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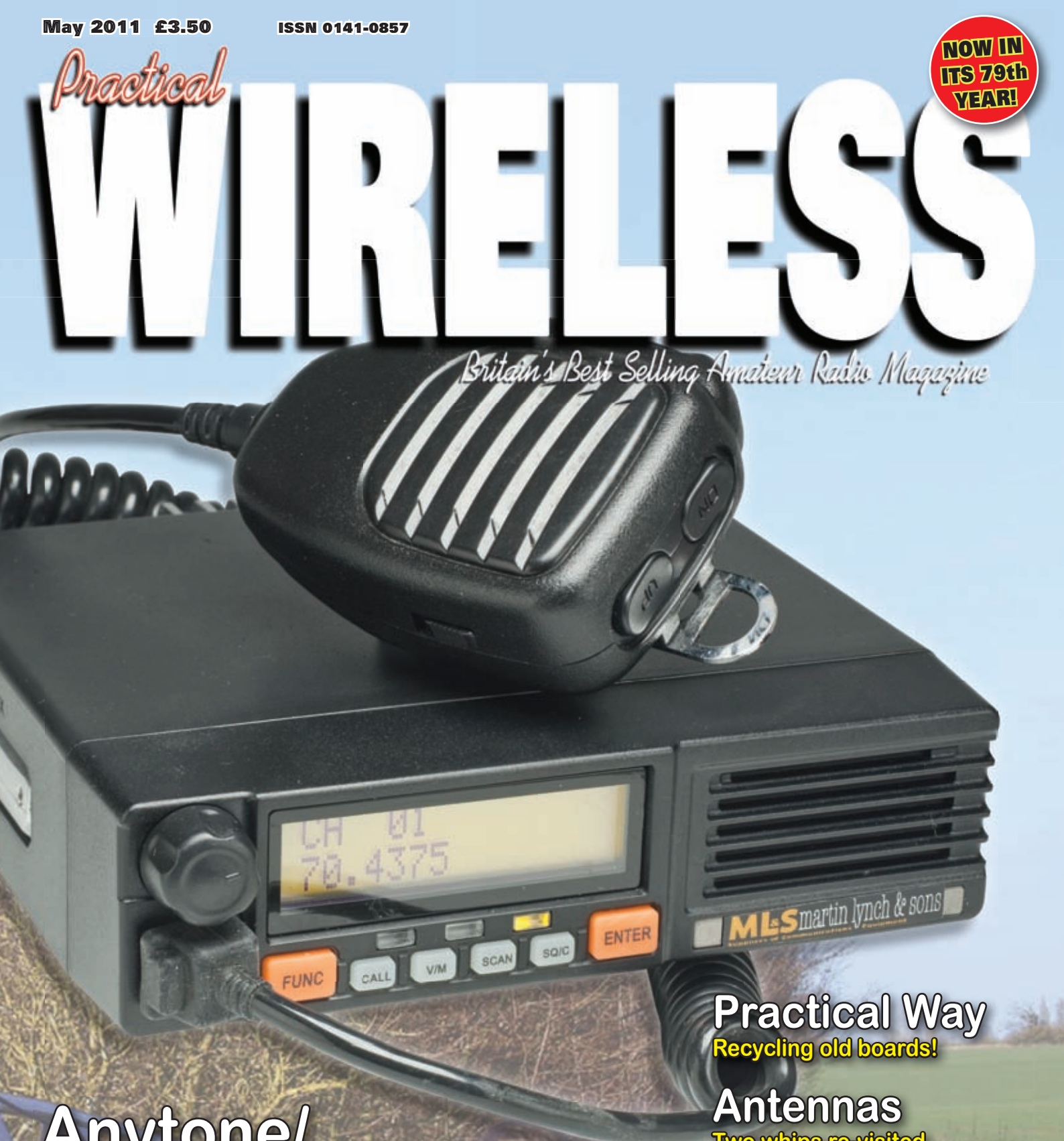

Anytone/ MyDEL-5189
70MHz FM Mobile Reviewed

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Recycling old boards!

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Two whips re-visited

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NEW ICOM IC-9100 ALL-ROUNDER

HF to 23cms Base Transceiver

The IC-9100 has received rave reviews and is THE radio for those who want everything in one box! Add the 23cms module and the D-Star board to expand your hobby even more. This radio is a real gem and comes with 2 year warranty.
UX-9100 23cms £449. UT-121 D-Star board £129.95. Roofing filters £52.95

HF/6m/2m	100W
70cm	75W
23cm (option)	10W

Satellite Mode Operation:
Optional D-Star DV Mode.

£2999 D

Longstanding Achievement Award for W&S!

ICOM

On our recent visit to Icom, W&S were presented with a trophy by Icom's Dave Stockley for outstanding service to Ham Radio. UK Ham's Favourite Icom Dealer.

ID-E880 NEW

2m/70cm 50W Mobile with D-Star and D-Star Repeat Mode. Features extensive GPS compatability, CTCSS & DTCS + Airband Receive, and 1000+ Memories.

£439.95 D

IC-T70E NEW

Dual Band 2m/70cm Handy

£159.95 D

IC-E90

Triple band 6m, 2m, 70cms.

£239.95 D

NEW IC-E80D

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

FREE software on Icom site

In Stock Now

£319.95 D

IC-E92D

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

£384.95 D

IC-E2820

Great dualband mobile.

£489.95 D

Fitted with UT-123 D-Star module. £699.95

HF Transceivers IC-7600

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.

£3295 D

IC-7800	Deluxe HF / 50MHz All-Mode 200W Transceiver	£8995 D
IC-7700	1.8-54MHz 200W with built-in PSK-31 + keyboard	£5999 D
IC-7200	HF & 6m DSP 0.005-3335MHz wideband receive with USB port	£839 D
IC-7000	160m-70cm 100W (hf) Mobile, portable or base station	£1189 D
IC-718	160m-10m 100W transceiver that brings HF to those on a budget	£595 D

Other Radios

IC-910H	£1295.95 D	IC-R6	£179.95 C	IC-R2500	£639.95 C
IC-2200H	£219.95 D	IC-R20	£394.95 C	IC-R8500	£1399.95 D
IC-R3	£399.95 C	IC-R1500	£499.95 C	IC-R9500	£10899 D

YouKits HB-1A-MK3 NEW

Available as from Early March
Limited quantity from first shipment

40m / 20m Model
HB-1A-MK3-40-20

30m / 20m Model
HB-1A-MK3-30-20

Completely self-contained ready built 5W CW transceiver with LCD digital readout and great performance - Look at the price!

£199.95

Provisional Specification:

Full band coverage	
Tx: CW	Rx: SSB CW & AM
Filters	Crystal for CW & SSB
Keyer	Built-in
Power Out	3W dry cells
	5W 13.8v
Memories	20 Channels
Volts	9 - 14v
Current	Tx 950mA max on
	Rx 55mA
Internal	8 x AA cells
External	13.8v

Tuning steps 100kHz - 10Hz
Size 140 x 95 x 35 (mm)

YAESU Major Shortage!

The production of Yaesu has been badly hit by the earthquake in Japan and there will be a severe shortage of some models, Remaining stock of the FT-950 is going fast!

FT-950 *HF - 6m Transceiver - We have the LAST FEW!*

HF transceivers are Yaesu's prime products and their use for contest work & DX is testimony to their quality and performance. The FT-950 represents the optimum in performance versus value. Features include:

Mic parametric 3-band EQ and processor, Tx audio monitor, Easy spot CW netting, Full break-in, SSB audio (rx) pitch control, SSB Tx bandwidth up to 3kHz, Front panel speed control, IF notch – shift and width control, Electronic iambic keyer, Contest 5 ch. memory keyer, CW audio filter, CW beacon keyer, VFO A/B with split select, Quick memory storage, Digital noise reduction, CTCSS, Repeater shift, Memory and VFO scanning, Attenuator, Pre-amp, Wide rx 30kHz – 56MHz, Roofing filters 3 / 6 / 15kHz and of course a built-in Auto ATU.

£1199 D

YAESU Two Great Mobiles

FT-2900E

75 Watt 2m mobile with 3W loud audio, CTCSS, DTMF mic and the "WIRES" internet feature.

£139.95 D

FT-7900E

2m/70cms mobile delivers 50/40W with CTCSS, DTMF, "WIRES" internet, 1000 mems and wide rx up to 999MHz.

£209.95 D

FT-2000 LAST FEW!

Another victim of the Japan earthquake is the FT-2000 series. There will be a big gap in deliveries once current stocks are gone, and maybe a price rise? This radio is a superb design used widely by DXpeditions & contest operators. Choose the 100W 160m - 6m 12v model Or the 200W model with 230V AC supply. If you want one, act quickly!

FT-2000	100W 12V	£1999 D
FT-2000D	200W + AC PSU	£2599 D

The Heavyweight Radio at a Lightweight PRICE!

HF Transceivers

FT-DX5000D	200 Watts of raw power and performance.	£4795.95 D
FT-DX5000MP	200 Watts plus additional panoramic display.	£5295.95 D
FT-450D NEW	As FT-450 plus 300Hz CW Filter & improved controls	£799.95 D
FT-450	100W HF - 6m transceiver - great value.	£639.95 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	£8999.95 D
FT-857D	HF to 2m mobile. portable or base - up to 100W	£679.95 D
FT-817BHIDSP	Fitted with DSP module exclusive to W&S	£629.95 D

VHF Mobiles & Handhelds

FTM-350E	2m/70cm Mobile Bluetooth GPS APRS	£479.95 D
FTM-10SE	50/40W 2m/70cms stereo FM	£309.95 D
FT-8800E	Dualband Mobile 50W / 30W	£329.95 D
FT-8900R	10/6/2m & 70cm Mobile	£369.95 D
VX-3E	2m / 70cm Handheld Wideband receive	£159.95 D
VX-7R	Waterproof dualband handy (silver / black)	£289.95 C
VX-6E	2m/70cms handy, 5W Wideband Receive	£238.95 C
VX-8DE	Triple Band 6/2m/70cm Upgraded APRS	£369.95 D
VX-8GE	Dualband 2m/70cm 5W + GPS Antenna	£359.95 D
FT-60E	2m/70cms, 5W handy Wideband Receive	£179.95 C

< VX-8DE

Flex-1500 SSB CW Transceiver

FlexRadio Systems®
Software Defined Radios

All Modes 5W HF - 6m Transceiver

The **Flex-1500** offers an amazing package with selectivity down to less the **50Hz** and a live **panoramic display.** A **single USB** connection to your PC (or Apple Mac running Boot Camp) will get you on the air in minutes. It is also **"transverter ready"** for VHF - UHF operation. Hear the difference and "see" the signals. "Click" on the signal waveform - you are netted ready to transceive - EASY!!

NEW FLEX-1500 Package (ends 30th April)
FLEX-1500 + SDR Software, Heil adaptor lead voucher, "Extras" software Disc.

All this for £579.95! D

Flex-3000 100W SSB CW TX

100W All modes with built-in ATU, firewire connection, hand mic and "extras" Disc.

£1299.95 D

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

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SD330
DIAMOND ANTENNA
Mobile "Screwdriver"

- *Length: Approx. 1.85m*
- *Weight: Approx. 1.1kg*
- *Frequency: 3.5-30MHz*
- *Max. Power Rating: 200W (SSB)*
- *Impedance: 50Ω*
- *SWR: Less than 2.0*
- *Connector: SO-239*
- *Type: 1/4 wave center loading*
- *Power Supply: DC 12V 100mA voltage & current*
- *Up-Down Time: approx. 50 sec. (3.5→30MHz), approx. 20 sec. (7→30MHz)*

£449.95 D

AOR
We are UK Distributors

AR-MINI

This amazing little radio covers 100kHz - 1.3GHz AM FM & WFM. 1000 memories, over 30 programmable features including CTCSS and DCS. Alphanumeric memories give meaningful channels and there is a builtin bar antenna covering 100kHz - 5MHz. Inc. NiMH pack and charger. FREE software database for PC loading via www.aorja.com.

£159.95 D

AR-8200-MKIII

The famous scanner with the quality performance. 530kHz - 3GHz AM FM FMW & SSB. Inc batts, charger + cigar lead. If you are looking for a truly wide-band great performer this is the best in its class!

£469.95 D

AR-8600MKII Base or Portable

The AR-8600MKII is a base or portable station receiver covering 530kHz - 3GHz. All modes AM FM FMW & SSB with standard rotary tuning. Requires external 12V or optional internal batt pack. A great station accessory for general listening or extra receiver.

£669.95 D

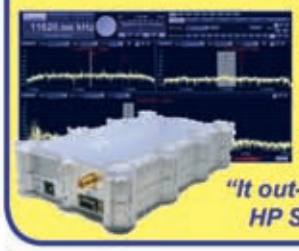
TG-UV2
QUANSHENG
2m/70cm Dual Bander

The TG-UV2 is a dual band 2m/70cm handheld. It covers 136.00 - 173.995 - 400 - 469.995MHz and FM broadcast 88-108MHz. The radio includes 7.2v 2Ah Li-ion battery for extended life.

- *3 Power Levels: 5W / 2.5W / 1W*
- *Steps: 5, 6.25, 10, 12.5, 20, 25, 30, 50 & 100kHz*
- *CTCSS, DCS & 1750Hz Tone*
- *Dual Watch*
- *200 Memories Alpha Numeric*
- *2 Deviation Levels*
- *2 Bandwidths*
- *CTCSS & DCS Scan*
- *Built-In LED Torch*
- *Backlit Screen*
- *PTT or VOX*

£81.95 D

WiNRADiO
WR-G31DDC "Excalibur"
Receiver 9kHz - 49.995MHz



Meet the new industry standard receiver for serious HF work. Just plug into your PC USB port for a new experience in sensitivity and dynamic range. No hardware design can match the way that signals are extracted, demodulated and both visually and audibly reproduced. Serious DXer or casual operator, you will be amazed.

"It out-performed my 100dB HP Spectrum Analyser"

£649.95 D

KENWOOD NEW TH-D72E

The very latest handheld from Kenwood is a dual bander with GPS, APRS and TNC capability. The TH-D72 has a built-in SiRF Star III GPS receiver and its antenna, so that you can enjoy various GPS functions with the radio stand-alone. You also can output its GPS data (NMEA-0183) to a PC through the USB port. You can even operate dual receive on the same band.

In Stock Now! £426.95 D

TGM Comms Compact Multi-Band Beam Antennas

If you have a small garden, then this is the anser. These compact beams will fit most locations. Auto swithing, small size and easy to erect.

MQ-26SR £639.95 D
Bands: 10,12,15,17,20 Meters
Fwd. Gain 10m-6dBd,12m-5.8dBd, 15m-5.8.0 dBd, 17m-5.4dBd,20M-5.0 dBd.
Power Rating: 1200 Watts P.E.P
Feed 50 Ohm Coax.
Front to Back Ratio: 12 to 20 dBd
El. Length:11 Ft 9 inches Boom 4 1/2 Ft
Turning Radius: 6 Ft 8 inches
Wind Loading: 2.0 Sq. Ft. Survival: 75MPH

MQ-24SR £539.95 D This antenna is similar but covers 6-10-15-20m.

B-245 £949.95 D 10-15-17-20-40m 2 el. 21ft el. 10ft Boom.

HF Transceivers

TS-2000E £1549.95 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 **£1799 D**

TS-480HX Ideal for mobile, portable or base station. Gives a massive 200W on HF and 100W on 6m. **£879 D**

TS-480SAT This model gives 100 Watts on all bands up to 6m, but adds a built-in automatic ATU. **£779 D**

Handhelds

TH-F7E	2m/70cm 5W (2-pin Kenwood) SMA **+FREE Clip Mic**	**£236.95 D**
TH-K2E	2m 5W 4-Key Keypad (2-pin Ken) SMA **+FREE Headset**	**£163.95 D**
TH-K2ET	2m 5W 16-Key Keypad (2-pin Ken) SMA **+FREE Headset**	**£172.95 D**
TH-K4E	70cm 5W (2-pin Kenwood) SMA **+FREE Headset**	**£163.95 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	**£445.95 D**

KENWOOD *The Amazing TS-590S!*

160m - 6m with superb receiver inc. dual roofing filters, Auto ATU, 32 bit f/p DSP & USB PC connection.
This is not an updated TS-570, but a completely new design embodying the very best engineering crafted by Kenwood to compete with the very best.

£1369.95 D

Vectronics
ATUs & Other Accessories

VC-300D

ATU with electronic PEP Meter and Dummy Load. It covers 1.8-30MHz and handles 150W continuous & 300W PEP. It will match coax, balanced line and end fed wires. There is an antenna selector switch and cross needle power / VSWR meter. To the right of the meter is a digital bargraph that can be user calibrated to measure true PEP. External 12V needed for this feature.

£219.95 D

VC-300DLP

Exactly the same as the VC-300D but without the digital PEP meter.

£184.95 D

VEC-254

High quality classroom morse code oscillator that makes copy easier and more comfortable.

£102.95 D

Watson
Power Supplies

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	**£92.95 C**

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

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That's right, you can now take advantage of our new scheme. We will purchase for cash your old ham radio gear - DEAD or ALIVE! If you want to buy a new radio, then we will allow you even more! Look around you at all those items you no longer need or use. Change them into cash and make a big saving on that new radio you have always promised yourself. All you have to do is phone one of our sales staff or e-mail us and tells us what you have to dispose of and what you want to buy. You could be sitting on more cash than you think! Call 01702 203353 or e-mail: sales@wsplc.com. Do it NOW!

Manson EP-925
25 Amp Continuous Variable PSU

£104.95 D

- *Output voltage 3 - 15V DC*
- *Output Current 25A (30A peak)*
- *Malfunction protected*
- *Dual meters for volts & current*
- *Front panel terminals*
- *Supply 230V AC 50Hz*
- *Weight 9.2kg*

Avair
Power & SWR Meters

All models have 12V backlight and include DC Cable.

AV-201 1.8-160MHz, 5/20/200/1kW **£49.95 C**
AV-400 140-525MHz 5/20/200/400W **£49.95 C**
AV-601 1.8-160MHz / 140-525MHz **£69.95 C**
AV-1000 1.8-160MHz, 430-450MHz, 800-930MHz, 1240-1300MHz. 5W, 20W, 200W, 400W. **£79.95 C**

Cross Needle Models Even Lower Prices!

The beauty of these cross needle meters is that they require no zero setting before you measure VSWR.

AV-20 30W / 200W, 3.5-150MHz **£39.95 C**
AV-40 15W, 0-150W, 144-470MHz **£39.95 C**

Diamond
VHF/UHF Antennas

A144S5R 5el 2m 9.1dbi 0.95m L **£49.95 D**
A144S10R 10el 2m 11.6dbi 2.13m L **£94.95 D**
A430S10R 10el 70cm 13.1dbi 1.19m L **£59.95 D**
A430S15R 15el 70cm 14.8dbi 2.25m L **£75.95 D**
SB144 Boom for dual 2m Yagis **£26.95 A**
SB430 Boom for dual 70cm Yagis **£21.95 A**
SS144 Stack transformer 2-way 2m **£94.95 C**
SS430 Stack transformer 2-way 70cm **£81.95 C**
KB144 Mast stand-off for vert. polarise **£19.95 A**
KB430 Mast stand-off for vert. polarise **£17.95 A**

Tonna
VHF/UHF Antennas

220505 6m 5 el. 10.1dBi gain 3.45m **£118.95 D**
220809 2m 9 el. 13.1dBi gain 3.47m **£79.95 D**
220909 70cm 9 el. 13dBi gain 1.24m **£74.95 D**
220919 70cm 19 el. 16.2dBi gain 2.82m **£94.95 D**
220623 23cm 23 el. 17.9dBi gain 1.75m **£77.95 D**
220725 13cm 25 el. 18.3dBi gain 1.45m **£102.95 D**

Create
Rotators

These are hunky Japanese rotators that we recommend for reliability & performance.

RC5-1 **£569.95 D**
RC5-3 **£719.95 D**

MFJ
Radio Accessories

MFJ-929 AUTO TUNER 1.8-30MHz 200W

LCD readout, 20,000 memories, long wire & coax, radio interface.
W&S £214.95 C

MFJ-991B Auto atu 150W **£214.95 D**
MFJ-994B Auto atu 600W **£349.95 D**
MFJ-962D 1.5kW ATU **£299.95 D**
MFJ-969 160m - 6m 300W **£219.95 D**
MFJ-971 Portable ATU **£122.95 C**
MFJ-974B Balanced ATU **£194.95 D**
MFJ-986 3kW differential tuner **£359.95 D**

MFJ-993B 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 £254.95 D

Build an All-Band Antenna Indoors or Outdoors - Do It Now!

MFJ-1260 Mic control 1 in/2 out **£101.95 C**
MFJ-1263 Mic control 2in/2 out **£121.95 C**
MFJ-1275 Sound card adaptor **£112.95C**
MFJ-1625 Window Ant + Tuner **£204.95 D**
MFJ-16B01 Dipole centre SO-239 **£22.50 A**
MFJ-16C06 6x dog-bone insulators **£5.95 A**
MFJ-16E01 300Ω end fed SO-239 **£10.95 D**
MFJ-1796 40m-2m vertical **£244.95 D**
MFJ-1798 80m-2m vertical **£309.95 D**
MFJ-1908H 43ft fibre glass mast **£244.95 D**
MFJ-1922 Digital screw driver control **£101.95 D**
MFJ-1924 Prog. screw drvr control **£132.95 C**
MFJ-1925 ATAS-100 controller **£74.95 C**
MFJ-202B Receiver noise bridge **£82.95 C**
MFJ-250X 1kW dummy load (x-oil) **£56.95 C**
MFJ-260C 300W dummy load **£45.95 C**

MFJ-998

W&S **£664.95 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 **£174.95 D**
MFJ-927 200W remote auto atu **£254.95 D**
MFJ-928 Basic auto atu **£203.95 D**
MFJ-931 Artificial ground **£114.95 C**
MFJ-932 Mini loop tuner **£143.95 C**
MFJ-934 Artificial ground + ATU **£204.95 C**
MFJ-935B Portable loop system **£204.95 C**
MFJ-945E Mobile atu 300W **£134.95 C**

TenTec
VNA Network Analyser

6000VNA 200kHz-120MHz

This new VNA gives affordable access to many capabilities of conventional bench-top Network Analyzers. Use it to test low power amplifiers, coax cables, measure and adjust filters, check antenna impedance vs. frequency, antenna SWR, even the length of transmission lines. Requires a PC connection. **£659.95 C**

Tigertronics
SignaLink Interfaces

New Delivery Expected!

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**

Uniden Bearcat

UBC-30XLT

A real bargain whilst stocks last.

Frequency Range: 87.5 - 107.9MHz WFM, 108-136.9875MHz AM, 137 - 173.99MHz FM

The radio has 200 memories, LCD display and can scan at 25 channels per sec.

£62.95 C

Check full spec. of these radios @ www.wsplc.com

UBC-3500XLT

FM FMB WFM AM Frequency:
- 25-512MHz
- 806-960MHz
- 1240-1300MHz.

2500 memories, RF near signal capture, Quick keys, Scan 100 channels per sec., CTCSS & DCS, Alpha numeric tags, Data skip, Auto store, Display contrast adjust, AC adaptor/charger included.

This is the Bearcat Flag Ship radio. It pacts an amazing number of features into a small package. If you are looking for a serious VHF/UHF scanner that covers the entire spectrum and resolves all the popular analogue modes, then this is a serious contender. **£209.95 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 **£11.95 C**
W-285 2m 3.4dBv 1.33m **£14.95 C**
W-77LS 2m/70cm 0/2.4dBv 0.43m **£14.95 C**
W-770HB 2m/70cm 3/5.5dBv 1.1m **£19.95 C**
W-7900 2m/70cm 5/7.5dBv 1.58m **£32.95 C**
W-627 6/2/70cm 2/4.5/7.2dBv 1.6m **£34.95 C**

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 £369.95 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=£4, B=£5, C=£8.50, D=£11

Practical Wireless May 2011

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Front Cover
Tim Kirby G4VXE goes mobile with the Anytone/MyDEL-5189 70MHz FM Mobile Transceiver. Photo courtesy of **Julie Kirby**.

Published on the second Thursday of each month by PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: 0845 803 1979. Printed in England by Holbrooks Printers Ltd., Portsmouth P03 5HX. Distributed by Seymour, 2 East Poultry Avenue, London EC1A 9PT, Tel: 020 7429 4000, Web: http://www.seymour.co.uk. Sole Agents for Australia and New Zealand - Gordon and Gotch (Asia) Ltd.; South Africa - Central News Agency. Subscriptions INLAND £38, EUROPE £47, REST OF WORLD £57, payable to *Practical Wireless*, Subscription Department. PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: 0845 803 1979. *Practical Wireless* is sold subject to the following conditions, namely that it shall not, without written consent of the publishers first having been given, be lent, re-sold, hired out or otherwise disposed of by way of trade at more than the recommended selling price shown on the cover, and that it shall not be lent, re-sold, hired out or otherwise disposed of in a mutilated condition or in any unauthorised cover by way of Trade, or affixed to or as part of any publication or advertising, literary or pictorial matter whatsoever. Practical Wireless is Published monthly for $50 per year by PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW, Royal Mail International, c/o Yellowstone International, 87 Burlews Court, Hackensack, NJ 07601. UK Second Class Postage paid at South Hackensack. Send USA address changes to Royal Mail International, c/o Yellowstone International, 2375 Pratt Boulevard, Elk Grove Village, IL 60007-5937. The USPS (United States Postal Service) number for Practical Wireless is: 007075.

Rob Mannion G3XFD/EI5IW's

Keylines

The Editor's looking forward to spring and h.f. portable operations!

As we approach spring, I'm starting to think about the possibilities of portable h.f. operations again. A decade or so ago, I kept my original Alinco DX-70TH in the car, using the cable extension unit so that the control 'head' could be mounted just below the dashboard.

Most of my portable operations from my car in the early 2000s were on low power (around 10W) using mobile antennas, either on 7MHz (mostly) and 14 and 18MHz. I could be on the air within a minute or so, as erecting the mobile whip onto a base on the car's roof rack was extremely simple.

Almost invariably on 7MHz – I would get a brief c.w. QSO with **John Worthington GW3COI**, our much-missed cartoonist who is now a Silent Key. John would literally 'pounce' on my first call and we'd have an enjoyable short QSO. Unfortunately, as the dementia – that has blighted so many other lives – set in and our contacts became much shorter. Despite this, John would always call when he heard me on the key – despite that latterly, he wasn't really fully aware of why he called me.

In fact, I was so saddened by the devastating affects of dementia on my friend that I avoided operating c.w. on h.f. while operating from my car – it always seemed that the propagation and vertical antenna always found its way to John's Welsh hideaway near Pwllheli on the Llyn Peninsula. I wanted to remember John GW3COI at his wittiest best. In fact, I'm sure he was a secret scriptwriter for *The Goon Show* in the 1950s – John was so funny he certainly should have been writing for the show!

In the final year or so before John died I kept in contact with him by letters, which he seemed to enjoy, although eventually my dear friend became very confused. Despite this, I knew he appreciated the news from the *PW* offices and his Amateur Radio helped lessen his isolation. I know – from personal experience – that many other dementia sufferers have enjoyed their Amateur Radio – despite sometimes being unable to respond to old friends over the air.

Portable Dipoles

When I got back to operating h.f. mobile from my car again I did so by using a portable dipole for 7MHz, because such basic antennas are so effective. I had decided to do some tests by comparing the results between a centre loaded resonant whip antenna against a very simple 7MHz dipole, supported in the centre by a mast made from broomsticks!

I fed the dipole with 50Ω coaxial cable and – despite the centre of the dipole only being 12ft above the car – the results were far superior to the mobile whip and I usually got a QSO from my first "CQ" or call to another station.

Although the mobile whip provided some good contacts with friends – including **Norlief Bjørneseth LA9FG** in Volda, Norway – using 10W of 7MHz c.w while I was parked under a fully leafed tree. I had decided to go on the air while my wife **Carol** was attending our dentist's surgery and despite being literally surrounded by the huge tree with drooping branches, together with a very dry shingle parking space – Norlief gave me an RST 579.

Despite the occasional good long distance QSO achieved with the mobile whips, I think the much more effective portable dipole provides far better performance because of its greater 'aperture'. The 'aperture' – a term not often referred to in Amateur Radio – refers to 'amount' of wavefront the antenna 'sees'.

A simple analogy can be demonstrated by dropping a pebble into a pond, and watching a short stick bobbing up and down on the ripples. The stick, although intercepting some of the energy in the 'wavefront' (the ripple) is only 'seeing' a small proportion. A longer stick intercepting the wavefront will 'see' more energy.

Whenever I'm 'playing' with antennas I remember the old adage from Amateurs friends who have long since left us. "Get as much wire up, as high as you can' they used to say. And, of course, they knew all about apertures – without even mentioning the term! So, my advice is to everyone thinking about portable operations – try a dipole!

Rob Mannion G3XFD/EI5IW

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Readers' Letters

Send your letters to:

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

Editorial comment: *Some rather long letters this month – and as they all cover very important topics they've not been edited for length. I think readers will understand why!* ***G3XFD****.*

£20 Star Letter

A Blind Spot Maybe?

Dear Rob,
I'm writing to you following a discussion in the E-mail group of the **Radio Amateur Invalid and Blind Club** (RAIBC) the charity working for Radio Amateurs with Disabilities. The subject being, the impression, rightly or wrongly, that a scientific calculator is required to tackle some of the questions in the Advanced part of the Amateur Radio examinations.

I started thinking about the examination and what a daunting process it must seem to a person who suffers sight loss, with an interest in getting into Amateur Radio. This prompted me, as a Severely Sight Impaired (SSI) Amateur, to set down some of my thoughts and observations:

The following comments are aimed predominantly at Sight Impairment – but not to the exclusion or detriment of other disabilities – instead they're more to flag up the unique and peculiar difficulties that 'Sight Impairment' presents. I have taken a position as if the Radio Amateur Exam (RAE) was just coming into being and what should be set in place to make the whole process accessible to the SI and SSI. ('SI' being 'Sight Impaired' but not technically Blind, as against 'Severely Sight Impaired' (SSI) which is now the term for Technical and Total Blindness). However, to confuse things both VI and SVI can still be in use in some areas!

The first challenge is to find a way to dispel myth and stereotyping surrounding SIs and SSIs. The most common myth is, that if a SI is not wearing a tasteful pair of wire framed round black glasses or bumbling around on the end of a white Stick, or trailing along holding the harness of a guide dog, they don't really have a sight problem.

There's an equally odd assumption that if some, using the previously mentioned aids, are visible, that the SSIs have developed a super human level of hearing and touch, and this totally compensates them for their sight loss! Yet another is that shouting loudly in an SI's ear is what is needed to overcome their sight problems!

Let's not overlook the plight of an SSI who is often assumed to live in a world of total blackness, empty and devoid of any imagery. Some people imagine we are destined to wander aimlessly about, or are sitting for hours getting blisters from weaving baskets. They certainly wouldn't consider that we could attempt anything too technical!

Finally (on the pre-conceived notions), isn't it strange the phenomena that on occasions some members of the general public feel compelled to address a guide dog rather than have a face to face conversation with an SI owner? Don't worry, I'm not being sarcastic, it's just a humorous and slightly tongue-in-cheek observation of some common and deeply engrained misconceptions that still linger, tending to support and re-enforce a general misunderstanding about Sight Impairment!

The RAIBC, RNIB and of course the RSGB, and journals and publications, could do a lot to help broadcast the struggles and successes of SIs and SSIs rather than as happens in the news media occasionally reporting the rare occurrence of an SSI climbing 'K2' or 'Mount Everest' or some other equally daring feat. However skilful sensational and news worthy items are presented, they do little for day-to-day awareness of what SIs are capable of in this predominantly sighted world (and this not just items relating to our hobby).

It may be surprising to note that only 5% (approximately) of the SI population in the UK are totally blind. And of that percentage there are probably more who suffer 'white blindness' and all the shades in-between.

It's sometimes noted that there's often a reluctance to even mention the 'Disabilities Discrimination Act' (DDA), which has been updated to 'The Equality Act 2010' with respect the RAE's 'accessibility', which, I would agree – if it was proposed to use it as a crude 'club' (In the weapon sense!) to beat unreasonable concessions out of the RSGB. For the Sight Impaired and/or any other disabilities, this would be inappropriate and well 'over the top'. I do take the view however, that it took a dedicated group of individuals a long time to get the plight and injustice of discrimination against individuals with disabilities recognised and protected by legislation.

Therefore, I think it would be a waste, not to use the principles embedded in the acts to establish guidelines and benchmarks to aim for a means of accessibility – not in an aggressive way, but very much in a practical common sense and formal way. It could be a charter of rules and dispensations, under what circumstances, and for whom, and why, and how special arrangements are applied for and granted, and who is responsible for what.

Also including other items, for example:

Course materials, manuals and items of reference, should all be available in audio, electronic or Braille formats, etc., (produced or commissioned by the RSGB). This being a requirement under the older 'DDA' and also the later 'Equality Act 2010', tempered, as before by the qualification that it is practical, reasonable and affordable to do so.

How manuals and questions are set out. For example emphasising the use of a Scientific calculator when one is not necessary to arrive at the answer.

An understanding that there is, within the range of Visual Impairment, those that were born with sight loss and others who have lost it recently, or very late in life, those that have no concept of access technology, or how to use it, and others who have become highly dependent upon it in their daily lives, such as using laptops and electronic notepads, etc, or even a person acting as a support worker. What will they be allowed to use in an exam environment.

Course or exam work that has a

practical hands-on element or circuit diagrams and graphs, that can be substituted by extra questions or a verbal interaction with a sighted person working to their instruction.

The option of examination venues such as a college, a radio club house or our own home. Also – very important to a Visually Impaired person when in unfamiliar surroundings – is the placement of furniture, lighting and sound levels, and not least the speaker's location.

Reasonable flexibility with exam time period, to take account of the questions having to be read and repeated, coupled to descriptions of pictures, diagrams and graphical images until they are fully comprehended.

Training the trainers and examiners on how to work with, and react to, SIs & SSIs, often is nothing more complicated than a stunningly simple approach, and an awareness of the difficulties presented by Visual Impairment.

Being condescending, overtly 'Politically Correct (PC), over-the-top and loud, about being seen to be doing the right thing is definitely not what's required. The result of this kind of behaviour will almost certainly bring about a drop out, or at best a major under-achievement.

In general terms SIs and SSIs are quite capable and resourceful individuals who have the same doubts and vulnerabilities as the next person. However, we are much more aware and often easily stressed by having to quickly adjust and function in an unfamiliar environment full of unseen sights, sounds and smells, so a little time and space is often useful just to ease us back to the normal knee-knocking level of nerves.

When talking to SIs and SSIs, I suggest that people announce their presence, and address their comments to the individual by name. You should also be aware that using arm waving, finger pointing, facial gestures and general body language has little or no impact when you're wishing to emphasise a point, or perhaps when you are just trying to describe where the toilets and fire exits are.

Don't be put off if SIs and SSIs appear to be facing in the wrong direction when they're being talked to – their audio direction finding, might be a bit sluggish. They will get there eventually. But on the other hand – don't be reluctant to check that your comment has been heard and understood, as quite contrary to popular myth, hearing difficulties can also be present with sight loss.

In line with what I've suggested, if two people are working with a SI (and most definitely with an SSI) – please avoid standing or sitting either side of them, as it may result in a fair impression of the candidate dancing the 'Twist' or the probability of suffering 'Wimbledon Tennis Watcher's Neck' and not really conducive to the absorption of information. Instead, the two people should sit together so that the SI addresses them in one place.

There are many more examples that could be quoted. However what's not being asked for is a whole series of outrageously biased and impractical dispensations that unfairly favour a particular group of individuals. Instead, I'm suggesting a the 'Stop and Think About It', common sense approach to the RAE and how it can be made more readily accessible to the Visually Impaired.

