everybody welcome!

October 1/2
The Leicester Amateur Radio Show
Contact: **Geoff G4AFJ**
Tel: **(01455) 823344**
FAX: **(01455) 828273**
E-mail: **g4afj@argonet.co.uk**
To be held at Donington Park International Exhibition Centre, near junction 23A M1. Opening times 0930 to 1730 on Friday 1st and 0930 to 1630 on Saturday 2 October. More information from the above contact details.

October 3
The Great Lumley Amateur Radio & Electronics Society's Rally
Contact: **Nancy Bone**
Tel: **0191-477 0036** (home) or
(07990) 760920 (mobile)
E-mail: **nancybone2001@yahoo.co.uk**
To be held at the Great Lumley Community Centre, Front Street, Great Lumley, near Chester-le-Street, County Durham. There will be free parking, plus easy access, good, inexpensive food and drink, a Bring & Buy and lots more. Doors open at 1030 for all, including disabled visitors. Admission is just £2, free of charge to under 14s accompanied by an adult.

amateur radio **news**

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

Annual General Meeting

RAOTA News

The Radio Amateur Old Timers' Association (RAOTA) will be holding its Annual General Meeting during this year's Leicester Show.

The RAOTA AGM will take place on Friday 1 October at the Tudor Inn in Castle Donington (Tel: (01332) 810875) starting at 1300hours with an optional buffet lunch. The arrangements are a repeat of last year's very enjoyable AGM.

The venue is a couple of miles from the site of the Leicester Show and transport will be provided for anyone who needs it. The RAOTA stand at the Leicester Show will be closed for the duration of the AGM.

Membership of RAOTA is open to anyone (licensed or listener) who shares the aim of RAOTA, which is to maintain the pioneer spirit and traditions of Amateur Radio. For more details of how to get involved check out the stand during the Leicester Show or contact:

Edward Rule G3FEW
15 Norwich Road
Lenwade
Norwich
NR9 5SH
E-mail: edit@raota.fsnet.co.uk

In Memory

Ian Kyle GI8AYZ/MI0AYZ

A tribute to Ian Kyle GI8AYZ/MI0AYZ as paid by Terry Barnes GI3USS. Ian passed away peacefully at home, as he would have wished, ten days after his 74th birthday after a long battle with cancer.

Terry writes: "Ian was arguably the most innovative and far seeing President of the Radio Society of Great Britain (RSGB) for many years. During his two year Presidency in 1997 and 1998 he masterminded the ground work, which led to the introduction of the incentive licensing system - Foundation, Intermediate and Advanced. He also started negotiations, which led to the abandonment of compulsory Morse testing (at 12w.p.m.) for access to the h.f. bands. Both these innovative schemes have been and are still being implemented by other administrations around the world.

Ian and I shared similar career histories, working in textiles or 'Rag Trade' as he called it, being made redundant, and translating our hobby, Amateur Radio into a second, worthwhile and fulfilling career as technical officers in Government service. We both served RAYNET sharing and controlling the emergency network in GI at various events for many years.

Ian preceeded me on RSGB Council and later after my Presidency was re-elected to Council, eventually becoming President for two years. He was an experimenter, innovator and constructor. Even a few short months before his untimely death he assembled an Elecraft transceiver. His first loves were v.h.f./u.h.f and microwaves back in the kylstron days and his last enthusiasm was for l.f. (73 and 136kHz) where he set some of the early distance records.

He was widely travelled and respected throughout the world and will be sadly missed by the entire Amateur Radio fraternity. Ian leaves behind his faithful wife of many years Jean, son Alasdair and daughter Lynne who both have held licences.

We offer our sympathy and condolences on the passing of this great family man who lived for his children and four (soon to be five) grandchildren.

Terry Barnes GI3USS

Video on Website

What is Amateur Radio?

To help promote the Amateur Radio hobby the recently created Essex Amateur Radio Website has started streaming a new RSGB video called What is Amateur Radio?.

What is Amateur Radio? is being streamed at speeds of 26 and 57kbs so, it can be viewed by those using dial-up modems, as well as broadband. It's believed this is the first time the video has been made available via a Website.

To view the video go to **http://www.EssexAmateurRadio.org.uk/** and click on the 'Find Out More About Amateur Radio' button at the bottom of the page. The website also has an associated E-mail reflector open to anyone. To join the reflector go to **http://uk.groups.yahoo.com/groups/EssexAmateurRadio/**

Scottish News

Dundee Foundation Success

Dundee Amateur Radio Club are pleased to announce the success of their latest Foundation Exam.

The Dundee Club held their latest Foundation Exam on held on 3 August 2004 when all three candidates passed their exam. The exam was held on-board the North Carr Lightship, which the Maritime Volunteer Service allow the Club to use during the Summer when the College is closed.

The picture shows **Stewart Fleming, Daryl Menzies** and **Louise Higgins**. Thanks go to **Tom Harrison GM3NHQ** for tuition and to other members who assisted with the tuition and exam. Full details on future exams can be found on the Dundee Amateur Radio Club's website at: **www.dundee-amateur-radio.co.uk**

Havoc Caused

Amateurs Not To Blame!

Trevor M5AKA drew our attention to the following story showing that it's not always Radio Amateurs who are to blame for poor television reception! Trevor, who seems to run a unique and worthwhile Amateur Radio news service writes:

"It was reported in the *Dorset Echo* on 5 August 2004 that a new police radio system had 'knocked out' television reception across parts of Dorchester, Dorset. The story is as follows:

Householders claim that the new multi-million-pound Tetra system has left them without a picture and out of pocket. They have to pay £50 for a new filter to ensure their reception is returned to normal.

Irate viewer Margaret Fowler sat down to watch TV with her husband at their home in Alfred Road when the television picture disappeared. She said: "Suddenly one morning we were totally wiped out - we had sound but no picture. We lost everything, even satellite and the video. We hadn't got a clue what was happening."

Mrs Fowler, 57, called out an aerial technician who installed a couple of filters to the set, which has to use a booster aerial because of the relatively poor reception. She continued: *"We mostly got the picture back, but it wasn't perfect. I started asking around and heard that there were others with the same problem".*

Barbara Legg, 59, also found herself unable to watch anything at her home in Monmouth Avenue. She said: "We thought it must be summer interference at first, but then we discovered it had happened to a few people and had come on suddenly." Mrs Fowler added: "Somebody mentioned that the police station on Weymouth Avenue had just installed a new aerial and wondered if it had anything to do with that."

Mrs Fowler called Ofcom, the organisation that regulates broadcasting and deals with reception problems and, after sending a technician to her home, they told her that the problem was related to a new police communication system called Tetra.

A spokesman for Ofcom said Tetra was a new digital system that allowed police officers to stay in touch with their base much more efficiently over much greater distances than the previous analogue system. He said: "There have been some cases where the system has caused some reception interference. In most cases the problem is occurring because the viewer has some kind of amplifier that boosts the signal, usually because they are some way away from the transmitter. "Difficulties can almost always be resolved by fitting the appropriate filter which can be supplied by an aerial professional." But this filter will cost individual householders money and Mrs Legg is not happy about having to pay for it. She said: "I can't see why I should have to pay - it worked beforehand and if something works and then another party puts something else into the environment that stops it working I think they should have to pay. I would have thought it would be better to do something to the police transmitter at their expense, rather than to individual houses".

Director of Wessex Aerials Ltd ***Dennis Monelle*** *said there had been a few cases of interference reported. He said: "It is easy enough to fix with a specific Tetra filter, either fitted in the customer's lounge or on the roof. The one on the roof is better for people who have to use a booster because it filters the interference before it gets to the booster." He said the filter cost no more than £50 including installation. No one from Dorset Police was available for comment at the time the news story was published".*

So there you have it - its not always the Radio Amateur causing interference to your television picture!

Components by Mail Order

Cumbria Designs

If you're looking for a component supplier that offers a mail order service - look no further...

Ron Taylor G4GXO has informed the newsdesk that Cumbria Designs have recently added a component sales section to their website. In addition to the range of popular component parts they are now offering a selection of 'hard-to-get' components in small quantities. The components will include high performance diode ring mixers and MMICs and they hope to eventually include toroids and possibly r.f. power transistors too.

Cumbria Designs
The Steading
Stainton
Penrith
CA11 0ES
Tel: 07973 894450
E-mail: sales@cumbriadesigns.co.uk
Website: http://www.cumbriadesigns.co.uk

Listen Out

Back on Air - G3BTW

By the time you read this GB3TW should be back on air so, if you are in the Tyne & Wear area listen out.

At the time of writing the Tyne and Wear Repeater Group are working to get **GB3TW** back on air by 28 August so, all being well it should be up and running by the time this issue of *PW* is published. The repeater will be operating from its new site at the Community Centre, Front Street, Great Lumley County Durham.

Change of Details

Martin Lynch Relocates

After many years of trading from his premises in Ealing Martin Lynch & Sons have moved.

Martin Lynch & Sons have been selling Amateur Radio equipment from their Ealing showroom since 1978 but due to increasing parking and traffic problems have now relocated to a new showrom in Chertsey, West London. Their new premises is situated between Junctions 11 & 13 on the M25, making it easily accessible by car and with Chertsey train station only 800 yards away, what could be easier?

So, why not go along and see for yourself the new air conditioned premises with its dedicated Yaesu, Icom and Kenwood equipment areas, meet the team and enjoy trouble free parking (it's right outside!)?

Martin and the 'gang' can now be found at: **Outline House, Guildford House, Guildford Stree, Chertsey, Surrey KT16 9AS.** It's only the address that's changed, the 'phone, FAX, E-mail and Website are all the same.

Kits For Hobbyists

Fast Components Limited, a new component supplier is targeting hobbyists with its brand new range of component kits.

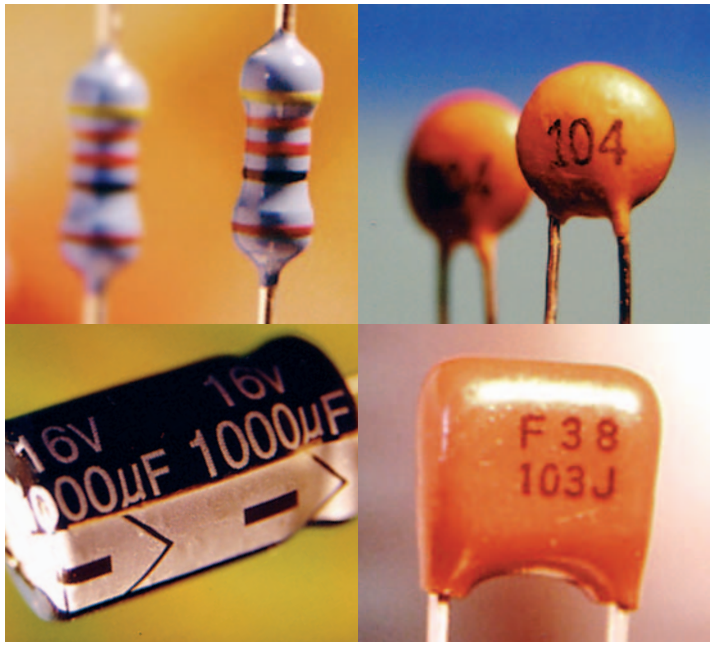
Fast Components have recently launched a range of kits including, 1000 1% metal film resistors spread over 93 values, 240 50V ceramic capacitors spread over 24 values, 93 radial electrolytic capacitors spread over 12 values and 100 miniature polyester capacitors spread over 9 values. The resistor kit retails at £9.99 and the capacitor kits for £4.99.

Customers can order direct from **www.fastcomponents.co.uk** where payment can be made securely with credit cards, PayPal, or Cheque/Postal Order. Full Adobe PDF datasheets of all kits are available on the Fast Components website.

Co-founder **Thomas Arundel** says "Electronic hobbyists have had a rough time of late. Leaded components are becoming more difficult to find, and incumbent suppliers are imposing 'small order' or high shipping charges". As a result, the Fast Components team are offering a fresh and more economic way to buy electronic components.

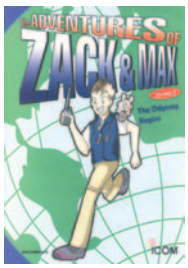
"We've started with a useful collection of kits to get hobbyists (especially newcomers) started" says Thomas. "We're planning to follow up with more passives, surface mount kits, mechanical hardware kits and semiconductors through the autumn." Postage & packaging is at cost with no minimum order charge.

"We sell brand new component kits" says **Tsuyoshi Kihara**, the co-founder who's behind Fast Components' supply network. "As former product designers we were frustrated with time and effort it took to build-up a decent stock of bench-top components. Once we started investigating a supply chain, we realised that we could sell kits of commonly required components at 1/3 of the price that those same components would cost separately."



For more information or for help with any queries contact:
Thomas Arundel
Fast Components Limited
Winchester House, Winchester Road
Walton-On-Thames, Surrey KT12 2RH
Tel: (0870) 750 4468
Fax: (0870) 137 6005
E-mail: sales@fastcomponents.co.uk
Website: www.fastcomponents.co.uk

Comic Strip Amateur Radio



Last year Icom (UK) Ltd were involved in producing an Amateur Radio Comic for the English market. It was named The Adventures of Zack and Max and was produced to encourage younger people and newcomers into the hobby and feeback suggests that this has been achieved.

Following the success of 'Zack & Max' a second comic was produced by Icom America and it became Icom America's highest ever Website download. A third comic is now being produced, which will hopefully be a joint effort between students in America and the UK.

Volume 3 will be called *Maddy Goes To England* and it is hoped that 10-12 year old Radio Amateurs will write and draw selected panels of the comic. With this in mind Icom UK want to know of any radio clubs in the UK who are interested in being involved.

The deadline is flexible...although the Editor of Maddy Goes to England, **David Condon**, would like to have everything finished by December 2004 if possible. David is not a representative of Icom but a teacher of 9-10 year olds in a public school. The basic appeal for the students in this project, on both the US and UK side, is that they will have written a comic book that will be read in the UK and USA. Also there is a huge public relations opportunity for participating clubs from both sides of the Atlantic.

Any interested club should contact the Marketing Manager at Icom (UK) Ltd via E-mail at **marketing@icomuk.co.uk**

Alinco Dual-Bander

Nevada have added the new Alinco DJ-C7E dual-band hand-held to their comprehensive range.

The Alinco DJ-C7E is being 'billed' as a 'true' shirt pocket hand-held dual-band transceiver, capable of receiving the v.h.f. f.m. broadcast band and optional airband receive and v.h.f. and u.h.f scanning. The DJ-C7E is housed in a rugged package measuring roughly the size of a credit card and just 1/2in thick, so it really will fit comfortably in your shirt pocket.

The Alinco DJ-C7 offers the following features:

- Full 144 and 430MHz transceiver coverage
- Airband receive (optional*)
- Wide v.h.f. and u.h.f. frequency coverage (optional*)
- f.m. broadcast receive
- 200 memories
- v.f.o., Memory and Scan operation
- Full CTCSS encode and decode
- Tone burst with four different frequencies
- Split frequency operation
- Programmable automatic repeater offset
- Standard SMA antenna port

The price of the DJ-C7E of £149 includes a lithium-ion battery and charger. See this radio for the first time at the Leicester Amateur Radio Show over the weekend of 1/2 October.

Nevada
Fitzherbert Spur, Farlington, Portsmouth, PO6 1TT
Tel: (02392) 313090. Website: www.nevada.co.uk

An Abundant Supply

Get Your Galena & Support GB4FUN!

Keen crystal set builder Jim Roberts, offers PW readers the opportunity to obtain some genuine North Yorkshire Galena for home brewed detectors...and support the RSGB's GB4FUN station at the same time! Rob G3XFD explains what's on offer....

Rob Mannion G3XFD writes: Jim Roberts and I have been corresponding for some time because of a mutual interest in the beautiful North Yorkshire countryside...and radio. In particular Jim, who's aiming to get his M3 Licence very soon - is interested in the truly fascinating history of the simple crystal set. However, Jim has an advantage over most of us - he's got access to a local quarry via a friendly manager. That kind gentleman has an abundant supply of Galena (Lead Sulphide, the commonest form of lead ore), which to the quarry is a by-product.

With the Galena from the quarry, used in conjunction with a steel wire 'whisker', Jim Roberts has made effective, 'genuine old style' crystal detectors. He's very pleased with the results on medium wave and sent samples to the *PW* offices. Envelopes however, proved unsuitable, as the first delivery ended up as a beautiful shiny group of small granules. That problem was solved when Jim sent more, safely packed in 35mm film canisters! The Galena (when freshly exposed to the air and before oxidisation takes place) is a beautiful material and everyone here was impressed by their small package as it is so beautiful to look at.

Using a 7m length of wire and no earth - I managed to receive medium wave stations from all over the UK in the evenings, and Spanish and French stations when it was completely dark. My piece of Galena was firmly held in a larger crocodile clip, whilst the 'whisker' (a small steel spring heated and pulled out at one end to provide the whisker, with a sharp point filed on to it). This was then moved over the exposed face of the Galena and I found it to be fascinating to discover how reception varied with different spots for the 'whisker'.

Thanks to Jim Robert's kind efforts and the friendly Quarry Manager - there are 100lbs (45kg) of dressed Galena ore available to enable readers to 'have a go' for themselves! Jim states clearly that he can't guarantee results - but you should have great fun trying, and you can help foster the promotion of Amateur Radio by sending for your sample.

Asking for a donation of £2 (coins only please) Jim Roberts proposes to pass on all profits to the **Radio Society of Great Britain** to help with the upkeep of the **GB4FUN** vehicle, on its journeys around the UK. His 'accounts' will be open to inspection - and Jim hopes readers will enjoy both the crystal experience and helping GB4FUN.

To get your Galena sample please send your return address on a strong A5 sized envelope and an empty (except for a small piece of tissue paper/cotton wool) 35mm film canister with your donation direct to Jim at the address below. The amount quoted includes return postage, and if you don't have a film canister, your local photographic/chemist shop will have plenty to spare!

Send your two £1 coins (to save accounting costs - no cheques or postal orders please) directly to

Jim Roberts
The Flat
49A High Street
Pateley Bridge
North Yorkshire
HG3 5JZ

If you require further information Jim's E-mail address is: **robertsjd@talk21.com**

Exams in Harlow

New Centre

The Harlow & District Amateur Radio Society now have a permanent base in which to hold their Amateur Radio exams.

The Mark Hall Barn, a Grade II listed building, is the new 'home' for the Harlow & District ARS. The club members have spent many hours renovating the building, even installing a toilet themselves. They also have an impressive tower on the site with antennas for all bands from h.f. to 1296MHz.

Over recent years the club has provided training for the Foundation, Intermediate and Advanced licences and earlier this year the building became a Registered Exam Centre.

Harlow are a friendly and active club and welcome new members. For more information contact:

Len G7UFF
Tel: (01279) 864973/(07931) 207184
E-mail: g6ut@qsl.net

amateur radio clubs

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

BRISTOL
North Bristol Amateur Radio Club
Contact: Dick Elford G0XAY
Website: www.nbarc.org.uk
The North Bristol Amateur Radio Club was formed nearly 30 years ago by people interested in amateur radio. Meetings take place on Friday evenings from 1900 to 2200 at the SHE7 building in Braemar Crescent, Filton, Bristol (just behind the HSBC Bank). Activities include training courses, radio operation, talks, contests, constructing and course socialising. Anyone is welcome to attend. The club has had recent successes at both Foundation and Intermediate levels and they are just starting further classes for yet more students at both of these levels. There are also plans for an Advanced class, as soon as an instructor is available!

ESSEX
Braintree & District Amateur Radio Society

Contact: John Button M5AJB
E-mail: club@badars.org.uk
Website: www.badars.org.uk
Members of the club meet every 1st and 3rd Monday of the month at the Clubhouse, Braintree Hockey Club, Church Street, Bocking, Braintree, Essex. The Braintree Hockey Club is adjacent to the A131 Braintree to Sudbury/Haverhill Road and two miles from Braintree Town Centre. Doors open at 1930 for an 2000 start, prior to 2000 and during the refreshment break, members have the opportunity to sell or exchange equipment, etc. Meetings usually end around 2200hours. The club operates a non-smoking policy at its meetings. A club net is operated on the 2nd and 4th Mondays (excluding Bank Holidays) under the club callsigns **G3XG** and **G6BRH**.

RHONDDA
Rhondda Amateur Radio Society
Contact: John Howells GW4BUZ
Tel: (01443) 432542
The Rhondda Amateur Radio Society are running a Foundation Licence Course, starting on Tuesday 14 September at 1830. The venue is the N.U.M. Club, Tonypandy, Rhondda. All ages welcome. Please contact John on the number above.

WEST SUSSEX
Horsham Amateur Radio Club
Contact: Alister Watt G3ZBU
Website: www.harc.org.uk
Members of the Horsham Amateur Radio Club meet on the first Thursday of each month at The Guide Hall, Denne Road, Horsham, West Sussex. The club have a variety of lectures covering a wide range of subjects. The club also have two nets, one is on Sunday mornings at 1000 local time with a frequency of 3.722 and the second is on a Saturday evening at 2130 local time, on 144.725 - all are welcome to join in.

WIGAN
Wigan-Douglas Valley ARS
Contact: D. Snape G4GWG
Tel: (01942) 211397
Please note that the Wigan-Douglas Valley ARS has changed the night of its meetings - members now meet on the 1st and 3rd Wednesday in the month instead of Thursday, but the time is still 8pm. at the Wigan Sea Cadet HQ, TS *Sceptre*, Brookhouse Terrace, off Warrington Road, Wigan.

Keep those details coming in!

Gordon King G4VFV takes a look at Volts, Amperes, Watts and Decibels.

Looking at....

Volts, Amperes, Watts and Decibels Part 1

In the May 2001 instalment of Looking At, which dealt with the Signal Strength Meter or S-Meter, the connection between signal power, Volts and decibels begged more detailed attention. This was also highlighted by the response from readers. Happily, I'm now able to focus specifically on these important relationships in this instalment.

The first thing to get clear is the distinction between electromotive force (e.m.f.) of the source and potential difference (p.d.). There's sometimes confusion between the two terms because they are both measured in volts (V).

Look at the circuit in **Fig.1**. This shows a voltage source connected in series with an on/off switch, a current meter (mA) and two resistors, R1 and R2. Now, any source of electricity, whether a.c. or d.c., for example as a battery, antenna, oscillator, etc., has an internal resistance. This is represented in the diagram by Ri.

Any reasonable high-resistance voltmeter, a.c. or d.c., connected across the terminals of the source with the switch in the 'off' position will give a reading mighty close to the source e.m.f. This is because barely any current is required to operate the voltmeter and, hence, only a very small current flows through Ri. In other words, even with the voltmeter connected, the indication will correspond essentially to the open-circuit voltage, which is a measure of the e.m.f.

Latent Force

The e.m.f. can be looked upon as the 'latent force' that produces the 'electric pressure' necessary to drive an electric current (whose symbol is I and unit the ampere, A) through a closed circuit. A pretty good analogy is the household water supply system. Even though the pipes may be full of water, there can be no flow without pressure to force the water through the pipes and out of the taps.

There would be no blood flow through the arteries and veins of our bodies without the force provided by the heart pumping up the pressure. Sometimes, perhaps a trifle too high for comfort! Similarly, there can there be no flow of free electrons in an electric conductor without the pressure of the e.m.f.

Going back to Fig. 1; when the on/off switch is closed the source e.m.f. forces an electric current in the form of a flow of free electronics round the circuit and through the resistors. The magnitude of the current flow is measured by the series-connected milliammeter.

It's worth noting at this point to have in mind that electrons flow in the negative to positive direction, even though by convention the direction of current flow may be regarded as from positive to negative. Someone got things a trifle mixed up in the early days!

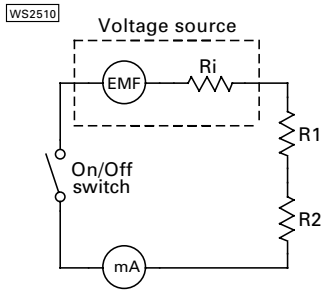


Fig. 1. Demonstrating the difference between e.m.f. and p.d. (see text).

Ohm's Law

Anyway, the reading on a voltmeter connected across the voltage source would drop when the on/off switch is closed. This is because it would then no longer represent the true e.m.f. of the source. Neither, of course, would the reading be that of the source e.m.f. with the voltmeter connected across R1 or R2.

The voltage developed across an element of resistance (or impedance in the case of a.c.) in a circuit passing an electric

continued on page 24

Q-TEK COLINEARS (VHF/UHF)

P&P £10.00

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

★★★★★★★★★★★★★★★★

X-510 2m/70cm (8.3/11.7dB) 5.2m long (PL-259 fitting). Glassfibre/chrome construction (3 sections). RRP ~~£149.95~~

★★★ £119.95 ★★★

Q-TEK 6m end-fed half wave....£49.95

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

CUSHCRAFT BARGAINS

Delivery £12.00

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

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** Del £10.00

SEND SAE FOR LEAFLET

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).....£25.00 P&P £4.00 (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

ALUMINIUM POLE CLEARANCE

We have sets of 4 (2") poles (3 of which are swaged) that slot together to make a (approx) 20' pole. Each section is approx 5' long – some have small dents in – some have been swaged slightly off centre – hence the price.

2 FOR £35.00 DEL £12.50
3 FOR £45.00 DEL £15.00

SCRAP PRICE **£19.95** Del £10.00

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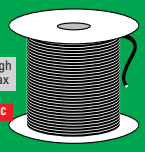

Genuine high quality coax

MILITARY SPEC

RG-213 Mil spec x 100m.
ONLY **£69.95** P&P £10

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ONLY **£35.00** P&P £10.00

Coax stripping tool (for RG-58).....£4.50

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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

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
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New RF grounding wire (10m pack) PVC coated.....£12.50 P&P £5

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

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

LOW LOSS PATCH LEADS

£2.50 P&P

Uses 5D-SFB low loss coax

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

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 increadible properties. Ideal for "R.F.I". Width 12mm/OD35mm.

6 for £12.00 12 for £20.00

P&P £3.50

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

ALUMINIUM POLES

All measurements approx

2" x 1.5m length	2mm wall thickness	£12.50 P&P £10
2" x 2.4m length	2mm wall thickness	£19.99 P&P £10
2" x 10'	Collection only 2mm thick	£24.99 P&P N/A
2" x 20'	Collection only 2mm thick	£39.99 P&P N/A

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

FIBRE GLASS POLES

Del £10.00

	1½"	1¾"	2"
1m	£8.50	£10.50	£12.50
2m	£16.00	£20.00	£24.00

TELESCOPIC MASTS

Approx lengths

6 section telescopic masts. Starting at 2 2" in diameter and finishing with a top section of 1 4" 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

TWO FOR £79.95 — *2 for £79.95* Del £12.50
THREE FOR £109.95 — *3 for £109.95* Del £15.00

BARGAIN MAST SETS

Set A: 5 section 21ft long (1⅛") mast set **£23.95** Del £10

TWO FOR £39

Set B: 5 section 16ft long (1⅛") mast set **£19.95** Del £10 (2 sets £35.00)

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	£18.00 P&P £8
18"	T&K Brackets	£22.00 P&P £8
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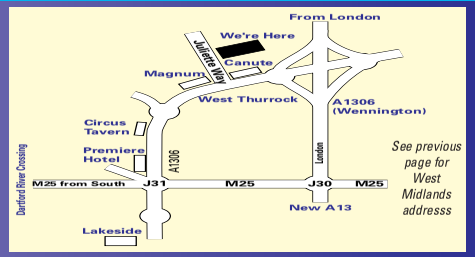

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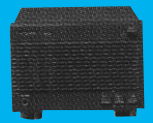

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Continued from page 20

current is known as the p.d., the value of which can easily be found from Ohm's law. This simple law states that one volt drives one ampere through one ohm, which can also be stated as the current flow being equal to the voltage of the source divided by the circuit's total resistance (I=V/R). Ok, so let's see how this works out in practice.

For simplicity, let's say that the source e.m.f. is 10V and that the total resistance of the circuit (Ri+R1+R2) is 1,000 Ohms (Ω) With the switch closed the current in this case works out to 0.01A (10/1000), or 10mA. Now that the current is known (indicated by the mA meter) it's easy to rearrange the equation to discover the p.d. across any of the resistive elements.

If R1 is, say, 390Ω, then the p.d. across this resistor would be equal to the product of 0.01A and 390Ω (I x R), or 3.9V. Similarly, if R2 is 600Ω, then the p.d. across this would be 6V. The p.d. across the internal resistance of the source, which is 10Ω, would be 0.1V, the three potential differences adding up to the source e.m.f.

At this stage it's noteworthy that as an ordinary dry cell (primary cell), for example, becomes exhausted and 'runs down' so its internal resistance tends to increase, which is one reason why the cell is then unable to provide the higher current flow of a new, unused cell. Measuring the open-circuit voltage of an almost exhausted cell with a high resistance voltmeter will always give an optimistic reading.

The voltage is best measured while the cell is delivering a load current normal for its type. An exhausted cell (or battery of cells) will give a relatively low reading when its voltage is measured in this way owing to the greater volts-drop (p.d.) across its higher internal resistance. To provide the highest current, therefore, the Ri of the battery must be as small as possible.

Now that we have a fair idea of the difference between e.m.f. and p.d., how do these quantities relate to the signal strength meter? Well, when an antenna is connected to a receiver (or transceiver), the receiver will be responding to the p.d. resulting from the antenna's source e.m.f. Moreover, and very important, only when the antenna is correctly matched to the receiver will there be optimum power transfer from the antenna to the receiver.

Maximum Power Transfer

The impedance of an antenna is effectively established by the internal impedance of its source e.m.f. In the case of a dipole antenna at resonance, for example, this is equivalent to a non-reactive source of around 73Ω. Non-reactive in this context means that the current and voltage are in phase, there being no predominately inductive or capacitive component. Optimum transfer of power from the antenna to a receiver (or from a transmitter to an antenna) only occurs when the two sides constitute a suitable match.

Well, that just about takes care of this month's instalment. Part 2 of this subject will look a little more into 'matching', before concluding on the S-meter. Cheerio for now. *pw*

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- and so much more!

SEE THE REVIEW ON PAGES 30~33

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The Radio Basics Collection

As the darker evenings approach Rob Mannion G3XFD has been busy selecting some previously published choice Radio Basics projects. He starts off with the RB capacitance /resistance bridge from December 2001.

This month I'm starting a short series of previously published - and well proven - Radio Basics (RB) projects. The first chosen project is the capacitance/resistance bridge, which first appeared in the December 2001 and January/February 2002 issues of *PW*. I've chosen it because the project is one of the most useful test instruments you can have in your workshop. It will also make an ideal project for those 'dipping their toes' into the inviting home-brewing 'water' for the first time!

