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Practical WIRELESS

Britain's Best Selling Amateur Radio Magazine

Wouxun Handies Reviewed

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by Mike Richards G4WNC

Antennas
Build a 70cm antenna
by Alan Ford VK2DRR

Practical
Aids to short wave listening with George Dobbs G3RJV

Design
With Tony Nailer G4CFY

Vintage
With Phil Cadman G4JCP

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AOR

We are pleased to announce that we have been appointed as sole UK distributors.

AR-8200mk3 Scanner 530kHz - 3GHz. £419.95 D

AR-8600mk2 £599.95 D Mobile/Base Receiver. Wide range 530kHz - 3GHz AM NFM WFM SSB, 1000 mems, Rotary tuning VFO.

AR-ONE High performance Receiver. 10kHz - 3.3GHz computer contollable. All modes + tuning steps to 1Hz. £4499.95 D

AR-MINI New Low Price! Scanner 100kHz - 1300MHz. Offers lots more than you think. From LW to GHz it has great sensitivity, CTCSS decoding & DCS. Built-in 100kHz-5MHz bar antenna & offers AM FM & WFM. Great for monitoring, airband listening or broadcast. FREE software available for programming. £139.95 D

DV-Dongle 2 Models!

DV-DONGLE USB to your PC or Mac and work D-Star by accessing internet open D-Star repeaters worldwide. £199.95 C

NEW DV-ACCESS Access Point, similar to above but able to TX/Rx over short distance so that with 2m D-Star radio you can work through your PC. £249.95 C

ICOM

ID-E880 NEW

* 2m/70cm 50W Mobile
* D-Star +D-Star Repeat Mode
* Extensive GPS Compatability
* CTCSS & DTCS + Airband Receive
* 1000+ Memories
* Detachable Head £429.95 D

NEW IC-9100

VHF/UHF Satellite + HF + D-Star £TBA

Arriving Soon 100W on HF-2m 75W on 70cms & 10W on 1296MHz Some items optional

NEW FIND IT CHEAPER? We'll Match it!

IC-T70E

Dual Band 2m/70cm Handy £159.95 D

IC-E90

Triple band 6m, 2m, 70cms. £234.95 D

NEW IC-E80D

* 2m/70cm Handheld
* D-Star +D-Star Repeat Mode
* Extensive GPS Compatability
* CTCSS & DTCS + Airband Receive
* 1000+ Memories

FREE software on Icom site

In Stock Now £369.95 D

IC-E92D

A great dual band handheld woth D-Star fitted. Wide receive £369.95 D

IC-E2820

Great dualband mobile. £424.95 D

Fitted with UT-123 D-Star module. £579.95

HF Transceivers

IC-7600 FREE USB keyboard!

This HF-6m transceiver is the successor to the IC-756 series. It takes features from the flagship IC-7800 and the more recent IC-7700, putting them into a package that brings the price within reach of many more hams. £3379 D

IC-7800	Deluxe HF / 50MHz All-Mode 200W Transceiver	£7999 D
IC-7700	1.8-54MHz 200W with built-in PSK-31 + keyboard	£5499 D
IC-7200	HF & 6m DSP 0.005-3335MHz wideband receive with USB port	£799 D
IC-7000	160m-70cm 100W (hf) Mobile, portable or base station	£1089 D
IC-718	160m-10m 100W transceiver that brings HF to those on a budget	£519 D

Other Radios

IC-910H	£1249 D	IC-R20	£389.95 C
IC-910HX	£1449 D	IC-R1500	£449.95 C
IC-2200H	£199 D	IC-R2500	£559.95 C
IC-R3	£385.95 C	IC-R8500	£1379.95 D
IC-R6	£172.95 C	IC-R9500	£9799.95 D

NEW The HF AlexLoop

Easy thumb tuning

£299.95 D

* 7-Band Loop Antenna
* 40/30/20/17/15/12/10m
* Manual tune in seconds
* 1m diameter loop
* Packs in case 40x27cm
* 20W QRP design
* Includes loop mast
* Easy handheld

RFSPACE SDR-IQ Receiver NEW

The SDR-IQ is a high performance receiver covering 500Hz to 30MHz. It is powered directly from PC USB socket and work with Windows or Linux systems. A highly stable unit with dedicated software. £469.95 D

New **IF-2000** SDR IF feed for FT-2000 & FT-950. Feed your transceiver IF out into an SDR receiver at 10.5MHz £219.95

FlexRadio Systems — FLEX-3000 Special Offer!

*100W Transceiver *160-6m Great Audio *Auto ATU *Selectivity to 50Hz

The Flex-3000 experience! A 100W 160-6m software defined radio. The hardware package contains the receiver front end, band pass filters, transmitter driver, PA & ATU. But the main signal generation & signal processing is inside your PC. Any modern PC or laptop with Windows & a fire wire socket, will run it. You get superb audio quality, amazing razor sharp selectivity, & complete programming options. The live spectrum & waterfall display plus overall graphic interface combines with a transceiver that fits in a brief case yet punches well above its weight.

This Month Only Save £100!

Flex-1500 5W 160m-10m Was ~~£1399.95~~ Now £1299.95 D

NEW Includes auto ATU! Firewire connection. 160m - 6m All Modes Transceiver 5 Watts of clean RF Power - USB connection - Selectivity to 25Hz! - Use with laptop for easy portable. £549.95 D

Flex-5000A 100W 160m-6m The ultimate SDR radio with amazing front end, extra RX option and 2m & 70cm options.

£2495.95 D

YAESU

Choice of the World's top DX'ers

NEW VX-8DE

* Triple Bander
* Upgraded APRS features
* Rugged and Submersible
* Powerful Li-Ion battery
* Beacon Function
* Built-in altimeter
* GPS option unit
* Increased Memory
* CW Trainier!

£399.95 D

HF Transceivers

FT-2000 £2079 D

FT-2000 classic HF & 6m 100W transceiver with PEP (performance upgrade) ready installed. Dual receive & fantastic filtering make this an impressive performer. We still have the largest, most up-to-date stock of Yaesu in the UK!

FT-2000D	200 Watt version of FT-2000 with built-in PSU.	£2899.95 D
FT-950	100W HF - 6m transceiver with DSP & Auto ATU	£1289.95 D
FT-450AT	100W HF - 6m with automatic ATU & latest updates	£699.95 D
FT-450	100W HF - 6m transceiver - great value.	£619.95 D
FT-DX9000contest	200W HF - 6m "formula one" contest machine	£4899.95 D
FT-DX9000D	Deluxe fully loaded base station	£8199.95 D
FT- DX9000MP	Amazing 400W "legal limit" radio	£8995.95 D
FT-857D	HF to 2m mobile. portable or base - up to 100W	£659.95 D
FT-817BHIDSP	Fitted with DSP module exclusive to W&S	£599.95 D

VHF Mobiles & Handhelds

FTM-10SE	50/40W 2m/70cms stereo FM	£299.95 D
FT-8800E	Dualband Mobile 50W / 30W	£299.95 D
FT-8900R	10/6/2m & 70cm Mobile	£359.95 D
VX-3E	2m / 70cm Handheld Wideband receive	£149.95 D
VX-7R	Waterproof dualband handy (silver / black)	£279.95 C
VX-6E	2m/70cms handy, 5W Wideband Receive	£229.95 C
FT-60E	2m/70cms, 5W handy Wideband Receive	£169.95 C

New Mobiles In Stock Now!

FT-1900E £129.95 D

55W 2m Mobile. 3 Watts of pristine audio, large LCD & 200 memories.

FT-2900E

75W 2m Mobile. No cooling fan needed! Large easy-to-read LCD. £139.95 D

FT-7900E £229.95 D

50/45W 2m/70cm Mobile. 1000 Memories supplied with DTMF Mic.

VX-3E

Carriage Charges: A=£3, B=£4, C=£6.95, D=£10, E=£12

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Zero Interest

TEN-TEC

Control Your Omni VII Remotely With Ethernet!

No PC Required At Radio End. FREE Software.

FREE MIC!
On All Tentec HF radios!
[not including kits]

G3OJV operates WiFi Peter, G3OJV, operating the Omni VII via Wifi using laptop built-in mic. The rig is ethernet ready. Just plug cable in back of radio - no PC needed. Software is FREE. Or use as standard -160m - 6m, superb audio, great receiver with three roofing filters, full DSP, large colour screen and easy menu system.

Jupiter-538B 160-10m 100W	£1499 D
Jupiter-538AT-B 160-10m 100W + ATU	£1799 D
Omni-VII-588 160-6m + ethernet	£2499 D
Omni-VII-588AT 160-6m + ethernet + ATU	£2799 D
Orion-II-566 160-6m flagship radio	£3899 D
Orion-II-566AT 160-6m flagship radio + ATU	£4199 D

NOW IN STOCK!
NEW AIRNAV RADARBOX-3D

RadarBox 3D - The world's ultimate virtual radar system with Google Earth as a map overlay & new 3D aircraft picture library.

Full Package £489.95 C

Current owners can upgrade to 3D with RadarBox-UG for just £109.95 C

RadarBox-Pro Basic Package - No 3D £399.95 C

YAESU
Choice of the World's top DX'ers

NEW HF RANGE

FT-DX5000 Series

W&S First! We were the first to receive official CE stock from Yaesu UK. No grey imports or non-Europe spec stock here! All our stock carries EU serial numbers that meets the full spec and performance. It matters because when you come to dispose of your radio in years to come, customers will want to check the serial number!

Exclusive Deals Only from W&S!

The new series comprises 3 options : FT-DX5000, FT-DX5000D & FT-DX5000MP. All offer 200W from 160m to 6m. Phone for latest deals & prices!

DUE SOON - ORDER NOW!

< FT-DX5000MP

WiNRADiO® Excalibur Receiver NEW

- ***9kHz - 49.999MHz***
- ***Software Defined Radio***
- ***USB Interface***
- ***3 Parallel Demodulator Channels.***

The WR-G31DDC "Excalibur" receiver heralds a new standard of performance at a very affordable price. The robust front end handles today's busy bands with ease. You will love the live spectrum display (up to 50MHz wide) and absence of significant spurious signals.

£649.95 D

Stock is very limited on this model due to component supplies.

Radio on your LapTop!

Others Models:

WR-G303e 9kHz - 30MHz all modes, digital display, spectrum scope etc. Comprises radio interface, power supply & software. **£659.95 D**

WR-G305e 9kHz - 1.8GHz all modes with digital display, as above but wider coverage. **£699.95 D**

The above models are for external PC use. For internal card mounting in your desk top PC there are the following:

WR-G303i £559.95 D **WR-G305i £589.95 D**

For commercial user we are able to offer professional demodulations software and advanced models.

FAST SAME DAY DESPATCH SERVICE!
Orders must be received before 3pm.

KENWOOD

NEW TS-590E

W&S Exclusive! We are pleased to announce the new HF radio from Kenwood. Prices to be announced.

bhi DSPKR

NES10-2- mkIII

New DSP speaker for any receiver or transceiver.

£109.95 C **NEW**

10 Watt integrated DSP speaker.

£154.95 C

NEIM-1031 Mk II

An in-line DSP module giving complete noise cancelling control

£139.95 C

www.bhi-ltd.com

HF Transceivers

TS-2000E **£1489.95 D**

The TS-2000E is the classic all-band, all-mode base station covering HF - 70cms at up to 100W. Includes dual channel receivers & DX-cluster monitor with built-in TNC.

TS-2000X +23cm **£1749 D**

TS-480HX Ideal for mobile, portable or base station. Gives a massive 200W on HF and 100W on 6m. **£849 D**

TS-480SAT This model gives 100 Watts on all bands up to 6m, but adds a built-in automatic ATU. **£749 D**

Handhelds

TH-F7E	2m/70cm 5W (2-pin Kenwood) SMA **+FREE Clip Mic**	£229.95 D
TH-K2E	2m 5W 4-Key Keypad (2-pin Ken) SMA **+FREE Headset**	£159.95 D
TH-K2ET	2m 5W 16-Key Keypad (2-pin Ken) SMA **+FREE Headset**	£165.95 D
TH-K4E	70cm 5W (2-pin Kenwood) SMA **+FREE Headset**	£159.95 D

VHF Mobiles TM-V71E £289.95 D

2m/70cm Dualband Mobile Transceiver. Features;- *Wideband Receive, Built-In Echolink, Simultaneous 2 Frequency Receive, Removeable Control Head, CTCSS Encode / Decode, 1000+ Memories, Supplied with DTMF Mic.*

TM-271E	2m FM 60W mobile. CTCSS, 200 Memories, DTMF Mic	£165.95 D
TM-D710E	2m/70cms 50/50W mobile. APRS +EchoLink, DTMF Mic	£429.95 D

Watson
Cross Needle Meters

NEW

These are high quality, accurate VSWR meters with large, clear display featuring X-needle movements.

WCN-200 £69.95 C
* 1.8 - 160MHz * 0 - 30 / 300 / 3000W
* 600W max above 30MHz * 2x SO-239

WCN-400 £69.95 C
* 140 - 525MHz * 0 - 30 / 300 / 600W
* 2x SO-239

WCN-600 £89.95 C
** 1.8 - 525MHz * 0 - 30 / 300 / 3000W*
** 600W max above 30MHz * 2x SO-239*

Butternut
Vertical Antennas

These antennas are extremely efficient and use no traps. The large, air-spaced coils are the secret, and resonant adjtments can be made at ground level.

HF-2V 80, 40m DX vertical. 9.75m, Easy erect. **£289.95 D**

HF-6V 80,40,30,20,15,10m self support 7.9m **£389.95 D**

HF-9V As HF-6V but adds 17,12 & 6m. 7.9m **£449.95 D**

Watson
Power Supplies

Power-Mite-NF **£69.95 C**

Compact Cont. 22 Amp Switch Mode PSU variable voltage & noise offset.

Power-Max-25-NF

Slightly larger than the Power-Mite and ideal companion for any 100W radio. **£89.95 C**

Power-Max-45-NF

38 Amp cont, 45 Amp Peak, Switch Mode PSU with variable voltage, V/A meters, & noise offset.

£129.95 C

Power-Max-65-NF

65 Amp Low Noise PSU. Patented Noise Control that permits you to move any noise away from the operating frequency.

£239.95 D

W-5A	5A Analogue fixed 13.8V	£29.95 C
W-10AM	10A Analogue variable	£59.95 D
W-10SM	10A Switched fixed	£49.95 D
W-25AM	25A Variable PSU	£89.95 C

Carriage Charges: A=£3, B=£4, C=£6.95, D=£10, E=£12

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Create Rotators

RC5-1 Medium Duty Rotator

*Rotating torque: 6kg/m *Braking torque: 80kg/m *Mast size: 48-63mm *Vertical load 400kg *Horizontal load 800kg *Rotation speed: 60-150sec/50Hz *Power requirement: 230V AC 80VA *Weight: 5kg *Cable: 7-core cable (not supplied) *Requires MC-2 lower mast clamp if mounting on pole **£499.95 D**

RC5-3 As above + preset control **£599.95 D**

RC5A-3 As above but heavy duty **£819.95 D**

Palm Portable Key German Engineering

Beautifully Enginnered Ultra smooth movement and balance. **£74.95 C**

This tiny straight key is manufactured in Germany & represents typical German design & brilliance. Ideal for portable or QRP & very popular for the users of FT-817 transceivers.

SGC Auto ATU

SG-211

SG-211 "Stowaway" auto ATU. HF + 6m Up to60W. Powered by internal battery. Not weatherproofed.

Was ~~£249.95~~ **£199.95 C**

Heil Sound Audio Equipment

Pro-set-4 & 5

Standard headset with a choice of NC-4 or 5 inserts. Requires AD-1 patch lead. **£114.95 C**

For Icom transceivers, choose the **Pro-Set-IC** with "Icom" Element **£129.95 C**

Pro-set-Plus

Pro-set Plus has the benefit of dual NC-4 / NC-5 mic capsules that can be selected. Requires AD-1 patch lead. **£189.95 C**

Pro-Set-PLUS-IC Icom Element **£194.95 C**

AD-1 Connector Leads One to suit any ham rig, tell us your radio. **£16.95 A**

GM-4 & 5

"Gold Line" mics contain the NC-4 or NC-5 capsule. Handheld or mounted on a stand. Requires CC-1 cable kit for rig. **£119.95 C**

CC-1 Cable Kits One to match every ham rig, tell us the radio you need it for. **£29.95 A**

Avair X-Needle Meters

Cross Needle Models - Even Lower Prices!

AV-20 200W 3.5 - 150MHz **£34.95 C**

AV-40 150W 144-470MHz **£34.95 C**

MFJ Radio Accessories

MFJ-998 W&S **£649.95 C**

1.5kW SSB & CW • Digital & Analogue X-needle VSWR • 1.8 - 30MHz • 20,000 memories • Radio interfaces optional • Built-in antenna selector • Field upgradeable firmware • Auto bypass protection

MFJ-925 Compact auto tuner **£169.95 D**
MFJ-927 200W remote auto atu **£249.95 D**
MFJ-928 Basic auto atu **£199.95 D**
MFJ-931 Artificial ground **£112.95 C**
MFJ-932 Mini loop tuner **£139.95 C**
MFJ-934 Artificial ground + ATU **£199.95 C**
MFJ-935B Portable loop system **£199.95 C**
MFJ-945E Mobile atu 300W **£129.95 C**

MFJ-929 AUTO TUNER 1.8-30MHz 200W

LCD readout, 20,000 memories, long wire & coax, radio interface. **W&S £209.95 C**

MFJ-991B Auto atu 150W **£209.95 D**
MFJ-994B Auto atu 600W **£339.95 D**
MFJ-962D 1.5kW ATU **£289.95 D**
MFJ-969 160m - 6m 300W **£209.95 D**
MFJ-971 Portable atu **£118.95 C**
MFJ-974B Balanced ATU 3.5-30MHz **£189.95 D**
MFJ-986 3kW differential tuner **£349.95 D**

MFJ-993B Rugged 300W Auto ATU

A true "Plug & Play" Auto ATU. Covers 160m to 10m. Capable of handling up to 300W - tunes almost any antenna, has X-needle meter & digital data display. **W&S £249.95 D**

MFJ-1260 Mic control 1 in/2 out **£99.95 C**
MFJ-1263 Mic control 2in/2 out **£109.95 C**
MFJ-1275 Sound card adaptor **£109.95C**
MFJ-1625 Window Ant + Tuner **£199.95 D**
MFJ-16B01 Dipole centre SO-239 **£21.95 A**
MFJ-16C06 6x dog-bone insulators **£4.95 A**
MFJ-16E01 300Ω end fed SO-239 **£10.95 D**
MFJ-1796 40m-2m vertical **£239.95 D**
MFJ-1798 80m-2m vertical **£299.95 D**
MFJ-1908H 43ft fibre glass mast **£239.95 D**
MFJ-1922 Digital screw driver control **£99.95 D**
MFJ-1924 Prog. screw drvr control **£129.95 C**
MFJ-1925 ATAS-100 controller **£72.95 C**
MFJ-202B Receiver noise bridge **£79.95 C**
MFJ-250X 1kW dummy load (x-oil) **£55.95 C**
MFJ-260C 300W dummy load **£44.95 C**
MFJ-261 100W dummy load **£32.95 C**
MFJ-265 2.5kW load fan cooled **£199.95 C**
MFJ-403 Micro CW keyer **£66.95 C**
MFJ-403P Micro travel iambic **£79.95 C**
MFJ-4103 PSU for FT-817 **£52.95 C**
MFJ-417 Pocket morse tutor **£76.95 C**
MFJ-4403 Trcvr volt conditioner **£109.95 C**
MFJ-442 Slim electronic keyer **£199.95 C**
MFJ-461 Pocket morse reader **£99.95 C**
MFJ-4714 4-way remote ant switch **£87.95 C**
MFJ-4726 6-way remote ant switch **£159.95 C**
MFJ-490 Memory keyer + paddle **£244.95 C**
MFJ-495 Memory keyer **£189.95 C**

Hustler HF & Mobile Antennas

Verticals

Hustler verticals are known around the world for their performance and sturdy construction.

6-BTV 6 band inc 30m **£259.95 D**
5-BTV 5 band 80-10m **£219.95 D**
4-BTV 4 band 40 - 10m **£179.95 D**

Mobiles

Base Whip Sections

MO-1 137cm Folds 1/3rd Up **£38.95 C**
MO-2 137cm Folds Halfway Up **£38.95 C**
MO-3 137cm Non Folding **£29.95 C**
MO-4 67cm Non Folding **£26.95 C**

Resonator Top Section

RM-10	10m	150-250kHz	**£21.95 C**
RM-11	11m	150-250kHz	**£21.95 C**
RM-12	12m	90-120kHz	**£21.95 C**
RM-15	15m	100-150kHz	**£21.95 C**
RM-17	17m	120-150kHz	**£26.95 C**
RM-20	20m	80-100kHz	**£26.95 C**
RM-30	30m	50-60kHz	**£29.95 C**
RM-35	40-30m	7-10MHz	**£29.95 C**
RM-40	40m	40-50kHz	**£29.95 C**
RM-50	60-40m	5-7MHz	**£29.95 C**
RM-60	60m	5MHz	**£32.95 C**
RM-80	80m	25-30kHz	**£32.95 C**

Diamond HF Antenna

BB7V *The small space answer!*

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

£325.95 C

Tigertronics SignaLink Interfaces

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

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

Watson VHF/UHF Antennas

VHF-UHF Verticals

W-30 2m/70cms 3/6dB length 1.15m 150W SO-239 **£49.95 C**
W-50 2m/70cms 4.5/7.2dB length 1.8m 150W SO-239 **£54.95 C**
W-300 2m/70cms 6.5/9dB length 3/1m 150W SO-239 **£74.95 D**
W-2000 6m/2m/70cms 2.15/6.2/8.4dB length 2.5m 150W **£89.95 C**

VHF-UHF Mobile Whips

W-2LE 2m 0dBv length 0.48m **£10.95 C**
W-285 2m 3.4dBv L. 1.33m **£14.95 C**
W-77LS 2m/70cm 0/2.4dBv L. 0.43m **£14.95 C**
W-770HB 2m/70cm 3/5.5dBv L. 1.1m **£19.95 C**
W-7900 2m/70cm 5/7.5dBv L. 1.58m **£31.95 C**
W-627 6/2/70cm 2/4.5/7.2dBv L.1.6m **£34.95 C**

Miracle Antennas Miracle-Whip

A tuneable telescopic whip covering 3.5 to 460MHz. Up to 25 Watts PEP, fiited with PL-259 plug. Great for FT-817 & IC-703 or any other QRP radio.

£109.95 C

Ducker **£109.95 C**

HF Mini ATU for helical whips

TGM Compact HF Beams

MQ-24SR 4-Bands **£499.95 D**

This antenna covers 4-bands, 20-6m & up to 5.5dB gain.
* *Element: 3.58m*
* *Boom: 1.37m*

MQ-26SR as above + 17m & 12m **£599.95 D**

B-245 1kW 5-Bands **£899.95 D**

5-band compact beam antenna that will get you on 40m!
* *Element: 21ft 6in*
* *Boom Length: 10ft*

Watson Coax Switches

Premium grade Watson RF coax switches.

4-Way Switches

CX-SW4N **£59.95 C**
DC - 1.5GHz 1.5kW 5x N-Type Connectors.

CX-SW4PL **£56.95 C**
DC - 800MHz 1.5kW 5x SO-239 Connectors.

3-Way Switches

CX-SW3N **£49.95 C**
DC - 1.5GHz 1.5kW 3x N-Type Connectors.

CX-SW3PL **£41.95 C**
DC - 800MHz 1.5kW 3x SO-239 Connectors.

2-Way Switches

CX-SW2N **£32.95 C**
DC - 3GHz 2kW 3x N-Type Connectors.

CX-SW2PL **£26.95 C**
DC - 1GHz 2kW 3x SO-239 Connectors.

MFJ-269

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

* *1.8 -170 & 415-450MHz*
* *Frequency Counter*
* *LCD readout*
* *SWR & impedance*
* *N-socket (Ant), BNC (Counter)*
* *AAx10 or ext. 12V DC*
* *Size 103w x 173h x 60d mm*
* *Weight 750g*

Carriage Charges: A=£3, B=£4, C=£6.95, D=£10, E=£12

Practical Wireless September 2010

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Front cover: The two Wouxun hand-helds on review in this issue.

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Rob Mannion's

keylines

Rob's after DAB radio again – and offers an apology.

In early July the UK's coalition Government Minister – the Right Honourable **Ed Vaisey** MP – made a surprising announcement; that the enforcement of digital audio broadcasting (DAB) on Band II v.h.f. – would now be 'Listener led'. In other words, the Government had reacted to the indignation shown by radio listeners by making it clear that only when the number of 'digital listeners' rose well above the 50% mark, would the enforced changeover on Band II begin.

Incidentally, Government sources have stated that analogue transmissions – frequency modulation – can remain on the band. But we'll have to wait some years yet to discover what low power analogue services we'll get on this crowded part of the broadcasting spectrum.

When I discovered that Mr Vaisey was to make an announcement on Thursday July 8th, I made sure that everyone else interested in the future of the – vitally important – broadcast radio service in the UK, were notified. But I was surprised indeed to learn it was somewhat of a 'climb down' statement.

Once in power, politicians don't often take much notice of the 'groundswell' of opinion of the general public – but this time it was different! The normally silent majority took full advantage of the Government website and registered their opposition to the imposition of DAB radio on Band II. Indeed, the public are fully aware that the digital broadcasts have a long way to go before they provide us with a reliable service, with simple to use and economical (power wise) receivers.

One particular statement – attributed to Mr Vaisey – said that the digital service wouldn't be imposed until the replacement service 'was as good as f.m. or even better'. And, of course, the 'As good as' phrasing delighted the opponents of DAB!

Although my own latest letter wasn't selected for publication in *The Daily Telegraph* on this occasion, the letters from extremely concerned readers on Thursday July 8th, made it abundantly obvious that listeners from all over the UK are extremely concerned for the future. Fortunately, the *DT* also carried a potent Editorial on the same topic. Surely, 'they' (the Government) must now listen and cancel – rather than delay – the 'switch over'?

The insurmountable problem for the broadcasters is (as far as I'm concerned) due to the advent of modern sensitive receivers. Indeed, reception of the analogue (f.m.) service has proved adequate via simple antennas on portable receivers – despite the Band II service area planning having never been aimed at providing reliable reception on rather inadequate set top antennas.

Unfortunately (for the broadcasters!) due to modern analogue receiver design, the majority of listeners, can and do get a good service on f.m. via receivers using set-top antennas. However, I think that any serially transmitted digital radio service can only provide a reliable reception when the receiver is connected to a correctly adjusted antenna, mounted at chimney height. Practical reception with DAB radio can never be reliable without a decent antenna. Receivers will also require a buffering store capable of holding enough data to get rid of – what the BBC's *Today* programme staff call "Burbly radio!" – as the data stream can often be interrupted due to reception problems.

Enhanced Version!

The *PW* team are always delighted when a project proves of interest to our readers. And when such a project has problems – as when we published the wrong version of *A Practical CTCSS Tone Encoder* by **Ken Ginn G8NDL** (July 2010 *PW)* it's disappointing. The version that appeared was Ken G8NDL's original, without the information on programming, etc. Through the co-operation of Ken G8NDL and **Tony Nailer G4CFY** – we will publish an enhanced version and newly designed p.c.b.

A full kit will also be available and readers who build the design from the p.c.b. published in the magazine, will also be able to purchase the necessary programmed PIC, available from Tony G4CFY at **Spectrum Communications**.

I must apologise for the annoying error and must also acknowledge that the project seemed ideal for readers – judging by the feedback received. So, if you have ideas for add-on type circuits – let us know. We'll soon get the necessary *Authors' Guide* on its way to you!

Rob Mannion G3XFD/EI5IW

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

readers' letters

The Star Letter will receive a voucher worth £20 to spend on items from our Book Store.

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Star Letter

My Junior School 'Imagineering' Club

Dear Rob,
Over the past year I have been going into my local junior school and running an 'Imagineering' Club. The club is designed to make youngsters more aware of science and engineering, by showing them how to make for themselves items such as a telescope and a compass and giving them an introduction to electronics by building a simple water detector.

Before I started them off assembling their water detectors (not for the faint hearted this; 10 boisterous ten year olds wielding soldering irons!) I gave them some history and produced a valve that had been languishing in the workshop since who knows when. They seemed quite interested in this and I was disappointed that I couldn't produce a valved radio to demonstrate.

So I decided to embark on a project to build a 'proper' valved 'wireless'. This inevitably took me to the large stash of *Practical Wireless* magazines that I have from the 1950s and 1960s. Leafing through these, I soon settled on a design to build: a simple two valve short wave t.r.f. receiver. I have obtained most of the components that I need and will start construction very shortly.

However, the really intriguing thing about these old *PW*s is the social history that they provide, alongside the technical articles. It's amazing how our lives have changed over the past 50 years. For example, the May 1955 edition reports the use of Pye radio telephones by a laundry company in Shepherd's Bush in London and a photographer in Cambridge. The writer obviously did not foresee the ubiquity of the mobile 'phone.

There were monthly statements of the numbers of Broadcast Receiving Licences held in the UK; just over nine million is the figure for February 1956. There's a discussion in the same magazine about the use of uncertified teachers of handicrafts in schools! The writer gets very hot under the collar because handicraft teachers were putting letters after their names, which were not accredited by any recognised institution.

In those earlier days of *PW* the magazine had a very outspoken programme critic, whose deliberations make highly entertaining reading nowadays. He comments, for example, on a certain **Mr Peter Butterworth**, who appears in a programme called *Variety Bandbox*. The critic tells us that the unfortunate Mr Butterworth "touched an all time low", with a script, "poverty stricken of all talent except vulgarity." This same critic also reports that some of the music played was "Grade 3 and 4 child's stuff and of no musical value or interest whatsoever." Pretty strong stuff, and included in a magazine that told us how to make our own transistors (seriously!), build six valved superhets and modify the ex Army 19 set for Amateur use. All for the princely sum of one shilling (5p)!

Times have changed, and probably for the better! Keep up the good work *Practical Wireless* and who knows what readers looking at the magazines of 2010 will be writing of them in 2060! Yours sincerely,
Mike Redman
Malvern
Worcestershire

Editor's comment: *What a fascinating letter Mike! Well done Sir! We'll be interested to see a photograph of your finished receiver. Personally, I think that Thermion (reputed to be Fred Camm the Editor, writing under a pen-name) was the fiercest critic! Incidentally, critics are often outlived – by the success of those who were criticised!* ***Peter Butterworth*** *(4 February 1919 – 16 January 1979) had a very successful career in the Carry On Films. His best film performance was* Carry On Camping *- filmed in a wintry Alton, Hampshire – where he played a greedy campsite owner. A wonderful characterisation. The same film is noted for Barbara Windsor 'going topless' (briefly).*

Radio Amateur Operating Mobile Prosecuted

Dear Rob,
It was nice to catch you on GB3DR recently! Unfortunately, the particular incident involving my operating while mobile was very much 'in depth'. I have pages and pages of evidence and court/police statements. I'm pleased that you are prepared to publish details as a warning to other Amateurs. So, I'll be as brief as I can!

I was originally pulled over in Okehampton, Devon, one evening last year when I was picking **Shelly**, my partner, up from an expedition on Dartmoor that she had to attend. All was going well until my SatNav was telling me to go down a road that had some freshly installed bollards in not allowing access.

So I did the normal thing of carry on driving until the SatNav refreshes and finds a new route (which it didn't! – instead it kept sending me back to the same place! So, not knowing the area at all, and concerned for Shelly's welfare in awful weather, I called through on 145.5MHz in the hope that someone would come back and be able to assist me. No one responded.

I then attempted the call again at a T junction controlled by traffic lights.

At the adjoining junction was a Volvo estate Police car who followed me. When I pulled over in Okehampton town centre near these bollards, the officer pulled alongside. He said, "I'm going deal with you for being on your mobile 'phone, pull over up the road."

I made the officer aware that I was using a two-way radio and not a mobile 'phone and that as long as it has not affected the standard of my driving (hitting the kerb, having an accident, jumping a red light, etc.) that they were in fact exempt from the relevant laws, which state, "it is an offence to use an interactive communications device whilst driving – mobile 'phones, etc., but there is an exemption for the use of two-way radio."

After an hour at the roadside the officer admitted that he did not know the relevant law himself and he would investigate and be in touch by Wednesday the following week. However, many weeks later when a court summons came through the post for the offence of "not being in proper control of my vehicle" (as stated I was stationary at traffic lights!).

After a pre-trial review I pleaded not guilty and in November 2009 I attended Exeter Magistrate court to defend myself. Well, I obviously lost! However, I was proud of myself for standing up in front of the court with no one but Shelly behind me for a bit of moral support, putting my point across and also correcting the Police Officer on several points he'd made. For example, he was concerned I wasn't concentrating and could have hit a child – as it was a summer's evening and children would be out playing. In fact I was in a town centre and – as I've mentioned already – it was awful weather, with heavy heavy rain, strong winds and dark. I certainly didn't see any children playing in these conditions. I was also concerned (and made these concerns aware to the court) about the following:

How was it permissible for the officer to use his toggle switch inside his vehicle (he showed me how it worked) which operates his in-vehicle radio (hands-free) – yet when he was behind me and obviously conducting a Police National Computer (PNC) vehicle check on my car – he used his Tetra handset that was strapped to his chest? Surely driving one-handed while talking downwards into the hand-set without his eyes fully on the road ahead – was just as bad (in my opinion worse) than putting a call out on S20 while I was stationary?

Taxis, Lorry drivers, CB users, Radio Amateurs, emergency services, etc use radio every day. When was the last time a taxi driver was prosecuted for using their PMR?

However, in my particular case I couldn't see how my driving was affected. But more importantly I was fighting for there not being one rule for one and one rule for the other- especially when all over the Internet I have only been able to find exemptions for two-way radio.

I would very much like this letter to be published in *PW* magazine. However, I'm not complaining against the police. Instead I just want to warn other drivers like me who thought it okay to use a radio, that if caught they could be prosecuted (In my case three points and a fine).

With road safety becoming more and more important Dorset Police has launched the 'No excuse' campaign. There will be more officers making sure drivers are concentrating on their driving. Any that aren't will be receiving their "zero tolerance enforcement."

So with this in mind, it would be good to warn all users, all over the country. If I can stop just one person from being prosecuted – then I'll be pleased.

Carl Johnson M3VWP
Isle of Portland
Weymouth
Dorset

Editor' comment: *Thank you for your letter Carl. I think it provides a salutary warning for us all! Please join me on the* Topical Talk *page for further comment.*

The Jet Stream & Radio Effects

Dear Rob,
I have some questions and suggestions for you and *PW* readers. First – as the jet stream passes through the earth's magnetic field, does this then induce an e.m.f. into the jet stream – causing it to generate its own magnetic field? Further, is the jet stream then attracted to the magnetically excited polar region in sun spot maximum years, allowing the 'Azores High' (high barometric pressure) to push further north – providing the UK (especially England and Wales) warmer summers?

Is this event then inversely proportional in solar minimum years – allowing the jet stream to drop further south, causing cooler weather to mix with the warmer air further south –

Mystery Photograph

Dear Rob,
I enclose a photograph,which I am hoping will be recognised by some of your eagle eyed readers.
I found it in my late uncle's (**Walter Hunter**) photo collection, but no one in the family can identify the person operating the radio. I suspect that it may be my great uncle **William Dawson**, as I know he had a great interest in technology way back in the 1930s.

Even if the person can not be identified, there is a lot of interest in the content of the photo. The horn is marked 'Claritone' and BBC. One of the books is titled *Hello Girls*, but I cannot read the name of the author. Behind the vase on the mantelpiece, in a picture frame, there seems to be a certificate, which could be from the RSGB. I would be grateful for any information about the photo, and thank you

and anyone who can help in advance. 73 to you all. Alex
Alex Blyth GM4TAL, Longniddry, East Lothian, Scotland
E-mail: eck.radio@hotmail.co.uk

Editor's comment: *Over to you readers!*

Harry Leeming's Lightning Experience

Dear Rob,
I'm writing with reference to the *Lightning & Amateur Radio* article by **Alan Ford VK2DRR** (August 2010 *PW*) and the the oddest thing I can say about lightning is its unpredictability! After one storm I had two Hi-Fi receivers brought to me by different customers. The first one looked by far the worst and was only brought so that I could condemn it for insurance purposes.

The aerial on the roof had been struck, the cable to this, and the receiver's power lead, had evaporated, leaving only a burn mark and a splash of copper on the wall – the case of the receiver was blackened. The owner's house electrical system needed rewiring and he told me that his wife had seen a fire ball roll through the lounge!

I looked inside the receiver and noted that the coaxial cable connecting the tuner head to the socket on the back had unsoldered itself at both ends. Out of curiosity, I temporally fitted a new mains lead, stood back and switched on. It worked!

The second unit was from a house that had not been struck, but I was advised that it had simply "gone off during the storm". There was not a mark on it but every transistor, diode, and integrated circuit I tested had blown, the unit was totally beyond economic repair. It's strange World! Oh well...it's back to preparing the next edition of *In The Shop* for *PW*!
Harry Leeming G3LLL
Heysham
Morecambe
Lancashire

Editor's comment: *It's a fascinating subject Harry and I think Alan VK2DRR covered the subject very well. Please join me on the Topical Talk page for further comment on this subject.*

Mirror Mirror On The Wall & Lightning

Dear Rob,
I found it very interesting to read Alan Ford VK2DRR's *Lightning & Amateur Radio* article in the August issue of *PW* because I remember – as a young child – my mother would turn the mirrors around, and put knives and forks in the drawer so we wouldn't be struck. It must of worked because we never were struck by lightning!

On to the vexed question of DAB radio now! I fully agree with all has been said against it in *PW* and elsewhere. I've also often wondered why – and who – chose the existing Band III v.h.f. allocation in the first place!

I say this because the majority of Radio Amateurs on the plate will know that in normal conditions that radio transmissions on 200MHz or so will not travel anywhere near as far as those on 100MHz (Band II). My regards to you all.
Paul Burgess G3VPT
Spixworth
Norwich
Norfolk

Editor's comment: *Thanks for your letter Paul. Personally, I have no problems at all with DAB radio remaining on Band III. For those who wish to invest in a fixed and correctly adjusted external antenna mounted at chimney height, I think the service – even with all its limitations – is adequate but I really hope that the analogue technology is not introduced on Band II! Please see* Keylines *this* issue.

