

# Practical Wireless

# PW

amateur radio & more!

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### THE IC-2100 & IC-2800

*Plus*

### QRP MILLENNIUM CONTEST RULES

### 'PRACTICAL WAY' & 'RADIO BASICS'



*(See page 10)*

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June 2000 £2.50





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Radio**

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**Sunday 28th May  
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**YAESU**  
Choice of the World's top DX'ers

**FT-100**

160 - 70cm All Mode

£799



**SAVE £450**

Coax Switch  
CS-600 £12.95



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CALCULATOR



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our Open Day

**YAESU FT-840 160- 10m**

£599

A firm favourite, this 100W radio is an ideal rig for those on a budget. Impossible to fault, it just goes on and on!

24-Month FREE Warranty on Yaesu

**YAESU FT-1000MP AC**  
160- 10m All Mode

£1795

19.4% APR Available

**SAVE**  
If you are looking for the rig with every feature including dual receive - then look no further!

It has stood the test of time and used by the world's top DXers and DXpeditions. Its excellent receiver combined with its superior transmitted signal makes this a natural choice for the HF enthusiasts.

**ICOM IC-756PRO 1.8 - 52MHz 100W**



Phone

You've read the rave reviews, and you have seen our recommendation on the web site. This radio with its amazing receiver and digital filtering, also includes auto ATU and real-time spectrum scope. A great DX rig.

**YAESU FT- 920AF**  
HF 160m-6m-100w



£1099

Includes full DSP and internal ATU. High tech receiver with dual tuning controls. Uses many of the FT1000 MP features but at a more attractive price. Full break-in on CW and includes a data port for TNC.

**ICOM IC-706IIG Plus IC-T8E**  
160 - 70cm All Mode  
£879 without IC-T8E



£999

Still a firm favourite with mobile operators and those who want a compact all-mode, all-band station. Phone for latest leaflet.

**YAESU FT-847**  
160m - 70cm All Mode

£1329 with switch mode power supply

**SAVE**

£1249

PRICE MATCH



The FT-847 has firmly established itself as a true all-band, all-mode transceiver. Loved by the VHF & UHF operators, and superb for satellite operation, it also offers great HF performance. We have sold more than any other dealer, which says a lot about our reputation and our price. **Phone for free leaflet today.** And remember, our stock is genuine UK, not modified overseas models!!

**KENWOOD TS-570DG**  
160 - 10m All Mode



£825

19.4% APR Available

Probably the most underestimated transceiver on the market. Don't be fooled by the low price, the TS-570 has one of the best receivers around. One of the best buys if you want top HF performance on a budget.

**ICOM IC-746 Plus IC-2100H**  
160m - 2m All-mode  
£1099 without IC-2100H



£1349

Your chance to purchase one of the most popular "all-band, all-mode" transceivers at a very competitive price and also get, the lovely IC-2100H mobile transceiver which has switched 12.5 & 25kHz filters. The IC-746 offers 100 Watts output on all bands and has a receiver performance to match.



# We Will **BEAT** Competitor's Prices Match or **wsplc.com** **Go** On genuine UK Stock

## ADI AT-600 Dual Bander Airband Rx

**£199**

- \* 2m & 70cm Handheld
- \* 5W Output on 13.8V DC
- \* Full CTCSS & 12.5/25kHz Steps
- \* 110 Alphanumeric Memories
- \* 29 Programmable Functions
- \* DTMF Keypad & AM Airband
- \* Ni-cads & AC charger



## KENWOOD

### TM-700DE 2m / 70cm

Data  
Mobile

**SAVE**

**£429**



Just arriving, this new model has built-in TNC, port for GPS, Data connector for SSTV, RTTY etc., CTCSS/DCS, Switchable TX/RX deviation, Dual receive, Wide receive option, Detachable head unit, 50 Watts on 2m, 35 Watts on 70cm, 200 memories, Alpha tag memo capability and a lot more. And who has the best price? - look no further!

## HOKA Software

### The Secret's Out!



We are now the UK distributors. As used by governments, it can decode just about any form of data transmission on HF and VHF. Simply connect between PC and RX audio. Can be loaded on any number of PCs. This is a very advanced programme.

**£349.95**

## C-150 2m Handy

**£99.95**

- \* 2m Handheld
- \* 5W Output on 13.8V DC
- \* 1750Hz Tone Included
- \* 25 / 12.5kHz Steps
- \* 20 Memory Channels
- \* Wideband Receive
- \* Uses 6 x AA cells (not inc.)



**£269**

## YAESU VX-5R

- \* 6m / 2m / 70cm Handheld
- \* 5W Output on 13.8V DC
- \* CTCSS Encode / Decode
- \* 25 / 12.5kHz Steps
- \* Auto Repeater Shift
- \* AM Airband Receive
- \* Lithium Cells & Charger



## YAESU FT-50R

**£199**

- \* 2m / 70cm Handheld
- \* 5W Output on 13.8V DC
- \* CTCSS Encode / 1750Hz tone
- \* 25 / 12.5kHz Steps
- \* 30 Memory Channels
- \* AM Airband Receive
- \* Ni-cad Cells & Charger



## SAVE C-408 70cm Handy

**£69.95**

Previously **£89.95**



- CTCSS
- Repeater Shift
- Digital Display
- 12.5 / 25kHz Step
- 20 Memories
- 230mW Output
- Uses 2 x AA

**NEW**

## Optoelectronics

### CD-100 MULTICOUNTER

Reads Frequency & Codes

- Range: 10MHz - 1GHz
- Memory: 100 Channels
- Decode: CTCSS, DCS, DTMF, LTR
- Power: Internal ni-cad battery
- Charger included

**£379.95**

## KENWOOD TH-D7E

**£259**

- \* 2m & 70cm Handheld
- \* 6W Output on 13.8V DC
- \* CTCSS & 1750Hz Tone
- \* Built-in Packet Modem
- \* 200 Alphanumeric Memories
- \* DTMF Keypad & AM Airband
- \* Ni-cads & AC charger



## YAESU

### FT-90R Can you believe the size? 2m/70cm Dual Band

**SAVE**



**£309**

The tiny dimensions of the FT-90R from Yaesu, are hard to believe. Yet it produces 50W on 2m and 35W on 70cm. Auto repeater shift on UK channels and switched 12.5 / 25kHz deviation, make this a number one choice.

## ADI AR-147

AM Airband Receive



**£199**

- \* 2m 50 Watt Mobile Airband Receive
- \* Full CTCSS Encode / Decode
- \* 81 Memories 25 / 12.5kHz Steps
- \* Keypad microphone & Mounting Kit

## GARMIN In-Car GPS Street Pilot

**£419**

The complete car navigational system. Large screen with UK mapping and optional street level data cartridge - plus lots more! Designed for the driver with easy routing and special data screen for car use. Optional UK CD **£69.95**, memory storage card 8Mb **£64.95**. With CD & card **£539**.



## GARMIN In-Car GPS-III Plus

**£349**

Detailed maps of UK and Europe plus street data upload feature via PC. Great value. Sits easily on the dash board and gives extremely comprehensive data including GB national Grid. Powered by AA cells or external 13.8V.



## ICOM IC-2800H In Full Colour!

**£310**



- \* 2m & 70cm Mobile
- \* Colour TV Screen
- \* Full CTCSS and 1750Hz Tone
- \* 50W 2m 35W 70cm

Includes FREE Remote head cable.

## ICOM IC-207H

**£245**



- \* 2m / 70cm
- \* 50W / 35W
- \* 180 Memories and 7 Tuning Steps
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- \* Microphone, Mounting Bracket etc.

## KENWOOD TM-G707E

**£239**

- \* 2m and 70cm
- \* 50W and 35W
- \* Full CTCSS
- \* 180 Alphanumeric Memories
- \* Detachable Head with Amber Display



## YAESU FT-8100R

**£349**



- \* 2m and 70cm
- \* 50W and 35W
- \* Wideband RX AM & FM 208 Memories
- \* 7 Tuning Steps DTMF Remote Front panel
- \* Very compact, supplied with all hardware.

## KENWOOD TM-V7E

**£299**



- \* 2m / 70cm Mobile
- \* 50W 2m, 35W 70cm
- \* Clear LCD Readout
- \* CTCSS & DTMF
- \* 8 Frequency Steps & 280 Memories
- \* Includes Microphone & Mounting Bracket



# MFJ

FREE CATALOGUE

**MFJ-969 300W ATU**



**£169.95**

160 - 6m Wire,  
Coax or Balanced

Includes VSWR / Power Meter, Ant. Selector,  
PEP feature, Roller Coaster Tuning

**MFJ-949E 300W ATU**



**£139.95**

160 - 10m Wire,  
Coax or Balanced

Includes VSWR / Power Meter, Ant. Selector,  
PEP feature, Built-in Dummy Load

**MFJ-948 300W ATU**



**£119.95**

160 - 10m Wire,  
Coax or Balanced

Includes VSWR / Power Meter, Ant. Selector,  
PEP feature, Built-in Balun, 12V Illumination

**MFJ-901B 300W ATU**



**£75.95**

160 - 10m Wire,  
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**MFJ-962D 1.5kW ATU**



**£239.95**

160 - 10m Wire,  
Coax or Balanced

Includes VSWR / Power Meter, Ant. Selector,  
PEP feature, Roller Coaster Tuning, T-Network

**MFJ-986 3kW ATU**



**£289.95**

160 - 10m Wire,  
Coax or Balanced

Includes VSWR / Power Meter, Ant. Selector,  
PEP feature, Roller Coaster Tuning, Differential Tuning.

**MFJ-989C 3kW ATU**



**£299.95**

160 - 10m Wire,  
Coax or Balanced

Includes VSWR / Power Meter, Ant. Selector,  
PEP feature, Roller Coaster Tuning, T-Network

**MFJ-912 Ladder Feed Balun**



**£39.95**

Connect between ladder  
feeder and coax and enjoy  
very low loss and all-band  
operation (when used with  
manual atu).

**WD- 25 Duplexer**



**£24.95**

This duplexer may be used both indoors  
or outdoors. It is supplied with mast  
mounting clamps and weatherproof  
shrouds for the coaxial plugs. The mast  
bracket can easily be removed, allowing  
the unit to be used for indoor use.

- \* 1.3 - 35MHz 500W
- \* 50 - 225MHz 300W
- \* 350 - 540MHz 300W
- \* Insertion loss 0.2dB
- \* VSWR <1.2
- \* SO-239 Sockets
- \* Wall or mast mounting
- \* Mast size 58mm
- \* 98 x 35 x 70mm

Every  
Model  
Stocked

## MFJ-269 Analyser

As Reviewed  
by RadCom

160m - 70cm  
Amazing Value

Imagine being able to plug into  
your antenna or feed line and  
make meaningful adjustments on  
site. Or be creative and turn  
hours into minutes and ideas into  
antennas! Read what RadCom  
says and make your own mind  
up. One of the best investments  
you will ever make!



**£299.95**

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**£69.95**

The easy way to learn  
CW. Sends real QSOs  
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Clear LCD display



**MFJ-1704 4-way Switch.**



Ideal for HF or VHF. This  
switch, fitted with SO-239  
sockets, is ideal for antenna  
selection. Has earth  
centre position

**£59.95**

**CX - 201 2-way Coax Switch**



2-way coax switch ideal  
for use in antenna system  
and service departments.  
Provides a very positive  
method of switching  
between two coax sys-  
tems and offers very low  
loss.

**£18.95**

**MFJ-259B Antenna Analyzer**

This battery powered analyzer will check the  
resonance and impedance of your antenna  
system in seconds. Make adjustments and  
watch the changes. Saves hours of work.

**£229.95**

**MFJ-1026 Noise Phaser**

**£159.95**



Reduces local electrical  
noise by up to 3 S points

Simply insert between antenna and transceiver. Using a small  
"sniffer" antenna, just phase out the local noise to uncover the  
signals. Offered on our usual 10-day approval.

**LINEAR AMP UK Amplifiers**



**£895**

**UK Ranger 811H (illustrated)**  
\* 1.8 - 30 MHz. 800 watts output  
\* Drive: - 10-100W \* Built in Power Supply  
**UK Discovery-Two Amplifier £1395**  
\* 144 - 146MHz \* 400 - 1KW Output  
\* Drive: -10-25W \* Built-in Power Supply  
**UK Explorer 1200 Amplifier £1595**  
\* 1.8-30MHz x 100W-1300W Output  
\* Drive: -10-120W \* Built-in Power Supply  
British made Amplifiers with a Pedigree

**GREAT  
VALUE**

## Cushcraft

5 Band Compact Beam  
NEW MA5B Mini - Beam

**£289.95**

**NEW**



10-20m inc WARC bands-  
1.2KW 50 Ohm feed  
2 Elements on 10/15/20m  
Dipole on 12m & 17m  
Max element length 5.2m  
Boom Length 2.2m  
Turning Radius 2.7m  
Weight 12Kg

Regular HF Beams from Cushcraft

A3S	3 el. 10,15,20m	£389.95
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A4S	4 el. 10,15,20m	£469.95
X7	7 el. 10,15,20m	£549.95
Ten-3	3 el. 10m	£139.95
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Full Cushcraft range stocked - Check our Web Catalogue

## Carolina Windoms

**CW-80 Special**

Carolina Windom 80 Special

Just 66ft long yet covers  
80m - 10m. It will out per-  
form a G5RV and give  
lower angle of radiation  
because of the 10ft verti-  
cal section which is forced  
to radiate. It will handle  
1.5kW



**£84.95**

**Just 66ft Long!**

Other Models (all with low angle radiator stub)

CW-160	160 - 10m 171ft long	£109.95
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CW-20	20 - 10m 34ft long	£77.95

**PacComm TNCs from USA**

Tiny-2	1200bps	£139.95
PicoPacket	1200bps	£139.95
Spirit-2	9600bps	£199.95

The lovely little PicoPacket even permits APRS with your  
mobile transceiver. Phone for leaflet.

## Power Supplies



**SEC-1223  
13.8V PSU**

**£99.95**

**23 Amps - 3.2lbs!**

**Back In Stock**

Lighter than an IC-706 and about the same size! The SEC-1223  
switch mode power supply delivers 23 Amps at 13.8V Thermo  
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100W rigs and can be changed for 115V AC

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UK's top  
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supplies.



**£89.95**

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independent laboratory testing for safety and electrical performance.

W-3A	3 Amp fixed supply.	£22.95
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W-25AM	25 Amp variable supply	£89.95
W-30AM	30 Amp variable supply	£119.95

**Compact 10 Amp  
Switch Mode PSU**

The W-10SM is small enough to fit in a  
brief case. Measuring just 230 x 100 x  
65mm, it's ideal for 50 Watt mobile's etc.  
Over voltage and current protection.



**£49.95**



**JUNE 2000**  
(ON SALE MAY 11)  
**VOL. 76 NO 6 ISSUE 1119**  
**NEXT ISSUE (JULY)**  
**ON SALE JUNE 8 2000**

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## 14 WIN - TICKETS TO THE RIAT 2000!

You could win one of 15 pairs of tickets to this year's very special **Royal International Air Tattoo (RIAT)** which takes place this year at **RAF Cottesmore** on the **22nd-23rd July 2000**. Why not have a go?



## 16 RADIO BASICS

This month **Rob Mannion G3XFD** continues the valved equipment theme in his column by describing the techniques used in building simple receivers.

## 18 CARRYING ON THE PRACTICAL WAY

This month, the **Rev. George Dobbs G3RJV** discusses some tuning methods as well as reminding readers of the reasons why he writes the column!



## 20 WHAT IS A?

**Ian Poole G3YWX** is back in *Practical Wireless* this month and this time he wants to tell you all about the photo-diode.

## 22 PAIRED ON AIR

**The IC-2100 & IC-2800!**  
**Richard Newton G0RSN** reviews two mobile transceivers from **Icom (UK) Ltd** - the **IC-2100 & IC-2800**. Richard thinks that these two rigs are poles apart, but both very useful and effective in their own way!



## 30 THE 18TH ANNUAL PW 144MHz QRP CONTEST

This month, long-serving adjudicator **Neill Taylor G4HLX** announces the rules for the annual 144MHz QRP Contest. Why not take part this year and send those logs in?



## 34 ANTENNA ROTATOR & 12V INVERTER REVIEW

With the **PW 144MHz QRP Contest** just around the corner, **Neill Taylor G4HLX** brings you a review of two very useful pieces of kit - the **Altai HT127 Antenna Rotator** and **SkyTronic Inverter** unit - it could make portable operating so much easier!

## 36 FILTERING WITH FOURIER!

**Les May G4HHS** looks into a subject that often causes confusion - the selective performance of receivers and in this article he takes a particular interest in s.s.b. reception.

## 40 ELECTRONICS-IN-ACTION

This month **Tex Swann G1TEX** looks again at Wheeler's formula for calculating the inductance of a coil, deals with the basics of power supplies and there's also a few books for your library.

## 42 ANTENNA WORKSHOP

In this month's 'Antenna Workshop', **Peter Dodd G3LDO** looks at the 'Moxon Rectangle' - an antenna that could be put up in almost any 'backyard' to improve your signals!