This project is built backwards - backwards in the sense that the front panel dial, box and other hardware will be built first. It's done this way so that the portable capacitor/resistance bridge - will give the best results possible with a simple circuit.

The CR bridge uses two other earlier RB projects which, if you've built them, can easily be incorporated into the latest unit to great advantage. They are the simple audio amplifier circuit, **Fig. 1**, using the LM386 integrated circuit (i.c.) published in the October 1999 (part of the Basi-Tracer project) *PW* and the multivibrator circuit, **Fig. 2**, which appeared in the September 1990 issue of the magazine.

The multivibrator will provide the audio signal (a buzzing sound), which is used to detect the 'null' (more about this later) and the amplifier brings the resultant signal to a level you can hear either on a loudspeaker or headphones.

Switching - a subject that is rather a frightening for some constructors - enters into this project. This is because there's some power supply switching to be undertaken, plus a single pole six-way switch to be used to select the different ranges in the bridge circuit.

Vintage Bridge

The circuit featured this month is actually based on a vintage Wheatstone Bridge circuit, which first appeared in *PW* in the early 1960s. It uses a combination of a known capacitor or resistor (on the reference side of the bridge) and the unknown component on the other side together with a reference signal source.

The user then adjusts the bridge via a 'balancing' potentiometer which then indicates 'balance' via the null detector or amplifier. It all sounds complicated but to be honest it's not!

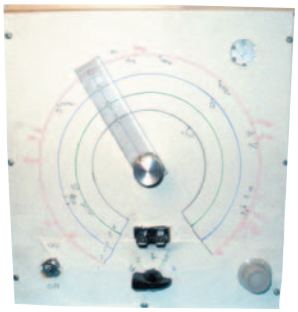
So, with some of the background explained...let's get on with looking at the construction of the simple C/R bridge. It will be one of the most useful simple items of test gear in your workshop.

Building Backwards?

You might wonder why we're tackling the C/R bridge project from back-to-front, as we'll be building the control panel and calibration dial first, before building the electronics. The reason is simple, it's because the layout, size and quality of the scale and the control knob is of prime importance.

Very often in basic constructional projects the final appearance of whatever's being built doesn't matter much to the constructor as long as it works! However, with this project - the time spent in making the bridge's front panel scale and control will be repaid by an instrument that's easier to use, allowing precise final readings of capacitance and resistance values to be obtained.

The illustrative drawings, **Fig. 3** and **Fig. 3a**, shows the layout of the panel. However, please note that they aren't to scale and are provided for your general guidance.



● A Capacitance/Resistance Bridge is a very useful item of test equipment. Rob G3XFD built several prototype C/R bridges and this version is built into a back-less wooden framework casing (see text).

Important advice: Before you start to collect materials for the panel, please bear in mind the following advice.

Try to make the front panel and the scale itself as large as possible - bearing in mind convenience! By making the pointer longer, finer (and more accurate) results can be obtained.

One of the prototypes I've built uses a panel size of 225 x 225mm, with the actual scale diameter being 175mm. I used my favourite easy to use Synthetic Resin Paper Board (SRPB) p.c.b. material.

My final prototype bridge balance control potentiometer is adjusted in operation by using a spun aluminium knob (removed from an old hi-fi unit) and a section of clear plastic cut from an audio cassette case, mounted together using epoxy resin adhesive. The main scale was then traced out onto the board with a felt tip pen located through a hole drilled at the end of the scale. This provide alignment for the paper sheet onto which the calibrations marks will be eventually marked.

Note: The potentiometer 'swing' (the rotation of the shaft) is usually not far off 360°. I found that most modern potentiometer/variable resistors - had a rotation of less than 270° and the 4.7kΩ good quality type I used in the prototype rotates throughout 300°. This factor, when combined with a as-large-as-you-can-make-it scales, will make it an easy instrument to use.

You should also leave room on the panel for the single pole six-way rotary switch, which I prefer to have mounted on the left. Space is also required for a double pole on/off switch and an earphone jack socket.

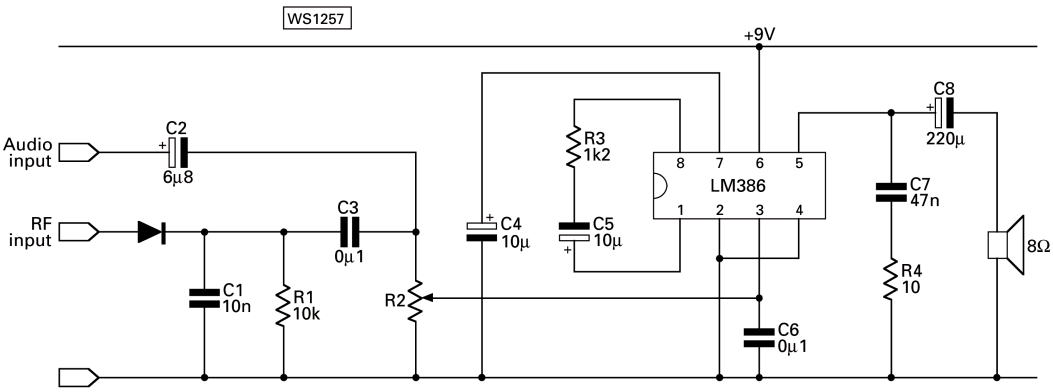
Familiar Circuits

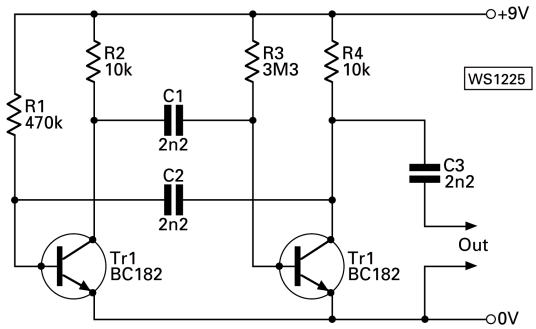
As I've already mentioned, the bridge project uses circuits regular RB readers will be familiar with. The diagrams in Fig. 1 and 2 show the LM386 audio amplifier we're to use, along with the simple multivibrator project which featured in the Basi-Probe which appeared some time ago. Using circuits we're familiar with as 'building blocks' we can all gain much experience and save precious hours on the workbench.

However, it's now time to bring the familiar circuit elements together, and at the same time introduce the 'bridge' circuit, which is the actual 'heart' of the unit. Interestingly, the bridge circuitry - shown in part A (Upper) of **Fig. 4**, (all the

● Fig. 1 (right): The LM386 integrated circuit (i.c.) audio amplifier previously featured in the Radio Basics series, is used as the null detection amplifier in the resistance capacitance bridge project (see text).

● Fig. 2 (below): The multivibrator circuit shown here - another project from the Radio Basics series - provides the signal source for the bridge project (see text).





components to the right of C3) was originally published in *PW* around 1960!

There's rarely anything new in radio and all I've done is to bring the project up-to-date to make and the project uses the output of the multivibrator, which hopefully you've already tried from previous RB columns! The frequencies available are ideal for null indication purposes and I was exceptionally pleased with the very deep null the instrument provided.

Unfortunately however, the use of the multivibrator, whilst enabling us to make a very simple bridge, causes problems. It suffers from the disadvantage that the all-pervading non-sine wave output from the multivibrator penetrates to parts of the circuit where it's most certainly not wanted!

Important note: From Fig. 4, you'll see that there are two separate power supplies. It will work from one common power source...but unless you are prepared to spend a great deal of time removing the unwanted signal from the amplifier circuitry by filtering - you'll still end up with a null which can be difficult to identify. **So, please, for simplicity's sake...use two separate supplies as I suggest**.

The inclusion of C8 in the negative (-) ground connection between the bridge/multivibrator unit and the amplifier provides d.c. isolation. Please ensure that you do **treat the two halves of the circuitry as separate halves** - linked only by C7 and C8. **Note:** This is why the two units are not shown linked in Fig. 1, to emphasise that the only electrical connection is via C7 and C8.

Practically speaking, if you adopt the 'Copper Island' technique, and build section A's circuitry on the same board as the amplifier, they must be isolated. You must make a saw cut on the ground plane, removing the copper between them to ensure full d.c. isolation.

Bridge Circuitry

The bridge circuitry doesn't have to be mounted on the main board. Instead, it's conveniently mounted on and around the single pole six-way switch, S2.

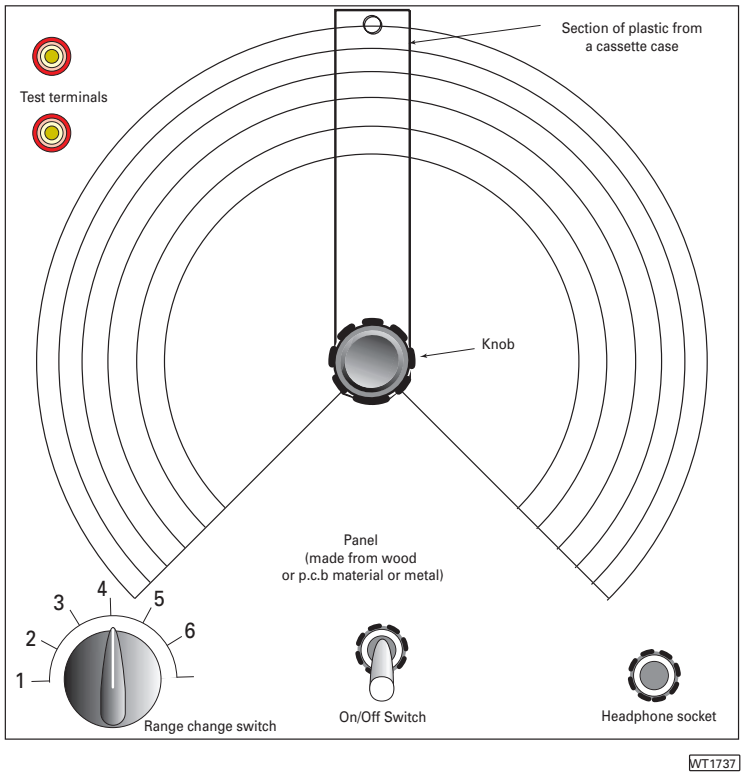
Depending on your version's front panel...you'll have a choice on where and how to place S2. If you've chosen the suggested 'as-large-as-possible' approach you should have plenty of room to place the bridge circuitry on and adjacent to S1, mounting the test terminals as in Fig. 3.

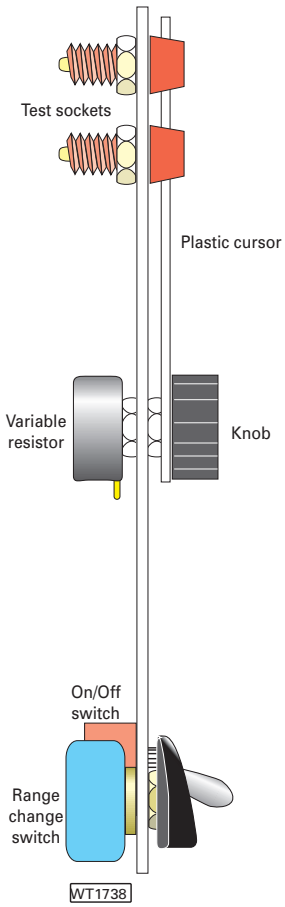
There's not a great deal of audio output from the unit but it's more than adequate for our use. I recommend that you should include a miniature (a 65mm diameter 8Ω unit is ideal) speaker in your version of the project.

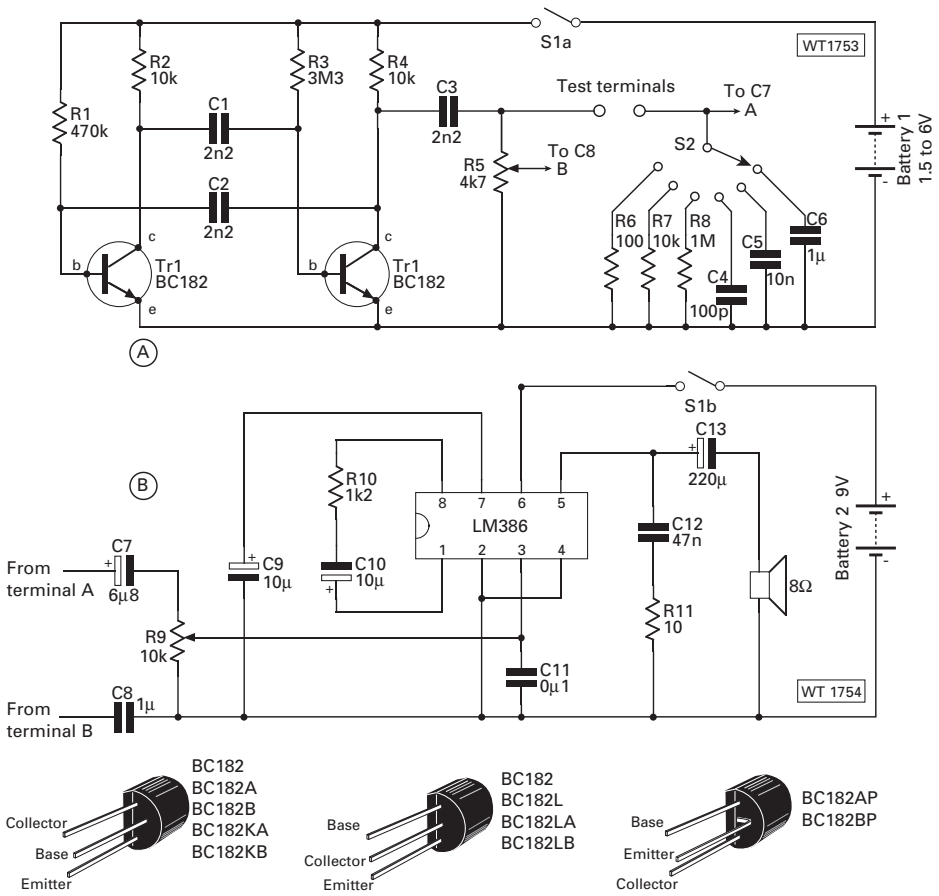
Power Supply

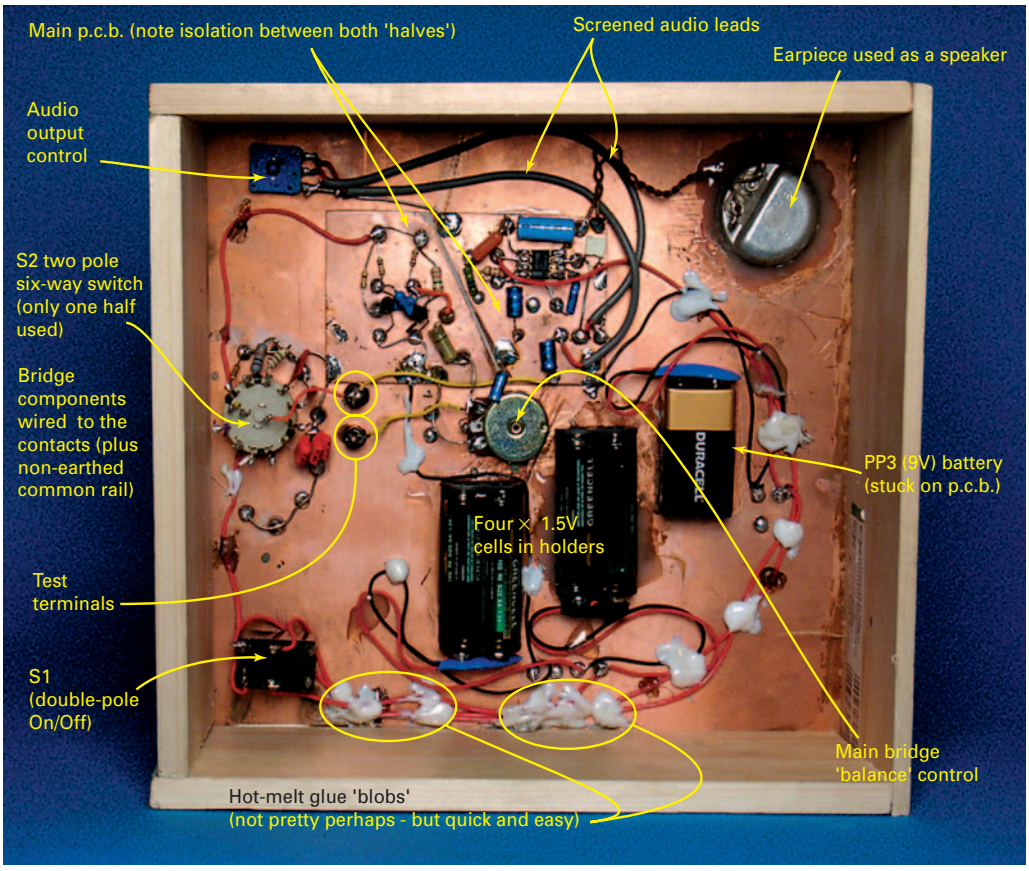
In practice, a 9V PP3 type battery will provide more than adequate for the audio amplifier and will last for a long time. In my second prototype I dispensed with a battery holder and stuck the

● Fig. 3 and 3a: Drawing showing the layout of the capacitor-resistor bridge's front panel. Note that six separate scales are required, for the three capacitive and three resistive measurement ranges (see text).









- Fig. 4: (top) The circuit of the C/R bridge. The section (A) is the multivibrator circuitry (Left) with the bridge itself on the right. The amplifier section is shown in B. Note: Sections A and B are electrically isolated (see text).

- Fig. 5: Annotated photograph of completed bridge showing major components and important points (see text).

battery underneath the front panel.

The multivibrator will operate satisfactorily on voltages between 1.5 and 9V. However in practice I've found 4.5V to be ideal - mounting three 1.5V cells in series within the cabinet and attached with adhesive - removing the need for a battery holder.

Both power supplies are switched on and off by S1. This (although not shown on the diagram by the usual dotted line linking them) is a double pole single throw (DPST) type.

Assembly & Construction

To provide you with some guidance on construction, the heading photograph, along with the annotated photograph in **Fig. 5**, shows the inside rear view of one of the prototypes I made.

You can either build your version on two separate boards or assemble it on one board in the same fashion I've adopted. But, as previously mentioned, ensure that a saw-cut across the board totally isolates the audio amplifier stage and the multivibrator and bridge circuitry.

Remember to (**this is most important**) ensure that when you assemble the circuitry that the only links between the two sections, as in Fig. 4, are via C7 and C8.

Switching & Linking

As it's part of the construction stage, it's advisable to now look at the switching and linking we've got to tackle. But don't worry...it's relatively simple and very straightforward.

The necessary switching for the six ranges on the C/R bridge is carried out by S2, **Fig. 6**, (I used a two-pole, six-way unit, leaving one side un-used, but you may also use a single-pole six way if you have one to hand).

Note: Don't forget that the 'earthy' ends (those that all connect to the common negative (-) rail on the multivibrator/bridge circuitry only link to that board).

Wiring up the switching circuitry for S2 is very simple and you can check it as you go with your testmeter (set to resistance ranges). Wiring for S1a and b is also simple - just make sure that you wire it so that power is supplied to both circuits from

their respective power sources when the switch is on.

Be careful - it's quite easy to get yourself mixed up and have one power supply on and one off! Again it's simple to check this by using your test meter - first to check continuity by setting it to resistance/continuity, and then by making sure the line voltage is present on the respective boards.

Take the usual precautions (when using high gain audio i.c. amplifiers) by placing the decoupling capacitor as close as possible to the audio input of the LM386 (pin 3 in this case) to reduce instability problems. As a precaution, I also screened the audio input cabling (from the centre tag - indicated by the arrow on R9), to pin three's connector on the audio board (see annotated photograph).

The screening is necessary because of the (previously highlighted) potent, all-pervading nature of the signal from the multivibrator as I've already mentioned. In practice though, the screening is simple to do. In fact, by looking at Fig. 5, you'll see that I've actually linked the input from the bridge (via C7) using a single core and wound-screen cable, recovered from an old cassette recorder, to the top end (the bottom end is at the negative rail side), and the input to the actual amplifier is done by using the same method.

Fig. 6: Close up photograph of the bridge circuitry, as assembled on and around S2 (see text).

Headphone & Speaker

Although the C/R bridge only has a limited audio output...it will drive a small loudspeaker unit. I've opted to use one of the many telephone earpiece units I have lying around. They provide excellent output levels at the frequencies we use for the multivibrator.

At some settings of the bridge - audio output will be quite low so, it's worthwhile fitting an earphone socket for use with a pair of low impedance stereo headphones. But don't forget to wire the socket so that a mono signal is presented for stereo headphones.

Close Tolerance

It's best to buy high quality close tolerance components for R6, 7, and 8 and C4, 5 and 6. Specify this requirement to your supplier and ask for the closest tolerance types they have available. In this way you can make your own bridge to be as accurate as possible and although it won't be a laboratory grade instrument - it will give very useful results.

When you've finished building the circuitry - the testing stage is simple. Power up the amplifier and listen for a slight hum when you apply a dampened finger onto the slider (centre tag) of R9. With the volume turned right up you should also hear the hiss of the amplifier's output.

To test the multivibrator just (temporarily using a wire link) connect the test terminal side of C3 directly to the positive side of C7. You should then hear the piercing (almost whistle-like) signal). If you don't hear it...check your wiring and connections. When all's well - you'll be ready to start calibration.

Calibration & Operation

To start preparing for calibration, score a central line down the cursor you've prepared (I made mine from the lid of a cassette case) and then drill equally spaced holes carefully along this line. Then (by placing coloured pens through the holes) rotate the cursor and trace out the scale lines. You can use three colours (with one scale one side, and another on the other side) or make six scales if you wish.

To calibrate - switch the power on and place a known value of resistor or capacitor (ranges 1 to 3 are resistance, 4, 5, 6 are capacitance) on the test terminals (crocodile clips attached to terminals are satisfactory) and then rotate the cursor. Do it carefully (this means slowly) and note where the tone of the multivibrator disappears (the null). That's where you'll appreciate the large scale as it makes finding the null easier!

If there's no discernible null try the next range up or down*. If you get a good null...mark that value clearly at the point on the scale in use. Repeat the operation for as many standard values as you have. You can eventually seal the scale with clear varnish if you wish.

In practice you'll find the bridge to be very useful in checking low and high resistances...and especially finding the value of those bargain variable capacitors. You'll soon find it very easy to use and I'll be talking bout it again later. Enjoy using your simple C/R bridge!

* If there's no detectable null - the component will either be faulty or out of the range of the instrument. (This is easy to confirm by trying another component)

COMPONENT SOURCES

The good quality 4.7kΩ potentiometer used in the G3XFD prototype was supplied by Sycom (see advert in this issue) along with the rotary single pole six-way switch for range selection. Protractors and plastic rulers for scales and pointers came from Staples, the stationers (most high street stationery shops will have them in stock).

Information Panel

In use the Radio Basics C/R bridge will enable you to compare (with known 'standard' values) the value of unknown or suspect capacitors and resistors. In use the unknown/suspect component is placed across the test terminals and the user rotates the main control until a 'null' (sound disappears or is greatly reduced) - reading off the values from the previously calibrated scale. It's particularly useful in identifying capacitors with difficult-to-decipher markings!

The standard 'Reference' components are best purchased new especially for use in the bridge and fortunately none are expensive!

The user can opt to employ either headphones or a small loudspeaker to identify the null. incidentally, this circuit provides a very deep null, and with the components shown for the multivibrator, together with the supply voltages suggested - the note is pleasant to listen to.

With practice the user will very quickly identify values to very narrow margins of accuracy. However, the ability to identify very small positional changes of the control knob (and the subsequent null) and the final read-out depends entirely on the size of the instrument's scale. So, take my advice and make your scale as large as you practically can! Time taken to prepare a large scale ready for calibrating will be repaid very handsomely indeed.

Rob G3XFD

The Icom IC-7800 Transceiver

Roger Cooke G3LDI has enjoyed evaluating the IC-7800 'super rig' over an extended period. And as you'll see...he was extremely reluctant to return the rig to Icom!

The Icom IC-7800 - 'top of the range' main station transceiver.

The IC-7800 transceiver arrived in a huge box, and my son had to help unpack it. It really is a magnificent looking heavyweight, or as the VKs would say, a "boat-anchor"! I used to own an AR88D and it's not far short of that historic receiver's at 25kg!

Ergonomically, the Icom IC-7800 is a very pleasing shape and size. I mention this because so often these days, transceivers seem to get smaller and smaller with difficult-to-use-knobs and even more difficult to read displays.

The Icom transceiver is roughly the same front size as my Yaesu FT-1000MP, one inch (25.4mm) taller and four inches (102mm) deeper. It also has two detachable rack handles to give a professional appeal.

Complete with a 200-page handbook and an individual specification sheet. It's obvious that these transceivers are individually constructed, although I'm not quite sure what this means***(see note)**. I presume there is no production line of people each installing just one item?

***Editorial note:** During the Icom promotion for this transceiver, held at Icom UK's headquarters in Kent earlier this year, the unequivocal assurance that each transceiver was individually built was confirmed. There's no production line as such and Icom also confirm that they intend that this will remain so.* ***Editor**.*

Transceiver Test

After construction each transceiver is given a complete test based on the ISO 9000 Series Quality Management System. The test equipment used also conforms to independent external calibration. Incidentally, the figures produced in the case of the transceiver under review almost always exceeded the suggested parameters.

For example, the dynamic range is supposed to be 109dB and the measured value, with the receiver tuned to 14.1MHz with s.s.b. selected, using 100kHz separation/Pre-amp off was 110dB. The carrier suppression measured at the same frequency was 80dB which is some 17dB better than guaranteed.

Superb TFT Display

The TFT display on the IC-7800 is superb. At first sight, it was difficult to take my eyes off the analogue meter on the display as it's so realistic!

The IC-7800 is not a transceiver to go straight on the air out of the box, but of course I did just that! Once on the air I got some awful audio reports...so I decided to do the sensible thing and read the book.

To say "it's menu driven" regarding the '7800 is an understatement because in reality the transceiver is in fact a computer with some excellent radio frequency (r.f.) circuitry attached! So, of course, the audio had to be set up, and there are several adjustments to be made, after the operator has found their way within the menu.

Once done, the settings can be stored, either in memory or on Compact Flash disk. Thus, if used in contest or expedition situations, each operator can store their own parameters, saving a lot of setting-up time, which is an important factor during a contest.

Playing & Learning

I spent some time playing, learning and finding my way round the various menus, having some contacts on c.w. and s.s.b. during the process. I found it to be a very enjoyable transceiver to use, and was very impressed with the performance.

It would take a lot more space to describe the IC-7800's parameters and other information displayed on the TFT screen and to discuss the two completely independent receivers. However, my mandate from the Editor is to try it on data - c.w., Radio Teletype (RTTY) and phase shift keying (PSK31) so I will leave the rest to somebody else. As you'll soon see - there's enough to deal with in my

department!

One small thing I must just comment on, though. When working 'split' when trying to contact a rare DX station can sometimes result in the transmitter calling (by mistake) when pressing the wrong button, on the DX station's frequency. But when you're working split with the IC-7800 it's so obvious. This is because there's a very bright white l.e.d. in the middle of the top panel that you just can't miss. As a reminder it's a nice thought.

Now it's time to enter my speciality mode and look at the data aspects on the transceiver. It turned out to be quite an experience.

Data Operation

In order to operate data modes on the '7800, a USB keyboard has to be plugged into the rear panel. I didn't have one, so I decided to ask a friend who works within the computer industry. He didn't have one either, so I asked around locally.

Nobody had a USB keyboard, so I decided to visit my local PC World shop and buy one. They didn't have one either and I realised this was becoming a problem!

A friend then suggested Maplins and perhaps a USB to PS2 adapter would cure the problem. Success - it was a good idea and I managed to buy an adapter.

Out of interest, while at my local Maplins shop, I asked about the USB keyboard. In reply they said that the USB type would become the norm eventually, but at present there are not many around.

Arriving back home I connected my PS2 keyboard with adapter.....still no success. A 'phone call to Icom then confirmed that the driver in the '7800 is for a USB keyboard and despite the adapter, the PS2 keyboard would not work. In the end Icom kindly posted a USB keyboard to me.

Original Data Mode

As c.w. is often classed as being the original. basic data mode, I decided to try this first. I had several QSOs and found that operating the transceiver with its internal keyer is a real pleasure.

Tuning around the bands can be made quite fast operation by selecting the appropriate tuning speed. The frequency can be changed in kHz steps from 0.1 to 25kHz.

For fine tuning, the 'quarter' tuning function can be selected. This reduces the dial rotation to 0.25 of normal. Then for extra fine-tuning if needed, a 1Hz step can be selected.

There's also a **Tuning Step** function, which is similar to the Shuttle-Jog tuning on my own FT-1000MP. Using the menu the speed can be set to **High**, **Low** or **Off**. (I found leaving it on high to be the most useful).

The transceiver features Digital Signal Processing (d.s.p.) controlled c.w. keying waveform shaping. The keying side tone is pleasant to listen to, and can be adjusted to suit the operator with a pitch control from 300 to 900Hz without affecting the transmit frequency.

Full break-in when operating on c.w. is available if required. You can also select semi-break-in, or off. Personally, I don't like full break-in.

A neat feature is the ability to listen to the tone of the transmit signal whilst receiving. This enables a zero-beat net without actually transmitting.

I was particularly interested in the keying characteristics and arranged a sked with a local, **Dave Johnson G3MPN**, whose opinion I respect. Having an FT-1000MP with key clicks (haven't they all?) I wanted to find out what the IC-7800 was like.

In the comparative tests, we adjusted relative signal strengths from S-2 to about S-9 plus 20. No clicks were detected, and the ability to adjust the keying waveform rise-time resulted in the conclusion that the default of 4ms was the best position.

There are four positions provided on the '7800 to choose from and 4ms produced the best sounding keying. We also tried it 'close in' to a strong signal and here it's worth looking at the automatic gain control (a.g.c.) on the transceiver.

Fig. 1: The IC-7800 in use with the optional TFT monitor (see text).

The IC-7800 has two types of a.g.c. loops. One of the loops detects the a.g.c. voltage at the Band Pass Filter (BPF) input in the d.s.p. unit and feeds back to the 1st intermediate frequency (i.f.) amplifier. This a.g.c. loop prevents saturation of the 1st i.f. amplifier from strong signals out of the BPF bandwidth, and improves the dynamic range against adjacent signals.

The second a.g.c. loop detects the a.g.c. voltage at the digital i.f. filter output which has only passed the intended signal and draws the full potential from the digital i.f. filter. It's impressive! Looking at the shape factor on the TFT screen, the selectivity is really text-book and coupled with the band-pass filtering, I would think this performance would be difficult to beat.

An audio peak filter (APF) is also available to boost a weak signal. Selectivity is superb and under crowded band conditions, the 150Hz position with APF as well, really pays off.