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**

providing the southern half of the UK cooler summers but warming the polar region?

Finally, does the unusually inactive (so far) eleven year solar cycle we are experiencing now, correlate with periods of cool weather experienced when similar low sun spot counts were encountered in past centuries? Yours sincerely,
Doug Cormack G4VZR
Coaley
Gloucestershire

Editor's comment: *Thank you for your fascinating series of suggestions and questions Doug! I've passed your letter over to our v.h.f specialist Tim Kirby G4VXE and I'm seeking an expert opinion from others sources. I'm also sure readers will help find the answers – so watch this space!*

Digital Audio Broadcasting – The Government Statement

Dear Rob,
Having read that statement from the Government Minister – **Ed Vaizey** – regarding the 'listener-led' change over from analogue to DAB radio – the only thing that I find good about it is that it buys a bit of time, so that we are not diving feet first into a situation that would have had possible disastrous consequences.

It does however raise more unanswered questions. For instance, what about DAB+, which is a better system or even Digital Radio Mondial (DRM)? Wonder how this research arrived at a figure of 7% less power to transmit Classic FM on DAB as opposed to f.m. If it was arrived at by comparing a single DAB transmitter with an f.m. transmitter then they are falling into the same trap of not looking at the overall picture, that is seeing how many extra DAB transmitters it would take to give the same coverage. To say nothing of the environmental effect of scrapping millions of perfectly good radios. Anyway we shall see, watch this space as they say!
Colin Vaughan
East Barnet
Hertfordshire

Editor's comment: *Thanks for your letter and support Colin. Please see my* Keylines *editorial for further comment on this vitally important subject.*

news & products

A comprehensive round-up of what's happening in our hobby.

Ten-Tec microphone on offer!

Essex-based Water & Stanton contacted *Newsdesk* with some interesting news for Ten-Tec fans. The press release states, "To mark the fact that W&S are now distributing Ten-Tec products in the UK & Ireland – the Ten-Tec factory have offered to supply a Regal desk microphone valued at £130 free of charge with every new Jupiter, Omni or Orion transceiver purchased from Waters & Stanton from July to October 2010. The retro style microphone will be supplied with a desk stand and appropriate connecting cable."

Further details from **Waters & Stanton PLC, *Spa House*, 22 Main Road, Hockley, Essex SS5 4QS**.
Tel: (**01702**) **204965**.
Fax: (**01702**) **205843**.
E-mail: **sales@wsplc.com**,
Website: **www.wsplc.com**

Ofcom & Recognised Spectrum Access

The UK Regulator Ofcom published – on July – 2010 a consultation on proposals to introduce Recognised Spectrum Access (RSA) for receive-only earth stations in the bands 3600 - 4200MHz for the Fixed Satellite Service (FSS) and the bands 1690 – 1710MHz and 7750 – 7850MHz for the Meteorological Satellite Service (MetSat).

The consultation outlines the proposed parameters and fees for grants of RSA. The introduction is expected to provide greater information about receive-only earth stations and their use of spectrum, putting Ofcom in a better position to plan terrestrial assignments in a way that avoids harmful interference to them.

The consultation can be found here: **http://stakeholders.ofcom.org.uk/consultations/rsa-roes/**

Another successful McMichael Rally!

This year's McMichael Rally was a success and there was yet another FT-450 Winner, with the news coming from Martin Lynch & Sons Ltd. in their press release:

"July 18th 2010 saw yet another superb turn-out for the McMichael Rally at Reading Rugby Ground at Sonning, Reading in Berkshire. The attendance was even higher than that of previous years aided by the superb Rally Prize of a brand new FT-450 multi-mode transceiver, donated by Yaesu UK and ML&S Ltd."

The lucky winner of the Raffle was **Mick Hunter M6MMM** of Stoke on Trent. The photo shows (from the left) **Chris Taylor** ML&S, **Vin Robinson G4JTR** Chairman **Reading & District Amateur Radio Club** (RADARC), Mick Hunter M6MMM, Martin Lynch and Tony Wiltshire of ML&S Ltd.,

Further information from **Martin Lynch ML&S Martin Lynch & Sons Ltd., *Outline House,* 73 Guildford Street, Chertsey, Surrey KT16 9AS**
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Website: **www.MLandS.co.uk**

Mark the date for the 2010 Telford Hamfest!

Martyn Vincent G3UKV contacted *Newsdesk* to ensure that *PW* readers don't miss the 2010 Telford Hamfest.

Martyn G3UKV reports: "The Telford Hamfest is coming round again – Sunday September 5th – and we're very busy up here in Shropshire making all the preparations necessary behind the scenes to organise another successful event. Last year, for the first time, we had an outside speaker from **Group for Earth Observation** (GEO) who gave a couple of great talks about satellite imaging and the work of that group to many of our visitors. It was so well received, that we are featuring another speaker this year at the **Enginuity Technology Centre** venue at Coalbrookdale, Telford.

"**Nick Miers** has also been booked to give two presentations about the code-breaking work that took place at Bletchley Park during the Second World War. Nick is one of the official guides at that famous place, and really knows his stuff. He's bringing an original Enigma machine with him to demonstrate its workings.

"Previous visitors will already know that the £2.50 admission to the Telford Hamfest also entitles them to a 30% admission discount to the Enginuity 'hands-on' Technology Centre – so in effect, you can come to the Hamfest almost for Free! There will be a wide range of exhibitors and traders, with a strong emphasis on Amateur Radio and electronics.

"The show kicks off at 10:30am, and lots more information is available from our website **www.telfordhamfest.co.uk** or from myself. We're looking forward to meeting many *PW* readers!

Martyn Vincent G3UKV (on behalf of the **Telford & District Amateur Radio Society**). **9 Sleapford, Long Lane, Telford, Shropshire TF6 6HQ**. Tel: (**01952**) **255416**."

A look back at the 2009 Telford Hamfest.

Nevada says 'goodbye' to André Ravary M0RAV

In the short time he's been working for the Amateur Radio Dealer, Portsmouth-based **Nevada Radio**, French Canadian **André Ravary M0RAV** has made many friends. However, he's now moving on to Yaesu UK and Nevada are looking for a replacement!

Mike Devereux G3SED contacted *Newsdesk* to wish his colleague well: "André has been at Nevada for the last year and I am delighted to see him moving on to Yaesu Amateur Sales – in Winchester, Hampshire, where his enthusiasm and knowledge will be of great use. Good luck André! But now I just have to recruit another 'Mike Devereux' for our busy Amateur radio Department. Any takers? Surely there's a keen *PW* reader who'd like to come and join the Nevada team? We're looking forward to hearing from you"!

Contact Mike Devereux G3SED
Managing Director
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Unit 1 Fitzherbert Spur
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Hampshire PO6 1TT
Tel: **023 9231 3091**
E-mail: **mike@nevada.co.uk**

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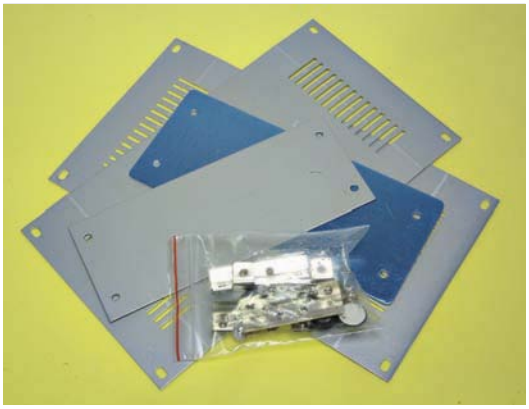
Sandpiper scores in a box!

But an alternative title could be 'From flat-pack to made-up in ten minutes'! *Newsdesk* takes a look at what could be a problem solved for radio constructors who are looking for a suitable enclosure for a project.

Our Technical Editor **Tex Swann G1TEX** reports on behalf of *Newsdesk*: "One of the most annoying parts of building your own project is finding a suitable box to finish off the task. There are several options open to builders, from custom-made commercial boxes that can take the cost up many grades, to simple soldered together panels made up from printed circuit board (p.c.b.) material. Now there's another alternative, that is both cost effective and good looking!

Better known for their range of antennas and fittings, **Sandpiper Aerials**, based in Mid-Glamorgan, now stock a range of self-assemble boxes that would be suitable for many of the small to medium-sized projects. The three sizes stocked come as a flat-pack containing the four sheets of metal that are formed to make up the finished item. The identical top and bottom plates are pre-grooved and malleable enough to bend by hand, to form them. The only tool needed is a medium-sized crosshead screwdriver.



The U-shaped section are then coupled together with four angled plates that hold either the front or back panels in place too. The back panel is cut to be the same size as the main box, but the front panel is a few millimetres larger all around, giving a smarter look overall.

Sandpiper have three sizes available: the smallest, SP1 at 80x46x65mm and costs £2. The medium-sized SP2, at 110x50x80mm, costs £2.50, while the larger SP3, at 140x56x110mm, costs only £3.50. Please add £2 p&p per box. More details from **Sandpiper Aerial Technology, Unit 8, Enterprise House, Cwmbach Industrial Est., Aberdare, Mid Glamorgan CF44 0AE.** Tel: **(01685) 870425,** FAX: **(01685) 876104**. E-mail: **sales@sandpiperaerials.co.uk** Website: **www.sandpiperaerials.co.uk/**

Garex flexi-whip antennas for hand-helds

Peter Longhurst G3ZVI of **Garex Electronics** contacted *Newsdesk* to announce the introduction of their range of flexible antenna whips for hand-held portable Amateur Radio equipment.

The Garex news release states: "Most of the antennas in the range offer an improved performance compared with the antenna supplied with the rig which usually takes the form of a helical ('rubber duck'). For example, a full length quarter wavelength on 144MHz will be several dB better than a helical.

"To coincide with launch of the Wouxun KG-699E 70MHz handy, Garex have produced a dedicated 70MHz Flexiwhip. It measures 520mm overall (compared with just 180mm for the supplied antenna).

"Air tests comparing the two antennas show a marked improvement using the Garex antenna, which uses a centre-loaded design. It's terminated in a SMA socket to fit the Wouxun antenna connector.

"Also available is a dedicated 70MHz whip terminated in SMA male connector suitable for the Icom E90. Several excellent user reports have been received.

"Garex either stock, or will make to order, flexiwhips for 50MHz upwards, terminated in any standard coaxial connector. Full length quarter waves are available for 144MHz upwards. Below 144MHz, the centre loaded design is used.

More details from Peter G3ZVI at
Garex Electronics
PO Box 52
Exeter
Devon EX4 8WX
Tel: **07714 198374**
E-mail: **gxpete@garex**
Website: **www.garex.co.uk/aerials/flexis.htm**

MFJ

LOOP ANTENNAS

MFJ-1788X **£469.95**
Frequency 40-15m, Size 1m, Power 150W, Auto band selection, Built-in cross needle VSWR/Wattmeter

MFJ-1786X **£429.95**
Frequency 30-10m, Size 1m, Power 150W, Auto band selection, Built-in cross needle VSWR/Wattmeter

MFJ-1782X **£375.95**
Frequency 40-15m, Size 1m, Power 150W, No auto band selection, no VSWR/Wattmet

The MFJ-1786 and MFJ-1788 Super Hi-Q Loop Antenna is ideal for restricted space locations. Rugged a l welded aluminium construction, it is fully weatherproof and does not require a separate control cable, the coax carries the signal and the DC control signals for tuning. You can remotely tune to the amateur bands in seconds. It has very narrow bandwidth which reduces harmonic interference and provides super front-end receiver selectivity

Miracle Antenna

MIRACLE-WHIP TX:3.5-460MHz, RX:0.6-500MHz, Power 25W, Length 1.44m **£119.95**

DUCKER-IL ATU for rubber duck, long wire or coax, Power 25W, Connection BNC Plug, Antenna socket BNC **£109.95**

DUCKER-PL ATU for rubber duck, long wire or coax, Power 25W, Connection PL259, Antenna socket BNC **£109.95**

MIRACLE-ADAPTOR Free-Style Adaptor Magnetic Mount kit for Miracle Whip Free-style adaptor magnetic mount, cable & PL259 Plug with 10m ground radial **£14.95**

MOONRAKER VHF/UHF Mobiles

GF151	Glass Mount 2/70cm, Gain 2.9/4.3dBd, Length 78cm complete with 4m cable and PL259	**£29.95**
MRM-100	MICRO MAG 2/70cm, Gain 0.5/3.0dBd, Length 55cm, 1" magnetic base with 4m coax and BNC	**£19.95**
MR700	2/70cm, Gain 0/3.0dBd, Length 50cm, 3/8 fitting	**£9.95**
MR777	2/70cm, Gain 2.8/4.8dBd, Length 150cm, 3/8 fitting	**£17.95**
MRQ525	2/70cm, Gain 0.5/3.2dBd, Length 43cm, PL259 fitting (high quality)	**£19.95**
MRQ500	2/70cm, Gain 3.2/5.8dBd, Length 95cm, PL259 fitting (high quality)	**£24.95**
MRQ750	2/70cm, Gain 5.5/8.0dBd, Length 150cm, PL259 fitting (high quality)	**£34.95**
MR2 POWER ROD	2/70cm, Gain 3.5/6.5dBd, Length 50cm, PL259 fitting (fibreglass collinear)	**£24.95**
MR3 POWER ROD	2/70cm, Gain 2.0/3.5dBd, Length 50cm, PL259 fitting (fibreglass collinear)	**£29.95**
MRQ800	6/2/70cm Gain 3.0dBi/5.0/7.5dBdBd, Length 150cm, PL259 fitting (high quality)	**£39.95**
MRQ273	2/70/23cm Gain 3.5/5.5/7.5dBdBd, Length 85cm, PL259 fitting (high quality)	**£49.95**

DIAMOND ANTENNA Yagi Antennas

Diamond performance from the superb Diamond factory

A502HBR 6m 2 Elements, Power 400W, Gain 6.3dBi, Radial Length 3m **£89.95**
A144S10R 2m 10 Elements, Power 50W, Gain 11.6dBi, Boom Length 2.13m **£84.95**
A144S5RR 2m 5 Elements, Power 50W, Gain 9.1dBi, Boom Length 95cm **£45.95**
A430S15R 70cm 15 Elements, Power 50W, Gain 14.8dBi, Boom Length 224cm **£65.95**
A430S10R 70cm 10 Elements, Power 50W, Gain 13.1dBi, Boom length 119cm . **£49.95**

MOONRAKER HF Mobiles

Get great results with the Moonraker range of HF mobiles !
... from as little as £17.95!

AMPRO-10	28MHz, Length 220cm, 38th fitting (slimline design)	**£17.95**
AMPRO-12	24MHz, Length 220cm, 38th fitting (slimline design)	**£17.95**
AMPRO-15	21MHz, Length 220cm, 38th fitting (slimline design)	**£17.95**
AMPRO-17	18MHz, Length 220cm, 38th fitting (slimline design)	**£17.95**
AMPRO-20	14MHz, Length 220cm, 38th fitting (slimline design)	**£17.95**
AMPRO-30	10MHz, Length 220cm, 38th fitting (slimline design)	**£17.95**
AMPRO-40	7.0MHz, Length 220cm, 38th fitting (slimline design)	**£17.95**
AMPRO-80	3.5MHz, Length 220cm, 38th fitting (slimline design)	**£19.95**
AMPRO-160	1.8MHz, Length 220cm, 38th fitting (heavy duty design)	**£49.95**
ATOM-20S	14MHz, Length 130cm, PL259 fitting (compact design)	**£24.95**
ATOM-40S	7.0MHz, Length 165cm, PL259 fitting (compact design)	**£26.95**
ATOM-80S	14MHz, Length 165cm, PL259 fitting (compact design)	**£29.95**

MOONRAKER New Ground Plane Free Collinear Verticals

We have always wanted antennas without radials without the compromise of performance – well now you can.

SQBM110P 2/70cm, Gain 3/6dBd, RX:25-2000MHz, Length 100cm, SO239 fitting **£54.95**

SQBM1010P 6/2/70cm, Gain 1.5/2.0/5.0dBd, RX25-2000MHz, Length 140cm, SO239 fitting **£79.95**

SQBM1010N 6/2/70cm, Gain 1.5/2.0/5.0dBd, RX25-2000MHz, Length 140cm, N-Type fitting **£84.95**

SQBM225P 2/70/23cm, Gain 2.5/5.0/8.5dBd, RX25-2000MHz, Length 130cm, SO239 fitting **£74.95**

SQBM225N 2/70/23cm, Gain 2.5/5.0/8.5dBd, RX25-2000MHz, Length 130cm, N-Type fitting **£79.95**

TA Tarheel Motorised Mobile

The best USA motorised antennas available here from Moonraker the European distributor – All models in stock now!

Little Tarheel II 3.5-54MHz 200W max length 48" **£349.95**

MOONRAKER GP2500

All Band HF Vertical

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

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

All at an amazing £199.95!

NEW GP2500F fibreglass version now in stock **£249.95**

MOONRAKER Dual and Triband Collinear Verticals

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

SQBM200P	2/70cm, Gain 4.5/7.5dBd, RX 25-2000MHz, Length 155cm, SO239	**£54.95**
SQBM200N	2/70cm, Gain 4.5/7.5dBd, RX 25-2000MHz, Length 155cm, N-Type	**£59.95**
SQBM500P	2/70cm, Gain 6.8/9.2dBd, RX 25-2000MHz, Length 250cm, SO239	**£64.95**
SQBM500N	2/70cm, Gain 6.8/9.2dBd, RX 25-2000MHz, Length 250cm, N-Type	**£69.95**
SQBM800N	2/70cm, Gain 8.5/12.5dBd, RX 25-2000MHz, Length 520cm, N-Type	**£129.95**
SQBM1000P	6/2/70cm, Gain 3.0/6.2/8.4dBd, RX 25-2000MHz, Length 250cm, SO239	**£79.95**
SQBM1000N	6/2/70cm, Gain 3.0/6.2/8.4dBd, RX 25-2000MHz, Length 250cm, N-Type	**£84.95**
SQBM223N	2/70/23cm, Gain 4.5/7.5/12.5dBd, RX 25-2000MHz, Length 155cm, N-Type	**£69.95**

MOONRAKER Multiband Mobile

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

SPX-100	9 Band plug n' go portable, 6/10/12/15/17/20/30/40/80m, Length 165cm retracted just 0.5m, Power 50W complete with 38th PL259 or BNC fitting to suit all applications, mobile portable or base ... brilliant!	**£44.95**
SPX-200	6 Band plug n' go mobile, 6/10/15/20/40/80m, Length 130cm, Power 120W, 3/8th fitting	**£39.95**
SPX-200S	6 Band plug n' go mobile, 6/10/15/20/40/80m, Length 130cm, Power 120W, PL259 fitting	**£44.95**
SPX-300	9 Band plug n' go mobile, 6/10/12/15/17/20/30/40/80m, Length 165cm, High Power 200W, 3/8th fitting	**£54.95**
SPX-300S	9 Band plug n' go mobile, 6/10/12/15/17/20/30/40/80m, Length 165cm, High Power 200W,PL259 fitting	**£59.95**
AMPRO-MB6	6 Band mobile 6/10/15/20/40/80m, length 220cm, 200W, 3/8th fitting, (great for static use or even home base – can tune on four bands at once)	**£69.95**
ATOM-AT4	10/6/2/70cm Gain 2m 2.8dBd 70cm 5.5dBd, Length 132cm, PL259 fitting (perfect for FT-8900R)	**£59.95**
ATOM-AT5	5 Band mobile 40/15/6/2/70cm, Length just 130cm, 200W (2/70) 120W (40-6M) PL259 fitting, (great antenna, great price and no band changing, one antenna, five bands)	**£69.95**
ATOM-AT7	7 Band mobile 40/20/15/10/6/2/70cm, Length just 200cm, 200W (2/70) 120W (40-6M) PL259 fitting, (Brilliant antenna HF to UHF with changeable coils)	**£79.95**

MOONRAKER Yagi Antennas

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

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

MOONRAKER ZL Special Yagi Antennas

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

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

MOONRAKER HB9CV

Brilliant 2 element beams ... ideal for portable use

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

MOONRAKER Halo Loops

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

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

MOONRAKER G5RV Wire Antennas

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

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

Accessories

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

MOONRAKER Trapped Wire Dipole Antennas

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

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

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

Moonraker Head Office & Mail Order
Cranfield Road, Woburn Sands
Bucks MK17 8UR
Tel: 01908 281705

Moonraker Satellite Shop @ M5 Communications
Moto Services Area, Junction 30 M5 South
Exeter EX2 7HF
Tel: 01392 427269

MFJ Antenna Tuners

ew ower pr ces

See our website for full details.

AUTOMATIC TUNERS

MFJ-925 Super compact 1.8-30MHz 200W £169.95
MFJ-926 remote Mobile ATU 1.6-30MHz 200W £419.95
MFJ-927 Compact with Power Injector 1.8-30MHz 200W £249.95
MFJ-928 Compact with Power Injector 1.8-30MHz 200W £199.95
MFJ-929 Compact with Random Wire Option 1.8-30MHz 200W £209.95
MFJ-991B 1.8-30MHz 150W SSB/100W CW ATU £209.95
MFJ-993B 1.8-30MHz 300W SSB/150W CW ATU £249.95
MFJ-994B 1.8-30MHz 600W SSB/300W CW ATU £339.95
MFJ-998 1.8-30MHz 1.5kW £649.95

MANUAL TUNERS

MFJ-16010 1.8-30MHz 20W random wire tuner £69.95
MFJ-902 3.5-30MHz 150W mini travel tuner £99.95
MFJ-902H 3.5-30MHz 150W mini travel tuner with 4:1 balun £124.95
MFJ-904 3.5-30MHz 150W mini travel tuner with SWR/PWR £129.95
MFJ-904H 3.5-30MHz 150W mini travel tuner with SWR/PWR 4:1 balun £149.95
MFJ-901B 1.8-30MHz 200W Versa tuner £109.95
MFJ-971 1.8-30MHz 300W portable tuner £119.95
MFJ-945E 1.8-54MHz 300W tuner with meter £129.95
MFJ-941E 1.8-30MHz 300W Versa tuner 2 ..... £139.95
MFJ-948 1.8-30MHz 300W deluxe Versa tuner £159.95
MFJ-949E 1.8-30MHz 300W deluxe Versa tuner with DL £179.95
MFJ-934 1.8-30MHz 300W tuner complete with artificial GND £199.95
MFJ-974B 3.6-54MHz 300W tuner with X-needle SWR/WATT £189.95
MFJ-969 1.8-54MHz 300W all band tuner £209.95
MFJ-962D 1.8-30MHz 1500W high power tuner £289.95
MFJ-986 1.8-30MHz 300W high power differential tuner £349.95
MFJ-989D 1.8-30MHz 1500W high power roller tuner £389.95
MFJ-976 1.8-30MHz 1500W balanced line tuner with X-needle SWR/WATT £469.95

MFJ Analysers

MFJ-229 UHF Digital Analyser 270-480MHz £199.95
MFJ-249B Digital Analyser 1.8-170MHz..... £259.95
MFJ-259B Digital Analyser 1.8-170MHz..... £259.95
MFJ-269 Digital Analyser 1.8-450MHz £349.95
MFJ-269PRO Digital Analyser 1.8-170/415-450MHz..... £379.95

LDG ELECTRONICS Tuners

LDG Z-817 1.8-54MHz ideal for the Yaesu FT-817 ..... £122.95
LDG Z-100 Plus 1.8-54MHz the most popular LDG tuner ... £143.95
LDG IT-100 1.8-54MHz ideal for IC-7000 ..... £159.95
LDG Z-11 Pro 1.8-54MHz great portable tuner £159.95
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LDG AT-897Plus 1.8-54MHz for use with Yaesu FT-897 ..... £183.95
LDG AT-100 Pro 1.8-54MHz £194.95
LDG AT-200 Pro 1.8-54MHz £214.95
LDG AT-1000 Pro 1.8-54MHz continuously £509.95

AVAIR SWR Meters

AV-20 (3.5-150MHz) (Power to 300W) £34.95
AV-40 (144-470MHz) (Power to 150W) £34.95
AV-201 (1.8-160MHz) (Power to 1000W) £49.95
AV-400 (14-525MHz) (Power to 400W) £49.95
AV-601 (1.8-160/140-525MHz) (Power to 1000W) £69.95
AV-1000 (1.8-160/430-450/800-930/1240-1300MHz) (Power to 400W) £79.95

WATSON Power Supplies

POWER-MITE-NF (22amp switch mode with noise offset) £69.95
POWER-MAX-25-NF (22amp switch mode with noise offset & cig socket) £89.95
POWER-MAX-45-NF (38amp switch mode with noise offset & cig socket) £129.95
POWER-MAX-65-NF 60 Amp cont 65 Amp peak switch mode variable volts supply with V & A meters & noise offset £239.95

MASTRANT High Performance Guy Rope

MASTRANT P3 3mm 200Kg £0.30ppm
MASTRANT P3 Drum 100m 3mm 200Kg £22.95
MASTRANT P4 4mm 400Kg £0.40ppm
MASTRANT P4 Drum 100m 4mm 400Kg £32.95
MASTRANT P6 6mm 850Kg £1.00ppm
MASTRANT P6 Drum 100m 6mm 850Kg £79.95
MASTRANT D2 2mm 200Kg £0.40ppm
MASTRANT D2 Drum 100m 2mm 200Kg £33.95
MASTRANT D3 3mm 400Kg £0.70ppm
MASTRANT D3 Drum 100m 3mm 400Kg £59.95
MASTRANT D4 4mm 800Kg £1.25ppm
MASTRANT D4 Drum 100m 4mm 800Kg £99.95

Cable

RG58 Standard, 5mm, 50 ohm, per metre £0.35
RG58-DRUM Standard, 5mm, 50 ohm, 100m reel £24.95
RG58M Mil spec, 5mm, 50 ohm, per metre (best seller) £0.60
RG58M-DRUM Mil spec, 5mm, 50 ohm, 100m reel £39.95
RGMINI8 Mil spec, 7mm, 50 ohm, in grey per metre (amateur favourite) £0.75
RGMINI8-DRUM Mil spec, 7mm, 50 ohm, in grey 100m reel £64.95
RG213 Mil spec, 9mm, 50 ohm, per metre £1.20
RG213-DRUM Mil spec, 9mm, 50 ohm, 100m reel £99.95
H100 Mil spec, 10mm, 50 ohm, per metre £1.40
H100-DRUM Mil spec, 10mm, 50 ohm, 100m reel £129.95
WESTFLEX103 Mil spec, 10mm, 50 ohm, per metre £1.50
WESTFLEX103-DRUM Mil spec, 10mm, 50 ohm, 100m reel £139.95
TV100U Mil spec, 6.7mm, 75 ohm, per metre £0.60
TV100U-DRUM Mil spec, 6.7mm, 75 ohm, 100m reel £49.95
300-M Ladder Ribbon, best USA quality, 300 ohm, per metre £0.85
300-20M Ladder Ribbon, best USA quality, 300 ohm, 20m pack £14.95
300-DRUM Ladder Ribbon, best USA quality, 300 ohm, 100m reel £59.95
450-M Ladder Ribbon, best USA quality, 450 ohm, per metre £1.00
450-20M Ladder Ribbon, best USA quality, 450 ohm, 20m pack £17.95
450-DRUM Ladder Ribbon, best USA quality, 450 ohm, 100m reel £69.95
FW-M Original high quality flexweave antenna wire, 2mm, per metre £0.75
FW-100 Original high quality flexweave antenna wire, 100m reel £49.95
FWPVC-M Original PVC coated flexweave antenna wire, 4mm, per metre £1.00
FWPVC-100 Original PVC coated flexweave antenna wire, 4mm, 100m reel £69.95

Antenna Wire (50m)

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

SEW-50 Multi stranded PVC covered wire, 1.2mm £14.95
SCW-50 Enamelled copper wire, 1.5mm £19.95
HCW-50 Hard Drawn bare copper wire, 1.5mm £24.95
CCS-50 Genuine Copperweld copper clad steel, 1.6mm £24.95
FW-50 Original Flexweave bare copper wire, 2mm £29.95
FWPVC-50 Original clear PVC covered copper wire, 4mm £39.95

Rigging Accessories

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

PULLEY-2 Adjustable pulley wheel for wire antennas, suits all types of rope £19.95
GUYKIT-HD10 Complete heavy duty adjustable guying kit to suit upto 40ft masts .. £49.95
GUYKIT-P10 Complete light duty/portable guying kit to suit upto 40ft masts £29.95
SPIDER-3 Fixed 3 point mast collar for guy ropes £4.95
PTP-20 Pole to pole clamp to clamp up to 2" to 2" £5.95
DPC-W Wire dipole centre to suit either 300 or 450ohm ladder line £4.95
DPC-S Wire dipole centre with SO239 to suit cable feed connections £5.95
DPC-A Dipole centre to suit ½ inch aluminium tube with terminal connections ... £6.95
DPC-38 Dipole centre with SO239 socket with two 3/8th sockets to make mobile dipole £5.95
DOGBONE-S Small ribbed wire insulator £1.00
DOGBONE-L Large ribbed wire insulator £1.50
DOGBONE-C Small ceramic wire insulator £1.00
EARTHROD-C 4ft copper earth rod and clamp £19.95
EARTHROD-CP 4ft copper plated earth rod and clamp £14.95
G5RV-ES In-line SO239 replacement socket for 300 or 450 ohm ladder line £4.95
AMA-10 Self amalgamating tape for connection joints, 10m length £7.50

Mounting Hardware & Clamps

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

TRIPOD-HDA Free standing, heavy duty, fold away tripod, which adjusts from 50-65mm £149.95
TRIPOD-25L Free standing heavy duty tripod to suit masts 65mm or less £69.95
TRIPOD-20L Free standing heavy duty tripod to suit masts 2 inch or less £59.95
TRIPOD-15L Free standing heavy duty tripod to suit masts 1.5 inch or less £54.95
TK-36 Heavy duty galvanised pair of T & K brackets, 36 inches total length £49.95
TK-24 Heavy duty galvanised pair of T & K brackets, 24 inches total length £24.95
TK-18 Heavy duty galvanised pair of T & K brackets, 18 inches total length £19.95
TK-12 Heavy duty galvanised pair of T & K brackets, 12 inches total length £17.95
SO-9 Heavy duty galvanised single stand off bracket, 9 inches total length £9.00
SO-6 Heavy duty galvanised single stand off bracket, 9 inches total length £6.00
CHIM-D Heavy duty galvanised chimney lashing kit with all fixings, suitable for upto 2 inch £19.95
CAR-PLATE Drive on bracket with vertical up stand to suit 1.5 or 2" mounting pole .. £19.95
CROSS-2 Heavy duty cross over plate to suit 1.5 to 2" vertical to horizontal pole £14.95
JOIN-200 Heavy duty 8 nut joining sleeve to connect 2 X 2" poles together £16.95
PTM-S Pole mounting bracket with SO239 for mobile whips, suits upto 2" pole . £19.95

Antenna Rotators *See website for full details*

We stock all the most popular rotators to suit all requirements

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PL103-30 30m Mil Spec Westflex 103 PL259 to PL259 lead £59.95
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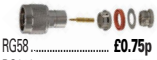
Connectors



PL259/6mm Standard plug for RG58 ..... £0.75p
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NTYPE/6 Compression type plug for RG58 ..... £3.50
NTYPE/9 Compression type plug for RG213 ..... £3.50
NTYPE/103 Compression type plug for westflex 103 .... £6.00
BNC/6 Compression type for RG58 ..... £1.50
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SO239/N Adapter to convert PL259 to N-Type male £3.50
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ALL PICTURES ARE FOR REFERENCE ONLY

The Wouxun KG-UVD1P
Dual Band 144/430MHz hand-held transceiver

When *PW*'s editor asked me to review the new Wouxon KG-UVD1P dual-band hand-held transceiver, he asked that I review it from the point of view of an established Amateur. The Wouxun brand is a new one to me and, I suspect, to many other Radio Amateurs in the UK. Whilst amateurs have come to expect a good standard of construction and performance from the established Japanese brands, frankly I had no idea what to expect!

The price of the KG-UVD1P is certainly very attractive at just £89.99 including 17.5% VAT. For this you get a 144/430MHz (2m/70cm) frequency modulated (f.m.) dual-band hand-held transceiver with up to 5W output on 2m and 4W output on 70cm.

Sitting in its intelligent charger that may be fed either from the mains, or a low-voltage d.c. supply.

Look & Feel

From the outside the KG-UVD1P, looks and feels as though it could have come from any of the established Amateur Radio manufacturers. It fitted into the palm of my hand well with the push-to-talk (p.t.t.) button falling nicely under my finger. It can stand vertically or lay on its back, and fits comfortably into a shirt pocket.

There's a very bight clear light emitting diode (l.e.d.) on the top panel. This can be turned on by pressing the bottom button below the p.t.t. button briefly. This enables the 'KG-UVD1P to be used as a torch. It's certainly very bright! Pressing the same button again turns the torch off.

The transceiver comes with 1300 mAh lithium-ion battery pack, an 'intelligent' charger, a mains lead for the charger. There's also a belt-clip, flexible whip antenna and hand-strap.

Optional (extra) accessories include additional battery packs, an empty AA battery pack, a lead to operate the charger from a car cigarette lighter socket, speaker/microphone, programming software and USB lead, leather case, BNC to SMA adaptor and an SO239 to SMA adaptor, spare charger, a six-battery charger and an in-ear microphone and headphone. Of these accessories, I think most purchasers will find they'll need one of the adaptors and the programming software and lead.

Antenna Connection

Like many modern hand-held transceivers, the KG-UVD1P uses an SMA connector. However, unlike those from other manufacturers, the connector on this rig is 'the other way round', so that the male pin (plug) is chassis-mounted on the transceiver and the female socket is on the antenna.

I hadn't come across the connector arrangement before but I found it worked very well. The associated gasket arrangements would help prevent rain getting into the transceiver. The only slight drawback for me was that I had to order a suitable adapter from the importers so that I could try the KG-UVD1P with an external antenna.

Battery & Charging

I found the arrangement for clipping the re-chargeable battery to the back of the transceiver to be particularly easy. The locking arrangement, made of sprung metal, gives a solid and reliable fixing.

After initial charging, I found that the battery life was excellent, even when using the transceiver on high-power. However, when the transceiver is installed in the charger, I noted that access to some of the buttons isn't possible and I noticed that the charger runs rather warm in operation.

The mains lead used with the battery charger is fitted with one of the smallest moulded on

Colin Redwood G6MXL tries out the budget priced dual-band v.h.f./u.h.f. transceiver from Wouxun

UK-style 13A mains plugs I've ever seen. For a portable transceiver, this is welcome as it makes it less heavy, easier to store and carry than mains leads fitted with bulkier mains plugs.

Whilst examining the plug, I couldn't find anywhere to access the mains fuse, which turns out to be integral. If the fuse blows, the lead (or plug) has to be replaced. I was told that the plug meets new EU regulations which come into force in September 2010. Although, from a quick internet search, I was unable to find more details. I chose to use an alternative mains lead with an accessible fuse that I had to hand*

***Note:** Martin Lynch & Sons Ltd. are now supplying a standard 13A mains plug, fitted with an appropriately rated replaceable fuse.* ***Editor**.*

Simple & Intuitive

The transceiver is simple and intuitive. The top right-hand rotary is both the **On-Off** and **Volume** control. There's none of the 'press-the-button for one second approach' that's been adopted by many hand-held rigs and mobile 'phones. Instead, it's just a simple, straightforward, traditional rotary volume control with built-in switch. It couldn't be easier!

The other rotary control on the top of the transceiver is the main tuning control. This control is nearest the antenna socket and is slightly taller than the on-off volume control. I found the lateral separation of the two rotary controls, together with the slight height difference to be really effective. Unlike some other transceivers I have tried, at no point did I find myself adjusting the wrong control by mistake!

Switching between the 144 and 430MHz bands is simple; I simply had to press the red **A/B** button above

Fig. 1: Dual-band on one handy and all the controls fall to hand easily.

the display to toggle between the two bands.

To try the rig on the air, I joined in my local club net on 144MHz. Running at the 5W output level into a small external 144/430MHz dual band vertical antenna. I was pleased with the signal reports I exchanged over some obstructed paths up to about 20km. They were similar to those I gave when I switched over to a top of the range base station used for comparison. I was also pleased to note that when I tuned 12.5kHz away from quite strong local stations, there was no breakthrough from adjacent channels.

The maximum receive audio volume is adequate in most situations, but I found it a little weak for use in a noisy environment such as a roadside lay-by. I suspect that the optional headphone/microphone would be helpful in such situations.

For some features, I found that I did need the instruction booklet. Generally this is well presented. I found the *Description of Functions* immediately following the contents page, very helpful. Some of the English wording has suffered a little in translation from Chinese, but I didn't struggle to understand what was intended, and I have certainly seen worse elsewhere!

Programming Software

Without the programming software, setting up the KG-UVD1P to use repeaters isn't straight forward and is not adequately described in the user manual. So, I ordered the programming software and special USB lead from the importer. Once installed on my PC running Windows XP, I found it very easy to program all frequency related configuration settings.

The software supplied came on two mini CDs, although one didn't appear to be the correct software for the 'KG-UVD1P. Initially I was unable to get the link between the computer and the radio to work until I discovered that I hadn't pushed the plug into the transceiver sufficiently! In the meantime I downloaded the updated software from the Wouxon web site.

Soon afterwards with the plug pushed fully home, I was able to set up repeater and simplex channels with ease, including all UK repeater shifts and continuous tone code squelch system (CTCSS) frequencies. Doubling up some of the repeater frequencies enabled me to program different CTCSS sub-audible tones for use in different parts of the country.

I was then able to enjoy a variety of repeater contacts on 144MHz using minus 600kHz repeater shift and on 430MHz using plus 1.6MHz and plus 7.6MHz repeater shifts, accessed using CTCSS or 1750Hz tone-burst.

Incidentally, programming the 'KG-UV1P was the first time that I've

Fig. 2: The unusual SMA plug and socket arrangement for the antenna. The l.e.d. on the top panel doubles up as a torch, when its control button is pressed.

Fig. 3: The battery pack clips securely to the metal-framed unit, and is released by the action of two slide-buttons at the same time.

tried to program a transceiver from my computer. After overcoming the problems, I found the process remarkably easy and I'd certainly recommend this approach with the transceiver.