## 44 A NOVICE IN THE MAKING

**Godfrey Bradshaw** tells of how he came across the Amateur Radio hobby, almost by accident - you could say that it was through non-encouragement that he stumbled across an interest for the hobby.

## 46 VALVE & VINTAGE

This month we welcome **Phil Cadman G4JCP** back into the *PW* 'vintage' wireless shop. He opens with the following question: "Warm sunny Sunday afternoons: what do they remind you of?" Turn to page 46 to learn the answer.



## 48 A SIMPLE ANTENNA TEST SET-UP

Or, as its author **Dave Coomber G8UYZ** says: "Home - Home on the (Test) Range"

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75 COMING NEXT MONTH IN SWM



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A novice in the making... Page 44



# 54 RadioScene

More regular reports from our reporters around the UK and it's hello to new 'HF Far & Wide' author **Carl Mason GW0VSW!**



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DSP .....£1099.00  
**FT-1000MP AC** Transceiver. Yaesu's flag  
ship .....£1790.00  
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bander 5W .....£269.00  
**VX-500** Handie receiver. 10kHz-1300MHz all  
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PSU .....£3459.00  
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## SPECIAL OFFERS

### ICOM

#### IC-756 PRO

Icom's  
flagship.  
Colour screen,  
32 bit  
processor. Absolutely fabulous.  
£2099.00

#### IC-746

HF/VHF all  
mode  
transceiver, 6m/2m, 100W with  
tuner built in. Also with free  
2100H. 2 years warranty.  
£1299.00

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Smallest DSP  
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Probably the  
best wide band  
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available, coverage from 0.1-  
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ATU, external,  
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160m. Normally  
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SPECIAL OFFER £249.00

#### IC-2800

Dual band  
mobile, colour  
display. Full  
duplex, inc. CTCSS, 50W output.  
Detachable front. List price  
£449.00. OUR PRICE £349.00

### KENWOOD

#### TS-870S

Kenwood's top  
HF radio, DSP  
& IF. No need  
for filters,  
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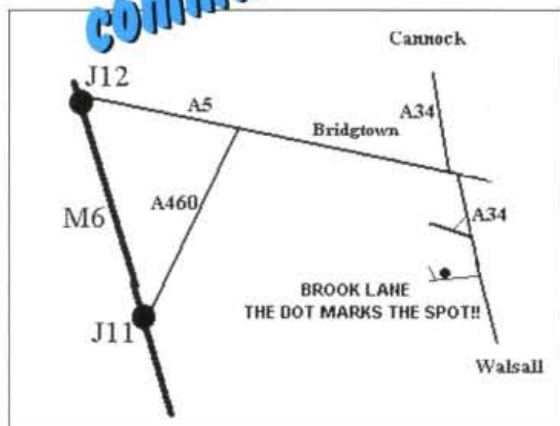
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KENWOOD	TS-450 SAT 100w	£595.00	YUPITERU	MTV-9000 AM/FM/USB/LSB/CW SCANNER	£245.00
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It's been an eventful month for me - but as you can see from this month's photograph - I found some time to relax and enjoy a short holiday and *PW* business trip to Ireland during the ten days between March 31st and April 11th. And to prove it, I've included the picture (courtesy of fellow Journalist and excellent photographer **Stewart Mackay G14OCK**) of me enjoying a traditional pint of Irish Guinness at the Bangor & District Amateur Radio Society's meeting on Wednesday 8th of April, with my good friend **Keith Burnside G14IYO** (Chairman of the B&DARS who appropriately enough bought the pint for me!).

It was, as I've mentioned, a very eventful trip, but I'll spare you the full details of the marathon trip home via Bangor, Dublin, Rosslare, Pembroke, Swansea to Dorset in a series of AA recovery vehicles with my sad-looking VW perched on the back! Incidentally, the pint was supped the evening I judged the club's home-construction contest on Wednesday 5th April - before my transport problems developed!

I had enjoyed five days driving through Ireland, airing my Irish callsign EI5IW from Rosslare to Donegal. In the north West, I'd stayed in Buncrana again, visiting **John Doherty EI9GB** and **Willy McCauley EI4EK** again, before heading to Bangor in County Down. That's when the trouble started!

My (14 month-old) VW Sharan, specially adapted diesel automatic car decided to develop a total gear box failure just after I'd enjoyed a fascinating day out at the Ulster Transport and Folk Museum at Cultra. I'd hired the same battery 'buggy' many of you have seen in action at the London Show in March (minus *PW* News & Production Editor **Joanna Williams**) - and this *Practical Wireless*, June 2000

time it really earned its keep!

As an Honorary Member of the B&DARS I'm always welcomed and given a wonderful time. This time though I received a quadruple dose of Irish hospitality because my car failed on the evening planned for a special meal at the 'Old Inn' at Crawfordsburn with fellow B&DARS members.

But on this occasion, all stops were pulled out to help me as I can only drive an automatic car fitted with hand controls nowadays and after my car had been carted off on the back of an AA transporter - the true spirit of Amateur Radio swung into action. **Terry Barnes G13USS** (former President of the Radio Society of Great Britain), typically, immediately came to my rescue and looked after my clothes and other gear from the car. Thanks again Terry!



Next, **Jeff M10AEX & Jane Smith**, who live in a delightful home on the Ards peninsula alongside Strangford Lough, put up with me for four days instead of two. They also provided transport (thanks folks) before Keith Burnside G14IYO ('Ireland's Youngest Operator' he calls himself!) took me down to the 'Four Seasons' Hotel in Monaghan for the Annual General Meeting and Dinner Dance of the **Irish Radio Transmitter's Society (IRTS)** where we were both invited to be 'Millennium' guests and speakers.

Keith G14IYO is an ideal person to travel with - he's an excellent raconteur (leaves me standing!) and is so well known as a presenter on Broadcast Radio and Ulster Television (which is also seen in most parts of Ireland) he becomes a

'Human Passport'. **Everyone knows him** and it's great to have a someone capable of sorting out those badly reported Amateur Radio news items!

## New IRTS President

The 'we must pull together' spirit was much in evidence at the IRTS AGM and Annual Dinner. New IRTS President **Dave Moore EI4BZ** was welcomed by outgoing President **Paul O'Kane E5DI** who gave an 'upbeat' farewell and 'welcome' speech to Dave EI4BZ.

Both Keith G14IYO and I had been welcomed as guests by the IRTS and specifically the **Monaghan Club**. We individually presented a short speech, in which we both reflected on the friendship and spirit of co-operation which exists between Radio Amateurs living on our off-shore European Islands.

In particular, on this occasion, I was made more aware that in Ireland - the contribution by *PW* and its approach to Amateur Radio and its followers is seen as benefiting the hobby. This contrasts with the feeling I detect here from some circles on our own Island.

I came away from the wonderfully entertaining event convinced that *PW*'s many friends,

wherever they live within the 'Emerald Isle', realise that this magazine works for Amateur Radio and supports everyone with an interest in our fascinating hobby. In fact, both Keith and I came away with 'Certificates' of Appreciation which were presented to us to mark the occasion. And those certificates made Keith and I realise how strong the bond is between Radio Amateurs in the 'British' Isles.

## Only Lament

My only lament for the weekend of 8th and 9th of April was that due to the breaking down of my car - I could not take up the pre-arranged overnight stay at the 'Four Seasons' Hotel arranged by the Monaghan Club. This was because Keith had to take me back to the Ards Peninsula -

arriving back at 0215 on Sunday Morning (he had to read the news at 0900. What a good friend he was!).

So, the chance to meet friends during the IRTS Rally on Sunday 9th was missed. And although I was looking forward to the rally - it was not to be. Perhaps next year will bring another opportunity. I hope so, because when it comes to providing a welcome ... EI & GI takes some beating. Thank you everyone and may God bless and keep you all.

## Welcome To Carl

As mentioned last month, we welcome **Carl Mason GW0VSW** as our new author/compiler for 'HF Far & Wide'. No stranger to the column - through his own activities on the band - I know Carl will get your full support and he'll do very well. Good luck Carl!

**Leighton Smart GW0LBI** has been forced - through unfeeling and unhelpful Government financial restrictions which seem to discourage people in areas of extremely low employment trying to create new careers for themselves - to stop writing for the magazine. We wish you well, Leighton and I'm particularly sorry to lose you as an author - let's hope common sense will one day prevail in the administration of State Benefits!

## Portable VHF Operating

Throughout the coming Spring and Summer I'm planning to carry out as much portable operation on v.h.f. as possible **on Saturday afternoons**. Sundays - with the exception of the *PW* 144MHz QRP Contest - are very difficult due to prior commitments. Instead, I hope to be operating on 144MHz n.b.f.m. and s.s.b and 70MHz n.b.f.m. on Saturday afternoons from approximately 1300 'clock time' to around 1630.

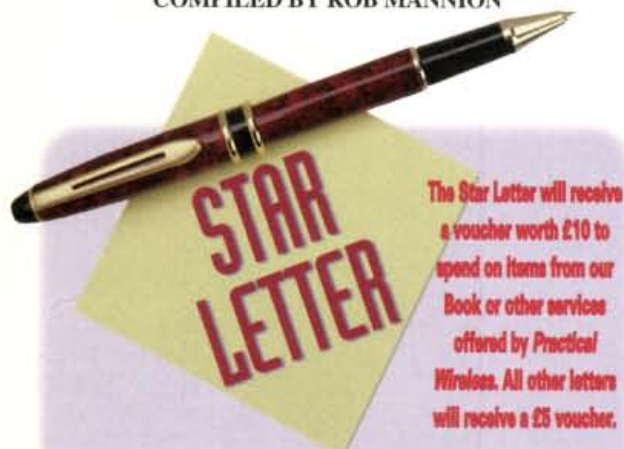
An E-mail on Friday (or quick telephone call) to the office on Friday afternoons will confirm if I'm able to be 'on the air' the next day. And I do hope that I'll get the opportunity to work you on v.h.f. And although I can't walk in the countryside as I used to enjoy doing - I can at least sit on a beautiful hill top, admire the wonderful view and enjoy talking to other Radio Amateurs. What could be better? See you on the bands! Cheerio for now.

**Rob G3XFD**



# Letters

COMPILED BY ROB MANNION



## Fork Lift Truck Mobile!

Dear Sir

It was nice to see the PW Editor at the Central Lancashire Amateur Radio Club on Monday 7th February, we found his talk very interesting. Rob G3XFD may remember I spoke to him on 145MHz while he was on his way home, mobile on the M55 and M6. I was driving a forklift truck - a side loader in fact - so called because the forks are on the side of the vehicle. My radio is an IC-706MkII, I've had it for three years now, before the Icom I had a Kenwood TS-50 (another nice radio too).

All my antennas are bottom loaded with a stainless steel whip, approximately four feet long, some I've made myself. From my truck I've worked PY, JY, VK, ZL, CM and more - too many to write down in this letter to you Rob. And not to forget 'state side', all on 10/15/20m.

I must say that these days I mainly go on 40m (7.062±MHz) on my truck and I once worked a special event station, Marconi 100 years celebration and the first signal across the pond.

On the air to Rob G3XFD I said "I bet you've never worked someone on a fork lift truck before!" To which he replied: "No, that's a first!"

I talk to people up and down the country and I've had some very nice QSOs and I've made lots of friends who always call in on 40m if just to say "Hello again, Bill".

Keep up the good work with the PW magazine Rob, I must have a suitcase full by now. I hope to catch you mobile some time on 40m Rob.

**Bill GONGE**  
Lancashire

Editor: It was good to work you Bill. I've now worked operators in cabs of steam engines, boats, and cranes. Have you got a more unusual /M than Bill G0ENG? If so, let's hear from you!

Mr W Clarke 6 Whernside Way Leyland Lancashire PR5 2ZN

## GONGE/MOBILE



**CFM QSO WITH G3XFD/M Rob**

DATE - 8 FEB 00

TIME - 10:30

FREQ - 145.425

SIG - 5/9

SSB

FM <<<

PSE QSL

TNX QSL

73 Bill Clarke



GONGE/m

## Polyvaricon Variable Capacitors

Dear Sir

I have just purchased the April issue, although I am a very infrequent reader of PW which I occasionally buy to see what is developing in radio, especially s.w. - my main interest being in foreign languages for which I find it useful. A couple of years ago I bought the G3WPO FDO MkII kit from Cirkit, for which the Polyvaricon capacitor was no longer obtainable, hoping to find a substitute.

In February 1999 I was lucky enough to discover a source of the 266+266pF Polyvaricon although it was a little different from the original model so I had to use slightly longer bolts for mounting it. I wound the D coil (about ten turns) without any aids but I realised the other lower frequency coils were going to present a problem.

The solution required the help of my brother but was otherwise quite simple. I took a four inch 6mm carriage bolt and using two conical caps (from toothpaste tubes - tubes of glue, etc.), drilled the latter to take the bolt and then wedged the coil former by tightening it with a nut and washers.

The bare end was gripped in the chuck of a hand drill which in turn was locked in the bench vice. My brother turned the drill and I controlled the take-up with my thumb on the bobbin, holding it with a screwdriver through the centre hole.

**J.G. Bruce**  
Cardiff

Editor's comments: Thanks for the tips.

## Severe Nostalgia!

Dear Sir

I have been meaning to write to you for a few months now and thought I must finally do it! I just wanted to say how much I enjoy reading PW every month. It has become a real joy to hear it flop onto my front door mat with the daily paper.

Although I'm not really 'old' yet (just 45!), I am afflicted - if that's the right word - with severe nostalgia. I very fondly remember my childhood, influenced as it was by a scientifically-minded elder brother, tinkering around with electronics and radio.

I had a grasshopper mind then, flitting from one thing to another - chemistry, astronomy, an interest in meteorology, but always radio and electronics was there in the background. I had PW to read, even then, as my brother used to take it regularly and as a family, we have read PW continuously since about 1961!

In those early years we had *Radio Constructor* as well - a magazine which I'm sure you remember. The 'adventures' of 'Dick and Smithy' within 'In Your Workshop' amuse me even now when I look back at old issues!

As my childhood years passed into adult life, I took up the hobby more seriously, gaining my Class B license in 1982 with the call G6TUA. I followed that up a year later with the callsign G4WFT. Since then I have dabbled in many areas - satellite communications, Packet radio, a

little h.f. and peripheral interests such as remote imaging.

So it is with great affection and interest that I read 'Valve and Vintage' as it invariably provokes memories to come pouring back, but the whole magazine is a wonderful read. In these days of "dumbing down" which seems to affect more and more aspects of life, I find PW retains an intelligent and balanced view of things.

So as I end this letter, I am about to climb into bed and read the latest issue of good old "Pracky Wireless", from the latest news to the old favourites. What better way to end the day?! Regards,

**Tim Kearsley G4WFT**  
Northants

Editor's comment: Long may you continue to enjoy PW Tim. I'm planning to comment on 'Dick & Smithy' from *Radio Constructor* in 'Keylines' soon.

## Radio Basics Series

Dear Sir

I would like to say how much I enjoy the "Back to Basics" ('Radio Basics') series in *Practical Wireless*. It has brought back a lot of memories to me from my early days of Amateur Radio, I have been following the series avidly over the past issues and have been delving into boxes in the shack that have not seen the light of day for a long time.

Like most Radio Amateurs, more sophisticated types of receivers and test equipment have been purchased over the years and the old home-brewed stuff has been put into mothballs and more or less forgotten. Using home-brewed diode testers, capacitor checkers, dip meters, etc., and listening to the old ZN414 radio and crude but efficient short wave receivers, to hear replies from my collection of home built amateur band c.w. transmitters, has revived my somewhat declining interest in our hobby.

So, thank you once again for these articles and I do hope that others are finding the series as absorbing as I do myself. There is one modern invention that I must admit I approve of though, it's nice to type this E-mail and send it to you without having to walk to the post box, it's freezing out there! Best wishes to you and the PW team.

**Jack Nelson G0DNC**  
Cheshire

Editor's comment: I'm pleased you enjoy the series Jack. It's hard work for me (on top of my other PW work) but I think the series is essential. It's gratifying to see from other letters and E-mails that many readers - in addition to beginners - are enjoying 'RB'. I'll keep on trying to find good ideas and projects!

## New Bungay Club

Dear Sir

I have just moved to Suffolk to the old village town of Bungay (pronounced "Bun-gee"). I have noticed the local community centre and thought what an ideal place to start a "Listeners/Viewers Club" - I say a "Listeners/Viewers Club" as our Amateur Radio friends have their own clubs and meet both in Suffolk and Norfolk, whilst this new

*Practical Wireless*, June 2000



club will hopefully be for those people out there who are mainly interested on listening and viewing. I therefore would like to meet up with anyone local or semi-local to Bungay interested in any form of reception on any bands or modes.

As for myself, I have been in the past, and intend to restart here, an active interest in TV and m.w. DXing, with a dabble into satellites be it analogue or digital. So, whatever your interest is and let's not leave it at just the above, get in contact.