I would always commend my hobby to anyone, especially those with a disability. It's both fascinating and absorbing, it's also socially and disability neutral. Indeed, whenever I operate I'm as good as anyone else and my disability effectively becomes invisible unless I choose otherwise.

The RAE and its successors the Foundation, Intermediate and Advanced Exams were never – and should not become – a way of training or finding another Einstein, electronics or mathematical genius. Instead they should continue to pass out informed, competent and responsible Radio Amateurs who will continue following the underpinning principle of 'Self Education'.

Finally, for those of you working through, and on your way to the Advanced Licence don't let anything or anyone dampen your curiosity or your enthusiasm. Just go for it regardless, remember you don't get taken outside and shot for making a mistake! I wish all of you the very best of luck and hope to meet you on air sometime. Best wishes

Brian Tuffill M0FFS SSI
Hayle
Cornwall

Editor's comments: *Some food for thought there Brian. However, I must admit that I – as a keen Labrador fan – have often introduced myself to a guide dog first – ensuring, of course, that I don't distract the dog at critical places. It seems to help avoid alarming the person. The contact with the dog has then invariably and effectively introduced me to the person being guided! Obviously, the comments addressed to the RSGB will no doubt be picked up by the Society themselves as they will also almost certainly read your letter here.*

Basics QSOs In Welsh?

Dear Rob,
Some years ago *Practical Wireless* ran a series of articles called *Basic QSOs in French...*' and various foreign languages, to help English-speaking Amateurs to exchange QSO details with non-English-speaking Amateurs abroad.

I think the time is right for this series to be repeated. We have lots of new Amateurs who weren't reading *PW* when the articles were first published and languages change over time and new words are added, especially in technical fields like Amateur Radio.

This time I would like to see Welsh added to the list of languages. I hear Welsh spoken not infrequently on 80 metres and would love to be able to join in, if only to give basic details of my station and location. I feel sure there are GW, 2W and MW readers who would be happy to help with this. Thank you for an excellent magazine and especially for **Tony Nailer G4CFY**'s *Technical for the Terrified* series!
John Fletcher G4EDX
Woodthorpe
Nottingham

Editor's reply: *Having just returned from a special train trip around Central Wales, I agree that more knowledge of this fascinating 'home nation language' would be helpful John! I've struggled with Welsh myself and have a Welsh Language course you can try if you wish. However, if enough interest is shown we might be able to help with an article. Finally though – what version of the language should we concentrate on? I've been told by experts that the Welsh spoken in the south of Wales differs quite a bit from that spoken in north Wales!*

Comparative Reviews – A *PW* Author's Opinion

Dear Rob,
I read the discussion around comparative reviews in the April 2011 issue with interest, both as a reader and occasional review author. My initial reaction was to support the idea of comparison reviews, as I thought it would be of benefit to readers. However, the more I thought about the practicalities, the more I realised that I don't think that this would be the case.

Reviewers already make limited comparisons with other transceivers even if they don't mention other models by name. I certainly did when reviewing the Wouxun KG-UVD1P in the September 2010 issue (I counted seven comparisons) and the Alinco DJ-G7E in the October 2009 issue (again seven comparisons including one where I mentioned a specific previous Alinco model as a comparison).

There are some consequences of full side-by side comparisons that need to be considered. A typical a review in *PW* takes three to five pages for a single transceiver. If a full side-by-side comparative review of say three transceivers is to feature in *PW*, this would mean that it will dominate the particular issue taking nine to 15 pages. In addition, further space would also be needed to make the side-by-side comparisons. Even in the form of summary table, it might easily take a further page.

Whilst the Editor will no doubt do his best to balance the space allocated to each manufacturer's transceiver, imagine the situation where one manufacturer has a particular new feature – like D-Star from Icom – that the comparative models from the other manufacturers don't have. The reviewer needs space to describe the new feature, its benefits and how well it works. The other manufacturers might feel aggrieved at not having the same amount of space.

I think the concept of a 'score' for performance could be very difficult. Most Amateur Radio equipment these days performs well, and giving a comparison score that can be justified and useful I think would be almost impossible and probably meaningless. What could readers conclude from three transceivers getting scores of 89, 90 and 91%?

As for scoring 'features', how to score 200 memories over 100 memories? And how much importance should be attached to the number of memories in the overall score? If a transceiver has more than 20 memories, then personally I'm more than happy. No doubt readers will each have their own view of how many memories they need.

Should reviewers give a transceiver with extended (out of band) v.h.f. receive capabilities a higher or lower score than one which just covers the amateur band? Personally, I would give extended coverage a lower score, but I know many Amateurs who would give extended coverage a higher score.

In these situations the reviewer can currently state the transceiver has 200 memories, has extended receive capability and has D-Star, then leave each reader to decide the importance or otherwise of these features. Producing full side-by-side comparative reviews will certainly take the reviewer a lot longer.

In a current single-model review, the reviewer has to take care to provide balance within the review, clearly describing the features and performance. Just because a reviewer might not like a particular feature doesn't mean it's bad. To provide a balanced review for three models will take at least three times as long. Add to this the time to make a balanced comparison of the three models will inevitably delay the time before a review of a new model can appear in *PW*.

Unlike the major camera manufacturers – who introduce new models at various price points to the market almost every year – in Amateur Radio it can be several years between new transceivers from the main manufacturers. So it might be the case that a new model from, say manufacturer A is compared with last year's model from manufacturer B and a model from three or four years ago from manufacturer C that may already have been reviewed.

The differences in practice, between digital single lens reflex cameras (SLRs) from the main camera manufacturers at a similar price point, are in reality quite small (I was reading some camera reviews recently). At the same price point, Amateur Radio transceivers have much greater differences such as the bands they operate on. I think that these differences are too great to make valid comparisons. Imagine a situation when a 'very good' h.f. transceiver from manufacturer 'A' covering 1.8 to 30MHz is reviewed in comparison with another from manufacturer 'B' that covers 1.8 to 50MHz, but whose h.f. performance is not quite as 'good'.

The overall score could easily be weighted in favour of the model that covers 50MHz, which would not help readers looking for the 'best' h.f. transceiver. In reality, I think that readers in the market for a transceiver that covers 50MHz will not be interested in manufacturer A's transceiver, but will be interested in manufacturer B's offering.

I have also considered the approach adopted by *Gramophone Magazine*

Buddipole Help Required by G0TAK!

Dear Rob,
I have just acquired a 'Buddipole' portable antenna system and (for a change), having read all the information I tried a 'dry run' of assembling the dipole indoors, it's large but quite possible. I was glad I had read the instructions as there's a hidden pitfall or two!

As supplied, the coils have attached to them, two 'standard tapping points', on one side these are colour-coded Red and Green, on the other side Black and Blue. A chart entitled 'The Basic Dipole Tuning' chart points out that the coils must be fitted to a particular side of the dipole centre, (after installing the rigid arms), tapped at a particular point, (or not, depending on the band of choice). Following this the telescopic sections need to be installed and set to a particular length.

The 'funny' bit is that the coils are identical in construction but are tapped at different points on either side of the dipole. Added to which the telescopic sections may need to be of unequal length – this results in what appears to be an asymmetrical dipole. That's the bit that I don't understand. I have always been brought up on the idea that a basic dipole is two **equal length**s of wire. Can anyone help me by explaining what is going on in this antenna design?

Having done as required by following the instructions I must say that the kit works very nicely. I can't wait for the good weather to come along. Finally, I hope you can afford the Tax on my incoming E-mails! 73

Roy Walker G0TAK/2E1RAF
Highgate Barn, Old Hutton
Kendal, Cumbria LA8 0LX
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in reviewing classical music CDs. When a particular new CD release is reviewed, it's reviewed in full and then briefly compared to a few 'selected comparisons' as references that are generally acknowledged to be 'good performances'.

I don't think that even the *Gramophone Magazine* review approach will work for Amateur Radio equipment. This is because I suspect that Radio Amateurs would struggle to agree on reference models. Even if they did, the reference model may not be currently available, which makes the exercise rather academic!

The other thing to consider is **to what extent** authors can make fair comparisons. If all models are not available at the same time, variations in propagation will make valid side-by-side comparisons difficult, although not impossible (camera reviews after all have to contend with different lighting conditions). An alternative comparison approach might be to compare the new model from manufacturer A with the model it replaces from the same manufacturer. I'm not sure that readers would find this particularly helpful. And I doubt if many readers would replace a three to five years old transceiver so soon – I certainly

wouldn't. This wouldn't be helpful where new manufacturers enter the Amateur Radio market.

I suspect that going down the road of side-by-side comparison reviews may encourage manufacturers to produce ever more complex and 'feature rich' transceivers. They might concentrate on ticking as many 'feature provided' boxes as they can, rather than delivering good on-air performance and ease of operation. At the end of the day all I want of a transceiver is to get on the air and make contacts, I need it to work well, but really don't need it to do the washing up too!

In the end I think readers are best advised to establish their own requirements, priorities and budget and then research what's available in the market place. Having narrowed their search, then I believe a factual review is helpful. Review readers can then do their own scoring if they wish, and decide what features and aspects of performance really are important to them and what isn't and arrive at their own conclusions. My regards to everyone.

Colin Redwood G6MXL
Creekmoor
Poole
Dorset

April 1st E-mail Tax Spoof

Dear Rob,
As usual very pleased to receive the April issue of *Practical Wireless* in the post. My attention was immediately caught by your front cover "Cyber Tax" headline which I read straight away. Feeling very cross about even more Government intrusion I passed the magazine to my wife **Joyce** for her to read the offending News article and then I remembered being previously caught by you in the last April issue!

I still haven't told Joyce as I am waiting until I also catch my daughters when they arrive shortly for lunch as I type this. Thank you for providing the additional entertainment in what is an excellent magazine, not only for me, but for the whole radio community.

You'll be pleased to know that the steam trains will be steaming up the the Keristal Rise at the back of the garden on Friday, the first train of the season, which this year will last until the end of October– the smells and vibrations of summer are arriving soon! Kindest regards.

Allen Gawne GD7LAV
Port Soderick
Isle of Man

April Spoof!

Dear Rob,
I was very interested to read in the *PW* 'News Flash' about the proposed 5p tax on incoming E-mails. I have also been told that a proposed tax of 2p per all words sent in c.w. It may be just a rumour, something to do with there being an 'AR' in the month! All the best to you and the *PW* team and thanks for the leg-pull!.

Jack (Tich) Nelson G0DNC
Stockport
Greater Manchester

That Dreadful *PW* Editor Frightens Us Again!

Dear Editor,
I was both shocked and annoyed when I saw the front cover news item regarding the possible introduction of an incoming E-mail tax. Then, realising the cover date and knowing your sharp and barbed sense of humour – I realised it was another, truly wicked, Mannion spoof! Yes Sir, you truly are a dreadful Man(nion) indeed!

Did you not realise Mr. Editor, that Civil Servants – even Politicians – get to see *PW*? Surely, you must realise the danger of giving 'Stealth Tax' ideas to the Chancellor? I was taken in at first because taxing E-mails seemed – at first sight – to be a workable idea. Then it slowly dawned! A great spoof Mr Editor – I'll make sure next time I meet you (the Newark show I think) that you'll buy me a Guinness to settle my nerves. What will the Editor think of next? What an abuse of power! (I wish I could still do it myself!). Best wishes.

Joseph (Jo) Mannion
Fazakerley
Liverpool
Merseyside

Editor's comment: Thanks Jo'! I'm delighted and concerned at the same time that our April Spoof 'hit the target'. Delighted to 'get you all going' but concerned that the Chancellor may take up the idea! And yes we are related (Jo's a cousin of mine and is a retired Journalist!). Thank you all (too many to publish) for your amusing responses. Here's to next year's Spoof!

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**

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Stop Press News

Peter Kirby G0TWW RSGB General Manager Leaves

The Board of the RSGB has today (Monday March 28th 2011) released the following announcement: Peter Kirby G0TWW, the RSGB General Manager, has left the Society's employment after the discovery of financial irregularities on his part. For the time being, RSGB Director Don Beattie G3BJ, will act as General Manager. He can be contacted at **Don.Beattie@rsgb.org.uk** or (**01234**) **832 701/07802 922 219**.

New Date For RSGB AGM

The postponed RSGB AGM will now take place on Saturday May 14th 2011 in Derby.

Don Hayter G3JHM Silent Key

As we closed for press news came that retired Broadcasting Engineer and well known microwaves operator Don Hayter G3JHM has died, his funeral was held in mid March. A full tribute to Don, who lived in Four Marks near Alton in Hampshire, will appear in the June issue of *PW* from myself and his Canadian/ Dutch friend **Kees Kaper VE5KKZ**. Our sympathies go to Don's family. **Editor**.

Bangor & District ARS Are Busy!

Michael Stevenson GI4XSF wrote in to *Newsdesk* with the comment "Bangor's Busy"! Mike went on to say that the Bangor and District Amateur Radio Society meet on the 1st Thursday of every month in '**The Boathouse**', **Seacliffe Road**, **Groomsport**, **Bangor**, **County Down BT19 6JP** at 8pm.

Mike continued, "At 8pm on Thursday May 12th 2011 we are having an operating evening. We will be testing the performance of vertical and cobweb antennas, so it should be an interesting evening. This meeting is a week later than normal, due to local elections being held in the Boat House on our normal evening. As always, visitors are most welcome. More information from me GI4XSF on **028 4277 2383**, or club website **www.bdars.com**

"Finally, our annual rally is to be held on **Saturday July 2nd 2011 At 1130**, at the same location as last year and on a **Saturday again!** The venue is **The Donaghadee Community Centre Parade** (past pier 36)**, Donaghadee BT21 OHE".**
Mike GI4XSF. E-mail: **mike@gi4xsf.com**

First Annual Douglas Byrne Marconi Lecture

Rob Mannion G3XFD reports for *Newsdesk*: "Tuesday March 1st 2011 saw The first Annual Douglas Bryne G3KPO Marconi Lecture being presented in the Saskatchewan Lecture Theatre in Exeter College in Oxford. The lecture was made possible after many years hard work by Gordon Bussey, who unfortunately died in Jauary 2011 – just as his work was coming to fruition. However, it was a fitting tribute to Gordon and everyone involved that the – rather hot and stuffy – semi-basement room was filled to capacity for the lecture, given by Professor Peter Scott from the University of Reading.

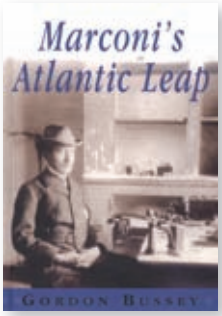
"Peter Scott – who hails from Huddersfield in West Yorkshire – is the first Douglas Byrne Fellowship holder and enthralled his audience in what many of them might not have thought to be an interesting topic – the economics of wireless production between the First and Second World Wars. However, even though the lecture contained very few technical references – it came as quite a surprise to many of the audience how the major manufacturers were 'tied up' by the control of patents by licensing from the Marconi Company! The audience – College Staff, Radio Amateurs, historians, the press and Members of **The Wireless Preservation Society** learned – amongst many other cartel type activities – the licence charges were based on the number of valve bases there were in each receiver! Personally, I thought this must have been the main reason why multiple-valves-in-the-same-envelope came about!

"Although there were obviously many questions waiting to be directed at Professor Scott after his fascinating lecture, unfortunately time was against us all and we were encouraged to discuss things with Peter Scott during the reception. And in fact he was kept very busy answering many questions from his eager audience!

"The Douglas Byrne Marconi Fellowship and the lecture delivered by Peter Scott, will be followed by annual lectures provided by future Fellows. They have been made possible by the Trustees of the Wireless Preservation Society in recognition of the Society's founder – Douglas G3KPO. The Bodleian Library and the Museum of History and Science made it clear to me they're are proud to host the scholars using the Marconi Collections to help increase the knowledge of the history of wireless communication.

Balliol College

"Following the reception in the Divinity School at the Bodleian Library – where some of the Marconi Archives were on display – guests walked the short distance to the Old Common Room at Balliol College. An very enjoyable dinner was served and when toasts were called at the end of the meal we all stood to toast the empty chair where **Gordon Bussey** was to have been seated. Everyone drank at toast to the memory of a truly remarkable man, everyone regarded the evening to have been a truly resounding success. After enjoying many anecdotes and discussions on the remarkable friend we had in Gordon Bussey – I headed for home – looking forward to the 2012 Douglas Byrne Marconi Lecture. It's bound to be fascinating! **G3XFD**.



There was one face missing from the first Annual Douglas Byrne Marconi Lecture – Gordon Bussey, the leading Marconi historian, who died on January 20th 2011. However, all his efforts to organise the Douglas Byrne Fellowship, the Lectures and the annual dinners to be held afterwards, were recognised by an unoccupied chair at the head of the table during the first dinner. A fitting tribute to a remarkable man.

Calling All Club Secretaries & PROs!

Now we've got your attention – the *PW Newsdesk* staff need your help to produce the best and most informative news pages available! And, if your club's Hon. Sec and PRO do not see *PW* (we often get reports from contributors who have obviously not read *PW*) we would also kindly ask you to alert them to our requirements to help prepare the best news items on your behalf.

Via E-mail only please: Because of the way we work nowadays, handling postal items for club news, etc., is extremely difficult. Instead, we ask everyone to use E-mail to send in information and photographs. If a member of staff is not working in the *PW* offices, it's a simple operation for the E-mails to be redirected.

Clubs News items: First, please ensure you include your own full name and contact details when you provide a news item. To help new members find your club location we ask you also to include the post code of your venue. This is a most important item of information nowadays and we can waste much time looking it up on your behalf and it can also lead to a news item being held over. Always attach a large and good quality logo if you have one, so we can use it in your news item. A photograph of your venue with members present can always brighten a news item up too!

Website details: Don't forget that your club website is a really effective way of publicising your club's activities – so make sure *PW* knows all about it! Also, if possible, please provide a direct E-mail link to your club Secretary or Membership Secretary on your website. Many people are reticent about filling in web-based 'enquiry forms', so a direct link is far better.

Full details: To get the best response from your news item it's important that everyone is mentioned by given name, surname and callsign (our style is not to detach a callsign from a name using a comma as it's directly linked to the surname). In other words in *PW* a name and callsign will appear as **Forename Surname Callsign**.

If someone has 'details withheld' (DW) in the various callbooks, etc., please ensure they give permission to be photographed and mentioned by their full name and callsign. If we cannot connect a callsign to a surname (for example that person is 'DW') all references to them will be deleted to protect their privacy.

Children in photographs: Please also ensure that any children who appear in photographs have permission to appear in the photographs from their parents/guardians and for them to be fully named in any news item. We cannot and will not just publish a child's given name only, as it may imply we have not had prior permission to publish. We appreciate this could cause problems when the Scouting organisations are involved as they have their own firm and inflexible security policy regarding the photographing of children. So, it's best to check beforehand to avoid wasting a good photo opportunity – and so protecting yourself as a photographer because of the heightened security towards children nowadays.

No rear views please!: Finally, as photographs of our hobby in action and the personalities involved are so important (let's face it - we're actually recording something that will eventually be recorded history!) – make sure that everyone is identifiable (no backs to the camera!) and that you have named everyone in the photographs. It's so easy to be unintentionally rude by forgetting to identify a friend in a photograph – so please provide indicators so we know 'who is who'!

So, with your help – we're looking forward to making the best news item possible! **The *Newsdesk* Team**.

News update

G4TPH Portable Magloop Antennas back in production

Due to supplier complications the G4TPH Portable Magloop antennas have been totally re-designed with several improvements over the original models. The New ML-40 MKII now covers 7MHz through 21MHz, tuning bandspread is improved, and power handling is now 35W with improved v.s.w.r. The ML-20 MKII has similar improvements.

Bandspread tuning and the higher power handling is due to the new capacitors and improvements made to the inductive loading units. The ML-40 MKII and ML-20 MKII antennas now use 15mm rails instead of the 10mm rails used in the earlier models. Computer modeling indicates an increase in efficiency.

Once the antenna is tuned for the centre of the band of operation a 1.5 to 1 v.s.w.r. or better is achievable across the band, without retuning. A 1.2 to 1 or better v.s.w.r. is possible on all frequencies. Full details are available on the G4TPH website including v.s.w.r. charts for each band. Further details from:

Tom Brockman G4TPH
1 Dalby Crescent
Newbury
Berkshire RG14 7JR
E-mail: **tom@g4tph.com**
Website: **www.g4tph.com**
Tel: **07771513505**

Note: *Ben Nock G4BXD has undertaken a review of the latest G4TPH Magloops and they are due to be published in the June issue.* ***Editor***.

Inventor Reg Moores G3GZT Silent Key

Inventor and enthusiastic polyglot in technology – Reg Moores G3GZT, a stalwart of the Worthing & District Amateur Radio Club for many years – has become a Silent Key.

Reg G3GZT was a prolific inventor throughout his life and claimed (he held a patent on his design for a radio microphone) that he invented the radio microphone we know today, and although other claimants denied Reg's claims – he vigorously defended his stance as the inventor of 'the first radio microphone'. He was also well-known for his work in nuclear engineering measurement technology, something in which he was completely self-taught. ***The Daily Telegraph*** obituary on this remarkable Radio Amateur can be see at **http://www.telegraph.co.uk/news/obituaries/technology-obituaries/8362736/Reg-Moores.html**

Note: Reg's own web site **http://www.reg-moores.co.uk/page2.htm** was still available as *PW* went to press in late March. I feel privileged to have known this truly remarkable man. May he rest in peace. **Editor**.

Spalding & District ARS Awards

Graham Boor G8NWC, the Hon. Secretary of the S&DARS reports, "At the recent AGM of the **Spalding & District Amateur Radio Society,** awards were issued to **Paul Marchant M0WAF** for services to the club, **Pete Henderson M0GTR** for the best newcomer, **John Hall M1CDL** for services as Treasurer to the club. And myself – Graham Boor G8NWC received the constructor's trophy!
Further details on the club from **Graham G8NWC Secretary S&DARS**
E-mail: **g.boor@btopenworld.com**
Website: **www.sdars.org.uk**

L-R Paul M0WAF, Pete M0GTR, John M1CDL, Graham G8NWC .
Photo courtesy of Bob Offer G1ZJP.

Energon Solutions Launch Their New Website

***Newdesk* have been contacted by Energon Solutions Ltd, a specialist retailer regarding their recent press release, which states, "The team at Energon have been specialising in hobby electronics for over seven years and have a wealth of experience in their field."**

Energon have also announced they've just launched their new website (**www.energonsolutions.co.uk)** which offers some exciting new products including the full range of high spec Maas mains power supplies. Maas Elektronik is an established German brand/manufacturer who specialise in high quality, high performance products for radio applications. Energon is also proud to offer the Maas range of professional PMR radios and a new dual-band 2m/70cm hand-held transceiver.

Maas power supplies are switched mode and provide the professional user with a very clean output which has been optimized for radio applications. All power supplies feature both an adjustable output and a fixed output d.c. output voltage of 13.8V. Maas power supplies feature either traditional analogue voltage and current meters or digital light emitting meters. The casing design is both rugged and compact with a solid feeling of quality. Cooling is provided by an integral fan that also features variable speed in higher spec models.

The Maas range of power supplies starts with a conservative 3A power supply, the SPS-8041 at a very reasonable £34.99 This is ideal for powering low power devices such as scanners etc. Mid range is the SPS-9250 a 25A unit capable of up to 15V output. This is priced at £89.99. Top of the range are the Maas HCS-3600 and SPS-9600 which are both capable of up to 60A and 15V. Both have rear mounted high current output terminals and front mounted low current terminals. The HCS-3600 is priced at £229.99 and the SPS-9600 at £199

Energon also offer the Maas PMR446 range of radios. These radios offer the professional user a rugged communications solution whatever the application, from hotel foyer to racetrack the Maas radios are ergonomically designed to function flawlessly in any condition.

Some of the outstanding features of the Maas PMR446 radios:
Lithium Ion battery as standard for longer talk times
Programmable via PC (Kenwood TK-3201/TK-3301 compatible)
Audible announcement of channels
Integrated mini flashlight
Battery status indicator
Robust housing (MIL STD-810 C, D, E)
Kenwood standard accessory socket

Energon Solutions welcomes technical consultation and commercial enquiries on all radio equipment. Maas have released a new dual band 2m/70cms handheld transceiver called the AHT-2UV. This is a fully functional dual band hand held with an impressive specification and even more impressive price point of £99 (further information for the website).

All prices include VAT at 20% . All products are available from **www.energonsolutions.co.uk Energon Solutions Ltd.**
Unit 10 Bell Farm Industrial Estate, Nuthampstead, Hertfordshire SG8 8ND
Tel: **(01763) 848 404** FAX: **(01763) 848412**
E-mail **info@energonsolutions.co.uk** Website: **www.energonsolutions.co.uk**

Rallying Points For 50MHz Fans!

The United Kingdom Six Metre Group (UKSMG) will be attending various events during 2011 to meet existing and prospective members and to encourage Amateur Radio operation on 50MHz around the world.
The current planned schedule is:-

Date	Rally	Location
10th April	Norbreck	Blackpool
17th July	McMichael	Reading
14th August	FRARS	Wimborne
30th Sept/ 1st Oct	Hamfest	Newark
6th Nov	ATF	Odense, Denmark

There will be members with many years of experience on hand to answer any queries and to give practical advice on operating during the F2 propagation expected during the sun spot peak of 2012/13.
David Dix G8LZE
E-mail **g8lze@uksmg.net**
Tel: **(01923) 823633**
Website:
http://uksmg.org/news.php

Club News

Hastings Electronics & Radio Club

Gordon Sweet M3YXH, Hon. Secretary and *Vital Spark* Editor of the Hastings Electronics and Radio Club (HE&RC) reminds *PW* readers that they've "Been welcoming visitors since 1066" – and provides details of what's happening at the club in the next few months.

April 30th: Spring Auction of Used & Surplus Equipment at Holy Redeemer Scout Hall, Upper Church Road. Doors open 9am for Auction at 10.15am.

May 25th: Construction Evening. Come along to our Club meeting where you will be made very welcome; 7pm on the fourth Wednesday in the month, at **The Taplin Centre**, **3 Upper Maze Hill**, **St. Leonards**, **East Sussex TN38 0LQ**. (The Centre is named after the late **John Taplin G3HR**I, a former club member and white stick operator).

Gordon Sweet M3YXH
Club E-mail: **g6hhherc@yahoo.co.uk**

South Essex Amateur Radio Society Activities

The South Essex Amateur Radio Society have a busy calendar as Hon. Secretary **Norman Crampton M0FZW** reminds us. April 13th, Sky at Night with **Bruce Sexton G1JJS**. May 11th, Summits on the Air, my experiences with **Dave Speechley G4UVJ**. May 14th, Field Event: **Rayleigh Windmill GB2RWM Mills on the Air**. June 8th, talk by **Jonathan Mitchener** from the Essex CW Group. June 19th, **Field Event**: Bay Museum GB2BM International Museums on the Air.

Newcomers are welcome to attend our Meetings and Field Events.
Contact: Norman M0FZW (Hon Sec)
Tel: **(01268) 692776**
E-mail: **secretary@southessex-ars.co.uk**
Website: **http://www.southessex-ars.co.uk/**
Local Network: **145.225MHz Weekdays 16.30-17.30**
Meetings: **8pm 2nd Wedneday of each month**.
Venue: **South Benfleet Primary School, High Road SS7 5HA**.

The BARTG Sprint 75 Contests

Roger Cooke G3LDI – Chairman of the **British Amateur Radio Teledata Group** (BARTG) contacted Newsdesk with the following up-dates: " The BARTG Sprint 75 Contests – there are now two of these, April and September. The dates for 2011 are 1700 - 2100z Saturday April 30th and 1700 - 2100z Sunday September 18th.

Note that these are short tests and we look forward to an even larger attendance this year. They are great fun and good practice for nimble fingers! Full details and rules can be found on the BARTG web site**: http://www.bartg.org.uk/index.asp** Look under the **Contest** tab.

More Changes At BARTG

Phil Cooper GU0SUP has had to relinquish his post as Awards Manager due to personal circumstances. Phil has done a great job for BARTG and we thank him for his services. He says that he will try to support the contests as and when time allows. Phil's place has been taken by **Chris Plummer G8APB** and we welcome him to the Committee. His resumé and picture can be found on the BARTG web site under the **Committee** tab. We would also like to welcome **Graeme Castleton G6CSY** to the Contests/DX/Software subgroup. Graeme will help streamline the contest procedure and will also be a source of information on various software programs. Take a look at his resumé and you will find that in the same place.

Seeking Sponsors

Nowadays BARTG is mainly a Contest/DX sponsoring web based group and we sponsor various DX-peditions, encouraging Data operations.

Membership is essentially free and you can join on the web site. You then become a 'Friend' of BARTG. However, donations, small or large, are always welcome to assist with the sponsoring.

We are also looking for Sponsors for some of our major awards/trophies. If you wish to Sponsor an award or trophy, write to Chris G8APB at **plummerc42@hotmail.com**
73 de Roger, G3LDI, Chairman BARTG
E-mail: **roger@g3ldi.co.uk**

Hot News

The USS Yorktown Will Soon Be Back On The Air!

Fred Hambrecht W4JLE/NNN0AAG contacted *Newsdesk* to announce that "On May 14th, 2011 the callsign *NWKJ* will be heard on the airwaves for the first time in 41 years. *Yorktown* will be activated by South Carolina Navy Marine Corp MARS members as well as operators from other states in Region Four for the annual military cross band test. *Yorktown* has also been the site for the Amateur Radio station WA4USN on the Amateur bands – under the auspices of the Charleston Amateur Radio Society. However, this will be the first use of *Yorktown*'s military call since its decommissioning. It required that *Yorktown* be re-listed in ACP 113 to allow the use of the 'Fighting lady's' military call on military frequencies.

The Amateur Radio frequencies being listened to will be announced by the operators on the frequencies listed below. European Amateurs should note that (for the non Amatuer MARS frequencies) the Yorktown operators will announce what frequency on the Amateur bands they'll be listening on to enable crossband QSOs.

Frequency	Emission	Amateur Band
4.010.0MHz	l.s.b.	3.5MHz (Note American frequency)
7.348.0MHz	l.s.b.	7MHz (Note American frequency)
14.478.5MHz	u.s.b.	14MHz (Best frequency for G/EI working to *Yorktown*)
20.994MHz	u.s.b.	21MHz (Non Amateur Band frequency

Further details from Fred Hambrecht W4JLE/NNN0GBS
E-mail: **w4jle@w4jle.com**

Roy Walker G0TAK's Antenna Workshop
PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW
E-Mail: antennas@pwpublishing.ltd.uk

Two Whips Re-visited

Roy Walker G0TAK has been carrying out some more development work on his practical antenna that uses two tuneable whip sections.

Readers may remember my article *A Tale of Two Whips*, which appeared in *PW* for November 2008? It was a practical idea that I thought was worth some more work and I've been doing some work on the antenna and have come up with a couple of interesting points.

To recap, the item I described in that article is a mobile or portable antenna capable of transmitting on eight Amateur Radio bands from 3.5 to 28MHz (80m to 10m), the tuning being achieved by tapping a base loading coil and altering the length of a telescopic top section.

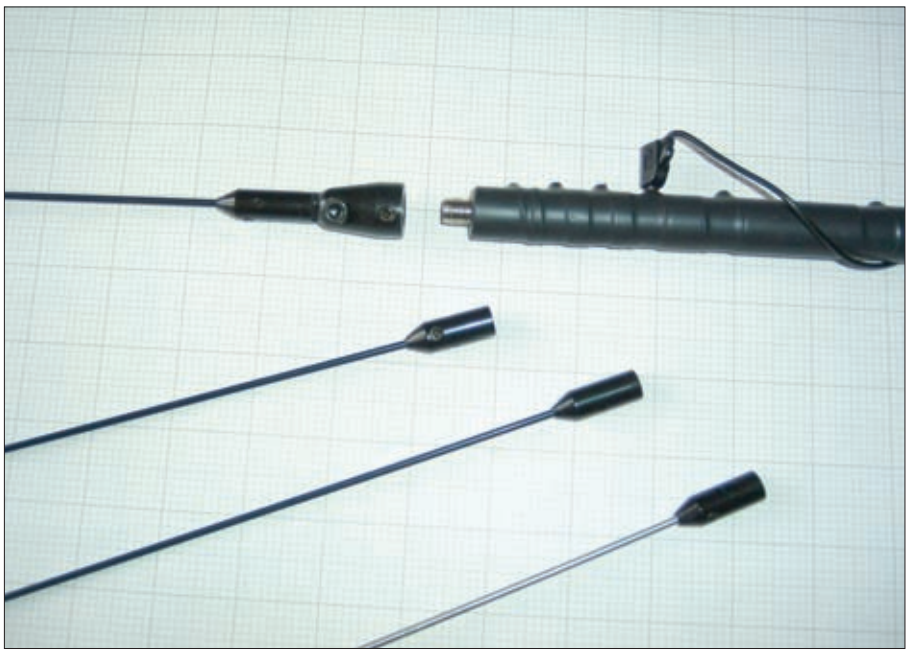
It's a short antenna but is capable of good results if you can only tune it up correctly. And thereby hangs the tale!

Identical Version

What appear to be identical versions of the antenna have been marketed by Sandpiper as the ATX MkII, by Moonraker as the SPX-100 and possibly by other retailers under other notations. Although the products seem the same, the tuning instructions are confusingly different. I have opted to adopt the Moonraker instruction sheet as it had, what I consider to be the more logical basis.

When using these antennas I found problems in replicating the tuning instructions 'in the field'. It means carrying the tuning sheet and a tape measure and may not always be convenient. Suddenly I had a 'Road to Damascus' enlightenment and have made my life much easier!

The SPX-100 instructions give only four different measurements of the telescopic whip to achieve a tune on the eight bands. Why not, I thought have a set of four pre-cut interchangeable whip sections to 'plug in' when changing band? That way I would know that I was measuring the correct length, and the antenna would be spot on tune.



The multi-band portable whips are sold under several model names, but are all very similar in specification.

SPX-100

Band	Tap	Whip	length
80m	Nil	48in	1.22m
40m	2	48in	1.22m
30m	2	18in	407mm
20m	3	48in	1.22m
17m	3	30in	762mm
15m	4	48in	1.22m
12m	4	37in	940mm
10m	5	48in	1.22m

I had in the "You never know when it might come in handy" locker four commercial whip sections, as sold to taxi firms and others so that they could cut them to frequency. A quick investigation revealed that the base section fitted neatly on to the top threaded section of the loading coil, and the whips could be cut to three of the four lengths I needed.

Going into the locker once more, I found a spare 'Hustler' whip section in excess of the 48in (1.22m) that I needed for the fourth whip, and it was of the correct diameter.

Placing the telescopic section from the Hustler back in the locker, I fitted the loading coil with one of the whip base sections. I then carefully measured and cut the whip + base sections to the required lengths and the job was done.

By using only a single base section I have cut down on the wear and tear on the threaded section of the base coil and avoided complicated re-fitting on every band change.

I have used the whips in what has come to be my 'Normal' portable set up of Yaesu FT-817, LDG auto tuner + magmount. And find that I can get an acceptable voltage standing wave ratio (v.s.w.r.) on each of the bands in the minimum amount of time. No doubt the automatic antenna tuning unit (a.a.t.u.) helps immensely by ironing out the odd 'off tuned length' discrepancy but my modifications does make the antenna much more user friendly.