When using the KG-UVD1P, there's a voice prompt that speaks the memory channel number (e.g. 'Two Zero'). It turned out that this is the number of the 'memory channel' and not in this case 'S20' or '145.500'. I found this confusing as it made me think there was activity on the channel when there wasn't. But the remedy was simple – I just turned off the feature, leaving just a gentle beep instead.

Wide Band

As supplied, the KG-UVD1P can transmit and receive outside both the UK 2m and 70cm Amateur bands and unfortunately I could find no mention of how to stop this in the instruction booklet. However, I found the easiest way to constrain its coverage was to program the 128 memory channels with all the specific frequencies I wanted to use. Just over 30 (repeaters and a good selection of simplex channels) were more than sufficient for my needs.

If you really need more, then multiple configuration files can be saved on your computer (e.g. one for each part of the country) and written to the radio depending on the geographical area of operation.

Squelch Settings

There are nine squelch settings available. Initially I thought the out-of-box squelch setting (5) seemed fine, but after some marginal contacts through GB3FI over an obstructed path from inside a car on the M4 near

Fig. 4: The USB lead and programming software makes the handy simpler to use. And could be used to 'clone' rigs for specific purposes.

Newport in South Wales, I decided that changing the setting to 3, which I found was better.

The users' manual describes how to change the setting and is it's typical of the various settings. Press the red **MENU** button, then the **SQL2** button, then the red **MENU** button, then use the up or down arrow keys to adjust the squelch level, then press the red **MENU** button, and then the **EXIT** button.

Pressing the bottom of the two buttons below the p.t.t. on the left-hand side of the transceiver for a second or longer opens the squelch for as long as it is pressed.

By pressing the first of the two buttons below the p.t.t., the KG-UVD1P can receive wide band f.m. (w.b.f.m.) broadcast stations between 76 and 108MHz. Some may find the extended Band II range useful for searching for Eastern European broadcast stations during sporadic E openings.

Incidentally, I was surprised when I saw 'Digital FM Radio' mentioned in the specification. Did this radio include reception of the UK digital audio broadcast (DAB) radio services? No, was the answer – what's really meant is that the Band II w.b.f.m. frequency is displayed on the easy to read liquid crystal display!

The w.b.f.m. sound quality was perfectly adequate for such a small set, and I found the sensitivity with the supplied flexi-whip antenna to be sufficient for reception of all the broadcast Band II stations in my area.

A Real Bargain!

Those who take the trouble to configure the KG-UVDP1 for Amateur band use will be rewarded with a particularly easy to use hand-held transceiver that can do all that is needed of a 144/430MHz hand-held, and furthermore it's a real bargain! No current models from the big Japanese manufacturers come close in price.

The KG-UVD1P has wider coverage than the usual Amateur hand-helds from the main manufacturers, so I think it's essential to invest the time and effort into configuration. With the aid of the correct programming software, this is certainly easy enough.

Finally, I would like to thank Martin Lynch & Sons Ltd. for the loan of such an interesting and exciting transceiver.

Product
Wouxon KG-UVDP1 144/430MHz dual-band hand-held transceiver.

Company
Martin Lynch & Son Ltd (Importers and Agents).

Pros & Cons
Pros: Those who take the trouble to configure the KG-UVDP1 for Amateur band use will be rewarded with a particularly easy to use hand-held transceiver that can do all that is needed of a 144/430MHz hand-held, and furthermore it's a real bargain!

Cons: The KG-UVD1P has wider coverage than the usual Amateur hand-helds from the main manufacturers, so I think it's essential to invest the time and effort into configuration. With the aid of the correct programming software, this is certainly easy enough.

Price £89.99 inc. VAT

Supplier: Martin Lynch & Sons Ltd., *Outline House*, 73 Guildford Street, Chertsey, Surrey KT16 9AS. Tel: (01932) 567333.
E-mail **sales@hamradio.co.uk**
Website: **www.hamradio.co.uk**

Manufacturer's Abridged Specifications

Transmitter

Radio frequency power output:	5W v.h.f., 4W u.h.f.
Frequency stability:	±2ppm.
Max. Freq. deviation:	±5kHz at 25kHz channel spacing. ±2.5kHz at 12.5kHz channel spacing.
Spurious radiation:	<30dBm

Receiver

Receiver design:	Double conversion superhet.
Intermediate freqs:	1st 29.250MHz, 2nd 450kHz.
Sensitivity (12dB SINAD):	0.16μV
Squelch sensitivity:	<0.2μV
Audio output power:	500mW

A new series for data modes transmissions from a very familiar name!

Mike Richard's

data modes

Mike Richards G4WNC begins his new series – Radio Amateur data modes, what they are and how to use them!

New Column *It's many years since Mike Richards G4WNC last wrote regularly for* PW *and we're delighted to welcome him back to the magazine with his new column.* **Editor.**

Welcome to *Data Modes* (*DM*). In this new series, I'll be guiding you through a wide range of data modes from radio teletype (RTTY) to ROS (a digital spread spectrum mode) and lots in between. However, in this first session I'll concentrate on some of the general information and principles that run right through all the digital modes.

Data Modes?

You may ask, "What are data modes'? In replying, probably the simplest definition of a digital mode in this context, is anything that cannot be directly deciphered by the human ear/eye/brain combination. Therefore, that would make all speech modes and c.w. non-data signals, which is about right! The vast majority of data mode signals are used to convey typed messages over radio, be that live QSOs or stored messages.

One of the essential points about data transmission is that the original message has to be converted into a form that can be handled by a digital medium. This means substituting each character in the message with new code that comprises a mix of 2-states. The simplest analogy is Morse Code where each letter is assigned a unique combination of dots and dashes and the signal carrier is either on or off. It's this conversion or encoding process that forms the heart of the many different modes.

Data Alphabets

Data alphabets are simply 'look-up' tables that are used to convert the information in our message into a numeric or digital form that can be processed by the chosen digital mode. Returning to the Morse analogy, the Morse code itself can be thought of as a data alphabet as each letter of the message is converted to a dot/dash combination using the Morse code look-up table. A similar system is employed for other data modes but the look-up tables, or alphabets as they're often known, change to suit the specific mode in use.

So why don't all the modes use the same look-up table? And the reason is, that in most cases, it's the look-up table itself that forms a key part of the overall system and is tailored to suit that particular digital mode. A good example of this can be found in the code that's used for Amateur Teleprinting Over Radio (AMTOR) and Simplex Teletype Over Radio (SITOR) signals. The operation of these data modes requires a simple method, that can be built into the code itself, for detecting errors.

The solution chosen was to arrange the alphabet look-up table so that every character comprised a combination of four '0's and three '1's. At the receiving end, the decoder checks the received message and discards anything that doesn't match the correct 4:3 pattern.

Another good example can be found in the alphabet used for the popular PSK-31 mode. In this mode the alphabet uses a range of code lengths with the most common letters being assigned the shorter codes. This helps improve the overall transmission speed. (*Much like Morse Code in fact. Editor.*)

So you can see that the alphabet chosen is very much part of the data mode. Even as I type this article my key presses are being converted into digital form using the Unicode that's used in many PC operating systems.

Bits Bauds & Speeds

I'll be talking a lot about data bits in this series so I ought to explain what the terms Bit, Baud and Speed mean. In this context, a data 'bit' (Binary digIT) is the smallest element in each of the codes. Let's use an RTTY signal, as shown in **Fig. 1**, as an example to illustrate this.

The RTTY signals are asynchronous (more on this later) so each character begins with a 'start bit' which is followed by five data bits – these five bits represent the character being sent and finally a 'stop bit' to define the end of the character.

The concept of data bits as the smallest element, runs right through all the data modes. When it comes to discussing the speed of a data link you will often find 'bit rate' and 'baud rate' used. Technically the bit rate is the number of digital bits transmitted per second whilst the baud rate is the symbol rate of the modulated signal.

In many of the simpler data modes the two are the same – so there's no problem. However, some of the more advanced systems can convey more than one data bit for each modulated symbol. (I'll explain this in more detail when we get to discuss those data modes).

Serial Data

Once the message has been converted into a digital format using the appropriate data alphabet, the information needs to be encoded ready for transmission. You will note that all the systems we are dealing with use the data alphabet to create binary digital numbers to represent each character. Virtually all the data modes use serial data to send information so it's important to be very clear on how serial data works.

The good news is that the concept of serial data is very simple and you won't even need a calculator to get to grips with the technology! Serial data occurs when the data information is sent one bit at a time in sequence. Using Mores code again as an example, these messages are all sent as serial data i.e. you read from left to right and send the Morse characters in that order.

I've shown a simple example in **Fig. 2**. Here you can see that the characters

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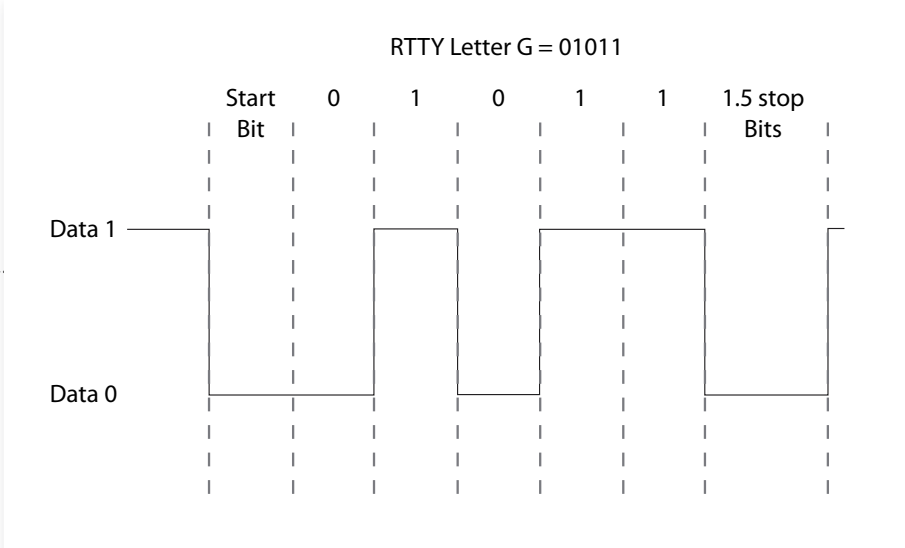

Fig. 1: Construction of an RTTY signal.

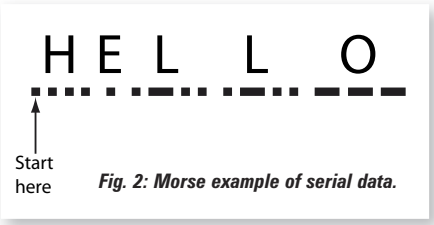

Fig. 2: Morse example of serial data.

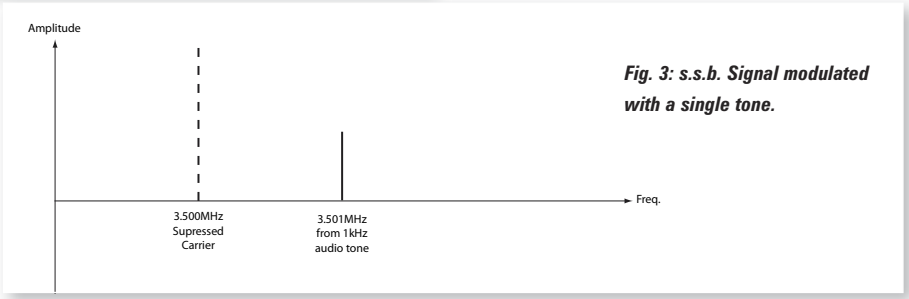

Fig. 3: s.s.b. Signal modulated with a single tone.

of the message are translated to Morse code and then each element is sent sequentially. This is exactly what happens in the majority of data modes and the differences are merely in the conversion and modulation processes.

One of the most significant differences between Morse Code and data modes, is that few use the simple on/off modulation of c.w. but use two or more signal states. The description of these states has been the cause of some confusion over the years, so let's take a look at the variety of names you may encounter. The range of names runs something like 'A/Z', 'B/Y', '0/1', 'Space/Mark', etc.

The different names are used to describe the state of the signal in different parts of a transmission network. Mark/Space is terminology used in the teleprinter and telegraph world and was primarily used for landline circuits. Conversely, Y and B is used to describe the signal states when carried over radio links.

The advent of PC-based decoding introduced logic 0s and 1s into the mix. I've shown a simple table in **Table 1** that shows how the different descriptions relate to each other. If you'd like to know more, the *Klingenfuss Radio Data Code Manual* is an excellent reference that's available from the *PW* Book Store. For the sake of this series of articles, I will use 0s and 1s to describe the data states.

By Radio Signal

Having used a data alphabet to convert the message to a digital form we now need to consider how to convey it using a radio signal. Many of the early systems such as RTTY were designed to operate with specialist transmitters that used Frequency Shift Keying (f.s.k.). This is where the carrier is moved between two closely-spaced frequencies in line with the movement of the RTTY signal between 1 and 0.

The spacing of the two tones chosen, was quite narrow and typically ranged from 170Hz through to 850Hz spacing. However, for Amateur Radio use pure f.s.k. is not practical because not all rigs include this mode. The solution, which is used for just about all data modes, is to emulate the relevant modulation system using single side band (s.s.b.).

One of the characteristics of s.s.b. is that by applying a single tone to the microphone input a single frequency r.f. signal is generated as shown in **Fig. 3**. In this example, I've shown what happens when you modulate an s.s.b. transmitter (picking out the upper sideband) with a 1kHz audio signal. Here you can see that the only output is an r.f. carrier that's spaced 1kHz above the suppressed carrier.

Therefore, if we were to apply our data signal as two discrete audio tones – one for 0 and the other for 1 these tones would also appear as r.f. carriers. The spacing between r.f. carriers would be the same as the audio signals so for a 170Hz spaced f.s.k. signal we just need to apply audio tones that are separated by 170Hz, see **Fig. 4**.

The same principle also applies to other modulation systems such as the many phase-shift keyed modes that are now in use. All we have to do is create the modulated signal at audio and feed it to the microphone socket of our s.s.b. rig.

The choice of audio tones is important as they have to be within the nominal 300Hz to 3kHz audio speech band. It's also advisable to keep the data tones away from the edges of the band as the sharp i.f. filters tend to introduce a degree of phase distortion

Table 1 – Circuit State Codes

Location in Link	Data 0	Data 1
Data Circuit	1	0
Land line	A	Z
Radio Link	B	Y
Telegraph Circuit	Space	Mark
Frequency Shift Keying (FSK)	Lower freq.	Higher freq.

at the band edges and data signals really don't like that! As a result, the standard tones used for data modes are normally kept between one and 2.5kHz.

While the audio modulation technique is extremely convenient, there's just one small problem and that's your rig's frequency display. Because we are using the rig in s.s.b. mode the frequency displayed on the dial will be that of the suppressed carrier – so when quoting operating frequencies for data modes it's common practice to quote the mark (higher) frequency. This means that you will have to tune below the quoted operating frequency if your rig is set to u.s.b. (Don't worry – I'll give more detail on this as we cover each mode).

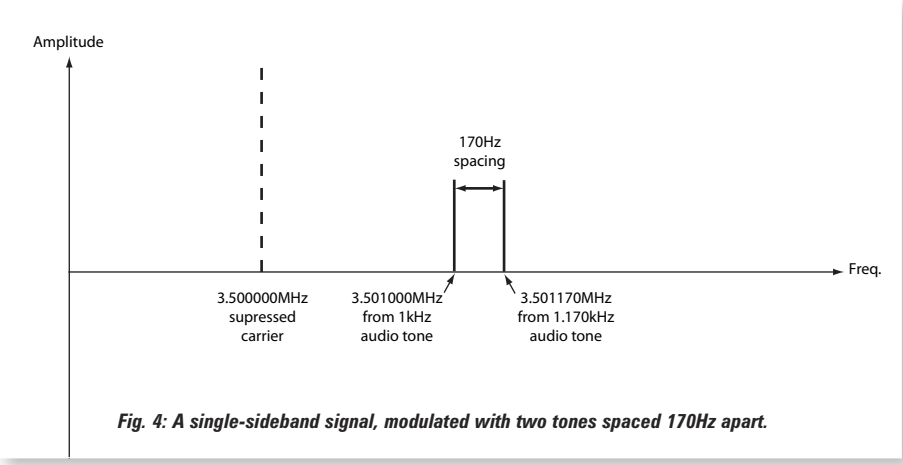

Fig. 4: A single-sideband signal, modulated with two tones spaced 170Hz apart.

Software Created

Recognition that the s.s.b. transmitter can be used to deliver a wide range of data modulation systems, spawned a huge development effort from enthusiasts to creating software that could both encode and decode a wide range of data signals. One of the vital ingredients in the mix was the parallel development of the PC's sound card.

The demand for ever-more sophisticated PC sound systems provided data enthusiasts with exactly what they needed – powerful Digital Signal Processing (DSP) in every PC. The introduction of the 16-bit SoundBlaster card was the turning point and this became the standard and most cards produced since have remained compatible with that basic standard.

As a result, software developers have been able to invest in the development of new decoders, safe in the knowledge that the PC foundation was secure. In the early days of decoding software the developers had full and direct access to all the hardware on the computer but since then, Microsoft operating systems have added layers of software that pretty much force programmers to use 'system calls' (slower, but easier to define 'requests' for access to the hardware) to get anything done.

Making system calls, is fine for conventional programming, but not so good if you want to do something different, or the maximum processing speed possible. The introduction of *Windows Vista* brought another problem as programs were no longer allowed to write or store User data in the Program File's directory. Instead, program data had to be stored in the Program Data folder.

The reason for the change, brought in with *Windows Vista*, was to help prevent malicious software (spyware, trojans or viruses) from interfering with program files. However, this single change 'broke' some decoding programs, as many had stored vital data in the same folder as the program file.

For smaller software creators and vendors, it's often not been viable to re-write their software to counteract this change, as any rewrites brings with it the risk of introducing more bugs in the program itself.

If you have a package that refuses to work on Vista a cure that often works is to remove and re-install the software but change the installation directory to something other than the main Program Files directory.

Synchronous Versus Asynchronous

Let's now look at the synchronous versus asynchronous arguments. These terms have taken-on many different meanings, so I need to explain the difference in Amateur Radio terms. The majority of modern data modes use synchronous transmission but some do use asynchronous so it's helpful to understand the difference.

The best example of an asynchronous transmission is RTTY. In this mode every character is wrapped-up with a start bit at the beginning and a stop bit at the end (See Fig. 1). In fact, the original RTTY systems often used 1.5 or 2 stop bits (50 or 100% longer bits). The system was designed to operate with electro-mechanical teleprinters and wrapping each character in a start and stop bit was a useful way to control the printing mechanism.

However, using start and stop bits is very inefficient as you need to send at least two extra bits for each character of the message. If you listen to a RTTY signal on-air you will also note that a single tone is transmitted when the operator stops typing.

In a synchronous signal however, there's no start and no stop bit sent, just data bits! So, efficiency is immediately improved. But, there remains the problem of synchronising the decoder with the data stream to find the start of the 'character' making up the message within the stream of data bits?

In most cases syncronisation is achieved using unique bit patterns that are inserted into the stream of data. The decoder then searches the incoming data until it finds the unique key and starts decoding from that point onwards. In some systems, such as Forward Error Correction (FEC), the synchronisation sequence is only sent at the start of the transmission, so synchronisation mid-message can become more of a problem. ●

That's all I have space I for this time around and concludes my brief introduction to some of the terms I'll be using over the next few months as we take a closer look at Amateur Radio data modes. I look forward to chatting about data modes very soon. Cheerio for now.

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DIGITAL

Alan Ford's

antenna workshop

Alan Ford VK2DRR presents Part 1 of his 70cm antenna by describing the background to the project and workshop techniques.

An 8-Element 430MHz Yagi Antenna. Part 1.

In this article I'll briefly explore the history and theory of the famous **Yagi-Uda** antenna (to give it the correct title), as well as address some workshop techniques that will be used in the construction of an eight element 435MHz Yagi. The actual construction will be dealt with in an article to follow.

Yuda Who?

Poor old **Shintaro Uda**! With **Hidetsugu Yagi's** assistance, he developed the Yagi-Uda antenna in Japan well over 80 years ago. However, the translation to English was done by Yagi and the antenna quickly became known simply as the 'Yagi' with 'Uda' left off for simplicity. So Uda quickly slipped almost into oblivion!

Yagis antennas are all around us. They are the most common form of terrestrial TV antennas and are also used for Band II frequency modulated (f.m.) radio broadcast reception, some business radio point-to-point applications and of course by Amateur Radio operators.

Experimenting with antennas has always been a popular branch of Amateur Radio – and indeed Foundation Licencees in particular value this outlet for creativity as they're not allowed to use home constructed transmitters or transceivers; nor can they modify them). There's much fun to be had constructing various antennas and experimenting, trying to get the maximum gain in the required direction (more on that later).

Like most antennas, the dimensions of the Yagi are closely related to the band of operation. In general, the higher the frequency the smaller is the antenna (more detail in due course) The 430MHz (70cm) and 144MHz (2 metre) bands are particularly suited to the construction of Yagi antennas that can be rotated, thus making use of their directional properties.

Basic Antenna Theory

Let's now look at some basic antenna theory – and before you groan, I'll promise to keep it brief and simple, provided the old hands will forgive me for cutting a few corners!

The job of an antenna is to transfer the maximum energy from the transmitter to free space (almost always with air in it!) or from free space to the receiver. To do this efficiently the antenna needs to be in resonance as well as having its impedance matched to the feeder.

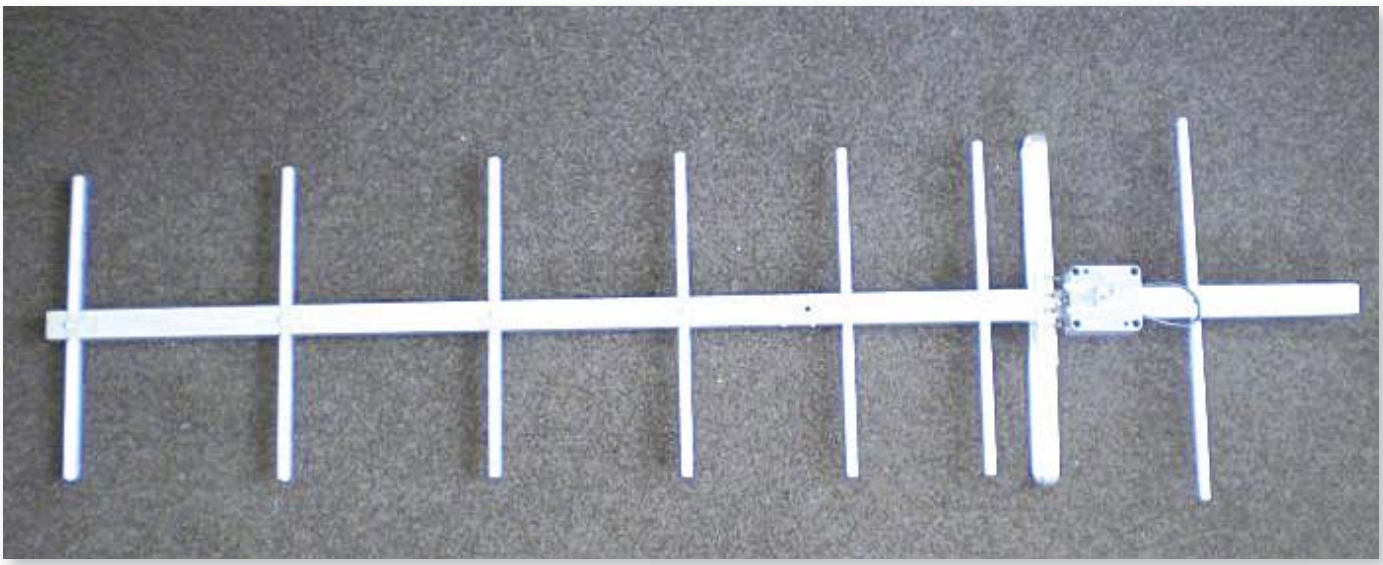
The resonance part is directly related to the length of the radiating element and is not hard to understand. The impedance part is a little harder but follows simple practical rules.

One thing is very convenient – and that's if an antenna is designed to transmit well on a certain frequency then its receive performance will also be optimum at that frequency. This is fine if you are working simplex (i.e. the receiver and transmitter are on the same frequency and take turns to use it) but of course with a repeater the frequencies are nearly always offset!

Fortunately a practical Yagi antenna can work well over quite a range centred around its design frequency. Because of this we say it has 'bandwidth' (again, more on this later).

Basic Isotropic Radiator

Now the most basic antenna of all is the theoretical isotropic radiator (**Fig 1.1**). It's virtually impossible to make one. It would also be grossly inefficient anyway as the whole principle of the isotropic radiator is that radio energy is radiated evenly



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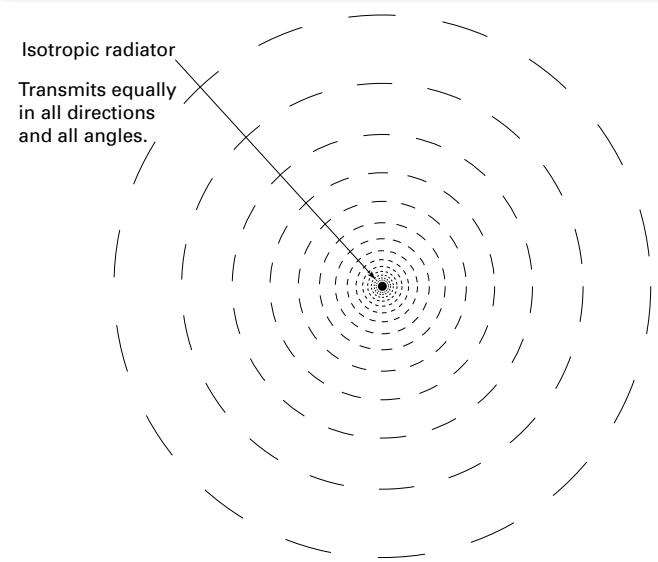

Fig. 1.1: An isotropic theoretical antenna is shown, this radiates in all directions equally but is almost impossible to create in reality.

all around the antenna, up and down and in all other directions. In practice that means large amounts of energy would be sent up into space or down into the earth.

In contrast, one of the simplest practical antennas is the half wave dipole. Here the energy is concentrated in one of two planes, depending on the attitude of the antenna – horizontally or vertically – but still all round in those planes, though not from the ends. This automatically gives some gain as the available energy from the feeder is concentrated into one of those planes.

It's important at this stage to emphasise that any passive antenna (not including an 'active' type with some form of amplifier) can only produce gain by concentrating the radiation (or reception) in one direction. The basic physics rule applies that you cannot get something for nothing. Gain in the chosen direction must be accompanied by an equal attenuation in others.

Basic Half Wave Dipole?

So what is the basic half wave dipole? Simply speaking, the answer is two pieces of conducting material such as a tube, strip or wire, placed end to end and fed at the middle, as in **Fig 1.2,** so that tip-to-tip the two conductors form a half-wave (electrically).

The **pure** wavelength is found simply by dividing the frequency in MHz into the speed of radio waves (same as the speed of light) being approximately 300,000km/sec, when the answer will be in millimetres. For example, for 435MHz (in the 70cm Amateur band) the calculation to the nearest millimetre would be:

Wavelength(m) = (300,000/435)
=0.690m (or 690mm)

So, a pure half wavelength would be 345mm (again to the nearest millimetre). However, this is not the same as its length **electrically**. In practice we have to make allowances for other factors, such as the different speed of radio waves in metals (found by applying what is called the velocity factor).

Note: I hope you've read this far and not given up in despair, because you'll be glad to know that when it comes to the actual construction (in a later article) you are not required to do any calculating. I will provide all the measurements for you. But it's always interesting to know the underlying thinking.

The Yagi

After the basic theory of the dipole we come to the Yagi antenna itself. So, just what is it that makes this type of antenna so special? The answer is, that the principle is that we arrange the dipole (which we now call the driven element because it's driven by the feeder on transmit and by the radio waves on receive). Then behind it we place another slightly longer element, and in front we place one, or more, slightly shorter elements. Reasonably enough, the longer one is called a reflector and the shorter ones are called directors.

The beauty of both the reflector and the directors is that they're not connected to any feeders. Their operation is purely influenced by currents in the driven element. Because of this they're known as 'parasitic elements'.

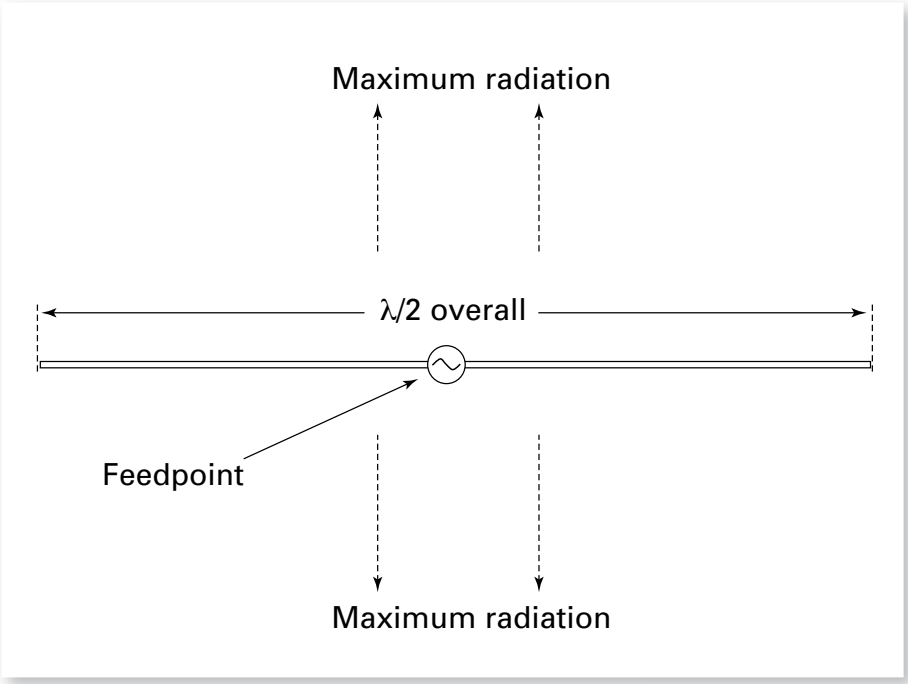

Fig. 1.2: Shown here is the half-wave dipole antenna, which radiates at right-angle to the element's length (including out of the page, towards and away from you).

Uda and Yagi found that by adding parasitic elements they could reduce the beam over which radiation occurs and thus produce signal-gain in the direction of the shorter elements (hence 'directors'). Additionally, they found that by increasing the number of directors they could reduce the beam-width more, further increasing gain (but at the same time making accurate 'pointing' more essential). Incidentally, it was also found by experiment that there was a negligible effect from increasing the number of reflectors (when they were in line).

The practical Yagi design has therefore evolved into a design with one reflector, the driven element and as many directors as is practical to add. The simplest Yagi is a three-element beam. It has one reflector, the driven element and one director, as in **Fig 1.3**.

Remember that we have a trade-off here. The more directors that are added the greater the gain is, but the beam-width becomes less, and with it, the need to point accurately becomes increasingly important.

You can probably see by now that a Yagi antenna is of little use at a base station trying to work mobiles, as they would be forever moving in and out of the optimum diurection. Also it's of limited use when there are various differing base-to-base paths, such as during a competition (where other stations are at different bearings), unless there is a means of steering the array. And now you know where rotators fit in! Before or instead of those, the Yagi mast could be rotated by using a strong arm – the well known 'Armstrong' method!

A Yagi can be made with a supporting boom that is made of metal (as the one to be described is) or it can be made with insulating material (the various dimensions are different). I prefer metal as it's often stronger.

Note: Here's one very convenient thing – if the boom is made of metal, it's perfectly in order for the parasitic elements to be in contact with it! This makes the practical construction of a sturdy Yagi much easier. However, the driven element **does** need to be insulated from the boom for reasons to be described in the second part of this article.

It's common to make use of the popular folded dipole rather than a 'normal' one. This is shown in **Fig 1.4**. One advantage of the folded dipole is that it has a wider bandwidth, that is to say it can cope with a wider band of signals about the centre design frequency. The vital measurement is the overall length and it turns out that for the practical eight element Yagi I shall describe it should be about 324mm.

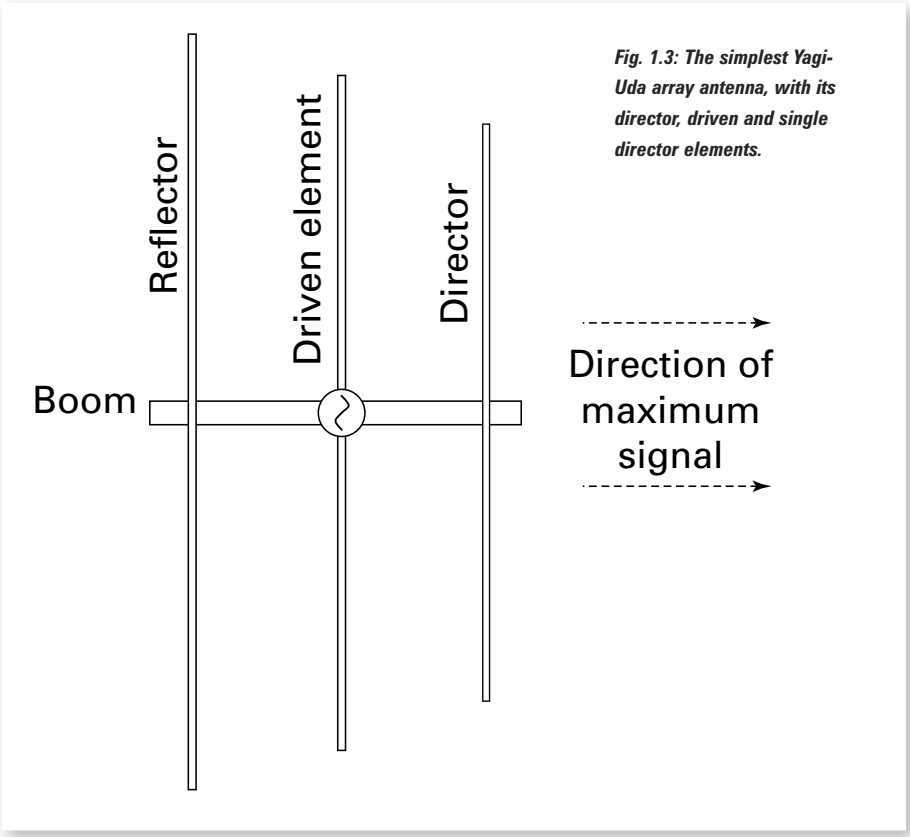

Fig. 1.3: The simplest Yagi-Uda array antenna, with its director, driven and single director elements.

The Balun

Having taken care of the resonance issue, now we come to impedance and at the same time a most important point with regard to the feeding of the antenna. Nowadays, all modern transceivers are produced with a 50Ω coaxial cable antenna feed arrangement. This is an **unbalanced** feed, because the outer screening of a coaxial cable is obviously neither physically nor electrically the same as the inner core. In contrast, the dipole or folded dipole is a **balanced** arrangement, with both sides of the connection appearing the same electrically.

The impedance of a folded dipole is around 300Ω and on the Yagi to be described the proximity of the parasitic elements brings this down to approximately 200Ω. The combined effect of the impedance mismatch and unbalanced to balanced connection would give rise to losses and such unwanted effects as TVI, caused when the outer screen of the coaxial cable tries to become part of the antenna and radiates.

Fortunately we can fix both these things at the same time by introducing a 4:1 (impedance) balun, which of course stands for 'balanced to unbalanced'. The balun is in effect a radio frequency (r.f.) transformer.

Many bright ideas have been developed for baluns but one of the simplest is made by introducing a loop of coaxial cable, which is electrically a half wavelength long (this time a relatively simple calculation involving only the velocity factor of the coaxial cable used for the balun). With the aid of the 4:1 balun to be described the 200Ω impedance at the centre of our folded dipole is matched to 50Ω, which is conveniently suitable for the transceiver.

Construction Techniques

I hope the old hands will forgive me for detailing some workshop techniques now! I suggest this because the art of 'chassis bashing', where Amateurs drilled and punched metal chassis in preparation for valve-holders and other such parts, is almost defunct. However,

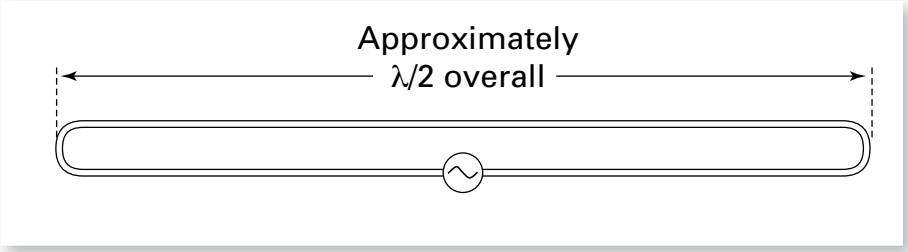

Fig. 1.4: The folded dipole has both an wider bandwidth and a rather higher impedance than a simple half-wave dipole, although they're both similar lengths overall.

metalworking and similar workshop skills can be and are put to use in constructing antennas.

The most common material used is, of course, aluminium, which has become quite cheap and easily obtained at hardware stores. For the Yagi project here, we will be using readily available 1in (25.4mm) square section tube for the boom, 1.5x1/8in (approx. 12mmx3mm) strip for the driven element and 3/8in round tube for the parasitic elements (in metric countries use 10mm tube but note that the slight difference in size means that the holes to be drilled in the boom for these parasitic elements must be either imperial **or** metric to suit the element themselves!)

Aluminium is relatively easy to work, being light, fairly soft and yet strong. However, one specialist tool you will need is a 4mm tap for cutting 4mm threads. Fortunately, they have become quite common and inexpensive.

Tapping threads used to be quite a 'black art' but there's nothing to it nowadays at the hobby level – although I doubt they'd let me loose on a spacecraft! You simply drill a pilot hole smaller than the M4 bolt to accommodate it, and then you turn the tap in the hole by hand a couple of turns at a time, then backing off to clear the swarf, and it will cut a thread.