I am therefore hoping that should this idea take off, the meetings will be held on Tuesday evening from 1930-2230 once a month, more frequently if the interest is there. The initial price of hiring the hall is £5 an hour so to make the idea viable, a minimum of four interested people are needed to help with the costs.

With very little to do in Bungay of an evening apart from going to the pub, here is your chance to make life more interesting, meet new people and take up this opportunity to meet fellow enthusiasts with a view to exchanging ideas and interests no matter what they are.

To make initial contact please write, stating your hobbies and interests to: **Mike Evans, 85 Hillside Road West, Bungay, Suffolk NR35 1RH**, not forgetting to enclose an SAE.

**Mike Evans**  
**Suffolk**

**Editor's comments:** Good luck to you Mike. With the recent reports of a worrying number of club closures everyone on PW wishes you well. Please keep us informed of progress.

## Roberts Radio Appreciation

**Dear Sir**

This is the first time I've written to your magazine having been a reader since it was nine pence (old money). So you will see that I am well into my 50 (or so) years.

The reason I am writing is to express my appreciation for the service received from Roberts Radio. My wife was kind enough to buy me the model R861 which I am more than pleased with.

Whilst we were decorating, I lost the small door that holds the batteries in place, as well as the instruction book, Roberts Radio were kind enough to let me have both these items at no cost. The gentleman didn't bother to ask me if the said radio was still under guarantee, or how old it was.

We could do with more companies like this and, in future when I'm buying a radio, I will buy Roberts.

**E. Rowe**  
**Wirral**

**Editor's comments:** Take a bow Roberts Radio!

## The EF50 Valve

**Dear Sir**

I'm writing regarding the famous EF50 valve. I was called up for service in the RAF in 1947 and after initial first training I was sent to Yatesbury, Wiltshire to train as an Air Radar Mechanic. While there we were taught to service equipment which used the VR91 valves as the EF50s were nominated in the RAF and much use was also made of the Mazda Octal VR65 (SP41) valves.

On completion of the course, I was posted to Lubeck in Germany and was there when the blockade of Berlin began. As a result, 'demob' was deferred for some trades, including Radar Mechanics, although by now I was employed as a technician at the British Forces Radio Network in Hamburg.

I was eventually demobbed about three months late and on returning to the UK I had to hand in

Practical Wireless, June 2000

my notebooks from the course as the equipment was on the secret list. Imagine my surprise when, soon afterwards on a visit to London, I saw the 'secret' equipment on sale in the radio surplus stores in Lisle Street! Apparently the 45MHz band i.f. strips with the EF50 valves were much in demand for home-brew TV in the London area.

Later I used an EF50 in a one valve tuner in front of my Williamson amplifier with good results during the day but it was prone to interference at night.

**John Haliburton GM4AQO**  
**Fife**

**Editor's comment:** Marvellous memories! Does anyone remember the 'hue & cry' when the nose cone radar of the ill-fated TSR-2 bomber appeared for sale in one of the famous London surplus shops in the 1960s? It cost the government a fortune - only to be sold to us as excellent quality 'scrap'!

## Atalanta Receiver

**Dear Sir**

Members of the Radio Officers Association will be interested to read Mr Cookson's letter regarding the Atalanta Receiver (PW March 2000). It always seemed to me that the Marconi Marine Company had an unequalled genius in naming its equipment.

What better names than **Oceanspan** for a transmitter, **Mercury** for the Atalanta's predecessor and **Quo Vadis** (Latin for 'Where are you going?') for radar? I have often wondered if these names - and there were many more - arose from the genius of one person and if so, who it was.

Or were they the product of the Marketing Department's activities with the Thesaurus? Does any reader know?

**Professor Brian Cotton**  
**Chairman of The Radio Officer's Association**  
**Southampton**

## Helping Hands - Please!

**Dear Sir**

Please print my letter as I need your readers' help - my father is a keen Radio Amateur and his callsign is GM4PVF. It has taken my father five years to build up his confidence to get back onto his radios again as he has cancer and a severe heart condition. He has been really sick but he really loves being a Radio Amateur.

The problem is that he needs a mast put up outside his house and as he isn't fit to do this himself so I am writing to see if any of your readers in the Glasgow area would be able to help out. My father is desperate to get back on the air as his radios are his life, I would be very grateful if anybody could help. I can be contacted on **0141-772 8066**. Thank you.

**Miss B Rankin**  
**Glasgow**

**Editor's comment:** I'm very confident that Scottish based readers will rally round to help. So, it's over to you - and we all hope Mr Rankin is soon back on the air.

## Amateur Radio & CB

**Dear Sir**

I am writing to you as someone who has been following both debates about Amateur Radio and CB radio and I am amazed that the relative authorities have not grasped the nettle of the declining numbers taking up the hobby. I would like to suggest that it is well beyond the time that the Morse code was removed as a requirement for a full amateur licence.

## Letters Received Via The 'Internet'



A great deal of correspondence intended for 'letters' now arrives via the 'Internet'.

And although there's no problem in general with E-Mail, 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 don't forget to include your full postal address and call sign along with your E-Mail hieroglyphics! All letters intended for publication on this page must be clearly marked 'For Publication' (on the letter itself). **Letters for possible publication are not normally acknowledged and we ask that wherever possible letters are not sent in by 'FAX'.** Editor

It's obviously an obstacle to newcomers and, in my view, a change to five words per minute would not encourage new blood. As we all know the difference between five words and 12 words per minute is speed and the latter requires practice. Thus suggesting that it isn't the speed, but Morse itself that is the obstacle, rendering the debate over speed totally irrelevant.

The Radio Amateur Exam (RAE) in itself is excellent, but I would strongly suggest that responsibility for the test should be taken over by the RSGB and therefore made available at a Amateur Radio rallies and of course the invigilator of any such exam should be an RSGB member for not less than five years. Given the format of the test paper as it presently stands, his job should be to prevent cheating and keep time, this would leave the test more available and accessible on a wide range of dates throughout the UK.

Now to CB. This is an area of radio where I think the most radical changes are essential. For instance, I have read some articles in numerous publications expressing the need for v.h.f. for CB. This I completely agree with, but saving CB is not just a matter of introducing a v.h.f. band.

The solution would be the introduction of something like an advanced CB operator. This would include the allocation of 26.000-27.995MHz f.m., a.m., s.s.b. plus a v.h.f. band of between 20-30 channels, of which 8 would be allocated for Packet radio. Incidentally, the omission of the Packet would, in my opinion, be a good thing, as I believe radio should be primarily about talking.

Obviously strict control of such a system would have to be akin to that of Amateur Radio and an exam to become an advanced CBER would have to be passed. This should consist of multiple choice questions of operating practice and procedure and of how to prevent interference and depending on a pass, a licence fee should cost approximately £25. The extra £10 on the licence would be to pay for policing the service.

I do realise that my views may be seen by many as extreme, but I firmly believe that such a system would create a breed of CB operator with good operating skills aligned to practice engendering a more professional attitude which must be a good thing for the overall future of 'radio'.

**Kevin Lunney**  
**Enniskillen**  
**Northern Ireland**



# News

COMPILED BY JOANNA WILLIAMS

## Headline News

### Future Products From Icom

Icom (UK) Ltd have been in contact with the *PW* news desk to tell us all about two new products which they hope will be with UK Radio Amateurs in the very near future. Both the **IC-718 h.f. all mode transceiver** and the **IC-R3 receiver** have been the subject of a few rumours recently but, not wanting to give our readers anything less than the facts, *PW* refrained from reporting on them until we had **full details** for our readers from Icom.

The IC-718 all mode transceiver is aimed as an **"entry level product"**, the press release states and it also utilises all the latest r.f. and digital technology. It's also very similar to the IC-R75 (you may have noticed), but the other important thing about the IC-718 is that the speaker is mounted on the front panel.

The IC-718 incorporates a 100W transmitter for s.s.b. and c.w. and has a built-in electronic keyer for c.w. use. With 40W output on a.m., this new h.f. transceiver also features an all mode, general coverage receiver which covers 30kHz-29.999MHz.

A "truly superior performance" is ensured, the press release states, due to a newly designed PLL circuit combined with a 4-element system mixer. As well as this, a microphone compressor coupled with an i.f. shift function means that the IC-718 delivers "really punchy audio to get your signal through in difficult operating conditions" with a reduction in "nearby interference".

A minimum number of switches and controls guarantees "ease of use" and all the popular operating modes are offered including u.s.b., l.s.b., c.w., RTTY (FSK) and a.m. The IC-718 has 101 memory channels enabling you to store operating frequency and mode so, all in all, this is one transceiver to look out for in the very near future.

The official launch of this budget transceiver will be at the **Dayton Hamvention** in May of this year but Ian

Lockyer says that **they expect to see it released in the UK in July 2000**. Rest assured that *PW* will be reviewing the IC-718 as soon as one is available.

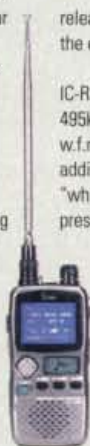
Official details on the IC-R3 are, at the moment, still only available on the international version (on display at Picketts Lock). But Icom are "working very hard in developing a UK version and hope to release a model into the home market by the end of this year".

A worthy partner to the IC-R2, the IC-R3 has wider receive coverage of 495kHz-2450MHz and a.m., f.m. and w.f.m. modes. But the most important addition is the two inch TFT colour l.c.d. "which allows you to watch TV", the press release states.

The IC-R3's colour l.c.d. has a "versatile dual screen format allowing you to switch from TV monitor to control functions at the press of a button" and it can also display up to five different screen layouts. Formats available include a simple screen, multi-function screen, band scope screen, direction finding screen and a TV and ATV screen.

There's a smaller l.c.d. screen situated beneath the larger two inch screen which is designed to present operating information (semi-duplex operation, tone squelch operation and priority watch indicator). The IC-R3 has 400 memory channels "arranged in eight banks" and, according to the press release, memory or frequency scanning is fast: "up to 30 channels per second".

The press release states that the IC-R3 is "Easy to use" and we think that it is definitely a receiver to look out for in the future and as soon as Icom have a firm UK launch date, *PW* will let you know. For more details on these or any other Icom product, please contact them direct - **Tel: Icom (UK) Ltd on (01227) 741741, Sea Street, Herne Bay, Kent CT6 8LD or E-mail: info@icomuk.co.uk or visit their Web site at: www.icomuk.co.uk**



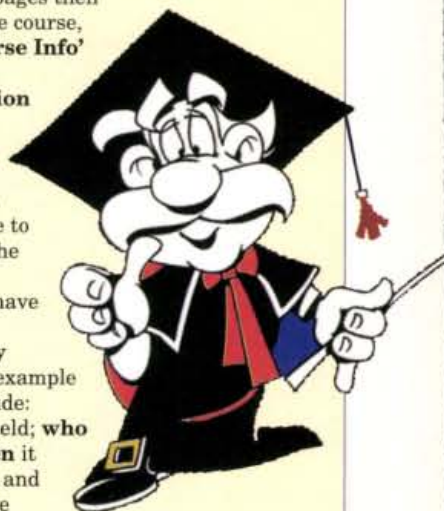
### Calling All Courses!

In the September 2000 issue of *Practical Wireless* we will be publishing our annual **'RAE Courses List'**, so if you're a representative from a club, college, examination centre or a course tutor who is running an **RAE, Novice RAE or Morse course** (from September of this year) please write in to me, Joanna Williams, to let me know.

If you feel that your course would benefit from some **FREE** advertising on our pages then please send in details of the course, clearly marked **'RAE Course Info'** to **Joanna Williams, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW**. Or you can E-mail me at: **jo@pwpublishing.ltd.uk**.

In order for your course to make it onto the pages of the **RAE Course List** in the September issue, you will have to get any details to me (**Joanna**) by the **14th July 2000** (absolute latest)! An example of the details I'll need include: **where** the course will be held; **who** is running the course; **when** it will commence (what date) and **any contact details** where people can get some more information and/or enrol.

**This will be the ideal opportunity for you to advertise your RAE, Novice RAE or Morse course, so don't miss out! Get that information off to me today!**



### New Catalogue & Store For Maplin

News in now from **Maplin Electronics** and it comes in the shape of their brand new catalogue for the period from April-August 2000. They say that they have "radically redesigned" it and the new catalogue is segmented into seven "discrete product worlds" ('Communications', 'Components & Cable', 'Computers', 'Electrical', 'Leisure & Hobbies', 'Sound & Vision' and 'Tools').

The redesign, **David O'Reilly** (Marketing Manager at Maplin Electronics) says, was done in order to improve the "customer viewing



experience", but "All the familiar categories remain". There are many new additional features to the Maplin Electronics catalogue for the April-August 2000 period, as well as price reductions to the Technical helpline and small order charge feature within



### Coming Soon

#### • WIN An Icom IC-756PRO • Worth £2399!

Coming soon, in a *PW* near you, is the chance for **one lucky reader** to win a brand new **IC-756PRO HF & 50MHz transceiver** worth £2399! Keep your eyes peeled for the next issue of *Practical Wireless* where we will have more details on how you can be in with a chance to win the very latest 32-bit DSP h.f. transceiver from Icom.



the catalogue.

Additional benefits, according to the press release, include "over £50 worth of vouchers and improved photography" and the CDROM catalogue comes with a comprehensive search facility that "aids product browse". Product pictures, technical specifications, order form facility and a data sheet library are all included on this latest Maplin catalogue in its CDROM format.

Launched on the 1st April, the new Maplin Electronics Catalogue is available now so for further details, please call them direct on Tel: 0870-264 6000.

Maplin also told us that they are opening another store, this time in Kingston at 2/4 Alderman Judge Mall, Eden St, Kingston Upon Thames KT1 1BS, Tel: 0208-549 8180 on Saturday 15th April 2000. Trevor Bayliss, inventor of the clockwork radio opened the new store at 0900 and he was also available to sign his latest book and was on hand to meet customers throughout the morning.

So, if you live in or around Kingston Upon Thames, why not pop along to the new Maplin store and benefit from some first-hand advice. Maplin state that customers will be able to choose from an "impressive product range including many specialised display sections ...".

## Lowe's Literature

We're already a quarter of the way through the year 2000 as this copy of *PW* goes to press, but the *Practical Wireless* news desk have managed to unearth another dealer's catalogue which some readers might like to know about. Lowe Electronics have been around for 29 years this year and their year 2000 catalogue reflects their growth and the changes that they have undergone over those years.

In the introduction to the catalogue, they say that there's a "broad spectrum of talents" at Lowe "from the expert skill of

our engineers to the wide product knowledge of our experienced sales staff". Lowe's product range has grown immensely over the years to incorporate a wide range of aspects from 'Airband and Scanning', 'Amateur Radio', 'Business Communications', 'Navigation', 'Night Vision', 'Short Wave Receivers' to 'Weather Monitoring' all of which are covered in the catalogue.

Products range from AOR, Fairhaven, Garmin, Icom, JRC, Kenwood, Sangean, Yaesu, Yupiteru and more, so if you would like to see a copy it then why not contact Lowe Electronics. The catalogue is free when you send four first class stamps (to cover postage) to Lowe Electronics Ltd, Chesterfield Rd, Matlock, Derbyshire DE4 5LE. Or you can always visit their Web site: <http://www.lowe.co.uk> and download a copy.

## Trek To Support MAG

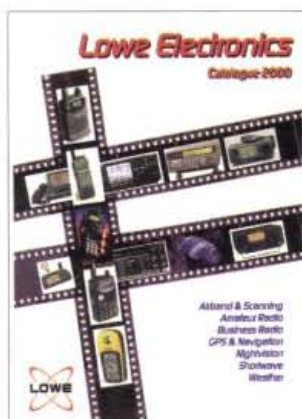
You may remember that back in the February 2000 issue of *PW*, we featured a news item concerning Gordon Smith G7UHP and the trek which he is taking part in to raise money for MAG - Mines Advisory Group. This charity, MAG, is "dedicated to reducing the loss of life and limb caused by land mines and unexploded ordnance (UXO)".

The ten day trek across Namibia's desert will be taking place in June/July 2000 and is supported by Trevor Bayliss, Amanda Redman and Paul

Burrell (former butler to Diana, Princess of Wales). Gordon is looking for people, businesses, etc., who will be able to offer him any financial or technical help and time is running out so the *PW* news desk agreed to feature this news item once more in the

hope that someone will offer some help of any sort.

If you can help then please contact Gordon directly at 256 Jockey Rd, Sutton Coldfield, West Midlands B73 5XP - but hurry as time really is running out!



## The QRP Component Co. Buys Out Howes Kits

Chris Rees G3TUX has told *PW* that he is delighted to announce his purchase of the "well-known kit business from C. M. Howes Communications". He goes on to say that his first priority is the relocation of the business to his Haslemere base which involves moving "substantial amounts of stock, machinery and documentation as well as the preparation of a new workshop and stores facilities".

Chris G3TUX states that once continuity of supply for the current kit range is assured, he will be looking to expand the number of products offered and also to "broaden their appeal to a wider section of the hobby electronics industry".