PW

KENWOOD

Authorised dealer

Hand-helds

TH-D72E Dual band 2/70cm with GPS & APRS **£429.95**
TH-F7E Dual band 2/70cm RX 0.1-1300MHz **£239.95**
TH-K2ET Single band 2m with 16 button keypad **£169.95**
TH-K2E Single band 2m **£164.95**
TH-K4E Single band 70cm **£164.95**

Mobiles

TM-D710E Dual band 2/70cm with APRS RX 118-524MHz & 800-1300MHz, 50 Watts **£444.95**
TM-V71E Dual band 2/70cm with EchoLink RX 118-524MHz & 800-1300MHz, 50 Watts **£299.95**
TM-271E Single band 2m, 60 Watts **£169.95**

Base

TS-590S HF & 6m 100W all mode transceiver **£1,369.95**
TS-2000X All mode transceiver HF/50/144/430/1200MHz 100 Watts All mode transceiver **£1,799.95**
TS-2000E All mode transceiver HF/50/144/430MHz 100 Watts All mode transceiver **£1,549.95**
TS-480HX HF/6m 200 Watts Transceiver **£879.95**
TS-480SAT HF/6m 100 Watts Transceiver **£779.95**

Accessories

PS-60 25amp power supply unit ideal for the new TS-590S **£309.95**
SP-23 External speaker **£71.95**
SP-50B Mobile speaker **£29.95**
MC-90 Deluxe desk microphone suitable for DSP transceivers **£194.95**
MC-60A Desk microphone with pre-amplifier **£124.95**
HS-5 Deluxe headphones **£56.95**

WOUXUN

Authorised dealer

Handhelds

KG-UVD1P Great value dual band 2/70cm **£91.95**
KG-699E Brilliant single band 4m 44-88MHz **£91.95**
KG-679E Superb single band 2m **£59.95**

Accessories

WO/ELO-001 Battery eliminator **£10.49**
WO/CCO-001 12v Car charger **£10.49**
WO/SMO-001 Speaker microphone **£15.49**
WO/PSO-110 Programming software **£20.49**
WO/CASE Leather case **£10.49**

TYT

TYT-800 2m 144-146MHz 5 watts 199 channels amazing **£49.95**
TYT TH-UVF1 2/70 5 watts 128 channels **£99.95**

Accessories

TYT-BE Battery eliminator **£14.95**
TYT-SP Speaker microphone **£14.95**
TYT-EP Ear piece **£9.95**

MOONRAKER

HT-90E 2m single band transceiver with full 5 watts output just **£59.95**
The HT-90E is a brilliant compact radio, perfect for beginners to the hobby. Comes complete with battery, belt clip, antenna, and rapid charger all for under £60 quid! Everything you need to get on air is in the box!

Hand-helds

ICOM

Authorised dealer

IC-E80D D-Star dual band 2/70cm handheld with wideband RX 0.495-999.99MHz **£329.95**
IC-E92D Dual band 2/70cm RX 0.495-999.9MHz with built in DSTAR **£389.95**
IC-E90 Tri band 6/2/70cm RX 0.495-999.9MHz **£239.95**
IC-T70E dual band 2/70cm handheld with 5W Tx & 700mW loud audio **£159.95**
IC-V80E single band 2m handheld with 5.5W Tx & 750mW loud audio **£104.95**

Mobiles

IC-7000 All mode HF/VHF/UHF 1.8-50MHz, 100 Watts output **£1,195.95**

ID-1 Single band 23cm 1240-1300MHz digital and analogue DSTAR transceiver **£719.95**
IC-E2820 + UT123 Dual band 2/70cm with DSTAR fitted, 50 Watts output **£699.95**
IC-E2820 Dual band 2/70cm DSTAR compatable, 50 Watts output **£499.95**
ID-E880 D-Star ready dual band with wide band RX 0.495-999.99MHz **£439.95**
IC-2200H Single band 2m 65 watts **£229.95**

Base

IC-9100 HF/VHF/UHF All in one transceiver to 23cm (optional) – amazing! In stock NOW **£2,999.95**
IC-7800 HF/6m All mode 200 Watts Icom flagship radio **£8,995.99**
IC-7700 HF/6m 200 Watts with auto ATU transceiver **£5,999.95**
IC-7600 HF/6m 100 Watts successor to the IC-756 ..... **£3,299.99**
IC-7410 coming soon ..... **£TBA**
IC-7200 HF/VHF 1.8-50MHz RX 0.030-60MHz, 100 Watts output (40w AM) **£839.95**
IC-718 HF 1.8-30MHz RX 300kHz - 29.999MHz, 100 Watt output (40w AM) **£594.95**
IC-910H dual band with optional 23cm, 100 Watts output **£1,299.95**

Accessories

PS-125 25 amp Power supply unit **£329.95**
SM-30 Desktop Microphone designed for SSB and FM **£119.95**
SM-20 600 Ohm 8-pin deluxe base station microphone **£169.95**
SP-10 Mobile 5w speaker 4 Ohms **£54.95**
SP-22 Mobile extension speaker **£34.95**
SP-20 Base station speaker with filters **£184.95**
SP-21 Base station 3w speaker 8 Ohms **£119.95**
SP-23 Base station speaker with built in high and low pass filters **£149.95**

QUANSHENG

TG-UV2 dual band 2/70cm 5 Watts with 200 memories ..... **Only £81.95**

The Quansheng TG-UV2 is a dual band 2m/70cms handheld. It covers 136.00 - 173.995, 400 - 469.995MHz and FM broadcast 88-108MHz. The radio includes 7.2v 2Ah Li-ion battery for extended life. It also comes with AC charger, carry strap and belt clip. This is a very robust radio - don't underestimate its performance from the price!

YAESU

Authorised dealer

Hand-helds

VX-8DE Triband same spec as VX-8E but with enhanced APRS **£369.95**
VX-8GE Dual band with built-in GPS antenna and wideband 100-999.90MHz Rx **£359.95**
VX-7R Tri band 50/144/430MHz RX 0.5- 900MHz, 5 Watts outut **£299.95**
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Accessories

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MB-9 Choke Balun for G5RV to reduce RF Feedback **£39.95**
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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 dipole with 4 legs)

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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**

Yagi Antennas

Diamond performance from the superb Diamond factory

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A144S10R 2m 10 Elements, Power 50W, Gain 11.6dBi, Boom Length 2.13m **£94.95**
A144S5R 2m 5 Elements, Power 50W, Gain 9.1dBi, Boom Length 95cm **£49.95**
A430S15R 70cm 15 Elements, Power 50W, Gain 14.8dBi, Boom Length 224cm **£74.95**
A430S10R 70cm 10 Elements, Power 50W, Gain 13.1dBi, Boom length 119cm. **£59.95**

HF Mobiles

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

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AMPRO-17 18MHz, Length 220cm, 38th fitting (slimline design) **£19.95**
AMPRO-20 14MHz, Length 220cm, 38th fitting (slimline design) **£19.95**
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AMPRO-40 7.0MHz, Length 220cm, 38th fitting (slimline design) **£19.95**
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ATOM-20S 14MHz, Length 130cm, PL259 fitting (compact design) **£24.95**
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New Ground Plane Free Colinear Verticals

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

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SQBM1010P 6/2/70cm, Gain 1.5/2.0/5.0dBd, RX25-2000MHz, Length 140cm, SO239 fitting **£84.95**
SQBM1010N 6/2/70cm, Gain 1.5/2.0/5.0dBd, RX25-2000MHz, Length 140cm, N-Type fitting **£89.95**
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GF151 Glass Mount 2/70cm, Gain 2.9/4.3dBd, Length 78cm complete with 4m cable and PL259 ..... **£29.95**
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MRQ525 2/70cm, Gain 0.5/3.2dBd, Length 43cm, PL259 fitting (high quality) **£19.95**
MRQ500 2/70cm, Gain 3.2/5.8dBd, Length 95cm, PL259 fitting (high quality) **£26.95**
MRQ750 2/70cm, Gain 5.5/8.0dBd, Length 150cm, PL259 fitting (high quality) **£36.95**
MR2 POWER ROD 2/70cm, Gain 3.5/6.5dBd, Length 50cm, PL259 fitting (fibreglass colinear) **£26.95**
MR3 POWER ROD 2/70cm, Gain 2.0/3.5dBd, Length 50cm, PL259 fitting (fibreglass colinear) **£32.95**
MRQ800 6/2/70cm Gain 3.0dBi/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**

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

The CHAMELEON V1

HF/VHF/UHF Multiband AntennaTM is a revolutionary antenna that stands at a mere 8.5 feet tall and contains a unique trap coil design. This antenna is ideally designed for mobile, portable or base station purposes were limited space is a concern.

Frequency Range: 80/60/40/30/20/17/15/12/11/10/6M + 2M/1.25M/70cm (144MHz - 500MHz) + USAF MARS/CAP (3.3MHz, 4.5MHz & 7.6MHz) **£249.95**

GP2500

All Band HF Vertical

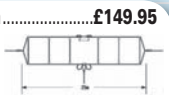
This is the perfect answer for anyone with limited space and requires no radials. Covering 80 through to 6M with a VSWR below 1.5:1!

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

All at an amazing £229.95!

NEW GP2500F fibreglass version now in stock **£279.95**

MTD-300 2-30M Broadband wire dipole antenna £149.95



The MTD-300 broadband dipole antenna is designed to provide optimum performance over a wide frequency range and is very easy to assemble and use.

● Frequency 2-30MHz ● Radiator length: 25m (82ft) ● Type: Terminated Folded Dipole ● Radiation: directional ● Feedline: 50 Ohm coax (30m) ● Connector: SO239 ● SWR: <2.0:1 to <3.0:1 depending on factors ● No transmatch required ● Power: 150W (PEP) ● Spreaders: 46cm (18in) ● Weight 3.1kg.

HF Verticals

Brilliant HF antennas that can be ground mounted if required which in todays limited space is a popular option. Also extra trap tuning is also available to get that perfect match if required.

Hustler 4-BTV 4 Bands 40-10m 1000W Length 6.52m Weight 6.8kg **£189.95**
Hustler 5-BTV 5 Bands 80-10m 1000W Length 7.64m Weight 7.7kg **£229.95**
Hustler 6-BTV 6 Bands 80-10m 1000W Length 7.30m Weight 7.5kg **£269.95**

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The Anytone/MyDEL-5189 70MHz FM Mobile Transceiver

Tim Kirby G4VXE takes a break from preparing The World of VHF to try out an interesting 70MHz mobile transceiver.

If you've kept an eye on *The World of VHF (WoVHF)* column in *Practical Wireless* (*PW*) recently, you can't fail to have noticed that 70MHz frequency modulation (f.m.) operations are starting to get mentioned much more often. Activity has increased significantly over the last few months and it's probably fair to say that in part this is due to the availability of commercial equipment from the Peoples' Republic of China (PRC).

Until recently, the only way to get on 70MHz f.m. was to use converted Private Mobile Radio (PMR) equipment. So, when the Editor called me recently and asked if I'd like to review one of the new breed of 70MHz f.m. mobiles – it's fair to say that I jumped at the chance.

The Rig Arrives!

The rig arrived from **Martin Lynch & Sons** badged as a MyDEL-5189, although the instruction manual and box showed the rig's original heritage as an AnyTone-5189, which is how the rig may be available from other retailers. The transceiver was well packaged for transit and comes neatly in its own small box and on opening it I found that the transceiver quite a small and simple rig.

Another first impression was that the heat-sink on the back of the rig is substantial! Certainly the heat-sink is effective. Despite enjoying some lengthy QSOs at the higher power level, the transceiver barely warmed up!

The build quality of the transceiver is good and solid and it has a pleasing 'feel to it'. However, It's perhaps not finished to quite the same standards as 'mainstream' manufacturers, but is entirely adequate.

The rig comes supplied with a mounting bracket, a microphone, a power lead and an instruction manual. The review model came with a standard microphone*, although advertisements from various sources specify that a DTMF microphone can be used.

The initial installation of the rig was in my shack, replacing the Philips FM1000 PMR set which I use regularly for 70MHz f.m. The AnyTone/MyDEL is a significantly smaller package – an immediate plus – and unlike the FM1000 and some of the other converted PMR rigs it has an internal speaker and an SO-239 antenna socket (many of the PMR sets are BNC), things to bear in mind if you're replacing an existing PMR set.

The power lead comes in two parts, like many modern rigs, with a 'tail' from the rig, to a connector which joins to the main lead. The overall length of the lead is good – I'm not sure if it was me, but the connector – once done up – wasn't that easy to release, at least with fingers! From a point of view of a good solid connection, this is good, but if you want to use it to take the rig out of the car when you park up, then it might be more problematic. I suspect it will become easier with use, but if not, you may wish to fit your own connectors.

***Note:** Martin Lynch & Sons Ltd. confirm that the transceiver is now supplied with a DTMF microphone as standard. **Editor**.*

Simple Front Panel

The front panel is simple, with seven controls and a display panel which shows **VFO**/**Memory** number, frequency and power level. The display is black text on an orange background which I found quite easy to read both in the shack and in the car. The microphone (or a PC) connects via an RJ-45 on the front panel.

Sadly, despite the 'standard' RJ-45 connector there's nothing standard about the wiring and a Yaesu DTMF microphone did not work with the rig. I did not test the PC interface to the rig – which is presumably of marginal use on 70MHz since there's no need to program repeaters with different offsets, CTCSS tones and so on.

I should probably mention the user manual now. The basics are covered clearly and make good sense. When it comes to some of the configuration that's possible within the 'shortcut operations' section of the manual, I'm afraid it's less clear! Various functions like 'channel delete' didn't work exactly as described. Neither did the **High**/**Medium**/**Low** power switch 'shortcut'.

Fig. 1: The simple layout of the controls perhaps indicate the 'designed for PMR' influence.

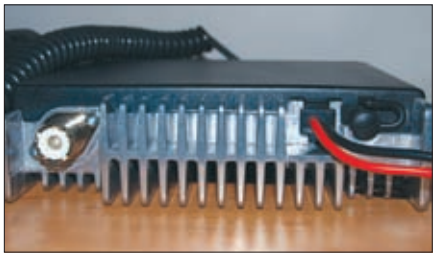

Fig. 2: A large external heatsink is used to dissipate any heat generated in the p.a. stages.

However, with the information contained in the manual, which I would describe as 'indicative' rather than 'comprehensive', I managed to do everything that I wanted to do! Users should expect to have to fiddle around a bit and for the manual not to be as accurate as you might have wished – but keep a sense of humour about you and you'll be fine!

Incidentally, a number of the functions described in the manual assume that a DTMF microphone will have been supplied with your rig. As noted earlier, the review model was not supplied with a DTMF microphone, so this may have complicated things somewhat.

Getting On The Air

Then it was time to get on the air. There's no clearly marked **On/Off** switch, but pressing the control on the top left of the rig seemed most intuitive and so it proved! There is no **VFO** control, but I used the **Up/Down** controls on the microphone to change frequency.

As noted previously, setting the power level proved to be something of a challenge. In early advertisements from some suppliers of this rig, a power level of 60W was quoted and indeed, the somewhat 'generic' specifications in the back of the manual point to this too. However, I measured high power as 22W, medium power as 10W and low power as 3.5W. Later advertisements of the rig claim a 25W output, which is more accurate.

Connecting the rig to the antenna – a half wave vertical at around 10m (30ft) – it was time to compare the receiver with the PMR set. The Tring 'Parrot' MB7FM on 70.4375MHz was available during the first part of the review period and was most useful. The 'parrot' is located around 50km from my home and on my normal PMR set is a steady S5-S6.

There was perhaps a slight hint of more noise on the AnyTone/MyDEL

Manufacturer's Specifications

Frequency range	66-88MHz
Number of channels	250
Steps	
Operating voltage	13.8V d.c.
Squelch	Carrier/CTCSS/DCS/5-Tone/2-Tone/DTMF
Frequency stability	±2.5ppm
Operating temperature	-20 to 60°C
Dimensions (W H D)	160x155x40mm
Weight	1Kg
Receiver	
Sensitivity (12db SINAD)	<0.25µV
Adjacent Channel Sensitivity	>60dB
Intermodulation	>60dB
Spurious rejection	>70dB
Audio distortion	<5%
Audio power output	>2W @10% distortion
Transmitter	
Power output	60W/25W/10W (please see text ref 60W))
Modulation	f.m.
Adjacent Channel Power	>60dB
Hum and noise	>36dB
Spurious emission	>60dB
Audio distortion	<5%

Company: Martin Lynch & Sons Ltd. (Importers).

Equipment: The Anytone/ MyDEL-5189 70MHz f.m. mobile transceiver.

Pros: Small and simple rig. Build quality of the transceiver is good and solid and it has a pleasing 'feel to it'. It's not finished to quite the same standards as 'mainstream' manufacturers, but is entirely adequate.

Cons: No S-meter, relatively poor manual.

Price: £148.95 (see Martin Lynch note ref. special offer).

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Tel (01932) 567 333.
FAX (01932) 567 222
E-mail: Martin@MLandS.co.uk
Website: www.MLandS.co.uk

Martyin Lynch G4HYK comments: Thanks for the courtesy copy of the review. Please note the new RRP is £148.95 and now includes a DTMF microphone as standard. The radio is available from stock and anyone ordering and quoting the *PW* review article will receive free carriage (UK Mainland) while the May issue is current. Accessories are available including programming software and lead at £19.95. Best Regards Martin.

rig than on the FM1000, but it was a very slight difference and the AnyTone/MyDEL received MB7FM well. If the AnyTone/MyDEL was slightly less sensitive than my FM1000 then it was marginally more sensitive than the Ascom SE550 that I had in the shack as well!

On transmit, the audio from the AnyTone/MyDEL was a much better level and more pleasing to listen to than from the FM1000 (the nice thing about the simplex repeater working as 'store and forward' is that you can listen for yourself!). **Note**: It's easy to switch between wide and narrow deviation using a menu shortcut on the review unit.

Disappointingly, for a transceiver being used in the Amateur Radio market, the transceiver has no indication of received signal strength whatsoever, so you'll have to use your ear to give signal reports. This is fine, but may take getting used to for some people and I must admit that I missed a visual indication of just how strong a signal was.

After some experiments in setting up the rig and getting comfortable with using it, I called "CQ" on 70.450MHz simplex and was called by one of my locals, **Alan Osborne G3SLI**. I was pleased to be called by Alan, because we speak often on 70MHz and he was able to compare my signal. Alan confirmed that my signal was the same strength as usual and that the audio quality was good.

Next, I put a call through MB7FM and was delighted to work **Larry Smith G4OXY** from near Biggleswade in Bedfordshire, as well as **Paul Waldock M0LRE/M** in East London. By this time, I was settling down and enjoying the rig, which has a simple 'feel' to it.

Considering the small size of the speaker on the rig, I found the audio quality excellent. You can, should you wish, connect an external speaker via the 3.5mm mono socket on the rear of the rig.

During a QSO with **Dave Davis G4AQK** I discovered that the default Time Out Time on the rig is three minutes! I wondered why the rig made a beep and went to receive! I hastily adjusted the Time Out Timer so it would never time me out!

And, during a QSO, with **Chris Hoare G4AJA** Chris asked me if I'd tried holding the **Enter** key on the front panel down. Obligingly I did and an 'alarm' sounded, which I found I could only silence by powering the rig off and on again. I'm not sure what the purpose of this (undocumented) feature is, but it amused us both!

The rig boasts 250 memories – definite overkill for 70MHz. However, I enjoyed the facility to store the regularly used f.m. channels into the memories and the ability to scan them. This worked well and once the instruction manual had been 'decoded' was comparatively simple to set up.

Scan 'dwell' time can also be configured, but I found the scanning speed fairly slow compared to other rigs and it couldn't (as far as I can see) be adjusted.

The CTCSS tones can be set-up for use on memory channels, although I'm not aware of any 70MHz repeaters that would demand this currently. Memories can also be 'named' with alphanumeric tags, although I didn't find a compelling reason to do so on 70MHz.

Note: The rig's frequency coverage is **66 to 88MHz** and there's no transmit inhibit to prevent operating out of the Amateur band – so you must take great care when operating. Take notice of the band edges where you're operating and ensure that you don't transmit out of band.

Tim enjoyed using the AnyTone/MyDEL AT-5189 rig very much.

Tim Enjoyed Using It!

I enjoyed using the AnyTone/MyDEL AT-5189 rig very much. It's a compact and efficient way of getting on 70MHz f.m. The rig is reasonably priced, although you may find that you can source converted PMR equipment that will perform similarly for less than the price of the AnyTone/MyDEL. However, for mobile use though, the AT-5189 scores highly on account of its compact size and ease of fitting into a small car.

Other plus-points are ease of use and whilst on the downside, the lack of an S-meter and a relatively poor manual for the more detailed functions should be considered. The rig has proved rightly popular so far – and it's good to hear 70MHz mobile becoming more active.

Many thanks to Martin Lynch and Sons Ltd. for the loan of the review rig and to my wife, **Julie** who took some of the photographs.

Mobile Use

The rig, being fairly small just about fitted in the centre console of my car. However, as it has a 'non-standard' microphone connector, I was unable to use my 'hands-free' microphone, but no doubt an adapter lead could be made if the rig was to be used regularly on the move. I had hoped to try the rig, mobile through MB7FM, but sadly the 'parrot' went out of service during the review period, but I suspect coverage would have been good.

Mobile activity is increasing on 70MHz f.m. and you stand a good chance of making some rewarding QSOs from the car if you operate regularly. I used a **Garex Electronics** (see **www.garex.co.uk**/) mag-mount 70MHz quarter wave antenna on the car and was surprised that the MB7NS 'parrot' – at Banstead in Surrey – was a surprisingly consistent signal over a distance of around 100km (62m). As you'll see from the photos, I also enjoyed using the rig in 'portable' mode, using the antenna on the car but making a few contacts from a remote track near our home.

Front panel buttons on the transceiver are small but are not too difficult to see in a mobile set-up and for those of us with big fingers there's a reasonable gap between the buttons – which always helps! The display is adequately sized and clear for mobile use – even in the sunshine.

Changing frequency is straightforward using the **Up**/**Down** keys on the microphone. And it would appear (from the manual) that using the DTMF microphone that other functions such as changing the power level can be more readily accessed.

Other functions – such as turning off the squelch quickly to hear a very weak station – might be hard owing to the size of the panel buttons and not recommended for safety reasons if you are on the move. Although most of my operation during the review was conducted on quiet country roads, the audio from the rig seemed quite adequate in volume and clarity.

PW

Rev. George Dobbs G3RJV's Carrying on the Practical Way
PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW
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Recycling Old Boards!

This month the Rev. George Dobbs G3RJV discusses the recycling of old printed circuit boards – after the (very) appropriate quotation!

Waste is worse than loss. The scope of thrift is limitless.
Thomas Edison

Welcome to *Carrying on the Practical Way* (*CoTPW*)! Such is the nature of this column that I end up with lots of completed projects mainly built on little boards. I file them away in my blue plastic box that once held ice cream and is labeled 'PW Projects'. It's useful to keep them in case of reader's queries that require me to refer to the actual project.

As the box fills up the older projects are either retained intact, because I will use them, or stripped of the more expensive parts and thrown away. (After I've removed anything that's re-usable!).

Sometimes my 'strip and ditch' appears ruthless but in my limited Amateur Radio space at our small retirement home, ruthlessness has become a necessary habit. The flaw in this rather haphazard system occurs when I want to return to a circuit or idea I've used in the past. Inevitably the board for the circuit I wish to revisit has been cast aside or stripped down and re-used. As the wise Mr. Edison suggests, waste can be worse than loss!

On the morning as I sat down to type these words, the postman delivered the February 2011 issue of *PW*. It may be something to do with silk purses and sow's ears – but I do like to see what the *PW* editorial team has made of my column. As usual, it was a silk purse*. I did notice that I had ended that column by saying, "I feel sure I'll come back to the Franklin oscillator again".

*(*A silk purse perhaps, but with some poor stitching, as we managed to get the pinout wrong for the 'PN2222' device shown in Fig. 4 on page 43 of that issue. My apologies* ***Editor***).

Franklin Oscillator Revisited

Aware of all I have written above, I decided to return to the Franklin oscillator sooner rather than later ….. in fact straight away while the board was still laying on a corner of my work bench! That oscillator had pleased me with its simplicity, wide frequency range, and good stability. The first thought that came to mind was to try it in a simple direct conversion (DC) receiver circuit.

To remind regular readers, and acquaint new readers, the circuit for the Franklin oscillator is shown in **Fig. 1**. It's very simple. Two field effect transistors (f.e.t.s) Tr1 and Tr2 act as amplifiers with a capacitive feedback loop. The Franklin oscillator was very common in the early days of Amateur Radio – but appears to be rarely used these days. The original Franklin oscillators used valves and were usually configured like an astable multivibrator circuit.

In this version there's only one feedback capacitor; the 5.6pF capacitor between the drain of Tr2 and the gate of Tr1. The great advantage of the circuit is that the frequency is controlled solely by the tuned circuit (L1 and C1) and all the other component values remain the same over a very wide frequency range. Because Tr1 is an f.e.t. it offers a high impedance to the tuned circuit thus reducing any damping effects. The output is coupled to a cascade buffer amplifier (Tr3 and Tr4) that gives enough oscillator output to drive even a passive mixer in a receiver.

The frequency of the oscillator depends upon the values for L1 and C1 and with the circuit as shown in Fig. 1,

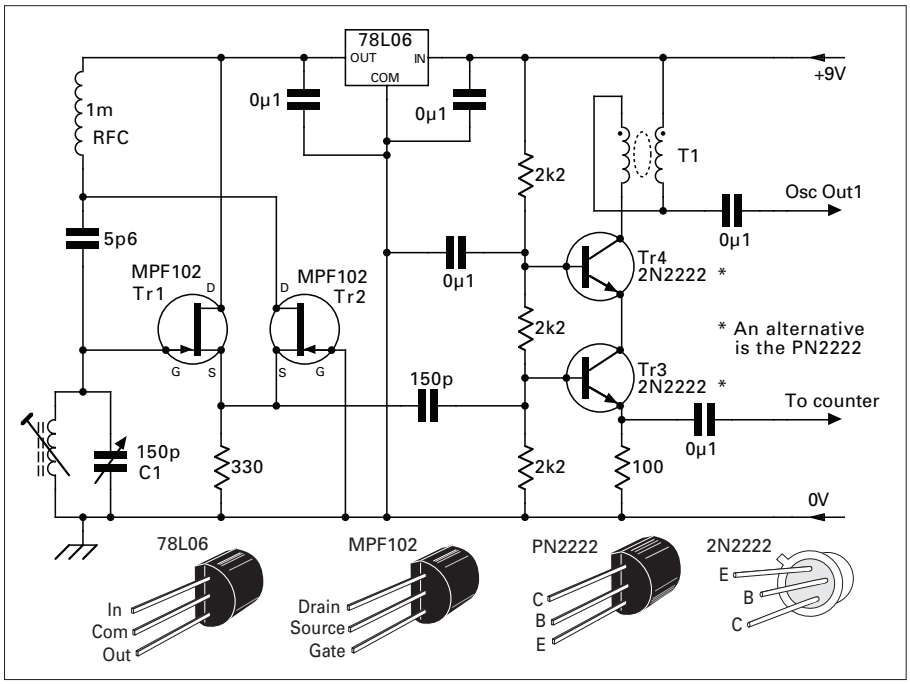

Fig. 1: The Franklin oscillator as presented in February 2011's issue of *PW*. Note that the pin-out shown then for the '2222' device was wrong. Both types are shown correctly here.

it should be possible to run it over any segment of the h.f. (short wave) Amateur bands. In my original tests I use the 10mm 10K coils supplied by **Spectrum Communications**.

Perhaps the most useful coil in the Spectrum range is the 5u3L which, with appropriate values for C1, will allow the oscillator to tune between about 5.5 and 15MHz MHz. Naturally, this tuning range is so large that small segments would have to be covered by using fixed capacitors and a small value variable capacitor in parallel for fine tuning.

If the 5u3L coil were to be used the oscillator could cover the 14 MHz (C1 = 27pF), 10MHz (C1 = 47pF) and 7 MHz (C1 = 100pF) bands. The quoted value for C1 is that required to hit the band in conjunction with a 5u3L coil. In practice most of suggested capacitance value would be formed by the fixed capacitor in parallel with the low value variable capacitor. This will require some experimentation but this is made easy by the adjustable core of the coil.

The core of the 5u3L coils allows a lot of adjustment. As the designation suggests it has a nominal inductance of 5.3µH (micro Henries) The coil I tested was 5.3µH with core set about 2mm down from the top of the coil former. It was, about 6.27µH with the core level with the top of the screening can and about 2.71µH with the core at the bottom of the coil former. That is a lot of range to play with!

Other bands could be covered with appropriate coils from the Spectrum Communications 10mm range. The Spectrum Communications website has full information on the 10mm coils including an "Inductance, frequency, and capacitance guide" that has suggested capacitance values for Amateur bands tuned circuits. I set up my Franklin oscillator board to cover the 7MHz Amateur band.

Suitable Mixer

Looking around for a suitable mixer to try a DC receiver, I rejected the use of the NE602 or NE612 mixer chip. I have used that too often in this column! Instead I went back to my 'direct conversion receiver roots' and used a dual-gate metal oxide semiconductor field-effect transistor (m.o.s.f.e.t.).

My first ever DC receiver used a dual-gate m.o.s.f.e.t. mixer in an article published, I think in 1977, in the old *Short Wave Magazine*. In more recent times the dual-gate m.o.s.f.e.t. has been more difficult to obtain. However, thanks to the **G QRP Club** I have a packet of BF988 v.h.f. dual-gate m.o.s.f.e.t. devices. I had never tried using them – so here was my chance!

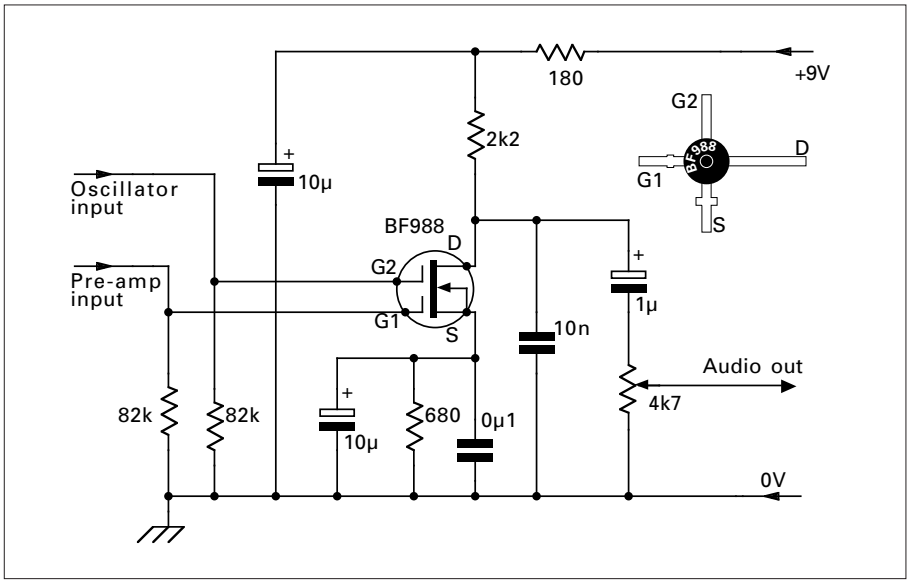

Fig. 2: A simple dual-gate m.o.s.f.e.t. mixer, becomes a direct conversion (DC) receiver, when the oscillator is at a similar frequency to the incoming signal.

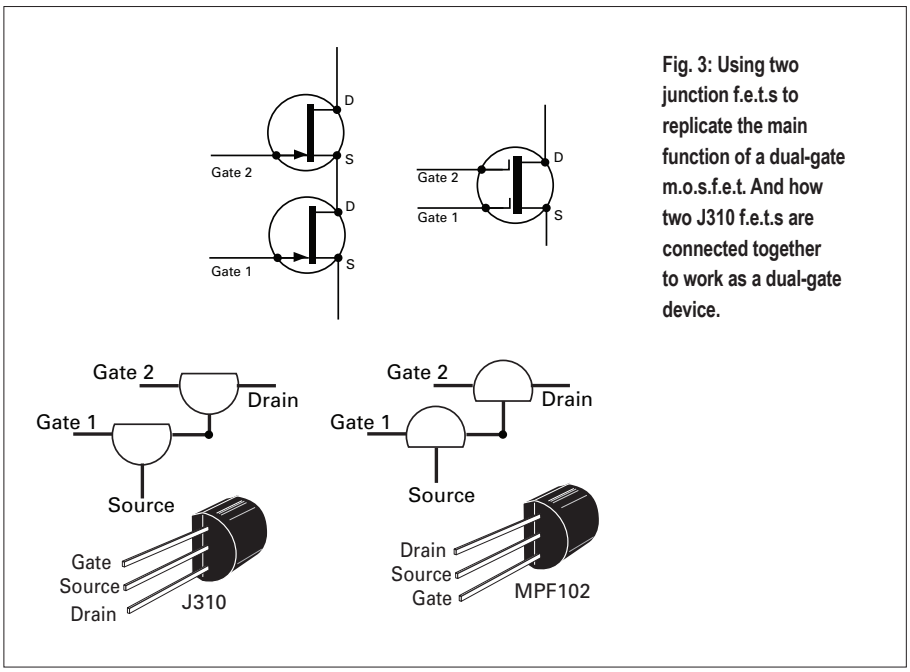

Fig. 3: Using two junction f.e.t.s to replicate the main function of a dual-gate m.o.s.f.e.t. And how two J310 f.e.t.s are connected together to work as a dual-gate device.

The diagram, **Fig. 2**, shows a circuit for a DC receiver mixer using a dual-gate m.o.s.f.e.t. mixer. As the circuit symbol for the device shows the dual-gate m.o.s.f.e.t. has source (s) and drain (d) connections like a conventional f.e.t. but as 'dual-gate' suggests it has two gate (g1 and g2) connections. The two gates accept the signals that are to be mixed; in this application the oscillator input and the incoming radio frequency (r.f.) signal via a pre-amplifier.

The source of the BF988 has high and low value bypass capacitors (100nF and 10µF) to remove audio and r.f. signals from the source. Products from the mixing of the input signals appear at the drain of the BF988. The desired audio signals are coupled via the 1µF capacitor to a potentiometer (ideally with a logarithmic track) that acts as a volume control.

The 10nF capacitor, from the drain to 0V, helps to bypass unwanted r.f. signals. I've not included a circuit for the necessary audio amplification required after the volume control because most readers will have suitable audio amplifiers. There have been many such audio amplifiers featured in this column using audio chips like the LM386 or LM380.

What happens if you don't have, or cannot get, a suitable dual-gate m.o.s.f.e.t. device to build the mixer? Let me recycle another idea!

In this column for June 2006 I suggested a replacement for a dual-gate m.o.s.f.e.t using two conventional f.e.t. devices. This is referred to in a small note in the book *Experimental Methods in RF Design* by **Wesley Hayward W7ZOI**, **Richard Campbell KK7B** and **Bob Larkin W7UPA**. The book is full of ideas for anyone who likes building radio circuits and a brief note (page 6.14) suggests that most circuits using a dual-gate

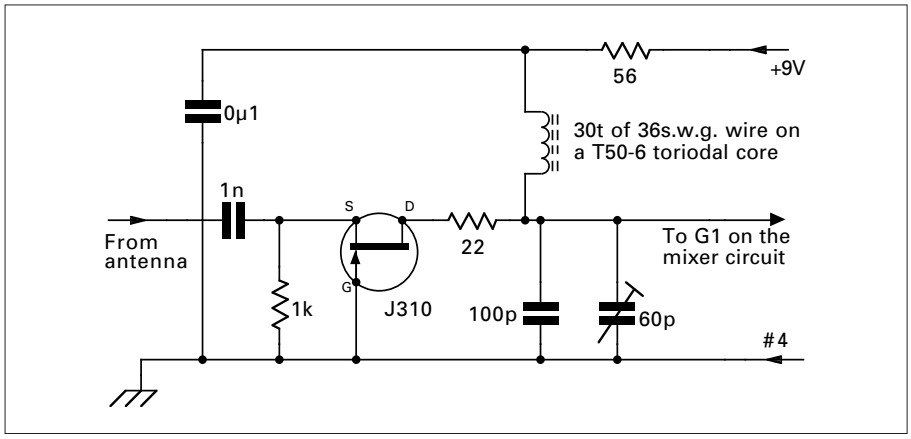

Fig. 4: When built with short lead-lengths, the grounded-gate f.e.t. mixer can provide a stable and wide-band amplifier, with around 10dB of gain. Note that in this instance the stage is tuned to give maximum gain at 7MHz.