You may ask – "How much smaller than the finished size should the pilot hole be?" In reply I'd advise that for a 4mm (M4) bolt in aluminium 3.3mm is ideal – but you can get away with 3.5mm, and drills of that size are readily available. For the purists, the tap will be of the 'taper' variety and we won't trouble ourselves with 'bottoming' or 'finishing' taps.

I'm assuming that you'll have the rudimentary workshop facilities of a sturdy workbench and adequate metalworker's vice. Additionally, although you can do without it, a drill press (a drill on a stand) makes the whole job much easier and more attractive as a finished product. For this job you'll also need a hacksaw, set square, centre-punch (this one has a sharp point – **not** a nail punch with a flat head!), steel rule, steel measuring tape, reamer, drill bits of 3/8in (or 10mm) for the parasitic elements, and 4mm for clearance for the 4mm (M4) bolts, 3mm for a BNC socket mounting flange and 3.5mm to provide pilot holes for tapped 4mm holes. The materials required will be listed in the second part of the article.

Basic Workshop Rules

Now for some very basic workshop rules: Eye protection must always be employed. Use a sturdy workbench and keep it clear of clutter! Never make sawcuts without marking out first. Never drill any hole without marking out and centre-punching first.

Larger holes should be started with a small 'pilot' drill. In this regard, note that in such cases if the pilot hole is too big, the larger drill will tend to 'grab' in the hole. The workpiece must also always be held securely when cutting or drilling – remember the good tradesman's motto "Measure twice and cut once!"

When marking out a line on the boom or the strip (driven element) for either a straight cut or hole, always use a try square and don't try to estimate a right angle. The established metalworking method is to scratch the line with a scribe (a sharp point – not a village 'literate person' of old times!) but I use a sharp pencil with a fine lead.

When you're sawing, don't force the saw. Instead, try to concentrate on keeping the saw blade vertical (making sure first that the piece you are cutting is exactly horizontal (no, using a spirit level is not overkill here). Some people like to use both hands on the saw, to make a steadier cut, but this isn't to mean that you should be pressing down with all your might on the saw.

Another tradesman's motto is "Let the saw do the work." And, when cutting along a marked line, you need to cut exactly on the 'waste' (un-measured) side as the saw cut has a width too (albeit small) and cutting exactly in the middle of the line will result in a piece that is slightly too small.

The Tolerance

Having given you my advice, I should also mention that the tolerance for all cut measurements in this 435MHz Yagi is a little over ±2mm. In practice you'll be able to cut reliably to within 1mm of the desired measurement. So generally fractions of a millimetre are irrelevant for our purposes and usually I have not attempted to use them. Neither need you sit in a corner of the workshop feeling upset because you think you've failed to make a cut accurate to a tenth of a mm!

Finally, another important reminder needs to be repeated! A drilled hole must first be marked and centre-punched, or the drill will 'wander' on the material as you apply it. Hopefully you'll be using the drill press (although using a hand drill is possible – though it's tedious). Again, do not force the drill down – just apply a gentle pressure, the smaller the drill the lighter the pressure. And a second reminder: wear protective glasses when doing any form of cutting or drilling.

As far as hole sizes go, theoretically an M4 bolt needs a hole somewhat larger than 4mm in order to give clearance. But in practice you will probably find that purchased 4mm bolts actually have a diameter of 3.9mm, and a 4mm hole will then give clearance.

In the next article to appear I will describe exactly how to make the 70cm Yagi. In the meantime if you've never worked with metal before I suggest you try making some cuts and drilling some holes, always remembering those safety rules!

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All bracket measurements are from wall to end of bracket

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A superb, no mess, quick fit in-car holder (fits airvent) for hand-helds. **£6.99** P&P £3

Tony Nailer's

doing it by design

This time Tony Nailer G4CFY continues his update to the *PW* Arun parametric peak/notch filter

The last *Doing it by Design* (*DiBD*) in July issue *PW* included the description of the original *PW* Arun Parametric Filter from the May 1986 issue *PW*. I considered possible problems with the original electronic design together with the difficulty of interfacing with the receiver.

My post design of the unit has done away with all the electrolytic coupling capacitors and the panel control for *Q*. I've now added a loaded input, so the unit can be plugged directly into a loudspeaker or headphone socket of a receiver or transceiver, and added an audi › amplifier and integral loudspeaker.

The size of the box to accommodate the modified circuit was dictated by the size required for the front panel components. There would be two **Frequency** controls, two **Peak**/**Notch** controls, a **Volume** control, a filter **In**/**Out** switch, an **On**/**Off** switch, an l.e.d. and a loudspeaker. I chose a standard case from my supplier measuring 200 x 125 x 75mm (for the UK) this is 8 x 5x 3in!

Input Band-pass Filter

In the closing paragraphs of the previous article I mentioned changing the input capacitor to give a 300Hz high-pass characteristic, and adding a capacitor across the feedback resistor of the first amplifier stage to give a top end low-pass characteristic.

The input resistor to the first amplifier is 47kΩ, so to find the required capacitance value, given in Farads, the formula C = 1/(2*Pi*R*F) is used.

C = 1/(2*Pi*47*10^3*300)

C = 1/(2*Pi*4.7*3*10^6) or:

C = 1/(2*Pi*4.7*3)μF

C = 0.0113μF.

The nearest value is 0.01μF = 10nF.

Similarly to find the capacitor to work in parallel with the feedback resistor to give 5kHz upper cut-off frequency, the same equation is used and C is in Farads.

C = 1/(2*Pi*47*10^3 *5* 10^3)

C = 1/(2*Pi*47*5* 10^6) or:

C = 1/(2*Pi*47*5)μF

C = 0.000677μF = 677pF.

(The nearest value is 680pF).

New Board

Only one complete notch/peak filter section was bread boarded and proved. I had a high degree of confidence that two stages cascaded would not cause any problem, nor the addition of a TBA820M audio amplifier stage! The circuit developed was amended and is shown in **Fig. 1.**

The circuit 'net-listed' to the accompanying printed circuit layout package and the new printed circuit board (p.c.b.) was laid out. Where the original project, which included a small transformer and supply regulator, measured 258 x 151mm (10.2 x 8in), the new board measures 5.2x1.88 inches (131.5x47.5mm), a significant reduction in size.

I then produced the artwork and the board was exposed, developed, etched, drilled and cropped. The board was populated with components – but I noticed that two electrolytic capacitors were tight against other, as I'd underestimated the diameter of one of them.

It was also noticed that one resistor could be moved slightly to allow improvement of the earth tracking. These shortcomings were addressed and the new p.c.b. artwork and component layout are shown in **Fig. 2**.

Circuit Evaluation

Potentiometers were connected to each peak/notch stage, a volume control potentiometer was wired between the filter and the amplifier section. At that time I did not have the dual 100kΩ linear potentiometers, so I wired 10kΩ resistors in each of the four frequency positions.

I hooked an audio signal generator up to the input and a loudspeaker was connected to the output. The volume control was turned to zero, and an oscilloscope probe was connected to pin 14 of IC1, the output of the first filter section.

At switch on a 10V p-p square-wave appeared on the oscilloscope screen. This was expected and the stability control 'trim-pot' was adjusted to stop the oscillation. Unfortunately, fully rotating it for maximum resistance failed to stop the oscillation!

Thinking this through, I reasoned that the 22kΩ resistor R16 & R31 being 5% tolerance could be ±1100Ω so the trim-pot should be changed from 470Ω to 2.2kΩ to be large enough to reduce the gain below the threshold level. So, I changed both trim-pots to the new value and was then able to set the gain below the oscillation threshold.

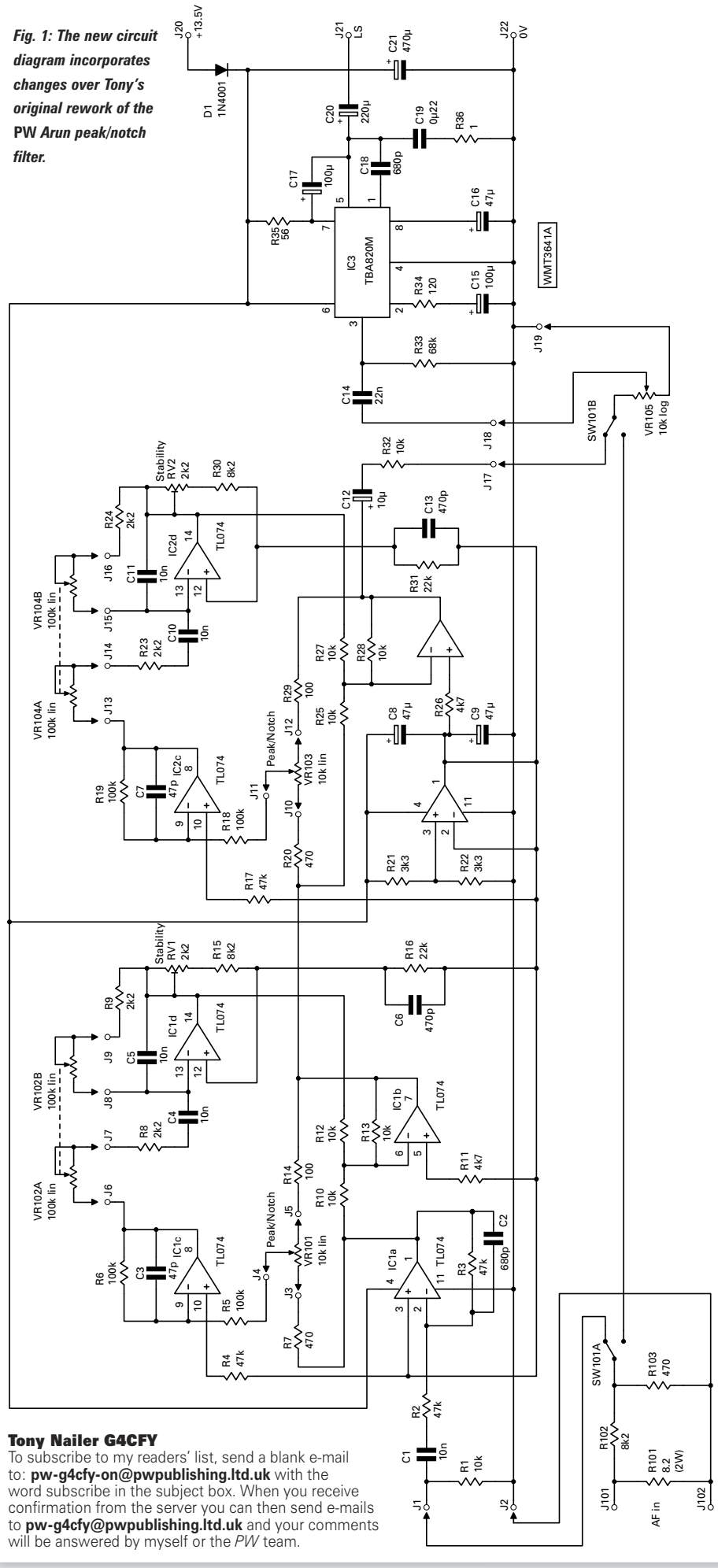

Fig. 1: The new circuit diagram incorporates changes over Tony's original rework of the **PW** *Arun peak/notch filter.*

Tony Nailer G4CFY
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Peak/Notch & Gain Functions

One peak/notch control was set in the middle of its range and the other was set to maximum notch position. The signal generator was swept across its range and the notch frequency found to be about 1.2kHz.

The signal generator was swept back and forth across its range while observing on the oscilloscope, the output signal from the first filter section. The peak/notch control was rotated until there was a flat response across the audio band. I noted that the output signal level was twice the input level.

Setting the second stage similarly, and testing at pin 14 of IC2 revealed the cascaded stages had an overall gain of four. This amount of gain is quite unnecessary as the audio amplifier stage requires less than 200mV p-p input for full output. The feedback resistor R13 of IC1d and R28 of IC2d were reduced from 22 to 10kΩ. The circuit was then re-tested and now revealed unity gain across the audio band 300Hz to about 6kHz.

Peak/Notch & Frequency Function

The 10kΩ resistors in place of the frequency potentiometers were wired with long leads, which enabled them to be twisted round and shorted out. This set the filters at the highest frequency, which I measured to be about 5.6kHz.

The peak and notch function was evaluated at this frequency and I noted that full notch could not be achieved, as the potentiometer appeared to run out of range. Another potentiometer with clip-on leads was connected across R14, at one end of the peak/notch potentiometer circuit.

Adjusting the add-on

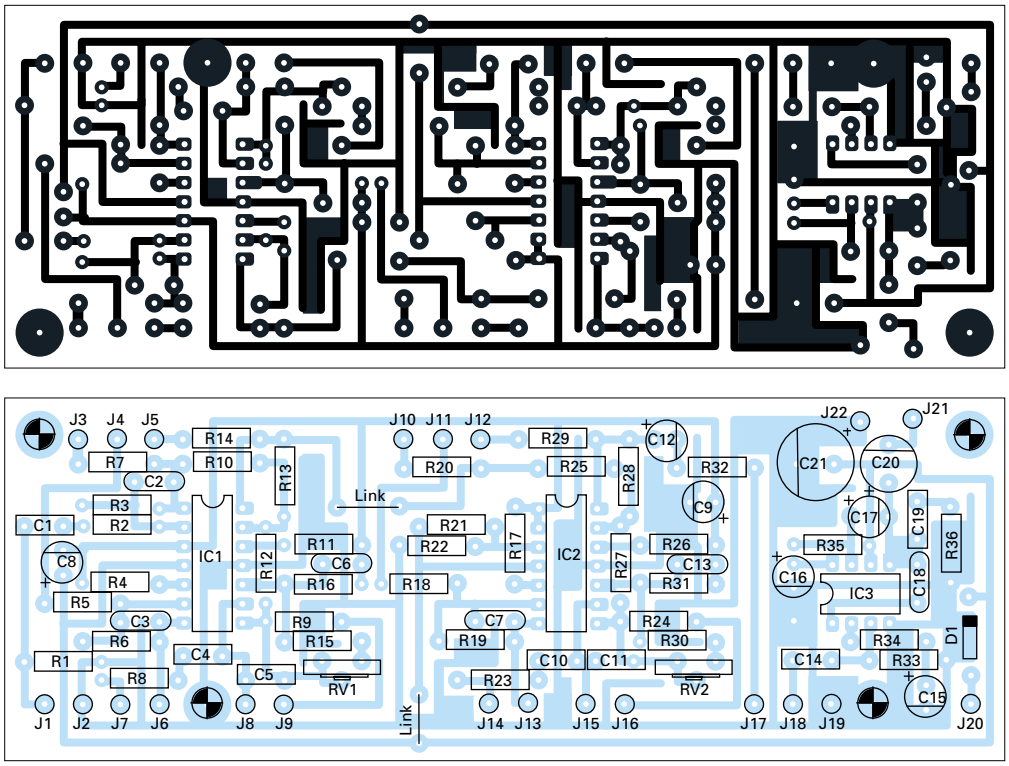

Fig 2: Significantly smaller than the original **PW** *Arun, here's the latest track pattern and overlay diagrams.*

Kits & Bits

A variety of options are provided to suit most needs.

The p.c.b. on its own £7.25.

The p.c.b. and components (referred to as a PCB Kit) £22.25.

The p.c.b. kit and all the pots £34.75.

The p.c.b. kit and all hardware – but without the drilled box – £57.

The p.c.b. kit and all hardware with drilled box (referred to as a Boxed Kit) £73.

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E-mail: **tony@spectrumcomms.co.uk**

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potentiometer revealed that only a low value for this resistor was required to achieve best notch. This is reasonable because when the peak-notch potentiometer is at that end of its travel, the maximum signal being fed through the Wien Bridge filter is 180° out of phase from the original. In fact R14 and R29 proved to be unnecessary and both could be deleted.

Developing The Hardware

I made several sketches of possible front panel arrangements, with due consideration of the wiring to the p.c.b. and the supply and signal input sockets on the rear. The parts were then carefully laid out on the panel and 'shuffled' to get the panel density fairly even.

The box drilling positions were marked up and the box was drilled. The assembly was quite straightforward and with the knobs fitted the unit looks quite attractive. I noted that securing the loudspeaker using three fixings put one of the screw heads close to the On/Off switch and **PWR** l.e.d. (It would be better aesthetically to use four fixings for the speaker to keep the screw heads further away from the switch and l.e.d.).

Wiring & Testing

The wiring worked out quite nicely and I was able to keep wires to the various controls well separated to avoid unwanted cross-talk and feedback. The input load and attenuator was connected between a phono socket on the rear panel and a solder tag at the p.c.b. fixing point.

At that time I was still waiting for the 100kΩ dual pots to arrive, so the substitute 10kΩ fixed resistors were still wired to the p.c.b. Nevertheless, I was able to test the unit at 1.2kHz and 5.6kHz by twisting and untwisting the fixed resistors.

What I found straight away was that the peak/notch wiring was the wrong way round, from an ergonomic viewpoint. What is natural, is for the notch to be in an anticlockwise direction and the peak to be clockwise rotation. So I swapped the outside wires on the peak-notch potentiometer.

Later that day the dual potentiometers arrived and I wired them straight in. I had to give thought to the wiring so that the frequency was lowest when at the anticlockwise position and highest when clockwise. With the unit completed, pictures of the front panel and interior were taken. Viewing these pictures on the computer it confirmed my initial thoughts that the knobs were too large, so smaller ones were ordered.

Further Evaluation

Having the unit complete, it was then possible for me to determine its characteristics in relation to the front panel controls. By sweeping the signal generator I found that the flat response position of the notch/peak controls corresponded to the controls being in the exact mid position. Excellent!

Moving on to the frequency calibration it was found that the frequency change was cramped at the clockwise

Looking into the completed unit shows all the variable controls on the front panel, all wired in neatly.

– high frequency end. Conversely there was only a very gradual change of frequency at the anticlockwise and low frequency end.

Tests using just a logarithmic 100kΩ potentiometer and an Ohm-meter revealed that a log pot is slow to change at the anticlockwise end and quick to change at the clockwise end of the rotation. Using a standard log law potentiometer with low frequency anti-clockwise and high frequency clockwise would make the problem much worse.

The unit could be wired to give an almost linear scale – if I was prepared to accept high frequency anticlockwise and low frequency clockwise. Unfortunately, this isn't intuitive and therefore ergonomically a poor choice.

None of my various suppliers stock reverse-log potentiometers, which are the real engineering solution to this problem but probably an expensive one. In the interests of economy it seems that at this time I have no alternative but to accept the cramped scale. The results are fully anticlockwise 110Hz, horizontal left 180Hz, vertical 300Hz, horizontal right 1kHz, and fully clockwise 5.6kHz.

Hardware Problem

In due ourse, the new smaller knobs arrived and I immediately tried to fit them in place of the previous ones. One fitted to the volume control, a 10kΩ log potentiometer from one supplier. The other knobs would not fit on the linear potentiometer purchased from a different supplier. This is a classic engineering tolerances problem and wasn't one I'd previously encountered. Referring to the supplies catalogues revealed that potentiometers are now made with either 6mm or 6.3mm shafts.

Knobs are also now made to suit each specific size of shaft, presumably with 0.1 or 0.2mm tolerance and clearance. So, the hole in one might be 6.1 or 6.2mm diameter, which will not fit on the 6.3mm shaft. The other might be 6.4 or 6.5mm diameter, which of course can fit on both.

Fortunately, the supplier I purchased the 6mm compatible knobs can also supply the 6.3mm compatible versions. Incidentally, it amuses me that huge sections of the engineering world include measurements formerly dictated by our imperial measurement system! For the purpose of this unit I was forced to drill out the ferrules using a ¼in (6.3mm) drill.

Connection & Operation

A suitable cable needs to be made-up with a 3.5mm jack plug at one end and a phono plug at the other. This connects between the Loudpeaker/Headphone socket of the receiver or transceiver and the **AF In** socket of the filter unit.

Similarly, a convenient length of light duty twin (red and black) lead needs to be cut and terminated for the d.c. supply. It needs to have either soldered ends or 4mm plugs to suit the bench 13.5V power supply at one end and a d.c. type connector (actually a line socket) to suit the 2.5mm chassis plug at the other. The unit draws 35mA quiescent current and 350mA when driven to maximum output with a 1kHz continuous audio tone.

The recommended starting configuration is with the frequency controls at 1kHz, horizontal right, with the notch/peak controls at vertical and the volume control at one third of rotation. Tune the rig as normal and then use the sections as required to notch-out one or two heterodynes or nearby stations.

The peak function can also be used to enhance the wanted signal by both frequency and peaking (or sharpening) adjustments. The frequency part can also be used rather like a tone control – to sharpen low frequency voices or to soften high-pitched ones. See you next time!

KITS & MODULES

NEW TRIBAND ACTIVE RECEIVE PRESELECTOR for 80,40, & 20m. Tuneable on 80m, fixed tuned on 40 and 20m. Can be configured for maximum gains of 16dB on 80m, 23dB on 40 and 20m, or 11dB on 80m 17dB on 40, and 18dB on 20m. Complete kit comprises amplifier and switch PCB's and components, 2 pole 3 way switch, polyvaricon, and 10K log gain pot. **£20.50 inc P&P**.

SPECTRUM 10mm COILS, pin compatible with TOKO types. Coil values 1.2, 2.6, 5.3, 11, 23, 45, and 90uH. Some types have the primary tapped at ¼ turns and a low impedance secondary winding. Others have centre tapped primary and relatively high impedance secondary winding. Full details of turns ratios, etc. can be found on the components page of the website. **1-9 qty 75p each plus £1 P&P**.

SPEECH PROCESSOR increases the average sideband power of SSB transmitters without driving the PA into clipping. Includes filtering to enhance the higher voice tones to increase intelligibility, and it sounds nice too. Panel control for clip and output level. Supplied with plugs & sockets to suit most popular rigs. Type **SP1000, PCB & Hardware kit £42.50, Ready built £60.00**.

TRANSVERTERS for 2 or 4 or 6 metres from a 10 metre rig, or 4 or 6 metre from a 2 metre rig. Includes new overtone local oscillator, and integral interface unit. 20dB receive gain, 25W transmit power. Low level drive dual IF versions **TRC2-10dL, TRC4-10dL & TRC6-10dL**, high level drive single IF versions **TRC2-10sL**, **TRC4-10sL**, **TRC6-10sL, TRC4-2sL, TRC6-2sL**, Complete kit **£179.00**. **Built £266.00**

TRANSVERTERS for ICOM rigs, supplied with cables. Automatic with no cable switching. IC756Pro & II & III, 775, 781, 7600, 7700, & 7800 use type **TRC4-10L/IC1.** IC735, 761, & 765 use type **TRC4-10L/IC3. Built to order £280.00.**

STATION PREAMPS for 2 or 4 or 6metres. RF & DC switched. Adjustable 0-20dB gain. 100W power handling. **RP2S, RP4S, RP6S, PCB & Hardware kit £35.00, Ready Built £57.00**.

MASTHEAD PREAMPS, for 2 or 4 or 6meters. 20dB gain 1dB NF. 100W through handling. RF switched & DC fed via the coax. Heavy duty waterproof masthead box, and a DC to RF station box with SO239 connectors. **RP2SM, RP4SM, RP6SM, PCB & hardware kit £41.00, Ready Built £65.00**. **Masthead fitting kit £6.00**.

MASTHEAD PREAMPS 400W rated, for 2 or 4 or 6metres. RF switched. DC fed via a separate wire. 20dB gain 1dB NF. Heavy duty waterproof masthead box with SO239 connector. **RP2SH, RP4SH, RP6SH. PCB & hardware kit £42.50, Ready Built £65.00**. **Masthead fitting kit £6.00**.

NEW PRODUCT

DUAL PEAK/NOTCH FILTER with Audio Amplifier. A successor to the original PW Arun Parametric Filter of 1986. It connects directly to the loudspeaker or headphone socket of the receiver and produces up to ½W of audio to a front facing loudspeaker. The unit can be used to notch out two unwanted heterodynes, or just one while enhancing the wanted audio frequency. Similarly it can be used sharpen otherwise dull speech or to dampen shrill audio. **PCB kit and all the potentiometers £35.75. PCB kit and all the hardware with drilled and labelled box £73.00. Ready Built £112.00. Prices include P&P.**

PSK31 INTERFACE KIT. Module as described in PW Feb 2009. Suitable for a variety of digital modes. PCB and components **£21.00**. Box kit complete with cables but excluding microphone plug **£35.50**.

3N201 MOSFET equiv. 40673 £2.25 each, P&P £1.00 any quantity.

LCR BRIDGE with 5 resistance ranges 100, 1K, 10K, 100K & 1M. 3 capacitance ranges, 100pF, 1nF, 10nF and 3 inductance ranges, 1mH, 10mH & 100mH, plus external reference. Scale calibrated 0.01 to 10 times reference value. Optional drilled and labelled plastic or painted diecast box. **PCB & parts with pot and switch £26.00. With plastic box £39.00, with diecast box £44.00.**

OFF-AIR FREQUENCY STANDARD, crystal calibrator unit phase locked to Radio 4 using a two-loop system. Includes a monitor receiver to ensure Radio 4 is being heard loud and clear. Fixed outputs 10MHz at 2V p-p, and 1KHz at 1V p-p as oscilloscope CAL signal. Switched outputs 1MHz, 100KHz, 10KHz, and 1KHz at 6V p-p, into 500 Ohms. Single board design as featured in July & Sept 2008 PW. Background heterodyne whistle at 2KHz confirms lock condition. 12/13.5V DC operation at 65mA. **PCB kit with ferrite rod £50.00, PCB kit + drilled box and hardware complete £86.00. Ready built £131.50.**

TWO TONE OSCILLATOR as featured in *PW* March 2005. A vital piece of test equipment used together with an oscilloscope for setting up AM, DSB, & SSB transmitters. **PCB & hardware kit £28.00. Ready Built £52.50**.

NEW PRODUCT NAME

CLASSIC

~~POUNDBURY~~ 20/80m SSB RECEIVER

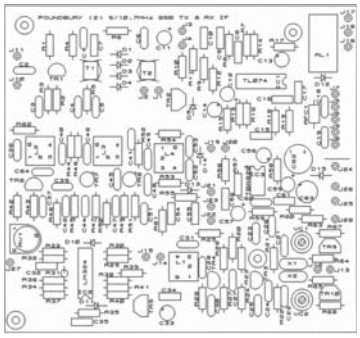
Classic superhet receiver for 20 and 80m using a 9MHz IF and a 5.0-5.5MHz VFO. Uses a 6 crystal ladder filter with near symmetrical passband, 2dB insertion loss, 1.8:1 shape factor, and 70dB stopband. Minimum discernable signal 0.2uV. Fixed tuned bandpass preselector on 20m, tunable preselector on 80m. Logarithmic AGC and Signal meter response. Maximum signal handling 1mV. 500mW audio output. Supply requirement 13.5V at up to 250mA. **VFO with its drilled box, preselector and main board PCB's and component kits including crystals £92. Complete kit including box and hardware £147.00. Ready built £240.00.**

UPWEY 160m AM/LSB RECEIVER

Single conversion superhet receiver for Top Band using a 4 pole ceramic IF filter LTW455HT. Stopband –40dB at + - 9KHz, -60dB at + - 100KHz. Ultra stable Colpitts VFO, and resonator-stabilised high-side BFO. Minimum discernable signal 0.1uV. Tuneable preselector and S meter. 500mW audio output. Supply requirement 13.5V at up to 250mA. PCB & parts kit including Main board, VFO with its box and tuning capacitor, preselector with polyvaricon, and BFO £82.50. **PCB and parts kit plus drilled and labelled case and all hardware including meter, speaker, and slow motion drive £175.50. Ready built £241.50.**

SYNTHESIZER CONVERSION CB to 10FM, suitable for the old style UK CB rigs with LC7136/7 or TC9119P synthesiser IC's. Puts the rig onto 29.31-29.70 MHz. Each board is aligned prior to despatch. State rig type when ordering. PCB size 64 x 40 x 17mm.
Type **SC29**. **PCB Built & aligned £26.50**.

PORTLAND VFO, a rock stable FET VFO. Meets the requirement for the Intermediate Licence VFO project. Modified to allow alignment to top and bottom of required band. Several versions available: 5.0 - 5.5Mhz for 20 & 80 metres; 7.0-7.2MHz for a direct conversion for the extended 40metre band; or 7.900 - 8.400MHz for use as part of a mixer-oscillator system as local oscillator for 4m RX or TX. Supplied with Buffer 2A to deliver 1.6V p-p into 50Ω with 2nd harmonic 40dB down. **PCB and component kit with potentiometer £18.00. Drilled Box and PCB kit with potentiometer and feedthroughs £27.00. Ready built £50.00**. State required frequency when ordering.



POUNDBURY (ver2) 9MHz SSB TX GENERATOR & RX IF. Speech processor and diode ring modulator with carrier suppression greater than 50dB. IN/OUT termination impedance 560Ω to match external SSB filter. Receive section FET and MOSFET IF amplifiers and a singly balanced diode product detector, discrete audio derived AGC, 0.5W IC audio amplifier. Includes USB and LSB carrier crystals, which are DC switched. PCB size 125 x 115 x 17mm. **PCB and components £66.00**.

TRANSMIT AMPLIFIERS, for 2 or 4 or 6 metres, single stage RF switched, class AB linear. Diecast box with heatsink and SO239 connectors. **TA6SA** 2W in 25W out, **TA4SA** 2.5W in 25W out, **TA2SA** 5W in 25W out. **Complete kit £63.00, ready built £82.00**.
TA6SB 5W in 50W out, **TA4SB** 7W in 50W out, **Complete kit £70.00, ready built £89.00**.

TRANSMIT AMPLIFIER & RECEIVE PREAMP, for 2 or 4 or 6 metres. Receive gain adjustable 0-20dB. Switching for either part or straight through. RF switched on transmit. Diecast box with suitable heatsink and SO239 connectors. RF input and output as detailed in paragraph above. **TARP6SA, TRRP4SA, or TARP2SA complete kit £89.00, ready built £123.00. TARP6SB, and TARP4SB complete kit £92.00, ready built £126.00**.

G2DYM / G4CFY AERIALS

Guy — 7 1 rap — -piece — 7 1 rap — Guy

TRAP DIPOLE for 80/40/20/15//&10m. 106 feet long. Supplied with 70 feet of low impedance twin feeder. Low TVI and low noise. 2S points quieter than a G5RV with same feeder length. PVC covered wires with lugs. Regular duty 150W rated £157.00.
600W rated £161.00, inc. carriage.

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

TWIN FEEDER 100 Ohm, 2kW rated, 24/0.2 in ndividual polyethylene sheaths with an outer cover of polyethylene. Solid construction to avoid water ingress. Good flexibility to overcome work hardening and fracture. Typically 0.5dB/m quieter than wide spaced 300 and 450 Ohm feeder and coax. Loss 0.04dB/m at 10MHz. 75p/metre plus £3 P&P. 100m drum £70 inc P&P.

TRAPPED INVERTED L AERIAL 80/40/20/15 & 10m, for a small garden. Coax driven from far end of garden and tuned against ground. A good all round aerial with 6dB more gain than a 24 foot trapped HF vertical. That's 4 times power on TX and one S point extra on RX. £74.00 inc. carriage.

E-mail: tony@spectrumcomms.co.uk **Web site www.spectrumcomms.co.uk**

Prices inclusive of postage unless stated. Payment by Credit/Debit card, Cheque or Postal Order. Cheques or Postal Orders payable to Spectrum Communications.

The Wouxun KG-699E

70MHz f.m. Hand-held Transceiver

The UK has had an allocation at 70MHz (4m) for a considerable number of years. Levels of activity have risen and fallen over this time, so therefore, it hasn't been as popular as the 144MHz (2m) band. There have been a few manufacturers of radios for 70MHz and so, most Amateurs either modify ex-Private Mobile Radio (p.m.r.) or use a transverter in conjunction with an existing high frequency (h.f.) or very hight frequency (v.h.f.) rig.

However, now that more countries in Europe are issuing allocations around 70MHz, I would hope to see this band added to new transceivers soon. And now Wouxun Electronics of China has made a breakthrough by introducing a handheld f.m. transceiver for 4m, the KG-699E. Yes, you read correctly, a 4m hand-held!

Sitting in it's charging cradle means the lower buttons on the keypad are inaccessible.

The KG-699E Package

The transceiver arrived with everything that was needed for easy set-up and use. This consisted of an intelligent charger unit, with separate mains lead fitted with a sealed three pin 13A type fuse-fitted plug. The complete lead and sealed plug (which contains a suitably rated fuse for the equipment) have to be replaced if the fuse ruptures*.

There's also a helically wound antenna, wrist strap and a comprehensive English language manual. The battery pack is of the Li-ion variety of 7.4V rated at 1300mAH capacity. Transmit output power is 5W maximum.

The charging unit has two inputs, the first being for 100-240V a.c. and the second is a 12V d.c. of the coaxial type. At the front of the unit there is a multi-coloured light emitting diode (l.e.d.), which changes state to indicate the stages of charging. When the KG-699E was inserted into the charger it was held nice and securely without any tendency to wobble.

Note:** Martin Lynch & Sons Ltd., have now confirmed that the transceiver will be supplied to customers with a standard 13A plug with a suitable replaceable fuse. **Editor.

The Manual

The manual itself I found to be well written and the English translation of a good standard. The 'shortcut guide' was most useful in 'setting up' the radio during the initial stages of operation. An expanded explanation of the 52 menus was given in later pages. As Wouxun manufacture a range of transceivers, there were some instructions that did not apply to the 70MHz version.

Two Main Controls

The KG-699E has only two main rotary controls, these being located on the top of the radio. The smaller one is the **On-Off** switch and **Volume Control** combined. Manual tuning is accomplished by using the larger knob. Also in the same area are two l.e.d.s used for indicating the transmit/receive state of the rig.

On the left side the push-to-talk (p.t.t.) switch is conveniently placed for thumb operation. Below this are two small push buttons, one for tone burst and the other for squelch defeat. The right side contains miniature jack sockets for external speaker/microphone units. A helically wound antenna screws in position at the top left corner. **Note:** The hand-held contains the male part of the connector and the antenna the female section of the system.

The battery can be easily removed via two latches near the top rear of the radio. Looking at the 'front panel, the internal loudspeaker and microphone are located at the top, the liquid crystal display (l.c.d.) in the centre and the keypad at the bottom.

Phil Ciotti G3XBZ enjoys 4m and has tried an amazing little rig that's bound to be of interest to 70MHz fans.

Switched On!

With the battery fully charged I switched the radio on and started to find my way around the various menu options. The frequency step size I selected was 12.5kHz, the squelch level 3. Menu 6, the transmit over timer, was initially set at 15 seconds, on the review model, so I increased this to three minutes to give a reasonable 'over' period.

After this chosen time limit the transmitter will automatically stop and cut you off mid sentence! I left the transmitter output power at the 5W level. I also programmed a number of memory channels with the f.m. frequencies for scanning purposes.

Fig. 1: In action on the 70MHz band.

Fig. 2: The push-to-talk switch is accessible to the index finger of a right-hand user.

Fig. 3: The extension speaker/microphone sockets are behind a close-fitting seal on the right-hand side of the rig. The button behind is one of two that allow the battery to be released.

First Contacts

Satisfied that the receiver was working well from my QTH – a good v.h.f. location – on the western side of Bournemouth, I tried calling several stations using the helical antenna. Results were disappointing, with reports of, "I know somebody is calling but you are not strong enough to make a QSO, sorry!"

The exercise was repeated several times, from different locations in my property and also from the garden, but with similar results being obtained. So, during a telephone conversation with **Rob G3XFD**, the editor of *PW*, we arranged a 'sked' for the following evening. Marginally better communication took place only because Rob knew my voice and callsign – we live about 8km (5 miles) apart in Bournemouth.

Earlier that evening I had taken the precaution of erecting a half-wave end fed which I use for occasional portable operation on 4m. Details of this antenna, and lots of other useful information, can be found at the website **70MHz.org**

With the feed point of the half-wave at 5m above ground level, the next phase of trials could begin. An adaptor consisting of a female SMA to female BNC allowed the antenna to be connected to the hand-held. This new combination allowed a solid 5+9 contact between Rob and myself to take place. I also took the opportunity to try a Kenwood SMC32 external speaker/microphone with the hand-held.

During the QSO, **John G7DKE,** broke in to enquire about what we were doing. After a short explanation he gave me a 5+8 report with good quality transmitted audio from the KG-699E. A few moments later **Pete Knight G7DMD/M** called to say I was 5+9 with very clear audio. During the QSO several stations commented that the hand-held sounded more like a base station – particularly when I was using the external speaker/microphone. Praise indeed!

Pete G7DMD had read about the Wouxun and was particularly interested to hear one on the air. John G7DKE then also reminded me about a net that was taking place a bit higher up the band.

A Larger Net

The **Blackmore Vale Amateur Radio Society** (BVARS) has a net running on Wednesday evenings on 70.475MHz starting at 20.30 local time. This net is usually controlled by **Chris Clease G0UZL** who was operating portable from Bulbarrow Hill, north west of Blandford in Dorset.

I called in rather late in the evening but was rewarded with a good 5+9 report both ways from Chris. Also worked was **Tony Marriot G0GFL/P** operating from another hill near Chris. We exchanged 5+8 reports. Both stations gave encouraging reports of good audio and signal strength with the 5W coming from the handheld.

Field Days

Poole Radio Society – the radio club that I belong to, hold what we call "days in the field". These are an opportunity for members to operate from a hill top site, on whichever band takes their fancy at the time. Successful operation has been carried out from 3.5MHz to 10GHz. It was very convenient that the review period coincided with one of these Sundays!

I was very interested to see what could be achieved operating from a site approximately 190m above sea level, with a clear take-off in all directions. Arriving at the site I quickly established the station and erected the half-wave antenna again at 5m above ground.

Using the helical antenna, I called and listened but failed to raise any contacts at all. So after trying this for half-an-hour the helical was removed and the bigger antenna connected. Doing this made a big difference with **Pete Hawkins G3YUD**, in Dorchester calling in for a QSO. We exchanged 5+9 reports, discussed the KG-699E and I received very good audio from Pete also. This contact lasted for 25 minutes.

Just after signing with Pete, another station from Dorchester called, this being **Clive Graham G3XIG**, who was slightly stronger. Again a good exchange of information. As Clive had previously read a lot about the handheld, on various websites, I took the opportunity to try the helical antenna again, but even with his squelch 'wide open' there was only

a slight lift in the noise at his end. The rest of the 30 minute QSO was completed on the larger antenna.