Transfer of the business took place on Monday 17th April, all enquiries and orders should now be addressed to: The QRP Component Company, PO Box 88, Haslemere, Surrey GU27 2RF. Tel: (01428) 661501, FAX: (01428) 661794. Alternatively, you can always send an E-mail to: [g3tux@aol.com](mailto:g3tux@aol.com)

## Changes To Repeater Coverage & Licensing

The Radio Society of Great Britain (RSGB) has announced that they have reached an agreement with the Radiocommunications

Agency (RA) regarding two changes to the "arrangements for repeater authorisation and use". Firstly, the existing policy of no coverage overlap in considering applications for additional repeaters is to be relaxed, "providing that sufficient frequencies can be found to avoid co-channel interference".

On the 144MHz band, implementation of the IARU region I 12.5kHz channel spacing in June 2000 enables the introduction of additional repeaters, but on the 430MHz band there may be some difficulties with available frequencies and the RA are prepared to consider applications for new additional dedicated Internet linked repeaters with wide frequency spacing, allowed for in the existing band plan.

"Frequency co-ordination will have to be carefully carried out", the press release states and the Data Communications Committee Chairman has agreed that some Packet links may have to be moved and in order to preserve the interests of ATV enthusiasts the RSGB Repeater Management Committee (RMC) will keep in contact with the British Amateur TV Club (BATC) "to ensure that mutual interference is minimised". For further details about the work of the RSGB Repeater Management Committee (RMC) please contact Carlos Eavis G0AKI, RMC Chairman, c/o RSGB Headquarters, Lambda House, Cranborne Rd, Potters Bar, Herts EN6 3JE.





## New Watson Power Supply

**Waters & Stanton PLC** (W&S) have sent *PW* news of the new **Watson W-40SMV switch-mode 40A power supply**. According to W&S, this is the "first power supply of its kind to be introduced onto the UK market".

The new power supply delivers over 450W of power and W&S say that it should be very popular with Radio Amateurs who want to run a 100W transceiver plus several other devices. "It will also form a good a.c. power base for solid state amplifiers".

"The W-0SMV will deliver 40A and has a continuously variable output voltage control from 3-15V, plus a fixed 13.8V position via switch on the underside of the case", W&S state. The unit weighs 3.5kg and measures 220 x 110 x 300mm with a 240V a.c. input voltage.

Delivery of the Watson W-40SMV will be in early June, W&S say, and it will cost **£149.95 including VAT**. Please contact Waters & Stanton PLC for more information: **Spa House, 22 Main Rd, Hockley, Essex SS5 4QS. Tel: (01702) 206835.**

## Timestep's Reduced Receiver

News in from **Timestep** now,

who tell us that their **PROscan polar receiver** has been reduced in cost and will now only set you back **£249** - a reduction of £150! "This professionally designed polar orbiting receiver has all six APT satellite frequencies fitted" the press release from Timestep states. It goes on to say that the PROscan receiver has "outperformed every other receiver suitable for weather satellites".

According to the press release, some of the key features of the PROscan include: highly pager resistant; greater signal-to-noise (hence better image quality); high resolution output from linear phase i.f. filters; works fine without the use of a pre-amplifier; intelligent sub-carrier mute; intelligent sub-carrier autoscans, channel lockout; full function i.e.d.s; can be computer controlled for fully automatic operation and it's compatible with PROsat, WXSAT, JVFX, etc. (You do need an interface and software to get images into your computer, as with any weather satellite receiver).

Timestep's 'i' or LC Interfaces with their 'i' software will simply plug into the serial port of your PC or notebook and give you full colour images. The 'i' interface costs £249 and the LC costs £149 (carriage extra on all items).

To place an order, or for more details, please contact **Timestep on Tel: (01440)**

## United in Friendship

Following an excellent meal, served along with typical friendly Irish hospitality at the 'Four Seasons' Hotel in Monaghan in April, the event was marked by a friendly tribute. Retiring Irish Radio Transmitter's Society (IRTS) President **Paul O'Kane EI5DI** (left) and **John Corless EI7IQ** (far right)

presented **Keith Burnside GI4IYO** (second from right) and **Rob Mannion EI5IW/G3XFD** with 'Certificates of Appreciation' on Saturday 8th of April. (See 'Keylines' in this issue for further comment on Rob's Irish trip).



**820040, FAX: (01440) 820281.** Alternatively, you can **E-mail them on: information@Timestep.com** or visit their **Web site at: http://www.Timestep.com**

## Latest from Roberts

The new **Roberts R9906 PLL digital three band receiver** is the first and only portable radio in the market to feature a scrolling text panel, according to the press release issued on behalf of Roberts Radio.



Stations transmitting digitally can detail up to 64 characters on the screen of the R9906 (see picture) and can give information on tracks that are currently playing, tracks that are coming up and details on interviews and radio presenters.

The press release states that the Roberts R9906 only costs **£60** and is extremely easy to use - it will

instantly scan the airwaves when once plugged in. More importantly, if you want to listen to a particular type of radio programme, a **Programme Type Button (PTY)** displays the nature of the programme to be tuned into (pop, rock, drama, education, etc.) and at the push of this button, the radio will automatically select programmes of a similar type.

With 30 station presets, an alarm clock radio (radio or buzzer alarm), a snooze function and a weekend cancel facility, this could be the gift you've been looking for. For stockists details, please **Tel: (01709) 571722.**

## Llanelli ARS Activities

The Assistant Secretary of the **Llanelli Amateur Radio**

**Society, B. Jones MW0CTX** has been in contact with *PW* to tell us all about their activities this year. The club meets every Monday evening between 1900 and 2100 (except the first Monday of every month) at the **Furnace Community Hall, Furnace Square, Llanelli.**

The club are able to offer a wide range of equipment for use including Packet radio and h.f. and v.h.f. Novice RAE, RAE and Morse courses are also available as the club is a registered City & Guilds Examination Centre and is affiliated to the RSGB.

If you are interested in





## 'Spotlight' 2000!

It's time to turn the 'Club Spotlight' on again as we invite you to enter your club magazines into the first **Practical Wireless & Kenwood Club Spotlight Magazine Competition** of the new Century. Local clubs entering will be competing for the magnificent original trophy - kindly donated by Kenwood - and 'national' clubs will be competing for the 'Bert's Bell' award, which was instituted in 1997 in tribute to the late Bert Newman G2FIX.

It's very simple to enter the Club Spotlight magazine competition and all you need to do is to send us the **three most recent copies** of your magazine along with a covering letter. The covering letter should make it clear **which category of club you would like to enter your magazines into.**

For example, the **Remote Imaging Group (RIG)**, winner of the 1999 national award - can only enter as a 'national' club' section, whereas the **Crowborough & District Amateur Radio Society** - last year's winners, now have to specify that they are a local club.

## National Or Local

For either category (national or local) your covering letter should provide the following details: How many people there are on the Editorial team and the type of job they do/or did (if retired); how long the magazine has been established; how it's produced (on your computer or text supplied to 'outside' printer for professional printing,

etc.) and whether or not the publication is 'sponsored', the number of copies printed and membership size of your club. It would also help the judging panel if you could provide some historical details on your club.

The judging panel this year includes **Jim Bacon G3YLA**, **David Barlow G3PLE** (who of course first suggested the competition!), **Tex Swann G1TEX** (PW Technical Projects Sub Editor), **David Wilkins G5HY** and **Rob Mannion G3XFD**. Additionally - and for entries in the **national category only** - the Salisbury Club will be providing one extra judge to decide the winner of the 'Bert's Bell' Trophy (Salisbury was of course Bert's Club).

**Entry to the competition is open now and all entries should be at the PW offices in Broadstone no later than Monday 3rd July 2000.**

This is because the presentations are to be made at the Leicester Show in September and members of the judging panel live in places as far apart as Cornwall, East Anglia and Greater London, so it will not be possible to consider late entries!

So, make sure your club's entry reaches us in good time by sending it to **Joanna Williams, Club Spotlight Magazine Competition, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.**

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

**Rob Mannion G3XFD**



going along to the club, contact the Secretary: **J. Jones GW0KJZ Tel: (01554) 820207, 64 Cleviston Park, Llangennach, Llanelli, Dyfed SA14 9UP.**

## Vikings Revisited At Scarborough

The PW news desk had an interesting press release in from **Roy Clayton G4SSH**, Chairman of the **Scarborough Special Events Group**. He tells us that the resort of Scarborough was founded by

the Vikings in 966 and to mark the millennium the town is hosting a Viking Festival with longboats, parades of decorated floats and medieval activities, from the **21-25th June.**

The Scarborough Special Events Group will be active on the h.f. and v.h.f. bands as **GB0VIK** during the Viking festival and this

commemorative QSL card will be issued to mark the occasion. Direct cards can be sent via the club

callsign: **G0000**. So, if you're on air over this period then why not make contact and add this very decorative QSL card to your collection?

Still with the Scarborough Special Events Group now and the

60th Anniversary of Dunkirk takes place this May and the group will be on air over the weekend of the **20-21st May** to commemorate the occasion. Two of the few remaining rescue ships are based in Scarborough Harbour and a special QSL will be issued featuring one of these vessels.

The Group will be active on c.w. and s.s.b. over this weekend in May, mainly on the 7MHz band and, once again, QSL cards can be obtained via the club callsign **G0000**. Good luck to the Scarborough Special Events Group for both of these special events.



PLEASE MENTION PRACTICAL WIRELESS WHEN CONTACTING COMPANIES IN RESPONSE TO ITEMS YOU SAW HERE FIRST!

PW

## TROUBLE FINDING PW EACH MONTH?

We need to know if any of you are having problems obtaining *Practical Wireless*. If you can't find a regular outlet, then let us know. Please contact **Distribution Complaints** by telephone (01202) 659910, FAX: (01202) 659950, E-mail: [dist-comp@pwpublishing.ltd.uk](mailto:dist-comp@pwpublishing.ltd.uk) or by letter to: **Distribution Complaints, PW Publishing Ltd., Arrowsmith Court Station Approach, Broadstone, Dorset BH18 8PW.**

WE CAN HELP YOU, IF YOU KEEP US INFORMED.

You can always place a regular order with your local newsagent. To help make this easier, please fill in and cut out the coupon on this page.

Dear Newsagent,

Distributed by Seymour

please reserve/deliver my monthly copy of *Practical Wireless*

Name.....

Address.....

Postcode.....

Signed.....





# COMPETITION!

**Look 15**  
PAIRS OF TICKETS TO BE WON!

The Royal International Air Tattoo (RIAT) 2000 (held in partnership with BAE Systems) is scheduled for take off on the weekend of the 22nd and 23rd July 2000 and will be taking place at a new venue - RAF Cottesmore, Rutland. To get the new century off to a "flying start" the RAF Benevolent Fund say "Fasten your seatbelt and let the G-Force be with you as the Royal International Air Tattoo 2000 goes vertical in a sizzling display of air power".

Commemorating the 60th Anniversary of the Battle Of Britain as well as 75 years of the University Air Squadrons (UAS), this year's event will see Spitfires and Hurricanes engaging in deadly dogfights with Messerschmitt raiders in order to bring to life the legendary Battle of Britain. A 'Missing Man' formation flying over RAF Cottesmore in salute to comrades who don't return from conflicts will wind up this part of the RIAT.

To celebrate 75 years of the UAS, a flypast of Bulldogs and Grob Tutors - the brand new training aircraft - is planned and the 'Young Bloods' from each of the University Air Squadrons will line up an aircraft on the ground and display squadron histories.

'Airlift 2000' is the RIAT's tribute to transport crews and the Hercules C-130J, C-17 Globemaster and other aircraft will line up beside classic transport aeroplanes of the 1940s and 1950s. A flying tableau will see crews recreating strategic humanitarian missions covering 50 years - from Korea to Kosovo.

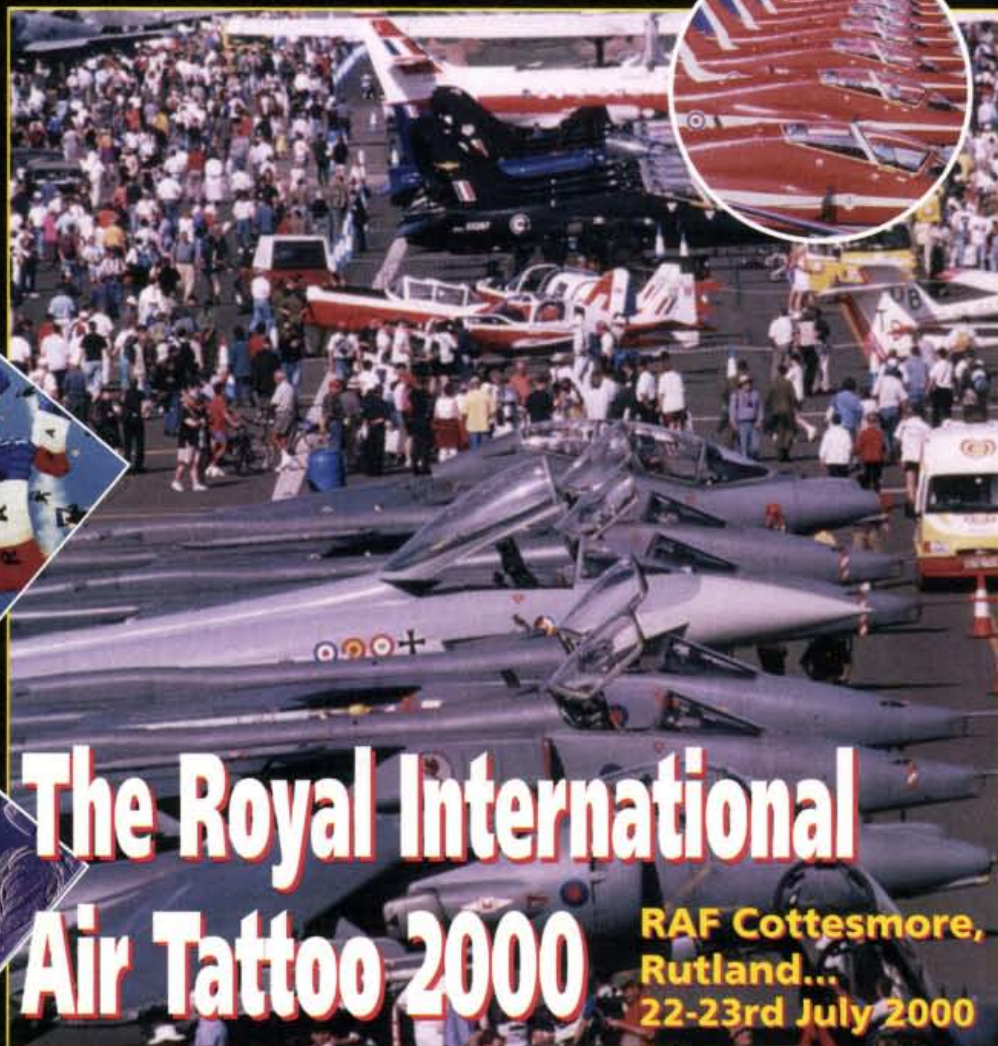
At the end of the flying display, there will be a free two-hour concert performed by the RAF bands who will play a "stirring" compilation of military music, popular hits and will be accompanied by dancers and other "variety acts" - a finale not to be missed!

The public gates to RAF Cottesmore (located off the A1 near Oakham) open at 0630 both days with the seven-hour flying display starting at 1030. So if you fancy your chances at winning yourself one of the 15 pairs of adult tickets which we have to give away, then why not have a go?

## In With A Chance

To be in with a chance of winning one of 15 pairs of adult tickets to this spectacular flying event, all you have to do is find the words hidden in the word search. All except one word can be found, write this word on the Order Form and send it, together with the completed wordsearch, to us.

Send your entry to **Practical Wireless, RIAT Competition, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW** by 30th June 2000. Please remember **do not** include other correspondence with your entry form (photocopies are acceptable **but must be accompanied by the corner flash from this page**). The Editor's decision on the winner is final and no correspondence will be entered into.



## The Royal International Air Tattoo 2000

**RAF Cottesmore,  
Rutland...  
22-23rd July 2000**

### 10 Words To Find:

BATTLE  
BRITAIN  
CHURCHILL  
COTTESMORE  
CRAFT  
FAIR  
SPITFIRE  
SQUADRON  
SYSTEMS  
TUTORS  
UNIVERSITY

ALL THE WORDS ABOVE  
CAN BE FOUND IN THE GRID  
**EXCEPT ONE.**  
WRITE THIS MISSING WORD  
ON YOUR ENTRY FORM AND  
SEND IT TOGETHER WITH  
YOUR COMPLETED  
WORDSEARCH.

B	O	F	B	A	N	D	S	A	Y	C
G	A	B	A	C	R	A	F	T	O	H
S	M	E	T	S	Y	S	I	T	U	U
E	R	R	T	K	T	S	T	R	T	R
B	I	I	L	F	R	E	R	F	S	C
O	A	A	E	E	S	I	I	W	T	H
R	F	S	V	M	C	L	M	L	U	J
G	L	I	O	A	R	R	H	I	T	L
N	N	R	N	I	D	S	I	Q	O	L
U	E	E	A	N	I	A	T	I	R	B
O	E	R	I	F	T	I	P	S	S	W

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# Radio Basics

This month Rob Mannion G3XFD continues the valved equipment theme in his column by describing the techniques used in building simple receivers. He's also got a suitable circuit for those of you who have a transmitting licence!