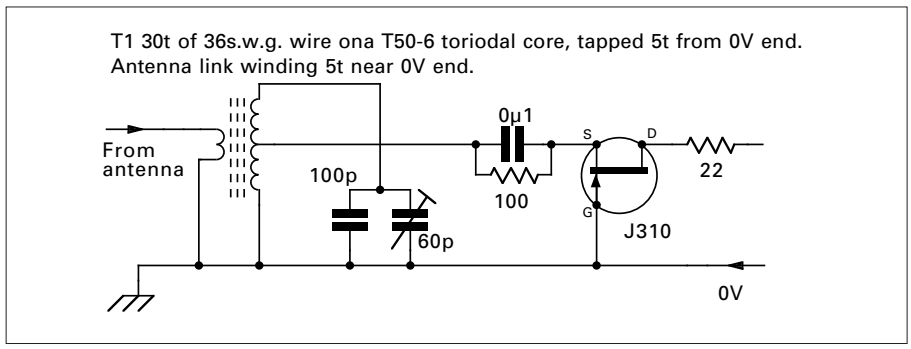

Fig. 5: If alternative tuning is required, then the antenna–source can have a tuned circuit included. Using both source and drain tuning can lead to instability under some conditions, creating an oscillator, rather than an amplifier stage.

m.o.s.f.e.t.s can be built using *n*-channel j.f.e.t.s in a cascade configuration.

The diagram, **Fig. 3**, explains how this may be done and Fig. 3**a** shows two f.e.t.s configured as one 'dual-gate' m.o.s.f.e.t. The bottom f.e.t. in the drawing is the source for the whole configuration and its gate becomes 'gate 1'. The drain of this f.e.t. is connected to the source of the uppermost f.e.t. the gate of which becomes 'gate 2' and its drain serves for the total configuration.

The diagram, Fig. 3**b**, shows the physical connections using a J310 f.e.t. as an example. The J310 is a commonly available f.e.t. but other *n*-Channel j.f.e.t.s could also be used in this arrangement. I have had good results with this idea and it could be used in the circuit of Fig. 2.

Not content with re-using the Franklin oscillator board I turned to another board I had recently featured in this column. In fact it was laying next to the Franklin oscillator in the corner of my bench and, I thought, asking to be used again. In the January edition of *PW* I discussed the use of the grounded gate f.e.t. amplifier. This is an unpretentious little circuit often used by, that doyen of Amateur Radio writers, the late **Doug DeMaw W1FB**.

Grounded Gate

As the name suggests, in a grounded gate amplifier the gate of an f.e.t. is connected to ground. A typical arrangement is shown in **Fig. 4**. Grounded gate amplifiers offer a limited amount of amplification, in the order of 10dB, but they are easy to build and usually very stable in operation. Two precautions that usually ensure stability are to keep the gate lead of the f.e.t. as short as possible and add the small value series resistor (R1) to prevent parasitic oscillations.

In the January article I showed grounded gate r.f. amplifiers for use at the front end of simple receivers. These had tuned circuits on the input and output of the amplifiers and several versions were described.

The amplifier in Fig. 4 is more basic in that only the output is tuned. Radio signals from the antenna are coupled to the source via a 1nF capacitor with a 1kΩ resistor as an input load.

A single tuned circuit is provided at the output. I had this laying on the bench too! The inductor is 30 turns of 30s.w.g. enamelled wire wound on a T50-6 core tuned to the 7MHz band with a 60pF trimmer (Murata 5mm ceramic trimmer – brown) and a 100pF fixed capacitor in parallel. A 100pF capacitor couples the output to gate 1 of the dual-gate m.o.s.f.e.t.

I must confess to having doubts that this arrangement would provide enough input tuning for a receiver on 7MHz. In practice I was pleasantly surprised. When I fed the antenna input via my Z-Match antenna tuner, the rudimentary receiver worked without breakthrough by unwanted signals. No doubt just connecting a piece of wire to the antenna input socket would not yield such good results. Those wishing to take the receiver a step further may like to add the simple tuned circuit shown in **Fig. 5**.

The transformer (T1) is similar to the tuned circuit in Fig. 4, with 30t on a T50-6 core. A tapping is made on the main winding, 5 turns from the grounded end to better match the input to the amplifier.

The antenna input uses a link winding. This is five turns wound over the centre of the main winding. This does help to tighten up the input tuning. Overall, I was quite impressed by this little 'bits and pieces' receiver culled mainly from odd boards laying around from previous projects!

My photographs show the ugly bits and pieces of board that make up the completed receiver. Once again I have used the so-called Manhattan style of construction where pads are glued to a printed circuit board (p.c.b.) material ground-plane. Components are interconnected using appropriately placed pads with the grounded connections going directly to the ground-plane.

Individual Boards

The individual boards are shown rather than the boards being shown joined up to make the receiver. In itself this can be a useful way to build projects. If the constructor is not especially concern about appearance or size, building sections of a project on sub-boards is a viable approach. In some cases, individual sections can be tested in their own right or alternative circuits could be substituted.

Then, if the time comes to take the project apart, sections on an individual board that worked well can be set aside for future possible use. Perhaps I should look for a larger 'PW Projects' box? **PW**

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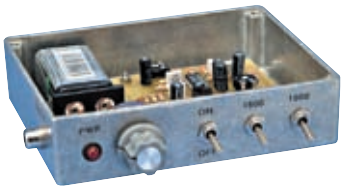

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Tony Nailer G4CFY's Doing it by Design
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Broadband 50W HF Transformers

This month Tony Nailer G4CFY deals with toroidal transformers for a 50W h.f. linear amplifier.

Welcome to *Doing It By Design* (*DiBD*), where, this time, I'm continuing the articles relating to the 5W h.f. broadband amplifier in November 2010, January 2011 and March 2011. Those articles have provided a foundation for the work I'm now embarking on. The design of a 50W h.f. broadband h.f. linear amplifier requires an understanding of the flux density in the toroidal cores, which was previously not of much importance.

The design of transformers is a minefield, where there are a wide variety of different devices, all requiring different solutions! My quest to find suitable equations led me into territory made obscure by not only the change of conventions between 1960 and today, but further complicated by the choice of parameters by the manufacturers of the toroids.

I have come across terms such as 'Oersteds' and 'Webers', 'Teslas' and 'milli-teslas', and 'Gauss'. There are formulae in some literature for flux density related to core area in 'centimetres squared', while in others the sizes are given as 'inches squared'. And – unfortunately – the majority of articles for linear amplifiers provide the windings for the transformers and baluns without an explanation how they were designed!

Measurements & Equations

In the 1960s and early 1970s both the Imperial system of measurements and the centimetre-gram-second (c.g.s) system were in use. Since then things have changed again, to the metre-kilogram-second (m.k.s) system but there appears to be no published work in Amateur magazines applying m.k.s units to toroids in high frequency (h.f.) linears.

It's no use having formula that work out the result in Tesla, or milli-tesla when the manufacturers quote the flux density in Gauss! Likewise Fair Rite and Micrometals (via Amidon) usually quote areas and path lengths in centimetres (cm), with dimensions in millimetres. **Note:** that 1cm=10mm, and an area of one square cm = 100 square mm (sq.mm).

It has been a bit of a struggle, to say the least, but I have now developed the formulae to cope with both the m.k.s system and with the toroid and binocular (or dual-aperture) core data. I've also discovered that while both Amidon and Fair Rite make cores with supposedly the same material, the permeabilities (μ) quoted aren't quite the same. For example type 43 by Amidon has a μ of 850, whilst that of Fair Rite is 800.

Dust iron toroids are not normally used in broadband linears and usually have an inductance factor, AL, quoted in μH/100 turns. Ferrite toroids and cores usually have the inductance factor in mH/1000 turns, or nH/turn. These last two are actually the same because inductance is proportional to the square of the number of turns, 'n'.

Little n = 1000*sqrt(LmH/AL) where AL is in mH/t, and n=sqrt(LnH/AL) where AL is in naH/t.

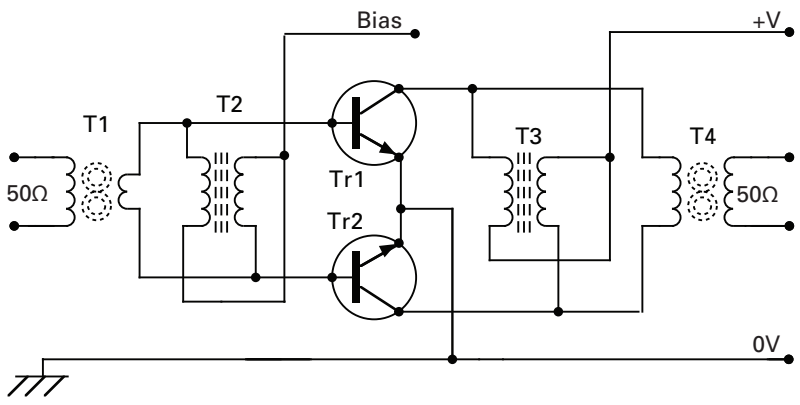
I make no apology for the inclusion of a huge amount of mathematics in this article. I know I have a loyal following of constructors who like the intermediate level of technology. However, and unfortunately, I can't do justice to this subject without a large amount of mathematics and the numerous examples should help readers develop a sufficient understanding to allow others to learn from my work and apply it to their own projects.

Skeletal 50W Amplifier

Please refer to **Fig. 1** for a simplistic look at the project I am about to embark upon in essence it's the same as the 5W broadband amplifier I showed you in the last *DiBD* column. I've deliberately separated the functions of the input matching and the output matching from the direct current (d.c) feeds to the bases and the collectors of the power devices.

The reason for separating the two functions is that the current and voltages seen by the input and output transformers are radically different from those of the bias baluns. Also that the bias baluns carry d.c. whereas the input and output transformers carry only r.f. alternating currents (a.c.).

Fig. 1: The skeleton circuit, of the 50W amplifier, which looks the same as the 5W device already developed. Note that filtering and biasing components aren't shown for clarity.



Input Transformer – First Attempt

Previous work by other authors revealed ratios for input transformers of 2:1 turns ratio for 250mW input, a 3:1 ratio for 500mW input and a 4:1 for 1W input. In this design I'm hoping to achieve 50W output for only 1W drive, so I'll choose a 4:1 turns ratio input transformer.

Experience with the 5W amplifier indicates that using a binocular core for

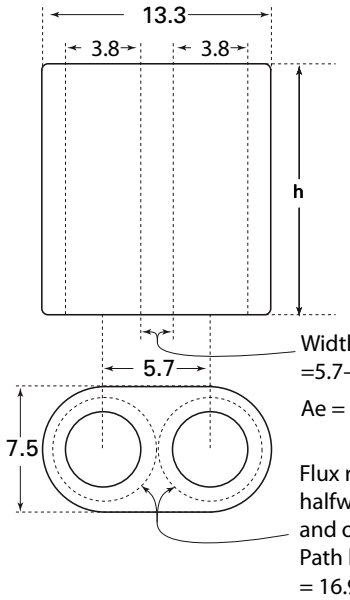


Fig. 2: The dimensions of the dual-aperture core, chosen for the first attempt at input transformer T1.

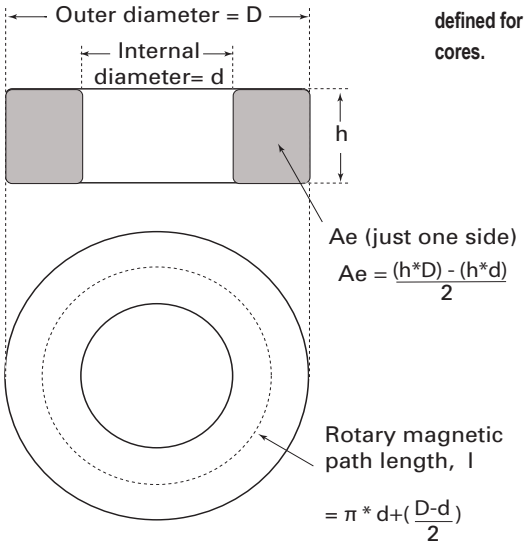


Fig. 3: The dimensions as defined for toroidal cores.

Calculations 1 – for transformer T1
(Input power 1W into 50Ω, turns ratio 4:1)

Let $P = \frac{V^2}{R}$ $V = \sqrt{V*R} = \sqrt{1X50} = 7.07V$ $\hat{V} = 1.414 * 7.07V = 10V$

Let $X_L = 4*R = 4*50=200\Omega$ $L = \frac{X_L}{2\pi f} = \frac{200}{2\pi*1.8*10^6} = 17.68\mu H$

Try a dual-aperture core type 61 material
Core effective area $Ae = \frac{L*l}{\mu_0\mu*n^2}$ m^2

Where L=17.68μH and l = $17x10^{-3}$m
and $\mu_0 = 4\pi * 10^{-7}$ μ = 125 and n = 4 turns

$Ae = \frac{17.68*10^{-6} * 17*10^{-3}}{4\pi * 10^{-7} * 125 * 16} = (0.012*10^{-2})\ m^2 = 120\ mm^2$

Total core length $h = \frac{Ae}{1.9} = \frac{120}{1.9} = 63.16mm$
This is far too big and would need five cores

and then the size of the core was calculated. **Calculations 1** reveals that using that material the core would need to be 63mm long, using five stacked cores, which is impractical and quite unnecessary.

Second Attempt At T1

My second attempt at values for T1 are shown in **Calculations 2**. They're a repeat of the work using another binocular core with type 43 material, with a μ = 850. The resulting area was 17.6sq.mm which gave a length of 9.26mm. A suitable part with a length 10.3mm, is made by Fair Rite as part 2843 000 302, available from RS Components as 467-3551, with an effective area that is 19.57sq.mm.

The flux density due to the a.c. signal is given the notation βac and has been calculated as 113Gauss for this core size. The saturation flux density for type 61 material is 2350, so this core and this number of turns creates a flux density well below the limit. The core will be wound with four turns primary and one turn secondary.

this transformer would be a good first choice. A 1W signal into the input impedance has a signal swing of 10V peak.

It's usual practice to choose an inductive reactance to be four times the load resistance. So, that for the 50Ω input transformer, the primary should have a reactance of 200Ω at the lowest operating frequency. This reactance works out to give 17.68μH at 1.8MHz and has to be achieved using four turns.

A type 61 binocular core was chosen, for which the geometry is shown in **Fig. 2**. Note the length 'h' is not specified as it needs to be determined by calculation. The AL factor is not specified for these cores, so I've used an alternative method of determining the inductance.

The formula to determine the inductance of a winding is related to the effective area Ae, the relative permeability μo (which is a constant $4*\pi*10^{-7}$), the permeability (μ) of the material, in this case is 125, the path length l found to be 17mm, and the number of turns, which I have chosen to be four.

The formula was transformed to make Ae the subject

Calculations 2 – second attempt for transformer T1
Try a dual-aperture core type 43 material μ = 850

$Ae = \frac{17.68*10^{-6} * 17*10^{-3}}{4\pi * 10^{-7} * 850 * 16} = 0.00176*10^{-2}\ m^2 = 17.6\ mm^2$

Total core length $h = \frac{Ae}{1.9} = \frac{17.6}{1.9} = 9.26mm$
A suitable part is 10.3mm long Ae = 1.9 *10.3 = 19.57 mm^2

The flux density due to the a.c. signal is $\beta ac = \frac{\hat{V}*10^4}{2\pi f * Ae * n}$ Gauss

where $\hat{V}$ = 10V, f = $1.8*10^6$Hz, Ae = $19.57*10^{-6}$ m^2
and n=4 turns

$\beta ac = \frac{10*10^4}{2\pi*1.8*10^6*19.57*10^{-6}*4} = 112.95Gauss$

βsat for type 43 material is 2350Gauss so, this core will easily do the job

Calculations 3 – Balun transformer T2

The impedance of the secondary side of T1 is 3.13Ω, each transistor is then driven from 1.565Ω. The balun winding needs to be four times this at 6.26Ω. The signal voltage will be 2.5V.

$$L = \frac{XL}{2\pi f} = \frac{6.26}{2\pi * 1.8 * 10^6} = 0.554\mu H = 554nH$$

Try winding a standard toroid of type 61 material FT37-61 where Ae = 7.6 mm² (or 7.6*10-6 m²), l=21.5mm and AL = 55.3mH/1000t = 55.3nH/t.

$$n = \sqrt{\frac{L}{AL}} \text{ (where AL is in nH/t)} = \sqrt{\frac{554}{55.3}} = 3.165 \text{ turns (4t)}$$

$$\beta ac = \frac{\hat{V} * 10^4}{2\pi f * Ae * n} = \frac{2.5 * 10^4}{2\pi * 1.8 * 10^6 * 7.6 * 10^{-6} * 4} = 72.7 \text{Gauss}$$

For a collector quiescent current of 50mA, assume a base current of 5mA.

$$\beta dc = \frac{n * I * AL}{10^5 * Ae} \text{ (where AL is in nH/t)} = \frac{4 * 0.005 * 55.3}{10^5 * 7.6 * 10^{-6}} \text{ Gauss}$$

= 1.46Gauss.

As βsat for type 61 material is 2750Gauss, this core will do the job easily.

Input Balun Transformer

The input transformer is 4:1 turns ratio step down, so the impedance at the secondary is 3.13Ω. That's 1.565Ω to each transistor. Each balun winding then needs an inductive impedance of four times this, at 6.26Ω. The signal voltage will be 2.5V peak. The inductance of the windings will be 0.554μH.

For my first try I started with a standard ring core toroid of type 61 material, the geometry of which is shown in **Fig. 3**. The FT37-61 core has an outside diameter 9.5mm, an inside diameter of 4.75mm and is 3.3mm high. The type 61 material has a μ of 125 and has an inductance factor AL of 55.3mH/1000t, which is the same as 55.3nH/t. **Calculations 3** revealed that 3.17 turns would give the required inductance, so four turns will be used.

The flux density βac due to the a.c. signal was 72.7 Gauss, and the flux density due to the d.c. bias current was just 1.46 Gauss. The sum of these is well below saturation flux density of type 61 material. The core will be wound with four turns bifilar, with the end of one winding connected to start of the other to create a centre-tapped winding.

Balun Transformer T3 First Attempt

Next I'll turn to looking at the T3 balun transformer. The collector load impedance for each transistor, is found from the peak signal swing (12V) squared, divided by twice the power output for each transistor.

So, for each transistor, delivering half the total power, this calculates to a load impedance of 2.88Ω. This indicates that the reactance of the balun needs to be 11.5Ω. At 1.8MHz this equates to an inductance of 1μH.

The peak signal swing is 12V and the efficiency is about 33%. This means for 50W r.f. output the d.c. input will need to be 150W! On the usual 13.5V supply this is a current of 11.1A r.m.s, which is 15.7A peak.

For the first try at the balun transformer, I chose a dual aperture core with a length of 10.3mm, in type 61 material with a μ = 125. Other parameters were the same as those of the second attempt at T1. **Calculations 4** results in a value of 2.3 turns, so I chose three turns. The flux density, βac due to a.c. was 180Gauss.

The inductance factor AL is not specified by Amidon or Fair Rite for this type of core but I have determined from toroidal core data that it is 50nH per turn for every 10sq.mm of core area. So in this case with an area of 19.57sq.mm, the AL will be 98.

Putting this value into the equation for d.c. flux density βdc gave 2358Gauss. This d.c. flux density alone is greater than the saturation flux density of 2350Gauss for type 61 material. So another core will be needed!

Transformer T3 Second Attempt

My second attempt of finding a suitable T3 core are shown in **Calculations 5,** which were worked for a slightly larger core 13.4mm long. The effective area was 25.46sq.mm and the AL is 127. The turns calculated at almost exactly at two. Flux density for a.c. was 208Gauss and for d.c. 1556Gauss. Combined the two gives a total of 1764Gauss, which is sufficiently below the saturation level of 2350 to be useable.

Calculations 4 – Balun transformer T3

Each collector load inpedance is 2.88Ω, the reactance of the balun needs to be four times this at 11.5Ω . The peak voltage will be 12V, so at 50W r.f. out and an efficiency of 33%, the d.c. power will be 150W.

$$\text{At 13.5V, } I = \frac{150}{13.5} = 11.1A \qquad L = \frac{XL}{2\pi f} = \frac{11.5}{2\pi * 1.8 * 10^6} = 1\mu H$$

$$\hat{I} = 1.414 * I = 15.7A$$

I will try winding a standard toroid of type 61 material with a length h, of 10.3mm, Ae = (1.9*10.3) = 19.57 mm² (19.57*10-6 m²) l=17mm, L = 1μH, $\mu_0 = 4\pi * 10^{-7}$ and μ = 125.

$$n^2 = \frac{L * l}{\mu_0 * \mu * Ae} = \frac{1 * 10^{-6} * 17 * 10^{-3}}{4\pi * 10^{-7} * 125 * 19.57 * 10^{-6}} = 0.00055 * 10^4 = 5.5$$

$$n = \sqrt{5.5} = 2.3t \quad \text{So, try two or three turns.}$$

$$\beta ac = \frac{\hat{V} * 10^4}{2\pi f * Ae * n} = \frac{12 * 10^4}{2\pi * 1.8 * 10^6 * 19.57 * 10^{-6} * 3} = 180 \text{Gauss}$$

$$\beta dc = \frac{n * \hat{I} * AL}{10^5 * Ae} \text{ (where AL is 50nH/t/10 mm}^2\text{) And AL = 98}$$

$$= \frac{3 * 15.7 * 98}{10^5 * 19.57 * 10^{-6}} = 2358 \text{Gauss}$$

As βsat for type 61 material is 2750Gauss, there is a possibility that this core could be near saturation.

Output Transformer T4

Now to turn to the transformer, T4. The individual collector loads for the transistors had been calculated to be 2.88Ω, so the collector-to-collector impedance is 5.76Ω. A 3:1 turns ratio transformer, with its 9:1 impedance transform, will present a load of 5.55Ω at the primary side, which is close enough.

Reactance at the output side will be the same as the input of T1, 200Ω, giving an inductance of 17.68μH. Signal swing across the load will be 70.7V peak. Assuming one primary turn and three secondary turns, as before **Calculations 6** gave the required core area as 31sq.mm, which needs a core length of 16.3mm.

Fair Rite makes cores of 6.6mm and 10.3mm, which when

Calculations 5 – Balun transformer T3, another try

Unfortunately the 10.3mm long core was not available from RS, but another 13.4mm long core is available (RS467-3618).

$Ae = 1.9*13.4 = 25.46\ mm^2 \quad AL = \frac{50nH*25.46}{10} = 127.3\ (127)$

$n^2 = \frac{L*I}{\mu_0*\mu*Ae} = \frac{1*10^{-6}*17*10^{-3}}{4\pi*10^{-7}*127*25.46*10^{-6}} = 0.000418*10^4 = 4.18$

$n = \sqrt{4.18} = 2.04t$ Use two turns.

$\beta ac = \frac{\hat{V}*10^4}{2\pi f*Ae*n} = \frac{12*10^4}{2\pi*1.8*10^6*25.46*2} = 208Gauss$

$\beta dc = \frac{n*\hat{I}*AL}{10^5*Ae} = \frac{2*15.7*127}{10^5*25.46*10^{-6}} = 1556Gauss$

Together the two flux densities are sufficiently below 2750Gauss to be useable.

stacked, would give 16.9mm and an area of 32.1sq. mm. This would result in an a.c. flux density of just 649 Gauss. Unfortunately, RS Components do not stock the 10.3mm long core. An easy alternative is to stack 3 of the 6.6mm cores to give 19.8mm and an area of 37.6 square-mm. The a.c. flux density is then 554 Gauss.

Output transformer T4 Alternative

As an alternative, to using the binocular core, I tried a design using a stack of a ring cores instead, the chosen cores were FT50A-43. These cores have a 12.7mm outside diameter, 7.9mm inside diameter, and are 6.35mm high. From the Amidon data sheet, it can be seen that Ae = 15.2sq.mm, l = 36.8mm, and μ = 850. Peak Voltage 70.7V, three turns secondary, inductance 17.68μH.

Calculations 7 gave a total area of 67.7sq.mm, requiring 4.45 toroids. Five could be used in a single stack or six in two stacks of three. With six toroids the total area was 91.2 square-mm and the a.c. flux density was 228Gauss.

Strangely though, when a smaller core type FT50-43, just 4.9mm high, was used, the area worked out at 55.5sq. mm and required just four toroids. The a.c. flux density would be 391Gauss, which is still well below the saturation level.

Calculations 6 – Output transformer T4

Each transistor provides a 12V signal swing into a 2.88Ω load. Collector–Collector this is 5.76Ω and a 3:1 turns ratio transformer would represent a 5.55Ω Collector–Collector load when feeding a 50Ω output load. The reactance of the output side needs to be four times the load, at 200Ω. The inductance is the same as T1's input at 17.68μH, achieved with three turns.

At the output terminal $RL = \frac{\hat{V}^2}{2*Po}$ and $\hat{V} = \sqrt{2*P_o*R}$

$= \sqrt{2*50*50} = 70.7V$

Try a dual aperture, type 43 core, where μ = 850

$Ae = \frac{L*I}{\mu_0*\mu*n^2}\ m^2$ where L=17.68μH, l = 17mm, $\mu 0 = 4\pi*10^{-7}$, n=3

$Ae = \frac{17.68*10^{-6}*17*10^{-3}}{4\pi*10^{-7}*850*9} = 0.0031*10^{-2}\ m^2 = 31\ mm^2$

$h = \frac{Ae}{1.9} = 16.3mm$

Fair Rite do make cores 6.6 and 10.3mm long, which when stacked gives 16.9mm. And Ae is then $1.9*16.9\ 32.1\ mm^2$

$\beta ac = \frac{\hat{V}*10^4}{2\pi f*Ae*n} = \frac{70.7*10^4}{2\pi*1.8*10^6*32.1*3} = 649Gauss$

The 6.6mm cores are available from RS (RS467-3551). The Fair Rite reference number is 2843 000 302. The 10.3mm core is also available from RS. Using three 6.6mm cores, should also work well.

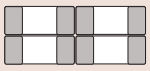
Calculations 7 – Alternative output transformer T4

Let's now try an alternative output transformer, using standard toriodal cores. I'll start with a two-by-two staclk of FT50A-43s.

$Ae = 15.2\ mm^2$, l = 36.8mm, μ = 850, $\hat{V} = 70.7$, n=3 & L=17.68μH

$A_T = \frac{L*I}{\mu_0*\mu*n^2}\ m^2 = \frac{17.68*10^{-6}*36.8*10^{-3}}{4\pi*10^{-7}*850*9} = 0.00677*10^{-2}\ m^2$

$= 67.7\ mm^2$



Number of toriods $= \frac{A_T}{Ae} = \frac{67.7}{15.2} = 4.45$

Four toroids will not be enough, so use six in two stacks of three.

$A_T = 6*15.2 = 91.2\ mm^2$

$\beta ac = \frac{\hat{V}*10^4}{2\pi f*A_T*n} = \frac{70.7*10^4}{2\pi*1.8*10^6*91.2*3} = 228.5Gauss$

This is well below saturatation.

Applying the same equation using FT50-43, cores, with l=30.2mm and Ae=13.3mm

$A_T = \frac{L*I}{\mu_0*\mu*n^2}\ m^2 = \frac{17.68*10^{-6}*30.2*10^{-3}}{4\pi*10^{-7}*850*9} = 0.00555*10^{-2}\ m^2$

$=55.5\ mm^2$

Number of toroids $= \frac{55.5}{13.3} = 4.17$, four toroids might just be enough.

The flux density would be 391Gauss

Applying The Calculations

Applying the calculations of a.c. and d.c. flux density to the collector supply balun of the previously designed 5W amplifier revealed a total flux density of 1598Gauss, when running at 5W. If that amplifier is run at 10W the current will increase by 40% and the flux density will rise to 2166Gauss. However, it's well below the saturation limit of 2750Gauss on the lower power and still quite safe at the higher level.

Whilst the equations all seem to work by rejecting cores unable to do the work and finding ones which give the required inductance without saturation, they have not been tested in the amplifier yet. The next article in this series will inform you of the results of laboratory tests on the amplifier using these transformers. As usual I will let you know what worked and what didn't, and how I went about solving any problems.

If you wish to communicate regarding this article you can contact me on **tony@pwpublishing.ltd.uk** Cheerio until next time! **PW**

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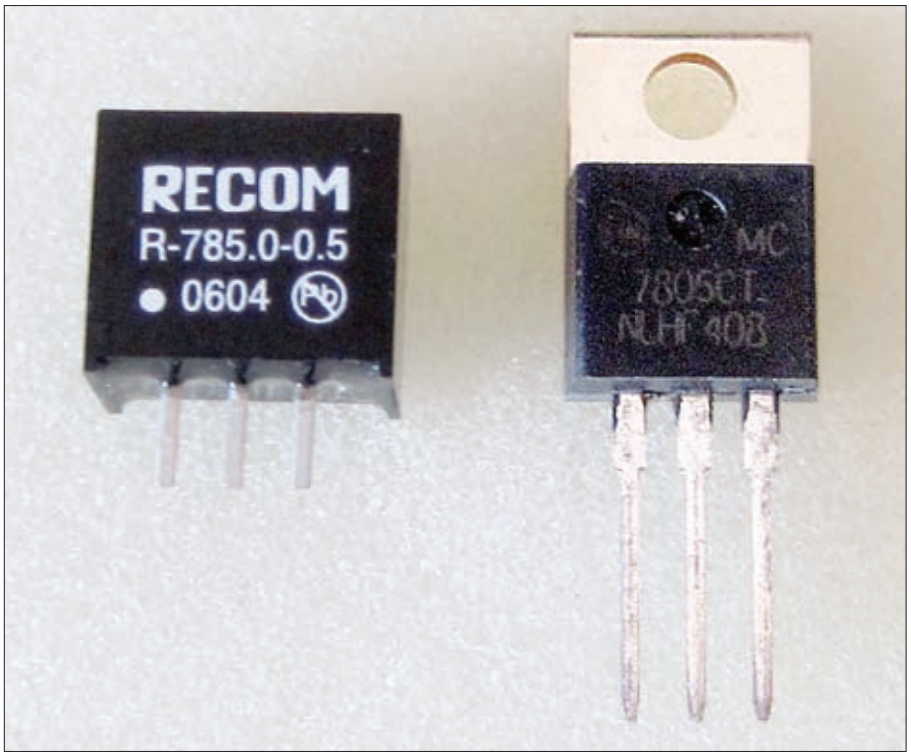
Mike Bush G3LZM suggests an alternative to the ubiquitous LM7805 regulator, that often 'wastes' energy as heat.

A Switching Regulator of the Small Kind!



How often have you needed to regulate down from, let's say 13.8V to 5V? Quite often I suspect! And, in most cases, a linear regulator circuit, using a dedicated integrated circuit (i.c.) similar to that shown in Fig. 1 is used.

There's one drawback of this type of linear regulator though, as the current drawn increases, the power dissipated by the regulator increases. Let's assume a current of a little over 200mA is supplied, then around 2W of power in the form of heat will have to be dissipated by the regulator.

As the current supplied, approaches the 1A maximum of the '7805 device, the power lost as heat rises to around 8W. This would normally need the i.c. to be fitted with a heat-sink. Often the heat-sink is formed by bolting it down to the metal chassis, which might not always be convenient.

Ballast Resistor

A ballast resistor 'R' can share some of the burden by dropping the voltage appearing at the 7805 regulator input. But it too will become warm and will have to have sufficient power rating to cope.

Should the input voltage increase then even more heat will be produced. This is because as the current drawn from the regulator increases, not only is there more heat produced, but there's a chance that the regulator might turn off due to voltage starvation caused by the voltage drop across 'R'. Careful circuit design is therefore required.

Fortunately, there's an alternative no-nonsense solution to the problems I've mentioned by using a Recom 785.0-0.5 'Innoline' switching regulator. This has been designed as a direct pin-for-pin replacement for the '7805 (TO220) type of fixed regulator, **Fig. 2**.

These regulators don't like 'feeding' an open-circuit load, so it's a good practice to put a 510Ω bleed resistor across the output so that the circuit's always supplying a minimum of 10mA, **Fig. 3**.

The advantages of these devices are:

- This fixed 5V version will give up to 500mA output.
- The input voltage can vary between 6.5V to 32V.
- There is little or no heat generated.
- Pin for pin replacement for the 7805.
- There's a range of output options.

So, I hope you find my ideas helpful and practical! **PW**

If you feel that such a device is just right for your task, they're available in the UK (£3.37 each for quantities 1-5) from **Dengrove Marketing**, **Tel: 01525 237731** or via E-mail address at: **sales@dengrove.com**

Recom is a German company whose web address is **www.recom-international.com** where you can view their entire range and download datasheets.

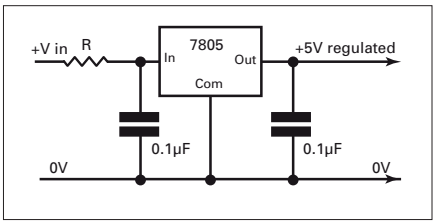


Fig. 1: A simple 5V regulator can (sometimes) have some unexpected heat problems.

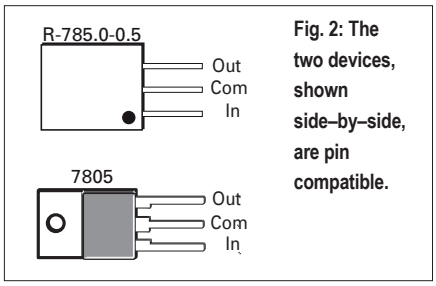


Fig. 2: The two devices, shown side–by–side, are pin compatible.

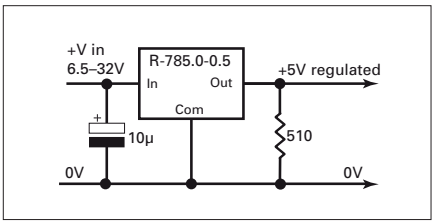


Fig. 3: Unlike the '7805, the Recom device, should always have a minimum current loading of 10mA.

SHOWROOM & MAIL ORDER:
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Haydon Communications

LOCAL TO GLOBAL

TEL: 01708 862524
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Our showroom is 5 mins from "Dartford River Crossing"
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★ WANTED: USED EQUIPMENT FOR CASH OR PART EXCHANGE ★

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HF TRANCEIVERS

FT-450

Amazing Rx front end performance. (IF DSP). HF + 6m (100W)
£599.99
or FT-450AT (+ ATU)..... £699.99
One customer claimed, "this is the best kept secret of the communications industry".