There are also four memory locations that can be edited and each location has a maximum of 70 characters. Barred characters can also be entered, such as AR, SK and so on. For the casual contest operator, there's an incrementing serial number, with cut numbers if required. Dot/dash ratio can also be adjusted.

Dave G3MPN and another local Amateur, **Malcolm Prestwood G3PDH**, both visited and I asked them to try the transceiver on c.w. Both agreed it was a very agreeable transceiver to use.

Both my friends agreed with me that QSK (break-in operating) was not for them. Malcolm tried it on 14.025MHz and being a **First Class CW Operator's Club** (usually referred to as FOC) member, he had a pile-up that took him around 45 minutes to quell!

Operating On RTTY

Having received the USB keyboard from Icom, I plugged it in and set the transceiver for RTTY receive. I was beaming to the Far East at the time and the first station I decoded was **Vic DU7/G4DUM** (Philippines), and he came back first call. We had a chat and then I found **BX4AN** (China). After a QSO with him, I then had a contact with **Claude XU7ABM** (Cambodia). Not bad for the first three RTTY contacts!

The IC-7800's displayed RTTY screen is very similar to

my MMTTY and Writelog combination. The screen is split, with the receive screen above the transmitted text.

The tuning indicator is the usual two vertical lines, one at 2125Hz Mark frequency and the other at 2295 Space frequency, giving the required 170Hz shift. Again in the RTTY mode, selectivity is superb.

The digital i.f. filter has superior filtering performance and a distinguished shaping factor that demonstrates the power of the 32-bit floating point d.s.p.. The digital filter is completely free from deterioration due to deviations in band characteristics, temperature change, or mechanical vibration.

Additionally, the digital i.f. filter also provides excellent ripple characteristics. The final filter shape is selectable, and is variable from soft and sharp, depending on the purpose.

Band-pass filtering is also available, as well as a notch. The d.s.p.-based manual notch provides stable performance and completely shuts off undesired beat signals without affecting a.g.c. gain.

I normally use band-pass tuning in MMTTY with the notch set in the middle of the pass-band. Operating this way, with very tight filtering, it's possible to squeeze stations really close together.

The '7800 also has a twin peak filter, which boosts both mark and space frequencies. This is fine and works well on weak signals, but only when the station is tuned in. In practice I found that tuning around with this function enabled was difficult due to the increase in noise level.

A few stations send in reverse mode, and to compensate for this, there is also a RTTY-R or reverse mode. The threshold level can be adjusted too; this helps to prevent too many stray characters being displayed on the screen.

As the receive screen has no scroll back, a **Hold** function has been provided so that the contents of the screen can be frozen for a while. However, there is a facility for saving data to the CF memory card. The sequence for achieving this is somewhat convoluted and would require some practice, but once committed to memory (the human kind!) I don't think there would be any problem.

Full Duty Cycle

The newly designed push-pull power m.o.s.f.et. amplifiers work with 48V d.c. and provide 200W of output power at full duty cycle with low Inter-Modulation Distortion (IMD) in all bands. However, regardless of statements like this, I always err on the side of safety and reduce the power for RTTY transmissions, as it's a 100% duty cycle mode.

Another factor to consider for RTTY is stability and there's certainly no problem here! The IC-7800 has a standard stability of 0.05ppm and this is why there's no optional extra of a high stability oscillator unit!

Other 'bells and whistles' in the RTTY department include **Unshift** on **Space** function, selectable on and off, a 'diddle condition' (boy how I hate those diddlers!) *. There's auto CR/LF capability and a time stamp facility which gives date/time and frequency depending on how it's set up.

There are eight memories all of which can be pre-programmed but, like the c.w. memories, each has a maximum capacity of 70 characters. Editing these can be accomplished in two ways, one from the key selection on the transceiver and rotation of the dial, or directly from the keyboard. The second method is far superior for obvious reasons.

Font colours can be changed to suit individual tastes, and saved data on the CF disk is compatible with a PC and can be transferred to the computer if desired. There's no incremental serial number facility in the RTTY mode.

I set up my FT-1000MP with my PC together with MMTTY and Writelog, and carried out some tests with Dave G3MPN, comparing both

- Fig. 2 (above): The IC-7800 display as presented when opening using the RTTY mode (see text).
- Fig. 3 (left): The IC-7800 display as shown when the transceiver is operated using the PSK mode (see text).

systems. In order to obtain a weak signal, we used 21MHz and side-on beams, with pre-amplifiers off.

Over a period of several minutes, using the same text, the IC-7800 was better at producing more legible copy. The keying was very clean with no distortion or IMD products, as indeed we expected, as FSK is used. The signal was barely perceptible over the noise and was probably of the level that would be normally ignored.

***Diddlers**: In this context it means that on RTTY, you can either have a plain carrier while your finger 'hunts' for the next letter on the keyboard, or you can have it just 'idle' from mark to space. Rogers says; "Listen around on the RTTY frequencies and you can hear the 'diddlers'. You can tell those that can't type that way! **Editor**.*

Operating On PSK

It was interesting to note that when changing modes from RTTY to PSK, the tuning display did not alter. I had to press **Exit/Set** and then **Decode** once again in order to display the PSK tuning. The main dial has to be tuned to the desired signal and has to coincide with the waterfall display. There's also a vector tuning display that can be used for accurate tuning. Similar conditions apply to PSK as I have already mentioned regarding RTTY and the bandwidth can be narrowed even further of course.

Nowadays Binary Phase Shift Keying (BPSK) is the more common mode used on the bands, but Quadrature Phase Shift Keying (QPSK) is also covered with the '7800. This requires more accurate tuning and is not used very much.

Threshold level can be adjusted in the same way as RTTY, and the memory functions are also the same, with eight pre-programmable memories to choose from. Time-stamping is also the same as is the selections of font colours. Data can be saved to a PC if required.

I did similar tests again with G3MPN, and again found the IC-7800 to be extremely sensitive, with legible print on an almost inaudible signal. Altogether, I found that the RTTY/PSK modems are really first class and produce very

pleasing results. The only criticism I have is the fact that the user has to supply the USB keyboard. I would have thought that this price range would have included that.

Other Aspects

There are, of course, a great many more aspects to discuss in this transceiver, but I was primarily concerned with the data modes. Despite this, I feel that amongst abundant functions, the large 7-inch (177mm) wide colour TFT liquid crystal display (l.c.d.) that displays settings and operating conditions, forms the main focal point of the transceiver.

Looking at the two photographs, one with RTTY, **Fig. 2**, and the other with PSK displayed, **Fig. 3**, you'll see that everything the operator needs to know about the operation is displayed there. The clarity and readability of the display is surprisingly good (even for an old G3 like me who now has to wear reading glasses). However, the main aspects of any transceiver in data modes are selectivity and stability. The '7800 has both, and the performance proves that.

Unusual Design Features

Unusual design features on the IC-7800 include highly reliable and durable mechanical relays for BPF switching instead of non-linear semiconductors, which cause distortion. The mechanical relay prevents 2nd order distortion at the primary stage of signal processing.

The IC-7800 has two 'roofing filters' before the 1st i.f. amplifier stage. One is a 15kHz filter for the frequency modulation (f.m.) mode and the other is 6kHz filter for s.s.b., c.w., a.m and data modes. The IC-7800 switches between these two roofing filters depending on operating mode. (The use of roofing filters dramatically improves adjacent strong signal blocking characteristics).

One feature that I've not seen on a transceiver before is a timer. If, like me, you forget times of 'skeds', then this can be programmed into the transceiver so that it comes on at the correct time, frequency and mode. It's much like a timer on a video recorder, with time, date, period and modes, together with a sleep function.

A Serious Question!

"To buy - or not to buy"? Apologies to 'Bill' (William Shakespeare!) for that modified quote, but this is a serious question and I suppose that with a price tag of £6500, a G3 would have to think long and hard about buying an IC-7800. The problem here is that having attained the 'bus pass' numerical equivalent; I equate prices of today with what I could have bought some years ago!

For example, the price of IC-7800 transceiver is three times more than I gave for my first three bedroom, three reception detached bungalow in half an acre of ground! I'm told I should not do this, but it really is difficult. Put another way, the cost of the transceiver is more than my yearly pension. Hmmmm, I really must get a life!

Looked at from another perspective, if I have more years after me than I have before me, and have some money set aside for a rainy day, then I could say... "Here's that rainy day" - It's a nice tune by the way!* Whatever, I would say that purchasers there will be for this transceiver, whether it's the 'big boy's toy' syndrome, the latest technology, or the thought that "if I spend that money I will always be first in the pile-up"...I would come into the second category. If you are in the third one, just remember that whatever transceiver you have, your signal is only as good as your antenna.

***Note:** A musical note in a review? This is because Roger G3LDI hides his light beneath a bushel - he's a very accomplished jazz musician! **Editor**.*

For a general-purpose transceiver covering two data modes as well, to work DXpeditions on RTTY and PSK as well as s.s.b., c.w., etc., then this transceiver is ideal. With my FT-1000MP, to work 3B9C on RTTY, I had to link up the PC, initiate the software and interface. The IC-7800 does the same job far more elegantly. Flipping from mode-to-mode is so easy, making DXing a 'doddle'!

However, if you were an avid Contester on RTTY for example, then my FT-1000MP with the PC running Writelog and MMTTY would beat it hands down. But, if you wished to do this with the '7800, it's possible to hook up the PC and do just that, plus you can also have that lovely display transferred to the PC screen as well!

So, the bottom line is that if you want the IC-7800 and can afford it without going short on food or heat, then go for it. I know I would!

I'm grateful to Icom UK for supplying the transceiver (**twice**) for an extended review, and also for sending me a keyboard. But I must take this opportunity to say how disappointed I was to have to return it! *pw*

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COMPANY

Icom UK Ltd.

CONTACT

Tel: (01227) 741741

PROS AND CONS

Pros: For a general-purpose transceiver covering two data modes as well, to work DXpeditions on RTTY and PSK as well as s.s.b., c.w., etc., then this transceiver is ideal. With my FT-1000MP, to work 3B9C on RTTY, I had to link up the PC, initiate the software and interface. The IC-7800 does the same job far more elegantly. Flipping from mode-to-mode is so easy, making DXing a 'doddle'! I'm grateful to Icom UK for supplying the transceiver (**twice**) for an extended review. But I must take this opportunity to say how disappointed I was to have to return it!

Cons: A little expensive for a G3 like me with a bus pass! But the bottom line is that if you want the IC-7800 and can afford it without going short on food or heat, then go for it. I know I would!

SUMMARY

If you can afford the IC-7800 - go for it!

PRICES

See detailed information panel.

THANKS

My thanks go to **Icom UK Ltd., Sea Street, Herne Bay, Kent CT6 8LD. Tel: (01227) 741741. FAX: (01227) 741742.**

Throw It High - Come Down Short!

Gerald Stancey G3MCK looks at the effect of pushing your transmitted signal up at a higher angle and what it can do for the typical urban Amateur.

On most h.f. bands, there's a gap between the ground-wave petering out and the first reflected skywave returning to earth. This area is sometimes called the dead zone and can blight h.f. communications over distances of 20 to several hundred kilometres depending on the time of day, and the frequencies used.

Propagation isn't just a problem and annoyance to Radio Amateurs, the military and disaster agencies frequently have the problem of needing reliable communications over an area. They need reliable communication at distances of up to about 300km in all types of terrain. There must be no dead spots caused by skip.

This method of propagation, I'm about to describe, attempts to provide a degree of infill, by launching the wavefront at a comparatively high angle, rather than towards the horizon, which is the more usual method.

The problem of the lack of coverage between the effective end of the ground-wave and the beginning of the returned skywaves, uses a technique called Near Vertical Incidence Skywave (NVIS). This propagation mode, unlike normal DX work, entails sending a signal up to the ionosphere at a high angle so that it's returned back to the earth not far from the transmitter.

The NVIS method of operating, isn't a DX technique and in many respects seems to go against what many Amateurs try to achieve. But this may be a mode that you already are unknowingly using, as it's actually the mode whereby most inter-G QSOs are made on the lower h.f. bands. It's also a method whereby the typical urban Amateur who lives in a hollow and has a small garden can still achieve many QSOs and have lots of fun.

How It All Works

So, let's have a look at how it all works.The theory behind NVIS is very simple. A radio signal that is sent straight up will either be returned to earth or go on into space. Which of these happens depends on the frequency that is used. Below what is called the critical frequency, a signal that is 'fired' skywards will be returned to earth. Other frequency signals above this critical frequency continue out on into space.

A simplified picture of what can happen is shown in the illustration of **Fig. 1**. The signal labelled A if above the critical frequency, fails to be reflected or refracted and so goes on into space. The signal labelled B is below the critical frequency and as such when it reaches the reflecting layer, it's returned to earth.

Because it's at an high angle, the point (on the ground) of return, from the reflecting layer is within the ground-wave area from the transmitter. And because of this, there's no skip effect with signal B as signals come back from the ionosphere mixing with signals from the ground-wave zone. This mixing can of course, and probably will, give fading and phase distortion. But then you can't have everything - can you?

However, the picture is not quite so simple. If the angle of radiation (marked q) is not too large, the signal labelled C may be above the critical frequency. If this is the case, then we would not have true NVIS mode as there would now be a skip effect. Many of you will have observed this effect already, listening on 7MHz (40m), when the nearer UK stations are inaudible but the European stations are coming through at good signal strengths.

Although in Fig. 1, I've shown the signals passing through the D-layer, we cannot just ignore this layer. The D-layer absorbs radio waves very strongly at the lower frequencies. This D-layer absorption means that optimum NVIS operation should be carried out as close to the critical frequency as possible, thus minimising the D-layer absorption.

Like so many things connected with radio the critical frequency depends on many factors; the major of which are: time of day, year and sun spot cycle. In practice the critical frequency will most likely be between 2 and 10MHz.

On a winter night at a time of low sun spot activity the critical frequency will be about 2MHz, rising to 10MHz or even higher during the day at periods of high sun spot activity. For most Amateurs the 3.5 and 7MHz bands, along with the spot frequencies around 5MHz (for those with a licence variation) are going to be the most useful NVIS bands to use.

What Antenna?

Having looked at the frequency aspect of NVIS, now is the time to look at the sort of antenna that is better for this propagation mode. Here the news is not only good but it gets better. Remember that we want to send our signals straight up. The professionals consider angles greater than 45° to be suitable for NVIS mode working. Looking at the vertical polarisation curves in the antenna handbooks we can see that a horizontal dipole l/4 above an ideal ground fits the bill. Studies have shown that over real earth the optimum

height is somewhat lower at 0.15 - 0.2l.

A half-wave dipole at this height will show a feed impedance very close to 50Ω. This will give a s.w.r. close to unity - that should please those who worry about even a small variation in that parameter. Also the radiation pattern at high angles from a low dipole is virtually omni-directional - this means that you don't have to worry about the direction that you run your dipole.

So far I have talked about the requirements for NVIS mode working. However, if at times you are prepared to forgo the no-skip element of NVIS and to consider radiation angles lower that 45° then this brings us to what I have called near NVIS mode working. These lower angles will increase the 'one hop' range. I have set an arbitrary limit of 30°, you may wish to assume another value.

For a low dipole the signal at 30° is about 3dB down on the maximum vertical signal but we can expect one hop ranges of up to about 1,000 miles. In short using near NVIS mode we can expect to cover virtually all Europe and this will give us a sufficient number of QSOs.

A Practical Station

Enough of the theory, let's look at a practical station, considering a 7MHz station for operation via NVIS. The dipole antenna that we need should be seven to eight metres high and about 20m from end-to-end. This can be accommodated in many urban gardens without bothering the neighbours or seeking planning permission.

The ridge height of a typical house is around eight metres and you may well have a suitable tree at the bottom of the garden. If you are short of space then inductive loading can compress your dipole down to about 10m+ without incurring too much loss.

If height has to be reduced then the antenna will be less effective but the result may still be acceptable. Some experiments that I have done with a 7 MHz dipole at the height of just two and a half metres, indicated the following differences compared with a dipole at seven and a half metres high

- daytime good conditions, no difference
- nightime good conditions, 1 S-point down
- daytime poor conditions, 1 S-point down
- nightime poor conditions, 1-2 S-points down

As QSOs made under good daytime conditions typically yield S9+ reports these losses are acceptable. Also I was only running just 30W so there was scope for recovery by increasing power a little.

Almost any of the more modern rigs will do for operation using NVIS. I've found that almost all modern rigs have good third order intercept figures and I've not found any trouble with cross modulation or overloading from the broadcast stations residing just above the 7MHz Amateur band.

What About DX

You may think that as you've optimised your station for NVIS working, what about DX? A near NVIS station is not optimised for DX working but that doesn't mean to say that DX cannot be worked. A low mounted dipole doesn't cut off all signals at angles less than 30°, it's just that those signals are weaker than those at higher angles. Propagation of signals with two or more hops can also occur, and so, choosing the time of operation can yield DX in spite of the NVIS optimisation. On 7MHz in the 'wee small hours' 579 rag-chew contacts with the USA are often achieved. My best DX (confirmed) is in the W6 call area.

Also don't forget that there are over 50 DXCC countries in Europe and they all count the same and you have to work them sometime.

Blaming Poor Gear

If you're not getting the results you want on the DX bands it's too easy to blame it on poor gear, or your QTH, or "if only I had a beam or a power amplifier" or... It's true that upgrading to a beam or power stage will improve you DX score, but the real problem may be your operating technique.

A 7MHz NVIS station as described above is the set-up that a professional communicator would establish and he has more money than you. The use of high angle radiation means that your site is very unlikely to be screened by high hills - a 1500m mountain at four kilometres away will not block off any radiation that is above 30°. So, unless you live right at the foot of Ben Nevis, there's hope for you yet.

I'd therefore suggest that anyone who is not happy with their DX results on h.f. sets up a 7MHz NVIS station running modest power to see how well they can do. If results are poor then there probably is something wrong with your operating technique, but unlike adding a beam and tower/mast NVIS operation costs almost nothing to add or improve.

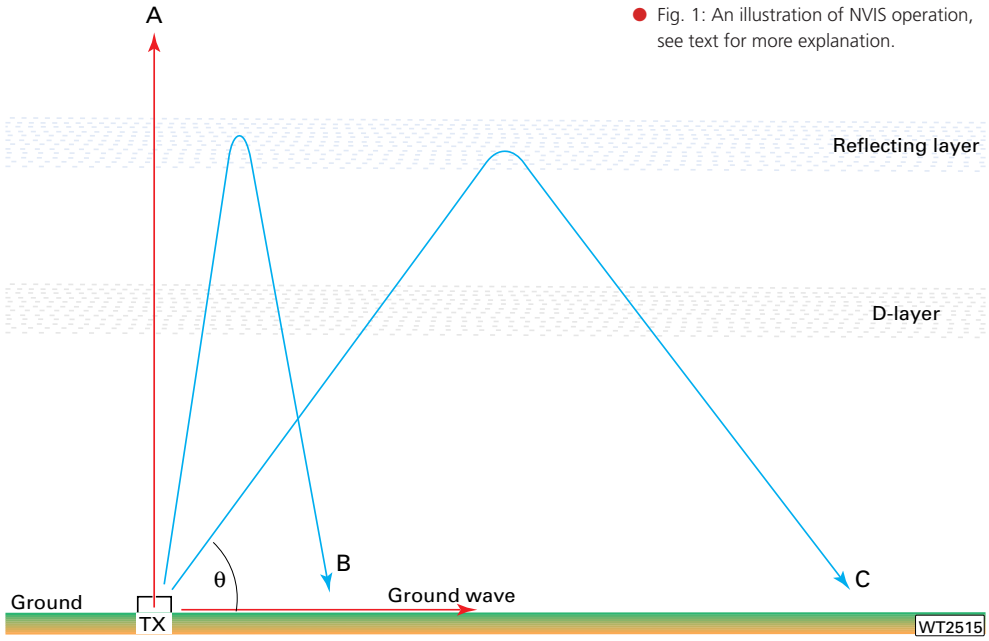


Fig. 1: An illustration of NVIS operation, see text for more explanation.

To Summarise

So, to summarise, near NVIS is easy to implement and will give you a lot of fun. Use it as a way of checking your operating skill. There are four things that determine the success of an Amateur Radio station. They are gear, site, antenna, and you. The first three cost money. The last is free and is the most important. As they say in the artillery it's the gunner not the gun that really matters. *PW*

The Vectis Run Part 10

By Rupert Templeman

It's January 1939 and travelling Wireless Technician-Salesman Alan Edwards is still in great danger. The monthly trip to the Isle of Wight - the Vectis Run - has turned into a nightmare but it now seems a Dutch Damsel's coming to the rescue!

Alan studied the Dutch girl as she struggled to get her breath back after forcing the door open. Her slim body was still trembling. At first he'd thought she was completely unhurt, but now the bruising on her shoulders, legs and arms were all too apparent. Despite this he could see that under the bruises and temporarily dishevelled look - she was as stunning as when he'd first seen her on the ferry only a few days ago.

Continuing in her almost perfect English she quietly explained the situation. Remarkable calmly, so Alan thought to himself.

The girl - she told Alan her name was Marjit Van der Pass - had realised that Alan couldn't climb up towards her. Neither could she get down to his level, so they continued their difficult conversation at different levels - and managed to see the stupidity of it all!

"My father worked on the special tube production line for the EF50" she said, "he had built a special receiver and had contacted others using wavelengths shorter than that used for television"!

"Oh, he was a Wireless Amateur too", Alan replied - mentally noting that Marjit had at some time been exposed to Americans, or their valve manuals because of the reference to a 'tube'. He'd always puzzled at why his Dutch friends spoke English with an 'American' accent - until he remembered that New York was once Nieuw Amsterdam - governed by the legendary Peter Stuyversant. Perhaps, in reality all Americans actually spoke their version of English with a Dutch accent"? He laughed a little to himself.

"You think we are in a happy situation"?, the girl said sharply, misinterpreting his murmured laugh, and using a quaint style of wording expressing her rising fear. She was trembling violently again.

"No, I don't Marjit", he explained, "It's just that my brain is overflowing with language, accents, ideas and also I'm wondering why all this is happening. Why, for example, are you involved"? Who are the men, and why on earth are you here - you're Dutch and they're German Agents aren't they?

The girl's eyes moistened as she explained. She was obviously in very great distress. "My father was working late one night by himself in his laboratory in Hilversum when Weingartner as he is known to me - the leader - stumbled on my father as he left with drawings of the tube. Weingartner had got into the factory during a visit organised by Philips for the German television trade".

Marjit then explained, that as she also worked for Philips, she knew that some of the visiting party were experts who had gained much experience on the televising of the Munich Olympics in 1936. She also thought some were obviously from the German military even though they were in civilian clothes.

Working in the main offices it was she - much to her later danger as it turned out - who had typed up the visitor security passes and pasted on the names and photographs. Weingartner, although not one of the official leaders of the delegation - was there for another purpose and had disappeared and everyone had thought he'd left the factory. He obviously hadn't!

Marjit controlled her voice, but sobbed quietly; "When he came out from hiding he had no idea my father was working late. Weingartner's mission was so secret he killed him without a moment's hesitation to keep the discovery from the Philips' security officers while he escaped".

Unfortunately for Marjit, her father's last words when he attempted to defend himself must have included the information that she was meeting him just outside the town at a café where they were to eat before going home. This had been a regular event since her mother died the year before. They then met her and on the pretext of taking her to her father, she was abducted.

When the agents found out she spoke excellent English and had been a regular visitor to Spalding, in Lincolnshire to visit relatives who worked in the English bulb growing industry - her captors knew she'd be very useful as cover, helping to give the impression they were relatives holidaying together. Although, as Marjit learned more of their mission, she also knew it was likely to be a one way trip for her.

Alan wished he'd been able to comfort the girl - he had shuddered with his own memories of the beating received from Stephan. He was the killer - and Alan knew the man wouldn't hesitate to kill him and Marjit. They had to escape...very soon.

"Tell me", Alan asked Marjit; "where have they gone now, where's their Citroën - my van is in their large lorry, so where have they put it"? He had many more questions but didn't want to overload the girl - she was coping bravely but he didn't want to push his luck.

The girl, rapidly gathering her thoughts together, told him that the large car had been hidden in a chalk pit not far from where they

Alan warmed the putty in his hands, and when the putty was flexible he moulded it around the knife handles, arranging them to form a crude Morse key.

had captured him. It had been well covered and looked like a large stack of straw...it wouldn't be found for a long while she thought.

"But" interrupted Alan..."how did they get hold of the furniture lorry - it's an unusual vehicle, and just what's this place? It's very near the sea, and I now know where we are, but it's important for me to know what the building is...so we can escape. I'm not even sure if the water comes in here every now and again with the tide". His voice trailed off - but the fear and desperation he felt transmitted to Marjit, who was sitting on the landing stage platform above.

Customs House

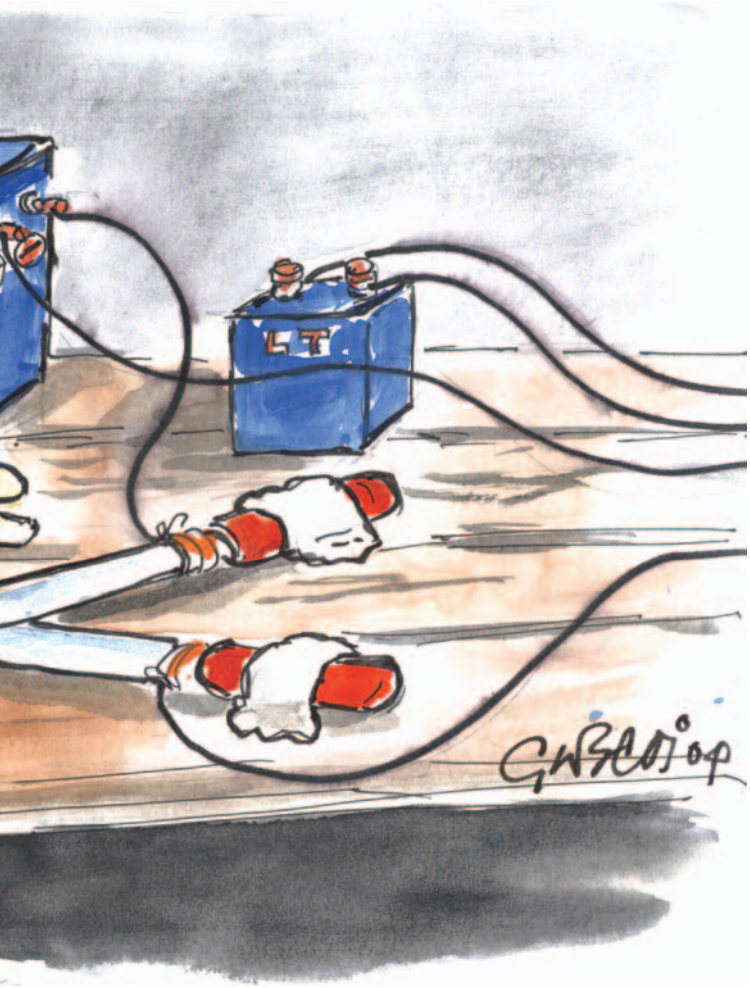
Marjit explained that the large building they were trapped within was something called a 'Custom's House'. Although she didn't understand the term - she remembered that it was at the head of a small creek and that a channel - she used the term 'canal' - blocked off by a small 'water gate' - kept the water away from the lower side of the building, which seemed to have once had boats entering underneath the house, where he was now prisoner.

Alan smiled inwardly at her description. The 'water gate' was obviously a small lock gate to keep the old Customs & Excise cutter afloat at all states of the tide. That explained the damp floor.

Newtown - one of the infamous 'Rotten Boroughs' he knew had been a den of intrigue in years gone by. It had even managed to have its own dubiously elected Members of Parliament despite a tiny population!

The agents had - as far as local people had been told - arrived at the remote building to prepare it for use as a holiday home. Locals had assumed that the lorry was full of furniture, and curious eyes had soon been satisfied as they'd seen two men wearing painter and decorator's overalls moving in and around the outbuildings. Nothing suspicious there they'd thought, but little did they know!

Marjit then explained that the large furniture lorry has been jammed against the stoutly built stone building's single entrance. They were trapped! She had then heard the agents discussing rowing a boat to "check a suitable landing place". Despite this, she knew both men would return to kill both their hostages, securing their silence, before they left for their homeland on completion of their mission.



"Landing place"? Alan's mind was really racing now! Of course, that was it - most of the spy films he'd seen at the cinema included the rescue of agents via submarine. The spies were looking for a suitable place for a submarine to pick them up and they had to be stopped!

Alan made a decision....it was time to tell the girl as much as he knew. And as he shared the story - her eyes opened widely. She was shocked - as she'd not known that Alan had been nothing other than an innocent Wireless and Television technician minding his own business until a few days before. Like the German agents - she thought that Alan was also a professional. It was her turn to laugh!

"I'm happy you are not who I thought you were", she said, almost giggling. Now I know you are really a friend I must help you".

Alan equally relieved, almost shouted with joy and wanted to embrace the beautiful girl. "We've got to get my beacon transmitter working, and let everyone know where we are" he shouted. "Do you know where the equipment that they took from me is please"?

Anxious to assist, Marjit disappeared for a while and then came back triumphantly with some wireless equipment. Briefly elated, Alan soon saw that it was a portable super-regenerative receiver. It was useless for his purposes....he needed his beacon transmitter.

Marjit left to search again, hoping to find Alan's beacon transmitter and the portable aerial. She quickly returned with a long length of high quality coaxial cable, telling Alan that one end of it disappeared into the roof and that there was no sign of anything else.

Reacting badly to the news, and in sheer desperation, Alan tried to jump and reach the landing, but it was a wasted attempt as the chains were too heavy. Exhausted and in pain, Alan then persuaded Marjit not to come down to him in case she too was trapped. It was time to think, and to think hard.

Wide Band Receiver

Within a few moments Alan saw that the agent's superegenerative receiver - lowered to him using the coaxial cable as a rope - was probably able to tune over a wide range of frequencies. Increasingly desperate thoughts were now cascading through his head and he remembered that 'super swoosher' receivers was infamous for re-radiating signals on the same frequency it was tuned into - especially if they weren't provided with a radio frequency amplifier stage. Maybe...it might be worth listening on the receiver - he might even be able to attract attention on the Ten Metre Amateur band using the receiver's interference potential as a transmitter?

Soon Marjit had also lowered the heavy batteries down to him. The lightweight headphones soon followed and scarcely daring to breathe he carefully connected the battery and listened. Would it work....was the aerial connected?

With an audible sigh of relief Alan heard the familiar 'swooshing' sounds. As he adjusted it he saw the tuning condenser's vanes mesh together - meaning the receiver was at the lowest coverage it could provide. It was then he heard the strong pulsing signals which he now knew were coming from the mystery transmitter above Ventnor tunnel on St. Boniface Down.