**A**s promised - and in deference to those transmitting amateurs who tell me they follow the 'Radio Basics' column - I'm including the circuit, **Fig. 1**, this month. Again, it's a circuit which has appeared in *PW* before, and this time it's the 'Empire' transceiver. (Although promoted as a 'transceiver', in reality it is a transmitter-receiver project).

The 'Empire' was published in the July 1990 *PW* 1000th issue supplement. **Tex Swann G1TEX** and I worked very hard - and close to magazine deadlines - to complete the prototype and finally finished it very late one Friday. The first station we worked (a pre-arranged QSO) was with **Jim Bacon G3YLA** up in Norfolk.

Due to propagation 'skip' conditions on 7MHz Jim was only able to give me a 339 RST report when we worked him at around 11pm, but I was still delighted, and very pleased to hear him on the simple receiver. However, after some 'tweaking' the next station (this was at around 0130 on the Saturday

morning!) made me (so Tex says) "sit up and react like a Pointer dog who's just spotted a Pheasant"!

The station? He was in Kazakhstan and gave my milliwatt level signal a good 579. Not bad for such a simple little rig eh? And I can tell you quite honestly - the sense of achievement I got from that QSO has never been equalled!

The thrill of obtaining such amazing results from such simple equipment takes some beating I can tell you! The regenerative detector (or even an intermediate frequency stage of a superhet equipped with a similar type of controlled regeneration) can provide surprising results and a truly amazing increase in selectivity. Try one and see!

## Blocking Problems

At this stage, I should point out to anyone who has not built a regenerative receiver - that they will become totally 'blocked' in the presence of a strong signal on the same - or nearby - frequency. When this happens, no tuning is possible and there's nothing you can do.

In fact, I can remember quite clearly that when **Tex G1TEX** tried to test the sensitivity of the regenerative receiver in the standard way he was misled. He was using the test laboratory which we had in those days (nowadays, when test results from evaluating equipment are mentioned, to be within the European Union law it must be clearly stated whether or not such tests have been carried out under fully certificated test laboratories - and no Amateur Radio magazines can afford such facilities, hence the disclaimers which appear alongside such test results).

Tex was in for a surprise! He'd never built such a simple receiver before and fell into the classic trap: he'd overloaded it! The receivers are in fact very sensitive - but if you try providing the normal test level signals - it will block immediately and will then give very misleading results.

In the same way that I and countless others had found out before him - Tex found that eventually he was feeding in 250mV with little to show for it, in fact the tests indicated (incorrectly of course) that the receiver was extremely 'deaf'. But on air the performance proved it was providing readable signals just as effectively as superhet receivers with quoted sensitivity specifications of less than half a microvolt.

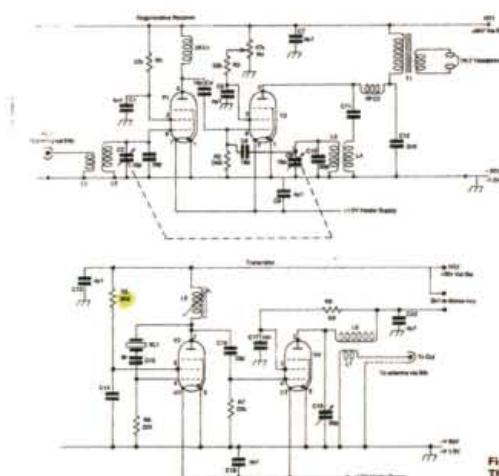


Fig. 1: The receiver circuit.

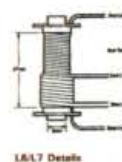


Fig. 2: The transmitter circuit.

● Fig. 1: The *PW* 'Empire' 7MHz Transceiver (in reality a transmitter-receiver). This project, using 1930s techniques was originally published in the July 1990 1000th issue of *Practical Wireless* (see text).

The only difference was of course that the regenerative receiver just could not provide the selectivity of a superhet. However, that's when the skill of the builder/operator comes in to play - and the fun starts. It's quite a challenge and I hope you have a go yourself!

## Not Such A Problem!

The blocking will not be so much of a problem for anyone who is only using the receiver section of the project. However, it comes into full play when you try to tune the receiver onto the crystal controlled oscillator frequency. It's then that you can end up getting 'lost' on the simple receiver's tuning scale ... but if you've been following the 'RB' series and have built the 'Tinny Dipper' or have access to one, you'll be able to use it to advantage.

To find out where your chosen transmitter crystal frequency is on the simple regenerative receiver's dial - you only need to use the 'dip meter' in the wavemeter mode (power off) and with the appropriate band coil in circuit. Switch on the crystal oscillator circuit and the dip meter (now being used as a wavemeter) until you get the maximum indication on the meter's pointer (don't forget - in this application you're looking for the maximum indication: i.e. with the meter's indicator moving as far to the right on its scale as you can get it to go).

You should then note the location on the dial and carefully place the dip meter's coil close enough to the receiver's tuned circuit. Carefully set the instrument down on the bench (take care not to move it off the frequency you've just tuned into) and proceed to the next stage.

Next, switch on the dip meter

and then carefully tune **the receiver** (note that it's **the receiver** you should tune) for maximum 'dip' on the dip meter before noting on the tuning scale where the dip occurs. You can then mark the receiver dial, noting where that crystal's frequency is on receive. If you have more than one crystal available for the band, you should then calibrate the receiver dial using the other crystals.

The advantage of the simple method is that the receiver does not have to be powered up for calibration. The only real problem is that the method is not absolutely 'foolproof' and in practice there'll always be a little uncertainty of exactly where you are. But when you've got the dial marked in the way suggested - there will always be a good general guide and you'll get a good idea to where you should be listening for other stations calling you.

Another (very helpful I've found) point is that as you won't have to tune very far either side of your transmitted frequency - it's unlikely that the regeneration control will need adjusting. So, you're unlikely to lose a potential QSO just because you've had to re-adjust R4 (Fig. 1, last month's circuit) for maximum sensitivity once again.

## Reprints Available

Although many readers will be able to build the 'Empire' project from the circuit diagram alone, I fully realise that some of you will prefer to have more comprehensive information.

So, to help, I have arranged for our Book Service staff to be able to provide a photocopy of the complete project for you. (Unfortunately, the 1990 issue of *PW* sold out very quickly, due to the fact it was a very special issue).



The photocopies are available for £2 (including post and packaging) and provides a suggested lay-out diagram (using p.c.b. material as a 'chassis') and full coil winding details for a 7MHz based project. **When ordering please ask for the 'PW Empire Transceiver' (July 1990) Photocopy Circuits, quoting this edition of 'Radio Basics'.**

## Building The Millennium

Now it's time to think about building the 'Millennium' receiver project. And although the 'Empire' also has a radio frequency (r.f.) amplifying stage - the 'Millennium' has an extra stage - in that it uses a 1T4/DF91 pentode valve connected up as a triode audio amplifier. This is achieved with pin 3 connected to pin 2, thus connecting the anode and screen grid together.

**Note:** In this configuration the 'suppressor grid' (shown internally connected to pin 1 of V3 in the circuit diagram published last month) has negligible effect. So, I ask you to ignore it and pretend it's not there!

The r.f. amplifier on the 'Millennium' (referred to as 'the receiver' from now on) plays an important role in the selectivity of the project (It also helps isolate the oscillating detector from the antenna - preventing you from 'transmitting' as you receive ... an effect which was really troublesome in the 1930s when neighbours could interfere with other receivers located close by!).

The antenna input winding and the tuned input stage windings help reduce 'out of band' signals. There's no way that they can eliminate 'unwanted signals' but they certainly reduce them if you take care to wind them carefully in the first place!

**Note:** To prove my point on the improved selectivity - when you've successfully built the complete project ... try the following simple experiments. **A:** First tune in a broadcast station on the frequencies above 7.1MHz (the '40 metre' broadcast band) and try the receiver with the antenna (a 10 to 15 metre long length of wire should be sufficient, with a good 'earth' connected straight into your garden) connected to L1 (the normal input connecting point). **B:** Then try connecting the antenna onto the lead of C2 which connects to L3. You should notice an increase in 'background' stations which you cannot reduce by tuning. If all is well - experiment 'A' should provide the best results in 'selectivity'.

To prevent r.f. 'feedback' and to stop your entire receiver from

## Millennium Receiver Coils

Several readers, including **Chris Pierre F6IVT** (thank you Chris) pointed out to me that I'd left out the coil former dimensions from last month's information. My apologies, that's what I get for re-using proven circuits where the vital information was in the text of the old article! In fact, the coils can be wound on plastic till roll centres, home-brewed rolled paper formers or anything with an external diameter from 12 to 15mm. Depending on the former size, tuning coverage will vary slightly, but your dip meter will help evaluate the coverage. (You have got a dip meter haven't you?). Suitable r.f. chokes (around 1.5mH) are available from **Robin Sykes of Sycom** (see advert in this issue) and when ordering them, don't forget to mention what so he'll know what to send.

becoming an uncontrollable oscillator - you should ensure that V1 and the components associated with it - is 'screened' from V2. This is simply achieved in practice by either building the receiver into a 'tin box' 'chassis' (A cheap bread or cake baking 'tin' is suitable for this job) with the r.f. amplifier (V1) and its components mounted inside and underneath, with V2 and its components on the outside and on top of the box.

The same method can be used with p.c.b. 'chassis' techniques. Here, as the material is so easy to work with, it's an extremely easy task to make 'screens' to fit between the circuitry as described. No bolts or screws are needed either because you can solder the copper laminate together, passing inter-connecting wires

through pre-drilled holes.

The tuning capacitor, shown as 100pF and 'ganged' (two variable capacitors mounted one behind the other and tuned on the same shaft) can be mounted so that only the control grid wiring is 'seen' by each circuit. **Note:** In practice, the close 'coupling' of the grid circuits and the 'sharing' of the same control spindle provided by the 'ganged' variable capacitor will cause no problems. The problems usually start when the output circuitry 'sees' the input circuitry in the same fashion as a microphone getting too close to a loudspeaker on a public address system with the shrieking results most of us have heard. "Enough said"?

Finally for this month, I'll briefly mention the output

transformer again (T1 in Fig. 1 last month). For this component, as I mentioned last month, you can use - quite successfully as I've proved myself - a 240V a.c. 'mains' to 6 or 9V transformer, as used in small power supplies. The same applies for the a.f. choke in V2's anode circuitry. The only difference here is that the secondary (the low voltage winding) is left unconnected (see 'Chokes & Transformer' page 17 May 2000 PW).

Next month I'll describe how you can add 'fine tuning' or 'bandspread' tuning to this receiver along with several other little refinements. And perhaps most importantly of all - I'll also describe how you can operate it to best advantage. Cheerio until then.

PW

## Basics Board

Each month Rob G3XFD will use the 'Basics Board' to keep you informed of topical summaries, 'snippets' and jargon relevant to the main subject under discussion in the main article. He'll provide the 'basic' explanation so that you can then study further in your own reference library.

**Screen Grid (SG):** a term often applied to a type of valve. However, it in fact refers to a grid (usually made up from a spiral of fine wire) located between the control grid (see last month) and the anode (see last month). Very simply stated - the screen grid permits the valve to provide higher levels of amplification at high frequencies (especially radio frequencies). This extra grid also helps to reduce the risk of unwanted self-oscillation in higher gain circuits - the bugbear of triode circuits. The SG is often operated at a lower voltage than the valve's anode. It has many uses, and in particular can be used to introduce other signals into the valve's circuitry. In valve diagrams the SG is normally shown as a dotted line directly above the control grid.

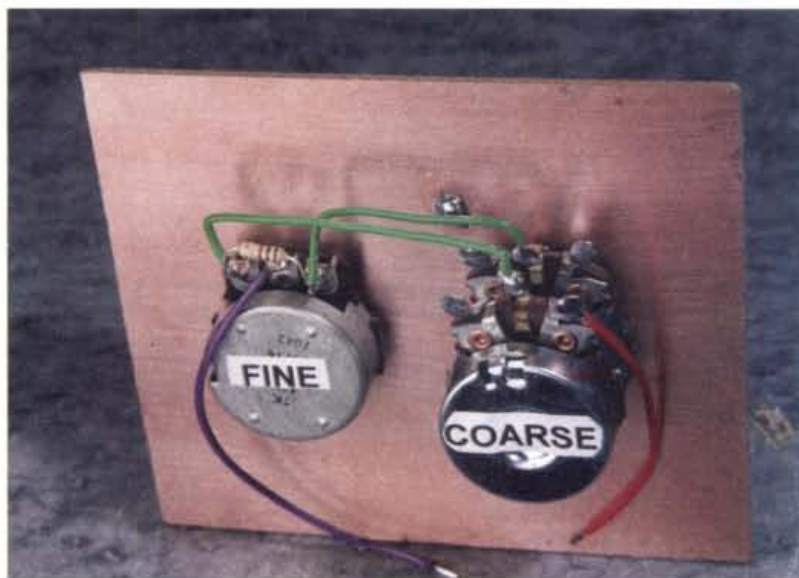
**Suppressor Grid:** The suppressor grid is usually made up from very much finer wire than the screen grid and is much more widely spaced in its turns. Its main purpose is to reduce 'secondary emission' from the valve's (usually referred to as a pentode when fitted with a suppressor grid) anode. This 'secondary emission' is caused when electrons 'bounce back' from the anode after striking it and then effect the overall performance of the valve. When plotted and viewed on a graph 'secondary emission' causes a noticeable 'kink' in the graph. However, when the negatively charged (it's usually internally connected to the valve's cathode) suppressor grid is operated - the finely spaced grid's (adjusted so that it won't significantly affect the main electron flow to the anode) negative charge deflects the 'secondary emission' stream back to the anode. Performance of the circuit is noticeably improved. In valve circuit diagrams the suppressor grid is normally shown as either a dotted line immediately above the screen grid and connected to earth via its own valve base pin, or alternatively it's shown with a line directly connecting it (internally, within the valve assembly itself) to the cathode.

**Valve base skirt:** A valve base 'skirt' does not, as the name might suggest 'hang down'! Instead, it's a metal skirt which stands up 'proud' of the valve base. It's normally equipped with a slot or key-way so that a metal 'screening can' can be placed over the valve itself and locked into position on the valve base. They're not fitted in equipment for decoration - always replace them. And don't forget ... as the valve can get very hot - so will the screening can. It's all too easy to drop a valve and screening can from burnt fingers!





# Carrying On The Practical Way



● This month G3RJV discusses the 'budget' approach to tuning and controlling home-brewed receivers.

This month, following his usual appropriate quote, the Rev. George Dobbs G3RJV discusses some tuning methods after reminding readers why he writes the column!

*"An engineer can do for half-a-crown what the fool can do for a pound."*  
**Anonymous.**

**T**he basis of the 'Carrying On The Practical Way' (COTPW) column is sharing radio enjoyment. Describing little projects that have given me pleasure on my workbench. Most of these projects are built from parts that I pull out of my stock of components.

Most Amateur Radio constructors work from a basic stock of components and only buy in the specialist devices and components required for a particular project. If you do not have such a basic

stock, my advice is to make one!

Under my workbench are several storage boxes, each of which contain a number of shoe boxes, which store my stock of components. The smaller ones, like resistors, capacitors and transistors, are packed in cheap manila envelopes, marked with their contents.

From the envelopes I can form the basis of almost any project I choose to build. It's not difficult, or expensive, to set up such a basic stock.

Many component traders sell collections of parts; sets of resistors or capacitors, which can become the starting point of the collection. I look around at radio events for cheap deals in common components and buy a reasonable quantity, because I know I will need them in the future.

I think that the **worst possible way to build any project** is to make a complete shopping list for that project and buy the parts from one of the more expensive component supply companies.

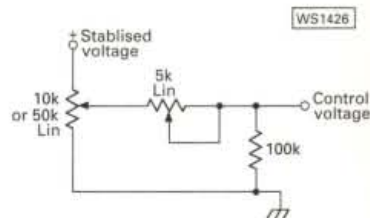
## Components Expensive

Some components are expensive unless the constructor has the good fortune to source them cheaply. In last month's column, I described a regenerative receive module which used a variable capacitor for tuning and a ten-turn potentiometer to control the regeneration.

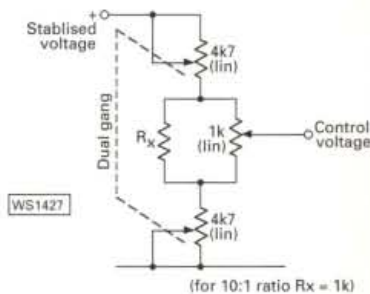
Both components will be expensive if obtained from the larger component suppliers. So this month I will attempt to describe cheaper alternatives for both the variable capacitor and the potentiometer. Although I am referring to that project, these ideas can be applied to many similar receiver circuits.