The last contact I had was with **George 2E1GOS**, from Bournemouth, who gave me a report of 5+7 with very good audio from the KG-699E. One station who I heard well was GW1SXT (Pontypool, South Wales) but I was unable to raise him despite several calls.

When the 'low battery' warning came from the loudspeaker I switched the hand-held off. The battery pack had lasted for three hours of continuous use, with three good QSOs taking place. I considered this to be a good performance bearing in mind its 1300mA/h rating.

Most Important Question

When reviewing any piece of equipment the most important question to be answered is "does it perform as specified?" And the answer is – I found the Wouxun KG-699E to perform very well when used with a better antenna than the one provided. The helical antenna is best left in the box unless you're planning to work hand-held to hand-held over short distance – perhaps at a rally or other event?

***Note:** Martin Lynch comments, "We will also be offering a 4m only antenna as an option as the supplied one is designed to cover 66-88MHz and as such is a compromise throughout its range". **Editor**.*

The hand-held is easy to use, lightweight and has many functions to keep the button pushers happy – with 52 menus in all, including A/B VFO, Dual Listen, CTCSS and DCS. Changing the menu settings is straightforward, so much so in fact, that on showing the rig to our club chairman **Les Hill M0ARM**, he found his way round the different options without looking at the manual at all!

During the review period I also used the handheld as a low power base station. Standing the radio in the charger unit (without charging taking place) and using an external speaker/microphone basic operation could be accomplished. However, when doing this not all of the keypad is available for use.

The presentation and overall finish of the radio is to a high standard and I believe it represents good value for the price. The hand-held is capable of being used outside our allocation on 70MHz. Please observe your licence terms and conditions and enjoy this interesting and friendly band.

It would be nice to hear more of these on the air, increasing the level of 4m activity. Owing to its portability I would expect to hear some SOTA operations soon, using the KG-699E. My thanks go to Martin Lynch & Sons for the loan of this remarkable little rig. ●

Fig. 4: The unusual combination of free SMA socket on the bottom of the antenna and matching fixed SMA plug on the body of the rig.

Product
Wouxun KG-699E 70MHz f.m. hand-held transceiver.

Company
Imported by Martin Lynch & Sons

Pros
Fits comfortably in the hand. Easy to use. Extensive features. Well made. Works exceptionally well on an efficient antenna, with no signs of overloading.

Cons
The supplied helical antenna is satisfactory for receiving but only practical for localised transmitting ('walkie-talkie') use.

Price £89.99

Supplier
My thanks to Martin Lynch & Sons for the loan of the review KG-699E. Further information on the Wouxun range and accessories, are available from ML&S at ***Outline House***, **73 Guildford Street, Chertsey, Surrey KT16 9AS.**
Tel: (**01932**) **567 333.**
E-mail **sales@hamradio.co.uk**
Website **www.hamradio.co.uk**

Brief (abridged) Specifications

Frequency coverage:	70MHz Amateur band.
Channel spacing:	25/12.5kHz.
Maximum deviation:	±5kHz (25kHz spacing), ±2.5kHz (12.5kHz spacing).
Frequency stability:	±2ppm.
Operating voltage:	7.4V
Operating Temperature:	–30°C to 60°C.
Battery details:	1300/1700mAh lithium ion.
Stand-by current:	50mA.
Antenna impedance:	50Ω.
Dimensions:	105 x 62x 39mm without battery and antenna.
Weight:	260g (with antenna and battery).
Transmitter r.f. power:	5W High, 1W Low.
Modulation:	F3E.
Receiver design:	Double superhet.
Intermediate frequencies:	1st 29.250MHz, 2nd 450kHz.
Receiver sensitivity:	0.25μV (12dB SINAD).
Audio power output:	500mW

ML&S are very proud to have been appointed UK & Ireland Distributor for the Wouxun Electronics range of Communication Handhelds

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Wouxun company's motto is 'Quality first, customer supreme'. To their customers this means they have the most advanced production facilities in the industry and do the most rigorous testing for product quality in order to meet the ISO9001 standard. Founded in 2000 and located in Quanzhou, China.

Wouxun KG-UVPD1P 2/70 Full Dual Band FM Handie

ML&S Price: £89.99

- ✓ 5W RF Output 2m & 4W 70cm
- ✓ Frequency Range: 144-146 & 430-440MHz (RX/TX) 136-174 & 420-470MHz Capable
- ✓ Work Mode: V/U or V/V or U/U can be set freely
- ✓ English Voice Guide
- ✓ SOS Function
- ✓ 1750Hz Tone
- ✓ DTMF Encoding Function
- ✓ CTCSS/DCS Scan (Digital/Analog)
- ✓ Bright Flashlight Illumination
- ✓ Band can be set freely on the same Channel VHF TX-UHF RX or UHF TX-VHF RX
- ✓ Built-in FM Radio (76-108MHz RX)
- ✓ Wide/Narrow Bandwidth Selection (25khz/12.5khz)
- ✓ Priority Scan, Add Scanning Channel
- ✓ High/Low Power Selection
- ✓ Channel Name Edit and Display
- ✓ 50 Groups CTSS/105Groups DCS
- ✓ Multi Step Frequency:(5K/6.25K/10K/25K/50K/100K)
- ✓ Multi Scan
- ✓ VOX Transmission
- ✓ Transmit Overtime Voice Prompt
- ✓ Begin/End Transmitting BEEP Prompt
- ✓ Auto/Manual Keypad Lock
- ✓ Wire Clone, Programmable By Computer
- ✓ Stopwatch Function
- ✓ Low Voltage VOICE prompt
- ✓ Busy Channel Lockout

Supplied accessories:
1.3Ah Li-Ion Battery Pack (5W)
Intelligent Base charger (110V-240V & 12V in input)
Belt-Clip
Dualband Antenna
Hand Strap
Handbook

Wouxun KG-699E/4M 4m FM Handie

- ✓ 5W RF output
- ✓ English voice guide to under 5W RF
- ✓ 70-70.500MHz 4m Amatuer Band (66-88MHz capable)
- ✓ Dual display and standby modes
- ✓ 128 Memory Channels
- ✓ 8 Groups Scrambler
- ✓ Channel Name Edit Available
- ✓ High/Low Power can be changeable by Top Key
- ✓ VOX (Level Adjustable)
- ✓ DTMF Encoding and DTMF Decoding
- ✓ 105 Groups D.C.S/50 Groups CTCSS
- ✓ DCS/CTCSS of RX and TX can be set respectively
- ✓ Reverse FrequencyFunction
- ✓ Busy Channel Lockout
- ✓ Distant Alarm
- ✓ ANI (Caller ID)
- ✓ Multi Scan Mode (TO/CO/SE)
- ✓ Inspection, Monitor, Stun, Kill and Emergency Alarm
- ✓ All Calls, Group Calls and Selective Calls
- ✓ Calling Ring and Ring Overtime Auto Answer
- ✓ Multi Silent Mode (QT/QTADT/QTXDT)
- ✓ Channel Steps (5K/6.25K/10K/12.5K/25K)
- ✓ Wide/Narrow bandwidth Selection (25KHz/12.5KHz)

ML&S Price: £89.99

Supplied accessories:
1.3Ah Li-Ion Battery Pack (5W)
Intelligent Base Charger (110V-240V & 12V in input)
Belt-Clip
Dualband Antenna
Hand Strap
Handbook

Wouxun KG-679E/2M 2m FM Handie

- ✓ 5W RF output
- ✓ English voice guide to under 5W RF
- ✓ 144-146MHz 2m Amateur Band (136-174MHz capable)
- ✓ 8 groups scrambler
- ✓ Channel name edit available
- ✓ High/Low power can changeable by top key
- ✓ VOX (Level adjustable)
- ✓ DTMF encoding and DTMF decoding
- ✓ 105 groups D.C.S/50 groups CTCSS
- ✓ DCS/CTCSS of RX and TX can be set respectively
- ✓ Reverse frequency function
- ✓ Busy channel lockout
- ✓ Distant alarm
- ✓ NI (Caller ID)
- ✓ Multi scan mode (TO/CO/SE)
- ✓ Inspection, monitor, stun, kill and emergency alarm
- ✓ All calls, group calls and selective calls
- ✓ Calling ring and ring overtime auto answer
- ✓ Multi silent mode (QT/QTADT/QTXDT)
- ✓ Channel steps (5K/6.25K/10K/12.5K/25K)
- ✓ Wide/Narrow bandwidth selection (25KHz/12.5KHz)

Supplied accessories:
1.3Ah Li-Ion Battery pack (5W)
Intelligent Base Charger (110V-240V & 12V in input)
Belt-Clip
Dualband Antenna
Hand Strap
Handbook

ML&S Price: £58.99

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Leather case
£9.99

WO/AAO-002
BNC Socket to SMA plug antenna adapter
£4.99

WO/AAO-001
SO-239 socket to SMA plug antenna adapter
£4.99

WO/CHO-004
110-234v AC & 13.8v DC spare charger (allows radio & spare battery to bec harged at same time)
£22.95

WO/CHO-006
Six-way charger
£149.99

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See www.wouxun.co.uk

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Please check with the organisers that the rally is 'on' before leaving home.

rallies

Radio rallies are held throughout the UK. They're hard work to organise so visit one soon and support your clubs and organisations. PW Publishing Ltd. is attending at rallies marked *.

August

August 15th
The Friskney & East Lincolnshire Rally
The Friskney & East Lincolnshire Communications Club Rally will be held in the Friskney Village Hall, Church Road, Friskney, Lincolnshire. This is 6.5 miles south of Skegness. The doors will be open from 10.00am to 2.30pm and admission will be £1.50. There will be talk-in on S22, catering, car parking and facilities for the disabled.
Bren 2E0BDS
Tel: 01754 820204
E-mail: felcc@btinternet.com
www.felcc.webs.com

August 22nd
The Rugby Rally
The Rugby Amateur Transmitting Society rally will be held in Princethorpe College, Princethorpe, Rugby CV23 9PX (NGR SP395710). This is a new location for this rally and it's 7 miles south-west of Rugby, not far from the A45. Doors will be open between 10.00am and 4.00pm and admission will be £2.00.
Tony
Tel: 07759 684411
www.rugbyats.co.uk

August 29th
The Bletchley Park Rally
The Milton Keynes Amateur Radio Society rally will be held in the grounds of Bletchley Park (MK3 6EB), home of Britain's code breakers during Word War II and soon to be the site of the RSGB's new National Centre for Amateur Radio. Doors will be open from 9.30am to 3.00pm. There will be trade stands, a special event station GB2BP and attractions for the family. Admission will be £2.00 for adults and 50p for children under 14 – adult ticket holders will be able to get £2.00 off the normal price of entry to Bletchley Park itself. Please note that unless you are visiting (and paying for entrance to) Bletchley Park, there is no rally parking on site. Parking is available on the street locally and there is a multi-storey car park immediately opposite at Bletchley Park Station (Sunday charges apply).
Steve
Tel: 07866 673192
www.mkars.org.uk

August 30th
The Huntingdonshire Rally
The Huntingdonshire Amateur Radio Society Bank Holiday Monday Rally will be held at the St Neots Community College, Barford Road, St Neots, Cambridgeshire PE19 2SH. The doors will open at 10.00am (traders from 8.00am) and there will be a large car boot sale, indoor traders, a Bring and Buy and refreshments.
E-mail: hunts.hams@yahoo.co.uk
www.hunts-hams.co.uk

September

September 5th
The Telford Hamfest
The Telford Hamfest will take place in the Enginuity Technology Centre, Coalbrookdale, Telford TF8 7DU. The doors will open at 10.30am and there will be talk-in on S22 and GB3TF (433.200MHz), trade stands, special interest groups and discounted admission to the Enginuity Centre.
Martyn G3UKV
Tel: 01952 255416
www.telfordhamfest.co.uk

September 12th
The Muckleburgh Collection Boot Sale
An amateur radio, vintage radio, militaria and general boot sale will be held at the Muckleburgh Collection military museum, Weybourne, Norfolk. For one day only, admission to the museum, restaurant and shop will be free, providing an unusual opportunity to visit the country's largest privately owned military museum without charge.

The North Norfolk Amateur Radio Group (NNARG) will also welcome visitors to their unique collection of all-service vintage military, amateur and other communications equipment in the Radio Hut at the museum. Radio clubs, individual amateurs, military enthusiasts and general stallholders welcomed. Pitches are £5.00 payable on the day – setting up is from 8.00am and free public admission is from 10.00am.
Bob Finch G0HYZ
Tel: 01263 838198
www.muckleburgh.co.uk
www.gb2mc.co.uk

September 12th
The Torbay Communications Fair
The Torbay Annual Communications Fair will take place at Newton Abbot Racecourse, Newton Abbot, Devon TQ12 3AF. There will be trade stands, catering, a Bring & Buy and facilities for the disabled.
Mike G3LQX
Tel: 01626 773934
Mike G1TUU
Tel: 01803 557941
E-mail: rally@tars.org.uk

September 18th
The Fog on the Tyne Rally
The Angel of the North Amateur Radio Club, in conjunction with STARS Radio Club, Fog on the Tyne Rally will take place at the Whitehall Road Methodist Church Hall (at the corner of Whitehall Road and Coatsworth Road – the car park entrance is in Whitehall Road), Bensham, Gateshead NE8 4LH. Doors will open at 10.30am and admission will be £1.50.
Nancy Bone G7UUR
Tel: 07990 760920 (Day)
Tel: 0191 477 0036 (Night)
E-mail: nancybone2001@yahoo.co.uk
www.anarc.net

September 19th
The Great Northern Hamfest
The 20th Great Northern Hamfest will be held at the Metrodome Leisure Complex, Barnsley S71 1AN. The doors will open at 11.00am and there will be trade stands, special interest groups, a Bring & Buy and facilities for the disabled.
Ernie G4LUE
Tel: 01226 716339
www.southyorkshirerepeatergroup.co.uk

September 26th
The Holsworthy Rally
The Holsworthy Amateur Radio Rally will take place in the Holsworthy Community College, Victoria Hill, Holsworthy EX22 6JD. There will be talk-in on V36 and S18.
Roger Williams
Tel: 07773 983691
E-mail: g8yrw@yahoo.co.uk

October

October 1st/2nd
The National Hamfest*
The second Lincoln Short Wave Club/RSGB National Hamfest will be held in the George Stephenson Pavilion, Newark and Nottinghamshire Showground, Lincoln Road, Winthorpe, Newark NG24 2NY (close to the junction of the A1, A46 and A17). There will be trade stands, a Bring & Buy, catering, special interest groups and facilities for the disabled.
Clive Catton
Tel: 01522 797 520 (office)
Tel: 01522 826 681 (home)
E-mail: clive@nationalhamfest.org.uk
www.nationalhamfest.org.uk

October 3rd
The Autumn Hangar Sale
The Autumn Militaria, Electronics and Radio Amateur Hangar Sale will take place at the Hack Green Secret Nuclear Bunker, French Lane, Nantwich, Cheshire CW5 8AL. The Bunker is situated just off the A530 Whitchurch Road, a few miles outside Nantwich, 30 minutes from Chester. From Junction 16 on the M6 motorway, follow the signs to Nantwich, then Whitchurch on the A530 (follow the brown Secret Bunker signs). The doors will open at 10.00am and admission will be £2.50.
Rod Siebert
Tel: 01270 623353
E-mail: coldwar@hackgreen.co.uk
www.hackgreen.co.uk

October 8-10th
The RSGB HF Convention
The RSGB HF Convention will be held at Wyboston Lakes Conference Centre, Great North Road, Wyboston, Bedfordshire MK44 3AL.
www.rsgb.org/rsgbconvention

Open six days a week. Mon - Fri: 9.30am - 5.30pm Sat: 9.00am - 5.00pm

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E-mail: sales@hamradio.co.uk

YAESU

PRICE INCREASES on YAESU and ICOM products introduced July 2010. Call now for availability and latest prices. ML&S have the largest stock of Yaesu in the country but will not last forever. Prices quoted are for current stock. Please call now and beat the price rise.

FT-817ND

After almost 9 years you would think there would be competition for the FT-817. Still the ONLY truly hand-portable 160m-70cm all mode transceiver available today.

£469.95

FT-817ND-DSP £579.95

COMING SOON! NEW! Yaesu FTdx5000D

HF/6M Transceiver with 112dB Dynamic Range & IP3 of +40dBm

See www.FTdx5000.com for more details.

Yaesu FT-857D & ATAS-120A Package

Still our best selling HF Mobile Radio.

FT-857D only £599.95 or with ATAS-120A £859.95

By adding the remarkable ATAS-120A Auto Antenna you have 40-10M at the press of a button without getting out of your car! No other manufacturer has been able to offer this unique feature together with their mobile radio. Having used the ATAS on 40m I was amazed how a mobile antenna so small performs so effectively. My single band whips have been consigned to the garage ever since!

Yaesu FTM-350E

Latest Dual-Band APRS Mobile from Yaesu!

Available NOW! £529.95

Yaesu FT-897D

The best multi-purpose multi-band transceiver on the market!

ML&S: £699.95

FT-897D with AT-897Plus £869.95

Yaesu FT-450 HF Base Transceiver with & without ATU. HF & 6m, full DSP

FT-450 shown with optional Bail Stand.

The Yaesu FT-450 is a major new HF & 6m transceiver offering full a 400MHz IF DSP design at a very low price. Available with or without internal ATU, this new rig offers serious performance for those who are not bothered about the upper V/U bands.

Yaesu FT-450 without ATU: £619.95
Yaesu FT-450AT with ATU: £699.95

Options:

MyDEL MP-8230 23Amp PSU	£69.95
Stand-FT450 Bail Stand	£19.95
ATU-450 Optional internal ATU	£163.43
MMB-90 Mobile Bracket	£19.36
MHG-1 Carry Handle	£10.17
MH-36E8J DTMF Mic	£71.48
MD-100A8X Desk Mic	£119.95
MD-200A8X Super Deluxe Desk Mic	£209.95
YH-77STA Headphones	£56.14
MLS-200 High Power weatherproof speaker	£28.55
ATAS-120A Fully Auto Mobile 7.50MHz Antenna	£279.95

Yaesu FT-2000 PEP

Performance, Excitement, Perfection!

The DX choice of 3B7C.
Always in stock. Always on demo. Two flavours, 100W or 200W, you choose.

FT-2000: £2199.95
FT-2000D: £2795.95

FT-2000 Accessories

Yaesu MD-200A8X The Yaesu MD-200A8X is a ultra high-fidelity desk top microphone. £209.95

Yaesu MD-100A8X Yaesu MD-100A8X is a desk top m crophone. £119.95

Yaesu FH-2 The FH-2 is a Remote Control Keypad built for the FT-2000. £43.89

Yaesu FT-2000 & FT-2000D Mini-Manual. Size, 4.5x8 inches. Twenty high-quality laminated pages, loaded with detailed instructions covering all aspects of using these superb HF rigs. £19.99

Yaesu MTU-160 The MTU-160 is an external µ-tuning unit for the FT-2000 on the 160 meter band. Price includes Base Unit Kit. £529.95

Yaesu MTU-80/40 The MTU-80/40 is an external µ-tuning unit for the FT-2000 on the 80 and 40 meter band. Price includes Base Unit Kit. £529.95

Yaesu MTU-30/20 The MTU-30/20 is an external µ-tuning unit for the FT-2000 on the 30/20 meter band. This MTU unit requires the external µ-tuning base kit. £529.95

Yaesu YF-122C 7-pole Collins CW Filter (500Hz/2Khz: -6db/-60db) for FT-817, FT-857, FT-897 and FT-2000 £118.48

Yaesu YF-122CN 7-pole Collins Narrow CW Filter (300Hz/2Khz: -6db/-60db) for FT-857 and FT-2000. £129.71

FT-950 HF Base Transceiver

Yaesu's "Midship Radio"
All FT-950s supplied by ML&S are latest PEP factory

Only £1129.95 Available from stock

FT-950 Accessories

CABPC-YAESU-USB USB Cables for FT-450/950 & FT-2000 £25.49

Yaesu FT-950 (Mini-Manual) £16.99

Yaesu Com Port Control and Programming Kit £25.54

DVS-6 Voice Memory Unit £44.90

MD-100A8X Desk top microphone £119.95

MD-200A8X Ultra high-fidelity desk top microphone £209.95

MTU-160 External µ-tuning unit for the FT-2000 on the 160 meter band.Pr ce includes Base Unit Kit £529.95

MTU-30/20 External µ-tuning unit for the FT-2000 on the 30/20 meter band. Pr ce includes Base Unit Kit. £529.95

FP-1030A Microprocessor-controlled antenna impedance matching network designed to provide all-amateur-band transmitting capability with the FT-897/857 series of transceivers, when used with an end-fed random w re or long whip antenna. £175.95

FH-2 Remote Control Keypad built for the FT-2000 £43.89

Quadra - VL-1000 1 kW, HF & 6M Solid State Linear Ampl fier and PSU (VL1000 & VP1000) £CALL!

SP-2000 Base station external speaker built for the FT-2000. £136.87

YA-30 Broadband folded dipole antenna working between 1.5-30Mhz, which comes with 30 meters of cable. £250.28

NEW Yaesu VX-8DE

With Enhanced APRS

£399.95

VX-8 Accessories

Maldol MMG-SM Minimag Quality, stable, Maldol miniature magnetic mount. £20.39

Yaesu BH-1 Stereo Bluetooth Headset £159.96

Yaesu BH-2 Bluetooth Headset £179.96

Yaesu BU-1 Internal Bluetooth Unit £90.43

Yaesu CD-40 Charger Cradle for BH-1/BH-2 £10.96

Yaesu CD-41 Rapid Charger Requires NC-86U £18.96

Yaesu CN-3 SMA to BNC Adaptor £9.96

Yaesu CSC-93 Soft Case £15.95

Yaesu CT-131 Microphone Adaptor Cable £29.96

Yaesu CT-134 Cloning Cable £36.96

Yaesu CT-136 GPS Antenna adapter for FGPS-2 £30.95

Yaesu E-DC-5B DC Cable with Cigarette Plug £29.58

Yaesu E-DC-6 DC Cable for Handhelds £7.10

Yaesu FBA-39 Dry Cell Battery Case £22.44

Yaesu FEP-4 Earp ece for BH-1 Bluetooth Headset £16.95

Yaesu FGPS-2 GPS Unit Requires CT-136 or MH-74A7A £82.95

Yaesu FNB-101LI 7.4V 1100mAh Lithium Ion Battery £45.94

Yaesu FNB-102LI 7.4V 1800mAh Lithium Ion Battery £61.26

Yaesu MH-74A7A Waterproof Speaker Microphone £43.89

Yaesu NC-85U AC Charger for BH-1/BH-2 £22.44

Yaesu NC-86U AC Charger for VX-8 £10.17

Yaesu VX-8E (Mini-Manual) S xteen high-quality laminated pages, loaded with detailed instructions. Ideal for setting-up and operating the VX-8R quad-band transceiver £14.99

Yaesu VX-3E. ML&S £159.95
Micro Handie 2/70 with scanner. Complete with Li-ion battery, charger & antenna.

Yaesu FT-60R. ML&S £1179.94
Latest twin band handie complete and ready to go.

Yaesu VX-6R. ML&S £234.94
Yet another 2/70 handie from Yaesu.

Yaesu VX-7R. ML&S £289.95
The UKs best selling Triple Band Handie.

FT-7900 with FREE YSK7800. £239.95

FT-1900 Replacement for the FT-1802. Rugged 50W 2m FM. £129.95

FT-270E Replacement for the VX-170 2M 5W Handie. £109.95

FT-2900 NEW! Replacement for FT-2800. MiL spec, high performance. £134.95

See Website for details of these new Yaesu mobiles

Yaesu FTM-10R. ML&S £269.95

Yaesu FT-8800. ML&S £329.95
Similar to the FT-7800 but can receive on 2 & 70 simultaneously.

Yaesu FT-8900. ML&S £379.95
High-power FM on 10m, 6m, 2m & 70cm. When your local repeater is busy, slip onto 10m & work DX!

Yaesu FT-897D
High Power version of the FT-897. Use as a transportable, (20W) or as a base/mobile (100W) Bundle Price: £CALL (Rig only: £759.95)

Yaesu FT-857D The Ultimate HF Mobile Installation! Plus ATAS-120D 40m-70cm Auto Antenna
Bundle Price: £869.95 (Rig only: £599.95)

Yaesu FT-817ND Only £469.95
The world's only all-band portable transceiver.

See www.hamradio.co.uk for more details on all of these items ... and much, much more! E&OE

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WiNRADiO WR-G31DDC EXCALIBUR

A high-performance, low-cost, direct-sampling, software-defined, shortwave receiver with a frequency range from 9kHz to 50MHz Now in stock, **only £649.95**

- ✔ 9kHz to 49 995MHz continuous frequency range
- ✔ Direct sampling
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- ✔ 50MHz-wide, real-time spectrum analyzer
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- ✔ Audio spectrum analyzer
- ✔ Audio and F recording and playback
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- ✔ EIBI, HFCC and user frequency databases support
- ✔ Very high P3 (+31dBm)
- ✔ Excellent sensitivity (0.35 µV SSB, 0.16µV CW)
- ✔ Excellent dynamic range (107dB)
- ✔ Selectable medium-wave filter
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MicroBit Remote Rig Interface

A complete remote control system for Amateur radio

Using Microbit's advanced technology, full remote control of your rig is available today. Imagine going on holiday but missing your HF system back home. Well no more! Using the RRC-1258 system all that is required is for you to take the head unit of say your IC-706 or TS-480 together with one half of the RRC-1258, plug into a LAN connection connected to the web and within seconds you are "ON AIR" as if you were sitting in your shack at home. (Minus the cat, TV and any other external interference!)

The previous model is still available.

Microbit-1258 mkI £349.95. Including Lead Set
Microbit-1258 mkII £399.95. Leads included

As used by top DXers throughout the world!

For more info see **www.hamradio.co.uk/rrc-1258.shtml**

Latest version of the Remote Rig. One version for ALL radio models.
Like the original RRC-1258, the MkII is sold in pairs, assembled and tested but not configured. Included in the package is one USB cable, Power cables (2 pc), Cat 5 cable for making IC-706 cable and a 2xRJ-45 extender.

ICOM

Icom HF Products

IC-718	Basic HF Radio, 12V, 100W output	**£529.95**
IC-7200	Mr T's choice for tough HF/6M Operation	**£819.94**
IC-7000	Full DSP, TFT Screen, 100W HF/6m + 2/70	**£1099.95**
IC-7600	100W, Twin RX, Huge Display. No psu	**£3149.95**
IC-7700	Superb 200W HF/6M Base, PSU/ATU	**New RRP £5499.95 ML&S £5395**
IC-7800	Icom's Flagship radio has gone up again	**New RRP £7995.95 £Call!!**
IC-PW1Euro	1kW Fully automatic HF/6m Linear Amp	**£Call!!**

Icom Receivers

IC-R9500	Flagship Base Receiver, 50kHz-3335MHz	**£Call!!**
	Totally mint used example in stock	**£6999**

Icom V/U Products

IC-E90	6/2/70 FM handie	**£299.95**
IC-E90/4m	6/4/2/70 version of this popular handie	**£339.94**
IC-E92ED	As above c/w D-Star fitted & splash–proof	**£379.95**
IC-E880	NEW! Latest D-Star Dual-Bander. Now in stock	**£439.95**
IC-E2820	Proper dual band, dual display, remote etc	**£425.95**
IC-E2820+D	Supplied with UT-123 D-Star board	**£589.95**
IC-910H	Multimode 2/70 Base Station	**£1269.95**
IC-910X	As above but with optional 23cm UX-910	**£1469.95**

Icom PC Controlled Receivers

Icom IC-R1500 & IC-PCR2500

All Windows XP, Vista or Windows 7 Controlled via USB

IC-R1500	10kHz-3300MHz All Mode with remote head	**£459.95**
IC-R2500	Identical to the above but with twin independent speakers	**£589.95**

Icom new Models!

New! IC-V80E
2m Handie 5W simple to use
Only £109.95

New! IC-T70E
2/70 Dual band handie 5W, compact
Only £159.95

New! ID-E880E

New! IC-E80D
D-Star Handie, 500kHz-1GHz RX built in
Only £339.34

D-Star Mobile, D-Star as standard **£439.95**

NEW Icom IC-9100 All-Rounder
HF through to 23cms Base Transceiver

V/UHF Satellite + HF/50MHz bands + D-STAR DV mode

- HF/50MHz 144/430(440)MHz & 1200MHz coverage
- SSB, CW, RTTY, AM, FM & DV modes
- 100W on HF/50/144MHz, 75W on 430(440)MHz. 10W on 1200MHz
- 32-bit floating point DSP & 24-bit AD/DA converter
- Double superheterodyne with image rejection mixer
- Optional 3kHz/6kHz 1st IF (roofing) filters (for HF/50MHz bands)
- Satellite mode operation
- Optional D-STAR DV mode operation

Icom IC-7600

See our website for first full detailed review by Adam Farson VA70J

The successor to the IC-7565Pro111, the eagerly awaited new mid-range HF/6M Transceiver will try and set another bench mark like that of its predecessor.

KENWOOD

STOP PRESS!
Kenwood announce a new HF/6m Transceiver.
TS-590S

Kenwood HF Products

TS-480SAT	Remote head HF/6m 100W inc ATU Transceiver	**£749.95**
TS-480HX	200Watt version of above, no auto-ATU	**£849.95**
TS-2000E	100Watt all mode HF/2/6M with auto-ATU etc	
	FREE HS-5 HEADPHONES (while stocks last)	**£1499.95**
TS-2000X	As above but fitted with 10Watts on 23cm (all mode)	**£1799.95**

Kenwood V/U Products

TH-F7E	The only 2/70 FM Handie with SSB/CW WB Receiver	**£229.95**
TM-V71E	First Class 2/70 FM Mobile with remote head	**£289.95**
TM-D710E	The only 2/70 FM Mobile/Base with APRS/TNC etc	**£429.95**
TM-D710E+Av	Map Bundle. Personal Navigator for GPS located APRS	**£Call!!**

It's not often we see a new HF product from Kenwood, but when we do it's usually been worth the wait. The new TS-590S can be seen as a modern day TS-570. Similar in size (and even front panel appearance and layout), the brief was to beat the performance of its obvious rival, the Elecraft K3. Mr Hart has already been booked to confirm or otherwise, but having met Mr Torii, (head of engineering at Kenwood Japan), you can bet your life he and his team will have done a good job.

The Kenwood TS-590S held its debut at the 2010 Dayton Hamvention and promises impressive, yet affordable amateur operation on the HF and 6 metre bands. It utilises the very latest technology including down conversion with the 1st IF at 11MHz, true 32 bit IF DP, roofing filters, USB power, etc. Excellent DSP receive performance is expected, combined with ergonomic operation.

Full specifications and details will be issued by Kenwood prior to release.

For further information see our website: www.hamradio.co.uk

New! Alinco DJ-G7E
2m/70cm/23cm Handie Transceiver. Simultaneous full duplex operation between any two bands. £299.95

NISSEI — One of the oldest names in Ham Radio

'ompac' metal body Cross Needle Meters. Fantastic value all PEP & Average reading.

Nissei	RX-103	1.6-60MHz, 20/200/2kW	**£49.95**
Nissei	RX-203	1.8-200MHz, 2/20/200W	**£49.95**
Nissei	RX-403	125-525MHz, 2/20/200W	**£49.95**
Nissei	RX-503	1.8-525MHz, 2/20/200W	**£69.95**

New Range to ML&S, HUGE DISPLAY, PEP & Average reading.

Nissei	TX-102	1.6-200MHz, 2/20/200W	**£59.95**
Nissei	TX-402	125-525MHz, 2/20/200W	**£59.95**
Nissei	TX-101A	1.6-60MHz, 20/200/2kW	**£84.95**
Nissei	TX-502	1.6-525MHz, 2/20/200W	**£89.95**

See www.hamradio.co.uk for more details on all of these items ... and much, much more! E&OE

Miracle Antenna

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

MMD-17 17M MIXED MODE DIPOLE,+ 5 BANDS WITH ATU **£89.95**
MMD-20 20M MIXED MODE DIPOLE, OTHER BANDS WITH ATU..... **£89.95**
MMD-30 30M MIXED MODE DIPOLE **£99.95**
MMD-40 40M MIXED MODE DIPOLE **£99.95**

Miracle Ducker iL HF-70cm Mini ATU with BNC..... **£109.95**
Miracle DuckerHF-70cm with PL-259 ..... **£109.95**
Miracle AntennaHF-70cm fitted with telescopic..... **£109.95**

Perseus VLF-LF-HF Receiver

PERSEUS is a VLF-LF-HF receiver based on an outstanding direct sampling digital architecture.

only **£699.95** as reviewed in Radcom May Issue

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

RFspace

SDR-IQ™ Software Defined Radio, Spectrum Analyzer and Panoramic Adapter.
Now in stock together with the IF-2000 IF Interface board for the FT2k & FT-950. Both on DEMO at Chertsey.
See http://www.hamradio.co.uk/acatalog/RF_Space.html **£469.95**

The World's Biggest Selling Virtual Radar System

Now includes built-in Airband & FM!

SBS-1eR Pocket Radar **£479.99**

MyDEL

HB-1A Ultra Compact 3 Band CW Transceiver

Offering up to 4 Watts output on 40/30/20M Bands, this tiny HF portable is powered by 8 x AA cells and is aimed at the serious QRP enthusiast and has performance similar to that of the Elecraft KX-1.

- 20 meters, 30 meters and 40 meter amateur bands.
- CW Transceive, SSB receive.
- Receiving from 5 MHz to 16MHz.
- Maximum transmission power of about 4 watts on external 12V.
- Weight 350Grams (approximate).
- Battery compartment to hold 8 rechargeable AA cells.
- Built-in auto function keys.
- DDS VFO with 20 frequency storage memory.
- Digital dial with LCD technology.
- Automatic keyer with the CQ programmable with your call.
- RIT 10 Hz, 100 Hz.
- Frequency conversion super-heterodyne receiver.
- Unit will operate with voltage supply from 8-14 VDC.
- Built in AGC function.

£249.95. Call or see website for further details.
NOW IN STOCK - very limited quantity.

LDG

LDG Auto Tuner Range

NEW SHIPMENT JUST ARRIVED!

AT-100proII NEW	Desktop tuner covering all frequencies from 1.8-54 MHz	£199.95
AT-200pro	Designed for new generation of rigs	£214.95
AT-1000Pro	1kw 160m-6m (1.8-54MHz) High speed Auto ATU, tuning range 6-1000Ohms	£510.95
AT-897Plus	Bolt-on Alternative Auto Tuner for the FT-897. Wider tuning range and cheaper too!	£183.95
IT-100	New version of the AT-7000	£159.95
YT-100	NEW AUTO ATU for FT-897/857 or FT-100 with additional Cat Port Control	£173.95
Z-817	Ultimate autotuner for QRP radios, including the Yaesu FT-817D	£122.95
Z-100Plus	Ultimate autotuner for Yaesu FT-817D	£143.95
Z-11ProII NEW	Portable compact & tunes 100mW to 125W	£159.95
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AS REVIEWED IN PW December Issue 2009

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The Rev. George Dobbs'

carrying on the practical way

This month the Rev. George Dobbs G3RJV is looking at aids to improve short wave listening.

"Hear the things you should hear – be deaf to others."
Ford Frick (American Journalist 1894 – 1978)

In the early 1980s my wife **Jo** and I owned a Volkswagen motor caravan – and a fine vehicle it was too. With two small sons to take on holiday it was a considerable step up from tent camping in both comfort and convenience.

The motor caravan also enabled me to operate an Amateur Radio station from most locations. In the VW camper I used an old but trusty Yaesu FT-7 transceiver and a set of Hustler mobile whip antennas that I bought on the flea market of the Dayton Hamvention.

I even remember working some fairly serious DX on 14MHz (20 metres) from a camp site in Luxembourg. But time takes its toll and these days when my wife and I travel we prefer the luxury of fresh sheets and hot showers in hotels! Not only that, my portable Amateur Radio station is usually replaced by my sketch book with a pen and tiny set of water colour paints. I have found that a glass, or two, of wine in the sunshine has less effect on wielding a pen than accurately operating a Morse key!

However, I'm not saying that I've forgotten Amateur Radio! Not a bit of it – almost everywhere I travel I take a short wave receiver to monitor the Amateur bands. My favourite all round receiver for many years has been the older version of the Sony SW7600. It covers all the high frequency (h.f.) Amateur bands, has lower sideband (l.s.b.) and upper sideband (u.s.b.) settings for Amateur band listening with a fine tuning control and even has BBC Radio 4 on long wave, should 'Test Match Special' be within range.

The receiver has fair sensitivity using the built-in whip, but it does have access for an external antenna via a 3.5mm mono jack socket. From time to time I have plugged in lengths of wire to improve reception; usually with limited success. So recently, after planning to do so for several years, I decided to try an 'active antenna' with the Sony receiver.

Active Antennas

An active antenna is a small antenna with a built-in r.f. (radio frequency) amplifier to increase the signal level and, in most cases, to match the input impedance of the receiver. It also attempts to overcome the problems of a physically small receiving antenna. But if it can do this 'trick' – why use large antennas at all? Well the answer lies with silk purses and sow's ears!

There are several inherent problems with active antennas – not least of which is that physically small antennas tend to pick up lots of rubbish. Because the reception field of the antenna is small, all the local electrical noise is picked up and then increased by the built-in amplifier. Such antennas can be an excellent means of discovering r.f. noise and in many locations there's a lot of it!

Also simple active antennas may have little or no r.f. filtering allowing problems of intermodulation when two or more unfiltered signals produce spurious signals. But in spite of such problems, I decide to try a simple active antenna with the Sony receiver.

About the simplest circuit I know for an active antenna is shown in **Fig. 1a**. This simple little circuit has been doing the rounds of amateur radio literature and web pages for many years. It has been in my circuit folder for so long that I have forgotten the original source.

I built the amplifier on a small piece of perf-board as shown in the photograph, **Fig. 2**. It's based upon an field effect transistor (f.e.t.) amplifier. I used the common MPF102 device but other N-channel f.e.t. devices, such as the 2N3819 or the 2N4416 would do the job. The layout will change rather, as the alternative devices have differing pinout connections to the MPF102, although they can be electrically similar.