Even though he didn't know the purpose of its transmissions, he knew there was no chance of communicating with the Ventnor station. But, as he tuned higher in frequency the faint but unmistakable sound of the television transmissions from London could be heard. He identified the Alexandra Palace sound channel, the early evening programmes had started, and then he had a brainwave!

A rather puzzled Marjit was asked to bring two knives from the kitchen. Then she was asked to remove putty from the nearest window after Alan had explained what the word meant!

Alan warmed the putty in his hands, and when it was flexible he moulded it around the knife handles, arranging them to form a crude Morse key on the board he'd been lying on. The next job was to wire the crude switch into the receiver's high tension line.

Alan smiled to himself...he was beginning to think it might work - there was just a chance he could communicate. If that is, Fred Cotton in Freshwater remembered his days signalling to Army observation balloons during the Great War! **To be continued...**

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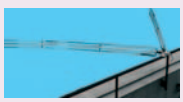

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AX-75 *144/430MHz* — *•TYPE 1/2λ, 144MHz, 5/8λ, 430MHz •GAIN 3.2dBi 144MHz, 5.7dBi 430MHz, •MAX POWER INPUT 60W •CONN. M-P •LENGTH 760mm •WEIGHT 140g* — **£33.95**

AX-95 *144/430MHz* — *•TYPE 1/2λ, 144MHz, 5/8λ, 430MHz •GAIN 3.3dBi 144MHz, 5.8dBi 430MHz, •MAX POWER INPUT 60W •CONN. M-P •LENGTH 950mm •WEIGHT 150g* — **£32.95**

AX-110 *144/430MHz* — *•TYPE 1/2λ, 144MHz, 5/8λ, 430MHz •GAIN 3.5dBi 144MHz, 6.0dBi 430MHz, •MAX POWER INPUT 70W •CONN. M-P •LENGTH 1100mm •WEIGHT 150g* — **£34.95**

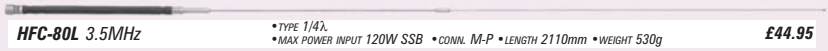
HFC Range

£79.95

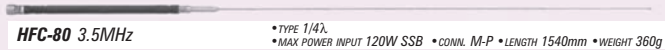
HMC-6S *7/21/28/50/144/430MHz* — *•TYPE 1/4λ, 7/21/28/50MHz, 1/2λ, 144MHz, 5/8λ, 430MHz •GAIN 3.5dBi 144MHz, 6.0dBi 430MHz, •MAX POWER INPUT 120W 7/21/28, 150W 50/144/430MHz •CONN. M-P •LENGTH 1800mm •WEIGHT 800g*

HMC-10 & HMC-14 *10m & 20m add-ons for the HMC-6* — **£22.95 each**

NEW! HFC-217 *7/21MHz. Max power input 120W. Length: 1300mm. Weight: 450g* — **£44.96**

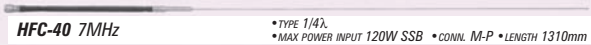


HFC-80L *3.5MHz* — *•TYPE 1/4λ. •MAX POWER INPUT 120W SSB •CONN. M-P •LENGTH 2110mm •WEIGHT 530g* — **£44.95**

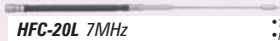


HFC-80 *3.5MHz* — *•TYPE 1/4λ. •MAX POWER INPUT 120W SSB •CONN. M-P •LENGTH 1540mm •WEIGHT 360g* — **£38.95**

HFC-40L *7MHz* — *•TYPE 1/4λ. •MAX POWER INPUT 200W SSB •CONN. M-P •LENGTH 1870mm •WEIGHT 330g* — **£34.95**

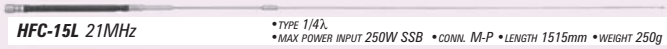


HFC-40 *7MHz* — *•TYPE 1/4λ. •MAX POWER INPUT 120W SSB •CONN. M-P •LENGTH 1310mm •WEIGHT 210g* — **£29.95**



HFC-20L *7MHz* — *•TYPE 1/4λ. •MAX POWER INPUT 250W SSB •CONN. M-P •LENGTH 1515mm •WEIGHT 275g* — **£34.95**

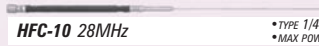
HFC-20 *14MHz* — *•TYPE 1/4λ. •MAX POWER INPUT 120W SSB •CONN. M-P •LENGTH 1010mm •WEIGHT 190g* — **£29.95**



HFC-15L *21MHz* — *•TYPE 1/4λ. •MAX POWER INPUT 250W SSB •CONN. M-P •LENGTH 1515mm •WEIGHT 250g* — **£34.95**

HFC-15 *21MHz* — *•TYPE 1/4λ. •MAX POWER INPUT 120W SSB •CONN. M-P •LENGTH 1010mm •WEIGHT 190g* — **£29.95**

HFC-10L *28MHz* — *•TYPE 1/4λ. •MAX POWER INPUT 250W SSB •CONN. M-P •LENGTH 1515mm •WEIGHT 245g* — **£34.95**



HFC-10 *28MHz* — *•TYPE 1/4λ. •MAX POWER INPUT 120W SSB •CONN. M-P •LENGTH 1010mm •WEIGHT 190g* — **£29.95**

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Earpiece & Microphone Headsets available for Yaesu, Icom & Kenwood

To see the full range of Hokushin's famous Maldol range please see our web site or call into the new showroom

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ML&S are the only authorised U.K. distributor for Tokyo-HyPower.

LOG ON NOW

HL-50B The only all mode 50W Linear Amplifier designed to work with the FT-817 & IC-703. ..... **Only £249.95**

HL-1Kfx A sturdy 240 volt powered 500W linear amplifier all mode with protection against over-drive, over heat, high drain voltage, and faulty band setting. ALC out. Remote TX control, all for a very attractive price. ..... **Only £1399.95**

ML&S martin lynch & sons
Suppliers of Communications Equipment

tel: 0845 2300 599 local call number
fax: 0845 2300 339
e-mail: sales@hamradio.co.uk

Outline House, 73 Guildford Street, Chertsey, Surrey KT16 9AS

call us six days a week, mon - sat 9.30 -

We've been successfully selling radio equipment from Ealing since 1978, so why have we moved to Chertsey west of London? **The quick answer is - easy parking and no traffic.**

When Martin Lynch first started trading from Ealing, you could drive direct to the showrooms, park outside, spend as long as you wanted trying your new radio or accessory and then go home with little fuss.

Then, around five years ago, traffic and parking got so difficult that instead of customers looking forward to their trip into London, they began to view it as a necessary evil to get to London's only Radio Store. We've listened to your comments and have done something about it by moving to Chertsey.

So how will customers benefit from our move to Chertsey?
The biggest single benefit is obviously parking. We have our own dedicated car park right in front of the showroom. That means you can drive to the store, park outside and walk straight in. Bliss! This may not sound like much to those of you used to shopping outside London but to anyone living near a city, it's a real luxury.

Also, traffic is largely unheard of in Chertsey. It's a small town about half a mile from Thorpe Park (drop off the family?) with quiet roads and virtually no rush hour. It also has some excellent local shops including an Italian Deli called Carlo's - to die for and bang opposite the showroom too!

What can you expect when you visit the new Showroom?
Naturally, there's the usual bunch of smiling faces and helpful staff but now they're in an air conditioned showroom that's LARGER than ever before. It has three dedicated sections for Yaesu, Icom & Kenwood along with racks of MFJ, Maldol, Diamond, CT-Keys, Miracle Products, SGC, Linear Amp UK, Avair, MyDEL, BHi and a full range of antennas and associated accessories. There's also a huge selection of famous USED equipment too.

So when is the new super-store open and how do I get there?
We finally opened on the 23rd of August and as some of you noticed, the odd builder, electrician and I.T. chap could still be seen wondering around the building. We are open every day from 9:30-5:30 and close slightly earlier on Saturday at 5:00pm.

When we say "easy access", we really mean it. The new address is Outline House, 73 Guildford Street, Chertsey, Surrey, KT16 9AS and it's located between junctions 11 & 13 of the M25. By car, it's just 1.2 miles from junction 11 or you can come off at junction 13 (Staines turn-off) and follow the signs to Thorpe Park. Follow the first sign past Thorpe Park to Chertsey Town Centre then, after a sharp right bend, Guildford Street is on the right. It's spilt into three sections and if you enter the street from the Windsor/London Street end, you turn right opposite the Royal Mail sorting office.

By rail, Chertsey Railway Station is literally only 800 yards away in the same street.
By plane, Heathrow is just 6 miles away.

Our customers have allowed us to become one of the oldest Ham Radio outlets in the country and investing in far larger premises in Chertsey shows our commitment to the hobby. Please come along and support your local emporium.

And don't forget, we are still looking for staff to join us at the UK's largest dedicated Ham Radio Store.

73, Martin G4HKS and the gang

Icom IC-7800
The worlds best H.F. Transceiver? Probably.
No silly freebies, just the ultimate understanding and support you deserve when making an investment of this magnitude. To discuss the new HF+6M Super Rig from Icom, call the ML&S Sales team today.

BUY NOW - PAY AUTUMN 2005 0% APR.

RRP £6400.00

Icom IC-756Promk11
HF & 6M 100W DSP Transceiver.

RRP £2599 ML&S £1895 or 48 x £56.07 p/m

Icom IC-7400
HF/6M/2M DSP Base Transceiver with ATU & 100W.

RRP £1699 ML&S £1299
with FREE SP-21 & SM20 (whilst stocks last)

Icom IC-706mk11G
Eight years old and still going strong. HF/6/2/70 Ideal mobile/base transceiver

RRP £939.00 ML&S £769 or 48 x £22.75 p/m

Icom IC-718
Basic ready to go 100W HF Transceiver supplied with Microphone & DC Lead

RRP £649 ML&S £449 or 48 x £13.29 p/m

Icom IC-910X
The best 2/70 & 23cm dedicated all mode base. 23cm included.
Basic Version (without 23cm) also available £1089 or 48 x £31.93 p/m

RRP £1675 ML&S £1239 or 48 x £36.66 p/m

Icom IC-703
10W Portable HF Transceiver with built-in PSU.

RRP £703 ML&S £589 or 48 x £17.43 p/m

Icom IC-R20E
The latest portable receiver with TWIN RX & digital record facility. For full spec see web

RRP £499 ML&S £419
or 36 x £15.23 p/m

Icom IC-2200H
Just Arrived! 65W o/p 2M FM. The optional UT-115 provides digitally modulated and demodulated clear audio. It also allows you to send voice and data simultaneously.

RRP £235 ML&S £199.00

Icom IC-E208
2/70 mobile 50/55W Transceiver with host of additional features.

RRP £365 ML&S £275.00 or £8.14 p/m

Kenwood TS-870S
Finally ceased production. We still have a few left at £1199.00 but why not consider the excellent TS-2000E or even the TS-480SAT. Call for details.

RRP £1599.95 ML&S £1199.00
or 48 x £35.18 p/m

Kenwood TH-D7E
A 2/7- Handie with TNC and APRS capability.

RRP £359 ML&S £299 or 48 x £8.85 p/m

Kenwood TS-570DGE
Still the ideal choice if you a want an easy to use radio.

RRP £999 ML&S £799 or 48 x £23.64 p/m

Kenwood TS-480SAT
The best selling Kenwood H.F. Can be used mobile or base. Includes ATU

RRP £1099.95 ML&S £949 or 48 x £28.08 p/m

Kenwood TS-480HX
As TS-480SAT but 200 Watts, no ATU.
RRP £1199 ML&S £999 or 48 x £29.56 p/m

Kenwood TS-2000E
Just superb on all bands 160m-2m with optional 23cm (X-Version)

RRP £1699 ML&S £1589 or 48 x £47.02 p/m

Kenwood TS-2000X
As above but with 23cm fitted.
RRP £1999 ML&S £1889.00 or 48 x £55.89 p/m

Kenwood TMD-700E
The unique 700E is not only a dual-band FM rig but has APRS and TNC built-in.
RRP £519 ML&S £439 or 48 x £12.99 p/m

Kenwood TH-F7E
2/70 Handie with Gen Cov RX. If you must have SSB RX on your dual-bander then buy one!

RRP £289.95 ML&S £249

Yaesu FT-1000MP mkV
Still the flagship of theYaesu HF Range. 200W and put the CDXC IOTA crew on the

RRP £2599
MLS £Guaranteed LOWEST U.K. Price Call

Yaesu FT-1000MP mkV Field
Ditto mkV but 100W and built in PSU.

RRP £1999
ML&S £Please Call for eye-watering price.

Yaesu FT-857
Our fastest selling HF-70cm Mobile/base

RRP £849, ML&S £649.00
OR 48 X £19.20 P/M

Call us 6 days a week, mon-sat 9.30-5.30

0845 2300 599

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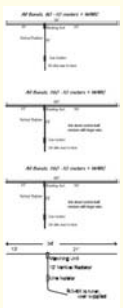
Five-Year Warranty available
When you next purchase any equipment from us ask about our 5-year warranty plan. It's superb value and made a lot of customers very happy they had it!

ML&S martin lynch & sons
Suppliers of Communications Equipment

Take-Away Now and Pay NOTHING until this time next year!!

Outline House, 73 Guildford Street, Chertsey, Surrey KT16 9AS

Radio Works New to ML&S, the full range of Radio Works Carolina Windom Wire Antennas.



CW-160	160-10m 76.8m long	£129.95
CW-160 Special	160-10m 40.5m long	£119.95
CW-80	80-10m 40.5m long	£89.95
CW-80 Special	80-10m 20.1m long	£109.95
CW-40	40-10m 20.1m long	£84.95
CW-20	20-10m 10.36m long	£89.95
CW-620	20-6m 9.7m long	£89.95
G5RV Plus	80-16m with balun 31m long	£59.95
Baluns & Isolators		
T-4 Plus	Line isolator 1.8-54MHz 4kW	£39.95
T-4 500	Line isolator 1.8-30MHz 500W	£32.95
T-4G Plus	Line isolator 1.8-54MHz + gnd4kW	£39.95
REM-BAL	Ladder line 4:1 balun 1.8-30MHz	£45.95
B1-2K Plus	1:1 current balun - for inverted Vs	£28.95
B4-2K	4:1 voltage balun - loops/folded dipoles	£39.95
Y1-5K Plus	1:1 current yagi balun - 1.8-54MHz	£39.95

Yaesu FT-897

Versatile Base, Transportable, Mobile 160m-70cm.

RRP £1099 ML&S £899 or 48 x £26.60

Yaesu FT-847

160m-70cm Including 4m!

ML&S CALL FOR LOWEST PRICE

Yaesu FT-817ND

Want to stay in touch on all bands for silly money? HF-70cm, complete with batts, charger etc. Now supplied with Higher Capacity Metal-Hydride Batteries

RRP £Too cheap. ML&S Even cheaper! See web!

Yaesu FT-817DSP

No we are not BHI's largest distributor (ZZzzzz) but we were FIRST to offer the FT-817 with DSP!

RRP £803, ML&S £589 or 48 x £17.43 p/m

Yaesu FT-7800

This weeks new model from Yaesu. Bar make the tea it'll give you 2m/70cm- @ 50W/40W

RRP £239, ML&S £239

Yaesu FT-8800

Similar to the FT-7800 but can receive on 2 & 70 simultaneously.

RRP £289, or 48 x £8.26 p/m

Yaesu FT-8900R

A full 4-band mobile, 10/6/2/70 with remote head.

RRP £429 ML&S £329 or 48 x £9.73 p/m

Yaesu FT-2800M

2M brick-built 65W rig.

RRP £179, ML&S £158.95

Yaesu VX-2E

Latest version of the VX-1R, higher power.

RRP ML&S £169

Yaesu VX-150

Built on the commercial VX-400, simple to use rugged 2m Handie, supplied with Nicads & Charger

RRP £149 ML&S £119

QPak

From those Miracle Antenna boys comes the worlds best Antenna Tuner. In fact it's so well engineered it's just too good to be called an ATU!

Range: 3.5 - 30 Mhz, 50 Mhz limited

Power: 20 watts max

Loads: Coax, random wire, balanced lines, verticals

Match: Up to 15:1 and beyond in some cases

Special Introductory Offer: Only £119.99

MyDEL MultiTrap

Forget the G5RV. Install a proper TRAPPED wire dipole MutiTrap for 80-10M Only 66i.Must be centre supported. **£89.95**

MyDEL MegaTrap

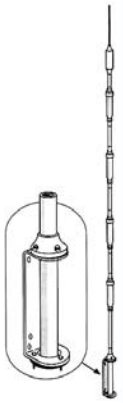
Same as Multitrap but 160m/80/40m, 105' long **£99.95**

Hustler 6-BTV

The best performing H.F. Vertical - ever! We have literally sold hundreds of these with fantastic customer reports. At last a vertical that gives you REAL PERFORMANCE on 80m and 40m, as well as the other bands. No radials required. Just mount 18' above the ground, connect to a decent earth spike close by and operate.

Specification:
6-BTV HUSTLER 80-10m Vertical 1kW.

- 6 Bands: 10, 15, 20, 30, 40, 80m
- VSWR 1.6:1 or better
- 10-40m Bandwidth up to 100kHz 80m
- Power: 1kW
- Feed: 50 Ohms
- Solid 25.4mm traps
- Feed with any length 50 Ohm coax
- Heavy duty aluminium mounting bracket
- Solid 25.4mm (1in) fibreglass trap formers
- Use as ground mount with or without radials
- Use with radials on elevated mount
- Size: 7.3m (24ft) - Weight: 7.5kg.



Only £219.95

Antenna Tuning Units

MFJ-993

Hot off the press! And is this GOOD!!!! The latest compact Auto ATU from MFJ will BURY the competition. Take a look at our web site for a detailed specification..... **£248.99**

MFJ-941E

The MFJ-941E gives you a 300 Watt antenna tuner that covers everything from 1.8 - 30 MHz -- plus you get a lighted Cross-Needle meter with on/off switch (light uses 12 VDC or 110 VAC with MFJ-1312D), antenna switch and a 4:1 balun... MFJ's lighted Cross-Needle meter shows SWR, forward and reflected power all at a glance in 300/60 and 30/6 watt ranges, 8 position antenna switch lets you select 2 coax lines, random wire/balanced line or dummy load (direct or through)..... **£129.96**

MFJ-969

The MFJ-969 Antenna Tuner gives you MFJ's superb AirCore Roller Inductor and full 6 meteres through 160 Metre coverage!..... **£199.00**

Power supplies

Watson W-25SM 13.8V DC, Switch Mode, Ultra Compact, 22Amps **£79.95**
IC-PS-85 20Amp Matching Switch Mode PSU for Icom Base Transceivers. ..... **Only £169.95**
Yaesu FP-30 Internal PSU for FT-897 ..... **£199.95**
Yaesu FP-1030A 25 Amp power supply..... **£179.00**
Nessei MS-1228 25 Amp continuous power supply. 28 Amp peak..... **£69.99**

Take Away Now and Pay NOTHING Until This Time Next Year!!

Having many years of experience offering specific finance packages for our customers, we can now offer various options on payment.
We have added "**Take-Away Now & Pay Later**" to all our products over £199. It works like this:

0% APR An example of our Take-Away Now: Discounted price of £300. Pay no interest provided you pay by the date the amount is due, in full. 29.8% APR
After the 12 months period has expired pay £15.76 for 36 months. TAP £567.43
Please note that interest is calculated from the date of the original agreement.

Words of advice when choosing your personal finance option.

Be very careful when you next run out of your local ham store having signed on the dotted line to get your new rig. ML&S have been providing customers with finance packages for many years and here are examples of finance based on £899 borrowed over 36 months.

1. **Option One**.....Classic Low-Rate Finance
2. **Option Two**.....No-Interest Finance Option
3. **Option Three**.....Take-away now, pay later
4. **Option Four**.....Tailor made to customers requirements

Option One
The most popular option, Classic Finance– is very simple and operates without an interest-free period. If you budget for your radio equipment over a fixed amount for 36 months (in fact 12-48 months if you prefer) then this maybe the best choice for you. Look at the total amount payable to see how much you really can save over options Two and Three.

Cost of Rig £899 Pay 36 x £32.68 Total amount payable **£1164.96** at 19.9%APR

Option Two
A variation on Option Three and one that doesn't leave it all to the last minute to find the amount due in one huge lump. You simply pay a small amount each month which is directly taken off the final amount due within the twelve month period. At the end of the term you simply pay the balance with no interest accrued. Unlike Option Three, the final payment is far less but you do still have the option to pay over a further 36 months at an APR rate of 29.9% APR.

Cost of Rig £899 Pay only £30.52 for 11 months **Pay £532.76** on due date with no interest Or pay 37 x £30.52. Total amount payable £1464.96 at 29.8% APR

Option Three
Also referred to as 'Buy now pay later'. A popular choice at the moment, this method enables you to take away your new rig and pay nothing for twelve months. Once the free-interest period is almost complete you are given the opportunity of settling the amount avoiding any interest charges or paying over a further 36 months accuring interest at 29.8%. APR.
Whilst this method initially sounds very appealing, the shock may come when the 12 month free-interest period has expired and you cannot afford to pay the amount in full. You are then locked into paying back over 36 months at an APR rate of 29.8%.
If you think that you will continue paying after the twelve months has expired and enter the 29.8% APR Rate, (which incidentally is calculated from day one of the original transaction), either consider option 1 or 2. Option 2 lessens the burden as you are at least paying from day one and won't accrue any interest charges unless you roll over to the next 36 months. On the due date for payment you pay the remainder (which will be far less because you have already contributed 12 small payments) and avoided any interest charges. Option 1 will work out the cheapest by far at an interest rate of only 19.9% APR.

Cost of Rig £899 Pay Nothing for 12 months **Pay £899** on due date with no interest. Or pay 36 x £47.24. Total amount payable £1700.64 at 29.8% APR

Option Four
Because of ML&S' experience in finance we are often able to tailor a payment plan to meet your own requirements. For example, you may wish to pay over 12, 24, 36 or 48 months. Instead of paying nothing for 12 months, 6 or 9 months maybe better. The variations are literally endless. Please give our finance help line a call (or email) and we will do our very best to offer a package that is the best for you.

Call 0845 2300 599 or email financeplan@hamradio.co.uk

AN AUSTRALIAN EXPERIENCE

John Hoban G3EGC shares his experience of operating 'down under' and the 'ups and downs' of making successful DX contacts

When I was first licensed in the late 1940s my ambition was to work the ultimate DX - the VKs and ZLs. I did make it eventually, but furthest from my mind in the days of a.m. and glowing valve heaters was the thought that one day I would step onto the shores of VK land.

In 1991, my daughter and her husband developed 'itchy feet' and a sense of adventure, taking themselves off to find a new life in Australia. It was only a matter of time before my wife and I had to go and find out what they were up to.

So, in 1993, we ventured out to VK land and I immediately felt comfortable there. Perhaps it had something to do with the Anglo/Irish origins of the country (with due acknowledgement to Captain Cook). Whatever it was, I found a homely feeling with an Australian accent!

John Hoban G3EGC at home on English soil in his shack.

Gosford Field Day

One day I called into a newsagents in Bondi and was delighted to find an Amateur Radio magazine called *Amateur Radio Today*. I had discovered VK Amateur Radio!

Reading the magazine, I found I'd just missed the Gosford Field Day Rally, advertised as 'the biggest field day in the southern hemisphere'. I resolved there and then that if I ever visited Australia again I would time it to take in that rally. A little over a year later, fate made me a widower and I was disinclined to want to go anywhere.

However, time heals and I did make further trips to Australia in 1995 and 1999 and yes, I did go to the Gosford Rally. The town lies on the Newcastle line, north of Sydney and is easily reached on the wonderfully smooth and comfortable double decker trains, which run through some beautiful countryside.

The rally is actually held on the racecourse at Wyong. The format is much the same as the rallies in the UK with dealers selling new and old equipment, displays and stands of various kinds, including that of the **Wireless Institute of Australia** (WIA). I particularly enjoyed the vast car boot sale, which flourished in the beautiful Australian sunshine. Wearing my white T-shirt emblazoned in red with my callsign, front and back, I enjoyed many pleasing encounters with VKs, some of who turned out to be ex-Brits.

Reciprocal Licence

In the summer of 2002 I decided to spend Christmas with my daughter and her husband in Sydney. I had an extra special reason for going, as I had a new grandson. However, in addition to that, a question in my mind was: 'Why not try Amateur Radio in Australia?'.

Reciprocal licence arrangements were now in place in so many countries so, why shouldn't I go for it? My 1995 edition of the *Australian Callbook* gave full details of how a visitor could get a licence. It looked so easy! It wasn't! I soon found that my attempts to telephone the relevant number in Sydney were fruitless. The information was out-of-date.

Then a computer literate friend of mine came to the rescue and after 'surfing the web' came up with the correct details. The old Australian Spectrum Management Agency had become the Australian Communications Agency with new contact details.

When I called a friendly Australian voice greeted me and after explaining my needs, he

advised me to '...present yourself here at the office, mate, and we'll be pleased to fix you up'. What a great attitude the Aussies have!

A couple of days after my arrival in Sydney, I easily found the air conditioned offices of the Australian Communications Agency. Arriving at the customer service desk, I was approached by a friendly official who, as soon as he spoke, I immediately recognised as the owner of the voice I'd heard on the 'phone a few weeks earlier.

I presented my completed application form RF57, my UK Validation Document, a copy, my passport and visa and A$34.70 (approx. £13). Ten minutes later, I was handed my Apparatus Licence to operate as **VK2IXF** for the period of my stay. It was all so easy!

Equipment Travel Easy

Today's Amateur Radio equipment is so small that it easily lends itself to travelling. My Kenwood TS-50, no bigger than a large book and was ideal as was the Nissei PS1225 switched mode power supply, which is even smaller and lighter than the TS-50. Antenna tuning could be done by my MFJ-945E mobile a.t.u.

Because I knew I would be operating in a room two floors up, an earth was not achievable and so my MFJ-931 artificial earth would tune a counterpoise wire thrown across the bedroom floor. With all four items of equipment roughly the same size, I'd experimented in the best way to pack them.

Eventually, I wrapped each item with two layers of bubble wrap and placed them in a suitcase, itself padded with three layers of bubble wrap in the base and lid. With the ancillary bits and pieces packed down each side, a complete Amateur Radio station was contained in a suitcase measuring 610 x 406mm, weighing only 12kg. This was designed to go in the aircraft hold and so avoid any possible complications that might arise from being X-rayed as hand luggage.

Many of you might throw up your hands in horror at risking valuable equipment in the hold. In my travelling experience, I have never suffered loss or damage to my luggage.

Operating VK2IXF

I knew that operating VK2IXF I would be limited in the kind of antenna I could erect and the best I managed was 17m of long wire sloping from the rear of the house to a small pole fixed on the back fence. I found I could load this well on 3.5, 7, 14 and 21MHz. I didn't try the WARC bands.

I should explain that I was located in the Glebe district of Sydney, which is a very densely populated area with hundreds of houses and other properties and very close to the city centre. I'd anticipated that the ambient noise level would be high. It was horrendous - a strength 9, heavy 'frying' noise immediately on switch on! Add to that the T1 drifting carriers, TV time-bases and a whole plethora of crackles, screeches, whistles and other unidentifiable noises and I very quickly realised that operating was not going to be easy in that location.

I decided that a listening mode would be the best way to start and get a 'feel' for the bands. I began with 3.5MHz as a good band for local contacts in the Sydney area.

At 1300 hours I tuned from one end of the band to the other. Apart from one signal, not a single Amateur transmission was heard! The exception was a Morse practice transmission put out by the WIA on 3.699MHz. So, I tried 7MHz - wide open and empty!

On 14 and 21MHz I could find nothing readable but there could have been signals buried under the very high noise level. The first day's listening was very disappointing.

Nevertheless, I carried on and came to realise that I was never going to get a QSO on 3.5MHz in spite of my many CQ calls, but 7MHz did offer better prospects. It was simply a matter of understanding the Aussie way of doing things! They didn't get going on 7MHz until about 1600hours!

Once I had the hang of it, I was well away and began to have some very good contacts, both locally and further afield. To the south, I was getting into Canberra and Melbourne and to the North, into Coffs Harbour and Brisbane. The antenna, which ran east/west was clearly firing north/south, although I did manage some contacts into the Blue Mountains area, west of Sydney.

I was particularly gratified by the excellent reports I was getting on my little TS-50, but also embarrassed because I was unable to respond in kind because of the high noise level, even though I was listening on earphones. However, this did not detract from the enjoyment of the QSOs.

● Packed and ready to go John's Amateur Radio gear bound for Australia.

Although the VK region 7MHz band is 300kHz wide, I didn't hear any stations above about 7.150MHz maybe because after dark the commercial signals are very strong. I did manage one interesting piece of DX when one night, I heard **JA2BAY** calling CQ on 7.093MHz. Hardly expecting to get through, I was staggered to receive a 5 and 9 report. That little TS-50 surely packs a punch! I did manage a couple of QSOs with VK3s and VK4s on 14 and 21MHz, but the high noise was the all prevailing problem.

Would I Do It Again?

I'm not sure I would operate again from VK land unless I can persuade my daughter and family to move from Glebe to a nice quiet suburb outside Sydney! I'd looked forward to DXing back to the UK and to working some of the rarer and exotic stations on the other side of the world, but the extremely high noise level made that a forlorn hope.

There is, however, another aspect, which regrettably is a reflection of the rather fraught times we are living in. Air travellers will know that on arrival at your destination and having cleared immigration, you collect your luggage from the carousel and generally make your way out through the green channel. I was following this procedure at Sydney Airport as I had done on previous trips when I found myself in a queue, waiting to be checked by two huge X-ray machines.

Since the Bali bombings, the Australians have become more security conscious and are checking every piece of luggage going into the country. From the point of view of a security officer, an air traveller with a suitcase full of radio equipment has to be regarded with some degree of suspicion!

I had all the reciprocal licence paper work and receipts for three of the four pieces of equipment so I was in a good position to argue my case. I was approached by a customs officer who asked for my immigration card and asked a few questions about the purpose of my visit to Australia. Then, quite unexpectedly, he wished me a 'Merry Christmas' and waved me out past the X-ray machine. If we have such a thing as an Amateur Radio Guardian Angel, mine certainly came good for me at that moment.

● The equipment set-up at VK2IXF.