A good air-spaced, low value, variable capacitor is now a very expensive item **if bought new**. I have collected them over the years and always buy any cheap examples I spot.

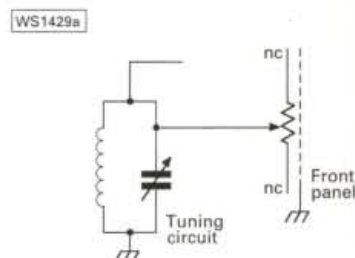
Although I have quite a collection



● Fig. 2: A simple circuit showing one possible cheaper method of replacing a multi-turn potentiometer. This is possible because in practice the original ten-turn potentiometer in the receiver application is only used over a small portion of its track (see text).



● Fig. 3: A dual-gang and a single gang potentiometer act as coarse and fine voltage controls. The dual-gang potentiometer is wired such that, as one half increases in value, the other half decreases in value. The set-up can be seen in this month's heading photograph (see text).



● Fig. 4: A simple 'fine tuning' control. Note that the two track ends of the potentiometer are left 'floating' (not connected). See text for further details.

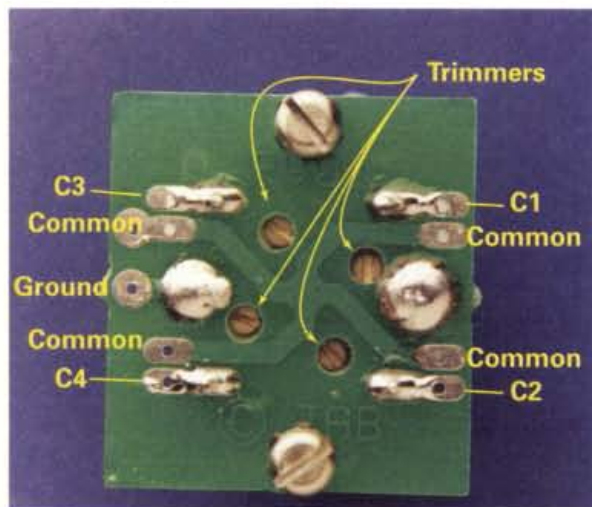


Table 1

	Range with trimmer		Swing (max)
	Trim (min)	Trim (max)	
C1	4 - 22pF	16 - 35pF	19pF
C2	4 - 22pF	16 - 35pF	19pF
C3	4 - 125pF	16 - 140pF	124pF
C3	4 - 125pF	16 - 140pF	124pF

(WT1426)

● Fig. 1: Diagram showing the PV01 capacitor with a table showing the range of values which may be achieved by selecting differing connections on the p.c.b. Used singly or in parallel, several ranges of capacitance commonly used by Amateur Radio constructors can be achieved.



of different values, sometimes I do modify the value. It's a simple process to reduce the value of a typical air-spaced variable capacitor, of the 'Jackson Bros.' type, by removing vanes.

With vanes at the opposite end to the control shaft, grip the outer-most vane with a pair of needle-nosed pliers. Pull the vane gently back and rock it from side to side. With care, it will then break free without damaging the other vanes.

Another possibility is the use of the much cheaper 'polyvaricon' variable capacitors. These are the tuning units so commonly used in the inexpensive medium, long and v.h.f. Band II broadcast band domestic radios. Most of them contain two sets of higher value vanes (for long & medium wave tuning) and two sets of lower value vanes (for v.h.f. tuning), very often with associated screw trimmers.

The polyvaricon variables are nowhere near as temperature stable as good as air-spaced variable capacitors, but I am often amazed at how stable they can be in many oscillator circuits. I used such a tuning capacitor in the regenerative receiver last month and in the superhet receiver described the month before that. They worked well in both of these circuits.

The Polyvaricon capacitor I used was a handy unit sold by **JAB Electronics** as the PV01 kit. The kit includes the polyvaricon capacitor, a shaft extended to accept a conventional quarter inch tuning knob and a printed circuit board (p.c.b.) to facilitate 'patching' of the various vanes. Also provided are two threaded stand-off pillars to secure the capacitor between the p.c.b. and a front panel.

The annotated photograph, **Fig. 1**, shows the PV01 capacitor. The various values and ranges of capacitance swing are in **Table 1**. By using the sets of vanes, singly or in parallel, several values in the range commonly used by Amateur Radio constructors can be achieved.

I've found the PV01 very useful and the variable capacitance stable enough for most receiver applications. It would probably also work well for some lower frequency transmitter variable frequency oscillator (v.f.o.) circuits.

## Ten Turn Potentiometer

Last month's project described the use of a ten-turn potentiometer to gradually change the biasing voltage on an oscillator stage to move it smoothly in and out of oscillation. The oscillator served as a 'Q-Multiplier' to an infinite impedance detector and the effectiveness of the circuit is greatly enhanced if the oscillator is just brought to the point of oscillation. The ten-turn potentiometer is ideal, but expensive.

The diagram, **Fig. 2**, shows one possible cheaper method. In practice, the original ten-turn potentiometer in the receiver application is only used over a small portion of its track.

The point of oscillation varies with the tuned frequency of the receiver and, if this is limited, **Fig. 2** provides a cheaper alternative. All that's required is a stable voltage variable over a small range.

A linear potentiometer acts as a potential divider over the whole voltage range and a smaller value linear potentiometer acts as a series voltage control to give the desired voltage change across a higher value load resistor. This will work well if the constructor only wants to cover, say, the 7 to 7.1MHz amateur band. The values may need some experimentation to suit the needs of the constructor.

## A Sophisticated Alternative

A much more sophisticated alternative to a ten-turn potentiometer is shown in **Fig. 3**. I first saw this method described by **John Young G7BCJ**, in *Sprat*,

the journal of the **G-QRP Club**. Here, a dual-gang and a single-gang potentiometer act as coarse and fine voltage controls.

The dual-gang potentiometer is wired such that, as one half increases in value, the other half decreases in value. The single gang potentiometer is connected between the two halves of the dual-gang control to act as a fine control.

A resistor,  $R_X$ , is connected across the fine control and sets the ratio between the coarse and fine controls. Using the values shown in **Fig. 3**, if  $R_X$  is  $1k\Omega$ , the ratio is about 10:1. Individual constructors may like to experiment with the value of  $R_X$ .

In practice it's easy to wire up the two potentiometers incorrectly. To help, you can see how it's wired by referring to the heading photograph. Both gangs of the dual-gang potentiometer should have a **linear track**, as should the single-gang fine control. This arrangement works very well and was used in the Third-world kit version of the **VE7QK Epiphyte SSB Transceiver kit**.

## Novelty Circuit

The diagrams **Fig. 4** and **Fig. 5** are presented as a 'novelty circuit'. Several older communication receivers and a lot of regenerative receivers used band-set and band-spread tuning controls. The former for coarse tuning and the latter for fine tuning. This was sometimes employed instead of using an expensive reduction drive for the main tuning control.

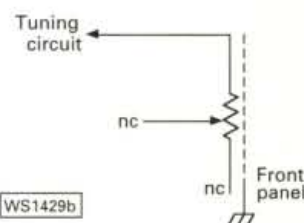
The problem for many constructors is that the fine tuning control usually requires a variable capacitor of very low value, say 5 to 10pF. Such values can be difficult to find.

The rather odd circuit of **Figs 4** and **5**, can usually do the same job with a cheap potentiometer. The top of the tuned circuit is connected to one of the connections on a potentiometer mounted on a metal front panel. The track of the potentiometer acts as a low value capacitance in relation with its casing.

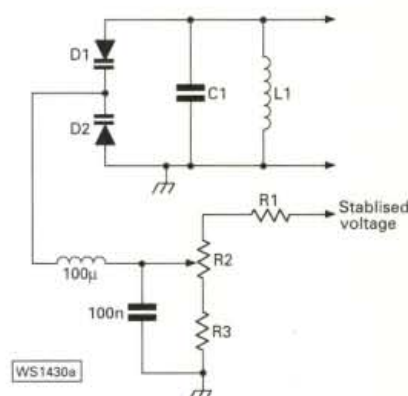
The variant in **Fig. 4** acts like a receiver incremental tuning control (r.i.t.) in that the value of the capacitance varies either side of the centre of the potentiometer track. The variant in **Fig. 5** is more like a conventional small value variable capacitor since the small capacitance change occurs over the movement of the wiper across the whole track.

And finally of course, the variable resistor circuits shown here are designed for varicap diode tuning, but you think these diodes are too expensive. Then why not use two npn transistors connected as shown in **Fig. 6a & b**. Almost any pair of cheap transistors should work reasonably well, giving a small swing in capacitance.

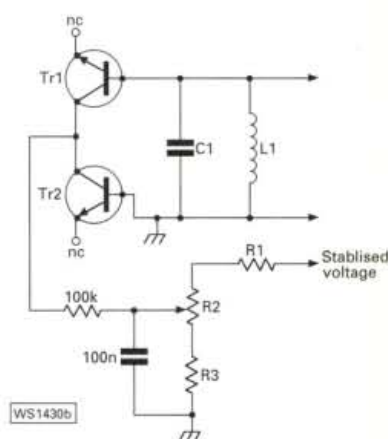
So, here are a few little cheap and cheerful tricks for the constructor. Try them and see how they go! Cheerio until next month, and remember ... keep those soldering irons hot!



● **Fig. 5:** A simple low value 'variable capacitor'. The slider and one end are left unconnected in this circuit. See text for more details.



● **Fig. 6a & b:** Two similar npn transistors can make a suitable replacement for a pair of varicap diodes, and may be cheaper too.





# PHOTO-DIODE?

**Ian Poole**  
**G3YWX is back**  
**in Practical**  
**Wireless this**  
**month and this**  
**time he wants to**  
**tell you all about**  
**the photo-diode.**

**L**arge numbers of photo-diodes are used in electronic equipment and have many uses in a variety of applications. They are remarkably simple and easy to produce, but some specialised versions are able to operate at speeds in excess of 20GHz.

There are a number of different types of photo-diode. The most commonly used form is based around a p.i.n-diode and was developed in the late 1950s, so now I've provided the background let's now look closely at the device.

## Photo-Diode Structure

The structure of the photo-diode is shown in Fig. 1, you can see that a

layer of intrinsic or undoped semiconductor is placed between the p-type and n-type layers of semiconductor. Whilst the intrinsic layer may be completely undoped, it may be very slightly doped to make it an n- [n minus] layer.

There are a variety of ways in which the diode can be fabricated, for instance, the intrinsic and p-type layers may be grown epitaxially. Alternatively, an intrinsic substrate may be taken and the p-type and n-type layers formed at either side of the semiconductor using diffusion.

In order to give the best performance, the maximum amount of light has to reach the intrinsic layer and in some structures the contacts may be placed either side of the centre so that light can enter the diode. Alternatively, the light may be allowed to enter directly into the intrinsic layer from the side of the device.

Most of the light is absorbed within a certain distance of the surface of the semiconductor and, as there's little gain from making the diode larger, the intrinsic layer of the diode is made to match this (assuming the light enters from the top or bottom). Any increase in thickness will tend to reduce the speed of operation - a vital factor in many applications and it won't improve the efficiency greatly.

It's also possible to have the light enter the diode from the side of the junction. By operating the diode in this fashion, the intrinsic layer can be made thinner to increase the speed of operation, although as you may expect, the efficiency is reduced.

If light enters a semiconductor, then a photon may strike the crystal lattice and when this occurs, energy is transferred to the atom that's struck. This may be sufficient to cause an electron to leave its orbit around the nucleus giving a free electron and a hole, i.e. a hole-electron pair.

Whilst the described action may take place in an ordinary p-n junction, the active area of the photo-diode is in the depletion layer. To

ensure that efficiency is sufficiently high, the depletion layer needs to be sufficiently thick and this is achieved by using a p.i.n-diode.

Photo-diodes are set to operate under a moderate reverse bias, by doing this the depletion layer is kept free of any carriers and, in the absence of light, no current flows. However, when a light photon enters the depletion region a hole-electron pair may be generated.

Under the action of the electric field from the reverse bias, the electron will migrate towards the

positive potential and the hole towards the negative and a small current will be seen. As more photons enter the crystal lattice, more hole-electron pairs are generated and the greater the level of current seen to flow.

When the diode isn't exposed to light it operates as a normal diode and follows the normal V-I characteristic as shown in Fig. 2. In the reverse direction virtually no current flows, but in the forward direction it steadily increases, especially after the knee or turn on voltage is reached.

When the diode is exposed to light more current is seen to flow and under conditions of forward bias, the normal forward current masks the current arising from the light. It's under conditions of reverse bias where virtually no current would normally flow that the greatest changes can be seen. Accordingly these diodes are operated under these conditions.

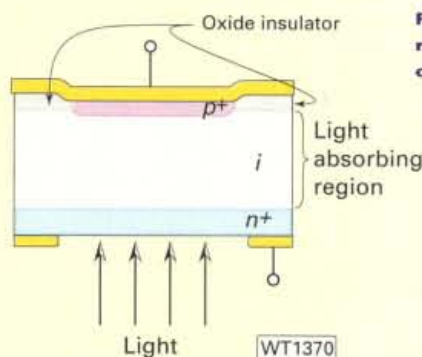
## Applications

The p.i.n photo-diode is the most widely used form of photo-diode and finds applications in many pieces of equipment from remote control sensors to audio and computer compact disk drives. In addition to this they're widely used as sensors in optical communications.

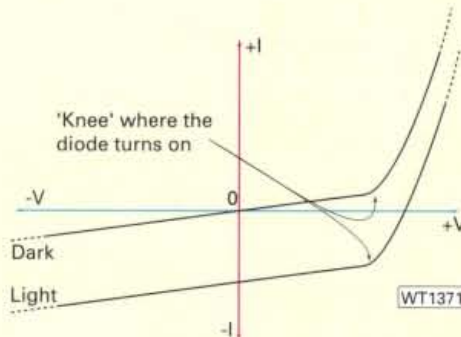
The main disadvantage of the p.i.n. photo-diode is that they don't offer any form of gain, limiting their sensitivity and this restricts their use to some degree. Nevertheless, they're still used in their millions because they're cheap, robust and reliable. **PW**

*Further information about semiconductor devices as well as much information about radio, 'Ham' radio and electronics can be found on my Web site at:*

**[http://website.lineone.net/~ian\\_poole](http://website.lineone.net/~ian_poole)**



**Fig. 1: Diagrammatic representation of the build-up of a p.i.n. photo-diode.**



**Fig. 2: V-I characteristic of a p.i.n. photo-diode.**



# New! 756PRO

## WATCH THE SCREEN



## You've heard the Rumours, now read the Facts...

**Icom (UK) Ltd** is proud to present the NEW IC-756PRO, HF+50MHz, 32bit DSP transceiver. The IC-756PRO contains new and improved features of great interest to serious HF operators and DX enthusiasts. Lets see exactly what this new rig has to offer...

**32-bit, Floating-point, IF DSP** - this refined level of processing improves noise reduction and provides auto-notch functions.

**5-inch TFT Colour LCD** - a first in a HF transceiver! This LCD provides a wider viewing angle and increased level of information, without cluttering the display area. The following information can be displayed:-

- Dual frequency display
- Memory frequency & memory name
- IF filter bandwidth
- RTTY tuning indicator and received characters
- Real-time spectrum scope
- Voice memory/CW memory keyer contents

**Digital Voice Memory** - 4 channels are assigned for transmit and 4 for receive, with up to 15 seconds recording in each.

**Digital Twin-Pass Band Tuning** - digitally narrows the pass-band

width at the DSP to efficiently eliminate interfering signals. Operating the PBT within the DSP allows sharper, superior pass-band width characteristics.

**Real-time Spectrum Scope** - selectable sweep ranges,  $\pm 12.5\text{kHz}$ ,  $\pm 25\text{kHz}$ ,  $\pm 50\text{kHz}$ ,  $\pm 100\text{kHz}$ .

**Dual-watch** - receive two signals on the same frequency band simultaneously. Monitor a DX station while operating on another frequency!

**AGC Loop Operation** - IF filter and notch circuits are included in the DSP loop, giving a wider dynamic range.

**Digital IF Filter** - with 51 selectable bandwidths. To operate in PSK31 and other digital modes, it is possible to set the bandwidth for the SSB filter to 50Hz.

**Low Distortion, RF-type, Speech Compressor** - with selectable transmit bandwidths of 2.0kHz, 2.6kHz, and 2.9kHz.

**Built-in RTTY demodulator/dual-peak APF** - an RTTY demodulator and decoder circuit is built-in. Two peak frequencies can be selected by setting the shift width

for RTTY operation. Received data is shown on the LCD.

**What are you waiting for! Hurry to your local Icom dealer and see for yourself how great the IC-756PRO is!**



Icom (UK) Ltd

Sea Street, Herne Bay, Kent CT6 8LD. Telephone: 01227 741741. Fax: 01227 741742. Internet: [www.icomuk.co.uk](http://www.icomuk.co.uk) e-mail: [info@icomuk.co.uk](mailto:info@icomuk.co.uk)

Count on us!