The required inductance of the r.f. choke (L1) that forms the load in the drain of the f.e.t. depends upon the intended frequency range of the amplifier. I used a small axial r.f. choke with a value of 22μH (micro-henries) and that worked well for the short wave spectrum. If you don't have an off-the-shelf 22μH inductor, try about four turns wound through a small 'pig nose' ferrite core like the BN-43-2402 (the value isn't critical).

It may also be worth a little experimentation with the values of C1 and 2; the capacitors that couple the signals in and out of the amplifier. I found that 470pF worked well but this might be reduced if a longer antenna is used.

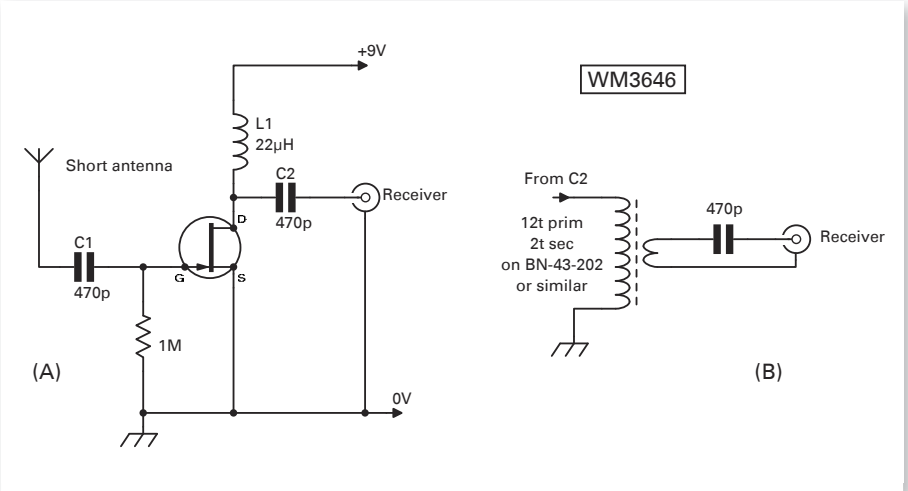

Fig. 1: The simplest active antenna circuit using a simple j.f.e.t. tried by George G3RJV.

Rev. George Dobbs G3RJV
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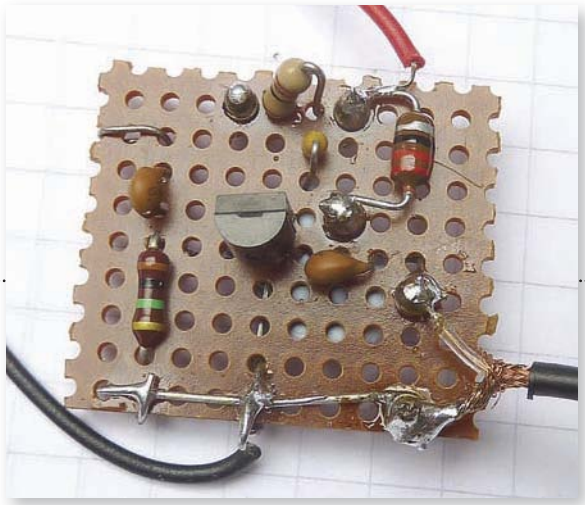

Fig. 2 The circuit of Fig. 1 was built up on perf-board.

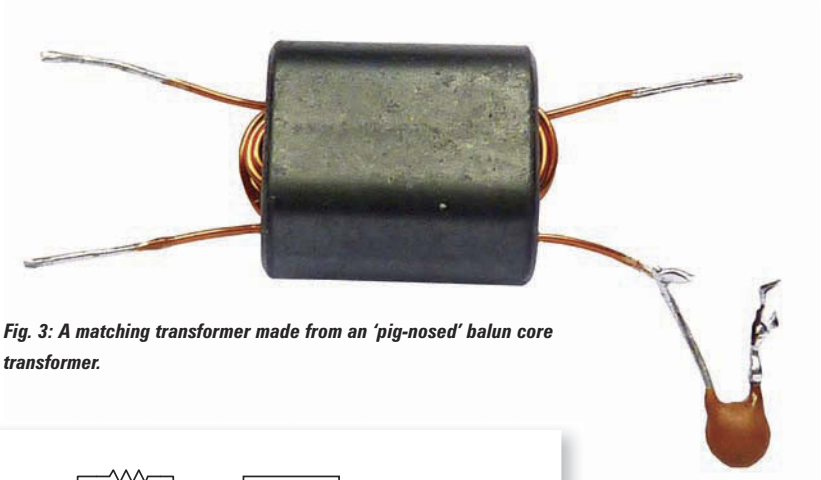

Fig. 3: A matching transformer made from an 'pig-nosed' balun core transformer.

The Circuit

Using the circuit in Fig. 1a, with two 50mm clip leads joined as one lead to form the antenna, I found the results gave a good improvement on the receiver telescopic whip. Although there was an increase in the background noise, I achieved greater signal strength. Unfortunately I misplaced the Sony SW7600 manual a long time ago – but I suspect that the external antenna socket was designed for a low impedance input.

In the circuit C2 couples the output from the drain of the f.e.t. resulting in a high output impedance. As ever looking for the simplest way ahead, I decided to add a simple impedance matching transformer. It was the easiest way ahead because I already had a transformer laying on the bench from a previous project. The transformer was a 12 turn primary winding and a two turn secondary winding on a ferrite BN-43-202 core, **Fig. 3**.

I guess that any similar ferrite pig nose core with the same number of turns would serve the purpose. Look for a ferrite core like the one shown in the photograph. The arrangement is shown in Fig. 1**b**. I added the 470pF output capacitor as a precaution.

Some external antenna sockets on short wave receivers carry a voltage, to power the amplifier, as well as the signal. The transformer was a useful addition. The background noise reduced and the signals were somewhat stronger.

The circuit, **Fig. 4**, is included to show how to power an active antenna amplifier from the receiver power supply. This circuit carries a 'health warning', in that I didn't actually build it – despite this it's typical of the circuits used in this application. The signal and the supply voltage travel down the same wire.

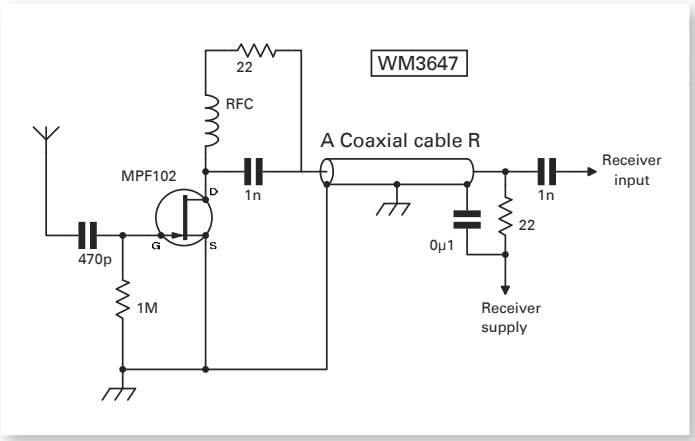

Fig. 4: How to power an active antenna and use the coaxial cable to carry the signal as well.

The diagram, Fig. 4, shows a coaxial cable joining the active antenna (A) to the receiver (R). A 1nF (1000pF) capacitor couples the amplifier output to the receiver with another 1nF capacitor at the receiver end of the coaxial cable. As these are in series, the total coupling capacitance is about 500pF. The capacitor at the receiver end isolates the power supply from the receiver input; protecting the receiver input circuitry from the supply.

The supply voltage is picked up from the receiver supply with a 22Ω resistor and 100nF capacitor offering some r.f. de-coupling. At the amplifier end another 22Ω resistor and 100nF capacitor provides r.f. decoupling for the supply at the r.f. choke in the drain of the f.e.t.

The 1nF coupling capacitor from the f.e.t. also isolates the drain of the f.e.t. from the supply voltage. This circuit is probably more appropriate when using an active antenna with a homemade receiver. Not only does the constructor have to take the supply voltage from the power line of the receiver but also find a suitable connection to the input circuit of the receiver. If possible, this input should be at high impedance. A circuit for the experimenter but worth trying with, say, a simple direct conversion (DC) receiver.

No External Antenna Socket?

So, what happens if the short wave receiver doesn't have an external antenna input? If this is the case, the I can suggest one simple solution. This is to couple the output from the active antenna to the whip antenna of the receiver by winding a coil over the whip **Fig. 5**. I tried this with the Sony receiver and it was quite successful.

Using a clip lead of some 50mm, I connected one end to the output of

the active antenna and wound the rest of the lead around the receiver whip antenna. Although the results weren't as good as the proper antenna input socket – it did give considerable improvement in short wave reception. (Note that far end of the clip lead is not connected to the active antenna).

Originally, I connected that end to the ground of the amplifier but found that results were slightly better with it free from any connection.

Fig. 5: This method of coupling an active antenna can be used when a receiver has no external antenna socket.

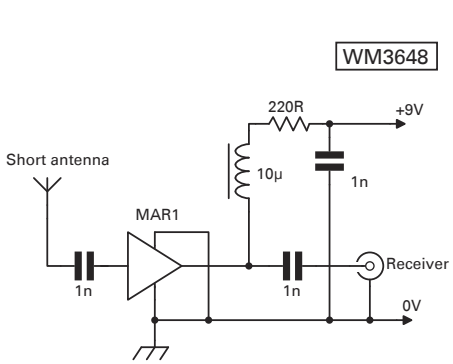

Fig. 6: The final circuit – using an m.m.i.c. – was derived from the manufacturer's data sheet and Georgev G3RJV adopted the 'Manhattan' assembly technique to build the project.

Another Approach

The diagram, **Fig. 6**, shows another approach to building an active antenna. In this circuit a m.m.i.c. amplifier chip is used. The acronym m.m.i.c. stands for monolithic microwave integrated circuit. These are very small i.c. devices designed for microwave (300MHz to 300GHz) applications. The amplifiers are matched to a characteristic impedance of 50Ω.

Although designed for microwave applications, m.m.i.c. amplifiers often make an appearance in Amateur Radio short wave circuits and their small size has been used to good effect in cellular phones. They are also very reliable devices as their expected mean time between failures (m.t.b.f.) is in the order of tens of thousands of years!

Some time ago I was given some MAR-1 m.m.i.c. amplifiers manufactured by Mini-Circuits. I had never put any of them to use before so, decided to try one in an active antenna circuit. They are curious devices – looking like a four legged spider with a spot on its back. The MAR-1 is an early m.m.i.c. and contains a Darlington Pair amplifier.

The circuit in Fig. 6 was simply derived from the manufacturer's data sheet and represents the basic configuration for an r.f. amplifier. The pin layout is also shown. That layout is simple, r.f. input and r.f. output ports, both at 50Ω impedance, and two grounding pins. An angled end and a spot on the case identify the r.f. input.

The r.f. output port doubles as a d.c. voltage input to power the device. The 1nF capacitor at the output serves as a signal coupling capacitor and a d.c. blocking capacitor. The 10μH choke is needed to feed the d.c. bias without losing r.f. signal. The 220Ω bias resistor would need to be increased to 470Ω if a 12V supply is used.

Building The Circuit

I planned to build the circuit in Fig. 6, using the 'Manhattan' construction technique with insulated printed circuit board (p.c.b.) material pads glued to a ground-plane. However, the pads were so huge compared with the size of the MAR-1 that I opted for ugly construction instead! My p.c.b. material stock contains some very thin material that will cut with scissors so I cut a piece about 20x30mm to serve as the ground-plane.

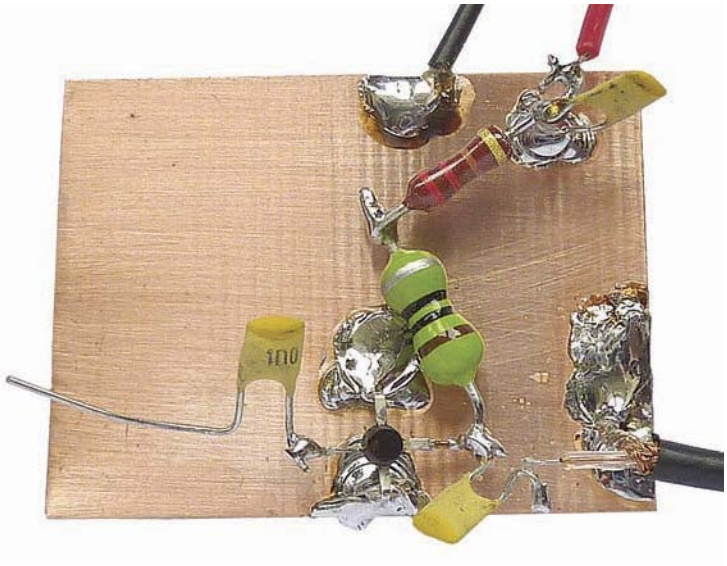

Fig. 7: The pin-out of the MAR-1 m.m.i.c. used in building the circuit of Fig. 6.

The ground pins are only about 5mm long but I found it was possible to bend them to form L-shaped legs to raise the MAR-1 above the ground-plane. Note: This does require fine pointed-nose pliers and care with soldering the little 'foot' to the ground-plane.

Both the input and output pins should be far enough above the ground-plane to solder the other components in place, **Fig. 7**. The non-grounded end of the 1nF decoupling capacitor acts as a stand-off connection for the 9V supply.

The m.m.i.c. circuit did make a viable active antenna and although the signal levels were less than the f.e.t. version – there was much less background noise. I used my improvised clip lead antenna again and connected the output to the external antenna socket; a correct impedance match.

Active antennas do have their limitations – especially if they're simple circuits – but I found it did help Amateur band reception on a short wave radio that that is really designed for broadcast station listening. The circuits I've described are very simple and cost little to make and may be useful to readers who like to carry a short wave radio when they are away from home. ●

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Colin Redwood G6MXL looks at v.h.f. and u.h.f. antennas to help you choose one for your needs!

Welcome to the September 2010 *What Next? (WN?)* column. This month I'm continuing to explore v.h.f. and u.h.f. topics by looking at antennas for these bands.

Antennas for v.h.f. and u.h.f. fall into two main categories, the first of which is intended for vertically polarised signals. Most commonly this first category of antennas will be used with f.m. transceivers such as handhelds and transceivers designed for use in vehicles. In the second category are antennas that are mainly used for horizontally polarised signals. These will be of the greatest interest to those wanting to use s.s.b. and c.w. on the v.h.f and u.h.f. bands. It is this second category of antennas that I'm going to focus on this month.

To start, I'm looking at some antenna parameters. In particular I want to show that antenna gain is not the only property that should be considered.

Antenna Gain

The various antenna manufacturers make all sorts of claims for the gain of their antennas and the (often for the not so experienced) deciBel (dB). My advice is to completely ignore any gain figures that are not stated in dBi or dBd. Without dBd or dBi, the information is just as useless as 'twice the gain as ……a sack of potatoes'.

Let me explain: Firstly the gain of an antenna is only **relative signal gain in one direction**, with an accompanying loss of signal in other directions! Even a dipole exhibits 'gain', in that the maximum signal is at right angles to the elements, and almost none in the direction of the elements.

The term dBd means the gain in decibels relative to a dipole. By referring to **Table 1**, you'll see that an antenna with 6dBd gain will have four times the gain of a dipole. The term dBi means the gain in decibels relative to an isotropic radiator. An isotropic radiator is a theoretical source that radiates equally in all directions,

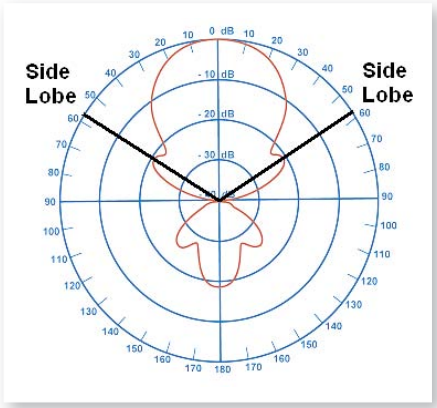

Fig. 1: A polar diagram of a Yagi showing -22dB side lobes at about 58°.

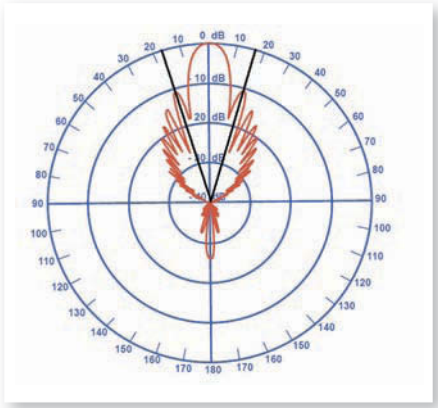

Fig. 2: A polar diagram of a more directional Yagi showing -12dB side lobes at about 17°.

Table 1: Antenna gain usually expressed in decibels (dB) relative to a dipole (dBd). The table shows what this means in reality.

3dB	=	2 times
6dB	=	4 times
9dB	=	8 times
10dB	=	10 times
20dB	=	100 time

which isn't attainable in practice.

Conversion: It's possible to convert dBi to dBd. dBd = dBi: 2.15, or if you prefer it round the other way dBi = dBd+2.15.

So an antenna shown as having 5.15dBi gain has the same gain as one specified with 3dBd gain.

I think the two ways to describe the antenna gain is a bit like seeing prices in two different currencies. To make a meaningful comparison you need to convert to a common currency!

Polar Pattern

A polar pattern is usually a form of graph plotted from the antenna* showing the strength of the signal relative to the direction of maximum radiation. It is important to note that a polar diagram does **not neccessarily** show the **absolute** gain of the antenna.

In the first example **(Fig. 1)**, the antenna is pointing North. It can be seen that to the East and West almost no signal will be heard. From the South, the signal will be about 18dB weaker than it is to the North. This is known as the front-to-back ratio. Notice that there are side lobes at about 58° East and West, where the signal is 22dB weaker in comparison with the North.

The second polar diagram **(Fig. 2)** shows a more directional antenna, than that shown in Fig. 1. This antenna has a higher front to back ratio of 26dB. Notice that there are many side lobes, including one at about 17° which is only about 12dB weaker than the main beam. With this antenna, it would be possible to point the beam 17° off a station and perhaps work it about 2 S-points weaker than if the main lobe of the beam was pointed at the station.

Antenna Bandwidth

The bandwidth of an antenna is an important consideration, particularly on some of the higher bands.This is because of the size (in frequency) of the Amateur band, the performance of the antenna may not be the same across the whole band.

A limited bandwidth is not necessarily a bad thing, as it can result in greater gain in the part of the band the antenna is designed for. As with many things, it all depends on what you want to do with the antenna. Bandwidth can be expressed in two ways. The first is the frequency range over which the standing wave ratio (s.w.r.) is below a certain amount.

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For example an antenna might have an s.w.r. below 1.3:1 between 430 and 435MHz. In this example, if you use the antenna at 438MHz, you could get an s.w.r. above 3:1 – which might impact on the maximum power that a transmitter will deliver. Sometimes this may be shown as a graph.

The second way of expressing bandwidth is to give the frequency range where the gain of the antenna falls by no more than 1dB.

The antenna's various radiation patterns can be evaluated by using a low power transmitter, on a special equipped test range. The necessary measurements ('plots') are then transferred to a special graph. The following website also explains antenna reciprocity when receiving/transmitting: See* ***http://en.wikipedia.org/wiki/Radiation_pattern*

Weight & Wind Loading

The wind loading of antenna is also an important consideration. The greater surface area the antenna has, the more it will be blown about in the wind! Thinner round booms, with thinner elements generally give the lowest wind loading.

Effective wind loading is measured in square metres, with a value of 0.1 to 0.2 square metres being quite typical. Note that this can vary depending on whether the antenna is mounted horizontally or vertically.

A more realistic measure of wind loading is to express this as a loading at a given wind speed. Note that the loading can increase significantly if there is ice or snow on the antenna.

The weight of antenna can be an important consideration. Generally speaking, more robust antennas tend to weigh more. However, less heavy antennas may be less strong.

At the end of the day, it is the combination of an antenna's wind loading and its weight that needs to be considered. When an antenna is blown around in the wind, it puts strains on whatever is being used to hold it up.

If the antenna presents both a high wind loading and is heavy, it will put a greater strain on the support arrangements. This can have implications for what sort of antenna support and rotator is used. (I will be looking at masts and rotators in coming months).

The Antenna Connector

Most v.h.f. and u.h.f. antennas have either an 'N' socket or a SO239 socket – this means that an 'N' plug or PL259 plug is required on the end of the coaxial feeder. Some older or cheaper antennas may require the centre and screen on the feeder to be screwed to terminals inside a plastic box. Whichever technique is used, make sure to seal the connection with self-amalgamating tape to keep it water-tight.

Feeding & Matching

Many, though not all, v.h.f. and u.h.f. antennas require some sort of matching arrangement. The most common is the gamma match (**Fig. 3**). There are two reasons for adopting this technique, the first is that it means that on a traditional Yagi antenna the driven element can be a single metal rod centrally connected to the boom, and not cut into two insulated legs. The other reason is that it matches the low impedance of the antenna to the impedance of the feeder.

The Sleeve or Bazooka balun is another common matching arrangement, which Tonna, the French antenna manufacturer, use on many of their antennas. In the classic approach this consists of a quarter wave tube attached to the outer of the coaxial cable a quarter-wave from the antenna. Tonna adopt a slightly different approach of connecting the tube to the boom a quarter-wave along the boom (**Fig. 4**).

Note: It's worth remembering that a balanced antenna fed with unbalanced coaxial feeder can produce a distorted polar pattern if not properly matched.

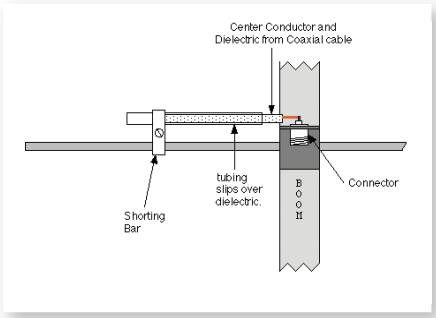

Fig. 3: A Gamma match.

Fig. 4: A sleeve or bazooka balun as implemented by Tonna on one of their 432MHz antennas. Note the use of self-amalgamating tape to waterproof the connections.

Fig. 5: A 'Halo' antenna.

Having looked at a number of antenna properties – it is time to move on to look at some common v.h.f. and u.h.f. antennas.

The Halo

If space is at a premium, a halo loop antenna (**Fig. 5**) can be recommended. A halo is an omni-directional antenna with horizontal polarisation. This form of antenna uses a gamma-match.

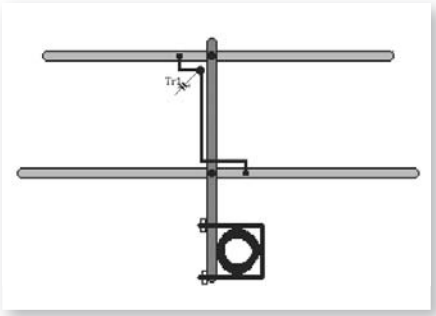

Fig. 6: The HB9CV antenna is compact and has an excellent front-to-back ratio.

Fig. 7: Three Yagis for the 1296, 2320 and 432MHz bands (top to bottom).

Fig. 8: A ZL-Special antenna, made popular by the late Fred Judd G2BCX in his many articles in PW.

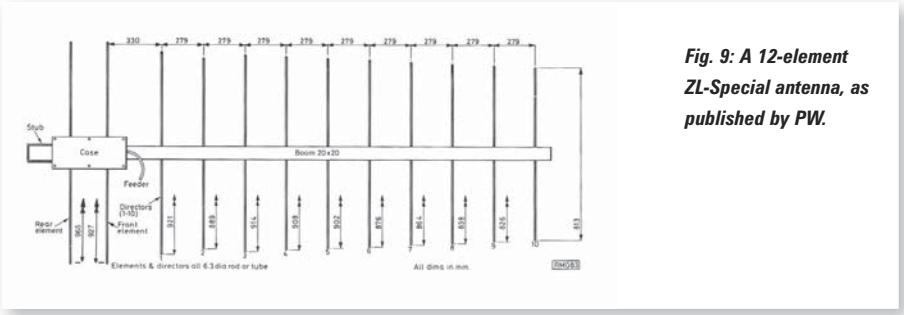

Fig. 9: A 12-element ZL-Special antenna, as published by PW.

The HB9CV

Another good choice where space is at a premium is the 2-element HB9CV antenna (**Fig. 6**), which can be mounted either horizontally or vertically depending on the polarisation desired. They also have the advantage of a small amount of gain and directional properties. In particular the front to back ratio is about 20dB.

The HB9CV design may be a particularly good choice for those with limited space wanting to operate on the 50MHz or 70MHz bands.

The Yagi

The traditional Yagi is available in numerous versions **(Fig. 7)**. As a general rule, for the same number of elements, the longer the boom on a Yagi, the greater the gain. Most Yagi antennas use a gamma match or a sleeve balun.

The ZL Special

At a first glance, the ZL Special antenna **(Fig. 8)** looks like 'normal' Yagi antenna. They have the advantage of high gain on a compact boom. The design, made popular in the UK by a series of articles in *PW* by the late Fred Judd G2BCX, makes use of a phasing line to feed two driven elements (**Fig.s 9** & **10**).

The G2BCX design was featured in *PW*'s *Out Of Thin Air* series of books. **Note:** If you decide to build a ZL Special yourself – make sure that the phasing and matching arrangements are properly waterproofed.

Building & Buying

Everything from simple dipoles to multi-element Yagi antennas is available commercially. Building antennas for these bands is something that can be tackled by most Amateurs with fairly basic hand tools.

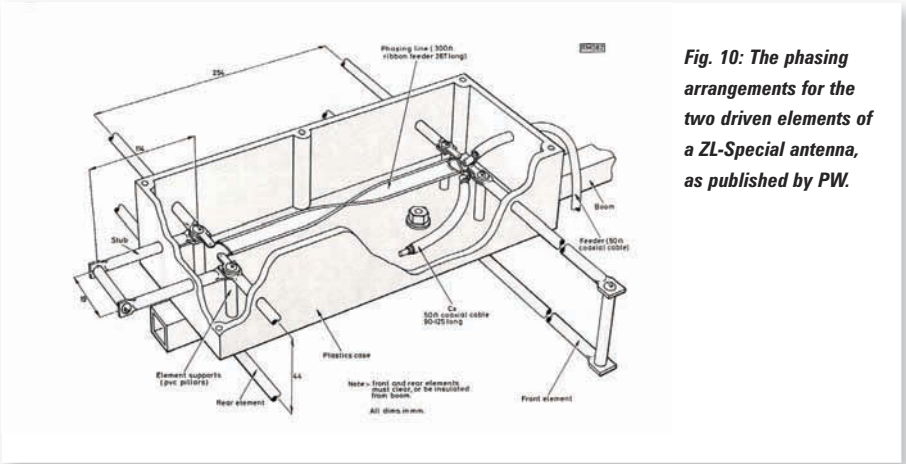

Fig. 10: The phasing arrangements for the two driven elements of a ZL-Special antenna, as published by PW.

Metal for the booms and elements can be obtained from many sources including some larger DIY stores, specialist metal suppliers (often found on industrial estates).

There are also suppliers of aluminium tube, square section and rods on the internet if you prefer to order the materials by post. Besides making antennas, *PW* advertiser Sandpiper also sell various fixings for connecting elements to booms and caps for the end of booms etc.

Avoid Indecision

Having looked at the variety of antennas this time, I urge *WN?* readers not to be put off by indecision from buying or building antennas for working s.s.b. and c.w. on the v.h.f. or u.h.f. bands! As with the h.f. antennas, v.h.f. and u.h.f. antennas are all compromises. The good thing is that in comparison with the h.f. bands, antennas for the v.h.f. and u.h.f. bands are smaller and the compromises are correspondingly much smaller.

At the end of the day, I believe that any of the antennas I have described will give better results than a vertically polarised omni-directional antenna! Cheerio until next time!

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Tim Kirby G4VXE's

the world of vhf

Incorporating VHF DXer

This month Tim Kirby G4VXE starts off his round-up of activities with news of yet another country on 70MHz!

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Twitter id: G4VXE

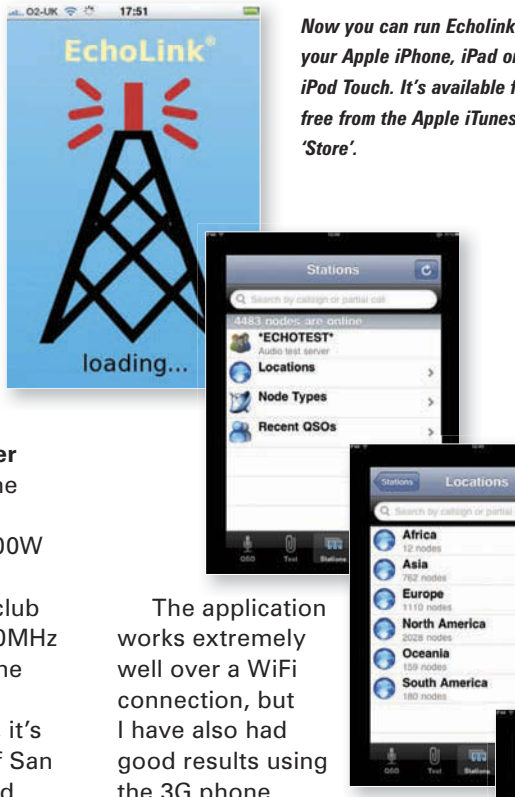
Welcome to the world of Amateur Radio above 30MHz! My esteemed predecessor, **David Butler G4ASR** commented recently that barely a month goes by without an announcement of a new country being given access to 70MHz. This month, it's good to be able to report that the Republic of San Marino (T7) is now officially on 70MHz.

On his blog, *PW* author **Roger Lapthorn G3XBM** wrote that The San Marino authorities have authorised 70MHz operation (100W max) until October 31, 2010, on 70-70.5 MHz. The San Marino club station, **T70A** was worked on 70MHz by many people on Sunday, June 20th.

So, if 70MHz is open to Italy, it's worth looking carefully to see if San Marino – completely surrounded by Italy and one of the European microstates, is active. **Toni Ceccoli T77C** is a very experienced DX operator who enjoys the v.h.f. bands, so I'm hoping to find him making lots of quick fire QSOs over the summer. Toni made San Marino very accessible on 50MHz when the country first had access to that band, so I'm sure he'll be doing the same for 70MHz.

Echolink On iPhone/iPod

If you have an iPhone, iPad or iPod touch, I wonder if you have discovered the *Echolink* application that you can run on these devices? The good news is that the application is free and may be readily downloaded from Apple's 'App Store'. It turns your phone into an *Echolink* client, which can connect to other *Echolink* stations, repeaters or conferences.



Now you can run Echolink on your Apple iPhone, iPad or iPod Touch. It's available for free from the Apple iTunes 'Store'.

The application works extremely well over a WiFi connection, but I have also had good results using the 3G phone network as well. One morning, I worked **Des Kiely G0RBD** on the GB3TD repeater and was telling him about the *Echolink* client for the iPhone.

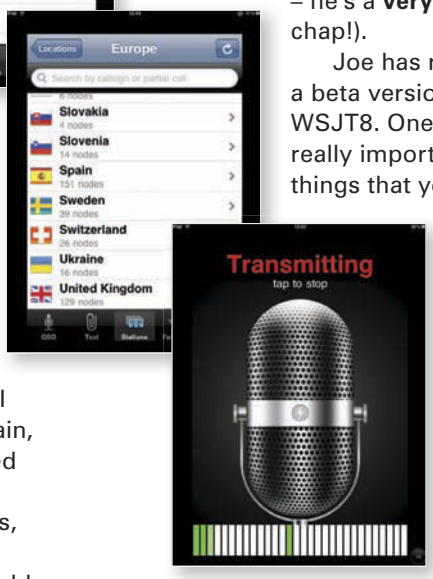
Des and I remembered that the GB3FH/GB3ZY 50MHz repeater systems near Bristol have an *Echolink* gateway, so as I walked from the car to get my train, I connected to GB3FH and worked Des! Occasionally the audio will pause if the 3G connection falters, but it seems to work pretty well.

Now, I know that there's probably a few of our readers tutting at me! Its not real radio, you're probably saying. And perhaps you're right! On the other hand, though, if having the *Echolink* clients on our iPhones or iPods makes us connect up to the network and make some v.h.f./u.h.f. repeaters around the globe spring into action – then is that really a bad thing? Our hobby changes all the time and we have to move with it. So, if you have an iPhone, iPad or iPod Touch then why not give it a go!

Weak Signal Working

If you're interested in weak signal working, perhaps using meteor scatter or moonbounce (EME) or even long distance scatter paths on the v.h.f. bands, you'll almost certainly have come across the *WSJT* software written by **Joe Taylor K1JT** (incidentally and importantly, he was awarded a Nobel Prize for Physics in 1993 – he's a **very smart** chap!).

Joe has released a beta version of WSJT8. One of the really important things that you should note is that WSJT8 is not compatible with WSJT7. So, before attempting any contacts, you need to be sure what version of the software you, and the distant station is using!



Here's what Joe writes about the WSJT8 release, "WSJT8 is an experimental version of the familiar

weak-signal communication program WSJT. It offers new protocols or modes optimised for meteor scatter, ionospheric scatter, EME, microwaves and QRP at h.f. Like the modes in previous versions of WSJT, the new ones are intended for making minimal QSOs, not for rag-chewing. The WSJT8 modes are not compatible with those in WSJT7. To use the new modes, transmitting and receiving stations must both use WSJT8."

Joe continued, "My working hypothesis is that the new modes in WSJT8 offer significant advantages over those in WSJT7 – and that it will probably make sense to recommend a complete switch-over some months from now. For that transition to happen in an orderly fashion, we'll need a widely held consensus that the change is for the better.

If one of the new modes doesn't live up to present expectations, or for another reason it's decided that some feature of WSJT7 should be retained, that wish can probably be accommodated. Input from users will be important following the initial beta release of WSJT8. I need to know what works, what doesn't work, what should be improved, and what enhancements should be given highest priority. All comments and suggestions will be greatly appreciated!"

Thanks for the information Joe – and I'm sure users of your new software will provide the feedback you require.

The QSL of Bachir Taleb 7X2RF – worked this month from the UK on 144MHz.

Taking A VHF/UHF Holiday?

If you're lucky enough to be going on holiday over the summer period, I wonder if you are considering taking some radio gear with you? Over the years I've taken varying amounts of gear with me on holiday. I tend to take less now than when I was first licenced, but I still find it very enjoyable to take some simple gear with me.

If you have some v.h.f./u.h.f. portable gear that you can take – then that will be perfect. It may add to your enjoyment of the holiday to perhaps take a hand-held transceiver with you on walks, maybe up hills or along the cliffs. Such places are very often great v.h.f. locations – where the land just falls away from you in one or more directions. That should give you a nice low radio horizon and hopefully a decent range, even with simple v.h.f. f.m. gear.

If you're on or near the coast, then it's always fascinating to see what you can hear from 'over the water' – and likewise, from the top of hills, a scan of the v.h.f./u.h.f. repeater and simplex channels will generally reveal something interesting. If you have a portable rig, such as a Yaesu FT-817 which will cover 50MHz, then it's worth taking it and a small whip with you. With any luck, you will catch some Sp-Es over the holiday period and make some contacts around Europe. I've found that 3W of 50MHz c.w. will go a long way.

Many years ago, in 1988, as part of the **Squarebashers VHF** expedition to Gibraltar, we managed to work across the North Atlantic from the top of the Rock of Gibraltar to VE1YX in Canada with around 10W and a really basic wire dipole on 50MHz! So, give it a go and please, don't forget to let us know how you get on.

Band Reports 50MHz

Next, it's time to look at the band reports, starting off with 50MHz. Chatting to **Des Kiely G0RBD** recently, we had to agree that it seemed like that there had been very few days in the last month when 50MHz hadn't opened at some point during the day.

Indeed, there have been lots of European openings – but also a number of more distant DX openings too. Some stations have reported openings into North America and the Caribbean on many days – some of them, Des noted, seemed to have gone straight over our heads from the Netherlands to the Caribbean – without 'touching down' in the UK.

Using around 50W and a vertical antenna, some of my more interesting contacts have been UW8SM (KN28) and YL3FT (KO26) on June 9th, TA2ZAF (KM69) on June 14th. Additionally, and once again, it's been a good month for 50MHz mobile.

On Sunday June 6th, I was very interested to hear EI9FBB/P (IO51) coming in as I was driving around. Hearing very short skip like that, generally indicates a very high maximum usable frequency (MUF). Generally if I hear EI, GM, GI, F, ON or PA on 50MHz Sp-Es, I hastily tune to 70 or 144MHz – with the hope that there will be some Sp-Es around!

Next morning, Monday June 7th, I could tell the band was open somewhere as I drove to the railway station at around 0615z. I called "CQ" on 50.150MHz and was delighted to be called by OK1VEI.

I then tuned down to the c.w. end of the band to hear OK1RD working an enormous pile-up of JA3/JA5 stations. I listened "oh-so-hard" to see if I could hear any of the Japanese stations, but if they were making it this far into Oxfordshire,

they weren't making it through all the TV buzz – at least not on my quarter-wave whip!

Monday, June 14th was another day when propagation started early. I called "CQ" on 50.150 as I was driving to the station and was called by SP2DNI (JO94) in Poland.

Graham Boor G8NWC reports that he's made 50MHz contacts to Poland, Hungary, Croatia, Sweden, Finland and Norway using a dipole at about 4.5m (15ft) and 75W.

Ian Kennard, G4PDS writes from Devon, "I had a fantastic time on the 50MHz UK Actvity Contest (UKAC) last night. This isn't a great v.h.f. QTH, but I usually work a few in the UKACs. However, last night I decided to call 'CQ' for a while as conditions seemed good early on with plenty of short skip Sp-Es. Anyway, managed to work 72 stations in the allotted time and it must have been the most fun I've had on the radio for years. Conditions must have just suited my set-up from here. Best DX was UR5MID at 3024km"!

Nice one, Ian, and that's the great thing about Sp-Es. When you're in the right place, it really is a case of – 'If you call CQ and they'll come back'.