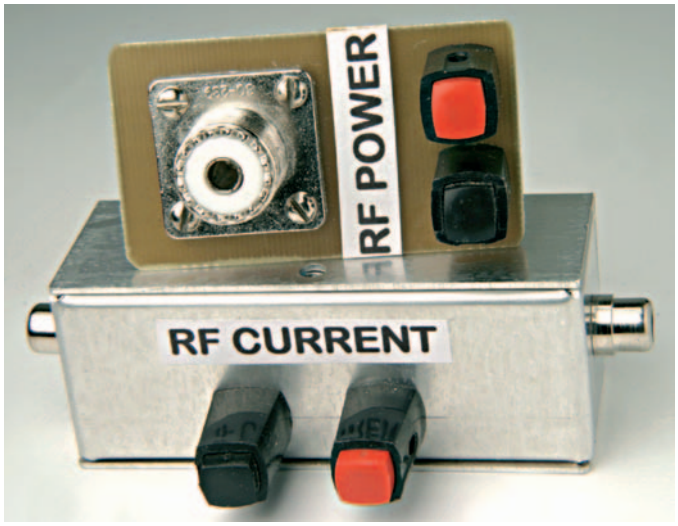
My experience does throw-up the question whether, in the present climate of world-wide insecurity, is taking our hobby abroad a good idea anymore? I'm too old to be a spy and too scared to be a terrorist so maybe for the future, I'll stay home and 'play radio' from the security of my own shack! I don't have that awful noise level there either!

PW

practical way

"Every contrivance of man, every tool, every instrument, every utensil, every article designed for use, of each and every kind, evolved from very simple beginnings" **Robert Collier**

This month the Rev. George Dobbs G3RJV is taking a look at an extremely important aspect of the radio hobby - taking radio frequency measurements. And of course...there's a project to build after you've read the quotation!



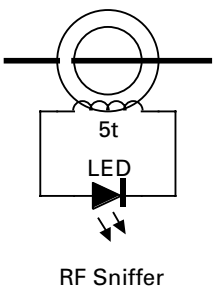
The little wooden lodge my wife **Jo** and I have in Wales is delightfully placed alongside a wood. A pathway from our small back garden leads directly into the wood and it's down this path that the local badgers come at night.

So, when I needed a low profile antenna for the h.f. station; the wood offered the easiest way to string up some wire. It needed to be modest and not easily visible, so I opted to try a W3EDP antenna. As many readers will know, this is an 84ft (25.6m) end-fed wire loaded against measured counterpoise wires.

The first antenna matching unit (a.m.u.) I used was the single coil Z-Match and I described this in this column for March 2003. However, the tuning is sharp and requires a reduction drive on the controls.

Later, a G QRP Club member using the lodge station suggested to me that I add an r.f. current meter. On reflection I think it's odd that I hadn't thought to add an r.f. meter, since I use one in my main home station!

● Fig. 1: A modern r.f. 'sniffer' (above) and circuit (below) using an ultra-bright or super-bright l.e.d. to indicate the amount of r.f. current passing through a wire. This is a modern version of the bulb-in-line system for providing an indication of r.f. current flow (see text).



RF Sniffer

WS2505

Smoke Up The Stack

What an r.f. current meter would do, in effect, is show the signal going along the wire and old timers used to call it..."showing how much smoke is going up the stack". In those days they may have used a bulb in series with an end-fed antenna wire and tuned for maximum brightness.

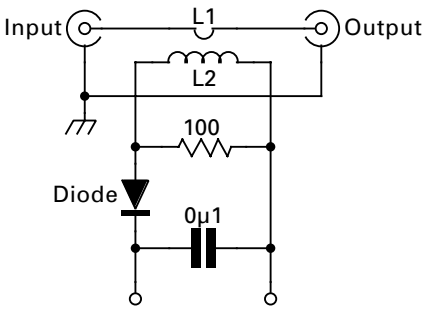
Ideally, they would have found a proper r.f. current meter which would probably be based upon a thermocouple meter movement. These, as a matter of interest use the current flow to heat a thermocouple (usually two different forms of wire in contact with each other) which then produces another current which can be indicated and measured. Thermocouple meters are nice things to have...if you can find one, but these days they are difficult to find.

Perhaps the nearest modern equivalent to the bulb-in-the-line idea is the r.f. sniffer shown in **Fig. 1**. This uses an ultra-bright or super-bright l.e.d. to indicate the amount of r.f. current passing through a wire.

The current is sensed using a simple transformer and the r.f. bearing wire passes through the centre of a ferrite core, forming one turn. The wire passing once through the core is counted as one turn (**Note:** if it's looped around the core that would be two turns).

The type of core and number of turns in the secondary

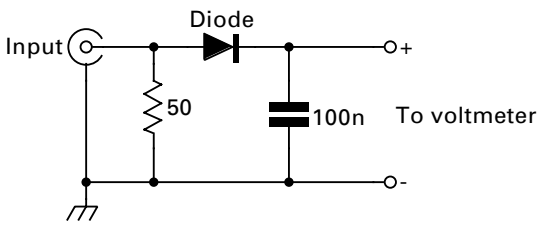
● Fig. 2: Circuit of a simple r.f. current flow indicator (see text).



To digital or analogue voltmeter

WS2506

● Fig. 3: A simple r.f. voltage probe circuit. This is a peak voltage probe as it measures the peak voltage of the r.f. voltage waveform. The diagram shows an r.f. input signal being fed to a 50Ω load (see text).



RF voltage probe

WS2507

winding are open to experimentation. From my own experience I've found it's worth trying any small ferrite core rather than buying one!

I found that an FT37-43 core with five turns of pvc covered 'hook-up' wire worked well at QRP power levels. However, measurement using the brightness of an l.e.d. is very subjective and an analogue meter would be much better.

An RF Current Probe

The usual circuit for an r.f. current probe is shown **Fig. 2**. Once again, the r.f. bearing wire forms the primary of a transformer. The winding, L1, is formed by the wire passing through the centre of the core. The winding, L2, which forms the secondary, is made up from five turns passing through the core as in the r.f. sniffer.

The ratios described represent a five times reduction in current from primary to secondary. **Note:** A 1:5 ratio in a transformer will increase the voltage five times but reduce the current five times.

A 100Ω load resistor across the secondary provides a voltage, which can be measured and the diode and capacitor form a peak reading r.f. probe to feed a volt meter. The arrangement shown produces a viable voltage, easily measurable with a milliamp reading meter and a suitable series resistor.

Incidentally, a meter could be calibrated directly in antenna current but this involves 'tip-toeing' through r.m.s. and peak value calculations and taking into account diode voltage drop. In practice such instruments are normally used to indicate peak readings during antenna tune-up without the need for a definitive current value.

Ferrite Core

As with the r.f. sniffer, a ferrite core is required for the transformer on the current meter. Most junk box cores would probably work in the circuit. Named suitable cores would include the FT37-61 or FT37-43.

The ideal diode is one with a small forward voltage drop. Germanium diodes, such as the OA91 or 1N34A are a good choice, schotty diodes are even better, although I have used small-signal silicon diodes, like the 1N914 and 1N4148 in such circuits.

I advise that you avoid the use of silicon power diodes (1N4001, etc.). This is because of their higher internal capacitance.

Looking At RF Voltages

At this point I think it's also worth looking at r.f. voltage measurements. Regular readers will remember that many times over the years in this column I've described the use of r.f. probes to measure r.f. voltages using a typical bench voltmeter. Usually the type I've used have been peak-to-peak voltage probes using a two diode doubler circuit.

The r.f. voltage probe shown in **Fig. 3**, is a peak voltage probe as it measures the peak voltage of the r.f. voltage waveform. The diagram shows an r.f. input signal being fed to a 50Ω load. The diode and capacitor combination produce a voltage, which represents the peak of the r.f. signal. It works because the diode charges up the capacitor to the peak voltage of the waveform at the input.

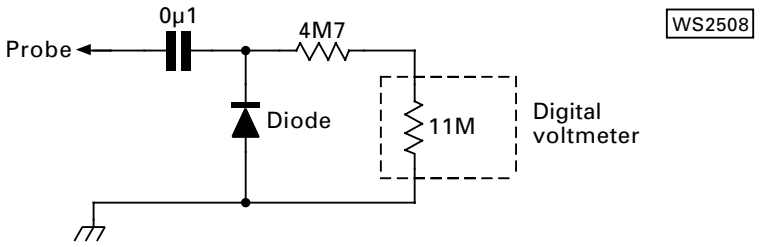
In fact, the effective power of an r.f. signal is not the peak value but the root mean square (r.m.s.) value of that signal. The r.m.s. value is 0.707 times the peak value (if the signal is a pure sinewave).

Values for power measurement across a 50Ω load are below:

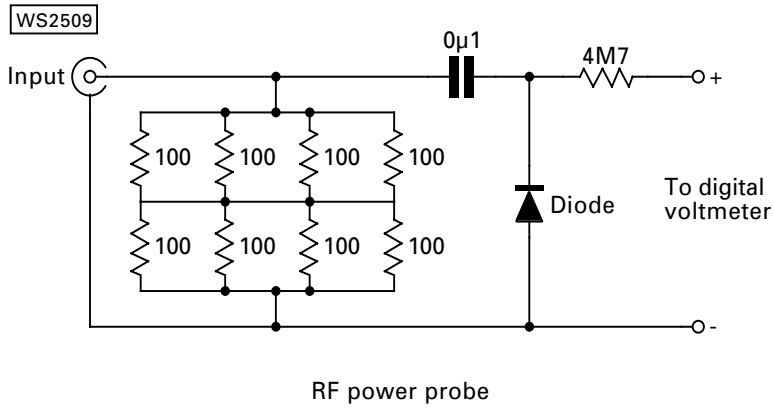
Power (Watts)	RMS Volts	Peak volts
5W	15.8V	22.3 V
2W	10V	14.4V
1W	7.07V	10V

Note: In practice these results would be slightly different. They are dependent upon the diode used and other variables such as the possible capacitive effects in the 50Ω load and the wiring.

It's not difficult to convert peak values to r.m.s. values; 0.707 times the peak gives the r.m.s. value. This can be done automatically by having a simple resistive potential divider included in the circuit. To help, a root mean square r.f. probe using a digital multimeter is shown in **Fig. 4**.



● Fig. 4: A root mean square (r.m.s.) r.f. probe using a digital multimeter (see text).



● Fig 5: A simple r.f. power probe. This is probably the simplest way to measure r.f. power with the r.f. signal being fed to a 50Ω load of a suitable power rating (see text).

The typical input resistance of a digital multimeter is some 10 to 11MΩ. The 4.7MΩ resistor together with the internal meter resistance (Fig. 4.) produces the required division of voltage.

Note: 4.7MΩ is an off-the-shelf standard value and works for an input resistance of 11MΩ. In theory this value should be modified to suit the actual value of the input resistance of the meter but in practice the 4.7MΩ is accurate enough for most digital multimeters.

Simple Power Probe

A simple r.f. power probe is shown in **Fig. 5**. This is probably the simplest way to measure r.f. power. The r.f. signal is fed to a 50Ω load of a suitable power rating and the r.m.s. probe produces an output for a digital voltmeter. The power output is the r.m.s. voltage squared, divided by the impedance (50Ω)

That's; $(V_{r.m.s.})^2/_{50}$

So, read the meter and perform the simple calculation to know the power of the signal.

Now, here are a few words about the 50Ω load. The resistor has to be capable of handling the maximum intended power for measurement. It must also be a non-inductive resistance so wire-wound resistors are not suitable. **Take care here because most high wattage resistors are wire-wound**.

Carbon or carbon composite resistors can be used in series or parallel or series/parallel arrangements. The example, Fig. 5, uses a series/parallel arrangement of 100Ω resistors. Each resistor shares the power, so if each resistor is a half watt (500mW) type the total power handling is 4W… and so on. Readers can work out suitable combinations for themselves. If not higher wattage resistors are available, one useful combination is 20 separate 1kΩ, quarter watt (250mW) resistors connected in parallel to make a 50Ω, 5W load.

The solution lies with a little Ohm's Law calculations. For average Amateur r.f. measurements, the circuitry and the calculations are very simple - so have a go and enjoy yourself!

pw

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Antenna Workshop

Richard Marris G2BZQ presents an antenna that can be erected in five minutes - indoors/outdoors - horizontal/vertical - or you can just hang it out of the window. As a plus-point it also tunes to the 7MHz band.

This project all started with a requirement for a quick assembly (about five minutes) utility antenna for 3.5MHz c.w. It seemed to be a great idea to be able to quickly erect a simple antenna, a little under five metres (16ft) in length, in under five minutes? But to achieve this an end-fed antenna would have to be loaded and needed a good earthing system.

However, when I took a look at an ancient coil of 300Ω flat-twin feed-line, which had hung on the garage wall for several years, suddenly the thought occurred that around five metres of this contained a total wire length of some 10m, if the end were soldered together. Such a length of wire, can be formed into a loop of a little under three metre diameter, which experience showed that it would produce a very effective tuned loop for transmission and reception.

So, I wondered, why not try an experiment, using the 300Ω twin as a long thin elongated loop antenna? Using this twin feeder as the loop would have some useful capacity between the twin wires (see later) and if it performed as a transmission loop antenna, it would be a design that wouldn't be so 'earth conscious'.

The schematic, if I may call it that, is shown in **Fig. 1** and the circuit couldn't come much simpler. Every item I used, came from the 'junk box', though once it was found that the idea worked quite well, a small investment was made in a new length of twin feed-line and a piece of copper clad board to serve as a base mounting plate ... about the price of couple of beers!

No TVI Or BCI

In the event, the prototype, described here, worked very well when coupled to a 3.5MHz 10W c.w. transmitter. There was no TVI or BCI noted. It also produced a low noise level on receive. This was no doubt due to it being a comparatively narrow bandwidth device. As a bonus, I found that it would also tune and load on the 7MHz band.

With a piece of nylon cord attached to the far end, the antenna could be erected in about five minutes. And, unlike many 'short' antennas, it was very docile in loading up with from the transmitter and in its operation.

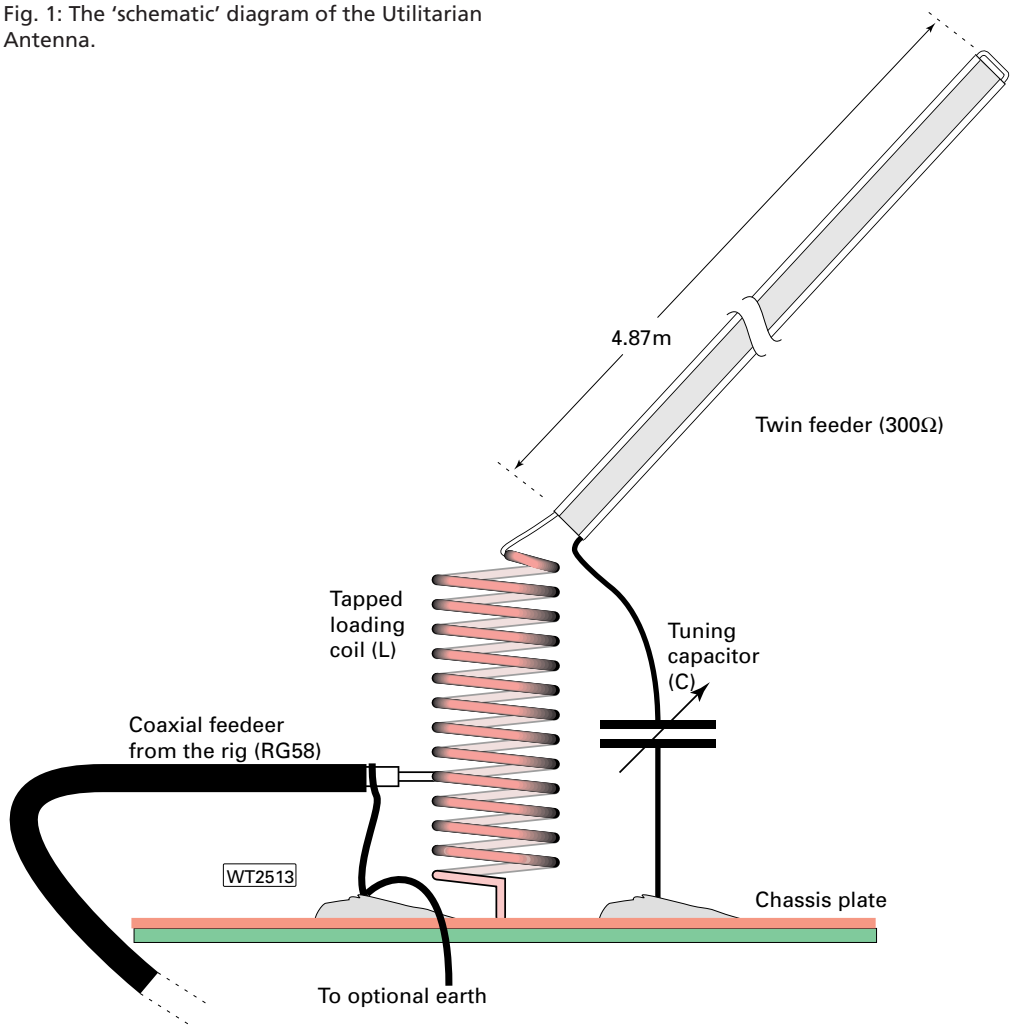
Let's just take a detailed look at the 'circuit' of Fig. 1. The antenna consists of a 4.87m length of 300Ω feed-line, shorted at the far end, by soldering the two feed wires together. If carried out carefully, this operation can provide a small eyelet, through which a length of thin nylon cord can be secured. This then acts as an end support to the antenna.

One side of the feed-line is connected to the variable capacitor 'C' to tune the antenna. The other feed-line end wire is connected to coil 'L' with a short length of RG58 coaxial cable tapped up from the bottom, to 50Ω, for connection to the transmitter. Both 'C' and 'L' are firmly secured to a copper clad board baseplate.

The 300Ω feed-line has a quoted capacity of 13.2pF per metre between the two wires. As a result we have approximately a total capacity of 63pF spread evenly over the full length.

Variable capacitor 'C' was a two-section, 410pF per

Fig. 1: The 'schematic' diagram of the Utilitarian Antenna.



section and conveniently fitted with an inbuilt slow motion drive. Only one section is used, though if the other section is connected in parallel, with the one used, it's possible to cover 'Top Band'. But, on this band, the performance is not good, however, it might be okay for local working.

One Section

Although I used one section of my junk-box capacitor, you could also use both sides of a dual 210pF per section unit. In fact almost any robust variable capacitor would suffice, providing it had good insulation, plus air spacing between the plates. A capacitor with a total value of between 350 and 500pF would be satisfactory.

Preferably the capacitor should have a slow motion drive, if not you can add an external one instead. As the unit isn't at an r.f. 'earth' potential, then to minimise hand capacity detuning effects, an insulated shaft to the tuning knob is necessary.

The illustrations of **Fig.**s **2** and **3**, show the simple layout of a piece of copper clad board (250 ×180mm). The tuning/loading coil 'L' is wound using 2mm (16s.w.g.) tinned copper wire close-wound on a piece of 22mm o/d tubing, using 20 close-wound turns, with a 50mm tail at each end. When this is removed from the mandrel, it will spring out to some 25mm diameter. The turns should be carefully pull-spaced, to an eventual one wire diameter spacing. This action makes the coils some 75-80mm long.

The ends of the coil should then be bent and mounted as shown in Fig.s 2 and 3, with one end soldered to a screw or solder post on the 25mm long insulated pillar. The other end of the coil should be mounted to keep the coil around 25mm from the baseboard. where the other tail should be securely soldered to the copper clad base plate.

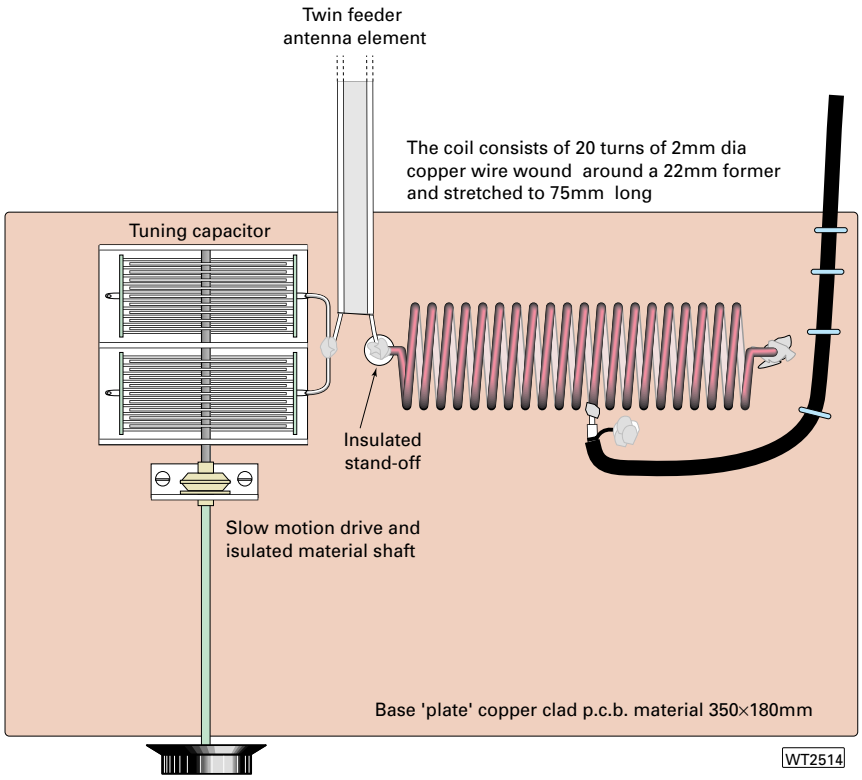
After soldering the outer shielding to the copper clad base plate, the coaxial cable should be secured with cable cleats, as shown. The coaxial cable also can also be folded when not in use and secured with a rubber band. But now you're ready to begin the testing phase!

To begin the next phase, the position of the coaxial cable tap will be found during testing but, at the assembly stage, should be lightly secured at 10 turns from the bottom. (In fact this was the final position on the prototype). Now all that's needed for testing is a transmitter, receiver and a field strength meter.

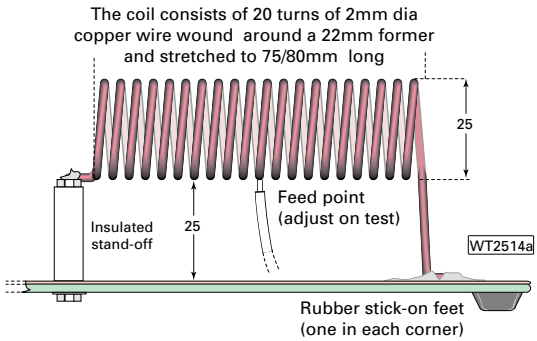
Hang the antenna with a length of nylon cord to a suitable in-room fixture, for initial testing. Tune the receiver side to about 3.55MHz and rotate the variable capacitor for maximum signal/noise. If using a separate transmitter, tune it to the same frequency as the receiver and match it into a 50Ω dummy load.

Substitute the antenna for the dummy load and feed a small signal into the antenna, which should produce a reading on the field strength meter (f.s.m.). It's just possible that it may be necessary to re-adjust the antenna variable capacitor minutely, by noting the radiated output on the f.s.m. Increase the transmitter power, as required and re-check.

Note: the simplest and best method of tuning up is by measuring the radiated signal on the f.s.m.



● Fig. 2: Looking down on the baseboard shows the location of all the parts.



● Fig. 3: The tuning/loading coil should be mounted so as to be parallel to and about 25mm away from the baseboard.

Testing Phase

During the testing phase of my original prototype, using the initial 'lashed up model' with the antenna draped over the back of three chairs, in a rough semi-circle, a DL station was heard calling QRZ? on the same frequency. A quick call to him produced a short QSO which was, certainly, not in the script!

In practice, the antenna wire can be hung vertically, horizontally or down (such as out of an upper window) or at any angle in between. An optional earth connection can be made as in Fig. 1. However, it didn't appear to make any difference to performance. No doubt this is because the antenna works as an elongated tuned loop.

Although not earthed at the antenna, the equipment is earthed in the usual way to maximise safety. I've found that the antenna 'loop' can be slung up indoors or outdoors (or part in, part out). It's very versatile ... as intended.

Don't forget, the most satisfactory way to load up the transmitter is to record radiated output on a field strength meter. Enjoy using your 'Utilitarian'!

PW

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valve & vintage

The warm smell of polished wooden cabinets and valves provide a clue that Charles Miller is looking after the 'wireless shop' this month. It's 1953 and Charles recalls his early days in radio and TV servicing, with freezing brake drums and fiery rockets!

As regular readers will already know, my first workshop after I had left the RAF and started up again as a self-employed radio and television engineer was a purpose-built affair. What exactly the purpose was eludes me now, but I suspect that it had something to do with minimising costs.

The original workshop came from a local ex-Government dealer as a bolt-together steel framework intended originally for a tent. It was about twenty feet (6m) long by eight (2.4m) wide and around seven feet (2m) high at the eaves and once set up was extremely rigid and strong.

My colleagues and I erected it in the garden behind my parents' home and clad it with sheet asbestos for the walls and corrugated iron for the roof. For the floor we used the sides of a very large and heavy wooden crate obtained from the same dealer. For the benches we used old kitchen tables which could be bought for a shilling or two apiece at our local auction.

The lighting came cheap too! I was determined to have a fluorescent tube over the bench to give shadow-free illumination but although the tubes cost only 10/6d (52.5p) the necessary fitting would have set me back about £5, so I made my own.

For a choke I used the field winding from an old energised loudspeaker and instead of using a conventional starter I wired a bell-push between the tube heaters. You switched on, depressed the bell push for a few seconds until the heaters glowed, then released it whereupon the tube ignited with a resounding rattle from the sorely-tried field winding.

Decidedly Cramped

That little workshop served me well for three or four years, although latterly as trade built up it became decidedly cramped. Also Dennis, who by then was working for me, and I discovered the hard way that asbestos is far from being the ideal material for workshop walls. The place was like an oven in summertime and like a refrigerator in the winter.

To counteract the cold we used a venerable old electric fire which, predictably, came cheap because it was well past its best. Whenever its rod element went open circuit, which was frequently, we simply twisted the broken ends together to form a rough repair. The trouble was that this sort of joint was comparatively high-resistance, which caused the element at this point to overheat very considerably, sometimes to the stage where the ceramic rod would melt and fire off bolts of fire around the room!

The fire-bolts looked very pretty but could hurt like hell if they landed on your foot. I once saw Dennis set his shoes on fire by holding his feet too close to the element, and very picturesque the smoke looked too...as it curled up through the lace holes.

If it was cold in the workshop it was perishing outside in that winter of 1953, when, as Spike Milligan remarked...*"the snow lay heavy on the slopes of Brigitte Bardot"*. As per usual, many service calls had to be done in the evenings and one of these led to my having one of my most alarming motoring experiences.

The incident took place on a night when several inches of frozen snow covered the ground. Dennis and I had gone out for some reason, not in my van but in my father's little Morris 8 Series E car. I parked it outside the customer's house, which was towards the top of a long slope and because of its steepness I made sure that the hand-brake was well and truly on.

When we returned to the car about half an hour later I released the hand-brake and started what I thought was my usual 'pull away'. The car moved off but after about one yard's normal progress it turned abruptly round 90° and proceeded down the rest of the hill sideways and totally uncontrollable.

At the bottom of the hill was a T-junction with a main road, the thought of which caused us some lively speculation as to our probable fate. We entered the main road, which was by some miracle traffic-free, in an unorthodox manner by sailing past the 'Halt' sign sideways and fetching up against the opposite kerb with a bone-jarring jerk.

When we had gathered our wits about us again and breathed thanks for our deliverance from a distinctly dodgey situation. We then turned our attention to the problem of how on earth were we to get home. Frankly, I'd had enough of sideways motoring and for that matter so had Dennis!

It was Dennis who deduced that one of the rear brakes had frozen on during our sojourn in the customer's house, thus causing the 90°. Dennis then bravely proved the theory by lying underneath the car on the snow and brutally assaulting the offending brake mechanism with a large hammer, upon which it relented and freed off. What had happened was that water inside the hand-brake operating cable had frozen, and since that day I have never left the hand-brake of any vehicle set on when the temperature is below freezing point.

Urgent Expansion

Soon we outgrew the workshop and urgently needed to expand. Very fortuitously the house next door was demolished by the local council and I was able to rent the site for just a few pounds a year. On it we built out of proper materials a workshop about twice the size of the first, using our experiences with this to install more convenient large benches and other servicing facilities.

The council had left the former adjoining wall of the house in position and we were able to cut a doorway into this to give communication between the two workshops. Shortly after we had completed the new building 'Big Ken' appeared upon the scene.

At six feet eight inches (2m) Ken looked big anyway but when he first appeared by stooping through the interconnecting door he appeared immense! He was looking for a job and as he appeared to be not only reasonably competent but also possessed the necessary insane sense of humour I took him on at once.

As one of Ken's first tasks I asked him to load some radio and television sets into the Austin van (for some reason or other I forgot to mention that its near side rear tyre was flat and needed to be changed). A little later Dennis and I poked our heads around the outer door of the new workshop and perceived, some 50 yards (46m) distant up the yard, Ken bending down doing something to the wheel.

Now, Ken bending down was a sight to behold, for his extreme height caused him to fold himself up with his rear end sticking out into a shape something like a distorted question mark. Dennis and I looked at each other, two minds with but a single wicked thought.

In the workshop was a small rocket left over from the previous Guy Fawkes Night and it was but the work of a moment for us to find it, insert it into a handy empty beer bottle, take aim, light the blue paper and retire immediately. The result was pleasing to the eye, or at least to our eyes; the rocket hurtled up the yard at around his knee level and passed by Ken's bottom with a banshee-like howl that caused him to leap gracefully into the air, performing as he did so a pirouette that enabled him to catch a glimpse of the rocket as it sped on its way to impinge with a powerful explosion on the outside toilet at the end of the yard.

Dennis and I looked at each other again with that quiet contentment that comes from a job well done. After Ken had recovered he took it quite well too, appreciating that in similar circumstances he himself would have found it difficult to resist launching a missile at such a tempting target. All the same, I pictured him going home and on being asked by his parents how he had got on in his new job telling them that his new employer had fired a rocket at him!

Ken settled in well and work continued to expand, to the stage where an even larger workshop was needed to cope with it all. I found it thanks to an old school friend who worked for an estate agent and it 'fitted' the bill nicely

Former Shoe Factory

My friend had heard of a small former shoe factory that had become available for rent and once I had looked over it I considered that it had possibilities. The place was about a 100ft (30m) long and 30 ft (10m) wide, with a ground floor and an upper floor.

● "the rocket hurtled up the yard at around his knee level and passed by Ken's bottom with a banshee-like howl that caused him to leap gracefully into the air".

It was too large for me alone but I got over this by subletting the ground floor to a greengrocer for storage purposes and using just the upper floor for a workshop.

With all that space available we were able to put in three really large benches, once for each of us, and still have plenty of room for storing sets awaiting repair or delivery. There was a drawback in that everything had to be carried up a flight of stairs, but we were young and active and this didn't bother us too much.