Cost:	IC-2100 £289.99 inc VAT
Company:	Icom (UK) Ltd
Contact:	Mark Jarvis
Tel:	01227 741741
Web site:	<a href="http://www.icomuk.co.uk">http://www.icomuk.co.uk</a>

With the spring and summer of 2000 fast approaching, the Editorial staff at PW thought it would be a good idea for Richard Newton GORSN to review two mobile transceivers from Icom (UK) Ltd - the IC-2100 and IC-2800. As you'll see, Richard thinks that they're poles apart, but both very useful and effective little rigs in their own way!

# Paired On Air The IC-2100 & IC-2800

I was lucky enough to be given the opportunity to have a look at two mobile radios from Icom - the IC-2800 v.h.f./u.h.f. dual-band transceiver and the IC-2100 144MHz f.m. transceiver. With the greatest of respect to the IC-2100, these two radios were poles apart in what they offered, but I was eager to find out how they both performed.

First, I will take a look at the Icom IC-2100, a single band v.h.f. transceiver covering the 144MHz amateur band (the review model had been expanded to cover 136-174MHz). It is a straightforward classic style mobile radio with a **smart and professional exterior**, most of which is heat sink. (See Fig. 1).

The microphone on the IC-2100 (see Fig. 2 and Fig. 1, far left) is connected to the front of the radio by way of a modular plug and the antenna connection on the rear of the radio is an SO239. There's the normal d.c. connector on a short lead at the rear of the radio and the front panel is home to the squelch and volume rotary controls as well as the larger tuning and menu navigation rotary control.

When I turned on the IC-2100 I could see that it had a **very good display** - the main frequency readout is large and the designations given to the row of buttons on the front panel are shown on the l.c.d. display. **The display is uncluttered and easy to read.**

Another little touch which I liked about this single band transceiver was that you could choose whether you have the display back-lit with either an amber or a green light. This in turn can be dimmed to the user's preference using four settings from dark to bright.

The IC-2100 offers a **wide range of user set-up functions** and the tuning steps can be adjusted through a comprehensive choice of 5, 10, 12.5, 15, 20, 25, 30 and 50kHz. There's an auto power off

function as well, which is a good idea for those who forget to turn the radio

off when they park up, not that I have ever done that of course!

Another little function that I found to be of use was called, 'Squelch Delay', which basically helps with rapidly fluctuating signal strengths and makes the squelch a little less quick acting, helping to reduce the mobile flutter on a signal. However, if you were operating base station to base station, especially in Packet mode, then this wouldn't be a good function to use.

## Packs A Punch

The Icom IC-2100 **packs rather a punch** with its high power setting of 55W, for the more reserved amongst us this can be reduced to ten watts. Or, for the even more refined and sensible, the power can be reduced to a mere five watts.

The radio comes with CTCSS and DTMF and their associated functions such as squelch control, 'pocket beep' and 'incoming tone scan'. The pocket beep function will, when activated, give an audible warning when a matching tone is received. (This could be used by a collection of friends as a simple paging facility or to ensure you don't nod off on one of those exciting RAYNET exercises!).

If you know an incoming signal has a CTCSS tone on it but you're not sure which tone it is, the IC-2100 can be set to scan the incoming signal for the tone. Although useful, I did find this a slow process and it was a little hit and miss at times.

I tested out the CTCSS tone scan on the IC-2100, the transceiver cycles round the available tones and it **managed to decode an incoming tone on every**

occasion I tried. The fastest result was an impressive seven seconds but the longest was well over one minute.

The IC-2100 offers a **good range of scan features**. You can use the programmable edge scan limits and, for example, programme the radio to scan between the upper and lower simplex frequencies, or the repeater outputs.

Perhaps the Marine band interests you? You can programme any upper and lower limit within the radio's range and then there's the normal scanning of the entire v.f.o. or memories. Individual memories can be locked out if and when desired.

The IC-2100 also offers an **array of scan resume functions** - you can set it to pause on a busy signal for either five, ten or 15 seconds before resuming.

Alternatively, you can set it to pause on a busy signal and resume after the frequency or memory has been quiet for more than two seconds or you can set the radio to pause on a frequency that is NOT busy and resume two seconds after a signal appears.

I have to be honest and say that I couldn't think of an occasion where I would use the final option - perhaps you can? I'm certain that there's someone out there who would see this as a really useful function.

'Priority Watch' is another area where the IC-2100 has some aces to play - the radio has **three different types of priority watch**. The first is that it will monitor a v.f.o. frequency and at the same

time checks for activity on a chosen memory channel every five seconds, so you can easily keep an eye on the local repeater and the calling frequency, for example.

Another 'Priority Watch' option is, again while monitoring a v.f.o. frequency, **Practical Wireless, June 2000**

Richard Newton GORSN has been writing reviews for Practical Wireless for eight years. He has been interested in Amateur Radio since he was little as his father was an Amateur. He specialises in h.f. mobile rigs.



Fig. 2: The HM-98 microphone as supplied with the review IC-2100. It plugs into the front of the '2100. (Also see Fig. 1, far left).



Fig. 1: The IC-2100 144MHz f.m. transceiver with its "smart and professional exterior".



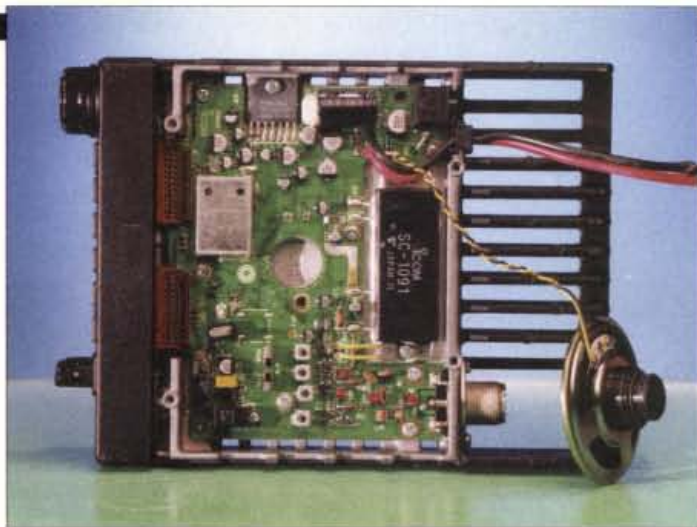


Fig. 3: Internal view of the underneath of the IC-2100. Here you can see the heat-sink on the back of the rig and the speaker.

you can set the radio to check each memory channel in turn every five seconds. Careful use of the memory lock-out procedure can make this otherwise rather laborious function into a fast-acting and useful monitoring technique.

The final 'Priority Watch' option is **Call Channel watch** where, while monitoring a v.f.o. frequency, the radio will check for activity on your chosen CALL channel frequency every five seconds!

## Impressive Specification

The IC-2100 has quite an impressive

**specification** - it offers 107 memory channels which consist of 100 standard memories and three pairs of programmable scan edge frequencies along with one call channel. As if this wasn't enough, Icom have included six 'Scratch Pad' memory locations.

The 'Scratch Pad' memories conveniently remember the last three simplex frequencies and the last three duplex frequencies you operated on in v.f.o. mode. These memories are automatically programmed on a rolling basis by the radio and can then be easily recalled and copied to a permanent memory channel if you wish. (The IC-2100 allows for a memory to be given a six-character alphanumeric tag).

Another rather useful little function that the Icom IC-2100 offers is that of a

locking press to talk (p.t.t.). You can set the p.t.t. switch to latch on and off, so that when you press the p.t.t. switch on the microphone, the radio will go to transmit and stay in that mode when you release the switch.

The locking p.t.t. makes hands-free operating a doddle. The radio is then switched back into receive mode by fully pressing and releasing the p.t.t. again, although useful it is also highly advisable.

There are some **rather interesting optional extras** to the Icom IC-2100, one of which is the wireless microphone, the HM-90 that is used with the optional infrared receiver - the EX-1759. There's also an option to clone the radio from an IBM compatible PC using the CS-2100 cloning software and the OPC-478 cloning cable.

## The IC-2100 On The Air

So, how did the IC-2100 do on the air? Well, I have to say that I was **very impressed** - I have known radios with rather impressive output powers being fine when it comes to getting a signal out, but this is of little use when you can't hear anyone. **This wasn't the case with the IC-2100!**

I was **very impressed indeed with the sensitivity both across the Amateur bands and throughout the extended receive capability**. I conducted some tests from the home QTH of Terry 2E1EJC near Blandford in Dorset.

Terry has been a professional in the world of radio for most of his working life, so I thought that I would see what he had to say about the IC-2100 and his comments on the next radio I had to review, the relatively new Icom IC-2800 also interested me. Why, I hear you ask? Well, Terry has just purchased an IC-2800 himself.

We turned the IC-2100 on and listened around, the Wells (Somerset) repeater **GB3WR** was a superb signal, as were several other v.h.f. stations from as far afield as Weymouth and Poole. Terry has a good QTH radio-wise, but even bearing this in mind, the results of our tests were still **very good indeed**.

The other impressive thing was that Terry lives near to a pager installation and also a local PMR transmitter but the IC-2100 was **unmoved and unhindered**. We even tuned to a couple of the pager frequencies to test the radio's selectivity, 25kHz either side the radio was as quiet as a mouse!

The IC-2100 proved to be a **very simple and easy to use radio** and the **handbook is well written and includes good diagrams and explanations**. It's well-built and I have every confidence that it would be a wonderful workhorse.

For those looking for a single band f.m. only radio for either mobile or base station operating, then the Icom IC-2100 seems to be a **unit of good quality that would give excellent results**.

## Product

### IC-2100 144MHz FM

#### Transceiver

Single band v.h.f. transceiver, covers the 144MHz amateur band, high power mobile.

## Accessories

**IC-2100:** DC power cable; mobile mounting bracket; microphone (HM-97 for Europe & Italy versions); fuse (20A) and mounting screws, nuts and washers.

## Pros & Cons

**Pros:** Very good display (uncluttered & easy to read); wide range of user set-up functions; high power setting of 55W which can be reduced to 5W; CTCSS and DTMF facilities; good range of scan features; three different types of priority watch; 107 memory channels; 100 standard memories; three pairs of programmable scan edge frequencies; one call channel; locking press to talk (p.t.t.).

**Cons:** CTCSS tone scan was a slow process and a little hit and miss at times.

## Summary

I enjoyed reviewing both of these radios, which together represented two ends of a spectrum, in my opinion. From the IC-2100 - the modest single band mobile to the somewhat more interesting IC-2800 dual-band radio.

In both cases **Icom have done a great job** and it was a pleasure to review these two rigs. In the case of the IC-2100, if all you want is a single band f.m. only radio then, at the right price, the '2100 could be right up your street.

RRP:  
**£289.99**  
inc VAT

## Manufacturer's Specifications

### General

Frequency coverage:	144-146MHz (TX) 144-146MHz (RX)
Mode:	f.m.
No. of memory channels:	113 (including scan edge pairs, six scratch pad memories and one call)
Frequency resolution:	5, 10, 12.5, 15, 20, 25, 30, 50kHz
Frequency stability:	±10ppm (-10°C to +60°C)
Power supply requirement:	13.8V d.c. ±15%
Current drain (at 13.5Vd.c.):	Receive: Standby 0.8A, Max. audio 1.0A
Antenna connector:	SO239 (50Ω)
Usable temp. range:	-10°C to +60°C
Dimensions:	140(w) × 40(h) × 180(d)mm (projections not included)
Weight:	1.2kg

### Transmitter

Modulation system:	Variable reactance frequency modulation
Output power:	High: 55W Mid: 10W (approx.) Low: 5W (approx.)
Current drain (at 13.5Vd.c.):	Max. power: less than 12.0A
Spurious emissions:	-60dB
Microphone connector:	8-pin modular (600Ω)

### Receiver

Receive system:	Double conversion superheterodyne
Intermediate frequencies:	1st: 15.65MHz 2nd: 450kHz
Sensitivity (at 12dB SINAD):	Less than 0.18μV
Squelch sensitivity (threshold):	Less than 13μV
Selectivity:	More than 12kHz/-6dB Less than 28kHz/-60dB (6kHz/-6dB, 18kHz/-60dB, f.m. narrow mode)
Spurious response rejection ratio:	More than 60dB
Audio output power:	More than 2.4W at 10% distortion with an 8Ω load
Ext speaker connector:	2-conductor 3.5(d)mm/8Ω

PLEASE MENTION THE PW REVIEW WHEN CONTACTING ICOM (UK) LTD IN RESPONSE TO THE REVIEW OF THE IC-2100 & THE IC-2800. **PW**



Richard Newton GORSN has been writing reviews for Practical Wireless for eight years. He has been interested in Amateur Radio since he was little as his father was an Amateur. He specialises in h.f. mobile rigs.

Cost: IC-2800 £349.99 inc VAT  
Company: Icom (UK) Ltd  
Contact: Mark Jarvis  
Tel: 01227 741741  
Web site: <http://www.icomuk.co.uk>

I have to say that it seems I've saved the best to last...



Fig. 5: The '2800 also comes with a supplied separation cable and a mini DIN socket for DATA applications (such as connecting a TNC).



Fig. 6: The "extremely easy to read" colour display of the IC-2800. Richard says that he found the display to be very impressive (see text).



Fig. 7: The "VIDEO IN" port on the right-hand side of the IC-2800's head unit.



Fig. 8: Internal view of the IC-2800's main unit.

# The IC-2800 Punchiest Of The Pair

The Icom IC-2800 is a dual-band radio with a colour l.c.d. screen. This radio has a head unit that is designed to be separate to the main body of

the radio and is supplied with mounting brackets for the radio and the head unit. (See Fig. 4).

The supplied head unit bracket is rather basic and, for ease of installation, I think that the optional mobile head mount, the MB-65 is advisable. This

will give far better freedom of movement and more choice as far as operating positions are concerned.

As is the norm these days, the IC-2800 offers far more than the standard 144 and 430MHz Amateur Radio bands. It receives a multitude of frequencies that include my old favourites - Air band and Marine band and the u.h.f. side can also be expanded.

The main body of the radio isn't large by anybody's reckoning and should easily hide under the driver's chair or even in it's mobile mounting bracket hidden under the dashboard, depending on the vehicle of course. The body of the radio is designed to deal with the possible heat generated by the impressive 50W high power on 144MHz and the 35W high power on 430MHz.

The transceiver also has a small and unobtrusive fan included and the body of the radio has connections for the modular style microphone plug, the supplied separation cable and a mini DIN socket for DATA applications such as connecting a TNC (see Fig. 5). On the rear is the SO239 antenna socket and two 3.5mm jack sockets for extension speakers, one for each band.

## The Head Unit

The head unit is quite large but I'm sure that room could be found in most vehicles to accommodate it. It offers much greater flexibility than trying to accommodate an entire radio and the display on the control head is really

quite excellent. (See Fig. 6).

The large and extremely easy-to-read colour display is rather impressive, albeit so different from what I'm used to that it took me a while to get used to it!

One of the main benefits to this new style display from Icom is that the viewing angle seems to have been increased.

Using one of four alternatives, the colour scheme can also be altered to suit your taste. One thing I thought was excellent and a super bit of design engineering is that Icom have actually included a speaker in the control head and not in the radio itself - a real plus point for me!

The controls on the head unit are well spaced and common sense seems to have been applied with how they have been laid out. The controls on the left-hand side are for the band that's displayed on that side and the same applies on the right.

The left side is dedicated to the v.h.f. bands and the right is the dedicated to the u.h.f. bands. The three rotary style switches on each side control the two bands, one being the tuning control which is also used when moving through the many option menus and the others are volume and squelch.

Four buttons are also present on both sides, but the designation given to the control buttons change. The current primary and secondary functions are displayed as part of the colour screen.

The control head also has a video input (see Fig. 7) enabling you to connect a video source (the European version of the Icom IC-2800 is set to accept video in PAL format). As far as I can see you can do nothing but actually view the video and I struggled to come up with a use for this interesting little gismo but failed.

I did think that perhaps you could rig up a small security style camera in the kid's room and if the baby monitor was leaping off the wall of the shack you could at least switch the head unit to video mode and see what was happening!

Another suggestion was that the camera be placed beside the front door, so if the doorbell rang you could select the video option and see who was at the

door on the colour screen of your IC-2800H. You could then decide whether you would drag yourself away from playing with your radio to answer the door - or not as the case may be!

One more suggestion was that if you go away in a caravan or camping as I do, the family could all get in the car and enjoy the day's videoing (without sound of course) viewing it on the radio screen. All very interesting and fun but I still failed to see the use.

Now, if you could've captured an image and told the radio to send it as SSTV that would've been different, but as far as I could see from the book this wasn't possible. I have to say the picture quality is excellent however.

Unlike some of the dual-band radios I've both seen and reviewed, it would seem that the two bands are totally separate. You're unable to display two v.h.f. frequencies or two u.h.f. frequencies as you can with some other dual-band radios.

The memories are also configured in a similar way, each band having 99 memories and one call memory. This means that you will have a memory channel number one for v.h.f. and a memory channel number one for u.h.f. and so on.