NEW FT-450D

This is the latest IF DSP marvel from Yaesu. HF + 6m (500/300 CW filters as standard). New design + ATU.
OUR PRICE **£789.00**
With free MD-100A8X desk mic

FT-857D DSP

HF + 6m + 2m + 70cm.
OUR PRICE **£639.99**
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£679.99

FT-897D

Includes DSP
OUR PRICE **£729.99**
OR FT-897 + MS-1228
£779.99

FT-950

HF + 6m IF DSP
OUR PRICE **£1179.99**
OR WITH NISSEI PS-300
£1299.99

FT-5000DX

FT-5000DX (200W HF + 6m)... £4299.99
FT-5000DX (above + monitor). £4749.99
FT-5000DX (above + filters) ... £5149.99

FT-2000D

FT-2000D (200W)..... £2549.99
FT-2000D + SP-2000..... £2699.99
1 x 2000D as new (1 month old).. £2349.99

FT-817 ND

HF + 6m + 2m + 70cms. Incl's battery/charger + antennas. Optional case £22. Extra spare battery £49.99
OUR PRICE **£495.00**
STAR BUY - FT-817ND + extra battery + case..... £559.99

MD-200

Broadcast quality dynamic mic. It sounds & looks superb. Fits 8-pin round & 8-pin modular radios. (Optional 6-pin modular adapter £19.99)
SALE PRICE **£239.99**
Yaesu MD-100A8X..... £129.99

MD-100 A8X

Superb quality microphone at an affordable price.
OUR PRICE **£129.99**

IC-7000

HF + 6m + 2m + 70cm. Superb IF DSP. Colour display.
£1169.99
or IC-7000 + MS-1228 £1219.00
IC-9100 new HF to 23cm... £phone

TS-2000E

HF + 6m + 2m + 70cm. Not only is this Kenwood's top machine with IF DSP, it also uses cutting-edge technology in a streamlined package.
£1489.99 TS-2000E + MS-1228 **£1539.99**
NEW TS-590 ..... £1365 .99 WITH FREE MS-1228

FT-2000

FT-2000 (100W HF + 6m)..... £1975.99
FT-2000 + matching speaker.. £2125.99

ANTENNAS

DIAMOND CP-6

A superb (diamond quality) 6 band trap vertical antenna with trap radials – "rotary" trap system allows "flat wall" mounting. 80m/40m/20m/15m/10m/6m. 200W SSB, HT 4.6m (15ft tall).
SEND SAE FOR DATA SHEET
£339.99

ATAS-120A

Military spec mobile antenna – superbly made. Covers HF + 6m + 2m + 70cm. *Fully automatic. (*certain Yaesu radios).
OUR PRICE **£279.99**

NEW INTRUDER III

13 band (80-10/6/2). PL-259 fitting. Includes WARC bands. 13 band version of Intruder II.
£49.99
(2 for £89.99)

INTRUDER II

11 band (80-10 6/2/70cm). PL-259 fitting. Colapses to 95cm (~ 3 ft).
£37.99
(2 for £70.00)

DIAMOND V-2000

6m + 2m + 70cm. 2 section (2.5m long) PL-259 fitting.
Superb quality
£129.99

PSUs

WATSON PSU

Power-Mite NF 22amp..... £69.95
Power max (25A) £89.95
Power max (45) £115.00
Power max (65) £225.00
W-10AM 25A (linear)..... £59.95
W-25AM £89.99

DIAMOND GZV-4000

Includes built-in extention speaker
OUR PRICE **£169.99**
GZV-2500 25 amp version of above. Sale price £129.99

DIAMOND GSV-3000

"Linear power supply". 30A @ 13.8V. 1-15V variable. Diamond quality PSU
OUR PRICE **£169.99**

NISSEI MS-1228

28A at 13.8V yet under 2kgs. (H 57mm, W 174mm, D 200mm approx). Fully voltage protected. Cigar socket & extra sockets at front/rear. Ultra slim.
NISSEI HAVE BECOME RENOWNED FOR PUTTING QUALITY FIRST, YET MAINTAINING A GOOD PRICING STRUCTURE. A TRULY SUPERB POWER SUPPLY UNIT
'Smallest version to date' now with cigar socket.
QUALITY MADE PRODUCT **£89.99**

NISSEI PS-300

Features: ★ Over voltage protection ★ Short circuit current limited ★ Twin illuminated meters ★ Variable voltage (3-15V) latches 13.8V ★ Additional "push clip" DC power sockets at rear. Dim'ns: 256(W) x 135(H) x 280(D)mm.
30 AMP/12 VOLT PSU
A truly professionally made unit built to outlast most PSUs.
TRUE 'LINEAR' PSU
OUR PRICE **£159.99**

VHF/UHF TX

YAESU FT-8900 R

10m + 6m + 2m + 70cm. (up to 50W).
INCLUDES DTMF MIC.
OPTIONAL DETATCH KIT £20
£359.99

YAESU FTM-350

2m/70cm Tcvr with APRS & dual Rx (50W O/P). Includes wideband Rx. Includes DTMF mic.
£475.00

YAESU VX-8E

6m/2m/70cm. "APRS" with Rx:- 0.5-1GHz. Incl's battery & chgr.
SPECIAL VX-8 + EXTRA BATTERY £319.99
£299.99

YAESU VX-7R

6m/2m70cm + wide RX. An amazing 6W water proof hand-held. Case £19.99. Spk mic £32.99. Cigar lead £24.99. BNC adapter £6.00.
Silver **£249.99**

YAESU FT-7900 R/E

Latest commercial built 2m/70cm mobile + wide Rx. (Incl's DTMF mic)
OPTIONAL DETATCH KIT £20
£229.99

ML-5189

Compact FM mobile. 4m/25W
£149.99 del £5

NEW WOUXON KV-UV920R

2m/70cm mobile
£phone


NEW YAESU FT-270 R/E
2m FM handie (keypad). Incl's batt/charger.
£99.99

ACCS

SGC BARGAINS

SGC MAC-200 New auto tuner 1.8-54MHz (200W) wire, vertical, dipole. You name it. (5 selectable outputs).
£289.99
SGC-239 Mini tower ATU (1.8-30MHz) £199.99
SGC-237 HF+6m Tuner..... £309.99
SGC-230 (HF-200W) ATU..... £449.99
SGC-Smart lock (specify model)..... £69.99

MFJ-993B INTELLITUNER

Fully automatic (1.8-30MHz). 300W SSB.
Easy to use ATU. SALE PRICE **£239.99**

MFJ-949E

SALE PRICE **£174.99**
● 1.8-30MHz 300W ATU ● Large cross needle meter ● 30/300W PEP power meter ● VSWR ● 3-way antenna selector ● Internal balun + dummy load.


MFJ-259B ANALYSER
1.8-170MHz
£259.99
Case 259B £29.99 Dip Coils 259/269£29.99


MFJ-269B ANALYSER
1.8-170MHz + 70cm
£339.99
Case 269B £29.99

MFJ-269 pro version..... £369.99
MFJ-260C 300W dummy load £49.99
MFJ-264 1.5kW dummy load..... £79.99
MFJ-969 Rollercoaster ATU (300W)..... £199.99
MFJ-962D 1.5kW (metered) antenna tuner..... our price £269.99
MFJ-994B (600W) intelli tuner £319.99

GIZMOS

ETON SATELLIT 750

0.1-30MHz SSB/AM 88-108MHz (FM stereo) 118-137MHz airband/rotary antenna. 1000 mems/ rotary tuning/wide-narrow filters & more.
+ FREE HD-1010 headphones
£299.99

WINRADIO EXCALIBUR

9kHZ-50MHz (all mode) receiver with spectrum analyser. Most manufacurers try to follow standards - WINRADIO sets them! WR-G3100C pack includes:- receiver + software + PSU + USB cable + BNC adapter. Requires PC.
ALL THIS FOR **£649.99**

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2m/70cm hand-held (SW O/P) VOX/CTCSS/DCS 200 channels. Dual watch. Incl's battery and drop in charger.
£79.99 P&P £5.00

ALINCO DJ-596E

2m + 70cm Handie. Includes nickle metal N.M.H.I and charger.
Includes free speaker mic
£139.99

KENWOOD TH-F7E

2m/70cm Tx. Rx: 0.1-1000MHz (AM/WFM/FM/ SSB). Incl's battery pack (Lion) + charger.
Includes free speaker mic
£229.99

WOUXUN HANDIES
FREE POST

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KG-679E (2m) £59.99
KG-679E (70cm) £59.99
KG-699E (4m) £92.99

LIMITED STOCK

10m PNEUMATIC MAST

We have a small quantity of "military spec" pump-up masts (part of a Government order). All brand new in a crate and supplied with cover (close HT ≈ 6 foot). Anodised green finish.
40m guy kit pack £49.99
Ground fixing spikes (3-off) £35.00
2 foot all ground fixing kit..... £99.99
(Can be hand operated or by compressor/foot pump)

10m MAST, ONLY **£1149.99**

NEW DIAMOND WD-330

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

WOW **£209.99**

W-8010 DIAMOND SHORTENED DIPOLE

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

£179.99

NEW DIAMOND BB6W

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

£199.99

CAROLINA WINDOM

CW-160S	(160-10m) 40m long.....	£149.95 P&P £10.00
CW-160	(160-10m) 80m long.....	£159.95 P&P £10.00
CW-80	(80-10m) 40m long.....	£129.99 P&P £10.00
CW-80S	(80-10m) 20m long.....	£149.99 P&P £10.00
CW-40	(40-10m) 20m long.....	£119.99 P&P £10.00
G5-RV	(80-10m) + balum	£74.99

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MA5B	Mini beam 10, 12, 15, 17, 20m..... WOW	£479.99
A4S	4 ele beam (10 - 20m).....	£669.99
A3S	3 ele beam (10-20m)..... WOW	£575.99
R-8E	Vertical (40 - 6m) "special"..... SPECIAL	£499.99

Q-TEK PENETRATOR

"We've sold 100s all over Europe"

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

SEND SAE FOR LEAFLET

£219.99

NEW Wire Penetrator 50ft long (1.8-70MHz).....£189.99

Q-TEK INDUCTORS

80mtr inductors + wire to convert ½ size G5RV into full size. (Adds 8ft either end).....£34.99 P&P £4.00 (a pair)

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Baluns 1:1 or 4:1 or 6:1.....£39.99 each P&P £4
Traps 80m or 40m or 20m or 15m.....£39.99 pair P&P £5

GENUINE COAX SWITCHES (P&P £6.00)

2 way CX-201 (0-1GHz) SO239.....£24.99
2 way CX-201 'N' (0-1GHz) 'N' £29.99
4 way CX-401 (0-500MHz) SO239.....£79.95
4 way CX-401 'N' (0-500MHz) 'N' £89.95

WATSON COAX SWITCHES

(POST £4.00)

CX-SW4N DC-1.5GHz (5xN).....£59.99
CX-SW4PL DC-800MHz (5 x SO-239).£56.95
CX-SW3N DC-1.5GHz (4 x N) £49.95
CX-SW3PL DC-800MHz (4 x SO-239).£41.95
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CX-SW2PL DC-1GHz (3 x SO-239) £26.95

REPLACEMENT POWER LEADS

DC-1 Standard 6-pin/20A fits most HF .....£22.00 P&P £3
DC-2 Standard 2-pin/15A fits most VHF/UHF .... £10.00 P&P £3
DC-3 Fits Yaesu FT-7800/8800/8900, etc ..... £17.50 P&P £3

YAESU REPLACEMENT MICS

MH-IC8 8 pin Yaesu mic (8-pin round) .....£44.99 P&P £5
MH-4 4 pin fits older HF, etc. (4-pin round) .....£39.99 P&P £5
MH-31A8J 8 pin modular .....£39.99 P&P £5

COAX BARGAINS

True military spec real UK coax

RG-58 Military spec x 100m.
£49.99 or 2 for £90.00
Coax stripping tool (for RG-58).....£4.99
RG-213 Military spec x 100m (10mm dia).
£129.99/100m or 2 for £229.99

Q-TEK TRI-MAGMOUNT

Very heavy duty. Available:- SO-259 or 3/8 – specify. **£44.99**

HEAVY DUTY 24ft SWAGED MAST SET

New extra heavy duty 2" mast set. 4 sections x 6 foot that slot together.

SPECIAL BUY

£69.99 each. Del £10 THREE FOR £149.99 DEL £15.00

NEW NOISE FILTER!

A superb TDK 'snap fix' ferrite clamp for use in Radio/TV/ Mains/PC/Phone etc.

Simply close shut over cables and notice the difference! Will fit cables up to 13mm diameter. Ideal on power supply leads/mic leads/audio leads/phone leads.

2 for £13.99 or 5 for £32.99 (P&P £4.00)

MAST HEAD PULLEY

A simple to fit but very handy mast pulley with rope guides to avoid tangling.
(Fits up to 2" mast) **£13.49** + P&P £4.50
30m pack (4.4mm) nylon guy rope £15.00
132m roll 4.4m nylon guy (480Kg b/f) ..... £45.00 Del £7.50

NEW EASY FIT WALL PULLEY

Pulley will hang freely and take most rope up to 6mm. (Wall bracket not supplied).

£13.49 + P&P £4.50

Wall bracket, screws not supplied. Simply screw to outside wall and hang pulley on WALL BRACKET £2.99 P&P £1.00

30m pack (4.4mm) nylon guy (480kg) £15.00
132m (4.4mm) nylon guy (480Kg) £45.00

HANGING PULLEY

Heavy duty die-cast hanging pulley. Hook and go!

£24.99

BARGAIN WINCH

500kg brake winch. BARGAIN PRICE

£89.99 Del £10.00

(Now includes cable grip)
Winch wall bracket..... £22.99

BUTTERNUT VERTICALS

HF-2V (80/40m).....£279.99
HF-6V (80/40/30/20/15 /10m).....£375.00
HF-9V (as HF-6V + 17/12 & 6m).....£425.00

TONNA YAGIS

22089	9ele 2m	£79.99
220811	11ele 2m.....	£109.99
220817	17 ele 2m.....	£139.95
220818	9ele 2m XD.....	£129.95
220921	21ele 70cm	£109.00
2208938	9ele 70cm XD.....	£135.99

NISSEI PWR/SWR METERS

RS-502 1.8-525MHz (200W) ..... £79.95 P&P £6.50
RS-102 1.8-150MHz (200W) ..... £49.95 P&P £6.50
RS-402 125-525MHz (200W) ..... £49.95 P&P £6.50
TM-3000 1.8-60MHz (3kW) Incls mod meter ..... £69.95 P&P £6.50
RS-40 144/430MHz Pocket PWR/SWR..... £34.99 P&P £5
DL-30 diamond dummy load (100W max) ..... £29.99 P&P £5

NEW SWAGED MAST SETS

20 foot mast. 1½" – 4 x 5 foot sections. (Swaged) **£49.99**

20 foot mast. 1¼" – 4 x 5 foot sections. (Swaged) **£46.99**

H/DUTY CAR BOOT MAST SET

18 foot (1½" dia).
18 foot – 6 x 3 foot (1½") slot together ally sections.

£49.99 each.

TWO FOR £82.99 DEL £13.00

NEW CAR BOOT MAST SET

Superb 18 foot (6 x 3 foot sections) that slot together.
Dia: 1¼" ideal to take anywhere. **£46.99**

2 for £79.99 del £13.00

LOW LOSS PATCH LEADS

£4.50 P&P

Connectors	Length	Price
PL-259 - PL-259	0.6m	£11.99
PL-259 - PL-259	1m	£14.99
PL-259 - PL-259	4m	£19.99
PL-259 - PL-259	20m	£49.99
BNC - BNC	1m	£12.99

MT-3302

Heavy duty universal mount.
Includes 5m cable **£29.99**

MT-6601

Adjustable roof rack/window bar mount

£19.99

YAESU G-450C

Heavy duty rotator for HF beams, etc. Supplied with circular display control box

WOW **£309.99** or £359.99 with 25m cable/plugs

G-650C extra heavy duty rotator.....£355 or £409.99 with cable
G-1000DXC extra heavy duty rotator..... £429.99 or £489.99 with cable
G-2800DXC The goliath of rotators.....£845.99
GS-065 thrust bearing £59.99
GC-038 lower mast clamps £35.99

AR300XL

Quality rotator for VHF/UHF. Superb for most VHF-UHF Yagis, 3-core cable required. 3-core cable £1 per mtr.
GS-050 stay bearing £34.99 OUR PRICE **£81.99**

DIAMOND YAGIS

No tuning required

2m/5 element	No tuning required SO-239 feed.....	£43.99
2m/10 element	No tuning required SO-239 feed.....	£79.99
70cms/10 element	No tuning required SO-239 feed.....	£49.99
70cms/15 element	No tuning required SO-239 feed.....	£64.99
6m/2 element	No tuning required SO-239 feed.....	£84.99

Q-TEK COLLINEARS (VHF/UHF) Del £12.50

X-30 GF 144/70, 3/6dB (1.1m)..... £44.99
X-50 GF 144/70, 4.5/7.2dB (1.7m)..... £59.99
X-300 GF 144/70,6.5/9dB (3m)..... £79.99
X-510H GF 144/70, 8.5/11dB (5.4m) £139.99
X-627 GF 50/144/70, 2.15/6.2/8.4dBi (2.4m)....£89.99

DUPLEXERS & TRIPLEXERS

MX-2000 50/144/430MHz Triplexer £69.99
TSA-6011 144/430/1200MHz Triplexer.....£64.99
MX-72 144/430MHz.....£34.99
MX-72 "N" 144/430.....£35.99
MX-62M (1.8-56MHz + 76-470MHz) £64.99

MOBILE ANTENNAS Del £10.00

DB-7900 2m/70cm (5.5/7.2dB) 1.6m (PL-259).....£39.99
DB-770M 2m/70cm (3.5/5.5dB) 1m (PL-259).....£24.99
Diamond HV-7CX 7/14/21/28/50/144/430.....£129.99
Diamond CR-8900 10/6/2m/70cm (1.26m) £99.99
Diamond AZ-506 2m/70cm – only 0.67m long.....£39.99
PL-62M 6m/2m (1.4m) PL-259 .....£23.99
PL-627 6m/2m/70cm (1.7m) PL-259.....£44.99

RH-9000 BNC

40cm flexible whip for the ultimate in gain. **£29.99** P&P £5.00
Tx:- 2m + 70cm (Rx:- 25MHz-2.9GHz).

RH-9090 SMA

40cm flexible whip that is ideal as replacement. Tx:- 2m + 70cm. Rx:- 25MHz-2.9GHz **£34.99** P&P £5.00

EP-300

Over the ear earpiece. **£9.95** P&P £4.00

RH-770H (BNC)

2m/70cm Tx + wide Rx. High gain up to 5.5dB.

£54.99 P&P £5.00

STATION A4 LOG BOOK OFFER

3 FOR £10.00 P&P £4.50

EARPIECE/BOOM MIC

Over ear earpiece + boom mic. Available in Kenwood version or Yaesu/Alinco/Icom.

£24.99 P&P £4.00

DOUBLE THICK FERRITE RINGS

A superb quaility ferrite ring with incredible properties. Ideal for "R.F.I". Width 12mm/ OD35mm. 6 for £12.00 P&P £4.00
12 for £20.00 P&P £5.00
30 for £40.00 P&P £10.00

COPPER ANTENNA WIRE ETC

Hard drawn (50m roll).....£40.00 P&P £7.50
New: 50m roll, stranded antenna wire.....£19.99 P&P £7.50
Flexweave (H/duty 50 mtrs) .....£44.99 P&P £7.50
Flexweave H/duty (18 mtrs) .....£21.99 P&P £7.50
Flexweave (PVC coated 18 mtrs) .....£24.99 P&P £7.50
Flexweave (PVC coated 50 mtrs) .....£59.99 P&P £7.50
Special 200mtr roll PVC coated flexweave.....£180.00 P&P £10.00
Copper plated earth rod (4ft) .....£14.99 P&P £8.00
Copper plated earth rod (4ft) + earth wire.....£24.99 P&P £8.00
New RF grounding wire (10m pack) PVC coated.....£14.99 P&P £5

METALWORK & BITS (Del Phone)

2" mast-floor base plate.....£14.99
6" stand off brackets (no U-bolts)..... £8.99
9" stand off brackets (no U-bolts)..... £10.99
12" T & K brackets (pair) £18.99
18" T & K brackets (pair) £22.99
24" T & K brackets (pair) £26.99
U-bolts (1.5" or 2") each £1.50

All bracket measurements are from wall to end of bracket

8mm screw bolt wall fixings £1.70
8-nut universal clamp (2" to 2") £7.99
2" extra long U-bolt/clamp £6.99
2" crossover plate with U-bolts £14.99
15" long (2") sleeve joiner (1.5" also available) £18.99
3-way guy ring £5.99
4-way guy ring £6.99
Heavy duty guy kit (wire clamp, etc.) £49.99
Set of 3 heavy duty fixing spikes (~0.7m long)..... £29.99
30m pack (4.4m) 480Kg B/F nylon guy £15.00
Roll of self-amalgamating tape 25mm x 10mtr..... £8.99
Special offer:- Self-amalgamating 3 rolls..... £20.00

Rallies

Send your rally info to:

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

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

APRIL

April 3rd

The South Gloucestershire Rally

The Avon Scouts Amateur Radio Club together with the Thornbury and South Gloucestershire Amateur Radio Club will be holding their third rally for the West Country at the Avon Scouts Activity Centre, Fernhill, Almondsbury BS32 4LX. This is conveniently located close to the crossover of the M4 and M5 motorways. The rally will start at 10.00am, admission will be £2.00 and there will be talk-in on S22, ample parking, refreshments and facilities for the disabled. There will also be space for 20 car boots on a hard standing nearby; tables and boots are available at £5 each and prior booking is essential.

Stan Goodwin G0RYM
Tel: 01454 413177
Mobile: 07833 517370
E-mail: gentryone@googlemail.com
www.avonscouts.org.uk/woodhousepark

April 10th

The Blackpool Rally*

The 49th Northern Amateur Radio Societies Association (NARSA) Radio, Electronics and Computing Exhibition will be held at the Norbreck Castle Exhibition Centre, Queens Promenade, Blackpool FY2 9AA. The doors will open at 11.00am (10.45 for the disabled) and admission will be £5.00 (concessions £4.00, under 14s free). There will be car parking, talk-in on S22, over 50 traders, special interest groups, a Bring & Buy, catering with a licensed bar, Morse tests and facilities for the disabled.

Dave Wilson M0OBW
Tel: 01270 761608
E-mail: dwilson@btinternet.com
www.narsa.org.uk

April 10th

The Cambridgeshire Rally

The Cambridgeshire Repeater Group Annual Rally will be held at the Foxton Village Hall, Hardman Road, Foxton, Cambridgeshire CB22 6RN. The doors will open at 10.00am and admission will be £2.00. There will be talk-in on S22, trade stands, a Bring & Buy, catering and facilities for the disabled.

Lawrence M0LCM
Tel: 01223 654880
E-mail: rally2011@cambridgerepeaters.net
www.cambridgerepeaters.net

April 17th

The Andover Boot Sale

The Andover Radio Club's Spring Boot sale will be held in the Village Hall at Wildhern, which is north of Andover just off the A343 (postcode SP11 0JE). The doors will open at 10.00am for buyers (9.00am for sellers) and admission will be £1.50. Vendors will be charged £6.00 per boot or £8.00 per table. There will be talk-in on S22, catering and facilities for the disabled.

Martin
Tel: 01980 612070
E-mail: martinsmith@kukltd.co.uk
www.arac.org.uk

April 17th

The Lough Erne Rally

The Lough Erne Amateur Radio Club 30th Annual Rally will be held in the Share Holiday Village, Lisnaskea, Co. Fermanagh BT92 0EQ N. Ireland – access from Erne/Shannon Waterway. The doors will open at 12 noon and there will be car parking, trade stands, a Bring & Buy, catering with a licensed bar and facilities for the disabled.

Iain
Tel: 028 66326693
E-mail: gibbjgbb@aol.com
www.loughterneradioclub.co.uk

April 17th

The Kempton Rally*

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

Paul M0CJX
Tel: 0845 165 0351
E-mail: info@radiofairs.co.uk
www.radiofairs.co.uk

MAY

May 1st

The Dambusters Rally

The Dambusters Rally will be held in the Thorpe Camp Visitor Centre, Coningsby, Lincolnshire LN4 4PE. The doors will open at 10.00am and admission will be £3.00 (under 12s free). There will be talk-in on GB4FR and GB3F, parking and overnight camping.

David
E-mail: tcrm@hotmail.co.uk
www.qsl.net/gb4tcm/dambusters.html

May 2nd

The Dartmoor Rally*

The Dartmoor Radio Rally will be held in the Tavistock College, Crowndale Road, Tavistock, Devon PL19 8DD. The doors will open at 10.30am (10.15am for the disabled) and there will be talk-in on S22 (V44) car parking, trade stands, a Bring & Buy, catering and facilities for the disabled.

Peter M1AYI
Tel: 01822 860277

May 8th

The Magnum Rally

The Magnum Rally will be held at the Magnum Leisure Centre, Harbourside, Irvine, Ayrshire KA12 8PP. The doors will open at 10.30am and admission will be £4.00 (accompanied under 14s free). There will be free parking, trade stands, special interest groups, club stands, a Bring & Buy and a raffle.

Helen Mason MM0HLN
Tel: 07873327597 (9.00am and 9.00pm only)
E-mail: helen@magnumrally.co.uk
www.magnumrally.co.uk

May 15th

Vintage Communications Fair

The National Vintage Communications Fair organised by the British Vintage Wireless Society will be held in the Warwickshire Exhibition Centre, The Fosse, Fosse Way, Leamington Spa CV31 1XN. There will be free car parking, the show will be open from 10.30am to 4.00pm and entry will cost £6.00 (under 14s free). Early entry (about 9.00am) will be available for £20.00.

E-mail: info@nvcf.org.uk
www.nvcf.org.uk/index.htm

May 22nd

The Mid Ulster Rally

The Mid Ulster Amateur Radio Club Rally And Boot Sale will be held in the Drumgor Youth Centre, Drumgor Heights, Craigavon BT65 4AP. The doors will be open from 12 noon to 4.00pm and there will be talk-in, car parking and a Bring & Buy.

www.muarc.com

JUNE

June 5th

The Newhaven Fort Rally

The Newhaven Fort Amateur Radio Group Rally and Fort Open Day will take place at Newhaven Fort, East Sussex, near the southern end of the A26. The doors will open at 10.30am and admission will cost £2.00. There will be car parking, a car boot sale, special interest groups, catering, attractions for the family and facilities for the disabled.

Eddie G0ECW
Tel: 01273 300772
E-mail: eddie@zamboodle.demon.co.uk

June 5th

The Red Rose QRP Festival

The 15th Red Rose QRP Festival will take place in the Formby Hall, Alder Street (off the High Street), Atherton, Manchester M46 9EY from 11.00am to 3.00pm. Admission will be £2.00 (children under 14 free) and there will be free car parking, trade and individual stands, club stands (including RSGB and GQRP), a low cost Bring & Buy, catering with a licensed bar and facilities for the disabled. Some tables are available at £8 but please book early.

Les Jackson G4HZJ
Tel: 01942 870634
E-mail: g4hzj@ntlworld.com

June 5th

The Spalding Rally

The Spalding and District Amateur Radio Society Annual Rally will take place in the Sir John Gleed Technology School, Halmer Gardens, Spalding, Lincolnshire PE11 2EF. The doors will open at 10.00am and there will be free parking, trade stands, catering and a car boot sale.

John G4NBR
Tel: 07946 302815
Graham G8NWC
Tel: 07947 764481.
E-Mail: rally-secretary@sdars.org.uk
www.sdars.org.uk

June 12th

The Ipswich Radio Rally

The East Suffolk Wireless Revival (Ipswich Radio Rally) will take place in the Orwell Crossing Lorry Park, A14 Eastbound, Nacton, Ipswich IP10 0DD. The doors will open at 9.30am, admission will cost £1.00 and there will be talk-in on S22, car parking, a Bring & Buy, a car boot sale, special interest groups, the GB4SWR HF station and catering.

Steve M1ACB
Tel: 07711 329624
www.eswr.org.uk

June 12th

The Junction 28 QRP Rally

The 10th Junction 28 QRP Rally organised by the South Normanton, Alfreton and District Amateur Radio Club in association with the G-QRP Club will take place in the Alfreton Leisure Centre, Church Street, Alfreton,
Derbyshire DB55 7BD. This is ten minutes from J28 on the M1 and the A38. The doors will open at 10.00am and there will be trade stands, a Bring & Buy, special interest groups and catering.

Russell Bradley G0OKD
Tel: 01773 783658
E-mail: russellbradleyg0okd@ntlworld.com
www.snadarc.com

Mike Richards G3WNC's Data Modes
PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW
E-Mail: mike@pwpublishing.ltd.uk

Spread-Spectrum? – No it's not!

This month Mike Richards G4WNC is covering a data mode that some Amateurs currently considers to be a spread-spectrum mode.

Welcome to this month's *Data Modes* (*DM*) where I have more MFSK this month with the much talked-about the 'ROS' data mode. This mode has come under an unfair level of criticism over the past year with the American Amateur Radio Relay League (ARRL) classifying ROS as spread-spectrum and therefore only available for use at 220MHz or above! Interestingly, the ARRL are standing alone with this classification while the rest of the Amateur Radio community are making good use of ROS on the high frequency (h.f.) and medium frequency (m.f.) bands.

Named After Author

The ROS modem is named after its author **Jose Alberto Ros** who is a keen software and communications engineer. Just over a year ago Jose Alberto directed his talents into developing a new data mode that could deal with the vagaries of long distance h.f. and m.f. communications.

While there are a number of weak signal data modes around, Jose Alberto wanted to build-in automatic speed detection, improved synchronisation and reduced processing delays to create a more practical and effective system.

The prototype system was launched in 2010 and had an immediate impact. Unfortunately, Jose Alberto mentioned spread-spectrum techniques several times in his initial technical paper and the ARRL and many other Amateurs picked-up on this. Before long a campaign had started to declare ROS a spread-spectrum mode and therefore outside the conditions of the Radio Amateur licence. The campaign resulted in the current ARRL restriction.

So, let's have a look at how ROS works. The adoption of the 'spread-spectrum' interpretation was inappropriate as we shall see, as ROS is an interesting adaptation of MFSK128 and has a lot in common with Olivia128/2000 which is a main-stream and perfectly acceptable digital mode. I'll start with the ROS h.f. mode as this is most commonly variant and is available within most of the h.f. bands – see **Fig. 1**.

The Alphabet: The first step within the ROS encoding process is to convert the typed message into the **IZ8BLY Varicode alphabet**. Varicode alphabets have been devised to help keep messages as short and efficient as possible by allocating codes to letters according to how often they occur in normal language. As a result, the more commonly used characters have the shortest code so the overall communication speed and efficiency is improved.

Peter Martinez G3PLX first developed a Varicode to support the popular PSK-31 mode. However, the IZ8BLY variant allows consecutive zeros and the character allocation has been amended to better reflect Radio Amateur QSOs rather than plain English text. The use of this code provides a message throughput of around 300 characters/minute when running ROS HF/16. Details of the IZ8BLY Varicode can be found at this site: **www.qsl.net/zl1bpu/MFSK/Varicode.htm**

Error Correction: As we've seen before in this series, setting-up an error-free link for use on the h.f. bands is not at all easy. Signals in the h.f. bands are subject to all manner of phase shifts, fading, multi-path, etc. So, achieving an error free link is something of a challenge. One way is to lock the sending and receiving stations together and send the message in small blocks with a confirmation message sent back to the sender when each part has been successfully received. However, that only works for 1:1 communication and not for general 'CQ' calls or 'broadcasts'.

An Alternative Method

An alternative method is to add what's known as Forward Error Correction (FEC). This is any system that adds information to the transmitted message to help identify and correct transmission errors. The simplest of these is to send

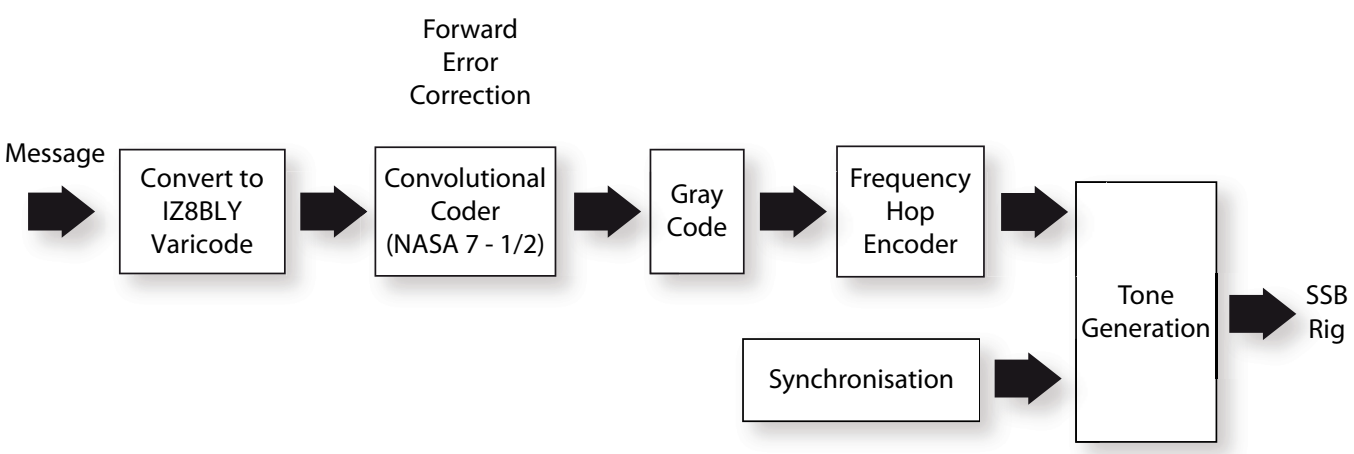


Fig. 1: The ROS mode modulation process.

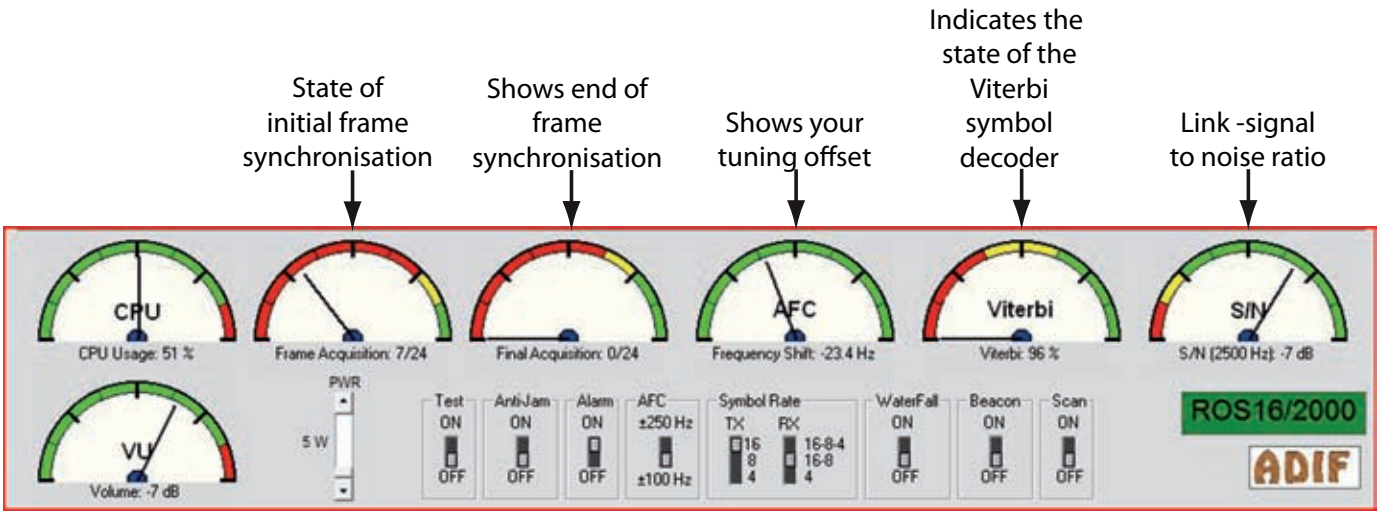


Fig. 2: The ROS Modem program's dial functions.