The staircase was a wooden structure built against one wall of the building and its interior had at some time in the far distant past been whitewashed. With the passage of time the whitewash had become exceedingly flakey and we had to be very careful when passing up and down the stairs not to disturb it and get covered with the stuff.

Now, living in a cottage near the factory was a lady customer with an L-I-S-P pronounced lisp, and from time to time she would come to the foot of the stairs and shout up "Mishter Miller"?....to which the standard reply, whoever it might be who answered was "Yesh"?

One day this lady let it be know that she was desirous of discussing the condition of her television set with an engineer, so naturally we sent Ken down to attend to her. We carefully closed the door at the top of the stairs and I took up large broom with which we swept the floor now and again. Lifting it above my head I swung it around like a hammer-thrower and clouted the side of the staircase with a sound like a thunderclap.

Dennis and I then went back to our benches and awaited events. A few minutes later Ken staggered into the workshop covered from head to toe in whitewash flakes and looking like a mobile snowman. He was also paralytic with laughter. Apparently he had just opened his mouth to speak to the lady when everything around him was blotted out by the whitewash blizzard.

However, the lady appeared to have noticed nothing unusual and had attempted to carry on a normal conversation until she had realised that she was not receiving any coherent reply, then had departed. This experience did not seem to put her off because the following day we once again heard that clarion cry of "Mishter Miller"? My customers were nothing if not loyal!

To be continued..... *PW*

VHF DXER

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REPORTS & INFORMATION BY THE LAST SATURDAY OF EACH MONTH.

THIS MONTH DAVID BUTLER G4ASR HAS REPORTS OF SPORADIC-E AND AURORAL OPENINGS

July was an excellent month for the v.h.f. DXer. The 50MHz band was open via Sporadic-E (Sp-E) propagation on all but a few days during the month. Contacts up to 8000km were made from the UK with stations in Europe, Africa, Asia, South America and North America.

The season was noted for numerous 50MHz openings into central America and the Caribbean area but far less than usual into Canada and the USA. The 70MHz band was also quite lively with a number of operators making cross-band contacts (typically to 50MHz) with stations throughout Europe. Of course, two-way contacts were also made but there are relatively few countries with authorisation to operate within the 70MHz band.

Conditions were good on the 144MHz band with daily contacts being reported via meteor scatter (m.s.) with stations around 1500km away. Sporadic-E propagation was noticeably reduced compared to previous years but nevertheless a number of 144MHz openings during July were reported.

Tropospheric propagation was reasonably good and during one three day period the 3000km path to the Canary Islands opened up allowing some very long distance 144MHz contacts to be made by stations in south-west England. Geomagnetic conditions in the last week of July were very disturbed and two very large auroral (Au) openings were reported. Contacts were made on all bands from 50 through to 430MHz with distances approaching 2000km. All-in-all, a pretty good month.

THE 50MHz BAND

Apart from a few days towards the end of July there were daily openings via Sp-E propagation on the 50MHz band. As expected most of these openings were pan-European but occasionally the skip distance extended enabling contacts to be made with stations in Africa and Asia.

Some of the more interesting DX contacts reported included the stations of CN8AT (Morocco), CT3KU (Madeira Islands), CU8AO (Azores), EH8BPX (Canary Islands), EH9IB (Ceuta & Mellila), HB0/IZ2DPX/P (Liechtenstein) OD5NH (Lebanon), OJ0VR (Market Reef), OY4TN (Faroe Islands), SV2ASP/A (Mount Athos), SV9/OM2TW (Crete), SX1A, SX3A, SX5A, (Olympic Games special event stations in Greece), T77GO (San Marino), YA1RS and YA4F (Afghanistan), ZA/IK0OKY (Albania), ZB3B (Gibraltar), 3A2MD (Monaco), 4X1IF (Israel), 5B8AV (Cyprus), 5T5SN (Mauritania) and 7X0AD (Algeria).

What set this year's Sp-E season apart from others were the numerous openings during July into central America and the Caribbean area. Contacts were reported on 10 days between 1-8 July, 12 and 26th and this contrasted sharply with only three openings on 3, 6, 8 July into Canada (VE) and the USA (W).

Normally, the situation would be reversed with around 10 openings to North America and very rarely to the Caribbean islands. Openings were quite lengthy and included the countries of Bahamas (C6), Dominica (J7), Dominican Republic (HI), Martinique (FM), Netherland Antilles (PJ2 - South America), Panama (HP), Puerto Rico (KP4), Saba (PJ7), Saint Christopher & Nevis (V4), Saint Martin (FG), Trinidad & Tobago (9Y), Turks & Caicos Islands (VP5), Venezuela (YV - South America) and Virgin Islands (KP2).

According to the DX Cluster network over 75 countries in five continents were worked from the UK on the 50MHz band during July and that is an impressively high number.

Daniel Lee MW1MFY (Monmouthshire IO81) seems to have caught much of the action. On 26 June he contacted the station of J79KV and on 3 July the station of PJ7M, both of which are claimed to be first contacts with Wales. Between 2038-2221UTC on 3 July Daniel also worked VE1ZZ, VO1PJN, K1SIX, W1FC, K4PI, NG4C, K5AND, K6EID and K7BV. On the following day at 1050UTC the station of N3DB was contacted on s.s.b. followed later in the evening by QSOs with KP4EIT, PJ7M and YV4DDK.

Propagation on 6 July was excellent with contacts being made between 1825-2105UTC with the stations of FM5WD, NP3CW, KP4EIT, KP4/N1TKK, WP4NEG, WP4NIX, V44KJ (for another GW first) and 9Y4AT. Dan also reports that he was the only one in the UK to work YA1RS when he contacted that station at 1413UTC on 10 July.

THE 70MHz BAND

A busy month on the Four Metre band during July with the National Field Day (NFD) contest, a number of Sp-E openings, the regular Tuesday night activity periods and two excellent auroral back-scatter events. A number of portable 70MHz stations were active during v.h.f. field-day at the beginning of the month. Most reported that band conditions were flat with no Sp-E propagation to liven up activity. Some even suffered from static rain, which wiped out the band for up to an hour or so at a time.

Predictably a few hours after v.h.f. field-day had finished the first Sp-E opening of the month took place! Between 1730-1800UTC on 4 July the stations of S51DI (Slovenia) and 9A3AB (Croatia) were heard making contacts on the 70MHz band with stations in central and northern England. The station of OK1DOZ (Czech Republic) reported hearing GW3LEW peaking 599 on 70.190MHz but could only make a cross-band contact to 50MHz as he does not have permission to transmit on the Four Metre band.

A further 11 Sp-E openings reached the 70MHz band and these were reported on 8-11, 14-16, 21, 26, 29-30 July. Stations heard working into the UK and with authorisation to operate within the band included OZ1DJJ, OZ2LD, OZ2SVY, OZ3ZW, OZ6JI, OZ7IS, S53J, S53X, S57LM, S59MA, 9A2SB and 9A6R. Other stations including some from I, LZ, PA, YO and YU were clearly very enthusiastic but regrettably did not have permission to use the band.

Other more responsible operators decided on the correct course of action and operated cross-band to 50MHz. These included the stations of F8DBF, IH9/I2ADN, IS0GQX, OE5MPL, YU7EF and 9H1AW.

CALLING CQ AURORA

During the last week of July a large active sunspot region unleashed several X-class solar flares which gave rise to auroral activity between July 22-27. Particularly strong events occurring on 25 and 27 July both of which reached as high as the 430MHz band. **Richard G4HGI** (IO83) was active on the 144MHz band in both events. He uses an Icom IC-746 transceiver with an MGF1302 low-noise amplifier and a GS35B amplifier running 400W into a 13-element F9FT Yagi.

On 25 July he observed that there were two reflecting areas, one located at 45 degrees and the other around 80 degrees. A total of 82 QSOs were made with stations in 17 countries, Czech Republic (OK), Denmark (OZ), Eire (EI), Estonia (ES), Finland (OH), France (F), Germany (DL), Hungary (HA), Latvia (YL), Lithuania (LY), Netherlands (PA), Norway (LA), Poland (SP), Slovenia (S5), Sweden (SM), England and Scotland.

The event on 27 July was fairly similar although the beam-heading was at 80 degrees for much of the opening. Richard reports contacting 85 stations in 14 countries, which included Austria (OE), Croatia (9A), Italy (I), Slovakia (OM), Switzerland (HB9), DL, F, HA, LY, OK, OZ, PA, SM and SP.

I was active at my QTH (Herefordshire IO81) during the aurora on July 27 on both the 70 and 144MHz bands. During the early phase and at the end of the event I concentrated on the Four Metre band and it was really good to hear so much activity. Running 100W into a 6-element NBS Yagi I made c.w. and s.s.b. contacts with the stations of EI3IO 59A (IO61), EI7IX 55A (IO53), GI4KSO 59A (IO64), GM3UAG 57A (IO87), GM6VXB 58A (IO97), OZ2LD 53A (JO54) and OZ3ZW 55A (JO54).

I also heard but didn't call GD0TEP (IO74), GW3HWR (IO71), G3JYP (IO84), G3LVP (IO81), G3SHK (IO90), G4OBK (IO94), G4RGK (IO91) and G4YTL (IO92). All the current UK beacons GB3ANG (70.020MHz), GB3BAA (70.015MHz), GB3BUX (70.000MHz), GB3MCB (70.025MHz) and GB3WSX (70.007MHz) were clearly audible via the aurora as was the OY6BEC (70.035MHz) beacon.

Two days earlier on July 25 between 1145-1645UTC there was a similar auroral event. Some of the 70MHz stations active during this opening included GM4VVX (IO78), GM4WYL, MM0BSM (IO86), G0EZY (IO91), G3LQR (JO02), G3WOS (IO91), G3YJX (IO70), G4DEZ (JO03), G4EZP (JO01), G4FUF (JO01), G8VHI (IO92) and G8XVJ (IO83). When the aurora on July 27 had intensified I moved up to the 144MHz band and between 1412-1602UTC made 57 c.w. contacts with stations in DL, F, HA, I, OH, OK, SM, SP, S5, YU and 9A. Running 400W into an 18-element Yagi my best DX contacts on the 144MHz band were with the stations of HA9EV (1736km), OH1NOR (1745km), YT7IM (1771km), HA8CE (1786km), HA8V (1790km), HA0MK (1800km), HA0HO (1802km) and YT1VV (1815km). Other c.w. contacts included HA1FV, HA3HV, HA5BSW, HA5KDQ, HA5KG, HA5PT, HA5UK, HA6NY, IV3HWT, IK4MPB, S52AA, S53J and 9A6NDX.

● Members of the Flight Refuelling Amateur Radio Society (FRARS) discussing how to get the 2.4m 1.3GHz dish up in the air during VHF NFD July 2004.

SPORADIC-E

On 2, 3, 5, 8, 10 and 11 July the maximum usable frequency (m.u.f.) reached beyond the 144MHz band. The effect called Sporadic-E is caused by very high concentrations of electrons in the E-layer being forced into a thin layer by upper atmospheric wind shears. The event on 2 July occurred between 1255-1415UTC with stations over much of England making s.s.b. contacts into Italy (I), Malta (9H), Sardinia (IS0) and Sicily (IT9). Best DX appears to have been between the stations of G4LOH (IO70) and 9H1ET (JM75) at 2245km.

A patchy event was reported on 3 July between 1105-1135UTC to the Canary Islands (EA8). Contacts approaching 3000km were made by a few stations in south-east England. The next event to hit the 144MHz band was reported on 5 July around 1834UTC but it only lasted a few minutes. Stations in southern England reported hearing CN8KD (Morocco) and a few Italian stations.

The Sp-E opening on 8 July was a much more intense affair with the 144MHz band active between 1150-1340UTC Stations throughout England reported working into Bosnia-Hercegovina (T9), Bulgaria (LZ), Croatia (9A), Hungary (HA), Italy (I), Macedonia (Z3), Romania (YO), Slovenia (S5) and Yugoslavia (YU). At the QTH of **Mitko LZ3NY** (KN12) s.s.b. contacts were made with UK stations G0BBB, G0NFA, G4DBL, G4RGK, G8IZY (all in IO91) and with G4LOH (IO70).

Up in north-east England the station of **G8GXP** (IO93) found a small patch of Sp-E and managed to make s.s.b. contacts on the 144MHz band with T94DU (1722km), 9A4KF (1769km), I4CVC/7 (1825km), YZ7EW (1879km) and IK7LMX for best DX at 2055km.

The next 144MHz opening occurred on 10 July between 1850-2005UTC to stations in Bulgaria, Italy, Malta, Poland, Sardinia, Slovenia and Yugoslavia. Best DX of the opening was probably the s.s.b. contact between GW4DGU (IO71) and 9H1AW (JM75) at 2310km. The opening was followed by a rare field-aligned irregularities (f.a.i.) event with stations being worked in Italy and Slovenia. UK stations needed to beam at a 'hot-spot' located on a bearing of 85 degrees from southern England.

The last Sp-E event of the month on 11 July was reported between 1740-1820UTC to stations in Spain (EA5, EA7 call areas). For one brief period the skip distance extended to the Canary Islands with the station of G7RAU (IO90) working EA8BPX (IL18) with 59 signals over the 2700km path.

DEADLINES

That's it again for another month. Good luck with your DX contacts and please let me know what you managed to work. Send your reports or news, preferably by E-mail, to reach me by the last weekend of the month.

73 David G4ASR

HF HIGHLIGHTS

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REPORTS, INFORMATION AND PHOTOGRAPHS TO ME PLEASE BY THE 15TH OF EACH MONTH.

I have had several enquires regarding the antenna used by **Alex Shillito G2FRY** in Nottingham who does very well on h.f. with a simple vertical mounted in his bedroom alongside a wardrobe. Well, I managed to have a long chat with Alex and he kindly forwarded a drawing of the antenna for you all to see (**Fig.1**) together with details of its installation and how it was constructed.

The metal rod is the element from an old CB antenna. A coil made of 30 turns of copper wire is wrapped around wooden dowel and then fixed to the bottom of the rod. A length of RG-58 coaxial cable feeds the antenna which is tuned by an a.t.u. and the earth is a central heating radiator which is about two feet from the antenna. This set-up in his bungalow (400ft a.s.l.) works extremely well and allows Alex to operate c.w. on 14, 21 and 28MHz and as an example He told me he worked into Brazil, Japan, Aruba and Argentina this month.

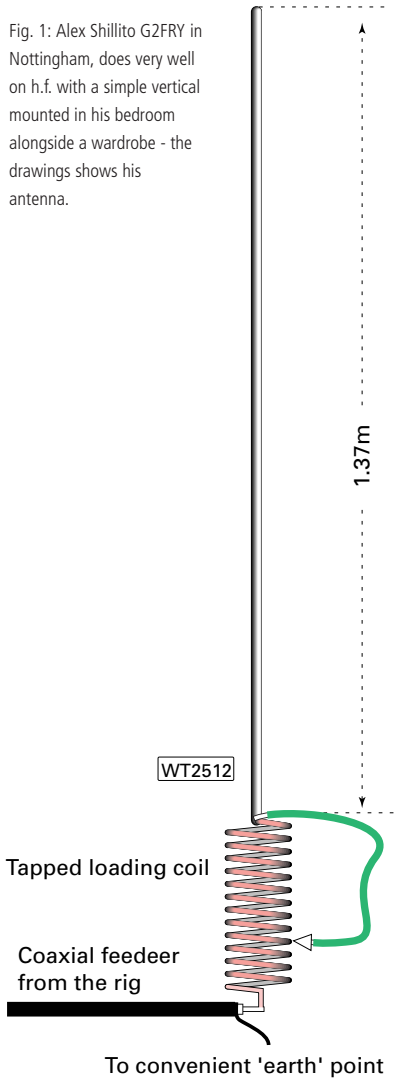

Fig. 1: Alex Shillito G2FRY in Nottingham, does very well on h.f. with a simple vertical mounted in his bedroom alongside a wardrobe - the drawings shows his antenna.

DX NEWS

Onto some DX news now and a group from the **World Wide Young Contesters** (WWYC) will be active as **OJ0YC** from Market Reef EU-053 between the 23rd and 26th of September. The operators will be OZ1AA, OH6GDX, SM3WMV and KU5B. They plan to operate on all bands and modes and to participate in the **Scandinavian Activity Contest** (SAC) using s.s.b. A QSL card will be made available via **Patrik Willfor OH6GDX, Langviksgatan 24 B13, FI-65100 Vasa, Finland** and full details of the operation are available at **http://oj0yc.m3php.net/**

Eight members of the **Tennessee Valley DX Association** will operate as **W4D** from Dauphin Island NA-213 from 1900 on the 24 September until 1200UTC on the 27th. The group will use 100W transceivers with a variety of antennas and plan to be active on all h.f. bands from 3.5 to 28MHz up. A QSL will be available via **Paul J. Pagano WA4AA, 7725 Royal Harbour Cir, Ooltewah, TN 37363, USA** direct or via the bureau.

MIA CONTEST

For island chasers this month there's **The Mediterranean Islands Contest**, which is taking place from 1200 on the 18th to 1200UTC on the 19th September. It should provide plenty of opportunity to pick up some new islands and work enough of them to claim one of several awards. This contest is organised by the Mediterraneo DX Club and a full copy of the rules and awards can be found at **http://www.mdxc.org/contestmia/rules.htm**

YOUR REPORTS

On to your reports now and first off is **David Ballantyne G6OCD** in Huddersfield, West Yorkshire who has just replaced his old h.f. rig with a Yaesu FT-102 and matching FC-902 tuner and changed his dipole for a full-size G5RV. David was pleased to work W2ONV (USA) in Saddle Brook, New Jersey late one evening on 3.5MHz s.s.b. proving the new antenna and location were working well!

Ted Trowell G2HKU on the Isle of Sheppy in Kent found 'conditions poor' for most of the month. Activities in the garden prevented much h.f. operating but one or two stations made his c.w. log. The 10MHz band around 2100UTC was not in good shape but Ted worked YI9ZF (Iraq) with 5W QRP, CQ14EFL (Portugal) and regular *PW* author **Henryk Kotowski** using the call **OH0/SM0JHF** from Aland Island EU-002 using a Ten-Tec Omni 5 at 70W or Icom IC-703 at 5W with his full-size G5RV.

THE 14MHz BAND

A change to the 14MHz band around 2130UTC found high QRN, but a few stations coming well through the noise. These included ZA1FD (Albania), ZP6CW (Paraguay), VK8KAW (Australia) in Darwin and FM5CW (Martinique) NA-107.

CARL HAS LOTS OF HF ACTIVITY THIS MONTH TO REPORT, TAKE IT AWAY CARL

Welcome now to new reporter **Kevin Haworth** whose callsign is **2E0XTC**. Kevin lives in the village of Knott End on Sea (IO83MW) overlooking Morecambe Bay and has been licensed as an Amateur since November 2003, passing his intermediate exam on the 18 May receiving the call **M3KJH**. Kevin says "My station has been in our family for two generations and was passed down to me by my late uncle **G7CEM**, who sadly passed away one week before he was able to operate on h.f. He used the Yaesu FT-107 I now own as a s.w.l. and as a boy I remember sitting with him listening to all kinds of exotic stations for many an hour. The antenna I use is a Cushcraft D4 dipole and I have just installed WINEQF on my computer as my logging programme and immediately started my h.f. activities. I haven't looked back since".

On 14MHz this month, Kevin's s.s.b. contacts include VK4BUI (Australia) in Tinbeerwah, Queensland, PY0FF (Brazil), 4X4MU (Israel), OD5UR (Lebanon), W5IZ (USA) in Burleson, Texas, C31JM (Andorra), ZD8I (Ascension Island) AF-003, VR2XLN (Hong Kong) and CN8TW (Morocco) in Casablanca.

In Kidderminster **Elgin Mackinlay M3BDK** has been on 14MHz s.s.b. later in the evening

when conditions seem to have improved slightly! Stations worked include HK3AK (Columbia) 2307, LU7YZ (Argentina) 2316, AA4V (USA) on the Isle of Palms in South Carolina NA-110 at 2327, YV5EED (Venezuela) 0416 and OD5NJ (Lebanon) 0548UTC. Elgin said "It might be worth mentioning to everyone that International Reply Coupons are not valid in Lebanon, only USA Dollar bills and the current mailing is US$1.75 for a QSL card".

Over to Nuneaton where **Chris Colclough G1VDP** used his Yaesu FT-897 and Cushcraft MA5B with s.s.b. once again to log OZ/DG7SFL/P (Denmark) on Langeland Island EU-172 , CE1LDS (Chile), JW7XM (Svalbard) on Spitzbergen Island EU-026, VO2/AB5EB (Canada) on Battle Island NA-044, 8P6RS/W4 (USA) in Orlando, Florida, 9K2RA (Kuwait), 9A/S52DG/P (Croatia) Krk Island EU-136, CU3GD (Azores) EU-003, A71EM (Qatar), TK/DL9YBY (Corsica) EU-014 and CQ14XK (Portugal) for the Euro 2004 Award with most contacts being made between 2100 and 0000UTC.

The mobile log of **Mark Taylor G0LGJ** in Dereham continues to grow with the help of his new 'Outbacker' type antenna and Yaesu FT-100. Making his log this month were EL/EI5IF (Liberia), 7X4AN (Algeria), EA9IE (Ceuta & Melilla) and HK3AK (Columbia) between 2102 and 2201UTC followed later by an early morning QSO with TK/IK2WZM (Corsica) EU-014 at 0354UTC.

Two s.s.b. stations were contacted by David G6OCD in the late evening. The first was OH3DB (Finland) and this was followed slightly later by UR5IAW (Ukraine).

Also on this band was **Martyn Medcalf M3VAM** who used his Icom IC-746 and long wire antenna to work s.s.b. stations F4ECJ (France) 1445, ER1QQ (Moldovia) 1548, EW/N6OX (Belarus) 1812, S50BAL (Slovenia) 1936, SV3EXU (Greece) 1937, HG56VEK (Hungary) 2005, LY2FY (Lithuania) 2231 and ED5AEK (Spain) at 2251UTC.

In Newtonabbey, Northern Island **Peter Lowrie MI5JYK** says "I picked up a copy of *Simple and Fun Antennas* by the ARRL and found a few 'superb' articles in it on verticals and in particular º wave ground planes. Several of the articles mention the idea that a ground plane works just as well with two radials as four was just an alleged marketing ploy! I therefore built a copy of one of the antennas described and scaled it up for use on 14MHz using an SO239 socket as the feed head with the radiator taped to a 21 foot fibre glass pole to act as a support for the radiating element and the radials acting as guys. The feed-point of the antenna is about 1.8m above ground which allows me to hang the radials at about 45 degrees. The antenna is then tuned via an a.t.u. which is fed with an odd length of RG58".

The arrangement certainly appears to work well judging by the size of Peter's logbook! And operating with his MFJ-9420 s.s.b. transceiver Peter worked ON4AEK (Belgium), ER7HQ (Moldovia), DA0HQ (Germany), SP9ZST (Poland), YL2KO (Latvia), the RSGB call GB5HQ, EA4RCT (Spain), OJ0U (Market Reef) EU-053, PA6HQ (Netherlands), OM5A (Slovak Republic), 5B4/RW4WR (Cyprus) AS-004 and two new ones, John GW3ARS (Wales) in Porthcawl and best DX P40HQ (Aruba) SA-036 between 1405 and 1711UTC. Not a bad tally for a new antenna 'cut one foot too short' and just 5W out. Peter is checking the measurements when he builds a second antenna for a spare!

THE 18 & 21MHz BANDS

With a change to the 18MHz band Martyn M3VAM found CQ44ITZ (Portugal) 1515, CS94MD (Madeira Island) AF-014 1518, S5048AL (Slovenia) 1926 and CN8JV (Morocco) at 1635UTC.

During one evening the band was in reasonable shape and Mark G0LGJ found 3V8BB (Tunisia), 7Z1SJ (Saudi Arabia) and ZX7ZZ (Brazil) around 2130UTC.

The 21MHz band provided Chris G1VDP with 7K3EOP (Japan) Shinjuka, near Tokyo, IR1PL (Italy) operating from the lighthouse at Portofino ITA-131, CS2004REP (Portugal) Euro 2004 Special Callsign and SX5A/58 (Dodecanese Islands) EU-001. Chris also mentions that he had to cancel his operation from Berry Head Lighthouse in Brixham, Devon due to problems with his car and wishes to apologise for anyone waiting for him on air.

THE 28MHz BAND

Only one report for the 28MHz band as most of you found conditions here very poor indeed. Ted G2HKU was listening one afternoon and heard 3V8BB (Tunisia) break through the noise with a good signal and worked him at 1500UTC with 70W!

● New reporter Kevin Haworth 2E0XTC.

● Chris Colclough G1VDP.

● Mark Taylor G0LGJ.

SIGNING OFF

That's about it for another month and the conditions have still allowed a fair bit of DX to be worked. The most popular band by far has been 14MHz though openings have occurred at some time or other on all other bands. I have had several calls from readers who want to know how to submit their logs. It's easy; If you would like to send in a report just include your name, callsign and location together with your station details, a copy of your log giving the band, time, callsign and mode used along with any other information you think will be of interest and I will do the rest! As usual my thanks go to all our reporters for their logs and to **Tedd Mirgliotta KB8NW** editor of the *OPDX Bulletin* for all the DX information. Until next time have a good DX filled month.

73, Carl GW0VSW

DATA BURST

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ROBIN GW3ZCF PRESENTS HIS SELECTION OF DATA NEWS INCLUDING A LOOK AT CARAVANNING AND AMATEUR RADIO

With the onset of summer, thoughts turn to leisure pursuits, and in my case that means caravanning. For years I have tried to combine this with Amateur Radio, but conditions in a crowded caravan park are not always conducive to successful DX operation.

Often neighbours are rather close and caravan sites are frequently in rather remote or hilly locations so TV reception can be marginal. Nothing is less likely to endear you to your neighbours than a QSO blotting out their picture just as they are settling down for a pleasant evening's viewing.

Antennas have to be pretty inconspicuous too. Depending on location and proximity of other caravans I've experimented with all sorts of portable antennas, ranging from a 7MHz horizontal loop 2.4m above the ground (with which I have worked into the Pacific Islands using 50W of s.s.b.) to a 28MHz vertical wire supported by a telescopic fibreglass pole of the type described in *PW* by **Rob G3XFD** a couple of years ago. Using this set-up I have had some very pleasant QSOs with Rob working as EI5IW during one of his jaunts to Ireland, while I was on a caravan site in Pembrokeshire.

My usual fallback is much more modest, consisting of a simple mobile whip on the roof of my car, held in place with a 7in magmount. I wouldn't trust this arrangement while on the move, but it holds the antenna very securely in a static location. Earth to the car body is by capacitive coupling through the magmount. This is not very effective on 3.5 or 7MHz, but seems more than adequate for the 14, 21 and 28MHz bands. I use an external antenna tuner to broaden the useful bandwidth somewhat, because my IC-706 shuts itself down if it sees a s.w.r. of greater than 2:1.

With such a modest set-up, the thing that has transformed my portable operation has been PSK31. The very narrow bandwidth means that, using about 40W, you can achieve the same signal-to-noise ratio as an s.s.b. signal running a couple of kilowatts or more, so low power and poor antennas still allow reasonable DX to be worked with ease. The bonus is the virtual absence of TVI – a PSK signal consists of a continuous carrier modulated by phase shifting, so it doesn't contain the same transients as s.s.b. or c.w. and is less prone to interfere with other users of the spectrum.

Quite often I operate in the caravan while my XYL is watching television – the mobile whip is located about 1.8m from the small television antenna, which we use, and even when the location of the nearest TV transmitter means it is beaming directly over the whip. There is never a trace of patterning on the TV screen. The PSK31 operation has proved a great contributor to domestic harmony, as even low powered s.s.b. operation was prone to wiping out the TV picture when we were staying in difficult locations!

Apart from my trusty IC-706 and the mobile whip, my portable equipment comprises a laptop computer and a simple interface with opto-isolator – I have described a number of these interfaces in earlier editions of Data Burst. The computer is loaded with several suitable software programs, including *Digipan*, *MixW* (which covers a whole range of digimodes) but the one I use most often is *Logger32* (**www.kc4elo.com**). This is still officially in beta release but is now very well tested and its basic functionality is outstanding. I have never found a program, which surpasses it for PSK31/63 and RTTY.

SATELLITES

While caravanning one year I heard on the news that the *International Space Station* would be clearly visible as it passed over South Wales. We looked up at the appointed time and had a splendid view as it passed out of the shadow of the Earth, illuminated by the sun and showing up brilliantly against the night sky.

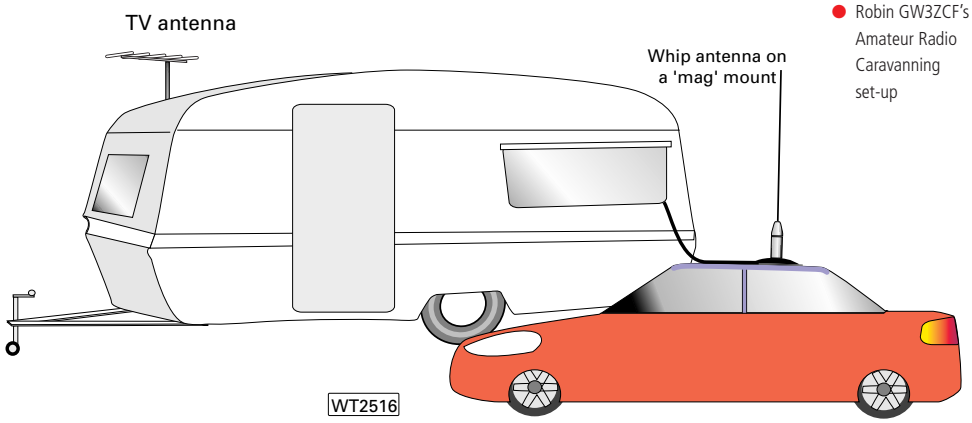
The experience prompted me to discover a little more about satellites related to Amateur Radio. Perhaps the best known example is the *International Space Station* itself. Many of the crew members are licensed Radio Amateurs and they have regular scheduled live QSOs with school pupils all over the world.

What a thrill it must be, to talk directly to an astronaut as the space station passes overhead. Details of schedules are published on the Internet and, when over the UK, the downlink can be heard on 145.800MHz.

Perhaps the most important satellite activity for the bulk of Amateurs has been using one of the Amateur Radio satellites as a 'repeater in the sky', enabling transcontinental QSOs to be made with simple hand-held, low power, transceivers.

There are two main classes of satellite used for Amateur Radio purposes. The Low Earth Orbit (LEO) satellites are at altitudes of about 700km and circle the Earth in about 90 minutes. They are visible at any one time from a circular 'footprint' on the surface of the Earth of about 3000 miles diameter. That makes transatlantic contacts possible, but only very briefly as both sides of the 'pond' can only see a given satellite simultaneously for a few minutes.