The 70MHz Band

Using my rather meagre 7W of c.w. and s.s.b. and a vertical antenna, I've been delighted to catch several openings over the month. On June 13th I worked S51DI (JN76) when he was coming through early at 0756z. Interestingly, at the same time, I could hear 9A1Z working a slightly longer path into Scotland.

Later in the day, I worked I0JX (JN61) and OM3CLS (JN99). June 24th was perhaps my best day on 70MHz so far. I worked IZ8DWF (JM78), IF9/I2ADN (JM67), I5OXT (JN52), YO9HP (KN35), IZ5EME (JN52), IW0FUK (JN61) and I6BQI (JN72). I didn't get it all my own way though! I heard IS0AWZ and ES1CW calling CQ but wasn't able to attract their attention.

I've also got my very own Wouxun KG699E for 70MHz f.m. now and am looking forward to making my first QSOs with it. I know it works, but I've only had one of those 'across the shack' QSOs with it so far.

Ian G4PDS wrote that his transverter was temporarily out of action, there having been an unfortunate (though not uncommon, in my own experience) incident transmitting into an open circuit.

Des G0RBD reports that **Ronald Pincho ZB3B** favours 70.250 rather than 70.200MHz which is a noisy frequency in Gibraltar.

The 144MHz Band

Reg Woolley, G8VHI wrote on his Facebook page that he'd worked Algeria on 144MHz. On June 10th the band was good in the direction of North Africa and the Mediterranean. Reg had the presence of mind to tune to 145.500MHz, on f.m. – yes, f.m.! He was rewarded with a QSO with 7X2RF, who only works f.m. So, when you next hear Sp-Es on 144MHz, don't forget to check the f.m. channels if the propagation is in a direction where activity is sparse – you may just get a very nice surprise!

No 144MHz Sp-Es to report at G4VXE, although on June 20th, I heard **Radoslav Nikolo LZ2ZY** (KN10) in Bulgaria for a couple of minutes. He was working into Belgium at the time and I didn't hear him work any UK stations. I heard G4MKF, close by, work someone I couldn't hear at all! That's Sp-Es for you. Though I don't generally expect to work DX from my 145MHz mobile station, I was surprised to have a text as I was driving to work on June 17th from **Paul Bennett 2E0BHA** who was mobile in Manchester and was hearing my QSO on the GB3WH repeater in Wiltshire!

John Blick, MM6KSJ sent a very interesting E-mail about his v.h.f. activities from the Island of Bute in Scotland. John is delighted with his new Alinco DJ-C7 hand-held and has made some excellent QSOs across the water to the mainland with as little as 300mW.

John hoped to find some QSOs on f.m. during the *Practical Wireless* 144MHz QRP contest but was disappointed. As I commented to John, the vast majority of contest activity is on s.s.b., but the wise contest operator will often call "CQ" on f.m. to try and 'mop up' stations that wouldn't be available on s.s.b.

Certainly it was unfortunate for the contest operators who didn't do as I've suggested – John's locator square would probably have been a useful multiplier! All was not lost, though, John had some very enjoyable QSOs via the *Echolink* repeater into the USA after he gave up on the contest.

John also enjoys APRS and uses the Yaesu VX8E. He wonders what people made of his 'track' when his GPS went briefly haywire and reported him travelling at 602m.p.h. and at an altitude of 22,615 feet. (Confused him for a passing transatlantic jet, I'm guessing!).

The 432MHz Band

No reports this month for 70cm this time, although I've heard the occasional bit of morning tropo on 433MHz as I've driven to work. I normally work through the Swindon repeater GB3TD with the output on 433.075MHz, but a couple of times this month, notably during the tropo on June 17th, I have heard the Northampton repeater GB3NH. Though this is hardly DX – it gives you a sense of feeling connected to what's happening on the bands, which I find enjoyable.

Getting in touch

The more news I have from you the better! Don't forget, stories of interesting v.h.f. QSOs are always welcome – it doesn't have to be DX! E-mail me, find me on Twitter (G4VXE). Or write me a letter! I look forward to hearing from you. So what's your world like on v.h.f.?

73, Tim

I hope you have enjoyed *The World of VHF*. However, to make it really work well, I really need to hear from **you**, so I hope readers will take the opportunity to get in touch. You can E-mail me **tim@g4vxe.com** or find me on Twitter where my id is G4VXE. If writing a letter works better for you, then you'll find my address at the top of the article. I look forward to hearing from you!

Phil Cadman's

valve & vintage

The traditional brown dustcoat indicates that Phil Cadman G4JCP is in the shop this month – chatting about his favourite technology!

Hello and welcome to another 'hot' *Valve & Vintage* (*V&V*) 'Shop'. I hope you're all making the most of the good weather – erecting new antennas and such – before the inevitable return of the cold, wind and rain.

Before moving on to my main topic, I have a point to mention from last time. You may remember that in my July column I asked if anybody knew what the letters **AIPRE** stood for? Two replies were quickly forthcoming, and both concurred that the letter 'A' stood for 'Associate' – then the disagreements began!

The first E-mail I received was from **Les Rix G3XJW** who said that IPRE likely stood for the Incorporated Practitioners in Radio and Electronics, a trade body from the 1950s and 1960s. Shortly afterwards, **Reg. Irish G4LUF** E-mailed to say that he thought it stood for the Institution of Practical Radio Engineers. So, I needed a casting vote and it came in the form of a telephone call from **Owen Dyson Jones GW3DRV**.

Dyson, he's known by his second name as is the custom in parts of Wales, agreed that it stood for the Incorporated Practitioners in Radio and Electronics and he had been a member many years ago. That was that, until a second telephone call from **John Gray** in **Corby –** who said he thought it stood for the Institution of Practical Radio Engineers. Confused? I certainly was!

Fortunately, a further call from GW3DRV resolved the issue: the Incorporated Practitioners in Radio and Electronics had once been known as the Institution of Practical Radio Engineers. So, the two institutions were actually one and the same, only the name was changed at some point. I'm glad that's sorted out. Unless somebody knows differently....!

Naturally, when Dyson Jones introduced himself I couldn't help but think of a certain manufacturer of vacuum cleaners. However, Dyson assured me that his name had nothing to do with domestic cleaning appliances and everything to do with astronomy!

The doctor who delivered the future GW3DRV was an amateur astronomer, as was Dyson's Grandfather, and the two gentlemen often compared notes. Immediately after attending the birth, the doctor suggested the newborn be called 'Dyson' – after the Astronomer Royal Sir Frank Watson Dyson – before rushing up the nearest Welsh mountain to watch a total eclipse of the Sun!

In early May I received a letter from **John Shaw G3ZKZ** who asked me to comment on a two-valve regenerative receiver he'd built and had found less than satisfactory. In fact, its performance was way below what he was expecting. John had made modifications which had improved things and was now interested in what may have been wrong with the original circuit.

The design in question was from the October 1946 issue of *PW* and it's reproduced in **Fig. 1**. At first glance it looks like a perfectly normal regenerative detector followed by a single stage audio amplifier. What could be wrong? Well, for one thing, the regenerative detector has no audio load!

At first I was convinced there'd been a drafting error, but even a cursory glance through my library of circuits revealed similar examples. The regenerative detector is such a simple circuit, how is it possible to get it wrong, or at least, less than optimum? Being perhaps a little cynical, there's only so much you can do with the design of a regenerative detector. With many magazine pages to fill each month, varying the circuit simply to make designs 'look' different must have been a frequent ploy by authors.

I've featured the regenerative detector many times, but I don't think I've ever covered its operation. Because despite its apparent simplicity, the operation of the circuit is relatively complex. Indeed, depending on how it's operated, the single valve may be doing three – maybe four – things at once. I'll try to explain what happens in some detail, however space constraints mean that I shall still have to gloss over some of its subtleties.

The Regeneration Circuit

First, let's deal with the 'regeneration'

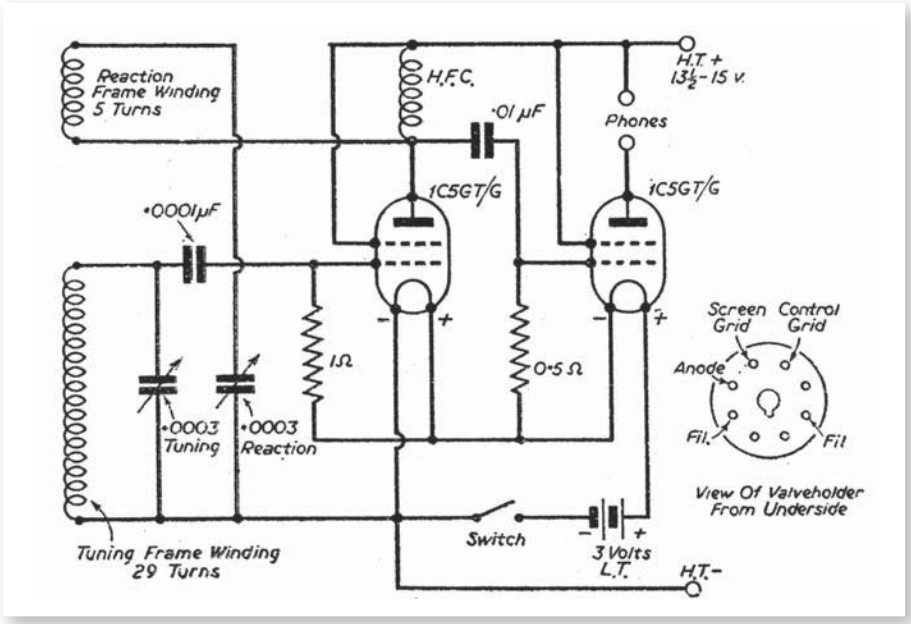


Fig. 1: The circuit from the 1946 **PW**. *There were two mistakes in this original drawing, the 1Ω resistor should be 1MΩ and the 0.5Ω one should be 500kΩ.*

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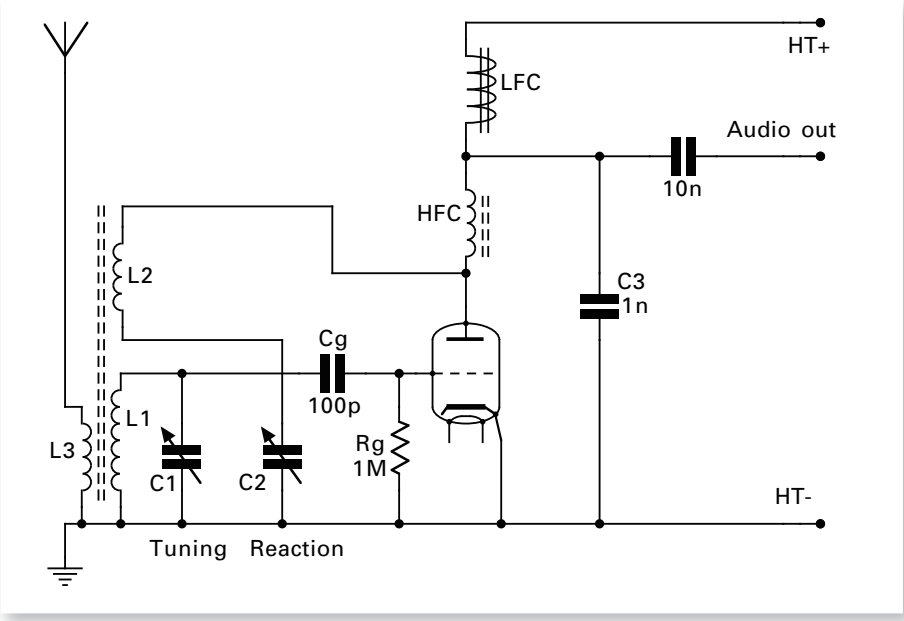

Fig. 2: The regeneration section of the circuit.

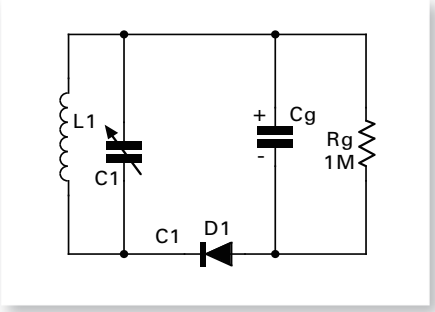

Fig. 3: Circuit of a simplified leaky grid detector.

part of the circuit. Please take a look at **Fig. 2**, which shows a conventional regenerative detector. Radio frequency (r.f.) energy gathered by the antenna is inductively coupled – via L3 – to the main tuned circuit, L1/C1. This r.f. signal is then coupled to the grid of the valve via Cg, and will cause a corresponding r.f. variation in anode current.

I'm using terms like 'r.f. voltage' and 'r.f. current' simply to distinguish between the various components of the voltages and currents present at different points around the circuit. For instance, the anode current comprises three components: an r.f. component, an a.f. component and a steady 'd.c.' component.

But for now, all we need to note is that the r.f. component of the anode current finds its path impeded by the r.f. choke, HFC (typically 1mH). However, some current finds its way through L2 depending on the setting of C2. As the capacitance of C2 is increased, more r.f. current will flow through L2.

Providing L2 is connected 'the right way round', the magnetic field set up by the current in L2 induces a voltage in L1 in phase with the received signal. This is positive feedback, and it serves to increase both the gain and selectivity of the detector. Too much feedback and the detector will oscillate.

Stripping away the components which make regeneration possible, we're left with what's known as a leaky grid detector, a simple form of which is shown in **Fig. 3.** Please note that diode D1 **doesn't physically exis**t, but it **appears** to be present because the grid and cathode of the valve behave just like a diode in this situation.

The illustration of **Fig. 4** shows a slightly different way of drawing the circuit in Fig. 3 with the valve and transformer omitted. The circuit is now recognisable as a simple half wave rectifier with Cg as the reservoir capacitor and Rg as a load resistor.

Any r.f. voltage induced into the tuned circuit L/C1 is rectified by D1, and the voltage across Cg will ultimately approach the peak value of the induced r.f. voltage (neglecting the forward voltage drop of the diode). When fed with a steady r.f. carrier, the voltage across Cg will be proportional to the amplitude of the carrier.

Going back to Fig. 3 and mentally removing D1, you'll (hopefully) see that the grid of the valve now has a steady negative bias voltage. Remember, as far as 'd.c.' is concerned, L1 is a short circuit. When no signal is being received there's no voltage induced in L1/C1, and so there's no negative bias on the grid, hence the anode current (and its gain) is at a maximum. Tune into a carrier and the negative grid bias voltage developed across Cg will cause the anode current to fall.

If the received signal is amplitude modulated, as in **Fig. 5**, then the bias voltage will vary in sympathy with the modulating waveform. The values of Cg and Rg should be chosen so that the their time constant (C*R) is long compared to the period of the carrier frequency. So, for a carrier frequency of (for example) 1MHz, the time constant should be much greater than 1μs. Typically, Cg is 100pF and Rg is 1MΩ, giving a time constant of 100uS. Well, 100μs is much bigger than 1μs, so those values are satisfactory.

However, there is another consideration. For the voltage across Cg to faithfully follow the envelope of the carrier - and hence the modulating audio waveform - the time constant of CgRg must be short compared to the period of the highest modulating frequency. Taking 5kHz as an example, the CgRg time constant is certainly less than 200μs, so it should be okay. That said, there will be some attenuation of the higher audio frequencies.

The net result is that the instantaneous (a.f.) anode current follows any amplitude modulation

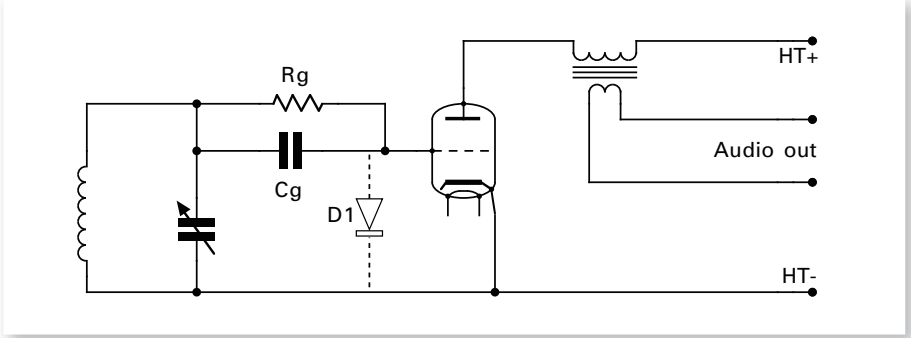

Fig. 4: The 1946 circuit, to show one of the valve's detecting functions.

of the carrier, and the average (d.c.) anode current will be inversely proportional to the amplitude of the un-modulated carrier. In Fig. 3 the transformer will not respond to the steady anode current component but will respond to the a.f. variations in the anode current.

In Fig. 2, where the signal is capacitively coupled to the next stage, the low frequency choke (LFC), which is typically 10H or more, appears as a high impedance to the a.f. variations in anode current while allowing the d.c. component of the anode current pass unhindered. The (optional) r.f. bypass capacitor C3 is there to remove any residual r.f. that 'sneaks past' the r.f. choke, plus it adds a little top-cut which may make listening more pleasurable.

When the detector is just oscillating, which is necessary for receiving Morse (c.w.) transmissions, the detector performs two additional functions. Firstly, it oscillates and so functions as a beat frequency oscillator (b.f.o.). Secondly, it 'mixes' the b.f.o. signal with the incoming c.w. and produces an audible beat note. It may be debatable whether this is one function or two! – but either way, the regenerative detector is an astonishingly simple yet extraordinarily efficient piece of electrical circuitry.

So – What's Wrong?

So, what's wrong with the circuit John G3ZKZ tried? Well, look at the anode circuit of the first valve: it has nothing to block the a.f. component of the valve's anode current. The r.f. choke - HFC – is (almost) a short circuit at audio frequencies, and so the amplitude of the detected audio signal fed to the second valve will be tiny.

John wired the primary of a small mains transformer in series with HFC, as in Fig. 2, and the receiver performed much better. As low frequency chokes are a bit thin on the ground these days, using the primary of a small mains transformer (or valve audio output transformer) is an acceptable substitute.

There's one further problem with the circuit: the r.f. signal present at the detector anode is fed directly to the grid of the audio amplifier. Given that this valve has virtually no negative grid bias (the grid resistor is returned to the negative end of the filament, not the h.t. negative point), it will behave as a leaky grid detector in its own right.

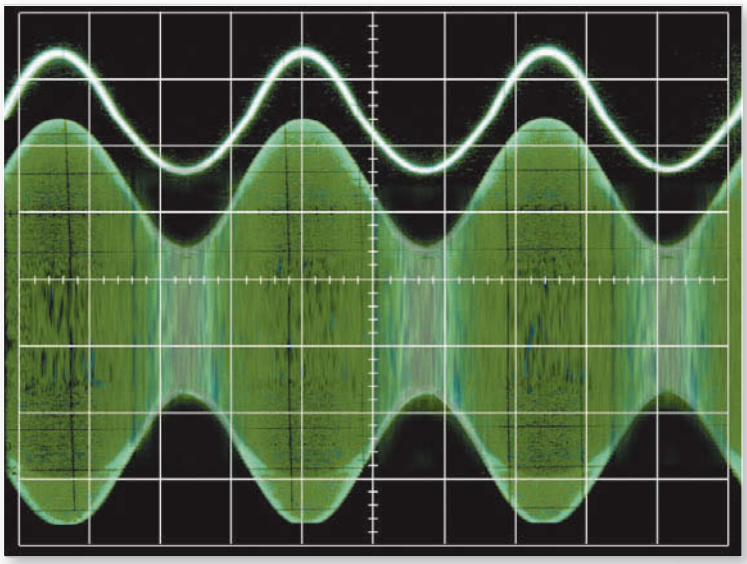

Fig. 5: The valve's bias voltage varying in sympathy with the received waveform (upper trace), which may be considered as an a.f. signal to the valve. The original incoming a.m. radio signal (lower trace) has equal and opposite a.f. signal level variations imposed on the r.f.

Its CgRg time constant is far too long though. So what is the second valve doing? Is it an audio amplifier or is it a detector? (Your guess is as good as mine!).

Despite Fig. 2 showing the 'classic' regenerative detector circuit, there are several acceptable variations. Very often the resistor Rg is connected between the grid of the valve and HT-, rather than directly across Cg. This is reputed to be the better connection.

In the interests of economy (and because l.f. chokes are bulky items), it's common to find a resistor used as the a.f. anode load. This is fine but the supply voltage needs to be raised to compensate for the voltage dropped across the resistor.

Where size and/or cost are paramount, a single resistor can replace both a.f. and r.f. chokes. However, this – like the 1946 *PW* circuit – allows r.f. signals to reach the grid of the audio amplifier stage. Under such circumstances the audio stage must have sufficient negative grid bias so as to prevent the stage behaving as another leaky grid detector.

Several Examples

As I said earlier, I've found several examples where the detector has no a.f. load. One such circuit I even found in the *Denco MaxiQ Coil Handbook*. At first glance it looks okay as there's a resistor seemingly in place of the l.f. choke. However, a 100nF (0.1μF) capacitor de-couples the 'business end' of this resistor to earth, effectively shorting any audio to ground!

I find it difficult to believe that **all** the circuits published in magazines and books over the years worked to an acceptable degree. Some clearly did work exceptionally well, while others must have been poor in the extreme. Did they get published just to provide articles for the insatiable constructional appetite of radio constructors in the 40s, 50s and 60s?

I'm always suggesting constructors try old circuits, but the problems with the circuit G3ZKZ tried has now made me very much aware that some old circuits may give less than satisfactory results. My thanks to G3ZKZ for raising this issue.

Final Long Shot

And finally, this (I admit) is a bit of a 'long shot'! Amongst my back issues of *PW* are some from the late 1960s which have the name '**Grenfel**' written on the back covers. Clearly this was written by the Newsagent to tell the Paper Boy (or Girl?) where to deliver the magazine. In the January 1968 issue I found several Postal Order counterfoils: four were dated 16 January and one was dated 31 January 1968.

From the value of the Postal Orders and from notes written on various pages within the magazine, it's possible to work out what Mr. Grenfel – or perhaps Master Grenfel, this was just after Christmas – ordered: Five ex-equipment printed circuit boards from G.W. Smith & Co., Six BY100 rectifiers and eight OA81 diodes from BiPak Semiconductors, a mains powered battery eliminator (for PP9 batteries, etc.) from Electronics (Croydon) Ltd., and three valves ECC85, ECH81, DL94 - from Readers Radio.

Is it possible that Mr. Grenfel still reads *PW*? I'd love to know!

73 Phil.

Carl Mason's

hf highlights

Share your news, views and reports with fellow readers. Reports to Carl by the 15th of each month please.

Carl Mason GW0VSW presents his monthly round-up from your h.f. reports. Reports and photographs by the 15th of the month please.

Welcome to this month's high frequency (h.f.) column where I feel it necessary to bring up an awkward subject. I'm sure there are many of us who have witnessed bad behaviour or operating on the h.f. bands and over the past decade or so it does seem to have got worse!

Bad behaviour is a subject that has been mentioned in *PW* more than once over the years and by many of our regular reporters. In 2008 **John Devoldere ON4UN** and **Marc Demeuleneere ON4WW** decided to write a document entitled *Ethics and Operating Procedures for the Radio Amateur*.

Their intention was to produce a universal guide on operating and operating procedures for newcomers and old-timers alike. This document was to be accepted by the IARU Administrative Council in 2008 as representing the point of view of the IARU on the subject. Two years later the manual has been translated into more than 25 languages with more translations following soon.

To help achieve easier access to all of the existing versions, the authors have set up a new website **www.ham-operating-ethics.org** where you can download the PDF files directly. You are invited to download any version of the document and to pass on copies to your friends. Don't forget, t**his is not a document** for newcomers or DXers only – instead it's a document for **all** operators and is well worth a read. Anything that encourages better operating on our bands has to be a good thing!

Austrian Military Radio Society

The Belgian Congo was a former colony which gained its independence from Belgium on the June 30th 1960. The newly formed 'independent' Democratic Republic of the Congo had over 80 million inhabitants living in it, though it lacked any kind of infrastructure and with several independence movements opposing each other. So, it was inevitable that armed conflict would break out and this was to bring about the first ever large-scale United Nations peacekeeping mission.

As Austria had established its 'new' armed forces it contributed a contingent with both men and materials for a field hospital as part of this UN peacekeeping force for the Republic. Almost immediately after that field hospital had become operational – all its personnel were to be taken as hostages for a few days. Due to the lack of any form of communication facilities the Austrians were therefore cut off from the rest of the world for this time and the powers that be decided that their armed forces should never be put in such a situation again!

In the debates that followed, the military brass noted that Colonel M. Milborn who was the Commanding Officer of the *FliegerTelAbteilung* or Aviation Communications Unit, was also an enthusiastic Amateur Radio operator. They quickly came to the conclusion that the Austrian Military already had the required experts amongst its ranks as there were already a number of Amateur Radio operators serving in the military.

The next step was to bring them together in an organisation of their own and the **Austrian Military Radio Section** or AMRS was formed. It created a '10th' provincial Amateur Radio society in addition to the nine provinces that already existed in the country. All ten societies are part of the *Österreichischer Versuchssenderverband* or ÖVSV, which is the umbrella organisation for all Amateur Radio operators in Austria.

Shortly after this, AMRS local chapters were to be founded in many barracks and all were to be supplied the necessary radio equipment. All training was conducted during duty hours and operators were encouraged to pursue their 'hobby' when off duty. In 1973 the first large-scale international operation was conducted to support the UN Forces in Cyprus (UNFICYP) - /5B4 and it was during this period that the operation of the 'Heimatfunkstelle' which was a specially equipped military short wave station for long-range communications was put to use and turned out to be a great bonus.

The next

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Geoffrey Pendrick M5GAC operated as MM5GAC/P where he made 145 contacts with 15 countries.

operation, for AMRS, was then conducted in support of AUSBATT an Austrian battalion serving with the United Nations Disengagement Observer Force (UNDOF) on the Golan Heights - /YK between Israel and Syria.

In 1991 the Austrian Military Radio Section was renamed the **Austrian Military Radio Society**. The Austrian Military Radio Society is now celebrating 50 Years of Peace Support Missions and the following special calls OE50AMRS, OE50XAM, OE50XCL, OE50XCW, OE50XLC, OE50XMA and OE50XRM will be activated from various locations in Austria using all bands and modes from September 1st until December 31st and the QSL route is via OE4RGC with all QSOs confirmed automatically via the bureau. The website can be found at **www.oevsv.at/**

Californian DX Foundation

The **Northern California DX Foundation** (NCDXF) was founded in 1972 to assist worthwhile Amateur Radio and scientific projects with funding and equipment. Although the words 'Northern California' still appear in its title, the activities of the Foundation are international in scope and a newly designed NCDXF website is now on line **http://ncdxf.org**

The Foundation hope that the new interactive website will provide a useful resource for all DXers and enable everyone to follow both past, current and future DXpeditions which have or are currently being sponsored by NCDXF.

The UK's own **Chiltern DX Club** began in the 1980s, has a similar function, and is one of the most respected DX groups in the world with approximately 800 members dedicated to encouraging excellence in DXing and contest operating. Their website can be found at **www.cdxc.org.uk/**

Special Events

On to Special Events stations now. In the Netherlands **PA08DWN** will be active on October 2nd, c.w. only, for the annual Furieade maritime event at Maassluis, near Rotterdam. Operations will take place from the radio shack of the tugboat *Elbe* which is in the process of being restored as a museum ship. The QSL route is via PA3ALM and I suggest you take a look at **www.zeesleperelbe.nl/** for the latest information and photos of the vessel berthed in the outer harbour at Maassluis.

To Italy now, where Radio Amateurs in the **Associazione Radioamatori Italiani** (ARI) Section of Udine and residents of the Italian region of *Friuli Venezia Giulia* will be celebrating the 50th anniversary of the aerobatic team of the Italian Air Force using the special callsign **II3PAN**.

With the support of the commander of the 313th National Acrobatic Team ***Frecce Tricolori*** situated at the Air Force Base of Rivolto di Codroipo the call will be in use on the 3.5, 7, 14, 21 and 28MHz bands until October 31st. A QSL is available via IV3IUM direct or through the bureau and there is an award for working the special call and others active in the Friuli Venezia Giulia region. Details of this can be found at **www.iv3ium.it/freccetricolori/index.htm**

Next, Canadian **Zrinko 'Zik' Zibert VE3ZIK** will be active again as **9A/VE3ZIK** from Bilice, a small village near the National Park KRKA in Croatia until September 27th. Several trips to islands in the IOTA group EU-170 are also planned. The QSL route is via DO7ZZ and not the 'VE' bureau and while paper cards are good all contacts will be confirmed on eQSL and Logbook of the World (LoTW).

Your Reports

On to your reports now and the first is for 10MHz where **Eric Masters G0KRT** in Worcester Park, Surrey used a Kenwood TS-570 at 100W and home-brewed and modified W3EDP antenna 25m (84ft) long with counterpoises tuned with an SGC SG-230 auto tuner. Eric was pleased to work a new country as 5N50K (Nigeria) – QSL via LZ1CL made his log at 1946UTC.

The 14MHz Band

The PSK31 mode was the choice for **Bill Ward 2E0BWX** in Edwinstowe, Nottinghamshire who used his Icom IC-7400 at 25W and a Diamond CP-6 vertical antenna to work DF1GB (Germany) 0652, F5TJD (France) 0725, IN5FKB (Italy) 0949. Then came EV1P (Belarus) 1016, RU3EJ (European Russia) 2050 and S57NTR (Slovenia) at 2106UTC.

Peter Leng ZL4TE in Cambridge, New Zealand has also been using the digital modes again working BG6SDO (China) 1011, VK2ATC (Australia) OC-001 at 2129 with PSK31. Then came 3D2AA (Fiji) OC-016 at 2133 using Olivia and LY10EPC (Lithuania) at 2121 QSL via LY3W. Peter was using his Yaesu FT1000MP MkV with an interface from G3LIV and a Cushcraft AV-3 vertical antenna at around 50W.

Incidentally, Olivia MFSK is different from some other types of digital keyboard methods. This is because it can often be decoded perfectly in the most difficult signal-to-noise conditions when the human ear cannot hear a signal and also when it cannot easily be seen on a conventional waterfall spectrum display. Check out **http://hflink.com/olivia/** for more information, software downloads and the frequencies used.

Operating away from home as **MM0XIG/P** on the Isle of Coll, Inner Hebrides EU-008 was **John Wakefield** M0XIG who packed his Yaesu FT-1000MP MkV and Comet

H-422 antenna to operate from the Island using s.s.b. at around 200W. Contacts on the 14MHz band included EW1MM (Belarus) 0909, DL5ME (Germany) 0906, SQ2FRF (Poland) 0925, IT9BDQ (Italy) 0932, F5VW (France) 0958 and VO1GWK (Canada) near St. Johns, the capital city of Newfoundland at 1109UTC.

Also on the band in Chelmsford, Essex was **Martyn Medcalf M3VAM** who used a Yaesu FT-897 and Comet CHA-250BX to find s.s.b. stations EA5KB/P (Spain) operating from a lighthouse at 0817, OH3P (Finland) at 1308, E73M (Bosnia & Herzegovina) 1316, IV3UHL (Italy) 1443, LZ39W (Bulgaria) 2045, VE5FX (Canada) 2203, UA3PC (European Russia) 2205, WY3P (USA) Carroll County Contesters in Sykesville, Maryland at 2219 QSL via WA3ADC.

On the Isle of Ramsey EU-008 in Scotland, **Geoffrey Pendrick** M5GAC operated as **MM5GAC/P** where he made 145 contacts with 15 countries including LX1HD (Luxemburg), RV9LM (Asiatic Russia), KH6RC (Hawaii) OC-019, OZ8CTH (Denmark), 9A3BSL (Croatia) and IS0R (Sardinia) EU-024. Geoffrey was using a Yaesu FT-840 with s.s.b. at 100W into a 14MHz dipole only 3m (10ft) above ground.

David Bambrook 2E0DAB in Little Milton, Oxford used his loft mounted dipole to work IQ7DV (Italy), EM6SE (Ukraine), RP3QVP (European Russia) and EW8A (Belarus) during an afternoon session. David was running 50W s.s.b. from a Yaesu FT-747GX.

In Wilmslow, Cheshire **Mike Dwyer 2E0BTK** used PSK31 again and EA3BDQ (Spain) 2124, CT2FYP/P (Portugal) 2203, VA3IU (Canada) 2359 and NA2Q (USA) in Fort Ann, New York at 0004. Additionally, while using his new call **M0MSD** with s.s.b., Mike worked Canadian stations VA3AXW and VA3DVR/M around 0009UTC. Later VK3MO (Australia) OC-001 was worked at 2323UTC using an Yaesu FT-950 and 100W to a home-made 'Cobweb' type antenna.

The 18, 21 & 24MHz Bands

On to 18MHz now where **Martin Juhe M0XJP** operated in Spain from La Romana near Alicante as **EA5/M0XJP**.

Martin Juhe operated in Spain from La Romana near Alicante as EA5/M0XJP and running an Alinco DX-70TH at 75W and EDX-1 tuner to a full size G5RV.

Running an Alinco DX70TH at 75W and EDX-1 tuner to a full size G5RV, Martin had s.s.b. QSOs with BD5BAJ (China) 1341, G4AKC/M Dave in Blackpool (bicycle mobile!) at 1415, PT7CB (Brazil) 1506. Then came LR1ECZ (Argentina) 1544, Z21BC (Zimbabwe) 1723 (QSL via NI5DX), CT3FT (Madeira Island) AF-014 at 1745, 4X4FR (Israel) 1815, SV8IJZ (Greece) 1835. Finally, there came CO8LY (Cuba) NA-015 at 1900UTC. Martin added, "It was interesting to see the difference in operating conditions away from home and I made over 130 QSOs with little effort!"

The c.w. log of **George Davis G3ICO** in Mudford, Yeovil continues to grow and included CO8LY (Cuba) 1131, PI65SRA (Netherlands) a special callsign to celebrate the 65th anniversary of the **Vereniging voor Experimenteel Radio Onderzoek Nederland** (VERON), the Dutch National Amateur Radio Society, at 1135. Then came TK2/DL2JRM (Corsica) EU-014 at 1254, ZA/HA5X (Albania) 1429, VP2EMR (Anguilla) NA-022 at 1850 and 9Q/DK3MO (Democratic Rep of Congo) at 1936UTC QSL via DF9TA. All QSOs were made using a Elecraft K2 at 10W to a doublet antenna, which was 40 metres long.

On the 21MHz band was **Martin Addison 2E0MCA** in East Finchley, North London who logged SX1L (Greece) 1003 (QSL via DL1JCZ), RA9DZ (Asiatic Russia) at 0905 and RK3IM (European Russia) at 1022.

The 24MHz band provided OZ6AGD (Denmark) at 1228 and DM3ML (Germany) 1235UTC. Martin was running a Yaesu FT-2000 and 50W to a G5RV antenna.

The 28MHz Band

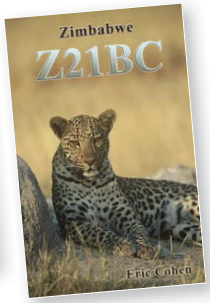
The 28MHz band was favoured by **Peter Lowrie MI5JYK** in Newtonabbey, Northern Ireland. He decided to set up a λ/4 wave two radial ground plane using a 'roach pole, which was tied to a fence. Peter's FT-817 was battery powered and s.s.b. contacts included OE2CRP (Austria) 0718, 5B4AIF (Cyprus) AS-004 at 0802, DL8NU (Germany) 0813 and HG6V (Hungary) 0900.Next came HB9CVQ (Switzerland) 1411, S53EO (Slovenia) 1915 and LA0EM (Norway) at 2047. Finally, F8AST (France) 1524 and PD1PTH (Netherlands) at 1550UTC were all worked with f.m. There's still some experimenting to do and Peter has promised to let us know how he gets on.

Finally, **Eric G0KRT** found c.w. stations CT1BWW (Portugal) 1401 and IZ3NVQ (Italy) at 1834 while using s.s.b. Then CT1REP (Portugal) 1339 and IZ6BXV (Italy) 2015UTC both made his s.s.b. log.

Signing Off

Well that is about it for another month. It was nice to see our reporters managed to find activity on most of the HF bands while both 3.5 and 7MHz produced a few more local calls .

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



Radio Spectrum under threat!

As users of the Spectrum, the issue is simple: PLA devices are causing interference and if we don't do something now we might not have a hobby take part in – it's that serious. Now is the time to start a Spectrum Defence Fund – not just to fight the PLT issue but other threats as and when they come up. The RSGB intends to challenge Ofcom's interpretation of the various Acts and Directives in respect of the PLA/PLT threat. We aren't looking to remove Comtrend and other such devices from the market place – that's an expectation too far, neither are we likely to see rapid results. What we are looking for, among other things, is to challenge Ofcom on their duty to ensure that in the future, non-compliant items such as Comtrend, are not put on the market.

A Judicial Review would likely cost in the region of £75,000 but could be a lot more as we'd be taking on organisation with almost unlimited funds to defend their corner who could, if they so desired, play a very long game that in turn we'd have to match. If every amateur in the UK pledged £10 to the Spectrum Defence Fund we'd probably have enough to fight the case and so we need your donations (no matter how small) to help us meet the threat.

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

Help us protect the future of Amateur Radio
Please donate online at

www.rsgb.org/defencefund

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

Spectrum Defence Fund

Advertising space kindly donated to the Spectrum Defence Fund by PW Publishing

Harry Leeming's

in the shop

This month Harry Leeming G3LLL looks at d.c. converter high tension supply problems and his vertical antenna tests.

Welcome to *In The Shop* (*ITS*) where I'm starting this time by asking a question – How do you get 900V from 12V? The question arose when '**Terry**' brought his FT-101E to me, it smelt like burnt toast and he wasn't surprised when I told him that the mains transformer was burnt out.

He then cheerfully announced that it did not matter, as he still had the direct current (d.c.) power lead, which he would plug in the back so that he could run it from a car battery. Terry was rather taken aback when I explained that this would not be possible as d.c. operation on this rig – needed a functioning mains transformer.

All high frequency (h.f.) rigs, with valves in the power amplifier (p.a.) stage, need a high tension (h.t.) supply of something in the region of + 500 to +1000V, together with several other positive and negative rails. The normal way to obtain these is via a transformer and rectifiers from the mains supply but semi-portable rigs, such as the FT-101 and TS-520, were also designed to operate from a 12V car battery.