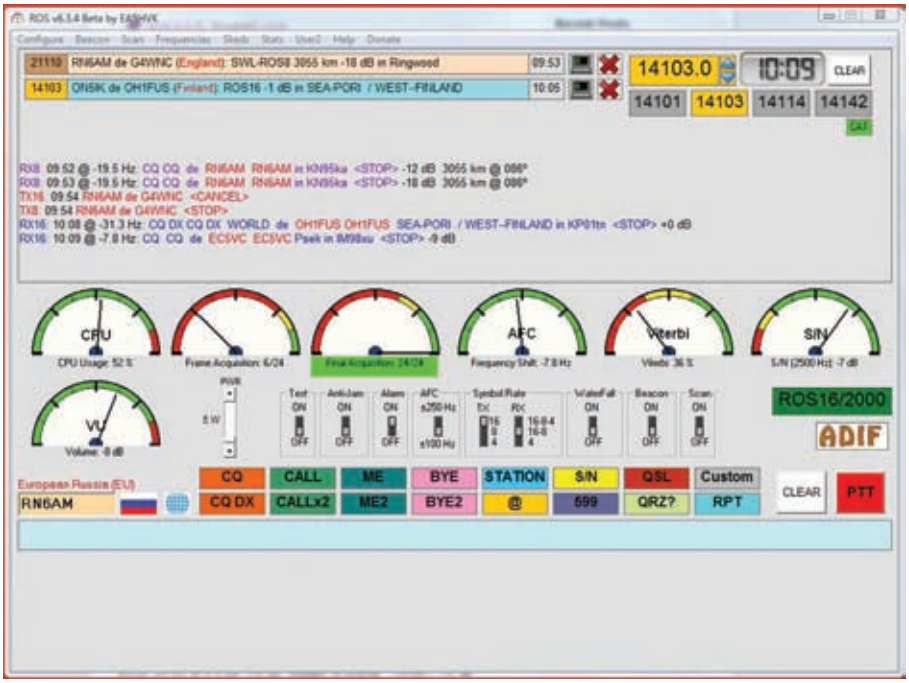
the message twice with the second part of the message delayed by a fixed number of characters and with both sets of messages interleaved to make one stream of data. This system works well and is employed commercially in the NAVTEX safety message system used for ships at sea.

Although the NAVTEX system works well, it's not good enough to handle very weak signals that are close to, or even below the noise floor.

The solution chosen for ROS also appears in many other modes, some of which I've already covered. The technique is called convolutional coding and is used extensively in the NASA space programs. Those multi-million dollar programmes that send probes into deep space use these powerful error correction systems to recover vital information from telemetry links as the signals is usually disappearing into the noise.

Convolutional coding works by adding data to the message but this data is determined by the content of the message itself. The code used for ROS is the standard NASA constraint length 7, rate 1/2 code that's also used in many other data modes popular among Radio Amateurs. The constraint length here indicates the number of bits that are contained within the encoder, all of which have an effect on the output bits.

The 1/2 parameter means there are two output bits for every input bit. The main benefit of convolutional coding is that each bit is effectively spread over time so becomes less susceptible to short duration interference. Before passing to the next stage, Gray coding is also applied to ensure that there is always a 1-bit change between successive 7-bit symbols.



The ROS Modem software in action

Encoded Signal

At this point, we have a convolutional encoded signal that would normally pass direct to the tone encoder. However, Jose Alberto found there was an advantage to be gained by shifting the symbols in frequency. As a result, the ROS 7-bit symbols are mixed with a frequency hopping code before being sent to the tone generator. Altering the symbol order isn't particularly unusual and is certainly employed in the Olivia modes. See the following site for a description of the Olivia system: **www.arrl.org/olivia**

Synchronisation Difficulties

One of the difficulties with convolutional coded data links can be the lengthy synchronisation and decoding delays. To overcome this, ROS employs a unique synchronisation system with 16 dedicated tones that are separate from the main 128-tone set.

At the start of a transmission 20 pre-defined synchronisation symbols are sent and the decoder will only start the decoding process if at least 12 of the 20 symbols have been received accurately.

Using the fixed synchronisation pattern ensures a much faster synchronisation. Once the message starts, each transmitted frame comprises 128 tones of data and 16 dedicated tones of synchronisation.

An added benefit of the synchronisation process is that speed changes can be automatically detected. As a result, the transmitting station can safely change the link speed knowing that the receiver will automatically follow suit.

The resultant signal that 'goes to air' comprises a series of 144-tone frames. For ROS h.f. these tones use 15.125Hz

spacing so the total band occupation is 2kHz, regardless of the symbol rate which can be 16, 8 or 4 baud. This is quite wide for the data rate but this mode is intended for use on very weak signal paths not everyday 599 keyboard chats on the 14MHz bands!

When switched to 10MHz, 7MHz or 1.8MHz ROS uses the narrower ROS16/500 that employs 3.5Hz tone spacing – thus reducing the bandwidth to just 500Hz.

Decoding Process

The decoding processes is essentially the reverse of the transmit process except that a Viterbi decoder is employed to decode the data symbols.

Using ROS On MF

When used on the m.f. and l.f. bands, ROS includes a very much narrower operating mode that has proved very successful. The m.f. mode uses many of the same principles as the h.f. system except just 16 tones are employed with inter-tone spacing of 6.5Hz giving an overall band occupancy of just 100Hz. The symbol rate for this mode can be set to one or seven symbols per second.

Getting Set-up

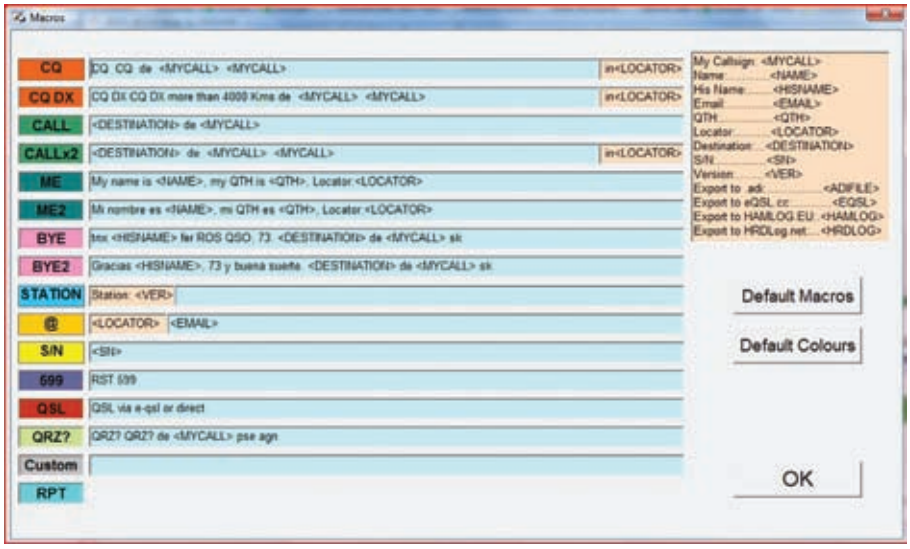
Jose Alberto has made ROS very easy to use with a comprehensive software package that is freely available to download. The main web site for ROS can be found here: **http://rosmodem.wordpress.com/**

The latest software versions are usually listed at the top of the page and these are available from a choice of three servers. These are all free servers that carry a rather a lot of advertising and it seems to me that the MediaFire server is the most straightforward to use. Once downloaded, 'unzip' the files to a suitable location and run the ROS Install program. You'll then be able to run the ROS software from your chosen directory.

When you run the software for the first time there are a few configuration settings to sort out starting with your personal and station details. Once stored in the program these details are automatically included in the macros that are used during a QSO.

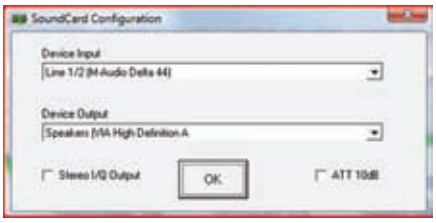
The next stage is to set the ROS software to operate with your rig. The software includes full rig control so providing you have the CAT interface connection you can manage your rig from within the ROS software.

To configure the system you need to choose the **Configure** menu item followed by **Rig** to get to the settings.



You should see this ROS macro setup screen.

The ROS Modem program carries, a simple rig control setup.



And similarly, ROS Modem carries a simple soundcard selection.

There are three choices for rig control: **CAT**, **VOX** or **COM**. By far the most comprehensive is CAT and this has been set to automatically scan for the correct 'Com port' and associated settings so, all you have to do is choose your rig from the drop down list – couldn't be much easier!

The VOX option is the one to use if you don't have rig control and want to control transmit/receive switching with the VOX setting in the rig.

The final stage in the initial setup is to select the correct soundcard for your PC. Use the **Configure** menu again but select **Soundcard** and choose the appropriate input and output devices. You will see that ROS offers a very pictorial interface with performance meters dominating the centre of the display and rig control functions at the top right. If all is well and you're using a CAT interface you should be able to select the desired band and frequencies using the buttons at the top right.

After band selection, you should also see the VU meter moving in response to received signals. It's important to make sure this meter remains in the central green segment and keeps well away from the red.

On The Air

As with all new modes, I suggest you spend an evening or two listening to ROS QSOs before you hit the transmit button. It's also worth spending some time to review and edit the QSO macros so you're familiar with the content and can make best use of them. As part of the familiarisation, take a close look at the performance meters as they provide a lot of useful information about the link – see **Fig. 2** for their layout.

When you're happy with the software you will find ROS operation very straightforward and the software does all the hard work of establishing the link and maintaining the signal quality.

Interesting Mode

The ROS mode is certainly a very interesting mode that – unfortunately I think – has been inappropriately classified as spread-spectrum. Hopefully, common sense will prevail and we will see the mode completely released into the public domain soon.

My thanks to Jose Alberto for his active co-operation in compiling this article. **PW**

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This really is a total shack in a box.

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TS-480HX	200Watt version of above, no auto-ATU	£879.95
TS-2000E	100Watt all mode HF/2/6M with auto-ATU etc.	£1399.95 (whilst stocks last)
TS-2000X	As above but fitted with 10Watts on 23cm (all mode) ...	SPECIAL £1779.95

Kenwood V/U Products

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TM-V71E	First Class 2/70 FM Mobile with remote head	£299.95
TM-D710E	The only 2/70 FM Mobile/Base with APRS/TNC etc	£445.95

NISSEI *One of the oldest names in Ham Radio*

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

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Nissei	RX-203	1.8-200MHz, 2/20/200W	£49.95
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Nissei	RX-503	1.8-525MHz, 2/20/200W	£69.95

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

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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

Perseus VLF-LF-HF Receiver

only £649.95

as reviewed in Radcom May Issue

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

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.

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See http://www.hamradio.co.uk/acatalog/RF_Space.html

The New RadarBox is now available from ML&S!

We like to give our customers a choice when it comes to choosing a new Virtual Radar so what better way than to add the RadarBox to the range.

AirNav Systems

Radar Box-3D. ML&S: £489.00
Radar Box-Pro. ML&S: £399.00

There is more excitement amongst RadarBox users and potential users now that the 3D version of the RadarBox is now available. This radical software upgrade brings to life the RadarBox with superbly detailed Google Earth mapping overlay. This is a major advantage that puts RadarBox firmly on top of it's competitors. Just look at these crisp, clear screenshots with the pictures of the aircraft in 3D and their precise position shown on the map. RadarBox has always given the best graphics of any system, and this latest addition really underlines the superiority of RadarBox. Known as RADARBOX-3D this complete system is available from all good communications dealers around the world. There is also an upgrade disc available for all existing users of RADARBOX-PRO, order this upgrade as RADARBOX-UG. RADARBOX-PRO is still available for those users who want a radar decoder without Google Earth and 3D.

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TWO NEW SUPER MODELS FROM LDG

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AT-897Plus	Bolt-on Alternative Auto Tuner for the FT-897. Wider tuning range and cheaper too!	£179.95
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Z-100Plus	Ultimate autotuner for Yaesu FT-817D	£134.95
Z-11ProII NEW	Portable compact & tunes 100mW to 125W	£159.95
RCA-14	4-way DC Breakout Box	£52.12
KT-100	Dedicated tuner for Kenwood radios	£173.57
RBA-1:1	Probably the best 1:1balun out there	£35.69
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ULTIMATE in professional weather stations, offering the usual feature set of the WX-831 but uses a Anemometer with solar cells, Satellite Meteotime forecast over the next 4 days and a massive split screen.

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VENTUS WX-831New much improved wireless Weather Station ML&S Price: £119.95.

The UK's favourite rig-mounted antenna system

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1.8-460MHz with Monster 1.8M Whip! **£119.95**

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As reviewed in this issue and Radcom April

Includes FREE DTMF Mic

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Palstar AT-2KP
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Palstar R30A, fitted Collins filters for SSB & AM **£649.95**

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MP-8230	13.8V DC, 25A power supply BACK IN STOCK	£69.95
MP-925	Linear 25-30A, 13.8V DC power supply	£99.95
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NEW Mini VNAPro Now with Bluetooth!

The new miniVNA PRO, the big brother of the well-known miniVNA, is an extraordinary and unique handheld vector network analyzer that makes available a multitude of new features and capabilities which are perfect for checking antennas and RF circuits for hams and commercial users. Together with your PC/Laptop, you can add to your laboratory the further advantages of having this first-class VNA instrument. This is the first world's wireless analyzer able of scanning and sending the data using an integrated Bluetooth module to a remote PC/Notebook up to 100 meters from the miniVNA PRO's location. This makes real-time antenna setup easy!

ML&S: £349.95

MiniVNA original still available (without Bluetooth): £259.95

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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.

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Miracle Ducker HF-70cm with PL-259 ..... **£109.95**
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See www.hamradio.co.uk for more details on all of these items ... and much, much more! E&OE

Feature

Buying Second-hand

Following his previous column on second-hand antennas, Chris Lorek G4HCL continues by giving advice on coaxial cable and connectors

Fig. 1: A 50Ω BNC connector has its white insulator running to the end of the connector. This type when taken apart carefully, may be reused – see Fig. 2

I'd originally intended for a section on coaxial cable and connectors to have been included at the end of the last column, but unfortunately I ran out of space! All antennas, apart from hand-held flexible whip ('rubber duck') antennas, naturally need a feed line and radio frequency (r.f.) connectors to link to your receiver or transceiver.

Once again, it's often said that your antenna system is the most important part of your station, it's not just the antenna that's important but also what you use to connect it to your radio with!

Surplus Connectors

It's usually tempting to buy bargain r.f. connectors when you see packets of them at, let's say, a radio and electronics rally or boot sale. And sometimes you can indeed often get a good bargain.

I've often seen bags of BNC plugs on sale at very low prices, but here I'll give a few words of advice. Unlike PL-259 connectors, which have no defined impedance (which is why you shouldn't use them at u.h.f.), both BNC and N-type connectors come in 50 and 75Ω impedance varieties, to match with 50Ω coaxial cable or 75Ω coaxial cable systems.

Although 75Ω N-types are rare, 75Ω BNC connectors are widely used in video systems, as a result you'll often see them for sale at 'consumer' prices. However, in Amateur Radio we use 50Ω impedance connectors and coaxial cable in our radio systems. It's the ratio of inner conductor diameter and outer shield which determines the characteristic impedance, and some years ago you could identify a 75Ω connector by its thinner centre pin compared to a 50Ω connector.

If a 75Ω plug was used with a 50Ω socket, the centre conductor might sometimes not connect. If you used a 50Ω plug with a 75Ω socket, the centre connector of the socket could splay out due to the 50Ω plug pin being a larger diameter. I must admit that I fell victim to this many years ago in my student days, in buying what I thought were bargain silver-plated N-type plugs at a rally. It was my flatmate – another Amateur – who pointed out the thin inner pin to me!

In more recent years both 75Ω and 50Ω BNCs, from some manufacturers at least, have used similar diameter inner pins, but with an absence of the white plastic insulation in 75Ω types to give the correct impedance. So before you buy, take a look at the connector centre pin and the white insulation.

If the insulation extends to the end of the connector and the inner pin is normal diameter, it's likely to be a 50Ω type – unplug the set-top antenna from your 144/430MHz hand-held you have along with you (if it's a BNC type) for a handy comparison. If however, there's no insulation to the end of the connector, and/or the centre pin is much smaller in diameter, it's invariably a 75Ω type.

Likewise with N-type connectors, which have similar inner mating dimensions to BNC connectors. So, steer clear and choose 50Ω types!

Coaxial Cable

Next, I'm turning to coaxial cable – with a few warnings in mind. Surplus or 'end of drum' lengths of coaxial cable can often be a good buy – take a look at the printed markings along the coaxial cable outer plastic sleeve to check it's the correct 50Ω type you need. The type numbers to look out for are: RG58/UR76 or RG-213/UR67. At the risk of upsetting sellers I wouldn't recommend that you buy, or even consider using, second-hand coaxial cable unless it came 'free' with the second-hand antenna you bought (but see later). Why? You may ask!

Unlike antennas, coaxial cable can, and does, seriously deteriorate over several years when it's exposed to the sun and to variations in weather conditions. Usually the part of the coaxial cable to suffer most is the outer plastic insulating jacket, which can become brittle after being exposed to years of ultra-violet light from the sun.

In extreme cases the coaxial cable outer jacket can crack and allow rainwater to seep in. Even a small split can become entirely 'opened up' in winter with the effects of water entering the small spilt and expanding when it becomes frozen, then melting, then expanding again when it becomes frozen again. Just think of the damage done to road surfaces, over the last couple of years due to frost!

Next, I'm asking you to think back to your school science studies when you learned about an effect called capillary action. This phenomenon is where liquid will rise by itself inside a narrow space like a thin tube, or in porous materials like coaxial cable braid.

If you dip the end of a tea-towel into a sink of water, you'll see the water rise into this, above the level of the sink water. If it's left there in the same position, the water will (in time) rise higher and higher, the level of rise only being limited by gravity and evaporation into the surrounding air.

Next, if this porous material was inside a very narrow space where it cannot evaporate easily – such as inside coaxial cable braiding – you'll be quite correct in thinking that it'll eventually travel rather a long way along the length of the cable. Unfortunately, the screening mesh being a metal that will corrode, it does

Fig. 2: This is the reusable type of BNC plug, make sure the centre-pin is with the plug.

Fig. 3: Spot the difference with the lack of insulator on this 75Ω BNC plug. This type is a 'crimp-on' type and cannot be re-used.

Fig. 4: Spot the difference! The 75Ω socket with its slightly smaller centre connecter is on the left. The 50Ω BNC socket is on the right.

and will corrode in such cases, when it's exposed to atmospherically polluted rainwater. Indeed, in time your lovely shiny coaxial cable braid will first turn dark brown or black, and eventually an ugly green colour.

Because of the copper screen's stranded nature it's only a question of time before its conductive characteristics change, the overall effect being a lot more attenuation to your signal – on both receive and transmit.

To give a practical example, I recently replaced my u.h.f. TV multi-point signal distribution coaxial cable, which I installed over ten years ago. Much of it being clipped against the outer brickwork of my house and leading to the various upstairs bedrooms and to the downstairs kitchen and study. The difference to what had eventually deteriorated over the years to a totally un-watchable u.h.f. signal on the weakest distribution channel to an upstairs bedroom, was transformed into a perfect noise-free picture.

After replacing the TV coaxial cable I'd estimate there was at least 10dB less loss at u.h.f. in that 12m length of coaxial cable than there was before! Inspecting my old coaxial cable showed me there was no water ingress, but the colour of the outer plastic coaxial cable had faded significantly, particularly on the side facing away from the brickwork, showing that years of ultra-violet sunlight had certainly had a physical effect on the cable.

Checking Coaxial Cable

You may want to check whether the coaxial cable you have, either the runs you already have in use already or some that's came along with an antenna you've bought (hopefully at no extra price!). To check it, all you have to do is to terminate it with a 50Ω dummy load and connect the other end to your transmitter – via an r.f. power meter or s.w.r. meter and a short coaxial cable patch cable of known good quality. Even better, if you can connect the meter directly to your transmitter antenna socket should you have a back-to-back coaxial cable adapter.

Next, key your transmitter, at the highest frequency you wish to operate on – at a power level which your dummy load and power meter can handle – and take a note of the power level reading. Then replace the short coaxial cable patch lead (or back-to back adapter) with the coaxial cable you wish to test, and place the power meter terminated with your dummy load at the far end, and key your transmitter again.

Take a note of the power reading, and compare this to that which you originally measured. You'll invariably get some loss, but compare this to what you should expect for the coaxial cable type, its physical length, and the frequency you're testing with. If you're expecting 3dB loss (which is a 50% power loss) but you only get, let's say 25% of your original power, i.e. a 6dB loss, it's thus 3dB more than it should be. This example shows the cable is losing a further and unnecessary 3dB, which isn't good!

No Dummy Load?

If you don't have a 50Ω dummy load – don't worry. Providing your transmitter has a low power mode setting, giving, let's say 10% or less of its maximum power, than you can connect an s.w.r. or power meter to your transmitter as above and connect the coaxial cable under test to this, leaving the 'far' end of the coaxial cable open circuited.

It's important to use low power in order to protect your transmitter power amplifier circuitry. But don't worry as it should easily be capable of handling 10% of its maximum rated power in reverse, a reverse power level that represent a fairly low s.w.r. value on full power.

Key the transmitter on low power and measure the forward and reverse power levels. If you only have a power meter rather than an s.w.r. meter, then first measure the forward power and then reconnect the meter the other way round to measure the reverse power.

The difference in relative power levels, when expressed in dB will be double the cable's 'one-way' attenuation. As an example, if the forward power measured is 1W and the reverse power is 0.25W (a 6dB difference) then the cable will have 3dB attenuation one-way over its whole length.

The higher the reverse power when compared to the forward power, the lower the attenuation, and the better the coaxial cable is at the frequency you measured the two power levels. To get a rough idea of the cable's loss at another frequency, multiply the figure you've measured by the square root of the new frequency divided by the measured frequency. So, if you measure a loss of 3dB at 14MHz, then it will be around three times that (10dB) at 144MHz.

Remember that every **3dB less loss** you get in your coaxial cable has the effect of **effectively doubling the physical size of your antenna**. Having said all this, I still wouldn't recommend buying or using second-hand coaxial cable unless it's been entirely stored and/or used indoors!

Fig. 5: A v.h.f./u.h.f. s.w.r. meter is a handy tool to check a length of coaxial cable.

No Wasted Effort!

I hope this edition of *Buying Second-Hand* has given you some insight on how not to waste your efforts in getting a good antenna system installed by possibly using coaxial cable that's well past its 'best before' date, or of course inappropriate connectors!

But as a final word, if you do find you have a large roll of otherwise useless large diameter coaxial cable – remember that copper is very expensive right now. You'll be able to get some money for the coaxial cable from your local non-ferrous scrap merchant – but make sure you take some form of identification as there are many cable thieves about and a reputable dealer will need your address.

I'll be back again with another *Buying Second-Hand* column soon. If any readers would like me to cover a specific type of equipment I'd be most pleased to hear from you. I can be contacted by E-mail: **g4hcl@rsgb.org.uk** or by post at: **PO Box 400, Eastleigh SO53 4ZF**. **PW**

See page 72 for ordering information.

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TS-2000X-HF/6/2/70/23cm... £1765.00.
TM-V7E - 2m/70cm's ..... £376.00.
TH-F7E - 2mtrs/70cm's £233.99
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IC-E80D D-Star V/U ..... £320.00.
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FT-897D - HF/6m/2m/70cm.. £754.99.
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FT-450D transceiver ..... £799.00.
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FT-DX5000D ..... £4892.00.
FT-DX5000 MP ..... £5400.00.

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Yaesu SP-2000 speaker ..... £149.95.
Yaesu MD-200 mic ..... £219.99.
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Icom SP-20 speaker ..... £197.99.
Icom SP-21 speaker ..... £98.99.
Icom PS-126 psu ..... £449.95.
Icom PS-125 psu ..... £326.99.
Icom RMK-7000 kit ..... £57.50.
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MFJ-934 ATU+AG £204.95
MFJ-921 2m ATU.....£98.95
MFJ-924 70cms £98.95
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MFJ-901B 200w Versa tuner....£111.95
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MFJ-802 Field Strength Mtr..... £55.95
MFJ-249B 1.8-170 Dig.....£264.95
MFJ-259B 1.8-170 .....£269.95
MFJ-269 HF/VHF/UHF £369.95
MFJ-201 grid dip meter.....£154.95
MFJ-269PRO 1.8-170&430-520 £389.95
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Ben's 'Chinese Take Away' Receiver

This month Ben Nock G4BXD laments the loss of local Amateur Radio and 'Junk' type shops and comments on the opportunities provided by the Internet.

A big hello from the 'Kidderminster Kollection' as it's my turn once again to man the *Valve & Vintage* (*V&V*) 'shop'. It's been an interesting few months here in Worcestershire and luckily I've still managed to avoid any accidents during my travels though I have done very little mobile operating. However, once again there have been some new additions to the 'Kollection' – surprise surprise! So, I'll start with another oriental arrival.

A Chinese Takeaway

It really is amazing just what you can find for sale around the world these days using this new fangled Internet! In one respect though, it's a shame, as the Internet has caused the death of many local Amateur Radio and related 'junk' (It's not really junk is it?) shops but – in another way it has opened up the world to many collectors.

So it was that I saw this interesting looking receiver being offered for sale from China. At first I thought the cost of getting it here would be prohibitive but not so as it turned out. However, I have found that the cost of shipping from places such as Hong Kong can be quite reasonable, considering the distance and weight involved.

The receiver, **Fig. 1**, is called the Type 222-1 and is a single conversion general coverage set tuning 1.5 to 30MHz in 5 wavebands. The receiver has four intermediate frequency (i.f.) bandwidths available, 0.4, 1.5, 3 and 6kHz and has a front mounted panel meter which, in conjunction with a 15-way switch, **Fig. 2**, allows monitoring of all the cathode currents of the sets valves along with heater and high tension (h.t.) voltages.

Fig. 1: The Chinese 222-1 receiver.

The receiver dates from the 1970s and was apparently produced at the Shanghai Third Radio Factory and was intended for the Chinese Army and 'government departments', (shades of big brother methinks). Apparently, there were slightly different versions available for different users.

The receiver has an external power supply unit – fortunately the one supplied with this set operating from 220V, so it's quite happy on the UK mains. There are apparently other voltage units made for the set.

The receiver uses 14 valves equipped with Chinese-made valve types 6K7, 6U1, 6K4, 6H2, 6J1, 6F2, 6P1, WL8P and WY-1. The construction is very sturdy and the performance of the receiver – on the bench with just a short length of wire – is quite impressive. The set has two radio frequency (r.f.) stages and three stages of i.f. amplification, at (I think) 600kHz, along with a crystal filter.

The audio output is designed for 600Ω but I have obtained a Collins 600 to 8Ω transformer. I have mounted this in an existing speaker cabinet along with a switch which allow its use on either impedance so is ideal with this set.

I think the wait for delivery on the set, though only around six weeks or so was well worth it to receive such an interesting receiver as the 222-1. I shall enjoy examining the handbook in detail, and playing with it further, once I learn Chinese that is!

French Military Set

Once again my viewing of the surplus world using the Internet has caused me more consternation. I was trawling though the various sites when, on a French based website, I came across a rather interesting French military set being offered for sale. I contacted the seller and asked him what he thought the cost would be to ship from France to the UK.

The French seller's initial reaction was to say that the set was too large and heavy to be shippable. Despite this – I like a challenge so I sought

the advice of my French Agent, 'Dominique', who has been very helpful over the years. Sure enough, he found a shipping company near to the seller and provided all the details needed. I presented the seller with this information, *'a fait accompli'* you might say, and he agreed the sale. I sent the money and sat back to await delivery.

A few days later there came a knock on the back door. "Mr Nock?"

"Yes" I replied.

"I've got a parcel for you in the van."

"Great! I thought and followed the driver to the street.

I was stunned by the size of the 'van', which was in fact what CBers would term a 'big rig'. This huge container lorry took up half the street, the driver opened the rear doors and lowered the fitted lift. There in the rear of the cavernous space was a dark menacing black lump on a pallet.

Using his fork lift truck the driver brought out the pallet and lowered it to the street on the tail lift. We then found the pallet and fork lift would not go down the side entry to my back garden – so the driver dropped the load on the pavement. Just then my hard-pressed YL, Gloria arrived back in a friend's car, her friend asking if the huge black lump was for me. Gloria's reply was simply "I would think so!"

So, the Saram 5-21 French Army transmitter receiver, **Fig. 3**, had arrived! It didn't look quite so big in the picture on the Internet. Maybe the seller had been right to question shipping but nevertheless – it had arrived all okay!

On the pallet, sat the very large and heavy mains power unit for the radio and the actual radio itself. Including a bit of packing – all wrapped in black plastic – the thing formed a cube of about four foot in all directions. The units were each carried (dragged) into the store one by one and the pallet was recycled and now forms part of the fencing in our garden.

I could find very little information on the Internet about the Saram 5-21 so once again I turned to 'Dominique' for help. His report stated, and I quote: "Frequency: 3 to 6MHz for transmit and receiver, continuous coverage: five mechanically pre-set frequencies possible. It's possible to 'Zero beat' the transmitter onto the receiver frequency. The operational modulation modes are A1, A2, A3. It provides 40W r.f. and a range (A3): 100km (as a fixed station):25km (mobile, on the move). Suitable antennas can be either a long wire or a whip antenna (3m). Power supply a.c. at 50Hz, 110 to 240V, at

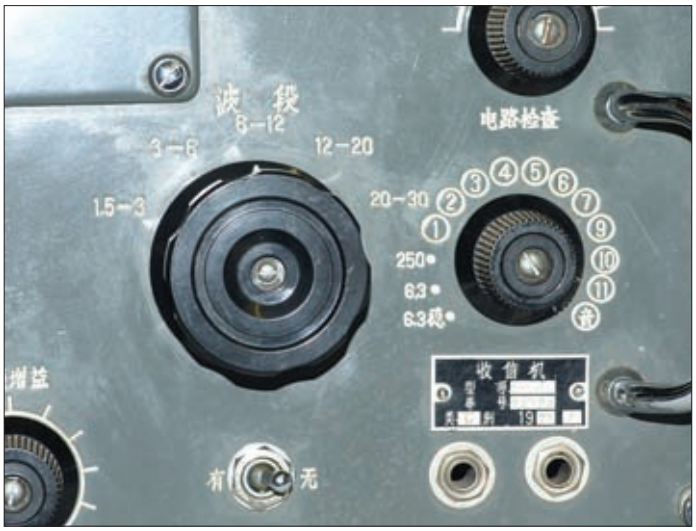

Fig. 2: The 222-1 metering switch.

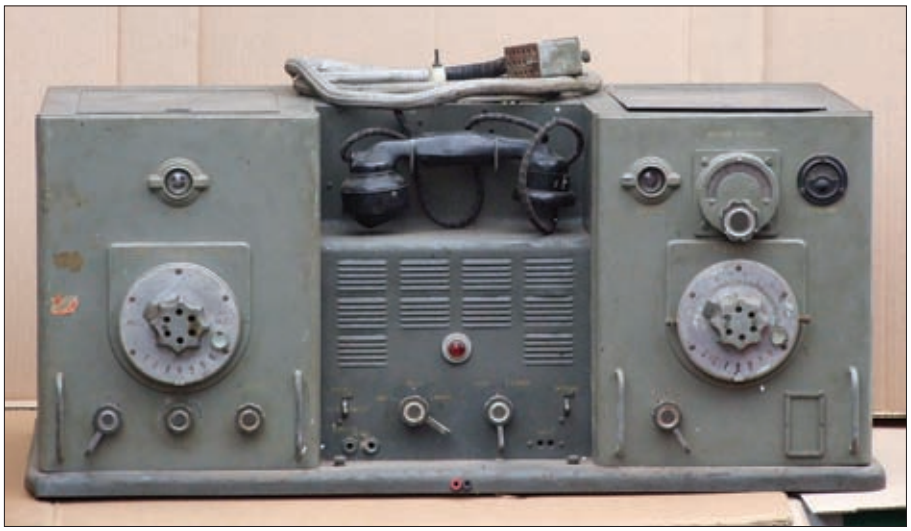

Fig. 3: The Saram 5-21 transmitter-receiver.

350VA. The p.s.u. outputs are: +1200V, +400V, -200V, -24V for the transmitter +250V for the receiver. The d.c. power supply is a 24V type, fitted with rotary converters."

Additionally, Dominique reported: "The 5-21 was designed at end of the second World War, (not sure they were known by the Germans) and manufactured in the years 1945-1948 in small quantities as the rebirth of our industry, using available stocks of parts and components, with remaining industrial capabilities (a lot of factories have been bombed).

"The 5-21 has the manual *Trans. MT-56* , dated April 1946 from our "Ministère de la Guerre" (i.e. War Ministry) 'Direction des Transmissions'. It's a scarce set, as I don't remember having seen one advertisement as a surplus unit in radio magazines in my younger years!"

I am, of course, indebted to Dominique for his great assistance in helping me to obtaining the set and researching the necessary information. I shall look forward to getting it operational in the very near future.

However, if readers are wondering – I doubt if I have learned any lesson about buying big size units via the Internet! I'm sure there are still bigger sets out there waiting for my attention and you never know – a large crane lorry might yet block Cobden Street unloading my next purchase!

Possibly The French WS17?

Yet another French set recently arrived at the 'Kidderminster Kollection', again through the hands of my French 'Agent'. This time though, it was slightly smaller and lighter (thank goodness!). This set is a pre war French Army transceiver using just three valves and bearing an interesting resemblance to the British Wireless Set No 17 in its operation.

The Sonora-made ER40 v.h.f. transceiver, not to be confused with the slightly more common post war French ER40A set (itself a copy of the British WS88) is a 50MHz amplitude modulated (a.m.) transceiver which first arrived around 1930. After several designs using a super-regenerative receiver were tried, a symmetrical circuit

Fig. 4: The ER40 v.h.f. transceiver.

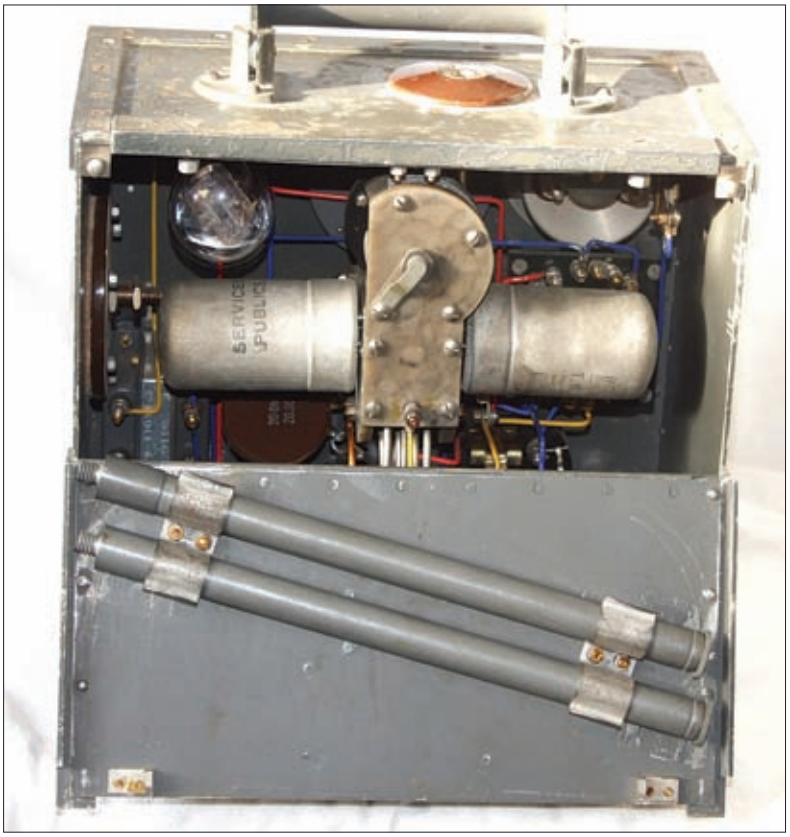

Fig. 5: Internally there are three valves in ER40. The set also has a whip antenna.

design was finalised around 1935. This was quickly superseded by model 36 which added a 'fine tuning control' in effect. Production continued through to the start of the Second World War.

According to a French publication, *Revue Historique de L'Armee* issue 1967-1, 4000 sets were supplied to the French Army in 1939. By then the design was obsolete and impractical for modern warfare – especially when faced with the might of the Third Reich and its technology in the form of sets like the Torn Fud2 for example. Many sets were quickly captured and simply scrapped by the Germans for the copper and other alloys in them.