The Phase 3 satellites are in much higher orbits (up to about 9000km) and have a footprint several times larger than the LEO satellites. Both



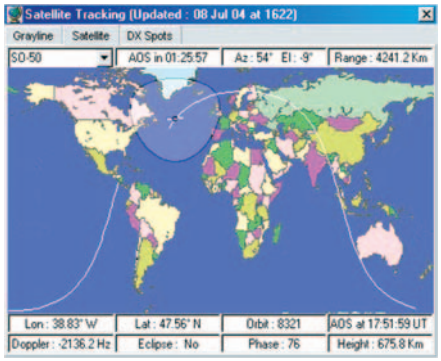
Robin GW3ZCF's Amateur Radio Caravanning set-up

types of satellite precess around the Earth so that they sweep a different region of the globe on each circuit.

Whichever satellite you are thinking of looking for, it's essential to use a tracking program so that you know when and where to look. There are many available programs – the one I use is part of *Logger32* and will track the positions of most of the Amateur satellites in real time.

To enable accurate predictions you need to download the current Keplerian elements from the Internet (a constantly updated set of figures, which tracking programs use to refine their calculations). In the case of *Logger32* you can do this automatically if you are connected to the internet by right-clicking on the map of the Earth and selecting 'Load Keplerian elements' from the drop-down menu that appears.

The image in **Fig. 1** shows a track taken on 8 July of the Saudi satellite SO50, which at the time of writing is operational. The uplink frequency for f.m. transmission is 145.850MHz, whilst the downlink frequency is 436.795MHz. You can see that at the time of the picture the footprint covers the UK, North East Canada and Greenland, so any of those countries ought to be able to hear each other. It's fascinating to watch the calculated satellite position moving around the Earth – you have to keep your overs pretty short as the time for which you can be in contact is very limited.



● Fig.1

● Fig.2

If you are new to Amateur satellites it's best to concentrate on receiving for a while. You can often hear them with a portable receiver with a simple rubber duck antenna, but it's best to use a hand-held Yagi which, having used your tracking program, you point in the right direction as the satellite appears over the horizon.

When you hear something, try rotating it until the plane of polarisation of the antenna matches that of the received signal. You may have to keep repeating this, because often the satellites are spinning on their axis. You really need three hands for this job, because the other thing you need to do is make small adjustments to your receiver frequency as the satellite passes overhead, due to the so-called Doppler frequency shift. Just as the siren of an approaching police car changes from a high to a low pitch as the car approaches and then recedes from you, so the radio frequency signals of a satellite vary from about 10kHz above nominal as it approaches to 10kHz below as it moves away from you.

A useful tip if you are using a programmable hand-held receiver is to pre-program a set of channels on either side of the down-link frequency you want to listen to, at 5kHz intervals. You can then follow the Doppler shift of the satellite as the signals become increasingly distorted.

I mentioned earlier that many of the old faithful Amateur satellites have gone to meet their maker. You can find the status of the current satellites from the Amsat website (**www.uk.amsat.org**), and it's worth a little time researching before wasting your time listening for defunct satellites. But if you do give it a go, happy listening!

GLOBAL POSITIONING SATELLITES

Still on a celestial topic, but with a much more down-to-earth application, I have recently started using a Global Positioning System (GPS) receiver in my car for satellite navigation. Originally, the preserve of owners of very expensive cars, as a £2000 option, you can now get very effective satellite navigation systems, using pocket computers (PDAs) for as little as £300.

The advantage of the PDA-based system is that they can easily be transferred from car-to-car. I took mine on holiday to Mallorca recently and used it in my hire car. For the first time, my XYL was able to enjoy the scenery rather than having her eyes glued to the map!

The GPS receives navigation messages from an array of satellites launched by the US military for defence purposes. Originally the signals were encrypted to prevent civilian access, but for several years they have been free for anyone to access. There are 24 carefully positioned satellites at an altitude of about 12000 miles, and each makes just over two orbits of the earth each day. They transmit at about 1500MHz, each transmitter puts out between 20 and 50W.

To receive the signals you need a special receiver. Mine is about the size of a computer mouse and sits on the dash by the front windscreen of the car (**Fig. 2**). In addition to containing an incredibly sensitive receiver which can 'lock' on to up to 12 simultaneous satellite signals, it also has a microprocessor, which stores positional data sent out by the satellites. From this, and from the relative times the signals are received from each satellite, it can calculate your position to an accuracy of about 25 metres - pretty impressive!

● Fig.3

The PDA comes in at this stage by using one of the commercially available routing programs, which contain detailed street maps and can perform the necessary calculations to give you spoken and visual instructions, turn by turn, to get to your destination. There are many brands of software available, probably the most widely used in Europe is *TomTom*, followed by *CoPilot*. With *TomTom* you can choose to view your route on a 2-dimensional map or have a three-dimensional picture of the road ahead, so that you have advance warning of impending sharp bends or complex junctions. **Fig. 3** shows the sort of display you get.

I find the routing is very effective and nearly always chooses a very sensible itinerary. If you wander off the proper route (perhaps because you can see a blockage ahead) it will instantly calculate an alternative.

There is a wide range of free downloadable programs, which will work in tandem with *TomTom*. One of my favourites enables you to type in the postcode of your destination and it will then find its position from the database and calculate your route automatically. Another sounds an alarm if your car exceeds any one of a set of pre-determined speeds, enabling you to keep your eyes on the road rather than the speedo.

If you are considering investing in a PDA based GPS system, I would advise you to spend a while reading the messages on the Pocket GPS forum (**www.pocketgps.co.uk**) You can learn a lot from more experienced users and perhaps avoid making an expensive purchasing mistake.

Well, that's all I have room for this time. Please let me have any ideas of topics you would like me to cover in this column and I will try to oblige. *73 Robin GW3ZCF*

IN VISION

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GRAHAM G8EMX HAS NEWS OF ELECTRONIC COPIES OF CQTV, THE IARU ATV CONTEST AND AN APPEAL FROM IRELAND

At the end of July, the British Amateur Television Club (BATC) posted its latest quarterly magazine *CQ-TV* to club members. This issue, *CQ-TV 207,* ran to 48 pages, with the cover and centre pages printed in colour and was the first issue to be available in purely electronic form. Initially an option to overseas members for a lower annual subscription, who receive a secure E-mail inviting them to download the magazine, *'CQ-TV 207'* was initially distributed to the BATC committee in a similar way.

The internet connection here at G8EMX is still dial-up, so my electronic *CQ-TV* took about 10 minutes to fully download. The PDF file delivers a true likeness of the magazine, but cannot be edited or even saved in the usual way. Instead, 'Save a Copy' transfers an identical file to your desktop or other PC location. Once saved and opened, the front cover appears on the PC screen then the pages can be magnified, scrolled through and the rest of the on-screen manipulations used.

Some BATC members have already signed-up to receive their magazine this way, so early reaction to this, designed to reduce postal costs and speed up arrival to overseas addresses, looks promising. Incidentally, the cover picture of *CQ-TV 207* shows the earth as seen from the *International Space Station*, where there are plans for the *ISS* to carry ATV. The intention is to have a conventional f.m. ATV input on 1.2GHz and a digital ATV output on 2.4GHz; a camera on the outside of the *ISS* will show pictures of our planet. Gives a whole new meaning to 'watch this space'!

The BATC's magazine has, of course been available electronically for a few years, with most of the printed issues having been scanned onto a CD. But even a compact disc has a finite capacity and the transfer of over 200 multi-page illustrated books has just about filled the disc.

So, *CQ-TV* Editor **Ian Pawson** has suggested moving from CD to – yes, you've probably guessed it – DVD! Not only does this provide huge space for future issues, but there is some actual video from the Bletchley Park convention in 1999, Shuttleworth 2002 and 2004 on the DVD. The disc is useable in domestic players and PCs and is supplied in '+R' media. Go to **http://www.cq-tv.com** for ordering details.

IARU CONTEST

The International Amateur Radio Union (IARU) ATV Contest takes place during the weekend of September 11 - 12, starting at 1800UTC on the Saturday to 1200UTC on the Sunday. So, if you've picked up your *Practical Wireless* promptly when it appeared on the shelves you might just have time to take part or listen and watch the activity.

Many ATV stations choose or have to go to a portable location (QTH) for contest working. While QTH may play only a minor part when operating up to h.f., location can be restrictive at v.h.f. and may prevent operation altogether at the microwave bands – on top of a hill is good, not down in the valley. Even if the height above sea level is favourable, the immediate surroundings – tall buildings, trees etc., can impede significant ATV contacts. So taking a portable ATV station to an accessible hill may be the only solution, where the main problem will be supporting the ATV antennas.

Operating a portable ATV station requires at least two, directional antennas – a 144MHz beam for ATV calling and talkback (144.750MHz), plus the 24cm ATV antenna, maybe higher bands too. These should be on a rotator, all at the top of a mast. Having tried the occasional ATV portable expedition myself, keeping this lot upright can be a major task. Roping to a vehicle, tethering into the ground, supporting on a tripod, trapping under a wheel have all been tried or considered. Then I sawed a lattice mast in half!

A few years ago I had bought a surplus 3m triangular-section lattice mast from one of the radio clubs, but it was quite heavy and unmanageably long. It's now in two sections, each liftable and much shorter. When bolted to a wide wooden base all ATV antennas, rotator and mast are quickly, easily and most importantly securely supported even in high winds. I hope to be active during the September contest so will try to put a photo in the next In Vision.

● The new BATC DVD, containing *CQ-TV* back issues, ATV handbooks and video footage from club exhibitions.

● The latest issue of *CQ-TV*, now available electronically (see text).

APPEAL FROM IRELAND

Now an appeal from **Mark EI9IB** in Kildare, near Dublin, Republic of Ireland. Mark is working on an ATV repeater but due to the 24cm band being only 1240 to 1300MHz in the Republic, the licence has stated 1249MHz in and 1280MHz out, a separation of just 31MHz (compare this to UK ATV repeaters with a 50MHz or greater separation). Mark is seeking help with making a high quality interdigital filter using at least five poles.

An even more unusual aspect of this is that other ATV repeaters in Ireland achieve correct filtering by large separation distances between transmit and receive antenna – in one case 'large' means a mile apart on different sites, linked by 10GHz! This is not possible at Kildare, so if anyone can help, please E-mail Mark direct at: **mark@hi2all.com**

BROADCAST TV NEWS

Finally, for this month, a brief round-up of some broadcast television news. The government continues to perpetuate uncertainty over the timescale for analogue closedown – latest press speculation extends the possible shutdown date by two years; a satellite broadcaster is considering provision of High Definition Television (HDTV) for the UK, using either 1080 interlaced lines or 720 lines with progressive scan; the terrestrial Freeview service is now in over four million homes and has begun the national roll-out of a seven-day electronic programme guide (EPG). Don't forget to let me have your ATV/TV related news too!

Graham G8EMX

Finding... Practical Wireless

We've received a few enquiries about the new arrangements at WH Smith so, for those of you who might be a little confused by what's going on, here's a brief explanation.

The WH Smith chain have decided to concentrate less on minority interest magazines and more on mass market titles. That means a lot of their branches will no longer be obliged to carry magazines such as *Practical Wireless*, *Short Wave Magazine* and *Radio Active*. In fact, about half their outlets will no longer automatically have our magazines on their shelves. The good news, of course, is that about half will still stock them. Below you'll find a list of all the WH Smith stores where *Practical Wireless* is still mandatory - they will definitely continue to stock it.

ABERDEEN .....St Nicholas Centre, Aberdeen AB10 1HW
.....408-412 Union Street, Aberdeen AB10 1TQ
ACCRINGTON .....14 Cornhill, Arndale Centre, Accrington, Lancashire BB5 1EX
AIRDRIE .....60-64 Graham Street, Airdrie, Lanarkshire ML6 6DB
ALTRINCHAM .....12 George Street, Altrincham, Cheshire WA14 1SF
ANDOVER .....31 High Street, Andover, Hants. SP10 1LJ
ARBROATH .....196 High Street, Arbroath, DD11 1HY
ASHTON .....Arcades Shopping Centre, Ashton, Lancs. OL6 7JE
AYLESBURY .....27-29 High Street, Aylesbury, Bucks. HP20 1SH
AYR .....198-200 High Street, Ayr KA7 1RH
BANBURY .....23-24 Castle Centre, Banbury, Oxon. OX16 5UE
BARNSTAPLE .....76 High Street, Barnstaple, Devon EX31 1HX
BASILDON .....Town Square, Basildon, Essex SS14 1BA
BASINGSTOKE .....Old Basing Mall, Town Centre, Basingstoke, Hants. RG21 7AW
BATH .....2 Marchants Passage, Bath, Avon BA1 1TA
.....6-10 Union Street, Bath, Avon BA1 1RW
BEFORD .....Harpur Centre, Midland Road, Bedford MK40 1TG
BELFAST .....Donegall Place, Belfast, Co. Antrim BT01 5BB
BERWICK .....75 Marygate, Berwick TD15 1BA
BEXLEYHEATH .....89 The Broadway, Bexleyheath, Kent DA6 7JN
BIRKENHEAD .....St Johns Pavement, Birkenhead, Wirral, Merseyside CH41 2YB
BIRMINGHAM .....29 Union Street, Birmingham, West Midlands B2 4LR
.....Fort Shopping Park, Fort Parkway, Birmingham B24 9FP
.....29 Union St, Birmingham B2 4LR
BIRSTALL .....Holdening Way, Birstall, Batley, WF17 9AE
BLACKBURN .....50 Lord Square, Blackburn, Lancashire BB1 7JR
BLACKPOOL .....Bank Hey Street, Blackpool, Lancashire FY1 4RT
BLUEWATER .....3 Rose Gallery, Bluewater Park, Greenhithe, Kent DA9 9SH
BOGNOR REGIS .....45 London Road, Bognor Regis, West Sussex PO21 1PQ
BOLTON .....5-7 Victoria Square, Bolton BL1 1RJ
BOREHAMWOOD ....Unit 11, Boulevard Retail Park, Borehamwood, Herts. WD 6 4PL
BOSTON .....27 Strait, Bargate, Boston, Lincs. PE21 6EG
BOURNEMOUTH .....9-13 Old Christchurch Road, Bournemouth, Dorset BH1 1DY
BRACKNELL .....10 Princess Square, Bracknell, Berks. RG12 1XW
BRADFORD .....Darley Mall, Bradford, W. Yorks. BD1 1TG
BRECON .....Units 2 And 3, Bethel Square, Brecon, Powys LD3 7JP
BRIDGEND .....7 The Rhiw, Bridgend, Mid Glamorgan CF31 3BL
BRIERLY HILL .....Merryhill Centre, Brierley Hill, West Midlands DY5 1SY
BRIGHTON .....69 Churchill Square, Brighton, East Sussex BN1 2TB
BRISTOL .....The Galleries, Bristol BS1 3XA
.....The Mall, Cribbs Causeway, Patchway, Bristol BS34 5GG
BROMLEY .....132-138 High Street, Bromley, Kent BR1 3EZ
BURNLEY .....15/16 Market Square, Burnley, Lancashire BB11 1AX
BURTON ON TRENT ..13-17 Underhill Walk, Burton On Trent, Staffs. DE14 1DE
BURY ST EDMUNDS ...15 Cornhill, Bury St Edmunds, Suffolk IP33 1DY
CAERPHILLY .....Castle Shopping Centre, Caerphilly, Mid Glam. CF83 1NU
CAMBERLEY .....51-53 High Street, Camberley, Surrey GU15 3RB
CAMBRIDGE .....Market Street, Cambridge CB2 3PE
CANTERBURY .....19 St Georges Street, Canterbury, Kent CT1 2LB
CARDIFF .....83/5 Queen Street, Cardiff, South Glamorgan CF10 2BE
CARLISLE .....51-53 English Street, Carlisle CA3 8JY
CHATHAM .....The Pentagon, Chatham, Kent ME4 4DP
CHELMSFORD .....73-75 High Street, Chelmsford, Essex CM1 1EJ
CHELTENHAM .....192-194 High Street, Cheltenham, Glos. GL50 1EP
CHESTER .....Foregate Street, Chester, Cheshire CH1 1HH
.....Broughton Mills Road, Broughton, Chester CH4 0BY
CHESTERFIELD .....4 Middle Pavements, The Pavements, Chesterfield S40 1PA
CHIPPING NORTON ..10 High Street, Chipping Norton, Oxon. OX7 5AD
CHORLEY .....New Market Street, Chorley, Lancashire PR7 1DB
CIRENCESTER .....19-21 Castle Street, Cirencester, Glos. GL7 1QD
COLCHESTER .....19 Culver Walk, Colchester, Essex CO1 1LX
CORBY .....32 Queens Square, Corby, Northamptonshire NN17 1PD
COVENTRY .....West Orchard Shopping Centre, Coventry,
.....W. Midlands CV1 1QX
CRAWLEY .....County Mall, Crawley, Sussex RH10 1FF
CROYDON .....34 North End, Croydon, Surrey CR0 1UB
CWMBRAN .....11 The Mall, Cwmbran, Gwent NP44 1PX
DARLINGTON .....37 Cornmill Centre, Darlington DL1 1NH
DERBY .....2 Devonshire Walk, Eagle Centre, Derby DE1 2NN
DIDCOT .....188 The Broadway, Didcot, Oxon. OX11 8RN
DONCASTER .....14-16 West Mall, Frenchgate Centre, Doncaster DN1 1ST
DORCHESTER .....8 South Street, Dorchester, Dorset DT1 1BL
DUMFRIES .....129-133 High Street, Dumfries DG1 2QT
DUNDEE .....Unit 18, Overgate Centre, Dundee, Angus DD1 1UF
DUNFERMLINE .....111-113 High Street, Dunfermline, Fife KY12 7DR
DUNSTABLE .....24 Broadwalk, The Quadrant, Dunstable,
.....Bedfordshire LU5 4RH
EAST KILBRIDE .....49 The Plaza, Town Centre, East Kilbride G74 1LW
EASTBOURNE .....110 Terminus Road, Eastbourne, East Sussex BN21 3AL
EDINBURGH .....Cameron Toll, Edinburgh EH16 5PE
.....33 Gyle Avenue, Syth Gyle, Edinburgh EH12 9JT
ELGIN .....St Giles Centre, Elgin IV30 1EA
ENFIELD .....Palace Garden Precinct, Enfield, Middlesex EN2 6SN
EPSOM .....Ashley Centre, Epsom, Surrey KT18 5DB
EXETER .....34-36 The Guildhall Shopping Centre, Exeter EX4 3NJ
FALKIRK .....123-127 High Street, Falkirk, Stirlingshire FK1 1ED
FALMOUTH .....17-18 Market Street, Falmouth, Cornwall TR11 3AF
FAREHAM .....4 Savoy Buildings, West Street, Fareham, Hampshire PO16 0AG
FARNBOROUGH .....Princes Mead Shopping Centre, Farnborough, Hants. GU14 6YB
FARNHAM .....14 The Borough, Farnham, Surrey GU9 7NF
FOLKESTONE .....57/59 Sandgate Road, Folkestone, Kent. CT20 1TU
FORT WILLIAM .....UNIT 5, 4 Tweedale, Fort William PH33 6EU
GALASHIELS .....29 Channel Street, Galashiels TD1 1BJ
GATESHEAD .....56A Metro Centre, Gateshead, Tyne And Wear NE11 9YT
GLASGOW .....53-55 Argyle Street, City Centre, Glasgow G2 8AH
.....Braehead, Glasgow G51 4BN
.....177 Sauchiehall Street, City Centre, Glasgow G2 3ER
GLENROTHES .....21 Unicorn Way, Kingdom Centre, Glenrothes, Fife KY7 5NU
GLOUCESTER .....41-45 Eastgate Street, Gloucester, Glos. GL1 1NZ
GODALMING .....82 High Street, Godalming, Surrey GU7 1DU
GRANTHAM .....49/51 High Street, Grantham, Lincs. NG31 6PH
GRAYS .....Town Centre, Grays, Essex RM17 6TG
GREENOCK .....42 Hamilton Way, Greenock, Inverclyde PA15 1RH
GRIMSBY .....Unit 5, Freshney Place, Grimsby DN31 1QQ
GUILDFORD .....56 High Street, Guildford, Surrey GU1 3ES
HALIFAX .....5 Market Street, Halifax, W. Yorks. HX1 1PB
HAMILTON .....46 Regent Way, Town Centre, Hamilton ML3 7DZ
HANLEY .....The Potteries Centre, Hanley, Stoke On Trent, Staffs. ST1 1PS
HARLOW .....Broadwalk, The High, Harlow, Essex CM20 1JD
HARROGATE .....Victoria Shopping Centre, Cambridge Street, Harrogate HG1 1TU
HARROW .....St Annes Shopping Centre, St Annes Road, Harrow HA1 1AS
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HINCKLEY .....29-31 Castle Street, Hinckley LE10 1DA
HOUNSLOW .....205 High Street, Hounslow, Middlesex TW3 1BL Y
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HULL .....10-20 Prospect Centre, Hull, Yorkshire HU2 8PN
HUNTINGDON .....122-123 High Street, Huntingdon, Cambs. PE29 3LG
ILFORD .....The Exchange, Ilford, Essex IG1 1DG
INVERNESS .....High Street, Inverness IV1 1HT
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LEICESTER .....Unit 10 Fosse Park, Leicester LE19 1HJ
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.....132-136 Kensington High Street, Kensington, London W8 7RT
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.....41/42 The Mall, Stratford, London E15 1XE
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.....125 High Street North, East Ham, London E6 1HZ
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.....Shopping Centre, Elephant & Castle, London SE1 6SZ
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.....69 Centre Mall, Arndale Centre, Wandsworth, London SW18 1TG
.....High St, Unit 8 Bugsbys Way, Charlton SE7 7SR
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.....Arndale Centre, Middleton, Manchester M24 4EL
.....91-92 Arndale Centre, Stretford, Manchester M32 9BD
.....The Arndale Centre, Manchester M4 3AD
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CT9 Iambic Paddle £69.95
CT11 Single Paddle £90.95
CT12 Classic Paddle £97.95
CT12DX DX Paddle £111.95
CT91Single Paddle £Phone
Watson Antennas
Watson W2000
Bands 6m/2m/70cm
Gain 2.15/6.2/8.4dB
Power 200W (50W 6m)
Type 1/2, 2x5/8, 4x5/8
Length 2.5m
£69.95
W-30 2/70 £39.95
W-50 2/70 £49.95
W-300 2/70 £64.95
W-2000 6/2/70 £69.95
WBV-70 4m 1/2 Wave £39.95
Bencher Antennas
Butternut HF-6V
Bands: 80/40/30/20/15/10
Height (Adj): 26 ft (7.9 m)
Weight: 12 lbs (5.4 kg)
Impedance: Nom 50 ohms
VSWR: 1.5:1 or less
£299.95
Butternut HF-2V 40/80 £229.95
Butternut HF-6V 80-10 £299.95
Butternut HF-9V 80-6 £349.95
Butternut HF-5B 20-10 £319.95
30-MRK 30m ad for HF2V £89.95
A-17-12 17&12 ad for HF6V £49.95
A-6 6m ad for HF6V-X £14.95
TBR-160S 160m HF2/6/9V £114.95
Hustler Antennas
Hustler 5-BTV
5 Bands - 80-10m
Height 7.64m - Weight 7.7kg
SWR 1.15:1 - Power 1kW
£209.95
Hustler 4-BTV 4 Band Vert £169.95
Hustler 6-BTV 6 Band Vert £239.95
West Mountain Radio
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plus
M8
pro
RIGblaster Models
RIGblaster Pro £229.95
RIGblaster Plus £139.95
RIGblaster M8 £109.95
RIGblaster M4 £109.95
RIGblaster RJ £109.95
Nomic 8P £59.95
Nomic 4P £59.95
Nomic RJ £59.95
Tonna Antennas
Tonna - 20655 23cms (1296 Mhz) 55 element 21.5 dbi gain "N" 4.64m long.
Tonna 20505 6m 5el £89.95
Tonna 20809 2m 9el £54.95
Tonna 20811 2m 11el £79.95
Tonna 20817 2m 17el £99.95
Tonna 20909 70cm 9el £45.95
Tonna 20919 70cm 19el £59.95
Tonna 20921 70cm 21el £74.95
Tonna 20635 23cm 35el £64.95
Tonna 20655 23cm 55el £89.95
Tonna 20745 13cm 25el £69.95
Diamond Antennas
HF10FX 10m Mobile £39.95
HF15FX 15m Mobile £39.95
HF20FX 20m Mobile £39.95
HF40FX 40m Mobile £39.95
HF80FX 80m Mobile £42.95
CR8900 10/6/2/70 £72.95
CP6 Base 6m-80m £239.95
X50 Base 2/70 £54.95
X200 Base 2/70 £84.95
X300 Base 2/70 £99.95
X510 Base 2/70 £124.95
X700 Base 2/70 £249.95
Cushcraft Antennas
X-7 - 20/15/10 7el £669.95
A3S - 20/15/10 3el £499.95
A4S - 20/15/10 £569.95
A3WS - 12/17 3el £379.95
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D3 - 20/15/10 Dip £249.95
D3W - 30/17/12 £249.95
D4 - 40m Rotary £349.95
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M-150GSA 1/4 2m Mobile £11.95
M-285 5/8 2m Mobile £13.95
NR-770H 2&70 Mobile £23.95
SG-7900 2&70 Mobile £31.95
CR-627 6&2&70 Mobile £33.95
X-200 2&70 Base £58.95
X-300 2&70 Base £63.95
X-510 2&70 Base £98.95
V-2000 6&2&70 Base £68.95
Radioworks Wire Ants
CW-160 160-10m (252ft) £129.95
CWS-160 160-10m (133ft) £114.95
CW-80 80-10m (133ft) £89.95
CWS-80 80-10m (66ft) £109.95
CW-40 40-10m (66ft) £84.95
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LDG Electronics

AT-1000

1KW Auto ATU - 1.8-54MHz - 1-8 secs Tune - Approx SWR Rating of 10:1

£499.95

LDG Z-100

100w Auto ATU - 1.8-54MHz - 0.5 - 6 secs

£129.95 **BEST SELLER***

LDG AT-11MP

100w Auto ATU - Covers 1.8-54MHz
1-5 secs Tune - Cross needle meters

£199.95

LDG RT-11

100w Waterproof Auto ATU - 1.8-54MHz
1-5 seconds Tune

£179.95

LDG RBA 1:1 & 4:1

1:1 or 4:1 Balun - Covers 1.8 - 30Mhz
Power rating 200w

£29.95

LDG AT-897

100w Auto ATU for FT-897 - 1.8-54MHz

£199.95

Accessories:

K-OTT Kenwood Interface	£49.95
Y-OTT Yaesu Interface	£54.95
Icom-IC1 Icom Interface	£29.95
Alinco-IC1 Alinco Interface	£29.95
AC-1 Cable	£19.95

W4RT Electronics

One-Plug-Power

One-Plug Power is the internal FT-817 battery solution you have been waiting for until now.

OPP-817
£54.95
NEW! 1800 mAh Large Capacity FT-817 Internal Battery Soluion Still use Internal 817 Charger

OPP-897
£99.95
One Plug Power for the FT-897 4500 mAh; Fully Compatible with the FT-897 and Yaesu Charger.

NEW!

One-Plug Power is the internal FT-817 battery solution you have been waiting for until now. One-Plug Power comprises a 1800 mAh NiMH battery pack, both over-termperature and over-current protection, connection to the FT-817 Molex connector, and a modified Yaesu battery cover door featuring a power jack that allows connection of a battery charger such as the Maha MH-C777 or MH-C888.

One-Big Punch

One BIG Punch (OBP) is a custom add-on accessory for the Yaesu MH-31 microphone commonly used with many Yaesu amateur radios

OBP
£49.95
Speech Compressor for the Yaesu MH-31 mic and FT817 FT857, FT897. Improve the TALK POWER.

Hand Mike
£57.95
W4RT Electronics Microphone with One BIG Punch Speech Compressor included.

The One BIG Punch is an AF-based speech compressor specifically configured to provide remarkable increase in talk power while maintaining good audio quality. The OBP is NOT a clipper, but a compressor providing great voice compression, high-level limiting, and noise gating. The unit can be mounted inside the MH-31, requires no additional electrical power, and can be turned on or off by using the MH-31's TONE switch.

One-Board-Filter

The One-Board Filter (OBF) affords you the opportunity to have both the Collins CW and SSB mechanical filters available in your FT-817 together!

OBF
£229.95
Replace two filters in the space of one. OBF includes the two optional filters and fitting.

Collins Mechanical Filters
for the Yaesu FT-817, 857 & 897.

500 Hz CW - £94.95 ***2.3kHz SSB - £94.95***

This is the option that many, many FT-817 owners have requested. The OBF utilizes Collins Mechanical Filters that are the same as used in the optional Yaesu filters for the FT-817. The bandwidth of the 7-pole CW filter is 500 Hz and the 10-pole SSB filter is 2.3 kHz. The One-Board Filter is NOT available for installation by FT-817 owners. This is not a "do-it-yourself" option. The One-Board Filter must be installed by RADIOWORLD, or a competent engineer . If in doubt please call for details.

One-Touch-Tune

At the touch of a button, you have the carrier needed for tuning. One-Touch Tune (OTT) is totally transparent to the FT-817 and to any external equipment that you have attached to the rig.

OTT-817
£54.95
It requires no external power and works with both manual and automatic tuners.

W4RT OTT-FT817	£54.95
W4RT OTT-FT100/857/897	£54.95
W4RT OTT-FT847	£54.95
W4RT FT817 One Fast Charger	£Call
W4RT Antenna Boss	£139.95

NEW* FT-817 Stand
£19.95
Simply snaps into position. Adjust for desired height. Complete with non slip feet and allen wrench.

Professional-Grade FT-817 Stand

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*Available and IN STOCK now**

W2IHY 8 Band Audio EQ Noisegate

£229.95

Finally, professional audio processing technology is applied to the unique requirements of amateur radio operators! The W2IHY 8 Band Audio Equalizer and Noise Gate is an easy-to-use, sophisticated unit loaded with high-performance features. This thoughtfully-designed, quality- constructed station accessory performs three important functions, all in one good looking, low-profile package.
Don't forget you can use your exsisting desk mike/pro mike etc.
For arm chiar or DX audio tailored to *your* own specifications.

Adapter cables to fit Icom - Kenwood - Yaesu £22.95

ATX Walkabout

ATX Walk--about PL-259

£47.95

The ATX Walkabout covers all bands (including WARC bands) from 80-6m, 5W guaranteed, 25W max. When fully telescoped it is about 65 inches long. This makes it ideal for the FT-817 or any other portable HF radio.