The clever twist in the design of these is that the normal alternating current (a.c.) mains power transformer, besides performing its usual function, is wired so that when the rig is operated from a d.c. supply, it can also act as a the tuned circuit in a power oscillator. The circuit, **Fig. 1**, shows a typical design and shows how the TS-520 d.c. converter unit connects to the power transformer.

The 'chopper' transistors Q1 and Q2 are the active parts in the oscillator circuit, which runs at about 60Hz, to 'mimic' the mains supply in the USA and Japan – ours of course, is 50Hz. 'Chopping' the d.c. supply in this way enables the transformer to produce its normal output voltages when the rig is operating from d.c. Note that the transistors are very expensive 60A germanium types, as the voltage drop on silicon transistors is too high.

If you're seeking a cheap receiver – if you ask around there must be many rigs like the FT-101, in which the receiver operates from 12-14V, with burnt out transformers. All you need to do is to disconnect the existing power supply unit (p.s.u.) section, make up a lead with a 2A fuse in series and connect it to a 13.8V supply. You'll then have a receiver that performs much better on the Amateur bands than an average general coverage set!

What Voltage?

So, what voltage do we mean? The question is posed because I'm sure that you'll have noted that writers such as myself tend to use the terms 12V and 13.8V interchangeably, just to confuse you! However, this interchange ability has a history, which goes back as far as the early car radios.

Of course, the voltage supply in a car comes from the battery. When the car has been stationary, with the engine switched off for a few minutes, this falls to about 12V. Start the engine, 'rev' it up a little, and the voltage will rises to around 14V, and so in-car equipment should operate satisfactorily over this voltage range. This confusion about voltages can, as you'll will now read – cause problems.

The FC102 Pilot Lamps

The FC-102 antenna tuning unit (a.t.u.) is a rather attractive unit, which will handle the output of a linear amplifier and so quite a few people who did not possess FT102 rigs, purchased the a.t.u.. The FC-102 needs a d.c. supply to operate it and the socket on the rear of the rig is appropriately marked '12 V'.

Several of my customers bought them, connected the d.c. input to their shack's 13.8V bench p.s.u., and then complained that the pilot lamps either blew after only a few months, or went dim because the green plastic on them had lost its transparency. Eventually however, the 'penny dropped' and I realised that when Yaesu stamped the socket as '12V', that's what they meant, as the FT-102 provided only 12V on the socket – which was intended for connecting to the a.t.u..

Connecting the a.t.u. to 13.8V

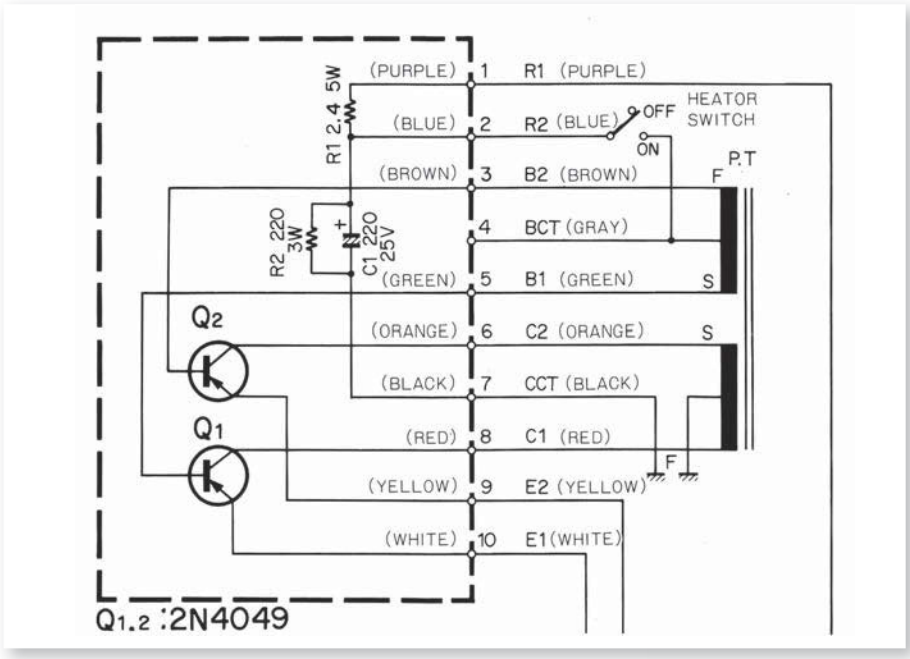


Fig. 1: The circuit, shows a typical design and shows how the TS-520 d.c. convertor unit connects to the power transformer.

Valved rigs often still need the mains transformer, even when running from a low voltage supply, in which case, the drain on the battery is higher than with a more modern rig, as some 500-900V must be produced for the valves to work reasonably efficiently.

Harry Leeming G3LLL
The Cedars
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Heysham
Morecambe LA3 2PQ
Tel: (07901) 932763
E-mail: G3LLL@talktalk.net

supply overruns it by 1.8V. Incidentally, connecting a resistor in series with the supply isn't a very good solution, as the voltage drop alters with the current variation, as different functions are selected on the FC-102. Instead, the simplest answer is to connect three 2A diodes in series with the positive supply lead, as per **Fig. 2**. These will drop around 0.7V each, irrespective of the current and so give out just under 12V and solve the problem.

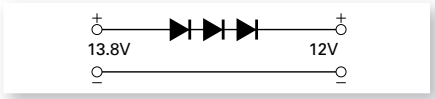

Fig. 2: Using series connected diodes to provide a voltage drop.

The Yaesu FT-747

I used to do quite a bit of static mobile operation many years ago, as the novelty of a mobile call enabled me to work quite a bit of DX. I was surprised as to how easy it often was to break in on a DX pile up, they often did not get my call the first time round but came back with 'QRZ the mobile'.

'**George**' also liked to motor to a quiet spot, switch on his FT-747 and work some DX – but he was having problems. Sometimes he got good reports but often his contacts complained that his s.s.b. transmissions were difficult to read and sounded like they had frequency modulation on them.

When George brought his rig to me for checking, initially I couldn't find anything wrong, gave it back to him as a 'no fault found' and suggested that as the FT-747 has a plastic case, he might be suffering from r.f. feedback. A few weeks later he was back again after having completed more tests.

He reported that everything seemed to be okay if he kept the car engine running – but that the f.m. returned within a few minutes of stopping it. And indeed, further tests in the workshop confirmed if I used the full length of the FT-747's supplied d.c. power cable, and reduced the output of my bench p.s.u. to 12V, the transmission did become distorted.

The Yaesu supplied d.c. power cord was rather long, had fuses in the negative and the positive wires and at full power with 12V going into the lead I found that not much more than 11V was arriving at the other end. The voltage regulators on the FT-747 only seemed to 'kick in' at about 11.5V and so on voice peaks the rig's internal voltage supplies were effectively un-stabilised, hence the f.m. and the distortion on transmission.

I eventually found that it was possible to considerably reduce the voltage drop by shortening the d.c. power cable and by only fusing the positive lead. After my suggestion George made up a very short thick lead, soldered just the one heavy duty 25A car fuse directly in the positive feed and installed a 100AH battery near to the rig. He then found that he could operate for a couple of hours or more, with excellent quality audio, was happy to work the world, without any need for the rig to be modified, or for the car engine to be left running!

Intermittent Heater Problems

'**Thomas**' E-mailed me, to report that he'd suffered from an intermittent fault on the heater supply to his FT-101E. The fault had eventually traced it to a dry joint in the link in the 11-pin auxiliary plug but, "It had blown his PA valves, and cost him nearly £100".

The problem mentioned by Thomas might sound impossible as disconnecting the heater supply to a valve will not destroy it – instead it will simply stop it functioning. However, trying to trace any intermittent fault on the transmit side of a rig will present hazards.

The usual methods of looking for intermittent faults, involves carefully prodding and poking at various parts while the equipment is operating. When dealing with a receiver there isn't too much to worry about, apart from your own personal safety. However, with a transmitter or a transceiver it's another story!

For example, should the transmitter suddenly start working, there's the danger that it might be set to run at full power, un-tuned into an unmatched load. You'll then have then only a few seconds to notice that the rig has started transmitting before the p.a. valves are destroyed.

A solid state rig may be a little more forgiving but it's still possible to do quite a lot of harm if you end up transmitting into an unmatched load for a length of time. So, when you're trying to trace such a fault – set the drive control at near minimum, or better still do all your tests in the s.s.b. mode, so that drive will only be produced when you speak into the microphone.

A Vertical Antenna?

Time to look at antennas now and most of us know that vertical systems work very well for some Amateurs. On the other hand some operators find that they are sensitive to local noise – and generate rather too strong a signal into local electronic equipment.

Antennas of all kinds are sensitive to location and once they have been installed and weathered, their value drops by 50% or more. So, when I was in business, I was therefore always reluctant to recommend something that might not work out.

I think that the simplest way to try out an antenna without committing yourself to a lot of needless expense, is to make a temporary one and see what the results are like. If you fancy trying out a vertical system, all you need to invest in is a couple of garden canes, and a length of wire as per **Fig. 3**.

This will enable you to knock together a temporary system for – let's say – 14MHz (20m) and it should perform just as well as the same

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

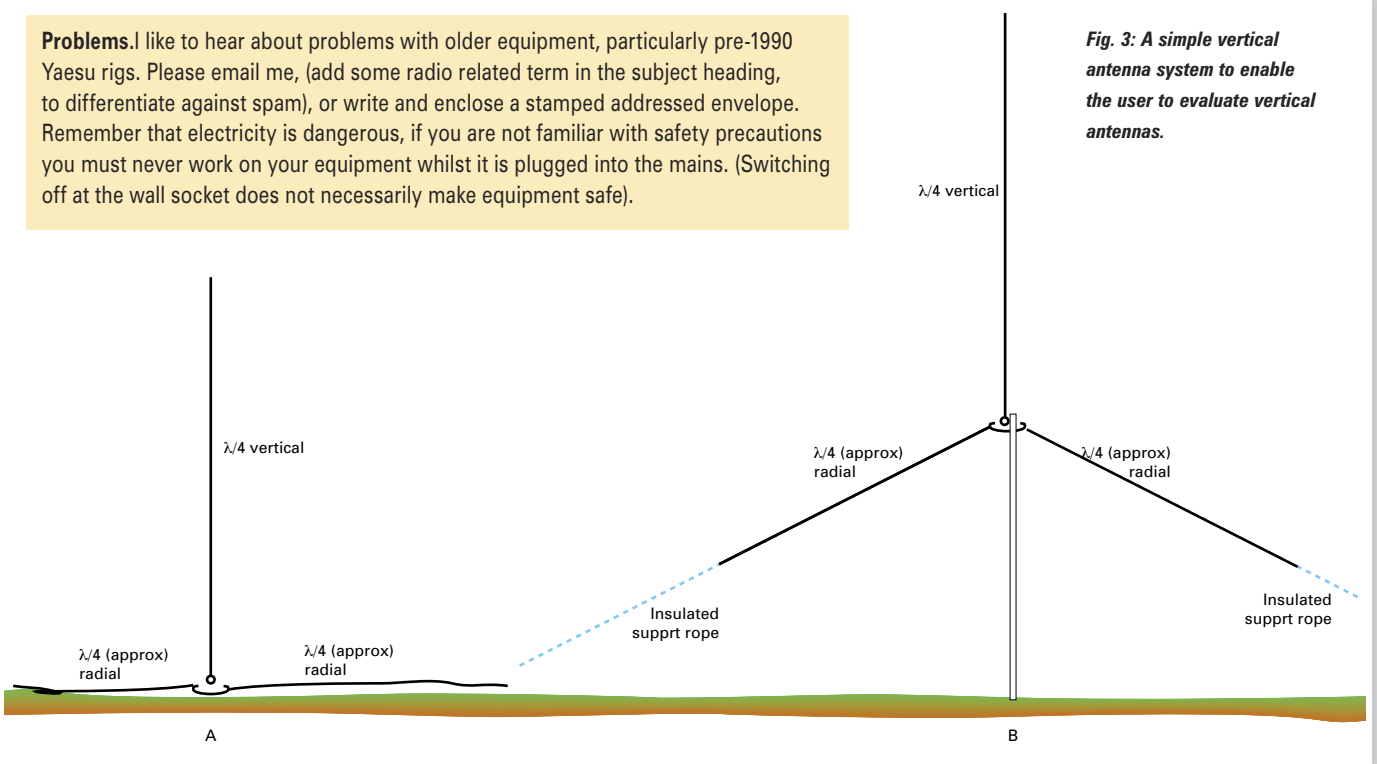

Fig. 3: A simple vertical antenna system to enable the user to evaluate vertical antennas.

section of a commercial multi-band system. Such a set-up might only survive the wind and the rain for a few months but by then you should know as to whether or not it's worth investing in a commercial system.

The system I've suggested can be mounted at ground level, using an earth rod and buried radials as per Fig. 3**a**. Alternatively, usually greater efficiency will result if the whole system is elevated as high as possible, as shown in Fig. 3**b**. The length of the radials isn't too critical – but the length of vertical section should be adjusted for the minimum standing wave ratio (s.w.r.), which should be about 1.5:1.

Rather Unpredictable

The results we can obtain using a vertical antenna system can be rather unpredictable, as the following incident well illustrates! Looking back 30 odd years ago the only satisfactory way I could work on h.f. was from the car. I had a 6ft long G-Whip mounted in the centre of the roof and used to go and park up on a bit of spare ground and operate static mobile.

I achieved some extremely good results, had my first ZL and VK (New Zealand and Australian) contacts and managed to cross the Atlantic on 3.5MHz (80m), but I still wondered just how 'inefficient' the whip was in comparison with a full sized antenna.

To find out more on the efficiency, one day I 'borrowed' an 18AVT, a 25ft high good quality 3.5– 28MHz (80 to 10m) multi-band vertical from the shop. I mounted this on a short stub mast hammered into the ground and ran a collection of radials out over the surface. On checking it out, I found the s.w.r. and the bandwidth to be much better than the G-Whip on all bands.

Next, I moved the car well away from the 18AVT and started to make some comparisons of performance. At first I thought that I must have got the feeders reversed on my two way switch – but no I hadn't! After double and triple checking there was no doubt about it, the G-Whip on the car roof was out-performing the ground mounted 18AVT by about an S-point on all the bands that were active ('open') that day.

Thinking to myself (at the time), I had only to look at the 18AVT and to compare the thickness of the trap coils to be assured that it must be a better antenna than the G-Whip! So what was happening?

Vertical Dipole

A quarter wave vertical aerial operates as the top half of a vertical dipole, the missing bottom half being formed by the 'reflection' from the ground, or in the ground plane. So, I could only presume that the body of my car formed a better ground plane than a dozen or so radials, hence the improved results. Unfortunately I could not think of a way of mounting the 18AVT on my car!

On the subject of radials it's worth noting that while 'the bit that sticks up in the air' might look the most impressive – with any quarter wave vertical system the ground plane is probably even more important.

I once read an article by an Amateur, who spent a considerable time measuring the increase in field strength as he gradually increased the number of radials. When he got up to 80 radials the signal was still getting stronger but at this point time and wire ran out!

While on this topic, the BBC have maps of the country showing ground conductivity, and they site their medium wave station there, not at the highest points! They then bury miles of copper wire in the vicinity.

The relationship between the height of the vertical masts Radio Amateurs are able to erect – and the wavelengths we use – are probably similar to what the BBC operates at on the medium wave band (It makes you think!). So, the next time you are thinking of moving house, how about telling the 'other half' that you'll have to check on the ground conductivity first? See you next month! ●

Roger Cooke's

morse mode

Learning Morse, vuvuzelas and old teaching films.

Roger Cooke G3LDI
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Station Approach,
Broadstone,
Dorset BH18 8PW
E-mail: roger@g3ldi.co.uk
Packet: g3ldi@gb7ldi.#35.gbr.eu

Well, that's the National Field Day (NFD) over for another year. This is my favourite event of the year. I have enjoyed NFD for many years – well never mind how long! This year was another success for the Norfolk ARC. We did get a storm, as usual, but not until Sunday afternoon and it then came down in stair rods!

However, the storm did clear enough for us to pack up. Our usual 'Bacon Butty' breakfast and the Sunday lunch, not forgetting a huge raffle, talks on the Saturday as a side attraction – really makes our day. However, nothing can beat operating in a tent in a field!

When I think back to the 1950s though, it's amazing how many changes there have been over the years. We used to have a receiver, something like an HRO and a transmitter usually built especially for NFD, running no more than 10W – using valves of course! Loggers and duplicate sheets were the order of the day, as was using a straight key or, if you were lucky, a semi-automatic paddle.

Our prize possession at a later NFD was an automatic 'CQ' sending machine, made from an electric motor with a large round disk with appropriate notches in its edge, keying a relay! Tents haven't changed much, but the gear has. Transceivers, 100W, computer logging programs and little else to do except type!

Our NFD 'A' team is shown in **Fig 1**. (Left to right) **Chris Soames G0TZZ**, **Peter Lock M0RYB**, **Malcolm Prestwood G3PDH**, Roger G3LDI and **Kim Medley G4WUG**. If you haven't tried a CW NFD, you really should. It is a great weekend.

Learning Morse Military Style

The American military put out a couple of tutorial films to encourage their personnel to learn Morse in the 1960s. I'm not so sure the method they show really is the best way, but I guess they must have had some success. Anyway, **Ron Price GW4EVX**, sent the URLs in for inclusion in this column. At 44 years old, these two films are, I think, instructive, but I must admit I find them more entertaining than instructive!

Army Morse Code Part 1
www.youtube.com/watch?v=Li8Hiwbc664
Army Morse Code Part 2
www.youtube.com/watch?v=fNLlaE56l6Q

Fig. 1: Left to right: Chris Soames G0TZZ, Peter Lock M0RYB, Malcolm Prestwood G3PDH, Roger G3LDI and Kim Medley G4WUG, all took part in the Norfolk ARC's CW NFD entry activity.

Non Amateur Morse

Following a request by **Graham Smith G3ZOD**, the following was sent in by **David J. Ring Jr. N1EA**. "The Israeli Navy 4ZO still transmits messages, the Mexican Navy transmits weather info on 3700 kHz (and perhaps on other frequencies) at 0100 or 0200Z, VUG the Indian Navy transmits weather and hydro warnings, and the Argentinean Navy still does weather and hydro information and notices to mariners. Check 4, 6, 8, 12, 16MHz bands. Military 5, 10 13, etc. and VUG – the Indian Navy, Argentina Navy are on the marine bands 4, 6, 8, 12, 16MHz"

Jamboree & Vuvuzelas

Here's a by-product of the World Cup – as if you didn't know that's football! This piece comes from **Dave Gemmell ZS6AAW** who says, "I'm the SA National Scouting Jambouree on the Air (JOTA) Co-coordinator and try to encourage as many SA scout stations to be on the air for the annual Jamboree-on-the-Air. (October 16th, 17th 2010). One of my tasks is to think up 'challenging activities' of a scout/radio nature. This year, as you very well know, SA has hosted world soccer. One of the 'famous by-products' is the Vuvuzela. (That trumpet-like instrument that was heard almost incessantly during soccer broadcasts!).

"Well, in SA we've decided to set a challenge to world scouts to try a send simple messages in Morse code using the vuvuzela! As an optional extra, I've also suggested the less noisy alternative of using it in the listening mode!

"Apparently you can use the instrument in reverse, putting it close to your ear like an ear trumpet. It's suggested that practice be carried out in 'social' hours. I would like to add to that request – as far away as possible and preferably in another country!"

Mobile Phone Morse

The next request came from **Bill Shepherd EI4BK** (**PA3FDK**), who said: "Recently I wished to brush up my Morse a little. I thought I'd like to do it in those moments when I have a little spare time when waiting for something else to happen. The ideal would be to use my new 'smartphone' a Qtek 8020 (i-mate sp3i). After searching a while I found a *Java* application (App.) called *Morse Coder* from **www.javaphone.it**

"The application does run, but it's rather primitive and lacks both decent tone and any feature of control. I wondered if you knew of a better application for phones or failing that could appeal through your column for authors to write one?"

There are some of my friends who say, that I have asked "What's a mobile phone?" (Seriously though, a couple of my friends have their callsigns as a ring tone, so I would think that an up-market 'phone would have an application available to enable it to run a Morse program. 73 and May the Morse be with you!

Roger G3LDI.

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E-mail: vincentvoy@hotmail.co.uk

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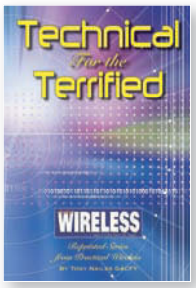

NEW!

TECHNICAL FOR THE TERRIFIED

This book started out as a series of articles by Tony Nailer G4CFY in *Practical Wireless* aimed at introducing the more technical aspects of the hobby to readers who, unnecessarily perhaps, felt that it was beyond them. It is aimed at bridging the gap between basic understanding, as gathered by students of the Intermediate and Advanced Radio Amateur courses and other – more project-based articles. Aimed at the less-experienced radio enthusiast, the articles are of a general nature, written to remove the fear of technology/techniques and theory.
As Tony says, when it gets technical, there's no need to panic!
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NEW!! AIRWAVES 2010

There have been a variety of changes to AIRWAVES since 2009. Quite a number of Military Discrete frequencies have been added, plus many existing frequencies have been reconfirmed. Further changes are likely in 2010, as it appears that the top of the Military Airband from 380 - 400 MHz will be handed over to the emergency services to increase the frequency management capability for the London Olympics. Some frequencies have already been moved out of this band recently, including three at Brize Norton. Seven London Military (East) frequencies have been moved to Scottish Military, which has been split into North and South areas and expanded. Manchester Area Control has closed and has been relocated to the Scottish Centre. All Upper Airways have been withdrawn from Shannon Control and the Oceanic Transition areas, leaving just Reporting Points, including many new ones.

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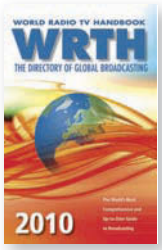

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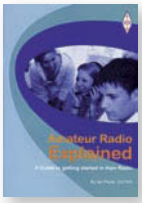

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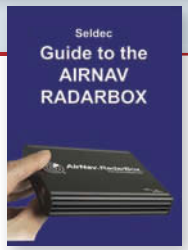

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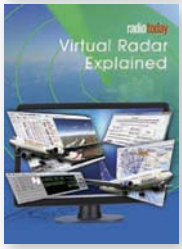

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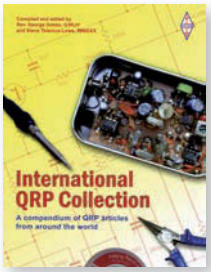

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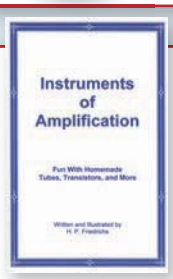

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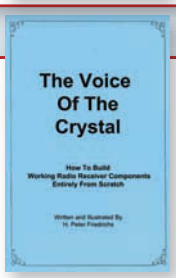

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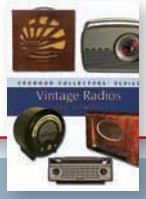

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Rob Mannion's

topical talk

This month the Editor discusses problems with the police when operating mobile and then remembers his own difficulties with lightning!

This month we have a particularly interesting selection of letters, and my spirits rose when **Mike Redman's** letter arrived. Mike's keen approach to his local junior school has to be admired, as he's set an example, despite all the bureaucratic hurdles we face when working with youngsters!

He's now suggested that getting his Amateur Radio licence may be his retirement project as he passed the RAE many years ago. And I've told him that getting on the air should be no problem at all – after all, we really need Amateurs with his 'get up and go'!

Disturbing Letter

However, I found the letter from **Carl Johnson M3VWP**, regarding his problems with the Devon & Cornwall Constabulary, very disturbing. I often work Carl via the **GB3DR** Dorchester 144MHz repeater (an excellent, well maintained repeater, looked after by a very dedicated team) and was first alerted to his problems earlier this year.

Unfortunately, for some reason I was under the impression that Carl had made an appeal against his conviction – so I delayed publishing it to avoid legal problems. I then discovered – when we 'met' again on the Dorchester repeater – that Carl hadn't entered an appeal. So, after chatting with him for a while, I agreed to publish Carl's letter to help make other Amateurs aware of the problems that can arise by using a hand-held microphone in a motor vehicle.

I don't know if Carl M3VWP is a member of a motoring organisation (AA or RAC) but if he is a member (and I'd heard about his problems before the court case) – I would have advised him to check to see if they could have offered legal support. However, I think he did well to defend himself! Magistrates and other Courts are overwhelming places – even for those of us who've acted as 'Expert' witnesses and not been the 'accused' – under the baleful glare of the presiding Magistrates or Judges. To me, there's something rather medieval, feudal and overwhelmingly intimidating about the court system in England and Wales (Scotland has a different legal system) and I think that Carl must have been very brave indeed to stand up and face such all-powerful adversaries!

Finally though, I have to be honest in my opinion that whatever Carl's defence was – it was the evidence/opinion of the Police Officer (who was involved) that was the deciding factor. **Whatever dispensation we might (rightfully) claim** – if the court is provided with evidence from a serving Police Officer – that it was considered Carl's driving was such that he could be charged with 'Driving without due care and attention' (etc.) – that Officer's opinion will almost certainly be accepted automatically by the Court.

My own advice is that we should only use 'hands free' equipment to operate our radio equipment where we're 'mobile'. Unfortunately though, even then – if a Police Officer considers us to be 'driving without due care and attention' – I'm sure we could still end up in court! So, please play safe and try not to compromise yourself and our hobby!

Finally, I would be pleased to hear from anyone who can pass on legal advice on this complex situation, so we can all stay – hopefully – on the 'right side of the law'.

Lightning Problems

Our author and friend **Harry Leeming G3LLL**'s letter (Letters' pages this issue) and his story of lightning problems, reminded me of the difficulties that has confronted some TV viewers in the Scottish Highlands. Indeed, a few people I'd helped set-up low power 'Active Deflector' u.h.f. TV re-transmitters, together with those using remote (often mountain-top sited) receiving antennas, coupled to cable systems of up to 1km or so long – suffered from lightning strikes.

Because I ensured that there was an earthed metal pole standing higher than the receiving antenna/antennas, direct lightning strikes were very rare. However, many mast-head amplifiers were often destroyed due to static discharges in 'thundery' conditions. Fortunately, insurance often covered the cost of the damaged equipment.

But one antenna receiving system – near Gairloch in Wester Ross – had to be fitted with a Faraday Cage type structure fabricated from chicken wire netting (one end open). It worked well, and reduced delayed images ('ghosting') that had been previously difficult to overcome!

Rob Mannion G3XFD/EI5IW

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3 types of auto scan tuning! 700 memories! **£89.95**

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ATS for FM/AM 1000 memories! **£299**

LDG Tuners Popular Models NOW in STOCK!

AT-100 Pro	160 - 6m) 125W	£189.95
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IT-100	for Icom IC-7000	£209.95
YT100	for Yaesu radios 125W	£199.95
Z-11 Pro2	(160 – 6m)125W	£159.95
Z-817	QRP for FT817 & others	£119.95
FTL	Meter for FT857, FT897	£79.95

Daiwa Meters 801HP SWR Power Meter

Japanese high quality, huge twin needle display reading Average power, Peak power and SWR

- Freq: 1.8 - 200MHz
- Power: 20/200/2KW
- Connectors: SO239

SPECIAL PRICE ~~£129~~ £99.00

CN801VN	140-520MHz (N type Sockets)	£119.95
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CN103LN	140-525MHz	£99.00
CN801S	900MHz-2.5GHz N types	£119.95
CN801V	140-520MHz (SO239)	£99.95

MFJ Accessories

MFJ 259B	HF/VHF Analyser	£279.95
MFJ 269	HF/VHF/UHF analyser	£349.95
MFJ 941E	300W Tuner	£139.95
MFJ 949E	300W HF tuner	£179.95
MFJ 16C06	4 pack Ceramic insulators	£4.95
MFJ 260C	300W Dummy load	£44.95
MFJ 550	Morse Key	£16.95
MFJ 901B	Portable ATU	£72.95
MFJ 945E	300W Tuner	£129.95
MFJ 948	300W Tuner w/balun	£159.95
MFJ 969	300W Tuner	£209.95
MFJ 971	200W Portable Tuner	£118.95
MFJ 993B	300W Tuner	£249.95

Antennas and Accessories

Nevada Wire Antennas Covered Flexweave wire		
G5RV	Half size (40 – 10)	£34.95
G5RV	Full size (80 – 10)	£39.95
Windom	Coax fed Half size (10/20/40)	£39.95
Windom	Coax fed Full size (10/20/40/80)	£44.95
Hard drawn Copper Wire		
G5RV	Half size (40 – 10)	£24.95
G5RV	Full Size (80 – 10)	£29.95
Heavy Duty – PVC flexweave		
WDM3	Windom Half size 1kW	£69.95
WDM4	Windom Full size 1kW	£89.95
Moonraker Antennas		
GP-2500	Vertical (80-6m)	£199.95
225P	2/70/23cms Colinear	£74.95
1010N	2/70/6metres Colinear	£84.95

COMET

HF Antennas		
H-422	Rotary Dipole 40/20/15/10 metres	£269.95
CHA-250B	Vertical covers 80 to 6 metres	£299.95
HF/UHF Base Antennas		
GP1	144/430 MHz 3.0 / 6.0dbi 1.25m	59.95
GP3	144/430 MHz 4.5 / 7.2dbi 1.78m	69.95
GP6	144/430 MHz 6.5 / 9.0dbi 3.07m	99.95
GP15N	50/144/430 MHz 3/6.2/8.6dbi 2.42m	99.95
GP98	144/430/1200 MHz 2.94m long	139.00
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CYA-1216E	16 element 1.2GHz yagi	99.00
Multi Band HF Mobiles		
UHV5	7/21/50/144/430MHz 100/200W	79.95
UHV6	7/21/28/50144/430MHz 100/200W 1.9m L	99.95
HF Mobile Whips PL259 Fitting		
CHS10	10MHz 1.05m long 250W	29.95
CHS21	21MHz 0.95m long 300W	39.95
CHS50	50MHz 0.95m long 300W	39.95
HA035	3.5MHz 1.13m long 120W	59.95
HFB10	28MHz 0.95m long 120W	39.95
HFB14	14MHz 0.95m long 250W	39.95
HFB40	7MHz 1.6m 250W	39.95
HFB6	50MHz 0.95m 250W	39.95
HR50	50MHz 2.13m long 200W	49.95
Magnetic Mount Antennas		
M24M	144/430MHz 1.7 / 4.17dbi 0.48m L	29.95
M72S	144/430MHz 1.7 / 3.5 dbi 0.52m L	29.95
VHF/UHF Mobile Whips PL259 Fitting		
CSB7500	Super Beam mob whip 144/430MHz	49.95
CSB7700	Super Beam mob whip 144/430MHz	54.00
CSB7900	Super Beam mob whip 144/430MHz	59.00
Handy Antennas		
BNC-750	BNC HF whip 7-50MHz TX/RX	79.95
CH32	BNC 144/433/900MHz 45mm	19.95
CH99	BNC Tel Whip 70-1000MHz 195-1135mm L	19.95
RX5	144/430/900MHz 44cm L 8W SMA	29.95
SH95	144/430/1200MHz 37cm L 10W BNC	29.95
SMA3	144/430/900MHz 25cm L 10W SMA	24.95
SMA-501	144/430 MHz SMA	19.95
SMA-701	144/430/1200MHz SMA	19.95
Antenna Mounts		
RS6	Roof Rack Mount - adjustable	19.95
RS550	Roof Rack Mount - deluxe adjustable	19.95
RS700	Gutter Mount adjustable	19.95
RS730	Trunk lip Mount adjustable	19.95
RMS	Magnetically mounted Gutter Clamp	29.95
WS1M	Window Mount deluxe SO239 plug	39.95
WS1B	Window Mount deluxe BNC plug	39.95
RS840	Trunk Lip ant mount	24.95
RS-020B	Trunk/Hatch back (Black)	21.50
RS-020S	Trunk/Hatch back (Silver)	21.50
Motor Bike Mounts		
BMB-S	Motor bike bracket (Silver)	25.95
BMB-B	Motor Bike Mount (Black)	25.95
Car/Caravan Mounts		
CAUBI	Trailer Mount - for HF whip antennas	49.95
Cable Assemblies		
3K054M	4 metre cable SO239 to PL259 plug	24.95
3K054N	4 metre cable So239 to N type plug	25.95
Current Baluns		
TFA-400	(1.3-500MHz) 400W	69.95
TF-1800	(1.3-500MHz) 1.8kW	79.95
TF-5000	(1.3-500MHz) 5 kW	99.95
Low Pass Filters		
CF30H	Low Pass Filter 32 MHz 2kW	119.95
CF50MR	Low Pass Filter 57 MHz 1kW	49.95

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Military style, Olive Green

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KT3 Kevlar	Black	2mm	400kg	**£59.00**
KT-3 Kevlar	Olive Green	5.5mm	760kg	**£99.95**

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DJ-175
VHF 2m Rugged Handheld
- Transmit freq: 144-148MHz
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- CTCSS, DCS & DTMF encoding
- 1000, 1450, 1750 & 2100Hz tone bursts
- 3 levels of output power 5, 2 and 0.5 W
- With Battery and Charger

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DJ-G7E Full Duplex Tri-Bander with 1200 MHz!
- Wide band receiver
- 2m/70cm/23cm bands
- Rugged water resistant case
- Inc: Drop-in Charger, Battery Pack, Swing Belt Clip, Antenna

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NEW!

DX-SR8
Affordable HF Transceiver - with a QPR Setting!
- Covers all SW & HF Amateur bands
- TX: SSB, CW, AM, FM
- Power: 100W SSB/CW, 40W FM
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- RX: 30kHz - 35MHz
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Full Featured Dual Band Mobile
- Removable Control Head
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Mobile HF plus 6 metre TX
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- Narrow filters fitted as standard
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30A Switching Power Supply
- Input voltage 230VAC
- Output voltage: (5 -15) VDC variable
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Now including the
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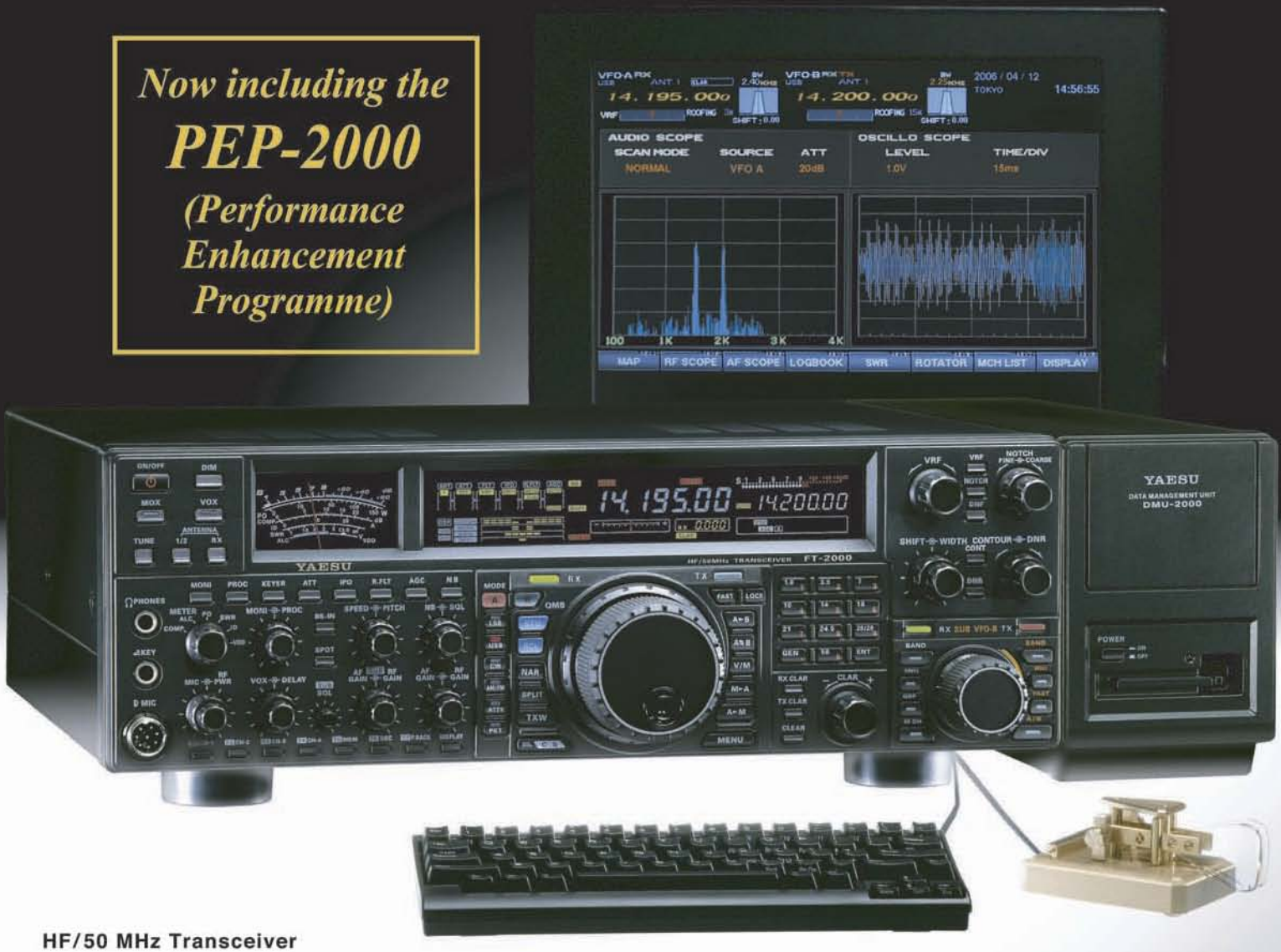

HF/50 MHz Transceiver

FT-2000

- FT-2000D 200 W with External Power Supply
- FT-2000 100 W with Internal Power Supply

Shown with after-market keyer paddle, keyboard, and monitor (not supplied). Optional Data Management Unit (DMU-2000) and monitor are required for viewing of Audio Scope and other display features.

Specifications subject to change without notice. Some accessories and/or options may be standard in certain areas. Frequency coverage may differ in some countries. Check with your local Yaesu Dealer for specific details.

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