The ER40 set, **Fig. 4**, uses two valves, type TM2, as a super-regenerative tuner detector on receive and as an oscillating power output stage on transmit. A third valve, type TMTD1, is used as the modulator stage on transmit, anode modulating the oscillator through a series choke arrangement.

The tuning range of the set is around 50 to 60MHz and using a pair of telescopic whip antennas, **Fig. 5**, stored in the rear of the set for transport, it provided a quoted range of around 1km over open ground. The radio was powered from dry batteries, comprising a 4.5V battery for the heaters and a pair of 40V batteries wired in series to give 80V h.t. housed in a separate box connected by a cable.

With the radio on the bench I applied some suitable voltages. Amazingly, the set actually still worked and using another radio two-way communication was indeed possible and proved!

Given the nature of super-regenerative sets and free running oscillators though I am not contemplating any serious on-air working – but it's very satisfying to know that such old technology is still performing. It would also be interesting to try and see just what the range of the set might be, **Fig. 6**, so perhaps when the summer comes I'll test it out.

And Finally

Well that's about all for now so I hope you have found it interesting reading. For more pictures please visit my web site at **www.qsl.net/g4bxd** and as always I can be contacted via E-mail at: **military1944@aol.com**. See you next time. Cheerio for now! **PW**

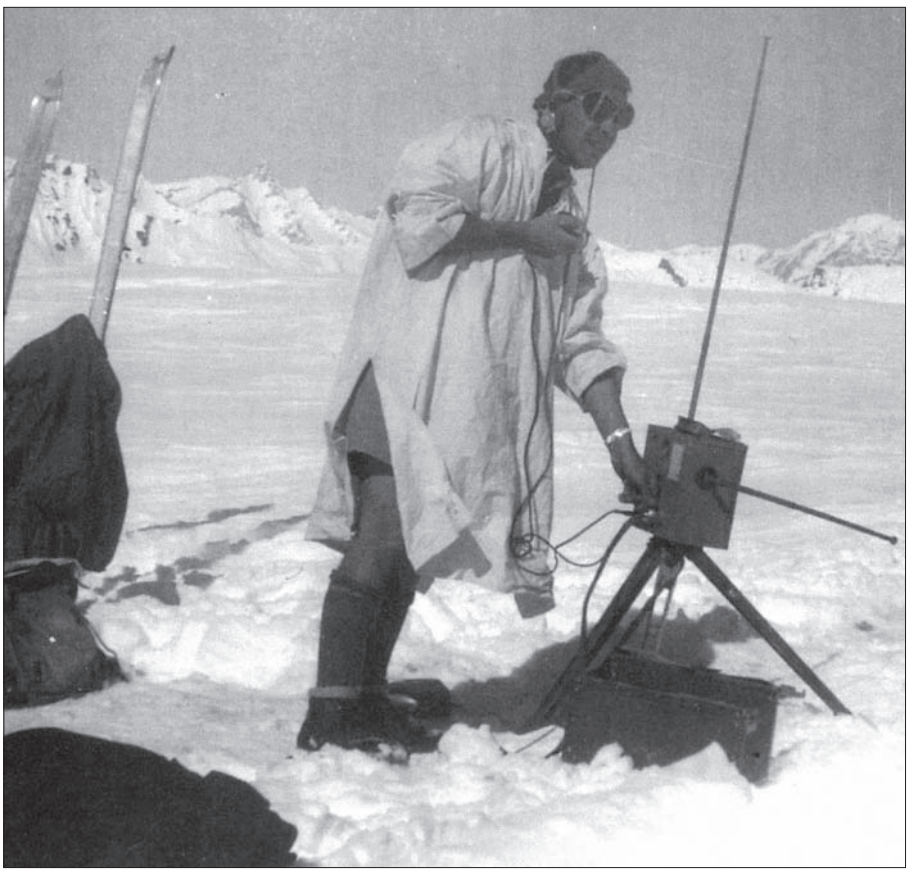

Fig. 6: A rare photo of the ER40 in use.

Colin Redwood G6MXL's What Next?
PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW
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Construction Space

This month Colin Redwood G6MXL looks at space for construction projects but starts with a letter from a reader in Wales.

Welcome to *What Next?* (*WN?*). Regular readers will remember that in the February 2011 column, I promised to look at construction space in a future issue. But before doing so, I received a letter from Wyn Mainwaring GW8AWT .

Following my request in the February 2011 issue for details of reader's shacks, Wyn GW8AWT described a shack that he set up in a small rented two-up, three-down terraced house. It was under the transverse stairway!

Wyn wrote, "The door opened to the skirting along the fire-place, secured by a hand-wheel screw into the firm skirting, yet instantly closed-up safely. The stair treads got extended (by approximately 500mm) wide boards (screwed up using wood screws), to make shelves, cantilevered against each step's under-surface."

Wyn continued, "The panelled door, then received a builder's board attached at a suitable working height, which was held by carved triangles of the same board. This was 'firmed up' by another piece of board and held vertically by a pair of reverse mounted rising butt hinges – this was kicked tight against the floor when open to provide a superbly secure/firm bench for a clamp-on vice. Long-filament type strip lights on the door gave flicker and QRN-free illumination. It was cosy and serviceable!"

Wyn also told me that he reckons it was the most clever (landlord hoodwinking) shack he has had over a period of 60 years. I know that many Amateurs use the space under the stairs as their shack. It's certainly a good use of what can otherwise be a rather under-utilised space.

From personal experience, I would recommend that readers consider fire safety precautions before using this space as the stairs immediately above may be need to be used as an emergency exit. Safety first!

Fig. 1: A typical component storage cabinet from Racco.

Construction Categories

In my view, construction falls broadly into two categories. The first I would term small bench work. This includes soldering components onto printed circuit boards (p.c.b.s), soldering radio frequency (r.f.) connectors to feeder, assembling and testing etc.

The second category is what I would term workshop work. This category includes metal work such as sawing and drilling, etc.

Let's start with small bench work. Much of what I've written in respect of an operating position – in the February 2011 *WN?* – will also apply to an area for construction, including finding a good height for the main work surface. The work surface is likely to get some damage from scratching and solder blobs, so probably doesn't need to be a high quality finish. Plenty of mains sockets are needed to power test equipment as well as the soldering iron, printed circuit board (p.c.b.) drill and equipment being tested.

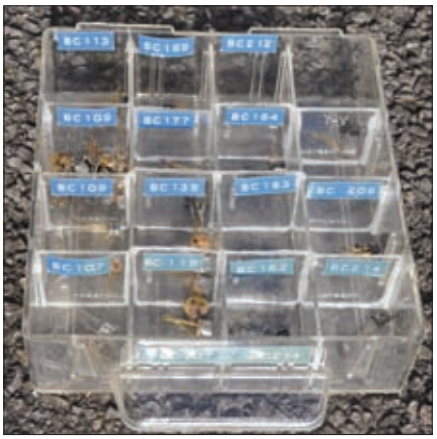

Fig. 2: Sub dividing component drawers.

Safety Considerations

When thinking about electrical sockets, I think it's particularly important to consider safety aspects. A 'Master' type on-off switch and the protection of a Residual Current Device (RCD) are particularly important, especially if you are likely to be constructing mains-powered equipment.

As the area will be used for soldering, it might be a good idea to get a cover to protect the floor surface (carpet) from any accidental solder spills. No matter how good at soldering you are, a blob of hot melted solder will hit the carpet – sooner or later!

Unless you wear spectacles, you should wear some goggles to protect your eyes from solder splashes.*

Editor's 'wise-after-the event' suggestion: After damaging one of the plastic lenses on my specs by a hot flux 'spit' – I purchased a pair of clip on lens protectors for £5 or so. Much cheaper than the £75 replacement cost of bi-focal lenses!* ***G3XFD**.*

Labelled Project Boxes

I recommend that *WN?* readers have a separate labelled box for each project in which to keep components, p.c.b.s, hardware, etc. With this approach you have everything for each project in one place.

As you proceed with your project, it's easy to tidy it away. This can be particularly important if you want to work on more than one project at a time or if you have to 'borrow' space from your operating position for construction. I know of several Amateurs who use

empty margarine and ice cream boxes for project storage.

Project Folders

Some Amateurs keep a project folder for each of their construction projects. They use the folders to keep copies of the circuit diagram, component lists and assembly information etc. I think this is a particularly good idea if you're assembling a kit or building your own design. For more complex projects it provides a place to refer to for subsequent repairs, modifications, etc.

I'll leave readers to decide whether to keep these folders on computer or as paper. My preference is to keep everything on paper at least until the project is finished.

Junk Boxes

In the 'old days', most Amateurs had 'junk boxes'. These were boxes of almost any size from a match box to large chests containing randomly stored components, which may or may not have worked, p.c.b.s, and pieces of metal and other assorted hardware all of which 'might come in useful some day' category.

These days, with so many different small components used in construction, I think that components need to be stored properly. Otherwise it's almost impossible to find the correct one when you need it! In fact I'm going to be rather radical here and suggest that perhaps few components need to be stored and that in general they should only be purchased when needed.

Component Storage

If you decide to store components, I would suggest the use of small labelled drawers for the purpose. **Racco** make a wide range of suitable storage drawers (**Fig. 1**), that are available from outlets such as Maplin and Argos in the UK.

Many of the drawer unit are available with optional sub-dividers – which I recommend purchasing. For the smallest components such as transistors, I have found that by using some polystyrene aero modellers' glue it's possible to sub-divide the drawers still further (**Fig. 2**).

I strongly recommend firmly fixing the component storage drawers to a wall. Once you have had a full set of drawers tip over and spill their contents on the workbench and floor – you'll fully understand why I make this recommendation with some conviction!

I use similar drawers for storing small items of hardware such as screws, nuts, bolts, p.c.b. drill bits and even small

Fig. 3: Tool Racks are helpful for keeping tools tidy and are readily available.

tools such as Allen keys, etc. They're also suitable for storing various r.f. connectors and adapters.

Tool Storage

Besides a good soldering iron and stand, I think tool racks (**Fig. 3**) for screwdrivers, spanners, wire cutters etc. are an excellent idea. By fastening the tool rack to a wall, it enables frequently used tools to be close at hand – but kept off the work surface when not needed.

Test Equipment

It's important to provide sufficient storage for test equipment. Older test equipment can be large and very heavy, so make sure that the shelves are sufficiently sturdy and well fixed to the walls. In reality a lot of construction can be carried out successfully these days with just a basic set of tools and test equipment.

A variable voltage power supply – with a current limiter – is something I find very useful. The one I use is based on an article in *PW* from the 1970s. A multi-meter is incredibly useful – and out of choice I would go for a traditional analogue one over a digital type although both have their places.

Second-hand AVO multi-meters can be picked up at rallies and can last a lifetime (**Fig. 4**). An r.f. power meter, 50Ω dummy load and a receiver covering 0-30MHz complete what I consider to be the essentials. Fortunately, none of the items mentioned need be very heavy or large these days.

In my view r.f. signal generators, frequency counters and oscilloscopes etc. are all in the 'nice to have' category. Some older models can be picked up second hand at rallies very cheaply. If based around thermionic valves, these can be very heavy, and in many

Fig. 4: Second-hand AVOs multi-meters can be picked up at rallies and last a lifetime.

cases may need skills to keep them operational, that newer Amateurs don't possess.

Safety Considerations

If you're planning some construction activity for the first time, I would strongly suggest familiarising yourself with the safety aspects of the Intermediate Licence Course.

Adequate Ventilation

Make sure that you provide adequate ventilation when you're soldering. The fumes should not be breathed in. Additionally, you should ensure that there's adequate ventilation for equipment – particularly older valved equipment.

Good Lighting Essential

Good lighting that allows you to see what you're working on is essential. It's all too easy to have your back to the window and the project in shadow. With modern smaller components this is particularly important.

Make sure that the light has a suitable colour temperature (the colour–type of 'white') that enables you to readily identify the different colours on resistors. 2.2k ohm (red, red, red) and 33k ohm (orange, orange, orange) resistors can seem very similar if looked at under the wrong lighting conditions! (**Fig. 5**).

Magnifying Lens

If your eyesight isn't perfect, you may want to get a magnifying lens to assist

you when soldering small components on to p.c.b.s. Some magnifying lenses are available supported on a stand with a built-in light. These are often sold by shops aimed at other hobbies such as needlework, so it may help to look around to find something that suits your needs.

Steadying Device

Whatever you're making, it really is helpful if you can keep whatever you are working on steady and firm enough to work on. When soldering, you need one hand to hold the soldering iron and the other for the solder. So, how do you keep the p.c.b. steady?

There are two ways of steadying the project that work for me. The cheapest is to use blobs of Blu-Tak (sold in stationery shops). I find this method to be very effective, although it does rely on the p.c.b. being reasonably small. The other is the 'extra hand – or 'third-hand' – type of arrangement where a crocodile clip is attached to a heavy base.

Workshop Activities

I don't think workshop activities are suitable for most domestic settings (i.e. the kitchen or spare room), and are generally best left to a garage or shed.

Fig. 6: Colin says that Q-Max hole punches produce neat holes in sheet metal.

A really substantial bench along with a vice and a drill are probably on the top of the list of items needed.

Personally this aspect of construction is the one I least enjoy. I manage to get by mainly using hand tools and a portable work bench by using pre-fabricated metal boxes. Nevertheless, I know many Amateurs really enjoy the 'metal bashing' aspect of the hobby.

For holes up to about 8mm I use normal high speed steel drill bits. For larger holes, I use the Q-Max range of sheet metal punches (**Fig. 6**). I find these give really excellent burr-free holes.

All that is needed is the appropriate punch, a pilot hole of the right size and a suitable key-wrench (Allen key). Armed with these, almost any size round hole can be made (**Fig. 7**). The Q-Max sheet metal punches aren't stocked by all d.i.y. stores, but a search of the internet will soon locate a source. I have found that they are very reliable and last a lifetime. No matter what size hole you need, a centre punch will assist in getting the hole in the right place.

For those who enjoy this aspect of construction, a pillar drill or at least a normal electric drill mounted on a stand will be high on their list. In addition other tools such as rulers, various screwdrivers, spanners, pliers, hammers, etc., will no doubt feature.

A separate area for painting boxes is also helpful. This needs to be clean, so that metal and wood dust doesn't get onto a newly painted surface while it's drying.

Fig. 5: Good light is needed to clearly identify resistors using their colour codes – these example are both 4.7kΩ.

Making Printed Circuit Boards

As a general principle, I don't think that it is good idea to etch p.c.b.s in the bathroom or kitchen. This is probably a job for the garage or shed!

A Few Ideas?

Hopefully, I've given you a few ideas for arranging an area in which to work on your construction projects. And, of course, I would be pleased to feature examples of readers' construction spaces in a future *WN?* column. Cheerio for now. **PW**

Fig. 7: A Q-Max hole punch in use.

Please 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).

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Satellites and Weak-Signal Sources

Our keen v.h.f. specialist author Tim Kirby G4VXE has news from a friend who is enjoying the out of this world Amateur Radio!

Welcome to the *World of VHF* (*WoVHF*) and the exciting Amateur Radio it brings! It was great to hear from Peter Goodhall 2E0SQL (Oxford) about his recent satellite activity. Pete says, "I'm pleased to report that I've really been enjoying my new satellite antenna system and it's been working flawlessly, I've still been hanging out on the f.m. 'birds' (AO-27,SO-50,AO-51) but enjoying it. The beams and automated tracking makes life a lot easier."

Peter continued: "In February I've managed 88 QSOs in total via the satellites and a range of countries worked included Spain (EA7AHA), Estonia (ES0HD), France (F0FVK), Ukraine (UR5BFA), Germany (DL7UHF), Ireland (Eire/Northern) (EI3GYB/MI3EPN). Also logged were The Netherlands (PE1SAT), Luxembourg (LX1BB), Belgium (ON4HF), Switzerland (HB9SKA), Poland (SQ9JYL), Czech Rep (OK1DNT), Canary Islands (EA8HB), Greece (SW2HTI), Italy (IK4RSR), Norway (LA4FPA). And also European Russia (RW3XL), Scotland (MM0KJG), Denmark (OZ1MY). Which I'm really pleased with as it's not a bad selection of QSOs!"

Congratulations, Peter, that's an impressive list! Someone else who has put the f.m. satellites to great use is **Jim Adams K0BAM** (Ridgway, Colorado, USA). I noticed Jim say on Twitter recently that he'd completed over 1000 QSOs on the f.m. satellites. I asked him to tell me more.

Jim Adams K0BAM (Ridgway, Colorado, USA), putting the f.m. satellites to great use with his handie and an Arrow Antenna.

Jim sent me a fascinating E-mail and there's only space to reproduce some of it here. In it he said: "Armed with a Yaesu FT60-R 5W 'handie', and an Arrow hand-held antenna I set out to try to make some contacts. Contacts on the f.m. satellites come fast and furious, and it took some time, but I got the hang of it. I work AO-27, AO-51, SO-50, and when they're on over America, SO-67 and HO-68.

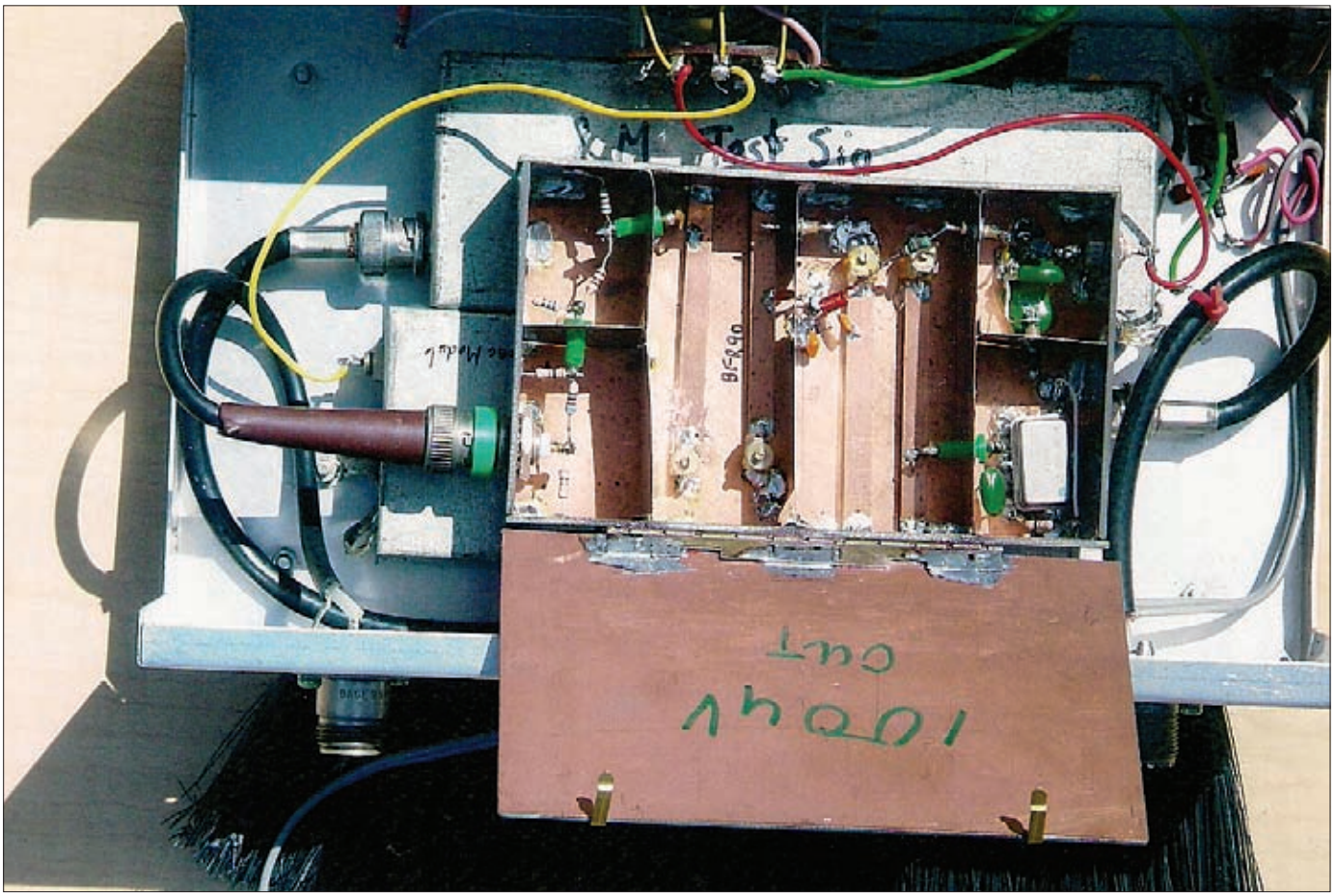
"I use *Satscape* **www.satscape.info/** to track the satellites. I've learned about Maidenhead Grid Squares, with my home grid square DM68. I've also worked portable from DM58, DM67, DM57 and DM69. It's a lot of fun to travel around and work portable. For county hunters, I learned my home county, Ouray County (named after Chief Ouray of the Ute Indian Tribe) is quite rare."

Jim went on to say: "My biggest thrill was talking to Colonel Doug Wheelock aboard the International Space Station. Here I am, in a small Colorado mountain town talking to an Astronaut! The resultant QSL card from NASA is one of my prized possessions.

"I'm either standing on my south facing patio or someplace outside in a field or park here, and have worked satellites in the rain, the snow, and cold. One day when it was a brisk 31°F below zero my handie locked up, and didn't seem to want to work very well. I took that as a hint to go inside and have another cup of coffee! I use the record memo function on my cell phone to record the contacts to later put them in my log.

"At first my neighbours, seeing me holding this antenna in the sky and talking on a small radio thought I was either a spy, a government agent, or just another 'whacko' who'd moved into their peaceful mountain town! After explaining Amateur Radio to them most seemed fascinated, one called me a 'nut' and one elderly woman yelled at me, "you're never gonna find a woman doing that stuff!"

Jim finishes up by saying, "So in my year or so working the birds, I've managed to contact over 100 different grid squares, earning the ARRL VUCC award with satellite endorsement, along with AMSAT OSCAR Satellite Communications Achievement Award, South Africa AMSAT Satellite Communications Achievement Award, and the W4AMI Satellite Operator Achievement Award for making over 1,000 satellite contacts. Today I'm at contact number 1014!



One of Steve Mahoney VK5AIM's weak signal sources.

"For those with limited funds, who live in antenna restricted areas, or just can't put up an h.f. station, working the f.m. satellites with an hand-held radio and handheld antenna is not only fun, but can offer you a lot of contacts, awards, and just some good fun!"

Thank you Jim! I also think Jim's said it all readers! What an inspirational story! I hope you found Jim's experience as fascinating as I did. If you give the f.m. satellites a go then be sure to let us know how you get on.

Weak Signal Sources

Steve Mahony VK5AIM (Elizabeth, South Australia) wrote a very interesting letter in which he describes his 'weak signal sources'. He has built sources for 50, 144, 432 and 1296MHz. He describes the 1296MHz source as "coming from an article in RSGB publications from way back. It uses a bunch of 1N914s all sandwiched between two 25mm square pieces of thin brass sheet.

"You feed a 432MHz signal into it. It has a couple of tuned circuits for 432MHz, followed by a couple of rejecter tuned circuits for unwanted harmonics and a final 1296MHz tuned circuit. You then get a good 1296MHz signal."

Steve says that he has even fed a 1W 432MHz signal into the multiplier from an Icom IC-4A hand-held and copied the signal on a 1296MHz receiver. The source is used mainly for checking antennas and receiver front ends.

Steve's 50MHz source is a 50MHz crystal oscillator module salvaged from a computer, with a couple of tuned circuits for 50MHz to clean up the square wave, followed by a resistive attenuator block to bring the signal down to 50µV. The 144MHz source is almost identical with a 48MHz crystal oscillator module followed by tuned circuits for 144MHz and the attenuator circuit.

The sources are in tinplate boxes, with lids and three internal compartments each. There are sections for the 5V regulator with supply filtering, the oscillator with tuned circuits for 144MHz and an attenuator to a BNC connector.

Steve says that the 432MHz source is not dissimilar to **John GM8OTI**'s transverter oscillator train (as published in *PW*). A 48MHz crystal oscillator module, a 'times-three' multiplier tuned circuit, then a stripline, tuned to 432MHz, a BF981 amplifier and another stripline tuned circuit followed by a resistive attenuator to reduce the output to 50µV.

Steve says that the modules are quite stable in comparison to most signal generators, or at least the ones that the average Amateur could afford! The oscillator modules can be purchased from various suppliers although Steve says that he finds it more satisfying to salvage them from old computers. He finds the 48MHz, 10MHz and 25MHz crystals the most useful and has found others that lie within the Amateur bands!

In practice, Steve uses his sources to compare sensitivity, automatic gain control (a.g.c.) action, cross modulation and other parameters of various transceivers, as well as to use it in conjunction with a small antenna for testing antennas and receivers. He's found some surprises and that he's learned not to expect a text book antenna pattern if you have buildings, tin sheds or metal fences close by!

The 50MHz Band

Just one very welcome report on the band this month,it's from **Gavin Nesbitt M1BXF** (Trumpington, Cambridgeshire). Gavin heard auroral c.w. from Swedish stations on March 1st.

The 70MHz Band

From my own station at **G4VXE** (Longworth, Oxfordshire), I managed a number of local and semi-local QSOs on 70MHz f.m. during the month, one of the more distant being G8FAK near Milton Keynes in Buckinghamshire. The Tring simplex repeater or 'parrot', MB7FM on 70.4375Mhz leads to some interesting QSOs, a particularly enjoyable one

being with **Larry Smith G4OXY** near Biggleswade, Bedfordshire.

Larry G4OXY was using 5W from a Wouxun hand-held to an external antenna. However, despite his comparatively low power, I was hearing fragments of his signal without the repeater – presumably by aircraft scatter. At the time of writing, MB7FM is off air. Hopefully it will return again soon, as it does provide an extra dimension to 70MHz f.m. activity in this area. It was also good to work **Vin Robinson G4JTR** at Caversham on simplex.

The 144MHz Band

Des Kiely G0RBD (Melksham, Wiltshire) worked EA1MX (IN73) and F1MOZ (IN93) on February 6th. Here at G4VXE **(**Longworth, Oxon) I didn't get onto the band until late in the day on February 6th. And although the HB9HB beacon was still coming through well, there didn't seem to be any DX to be worked. But just as I was about to give up, I heard a weak French station calling who I recognised as F1MOZ (IN93), and I was delighted to make a QSO with at a distance of 883km.

Unfortunately, I was away from the shack during the tropo opening on March 1st/2nd but the great thing about having a set in the car is that you can always keep an ear on the band! So, I was interested to hear the ON0WV (JO11) repeater, weakly but clearly on 145.650MHz as I was driving home from a Ridgeway Repeater Group (**www.rrg.org.uk**) committee meeting. Next morning, the Bedford repeater GB3BF on 145.7875MHz was easily audible as well as GB3CF in Leicestershire on 145.6MHz – which was five or six S-points stronger than normal.

Gavin Nesbitt M1BXF (Trumpington, Cambs) was playing briefly on 144MHz on March 2nd before heading to the Camb-Hams (**www.camb-hams.com/**) 'Pye and Pint' monthly get together. Before leaving at 19:00z he managed 18 QSOs with stations GM8OEG (IO86) who had his antenna at 3m and he was 59! Then came GM4JR (IO85), F6FTI (JO00), DL6YEH (JO32), PD4R (JO32), PD3ALX (JO21), PA1VW (JO22), PE1BIW (JO32), DL1STG (JO31), DH4DAO (JO41), G1SAA (JO02), DK3NG (JO43). The best DX was DK9OY (JO52 686Km), and then he worked PD0FSB (JO22), PA0DDB (JO32), DB4BU (JO33), DG3XA/QRP (JO43, 5W at 669km) and PD3JSB (JO21).

Interestingly, DG3XA was 59 with his 5W and then he switched on his amplifier, his 700W signal was then only 59+20. Gavin tried with OZ5TG later at about 2230z but didn't manage to work him. However, **Reg Woolley G8VHI** and **Dick Richardson G8DER (**both either side of Coventry in IO92) worked OZ5TG at the same time 56 and 52 respectively. On March 3rd, Gavin made QSOs with PA1MP (JO32), DG9YIH (JO32) and DG3FK (JO41 ODX at 639km).

Members of the Dundalk Amateur Radio Society EI7DAR.

Gavin writes, "Many of the contacts above we made using my Flex-1500 SDR transverting to 144MHz using a Microwave Modules 28/144MHz transverter. This drives my Sagra 600 amplifier into a 9-element YU7EF antenna at 12m above ground on a SCAM mast. I have an SSB Electronics masthead preamplifier but it's not sequenced with the transverter yet – so for any weak stations I switch over to my IC-910 which can power and sequence the pre-amplifier."

Peter Goodhall 2E0SQL (Oxford) was pleased to make some s.s.b. contacts with his FT817 at 5W and a 5-element yagi. During the opening on March 1st/2nd he worked; M1MHZ (JO92), M0WAF (IO92), G4DEZ (JO03), G3PYE/P (JO02), M1BXF (JO02), 2E0NEY (IO81), G8DER (IO92) and G6OES (IO92)

Graham Boor G8NWC (Spalding, Lincolnshire) wrote, "On March 2nd, I noticed that the GB3VHF beacon was stronger than normal, and the PI7CIS beacon was being received at good strength. I tuned down quickly and was rewarded with two quick contacts to DJ2TX (JO33) and PI4HLM (JO22). I only had a short time to listen, but it seemed we were being blessed with some excellent propagation, nice to hear activity outside the normal contest environment."

The 432MHz Band

Des Kiely G0RBD (Melksham) enjoyed the tropospheric opening on February 6th. He worked F8BRK (IN99), F4CWN (JN03) and F1EZQ (JN27) as well as some G stations who were taking part in the RSGB 432MHz Affiliated Societies Contest. Later the same day, Des worked EB1DDU (IN73) and EB1YL (IN73). Des runs about 30 watts to a 10-element Yagi at about 8m.

Here at G4VXE I missed the best of the conditions on 432MHz on February 6th, but worked a number of UK stations during the RSGB 432MHz Affiliated Societies Contest, the best DX being **John Lemay G4ZTR** (JO01) but activity seemed good. A few days later, during the RSGB 432MHz UK Activity Contest activity and conditions seemed reasonable, with M1MHZ (IO92) and G4DHF (IO92) being the best DX at around 160km.

The 1296MHz Band

I mentioned recently that **Graham Jones G3VKV** (Cheltenham) had just the masts on top of Cleeve Hill as a reflector for his 10GHz signals. I spoke to Graham recently and he mentioned that the masts work equally well as a reflector on 1296MHz too. Graham has also run successful tests with stations in Wiltshire and Oxfordshire. These pathways would ordinarily be almost impossible paths from Graham's home at the foot of the Cotswolds. Graham uses a fixed dish pointing at the masts on Cleeve Hill for these scatter experiments.

Thank You!

Very many thanks to everyone who has contributed to the column either by E-mail or on the air and additionally to **Ivan Tallon EI-1166** (Navan, Irish Republic) who was kind enough to write. Ivan is a member of the **Dundalk Amateur Radio Society EI7DAR**. We're looking forward to v.h.f./u.h.f reports from your part of the world, Ivan!

Cheerio until next time. Keep writing! **PW**

Roger Cooke G3LDI's Morse Mode

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The Morse Mode

Roger Cooke G3LDI, welcomes back a recent escapee and chats about Marconi day and marine Radio Officers.

Welcome to the world of Morse! Recently we 'lost' one of our prolific contesters from the Norfolk ARC due to a move 'down-under'. Peter Lock M0RYB, had taken part in all the RSGB contests and lots of others besides, using all modes. He's now resident in Rushworth, Victoria, with the callsign VK3BYR.

However, we have since learned that Peter wasn't happy with his lot down under so, he has decided to return home again! This is good news for NARC however, as Peter, a very keen contester said that he'll be supporting NARC in all the RSGB CC contests once again.

Are You missing Out?

Newly licenced Amateurs can get on the air these days with their shining new 'M6+3' calls and never do anything else. I think this is a sad reflection of our hobby these days. Although some keen types go on to pass their intermediate to get a 2E0 call

I'd encourage everyone to go for the full licence, which these days is an 'M0+3' call. However, having achieved this, I think that most give up and never even considering trying c.w. Why Is that? Well, there are several 'reasons' given, mostly boiling down to "I can't be bothered". It really is a shame, because I feel sure that these people don't realise what they're missing.

The newer 'Morse-less' Amateurs have a licence that allows them to use the high frequency (h.f.) bands – but in fact they can only use about 60% of the band space! That's because they will never venture into the exciting end of the bands where the Morse is to be found!

Most DXpeditions use Morse, in fact there have been a few lately that have used **only** Morse and data. Morse operations are more efficient, occupy less bandwidth, and you can operate in virtual silence if you wear headphones.

The only thing c.w. requires is some dedication on your part, a good tutor and some practice every night. Learning the code is the first step and I have covered it here before, but can go over it again if you missed the first articles! There could be a GB2CW scheme in operation in your locality an ideal way of learning. If there isn't, ask about it at your local club.

If you can find a suitable volunteer ask him, or her, to E-mail me for the details. Go on, make 2011 the year that you became a really well equipped Amateur and get to 25w.p.m. using Morse. Until then you won't know what you are missing!

International Marconi Day

The **Cornish Radio Amateur Club** has announced that International Marconi Day (IMD) 2011 will be held on Saturday April 30th. The club say the usual date of International Marconi Day 2011 would have fallen on the Easter Weekend so the date has been changed to the following Saturday.

The organisers of this year's event are **Norman Pascoe G4USB** and **Ken Tarry G0FIC**. Previous IMDs were organised by **Geoff Chance M0GRC** who sadly passed away this year. To get your interest here's an image of the IMD Award Certificate above**.** This is based on an early Marconi Company Stock Certificate and there are two varieties on offer. They are:

1: For transmitting stations for working the pre -defined number of contacts over the 24 hours of International Marconi Day – Full details can be found on the IMD site: **www.gb4imd.org.uk**

2: For listening stations who log the pre defined number of two way contacts made by official Marconi Day Stations over the 24 hour period of International Marconi Day. Full details can also be found on the IMD site. *Cornish Radio Amateur Club (CRAC)* **http://g4usb.co.uk/cornish-radio-amateur-club/**

Cornish Radio Amateur Club Blog **http://crac.g4usb.net/cracblog/**

Geoff Chance M0GRC - SK **www.southgatearc.org/news/june2010/geoff_chance_m0grc_sk.htm**

Marine Operators

Marine Morse operators set high standards and **Steve Appleyard G3PND** is no exception. Steve recently joined our Club, NARC and also gave a superb talk on 'The Decline of the Marine Radio Operator'. Obviously technology has overtaken the need for a dedicated Radio Officer on board ships these days and Steve has retired to North Norfolk.

We managed to persuade Steve to make full use of his Morse skills by taking part in the RSGC CC contests for us this year. **Malcolm Prestwood G3PDH** is another retired Marine Operator here in Norfolk and it was

quite interesting to hear how they both used to talk to each other and to shore bases whilst at sea.

Interestingly enough, Malcolm told me that he and Steve had to pass a Morse test at 25w.p.m. – using a straight key to become Radio Officers! Having just taken part in the FOC Straight key event, I have a greater respect now for those operators! Steve is pictured above. 73 and May the Morse be with you! Roger G3LDI. **PW**

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An Unusual Way to Damage Your Rig!

Harry Leeming G3LLL presents his regular column where he remember his time running a busy Amateur Radio shop and electronic adventures with his customers!

I had known 'Frank' for years, he was a radio and TV mechanic and a keen Radio Amateur. One day he called in to give me a little information about an odd fault that had occurred on his Yaesu FT-480. He fitted it to his car, switched on, and found that that the display disappeared when he pressed the push-to-talk (p.t.t.).