ATX Walkabout BNC	£47.95
ATX Walkabout PL259	£47.95
ATX Walkabout Universal	£54.95

The Miracle Whip

RX - 0.6 to 460 Mhz
TX - 40,30,20,17,15,12, 10, 6, 2m & 70cm

Power Limits 25W PEP 10W Cont.

£127.95

In Stock*

* The Miracle Whip will transmit on almost any frequency you are licensed to use including WARC, MARS/CAP, Alaska Emergency, Citizens Band, Marine, and most commercial HF SSB and VHF/UHF channels

** The Miracle Whip is optimized for for best receive rather than lowest swr on 80 and 160, as no short antenna will present good transmitting opportunities at these frequencies

Portable Masts

Telescopic Masts Inc Guy Rings

Small 17' 6"	£55.95
Medium 26' 0"	£65.95
Large 33' 0"	£75.95
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£39.95

An extremely strong magnet base which actually consists of 3 x 5" chrome magnets that are interconnected with metal strips to form one very large mount. Suitable for very large mobile antennae such as ¼ wave tank whips.

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Tokyo Amplifiers

Tokyo HL-50B HF / 50MHz Power Amplifier

£269.95

Frequency: 3.5 - 28MHz + 50MHz
Mode: SSB/CW, FM/AM
RF Drive: 5W (FT817)
RF Output: 50W PEP (25W AM)
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Discovery 6-31 2m 1KW	£1395.95
Discovery 6-35 2m 1.5KW	£1595.95
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SGC-231 HF+6m	£359.95
SGC-235 HF-500w	£749.95
SGC-237 HF+6m	£299.95
SGC-237Porta	£589.95
SGC-237PCB	£299.95
SGC-239 HF	£185.95
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YAESU

G-2800SDX Rotator	£999.95
G-450C Rotator	£379.00
G-550C Rotator	£309.00
G-650C Rotator	£499.00
G-1000DXC Rotator	£599.00
G-5500C Rotator	£569.00

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Military Spec High grade 50 Ohm coaxial Cable **£69.95** A 100m Drum

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RG8 Super	£0.70 per Metre
RG213	£0.90 per Metre
W103 Westflex	£1.20 per Metre
RG-8 75 Metre Drum Special	£39.95
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Flexweave-PVC-50 50m	£39.95
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Rotator Cable: - Color coded Cable

3 core	£0.45 per Metre
7 core	£0.79 per Metre
8 core	£1.09 per Metre

DC Connecting Cable

5A DC Cable	£0.50 per Metre
10A DC Cable	£0.75 per Metre
20A DC Cable	£1.00 per Metre
25A DC Cable	£1.10 per Metre

Second Hand List

Second Hand Antennas

Cushcraft X9 10/15/20 9ele	£450.00
Cushcraft MA5B 10-20m	£250.00
Cushcraft R-6000 Vertical	£200.00
Cushcraft A3S 10/15/20 3ele	£299.00
Butternut HF6V Vertical	£175.00

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Kenwood YK88CN	£40.00
Kenwood YK88SN	£40.00
Yaesu XF114SN	£60.00
Yaesu XF112C	£40.00
Icom FL-53	£100.00
Icom FL-101	£40.00
Kenwood DRU-3	£70.00

PLUS MUCH MORE... CALL FOR DETAILS

Second Hand List.

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Best prices paid on your used equipment.

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Adonis AM-805G Desk Microphone £70.00
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AKD 6001 6m FM Transceiver £135.00
Alinco DR-135E 2m £120.00
Alinco DJ-G5EY Dual Band Handheld £199.00
Alinco DJ-X10 Wide Band Receiver £200.00
Alinco DR-150 2m Transceiver with Air-and Receive £139.00
Alinco DR605 2m/70cms £175.00
Alinco DR-M10 10 Metre Transceiver £99.00
Alinco DX-70 HF & 6m Transceiver £349.00
Alinco DX-70TH HF & 6m Transceiver (100W Output) £475.00
Alinco DX77 HF Base £399.00
Alpha 91B HF 2KW Amplifier £1,599.00
Ameritron QSK-5 Amplifier Switch / Pre Heat £200.00
Ameritron ALS600 HF Amp 3 wks old £1,100.00
AOR ARD-2 Navtex Decoder £200.00
AOR AR-3000A Wide Band Receiver £450.00
AOR AR-3030 HF Receiver, Including PSU £350.00
AOR AR5000+A AR5000+A £1,599.00
AOR AR-7030 Top Receiver £550.00
AOR AR-8200 mkIII Receiver £299.00
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Bearcat UBC-780XLT RX Trunktracker £220.00
BNOS 20AMP PSU 20A PSU £89.00
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BNOS CLP430/25/100 70cms 100w Amp £199.00
BNOS LP50-3-50 6M Amp Solid State £89.00
Bnos LPM144/10/100 2m 100w Amp £119.00
Daiwa CN-103L 2/70cms Cross needle Meter £40.00
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Daiwa PS-30 XM II 30A PSU £99.00
Daiwa DK-10 Electronic Keyer £40.00
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Datong FL2 Multimode Filter £60.00
Diamond SX-100 Meter - 1.6 - 60MHz £65.00
Diamond SX200 SX200 £69.00
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Drake R8 Receiver £450.00
Drake R8A Receiver+Converter £499.00
Drake TR7+PSU HF Base £500.00
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High Sierra Sidelick Sidekick antenna £160.00
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Icom IC-471E 70cms Multimode Transceiver £299.00
Icom IC-490E 70cms Mobile Transceiver £250.00
Icom IC703 HF/6M £450.00
Icom IC-718 HF Mobile/Base £389.00
Icom IC-726 Mobile/Base £400.00
Icom IC740 HF £299.00
Icom IC7400 HF/6/2 Band / All mode Tranciever £949.00
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Icom IC-775 DSP Base £1599.00
Icom IC901 2m/70cms £175.00
Icom IC-R10 Handheld Scanner £229.00
Icom IC-R3 Handheld Scanner £275.00
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Icom IC-R71E Receiver £325.00
Icom IC-R72 Receiver £350.00
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Icom SM6 Icom microphone £75.00
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Kenwood TS-271E £165.00
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Kenwood TS480HX HF 200w Mobile £850.00
Kenwood TS-570S Mobile / Base HF + 6m £825.00
Kenwood TS-870 HF DSP £899.00
Kenwood TS-530 HF 100w £299.00
Kenwood TS-570DG HF 100w £675.00
Kenwood TS-950SD HF 150W DSP Base Station £1,200.00
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Microset RU-432 70cms Amp 100W £150.00
Microwave Modules 432-50 70cms Amp 50W £99.00
Microwave Modules MML/432/50 70cms Amp £129.00
Palstar PS30N PSU £79.00
Realistic DX394 HF Receiver £99.00
Realistic PRO2005 £120.00
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Timewave PK-12Packet £99.00
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Trio TS530SP TS530SP £299.00
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Welz CT-150 Dummy Load £50.00
Yaesu 1000mp mkV HF Base £1,799.00
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Yaesu FC700 ATU £99.00
Yaesu FL-2025 Amplifier £90.00
Yaesu FP-700 Power Supply £100.00
Yaesu FP707 PSU £110.00
Yaesu FP757GX 757 PSU £99.00
Yaesu FP-757GX Switched Mode for FT-757 £300.00
Yaesu FR-101 HF, 2m, 6m Base Transceiver £399.00
Yaesu FRG-100 HF Receiver £299.00
Yaesu FRG8800 RX £199.00
Yaesu FRG8800 RX + converter £299.00
Yaesu FRG9600 RX VHF/UHF £199.00
Yaesu FRT7700 FRT7700 £70.00
Yaesu FRV-7700 Converter for FRG-7700 £60.00
Yaesu FT-100 HF / 6m / 2m / 70cms Mobile £499.00
Yaesu FT-1000MP AC HF Base £1,199.00
Yaesu FT-1000MP Field HF DSP Base £1,599.00
Yaesu FT-1000MPmkV 200W DSP HF Transceiver £1,800.00
Yaesu FT102 HF Base 150W OP £375.00
Yaesu FT200 FT200 £175.00
Yaesu FT-2600M Mobile VHF / FM Transceiver £120.00
Yaesu FT-290RmkII 2m Multimode Mobile Transceiver £225.00
Yaesu FT-41R Handheld Transceiver £120.00
Yaesu FT-470R Dual Band Handheld £129.00
Yaesu FT-690R 6m Multimode Mobile Transceiver £199.00
Yaesu FT-7100M 2m / 70cms Mobile Transceiver £220.00
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Yaesu FT736R 2/70/6 Base £750.00
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Yaesu FT-790R 70cms Multimode Transceiver £175.00
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Yaesu FT-817 Mobile HF, VHF, UHF Transceiver £450.00
Yaesu FT840 HF £399.00
Yaesu FT897 Portable £699.00
Yaesu FT-847 HF/6/2/70 £899.00
Yaesu FT-920AF HF / 6M Base Transceiver £899.00
Yaesu FT-90 Micro 2/70 £220.00
Yaesu FT-900AT HF 100w £549.00
Yaesu FT980 FT980 £399.00
Yaesu MD-200 Base Mic £175.00
Yaesu FTV-1000 200 W Transverter £475.00
Yaesu MW-1 Remote Control Microphone & Infra-Red £60.00
Yaesu NC70 CHARGER £60.00
Yaesu SP980 SP980 £60.00
Yaesu VR-500 Yaesu Handheld Scanner £149.00
Yaesu VR-5000 Top Class Base Scanner £450.00
Yaesu VX110 VX110 £99.00
Yaesu VX1R VX1R £99.00
Yaesu FT747 HF Trx £299.00
Yupiteru MVT9000 II £269.00
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Trader's Table

The equipment for sale on this page is secondhand or ex-demonstration

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THE SHORTWAVE SHOP

01202 490099

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ICOM IC 706 Mk2G HF/VHF/ UHF TCVR £495
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YAESU FT290R MK1 VHF TRANSCEIVER £145
YAESU FT897 HF/VHF/UHF TCVR £675
YAESU FT990 HF TRANSCEIVER £650
YEASU FT2700RH VHF TRANSCEIVER £195
YEASU FT690R MK2 50Mhz MULTIMODE £235
YAESU FT790R UHF TRANSCEIVER £225
ICOM IC Q7E VHF/UHF TRANSCEIVER £135
ICOM IC275H VF MULTIMODE TCVR £450
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KENWOOD TS50 HF TRANSCEIVER £395
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YEASU FT 736 50/144/433Mhz TCVR £595

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ICOM PCR1000 HF/ VHF/UHF RECEIVER £249
FAIRHAVEN RD500 REVEIVER £525
ICOM IC-R75 HF RECEIVER £495
KENWOOD R5000 HF/VHF RECEIVER £425
KENWOOD R1000 HF RECEIVER £225
REN TEC R-350 HF RECEIVER £595
LOWE HF225 HF RECEIVER £250
AKD HF3 HF RECEIVER £95
ALINCO DJX-3 H/H SCANNER £89
AOR AR8200 WIDE BAND H/H RCVR £225
AOR AR1500 WIDE BAND H/H RCVR £85
YUPITERU MVT7300 H/H RCVR £135
YUPITERU MVT7100 H/H RECEIVER £145
YAESU FRG100 RECEIVER inc PSU £295
YAESU VR5000 WIDE BAND RCVR £399
YEASU FRG8800 HF RECEIVER £225
BEARCAT 9000XLT BASE SCANNER £165
PRO 2006 BASE SCANNER £125
YEASU VR-500 H/H SCANNER £135
PRO 2004 BASE SCANNER £125

ACCESSORIES

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KENWOOD SP31 SPEAKER 850/870 ..... £75
KENWOOD PS31 PSU 850/870 ..... £135
GLOBAL 2000 SWL ANTENNA TUNER £69
MFJ 931 ARTIFICIAL EARTH UNIT £89
YEASU FP1030A 30A POWER SUPPLY £139
YAESU FP707 POWER SUPPLY £85
WATSON SUPER SEARCHER COUNTER £65
LGD LT897 ATU FOR YEASU FT897 ..... £149
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YAESU FT100 FM UNIT £25
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Alinco DJX3 Wideband Handheld Scanner £89
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AOR AR8200 Mk II Wideband Scanning Receiver £249
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Bearcat UBC278CLT Base Scanning Receiver with Clock Radio £110
Bearcat UBC3000XLT Handheld Scanning Receiver £130
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Realistic PRO2005 Wideband Scanning Receiver £120
Yaesu VR120D Handheld Scanning Receiver £120
Yupiteru MVT7300 Handheld Scanning Receiver £189
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Icom R75 Base Receiver £499
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Joyear WS2000 Portable Worldspace Recever £79
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Roberts 9914 FM/MW/LW/SW Receiver £65
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Yaesu FRG8800V HF Receiver + VHF Converter £325
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Paccomm Spirit2 9600 baud TNC £99
Garmin Street pilot mint european base maps £299
Watson 30-35amp PSU with meters £89
Datong FL-3 multimode filter £99
MFJ949E 300watt tuner with dummy load £125
Kenwood SP-23 matching speaker for TS570D £55
Heil HM-10 dual insert studio quality mic £99
Watson WMM-3 multimode data decoder £45
Kenwood desk mic MC80 ..... £60

VHF/UHF TRANSCEIVERS

Yaesu FT2600 65watt 2meter mobile £139
Yaesu FT8800 2m/70cm latest dualband mobile £279
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Yaesu VX5R 6M,2M,70CM handi, last new unit £249
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Kenwood TS480SAT demo HF,6 auto ATU £949
Yaesu FT-900AT 100watt all mode detachable head £549
Yaesu FT767GX HF,6,2m fitted auto ATU AC £599
Icom IC728 0-30mhz FM board fitted boxed £449
Kenwood TS440SAT 100watt 100mem auto ATU £499
Yaesu FT1000 MKV field auto ATU,DSP,AC £1449
Kenwood TS870S DSP, Auto ATU, boxed £999
Yaesu FT847 HF+6m+2m+70cm mint £899
Kenwood TS870S DSP,auto ATU boxed and mint £999

SHORTWAVE RECEIVERS

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Lowe HF225 0-30mhz keypad option bowed mint £269
Sony SW55 portable receiver all mode 0-30mhz £199
AOR3000A 0-2036mhz AM,FM,LSB,USB mint £599
Sony SW100E Tiny Shortwave 0-30mhz+VHF £119
JRC NRD525 Top class 0-30mhz receiver £499

SCANNERS BASE/MOBILES

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AOR5000 0-2600mhz all mode, boxed £1099
AOR3000A 0-2036mhz all mode 400 mems,mint £599
Yaesu VR5000 0-2600mhz all mode £499
Bearcat 780XLT 25-1300mhz trunk tracker Demo £279
Alinco DX10E 1000 channels 0-2000mhz handheld £225
Bearcat UBC278cxl base scanner 100mems demo £139
AOR 8600 0-2040mhz £455
Yupiteru MVT7100 0-1650mhz nicads etc £169

All prices in Sterling

WATERS & STANTON

01702 206835

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Alinco DR-M03SX 10m FM Mobile 28-29.7MHz 10W £159
Icom IC-703 HF& 6m All Mode QRP mobile + Gen.Cov. 10W £449
Icom IC-706 x2 HF,6m,2m All Mode Mobile/Base with Gen.Cov £449
Icom IC-718 Base Transceiver with Gen.Cov. 100W 12V £349
Icom IC-7400 HF,6m,2m All Mode Base + DSP & Gen.Cov. 12V £999
Kenwood TS-570DG Base with Gen. Cov. + ATU & DSP filter 100W 12V £699
Kenwood TS-850SAT Base Transceiver with Gen.Cov. and ATU 12V £899
Yaesu FT-897 HF,6m,2m,70cm All Mode + DSP & Gen.Cov.RX 12V £749

VHF/UHF BASE/MOBILE TRANSCEIVER

ADI AR-147 2m FM Mobile 50W CTCSS 40Ch £149
AKD 6001 6m FM Mobile Channelised 25W £99
Alinco DR-M06TH 6m FM Mobile 20W CTCSS £159
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Yaesu FT-530 2m,70cm FM Handy + Full Duplex, DTMF keypad £119

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AOR AR-7030 0-32MHz All Mode with Processor,NB & NiCd + PSU £499
AOR AR-7030+ 0-32MHz Receiver + Notch filter, NB & Filters 12V £599
Grundig SAT-800 1.8-30MHz Portable Receiver + FM Stereo, SSB & Air £299
Lowe HF-150 30kHz-30MHz All Mode 12V £199
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Lowe HF-250 x2 30kHz-30MHz Receiver 12V PC Compatable £329
Roberts R-861 Portable 150kHz-30MHz SSB , FM stereo RDS £139
Sangean ATS-818 Portable Receiver with FM stereo and SSB £99
Sony ICF-SW07 Mini Receiver + FM stereo, SSB & "One Touch" tuning £169
Sony ICF-SW7600G Portable Receiver with FM stereo and SSB £89

SCANNERS MOBILE/BASE

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Icom IC-R8500 x2 100kHz-2GHz All Mode Receiver 1000ch. 12V + PSU £899
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Uniden UBC-9000XLT x2 25-550,760-1300MHz AM,FM,WFM 500Ch. 12V + psu £199
Yaesu VR-5000 x2 100kHz-2600MHz All Mode Receiver 2000Ch. 12V £429

SCANNERS HAND HELD

Alinco DJ-X10 100kHz-2000MHz All Mode 1200Ch. £179
Alinco DJ-X2000E 100kHz-2150MHz All Mode + CTCSS, Alpha 2000Ch. £329
Icom IC-R10 x2 500kHz-1300MHz All Mode 1000Ch. + RS-232 ..... £199
Opto R-10 x2 30MHz-2GHz FM Interceptor £99
Uniden BC-296D 25-1300MHz (+gaps) AM,FM,WFM + DigiDec. 1000Ch. £299
Uniden UBC-60XLT-2 66-512MHz (with gaps) FM 80Ch. £59
Yaesu VR-120 100kHz-1300MHz AM,FM,WFM Receiver 640Ch. £109
Yupiteru MVT-7300 x4 521kHz-1320MHz All Mode + 8.33kHz step £229

STATION ACCESSORIES

AEA PK-232 PakRat Dual Port Multimode Data Controller £79
AKD WA-1 120-450MHz VHF/UHF Wavemeter £29
Ameritron AL-811HX 10-160m 800W Linear Amplifier £569
Comet CF-BPF6 6m Band Pass Filter 150W £49
Datong ASP Auto Speech Processor £95
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Diamond SX-600 1.8-525MHz 200W SWR,PWR meter + 2 sensors £99
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JPS NIR-10 Noise / Interference Reduction Unit £199
JPS NTR-1 DSP Noise Reducer £99
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MFJ MFJ-1022 300kHz-200MHz Active Receive Antenna 9V £39
MFJ MFJ-1214PC Multimode Interface for IBM FAX,CW,RTTY,ASCII £119
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MFJ MFJ-1276 HF / VHF TNC with Precision Tuning + Pactor £129
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PacComm Tiny-2 VHF Packet TNC £79
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Revex W-544 140-460MHz 200W SWR,PWR meter + Remote Sensor £59
SGC PowerClear DSP Audio Filter with 5W Amp,Band Pass Filter £199
Watson WMM-1 Multimode Modem £49
WMM RB/NO/RJC RigBlaster "No Mic" Soundcard Data Interface £49
Yaesu FL-2025 2m clip-on 25W Linear (for FT-290R II) £99
Yaesu FRT-7700 150kHz-30MHz Receive ATU for FRG-7700/8800 ..... £49
Yaesu FRV-7700 118-150MHz Converter for FRG-7700/8800 ..... £49

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Garmin GPS-12 Hand held 12Ch. 500 Waypoints with BackTrack £79
Garmin GPS-II Plus 12Ch. 500 Waypoints,BackTrack £149
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The Publishers of *Practical Wireless* also wish to point out that it is the responsibility of the buyer to ascertain the suitability of goods offered for purchase.

FOR SALE

AKD HF3 receiver, g.w.o., £75 o.n.o. AR108 airband scanner, mint, with box and instructions, nice. Roberts RM20 in g.w.o., £20 o.n.o. Paul on (01733) 704836 or (07963) 320939.

AR 5000+3 very little used, complete with box and operators manual, sale due to loss of interest, £800 o.n.o. Tel: Eric on (01226) 710626

Collection of Gram radios, tape recorders, gramophones, car radios - all good oldies, call for list, lots of spares. HMVs £10-£200, multi-track tape.
Talking Book machine, £40. Celebrity Gram plus old records.Tel: (01872) 862575.

Collectors item G3HSC, rhythm method of Morse tuition, basic, advanced and test records, plus 'Morse Code' by Margaret Mills, G3ACC bought, offers. G0AAO, QTHR. Tel: (01206) 243353.

Daiwa SR9, 2m (144MHz) receiver, boxed with mobile mount and 11 Xtals plus v.f.o., £50 (post free). John G8BXO, 3 Westpark, south Molton, Devon EX36 4HJ. Tel: (01769) 573382.

DC1 145 2HN-2m bandpass filter with 'N' connectors, boxed with instructions, £50 o.n.o. Palstar PS-50 40A p.s.u., excellent condition, due to weight, buyer must collect, £50 o.n.o. Martin G0HRZ on 0208-597 0234.

DSP Processor W9GR DSP3 professionally assembled v.g.c. with data, £60. Switch mode power supply matches FT-817, £10. Walk-about 80-6m (3.5-50MHz) meter whip for FT-817, £15 postage extra, Tel: Dave on (01443) 683912.

Older stereo receiver, Ferguson 3482 - complete with matched speakers, also circuit diagram, £100. Buyer collects, Glasgow area. Tel: (01692) 813107.

Electronic Iambic Morse Keyer 5-35 w.p.m. for practice or transmit, programmed PIC with auto-sleep, plus easy-build details, very few extra components needed, Real bargain at £10. E-mail: chick@chickene.freeserve.co.uk

Electronic Morse keyer, 5-35w.p.m., for practice or transmit, programmed PIC with auto-sleep, easy build details provided, needing very few extra components, excellent club project, £10. E-mail: chick@chickene.freeserve.co.uk

Kenwood TS-480SAT, new, in box, never used, all the fittings, manuals, etc., £795. Kenwood TS-50, as new, never used mobile, boxed, fittings, manual, etc., £375. Alan G4YYD, Bury, Lancs. Tel: 0161-797 7893.

Kenwood TS-50 h.f. radio, all mode.including a.t.50 auto a.t.u. Both in mint condition. No box but all leads and manuals, £450.00 o.n.o. Tel: Darron on (01697) 344102 or Email west@wigton42.freeserve.co.uk

Kenwood TS-520S h.f. transceiver, very good clean condition, offers. Watson W-10AM p.s.u., little used, as new, boxed, £45. Prefer inspect and collect or plus carriage. Tel: Chesterfield (01246) 566040.

Kenwood TS-930S, original box, service manual, mic., £400. FTDX 401, manual, £150. MFJ noise bridge, £10. MFJ h.f./v.h.f. s.w.r. analyser, 1.8-170MHz, MFJ-249, £50. ? block SWR200, £20. MFJ-1704, £25. Tel: (01484) 654650.

Lowe SP58400 3-15V 40A p.s.u., exc condition, boxed, £55. Cushcraft A144-105N 10-ele 2m

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(144MHz), little used, £40. Prefer buyer collects or carriage at cost, each item. Bob G8BCA, Mildenhall, Suffolk. Tel: (01638) 714051.

MFJ-1020B active antenna, includes whip patch, leads and manual, some wear on frequency dial numbers, £30 o.n.o. Lionel on (01795) 538599 before 2100 please.

Philips PM3217 50MHz 'scope, £100. Tektronix 475 200MHz 'scope with spares, £180. Lowe HF-225 receiver, £150. Picoscope ADC200/50 PC 'scope, £200. All g.w.o., selling due to upgrade, buyer collects. Tel: Flintshire (01244) 546960.

Practical Wireless, from February 1993 to December 2003 (one or two missing), £5 secures, very heavy, buyer collect or delivery Pontefract area or at Rochdale QRP Rally in October. Walter G3ESP, QTHR. Tel: (01977) 611229 almost anytime.

Realistic base scanner, clean with manual, boxed, receive from 66-960MHz, 200 memories, a.m./f.m. direct programmable entry, receive anything, good condition, accept £80 includes postage, original box. Frank on (01608) 663745.

Shack Clearance Sale: FT-102, £150. FC102, £150. FV102, £150. SP102, £25. MDI, £50. FT-736R + 6m (50MHz), £450. KW1000, £150. KW107, £75, FL100B, £50. FRG-7, £50 plus P&P. Alex G0JZE, Chipping Norton, Oxon. Tel: (01608) 643585. E-mail: alexmcfadyen@btinternet.com

Tennadyne T8 log periodic, 13-32MHz, excellent condition, boxed, £400 o.n.o. Daiwa 4-way antenna switch, 1kW d.c., £40. Collectors item, Class-D wavemeter, £20. Tel: (01352) 771520 or E-mail: gw3tmp@tiscali.co.uk

W/S19 not working, W/S 10 power supply unit, offers on both. Tony Fletcher, Nottinham. Tel: 0115- 939 5970.

Yaesu FT-847 + FC-20 auto a.t.u., mint, still under warranty, £100 or deal FT-897, Yaesu FV-707 DM, v.f.o. for FT-707, £100. Nissin R500 valve, medium and short wave radio, £40. Tel: (01937) 844197.

Yaesu FT-847, h.f. to 70cm (430MHz), in 100% condition, 2 x Collins filters fitted, one year old, £900. Without Collins, £800. FC-20 a.t.u. to suit FT-847 or FT-100, £140. 36A supply, £60. 3kW s.w.r. meter, £60. All as new, deliver South/South E. Mark G0EBB on (07903) 661512, evenings or (01825) 791305, E-mail: mark@rodgers.fsworld.co.uk

Yaesu FT-900, int. audio a.t.u., complete with 20A fan, assisted p.s.u., both items v.g.c., £500. Tel: 07745 235292.

WANTED

7MHz c.w. band, any crystals and holders, also variable capacitors, 100pF and 140pF or near there valves. Brian M1EWP, QTHR. Tel: (01726) 61549.

1155 RX and 1154 TX also wanted, quad valve amps and pre-amp, carriage paid or will collect. Peter G8CKM on (01939) 290118 or E-mail: peterparker2@lineone.net

Manual or any information for oscilloscope Gould Digital Storage 4030, expenses paid. Tel: Wareham, Dorset (01929) 554221.

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Practical Wireless BO

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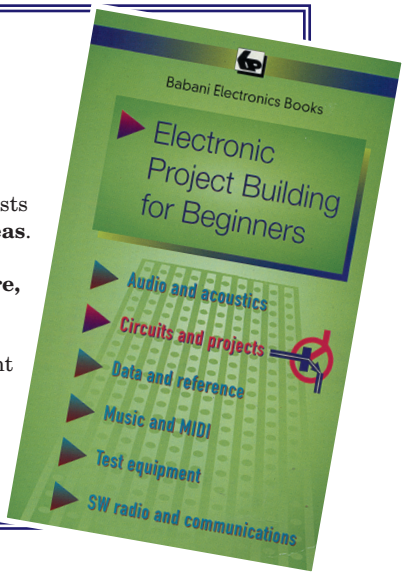

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topical talk — Copyright Problems

Once again 'Letters to the Editor' have provided Rob Mannion G3XFD with some ideas for this month's topical feed-back page. This time it's mainly covering the problem of copyright.

As usual we've got some very interesting letters this month with a mixture of objective appreciation and criticism. incidentally, if you've not written in with your comments on the editorial contents of *PW* - please do so. Even with the amount of post (and increasing level of e-mail correspondence) it's obvious that the largest percentage of our regular readers are the classic 'silent majority'. Don't forget - your opinion is important and we aim to publish a representative selection of letters - brickbats included.

One of our authors - **Len Paget GM0ONX** (An Inverted L For Small Gardens, *PW* February 2004) - thought strongly enough to write in with his opinions and you can see what Len has to say on the letters pages. In my reply I explained how we react to reader's comments, and also invited readers to join me on the Keylines (page 9) where I discuss further the future of specialised fictional serials in *PW*.

However, in his letter Len GM4ONX actually raised an extremely important point not previously discussed in any editorial, or within our *PW Author's Guide*. It was regarding the possibilities of obtaining editorial material via the

Aladdin's Cave!

There's no doubt about it - the Internet does carry a wealth of information and could be considered as being an electronic 'Aladdin's Cave'. Len GM0ONX suggests that *PW* should perhaps consider some of the material, which is published on the Internet (and yes, it is considered to have been published) and course, his idea does have merits.

Unfortunately though, in common with other spheres of everyday life...there are cheats around. These include some who claim to have written material, thought of an idea and own the copyright of what they're publishing when in fact they don't. That's why - for legal reasons - we must have direct contact with the legal owner of the copyright so they can assign us the appropriate rights. We can then do our very best to avoid enabling even more lawyers to own expensive cars, second homes, etc!

In professional publishing we have to be extremely careful, but despite such care both *PW* and other Amateur Radio/hobby electronics magazine have been caught out by (not necessarily intentionally devious) authors who have had the same articles accepted for publication. Very occasionally we've ended up with the same project published in the same month - and you'll probably realise that after such events the authors involved are treated with great caution!

Other problems have included claiming of ownership of copyrighted articles and projects which were published in *PW* (as in the case I'm about to mention) in another monthly hobby electronics magazine. It happened several years ago and readers quickly drew our attention to the fact that someone was claiming that a published *PW* project was his idea. I'm not mentioning the magazine as the Editor and staff are our friends and because they were very embarrassed. It wasn't their fault...and it could have easily have happened the other way round.

In fact, *PW* had a 'near miss' in the September 2004 when we published an article by **David Allan** entitled A Short Wave Reflex Receiver on pages 30 and 31. David freely admitted he didn't know where the circuit came from and actually requested readers to help him find the original author to enable due credit to be given.

Websites can prove very helpful. However, the Internet could be a legal quagmire for magazine Editors searching for articles to publish! (see text).

As usual, *PW* readers were anxious to help David Allan in his search and the first to telephone was **CM** (**Martyn**) **Lyndars**, of HAC short wave receiver fame. Martyn who has many hundreds of letters from the recently deceased **Sir Douglas Hall** from years of correspondence (they shared a common interest in getting the most out of deceptively looking circuitry) confirmed it was one of the late gentleman's designs (see Keylines page 9). So, thank you Martyn!

So in rounding off Topical Talk this month - I ask once again that if you find anything on the Internet suitable for *PW* - you encourage the author to contact us directly. Similarly, if you've published any of your own ideas using the same medium please contact us for an *Author's Guide*. You may well have another idea, or even an up-dated version of interest to *PW* readers. **PW**

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