After removing the rig and poking around a little he found that the negative lead had dropped off from the connection he had made direct to the car's battery. He re-made the connection and all seemed to be well, except that he still could not hear any stations. Then he tuned to the frequency of the local repeater, which should have been 5 and 9+, and could just hear it down in the noise.

Frank's first thought was that there was something wrong with his antenna, and so he took the rig in the house and tried it on his base antenna system. But still it was extremely 'deaf', and so onto his workbench it went.

Eventually he found that the primary of the receiver antenna coil was open circuit, and upon close examination it looked like the thin wire had fused. Being rather dexterous with his hands, he managed to remove the damaged turns, and fit a couple of turns of wire to act as a new primary. He then assembled the rig, peaked up the coils alignment and the FT-480 was as good as new.

But why had the coil burnt out? When Frank fitted his rig to his car, one of the first things he had done was to push the centre pin of the PL259 plug into its socket. The antenna was a gutter mount with an internal matching coil wired between the inner and outer leads of the coaxial cable. When he had initially touched the centre pin of the PL259 plug on the antenna socket the negative power lead was not connected, and so the only negative power connection to the rig was via the primary of the antenna coil, (see **Fig. 1**) which promptly went open circuit.

Since Frank explained his problem to me, I have had to replace a few FT-480 antenna coils. which have failed under similar circumstances. So, to prevent a repetition in these cases, I have wired a small disc ceramic capacitor at point '**X**' (in Fig. 1). (No! I'm sorry – before you ask – I no longer have any spare coils. You'll have to find someone who is as dextrous as Frank).

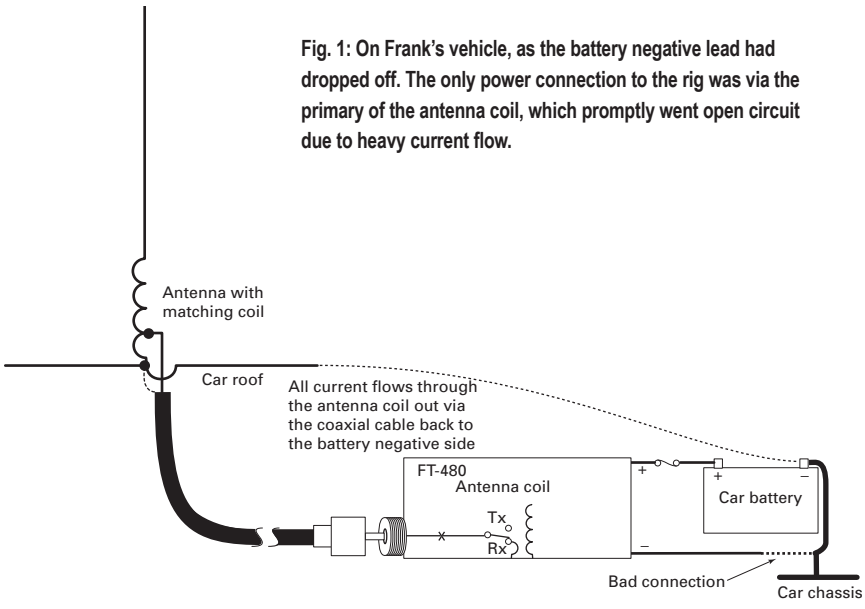

Fig. 1: On Frank's vehicle, as the battery negative lead had dropped off. The only power connection to the rig was via the primary of the antenna coil, which promptly went open circuit due to heavy current flow.

The FRG-8800 Receiver

The FRG-8800, **Fig. 2**, was a popular general coverage receiver, it looked quite pretty, was simple to use, and could be fitted with an internal very high frequency (v.h.f.) converter. However, it had a rather peculiar quirk.

'**John**' picked up a nice looking FRG-8800 second-hand, installed it in his living room, made good use of it for several days and then the display went blank. Heeding the advice "If all else fails read the instruction book", he removed the memory back-up batteries as instructed and all was fine until he replaced them, when the display disappeared again. At this point he sent me an E-mail, and fortunately I was able to explain the problem to him.

For some odd reason the FRG-8800 takes rather a lot of current from the back-up batteries and it's designed to be switched off at the front panel but left permanently plugged in to a live mains socket. If used this way the batteries will hold the memories during (let's say a power cut) or when the receiver is transported. They will however, go flat, and short out the supply to the display unit if they are left in when the receiver is not connected to the mains for more than a few days. The answer is to leave the rig permanently plugged in to the mains, with only a 1 or a 2A fuse in the mains plug for safety's sake, or to dispense with battery back-up altogether.

Ferrograph Tape Recorders

In the 1970s we were sales and service agents for the semi-professional Ferrograph tape recorders. These were very well made and extremely heavy – they weren't like cheaper alternatives – full of drive belts and clutches – instead they used three separate motors for the drive mechanism.

Like most equipment the Ferrograph recorders had their weak spots and one

came in for repair from a large Nation Health Service (NHS) Hearing Centre, after one of the drive motors jammed. This was quite a common fault when the bearings had either become dry, or had got out of alignment – and so I gave it the usual treatment. I tapped the motor spindle and the motor itself gently with a hammer until it became free and then lubricated all the motors and the drive wheels.

The recorder then seemed okay, but as there was an extra tape head, with a professional looking amplifier module fitted, I needed to know what these were for. I 'phoned the Hearing Centre and eventually managed to get through to someone who could give me an explanation.

I discovered that the recorder was used for testing people who were suspected of either pretending to be deaf, so as to make an insurance or benefit claim, or who had some kind of psychological deafness, due perhaps to having received a shock. A socket had been added to the recorder to which a pair of headphones could be connected and worn by the person being tested. They were then asked to count quickly up to 100, or read from a book while speaking into the recorder's microphone.

The sound from the second tape head was fed into the phones and due to the spacing of the playback head, the person being assessed heard their own voice – delayed by a fraction of a second if their hearing was okay. The delay, could be altered by adjusting the tape speed and the volume by a calibrated control.

The system worked like this: If you ever try counting or reading, while listening to a strong echo of your own voice, you'll find that it's just about impossible, particularly if someone suddenly alters the delay.

In fact I had quite a bit of fun trying this on various members of staff, after telling them to try and pretend that they were deaf. None succeeded in counting beyond about ten, they either collapsed laughing, or their speech descended into gibberish! I don't know if this method of testing is still used, but it was certainly effective.

Setting Up RF Processors

The sub-heading here could be, "When I switch on the r.f. processor on my FT-101ZD, it stops transmitting." Setting up an r.f. speech processor seems to create quite a lot of confusion and this is hardly surprising as even mighty Yaesu

Fig. 2: The FRG-8800 was a popular general coverage receiver. It was simple to use, and could be fitted with an internal very high frequency (v.h.f.) converter, but it has a 'quirk', which Harry discusses this month.

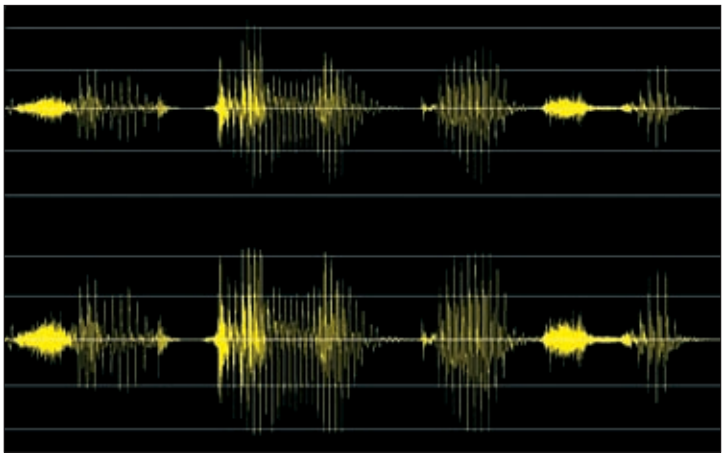

Fig. 3: Normal speech contains a lot of information at low level, together with occasional higher peaks, as shown in the upper trace. When the audio is amplified and sharply clipped, as in the lower trace, the top of the voice peaks are turned into virtual square waves.

seemed to get rather mixed up about it themselves. Indeed, the first samples of the FT-101E had no user-adjustable processor output control, which is pretty essential if the system is to work properly, and they found it necessary to quickly add one in the next batch.

Rather than just answer the question, first it might be as well to have another look at the subject of speech processing. So, off we go! Normal speech contains a lot of information at low level, together with occasional higher peaks, as in the upper trace of **Fig. 3**. With a single sideband (s.s.b.) transmission the maximum height of the peaks, depends on the peak envelope power (p.e.p.) power rating of the transmitter, so the microphone gain has to be set such that the peaks don't overload the transmitter.

If the gain is set too high, or the operator shouts, the transmitter will be over-driven, and could then 'flat top.' This will cause distortion and may also result in the transmission 'splattering' and causing interference to operators on adjacent frequencies.

To try and make their equipment 'operator proof', transceiver manufacturers fit some kind of automatic level control (ALC). This turns down the gain if excessive audio drive levels are applied and so helps to minimise the peaks 'flat topping'.

The use of a small amount of ALC can increase the readability of a transmission to some extent. It enables the microphone gain to be increased slightly, and so lift the low level audio signals, without over-driving too much on peaks.

Alternatively, if a simple audio clipper is wired into the microphone lead, the peaks can be clipped. It's then possible to make the low level information carrying voice frequencies 'louder' without overloading on the peaks, but the design of these units creates other problems.

When the unchanged audio wave is amplified and sharply clipped, as in the lower trace of Fig. 3, the top of the voice peaks are turned into virtual square waves. Square waves contain the basic fundamental frequency, plus many harmonics, hence a multitude of extra output frequencies are generated, especially by the strong low frequency peaks in male speech. These broaden the transmission and make it sound distorted.

Once a waveform is turned into a square wave, it will 'tilt' and overshoot

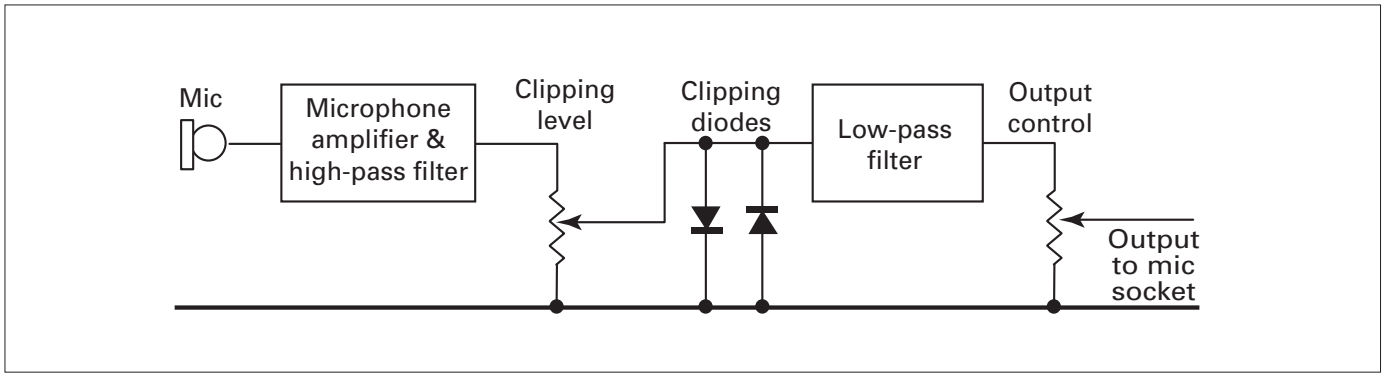

Fig. 4: The block diagram of a simple add-on speech-clipping unit that can cause problems if used too aggressively.

if passed through a coupling capacitor and this can result in the clipped wave having even higher peaks than the original one! To some extent the distortion and overshooting can be minimised by the use of a high-pass filter at the input of the clipper to reduce the strength of the low voice frequencies, and a low-pass filter at the output to reduce the harmonics, as shown in **Fig. 4**, but this has its limitations.

In the 1970s there was quite a flurry of interest in the use of r.f. speech clipping, as an alternative way of trying to improve the intelligibility and effective power of s.s.b. transmissions. I read the magazine articles, did quite a bit of experimenting, and eventually brought out an add-on r.f. speech processing unit for the early FT-101 MkI, FT-101 MkII, and FT-101B. The project was quite a success and I sold many assembled units and also kits via the late **Milton Lowens** who ran the FT club in the USA.

Milt' visited Yaesu in Japan, and showed them a unit. This possibly encouraged them to incorporate r.f. speech processing in their equipment, as shortly after this they produced the FT-101E. This was the first Yaesu unit that was fitted with r.f. speech processing, and Yaesu subsequently incorporated it into many other models.

So what is r.f. speech processing or clipping, why does it work better than audio clipping, and how do you set the controls up? More about this next month!

Practical Wireless!

Next, on to *Practical Wireless!* I once read that an expert in aero dynamics, had on the basis of the latest scientific knowledge, concluded that a bumble bee could not possibly fly. At least this expert accepted that there must be something amiss with the calculations, and set off to try and find what was wrong because nobody had told the bumble bee, which has been successfully flying from flower to flower for millions of years!

For over 20 years I have been irritated by letters in technical publications that have 'rubbished' the performance of magnetic loops on the basis of mathematical and computer simulations, without the writers having tried to make and test an efficient one. So, congratulations then to **Peter Dodd G3LDO** for properly constructing a loop, and then testing it under controlled conditions, as per his article in the December 2010 issue of *PW*. Peter proved that when they are properly constructed they do work quite well, all of which made me think!

About 30 years ago I had the idea of adding a Plessey double balanced mixer (d.b.m.) integrated circuit (i.c.) as a replacement for the first mixer in the early FT-101. I tried a rough hook up, and it made the receiver noticeably quieter, particularly on the 7MHz (40m band). I went ahead, ordered some printed circuit boards (p.c.b.s) and built and sold a few hundred d.b.m. kits.

Years later, when I had better test equipment, I tried to measure the improvement of performance, using standard two-tone intermodulation test procedures. Despite the fact that the modification clearly worked, I failed to measure much improvement. If I had been better equipped and had done the two-tone tests on my first prototype, I could well have rejected the idea out of hand!

I now realise that standard two-tone tests, while they produce some meaningful figures, in no way simulate actual reception conditions. In those days, On 7MHz for instance, there were not just two signals coming into the front end of the FT-101! Instead there were hundreds of powerful broadcast stations and Amateurs, plus many strong signals at around the first intermediate frequency of 5.5 to 6MHz. These are all mixing with each other, and under these conditions the Plessey d.b.m. chip certainly did improved things. However, thanks goodness most of the broadcast stations have now gone from the 7MHz band!

Marconi was advised by mathematicians and electrical experts that he could not possibly send a radio wave across the Atlantic, it's as well he didn't listen. I wonder just how many developments are now stifled at birth, because someone's computer program 'says' that it 'cannot possibly' work?

Still Room For Experiment!

I think that there's still room for the keen Radio Amateur to experiment and it may well be best to 'put the cart before the horse. That is to **try** something – then if it works – get the experts to puzzle out the reason. (Once you've registered your patent, do be sure to let the Editor know, *PW* would like to be the first to announce an earth-shattering discovery). See you next month! **PW**

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).

There was a slight problem in Harry's *In The Shop* column for the April 2011 issue of *PW*. On page 64, at the top of the centre column of text, in the first paragraph it says "If this were allowed to happen the voltage and frequency would both start to drop." The text should have read "*If this were allowed to happen the voltage and frequency would both start to rise*."
We apologise both to Harry and readers for this error. Editor

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As usual, information, reports and photographs to Carl by the 15th of each month please.

Taking your radio on holiday this year?

Carl Mason GW0VSW is looking forward to holiday time and one reader has already taken his equipment abroad and enjoyed it!

Welcome to *HF Highlights* and – with the weather gradually improving and summer just around the corner – I have no doubt that many of you will already be planning this year's holiday. With such a large choice of locations available now, it's not surprising that some of you will be tempted to squeeze some Amateur Radio gear into your luggage and enjoy some operating away from home.

One reader who has already been 'on holiday' is **David Hutchinson GI4FUM/C91DJ** who with his wife **Gillian GI8MIV/C91MV** were part of the October 2010 DXpedition to Praia do Bilene in Mozambique. In 12 days of operating the team members made over 15,000 contacts and the QSL card designed by **Glenys Bettley G8KWD/ C91KW**, printed in the March column, is now in great demand.

Secretary of the Chiltern DX Club **Tony Bettley G4LDL/C91DL** was the top operator with over 6000 contacts in the log under a variety of the team's callsigns while David and **Daniel Hubbard ZS6JR/C91JR** both made around 3000 contacts under their own calls and 1430 contacts with 94 countries using C91MS for the Mozambique Scouts as part of Jamboree on the Air.

Six scouts travelled up from Maputu to participate in the Amateur Radio activity and they said that the last time a JOTA station was run for Mozambique Scouts was over ten years ago. Unfortunately, neither Tony nor David spoke Portuguese but one Scout was bilingual, and spoke English and was able to translate the Portuguese for them. The team also found the time to enter the CQ World Wide SSB contest as a Multi-Single station using the call C91WW and were pleased to make over 4,500 contacts into 137 countries.

The team who were part of the October 2010 DXpedition to Praia do Bilene in Mozambique.

Two Elecraft K3 transceivers were used with Icom IC2KL solid state linear amplifiers together with a Yaesu FT-100MP but the K3s were the team's preferred rigs. For antennas the Cushcraft A4S beam for 14/21 and 28MHz was used at 21m (70ft) while a Cushcraft A3WS beam at 18m (60ft) was used for the 18 and 24MHz bands both mounted on a 4-section lattice steel tower on a trailer. Four square (phased verticals) for 7MHz and a base loaded vertical for 1.8/3.5MHz completed the station. Conditions on lower bands were very poor because of high noise levels but the vertical was used to good effect on 10MHz.

The team were plagued by frequent thunder storms and on those occasions they had no choice but to close the stations down until the storms had passed. Station logging was done on personal laptop computers using the *Wintest*, *SD*, *Xmlog* and *N1MM* logging programs, although they were unable to network the PCs so they had to resort to running a single station in the CQWW contest.

Expecting to find South African round-pin power sockets at their location, adaptors had been packed to convert the standard UK square pin plugs to these. However, it turned out that power sockets in Mozambique are the same as the 2-pin (Schuko) sockets found in Europe and fortunately Daniel had even allowed for this!

There's no doubt that a good deal of planning goes into a DXpedition – but that's all part of the fun and the 'pile ups' that followed were well worth the effort. Inspired by their experiences on this DXpedition the team have decided to do it all again in 2012 but this time to the Republic of Namibia in Southern Africa and possibly to a lodge called Frans Indongo **www.indongolodge.com/**

The lodge is located north-east of Otjiwarongo and north-west of Waterberg Mountain and Daniel ZS6JR would arrange for all equipment and antennas to be set up ready to operate. The chosen time could coincide with a major h.f. contest which would make the radio side of the trip more interesting. If this fires your imagination and you are interested in joining the DXpedition then David would love to hear from you. Photographs from the DXpedition can

The Scouts from Maputu participated in Amateur Radio activity as a JOTA station run for Mozambique Scouts.

be seen at **http://travel.webshots.com/album/578942651QRRqdc?vhost=travel**

New Entity

In January Southern Sudan which is bordered by Ethiopia, Kenya, Uganda, the Democratic Republic of the Congo and the Central African Republic, held a referendum to decide whether to continue to be part of the Republic of Sudan or choose its independence as a separate nation. This poll was agreed as part of a 2005 peace agreement to end nearly two decades of war and the results have shown an overwhelming vote for secession.

The new country is set to formally declare its independence on July 9th. Therefore, when Southern Sudan meets the current DXCC criteria it will become a new Entity. A working group that includes **Alex Van Eijk PA3DZN, Robert Kasca S53R** and **Martti Laine OH2BH** has been established to enable Amateur Radio to enter the scene with a professional and supportive role in the context of introducing the new country to the world of Amateur Radio.

It should be noted that this potential new country is emerging with a limited administrative structure and the first Amateur Radio activation should be accompanied with a well thought out plan prepared with the help of Southern Sudan's relevant authorities that includes telecommunications, security and education.

The group will be holding discussions about the provision of potential help from the **North California DX Foundation** or NCDXF **www.ncdxf.org/** and resources from Japan. More information can be expected soon with preparations for a new DX counter well underway. Also, the **Intrepid-DX Group www.intrepid-dx.com/** and the **DX Friends www.dxfriends.com/** are planning a joint operation which should take place on or after July 9th and is intended to be a major effort with a target of making more than 150,000 QSOs.

The plan is to have up to ten stations running at one time using linear amplifiers together with high performance beams and vertical dipole arrays for 24 hours a day. It is hoped that the callsign **ST0DX** will be issued shortly and as the DXpedition will last for around three weeks it should enable as many DXers as possible the chance of a first contact with this new DXCC entity. The website for this planned DXpedition is at **www.dxfriends.com/** and Icom America has already agreed to be Global Radio Sponsor while Acom-Kilz will provide the ACOM amplifiers for this operation.

The QSl card from 9M2MRS, in West Malaysia, received by George Davis G3lCO.

The Intrepid DX group hope to join in with the DX Friends group when operating from Southern Sudan.

The DX News

On to some DX news now and to Canada where **John Boudreau VE8EV** and *PW* reader **Gerry St. Amand VE8GER** are planning an IOTA DXpedition to Tent Island NA-193 using the (forgive the pun!) 'tentative' callsign XK1T. John says they are "targeting five to seven days in late April over the Easter holidays. The final dates are to be picked at the end of March to avoid any forecast of unsettled 'geomagnetic' conditions"

The IOTA expedition will be a high-power/Yagi operation with activity expected to concentrate on 14MHz using s.s.b. – but more c.w. than on previous trips. Check out the interesting 'blog' at **http://ve8ev.blogspot.com/** which also describes John's method of QSLing after an activity!

On to Morocco next, where **Ron Maples W3PV** will be active as **CN2PV** from Rabat until May 1st. He will be QRV mostly on 7MHz c.w. but will also operate other bands when they are open. The QSL route is to be via W3PV direct to PO Box 161, Destin, FL 32540 USA, or via the bureau.

Southern Sudan is a newly independent state that the DX Friends group hope to operate and it should take place on or after July 9th 2011.

The Northern California DX Foundation, may also offer some help to the operation in Southern Sudan later this year.

Finally, we're off to Italy and the special call **IO4UI,** which will be aired from March 1st to September 30th to celebrate the 150th anniversary of the unification of Italy. You can expect to find the call on all bands – please QSL via I4JEE and all QSOs will be confirmed automatically via the bureau.

Your Reports

On to your reports next and **Eric**

Masters G0KRT in Worcester Park, Surrey starts us off again with a 5W QRP contact on 3.5MHz with HA7JTR (Hungary) at 2019. The 3.5MHz band provided LY2PX (Lithuania) at 1951UTC and both QSOs were made using his Kenwood TS-570 and a modified home brew W3EDP antenna 26m (84ft) long with counterpoises tuned with an SGC-211 auto tuner.

The log from **Jim Pedley GM7TUD** in Locharbriggs, Dumfries, Scotland shows 7MHz s.s.b. contacts with VK0KEV (Australia) on Macuarie Island AN-005 at 0819 (QSL via JE1LET). Next came D44TBE (Cape Verde) on Sal Island AF-086 at 0823UTC (QSL via IK5CRH). All were achieved using a Kenwood TS-590 with 100W and Butternut HF2V vertical antenna.

On to 10MHz where **George Davis G3ICO** in Yeovil, Somerset had a variety of c.w. contacts including 7X2ARA (Algeria) the call of 'Amateurs Radio Algeriens' at 1510. Then came 9M2MRS (West Malaysia) at 1513 (QSL via PA0RRS) and 1A0KM (Sovereign Military Order of Malta) at 1629UTC using an Elecraft K2 at 5W to a 40m long doublet antenna.

The QSL from LZ170MDS operated by the Balkan Sports Club to honour Bulgarian Saint 'Dimitrii Slivenski".

Jim Pedley GM7TUD received this fine QSL card from ZS8M on Marion Island South Africa.

The 14MHz Band

Moving to 14MHz George managed 3A2MD (Monaco) at 1528 and LZ170MDS (Bulgaria) the Balkan Sports Club with a call in honour of Bulgarian Saint 'Dimitrii Slivenski' at 1458UTC.

Also on the band was **Bill Ward 2E0BWX** in Edwinstowe, Nottinghamshire who used his Icom IC-7400 and SRC X65 wire antenna and PSK31 at 25W to work ER1ECS (Moldova) 0932, IN3GNV (Italy) 0935. Then came HA8QJ (Hungary) 1103, EA3AMX (Spain) 1108, OK1CJT (Czech Republic) 1209, UA2FHZ (Kaliningrad) 1433 and OH3BY (Finland) at 1443. While 50W s.s.b. found S58MU (Slovenia) 1010, EA1HDD (Spain) 1216 and IZ2SQS (Italy) 1330UTC.

Also using PSK was new reporter **Steve Wellon G6DMG/M0SAS** in Lyppard Bourne, Worcester. Steve used a Yaesu FT-857 at 20W with a MyDEL CG SB-2000 USB Interface, *HRD* free software **www.ham-radio-deluxe.com/** and Cushcraft MA5 mini beam to work UA1ZOH (European Russia) at 1301UTC. The QSL he received is rather interesting and the second we have featured that has a submarine on it!

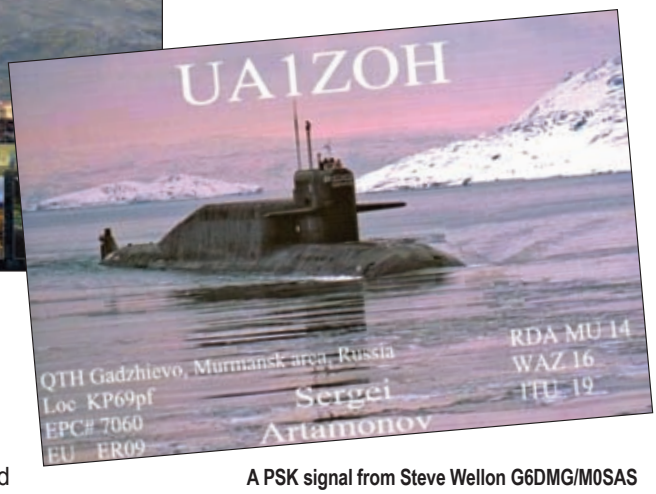
The 18 & 21MHz Bands

In Newtownabbey, Northern Ireland **Peter Lowrie MI5JYK** braved high winds and snow to make some more QRP contacts on the 18MHz band working s.s.b. stations E75MC (Bosnia & Herzegovina) 0954, UA1AES (European Russia) 1008, IK0TRV (Italy) 1122, IS0RXF (Sardinia) EU-024 at 1129, EA3EVL (Spain) 1138, SP5TWA (Poland) 1245, LY1L (Lithuania) 1255, LZ12EYAC (Bulgaria) at 1330 QSL via LZ1BJ, EA9IB (Ceuta & Melilla) 1405 and his best DX OX3KQ (Greenland) NA-018 at 1529UTC. All were achieved using a Yaesu FT-817 at 2.5W with a home-brew two radial wire ground-plane antenna for the band.

Eric G0KRT used s.s.b. and 100W and worked WX2F (USA) in North Merrick, New York at 1617, while Jim GM7TUD found some interesting s.s.b. DX working W0S (Northern Mariana Islands) OC-086 at 0921. This is a call operated by the Mariana Friendship Club (WH0SS) in Saipan to celebrate the Silver Jubilee of the international exchange program between students from the Seisa Group in Japan and the Marianas High School in Saipan. All QSLs via JA1HGY.

Next came VP8ORK (Falkland Islands) at 1222, this was the Microlite Penguins DXpedition team activating the South Orkney Islands AN-008. The QSL route via VE3XN). Then came TJ9PF (Cameroon) 1502 QSL via F5OGL, V31ML (Belize) on Caye Caulker NA-073 at 1553 (QSL via DJ1JB) and ZS8M (Prince Edward & Marion Islands) AF-021 at 1625UTC. This time Jim was using a Cushcraft MA5B mini beam.

Using PSK31 again – at 25W – was Bill 2E0BWX who operated on 21MHz for a time logging RV6ALI (European Russia) at 1157 and UT9LC (Ukraine) worked at 1214UTC.



A PSK signal from Steve Wellon G6DMG/M0SAS raised the station of UA1ZOH.

The 24MHz Band

The 24MHz band was open for brief periods with Jim GM7TUD finding s.s.b. stations TJ9PF (Cameroon) 1056, ZD7FT (St Helena) AF-022 at 1056 and HI3/W1JNZ (Dominican Republic) at 1531 using 100W and a Cushcraft D3W rotatable dipole antenna. Meanwhile, George G3ICO had 5W c.w. QRP contacts with 4X6HP (Israel) at 1413 and 3B8DB (Mauritius) AF-049 at 1419UTC.

Signing Off

Well that's it for another month and there has been plenty to get through! As usual my thanks go to **Maurio Pregliasco I1JQJ/KB2TJM** editor of the ***425 DX Newsletter*** for all the DX information and to all our reporters for their logs. Until next month I wish you all good DX.73, Carl GW0VSW.

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B.B. May '11

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Uniden	UBC-60XLT	66-512MHz (with gaps) FM Hand Held Receiver 80Ch. 4 x AA cells	£59
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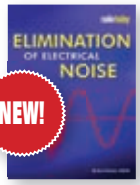

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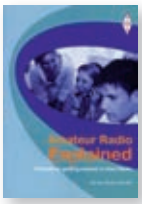

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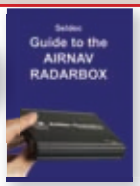

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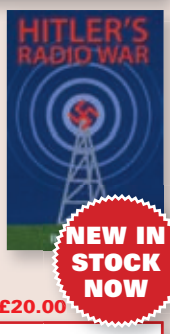

This book tells the story of Nazi international broadcasting during and before the Second World War. At its peak German radio stations broadcast in fifty-four languages to a worldwide audience. For the first time in an international conflict, citizens of the warring nations could hear enemy propaganda in their own living rooms. Many of the voices that they heard belonged to a new type of criminal, the radio traitor. The nickname Lord Haw-Haw is still famous internationally, but there were numerous other radio renegades speaking on behalf of the Nazis. The Nazis' propaganda was sinister enough, but they also ran a series of secret stations that spoke to enemy audiences in the name of 'patriotic' dissidents who claimed to be broadcasting from clandestine transmitters in their own countries. Using archival material, "Hitler's Radio War" dissects the message that Germany's overt and covert propaganda stations broadcast to their audiences, as well as the lives and motivations of the broadcasters.

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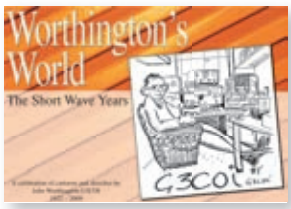

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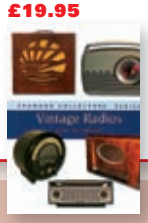

This book tells the collector and the armchair wireless enthusiast everything there is to know about classic radios from the 1920s to the end of the 1960s. All the important makes and models are discussed and the author also covers buying and selling, care and restoration and many other topics, including foreign radios and radio-related ephemera. Illustrated with many colour photographs, this is the perfect collector's companion to the fascinating hobby. 208 pages.

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Rob Mannion G3XFD/EI5IW's

Topical Talk

The Editor remembers how Radio Amateurs helped maintain Talking Book machines and comments on feedback from readers on reviews.

The long and interesting letter from Brian Tuffill M0FFS (*Letters* pages this month) provided plenty of food for thought as I prepared it for publication. Although I have come across many degrees of sight impairment – until I read Brian's letter I had no idea it was so complicated! He also obviously has a sense of humour!

For many years I was a Talking Book Service maintenance volunteer and I enjoyed meeting and helping blind people. When I started there were still a few LP record 'Talking Book (TB) machines around but most of the machines used a special and robust multi-track cassette type player using heavy duty cassettes much larger than the compact type.

The TB machines were extremely reliable and easy to use. At the end of each track the user just had to press a large black knob control, a mechanical bell sounded and you were on another track. I enjoyed repairing the machines – many Radio Amateurs were involved in this work – and getting to know our 'TB' users was often great fun!

Although most TB users had their one 'favourite' maintenance volunteer to 'call out' I would often meet some fascinating people when their own 'favourite' was on holiday. Indeed, one old gentleman – a First World War veteran – had asked for "someone to come quickly as I'm in the middle of a good book". So, off I went to Droxford in the beautiful Meon Valley in East Hampshire, north of Fareham. I didn't realise it at the time – but that trip was the first of many and the start of a friendship!

The old gentleman lived alone in a 'sheltered community' type bungalow overlooking the River Meon. It was a beautiful place where his near neighbours included several serving and retired Admirals!

As soon as my Morris Minor was spotted, a friendly Warden approached me – realising who I was – asking me if I had a good supply of cotton wool, cotton tipped buds and surgical spirit. Puzzled, I asked why and was told that I'd soon find out!

Entering the bungalow I was met with a 'fug' of tobacco smoke laced with a high content of potassium nitrate (saltpetre). This was the sign of a 'roll your own cigarette enthusiast (the potassium nitrate has to be added to keep the home rolled cigarette alight). Indeed, most roll-your-own smokers seemed to use more matches than tobacco!

Welcoming me in to his home the old gentleman led me to his chair and the table next to it. I soon saw what was wrong with the TB machine – it was literally oozing shreds of roll-your-own tobacco! It was just a case of stripping the machine down, removing as much tobacco as I could from the mechanics and then cleaning it up using surgical spirits or meths and plenty of cotton wool balls!.

I often tried and explain to the old gentleman that it was best that he prepared his cigarettes (quite a feat for a totally blind person) away from his TB machine. His standard reply was he enjoyed his smoke and enjoyed meeting the TB service volunteers! I couldn't argue with that!

In the five years or so I knew the old gentleman I got to learn how he survived the First World War. On his return from his second rest period behind the lines the lorry carrying him and supplies of ammunition jerked as it tried to move forwards. He was thrown out and suffered a compound fracture to his left leg, which later had to be amputated.

In later life he lost his sight due to diabetic complications. Despite his problems he enjoyed life as a skilled carpenter until retirement. I felt privileged to have known him! Amateur Radio enabled many of us to help others – and I'd be interested to hear from other former TB service volunteers.

Practical Wireless Reviews

Also on the letters pages, I found **Colin Redwood G6MXL**'s letter (*Letters* this month) very informative. It was Colin's own idea to write in and I found his opinions – from the author's point of view – to be very helpful indeed. We would also like to receive your comments on reviews! Please get busy on that keyboard!

Rob Mannion G3XFD/EI5IW

coming next month

Practical WIRELESS

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It's 144MHz QRP Contest Time!
Yes, it's that time of year again. Hasn't time flown by? Join **Colin Redwood G6MXL** as he provides up-dates on the rules and helps us prepare for the best day out that's to be had on 2m! Let's hope for good DX conditions and nice weather!

Mini Loops Reviews
Taking a rest from preparing his *Valve & Vintage* column, **Ben Nock G4BXD** has been busy on the Amateur bands – trying out some new versions of two mini loops.

A Simple Phase Locked Loop VFO
Ron Taylor G4GXO describes a simple and extremely practical phase locked loop (p.l.l.) variable frequency oscillator (v.f.o.) that could be ideal for many different projects.

Building A Rig Control Interface
Mike Jones G3UED shares the experience he gained while building a rig control interface. Our keen author thinks many readers will find it a useful accessory in the shack.

The Fishtail Antenna
It may look as though Lake District-based **Roy Walker G0TAK** is mixing his angling time with Amateur Radio! However, our ever-ingenious author has come up with a useful antenna design that we can all build and try out!

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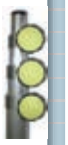

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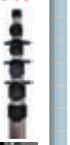

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