I turned the radio on and started to play and I have to say that the IC-2800 enthralled me. The simple functions are quite easy to get to grips with quickly, however reading the rather comprehensive handbook is a must to get the best out of this lovely radio.

Due to the rather gorgeous colour display (you can see that I'm getting used to it now) the user interface is interesting and presented very professionally. For example, when editing a memory, everything is laid out in graphical form for you, even programming the memories with the alphanumeric tags was a simple operation and also getting your callsign to appear on the 'power on' screen. Vanity - the shame of it!

It was actually a pleasure programming the IC-2800 - you'll not hear me say that about a radio very often! However, if you do get fed-up with programming the radio, there's always the optional programming software and cable!

## Little Gems

Now for the little gems I found. The IC-2800H offers a similar scratch pad Practical Wireless, June 2000



memory option as I described earlier for the IC-2100 and I thought that there's potential for this to be a very useful feature, especially when mobile - there's a facility for setting the tuning step again all displayed on the screen in a way that makes programming a real joy.

Another useful feature that the IC-2800H shares with the IC-2100 is the latching p.t.t. for hands-free mobile operating. The radio also comes equipped with CTCSS and DTMF and all the normal associated functions.

The CTCSS tone scan seems to be slightly faster than the one on the IC-2100, although I have no data, scientific or otherwise, to support that observation. The IC-2800 also supports the Icom HM-90 and EX-1759 infrared microphone for wireless operation.

The IC-2800H has a lovely little band scope function that you can set to scan for signals between programmable limits on either band. The real plus point with this is that you can sweep both bands simultaneously, the down side, however, is that the audio on the centre frequency is muted while the sweep is taking place.

The band scope function, along with the fact that the IC-2800 shares the excellent scanning features that I have

already described in the IC-2100 review, make the IC-2800H a formidable monitoring receiver in its own right!

The different programmable scan edges are displayed when you select scanning as an option in small numbers under the main frequency readout. This makes selecting them extremely simple and you can see exactly what you're doing every step of the way.

I asked Terry 2E1EJC to comment on the radio as he had purchased one very recently and he said: "It's a gorgeous radio, the display is beautiful, the radio is so sensitive but very selective as well. I've had no trouble with pagers, I love it. It's straightforward to use, one of those radios you can use without having to read the instructions".

Praise from Terry is praise indeed, so I decided to get on the air and see how it performed. I arranged a sked with Terry so that I could hear the transmitted audio myself and I have to say that Terry was right, it sounded very nice indeed.

## Easy To Use

The first thing that I really noticed when I started to play with the IC-2800 was just how easy it was to use. Then I noticed the received audio - the speaker in the head unit was splendid and it

really did do an excellent job, when mobile it was great!

I listened to my favourite Air band frequencies and the radio performed very well indeed, even with the benchmark of the low power departure information from Bournemouth airport. The audio quality on a.m. was excellent, the Marine band was a success too.

I listened out for repeaters on 430MHz band and, to be honest, they're about the only signals that I can be sure to find on this band in my area. From my QTH in Bournemouth I heard the Salisbury repeater, the Blandford repeater, the Weymouth repeater and the Bournemouth repeater, all with excellent reports.

Alas, on the occasions I was looking for contacts I called and called with little response but, just as I was giving up hope, I got a reply to my plaintive call on 145.500MHz. James 2E1EMK from Wilcot in Wiltshire called me and we had a very enjoyable chat. This was on a very wet and horrible night where conditions must've been about as flat as you could get them.

James was running ten watts from a Trio 9130 into a W2000 vertical only just above the roof of his house and I was running 50W with exactly the same antenna about three metres above the ground. My QTH is about 30 metres above sea level (a.s.l.) give or take a centimetre or three, so I was delighted with this contact as the distance between our two stations is about 80km.

James gave me a 5 and 5 report and I was hearing him a good 4 and 3. I then dropped my power to ten watts as well and James reported that I had dropped an 'S' point. He could even hear me on the five watt setting!

He told me that the audio was "Nice and Clean and clear with no fade on the signal". This contact lasted for about 20 minutes to half an hour and I was very impressed with it as the take-off from my location in James' direction is not the best in the world.

I was very pleased indeed with the IC-2800. It has some gismos on it, the video link is something that seems to have been put on just 'because' as opposed to having a real use, but it is certainly an idea that's worthy of enhancement.

The colour l.c.d. display is perhaps not to everyone's taste but it certainly brightened things up for me. Icom seem to have made best use of the display to give the IC-2800 an interesting and good looking user interface that made every aspect of the radio's extensive range of features interesting and easy to use.

It may seem silly in the grand scheme of things, but the speaker in the control head was a real plus point for me as well. A gold star goes to the designer who thought of that one!

## Product

**IC-2800 Dual-Band FM Transceiver**  
Dual-band v.h.f./u.h.f. transceiver, covers the 144 & 430MHz amateur bands. Head unit designed to be separate from main body.

## Accessories

**IC-2800:** A d.c. power cable; remote controller cable; remote controller mounting bracket; main unit mounting bracket; mounting screws, nuts and washers; fuse (FGB 20A); remote controller mounting screws and nut and microphone.

## Pros & Cons

**Pros:** Has a head unit designed to be separate from the body; extremely "easy-to-read" colour l.c.d. display; Icom have included a speaker in the control head; excellent picture quality; simple functions are easy to use; programming the memories is simple.

**Cons:** Video link doesn't appear to have any real use.

## Summary

I enjoyed reviewing both of these radios, which together represented two ends of a spectrum, in my opinion. From the IC-2100 - the modest single band mobile to the somewhat more interesting IC-2800 dual-band radio.

In both cases Icom have done a great job and it was a pleasure to review these two rigs. Where the IC-2800 is concerned, I was very impressed with the design of this dual-band radio - sometimes it's the small touches - like the speaker in the control head of the '2800 - that make the difference!

My thanks go to:  
**Icom (UK) Ltd**  
Sea Street  
Herne Bay  
Kent CT6 8LD

E-mail: [info@icomuk.co.uk](mailto:info@icomuk.co.uk)

for the loan of the two review transceivers

RRP:  
**£349.99**  
inc VAT

## Response From Icom?

We FAXed a copy of the review of the IC-2100 and IC-2800 to **Icom (UK) Ltd**. As it is PW policy to let manufacturers/dealers who supply equipment for review the chance to read the review and comment on it.

After reading the review, Icom would like to say that they have noted Richard's comment on the video input and have received similar comments in the past. Due to tight deadlines this month, Icom's full response will be printed in next month's PW, so you'll just have to pick up a copy of the July 2000 issue to find out what they have to say about the video input on the IC-2800.

## Manufacturer's Specifications

### General

Frequency coverage:	144-146, 430-440MHz (TX/RX)
Mode:	f.m. a.m. (118-135.995 RX only)
No. of memory channels:	232 (inc. 12 scan edges, 10 log, 10 repeater and 2 call)
Tuning steps:	5, 10, 12.5, 15, 20, 25, 30 and 50kHz
Frequency stability:	±10ppm (-10°C to +60°C)
Power supply requirement:	13.8Vd.c. ±15% (negative ground)
Current drain (v.h.f./u.h.f. at 13.5Vd.c.):	TX (Max power): 12.0A/11.0A RX (Standby): 1.2A RX (Max. audio): 1.8A SO239 (50Ω) mini DIN 6-pin PHONO (RCA 75Ω) Controller: 140(w) × 70(h) × 34(d)mm Main unit: 140(w) × 40(h) × 165.8(d)mm (projections not included) Controller: 290g Main unit: 1.15kg
Antenna connector:	
Data connector:	
External video input:	
Dimensions:	
Weight (approx):	

### Transmitter

Modulation system:	Variable reactance
Output power:	High: 50W/35W Mid-H: 20W (approx.) Mid-L: 10W (approx.) Low: 5W (approx.)
Spurious emissions:	-60dB
Microphone connector:	8-pin modular (600Ω)

### Receiver

Receive system:	Double conversion superheterodyne
Intermediate frequencies:	1st: v.h.f. 15.65MHz, u.h.f. 46.05MHz 2nd: 450kHz
Sensitivity:	0.16µV typical (at 12dB SINAD)
Squelch sensitivity:	less than 0.13µV (at threshold)
Selectivity:	Wide: more than 12kHz/-6dB less than 28kHz/-60dB Narrow: more than 6kHz/-6dB less than 18kHz/-60dB
Spurious & image rejection ratio:	more than 60dB
Intermodulation rejection ratio:	more than 60dB
Audio output power (at 13.5Vd.c.):	more than 2.4W at 10%
144MHz SP connector:	2-conductor 3.5(d)mm/8Ω
430(440)MHz SP connector:	3-conductor 3.5(d)mm/8Ω

PLEASE MENTION THE PW REVIEW WHEN CONTACTING ICOM (UK) LTD IN RESPONSE TO THE REVIEW OF THE IC-2100 & THE IC-2800. PW



**May 14:** Dunstable Downs Radio Club will be holding its 17th Annual National Radio Car Boot Sale at Stockwood Country Park, Luton, Bedfordshire. Site will be open from 0900-1500. Leave M1 at Jnc J10a and follow signs for 'The Mossman Collection'. Talk-in on S22. For further details and booking form access: [www.ddrcbootsale.freeserve.co.uk](http://www.ddrcbootsale.freeserve.co.uk) or write to DDRC, PO Box 4053, Dunstable, Bedfordshire LU5 5ZJ enclosing an s.a.e., FAX enquiries to (01525) 383898 or E-mail: [ddrc@magstripe.demon.co.uk](mailto:ddrc@magstripe.demon.co.uk)

**May 21:** The Three Counties Radio & Computer Rally is to be held at Perdisswell Leisure Centre, Bilford Road, Worcester. There will be trade stands, radio and computer dealers, parts and accessories, refreshments, licensed bar and free car parking. Admission will be £2 and there will be a free raffle with good prizes. Trade stands available, contact **Eddie Cotton** on (01905) 773181.

**May 21:** The Mid Ulster ARC Rally will be held in the Silverwood Hotel, Lurgan, Co. Armagh at 1200. Trade stands, Bring & Buy, etc. Talk-in on S22. Further details from **Jim G10ND** on 0283-885 1179.

**May 21:** The 43rd Northern Mobile Rally will be held in two modern 'conference' rooms at the Yorkshire Showground. As well as Amateur Radio traders, there will also be computers and TV and video specialists. There will also be other attractions on the showground, including an Antiques Fair, Barbecue, local ice creams, parking for up to 1000 cars, and a Bring & Buy stand. Talk-in will be on 2m (144MHz). For more details please contact **Gerald GOUFI** on Tel: (01765) 640229 or E-mail: [goufi@mail.com](mailto:goufi@mail.com)

**May 28:** The Bury Radio Rally will be taking place at the Mosses Centre, Cecil Street, Bury, starting at 1100 and features include a trade show, special interest groups, Bring & Buy and refreshments. Admission costs £1.50, £1 for concessions. Enquiries to mailbox (07946) 090773 or E-mail: [buryrally@hotmail.com](mailto:buryrally@hotmail.com)

**May 28:** The East Suffolk Radio Rally (the Ipswich Radio Rally) will take place at 'The Hollies', IACSSA, Straight Road, Foxhall, Ipswich. The ESWR is now principally a large car boot sale with indoor trader and special interest group support. Open from 0800 for traders and 0930 for buyers. In common with many rallies, the event will close mid afternoon. Talk-in will be provided on S22. Further details from **Sam Jewell G4DDK** on (01394) 448495.

**June 4:** The Mid Hampshire Radio Rally will take place at Medstead Hall, Medstead, Alton, Hampshire. Doors open 1030 and entry is just £1.50, which includes raffle entry in aid of the RAIBC. Telephone (07790) 577945 or E-mail: [chris@g0wyf.freeserve.co.uk](mailto:chris@g0wyf.freeserve.co.uk) or check out their web site at [www.g0wyf.freeserve.co.uk](http://www.g0wyf.freeserve.co.uk)

**June 4:** The Leeds & District ARS are holding their twice yearly car boot sales on Sunday 4th June and Sunday 20th August at the Yarnbury Rugby Club, Brownberrie Lane, Horsforth,

Leeds. Please contact **J. A. Mortimer M1CAI** on (01943) 874650 for details. It will be a general car boot sale but with Amateur Radio, electronics and computer sections. Sellers cars (inc. small trailer) will be £5 with vans/large trailers being charged £10. Refreshments and plenty of free parking will also be available. **June 4:** The Mansfield Amateur Radio Society's annual Radio & Electronics Car Boot Sale is to be held at Debdale Lane Sports and Social Club, Debdale Lane, Mansfield Woodhouse, Nottinghamshire, commencing at 1000. Bar, refreshments and ample parking available. Details from **Angela** on (01623) 429218, E-mail: [andange@netscapeonline.co.uk](mailto:andange@netscapeonline.co.uk) or for the latest information visit <http://members.netscapeonline.co.uk/andange/rally.htm>

**June 4:** The 4th Red Rose QRP Festival is to be held at Formby Hall, Alder Street (off High Street), Atherton, Manchester, between 1100 and 1600. There will be trade and club stands. There is a huge car park, disabled facilities, refreshments and bar. Display of Morse keys and QRP rigs, plus a low cost Bring & Buy. Admission is £1. More details from **Les Jackson G4HZJ**, 1 Belvedere Avenue, Atherton, Manchester M46 9LQ or Tel: (01942) 870634.

**June 18:** The Norfolk Amateur Radio Club will be holding the Barford Rally & Electronics Car Boot Sale at Barford Village, located 9 miles west of Norwich, off the B1108, signposted. Open for traders from 0900, and for buyers from 1000. Local repeater and packet groups will be represented and Novice licence stand. There is ample car parking, a Bring & Buy, RAYNET supplies, refreshments and a raffle. Entry is free. **John G0VZD** on (01953) 604769 or **Peter** on (01603) 415992.

**June 18:** The Newbury & DARS will be holding their 14th annual Amateur Radio Car Boot Sale at Cold Ash playing field near Newbury, Berkshire. Sellers/traders should arrive at 0800 and the sale will be open from 0900-1500. Sellers/traders don't need to pre-book and the charge is £9 per normal size pitch. Any telephone enquiries should be made to **George Cook** on (01488) 682814.

**June 25:** The Bangor & DARS (Northern Ireland) are holding their Summer Radio & Computer Rally at the Clandeboy Lodge Hotel, Bangor. There will be a good selection of traders attending, plus there is the always excellent Bring & Buy, with the addition of a new computer section. Doors open 12 noon and admission is just £2. Further details from the club Web site at <http://welcome.to/bdars> or from **Mark M1DRU** on 0289-058 6515 or E-mail: [mildru@amrad.net](mailto:mildru@amrad.net)

**June 25:** The Longleat Rally will be

taking place at Longleat House near Warminster, Wiltshire on Sunday 25th June 2000 - all the usual attractions. Please contact **Ron Ford G4GTD** on Tel: 0117-985 6253.

**July 8:** The Cornish Radio Amateur Club are holding their 37th Cornish Mobile Rally at Penair School, Truro. **Ken Tarry G0FIC** on (01209) 821073 or E-mail: [ken@jtarry.freeserve.co.uk](mailto:ken@jtarry.freeserve.co.uk)

**July 9:** The 11th York Radio Rally will be held in the Knavesmire Building, York Racecourse, York. Doors will open at 1030 and admission is £2 - children accompanied by an adult will be admitted free. Ample free parking, Amateur Radio, electronics and computers, Morse tests and repeater groups, refreshments and licensed bar. Talk-in on S22. Further details from **Pat Trask G0DRF** on (01904) 628036.

**August 13:** The 11th Great Eastern Radio & Computer Rally is to be held at the Park High, Queen Mary Rd, Gaywood, Kings Lynn, Norfolk. Refreshments will be available all day. Talk-in on S22, free parking, Bring & Buy and lots more. Contact telephone number is (01553) 841189. For latest, please see [www.qsl.net/G3XYZ](http://www.qsl.net/G3XYZ)

**August 27:** The Milton Keynes ARS will be holding their 14th fayre and car boot at Bletchley Park Museum. Open to Traders from 0700, £7 in advance, £10 on the day. Doors open to buyers at 0900 and entrance is just £1. Talk-in on 154.550/433.550MHz, refreshments, Morse tests, museum open. For more details please contact **Dave G3ZPA** on (01908) 501310 or E-mail: [m0bzk@bletchley.madasafish.com](mailto:m0bzk@bletchley.madasafish.com)

**September 3:** The Bristol Computer & Radio Rally will take place at the Brunel Centre, Temple Meads Station, Bristol. Doors open 1030 (disabled from 1015) and close at 1600. Admission is £1.50, accompanied children under 12 free. There will be 250+ tables, table hire at £15 each, large Bring & Buy, under £30 Bring & Buy and refreshments. More details from **Muriel Baker, 62 Court Farm Road, Whitechurch, Bristol BS14 0EG** or Tel: (01275) 834282 (24-hour answerphone).

**September 10:** The Lincoln Short Wave Club are holding their Lincoln Hamfest at the Lincolnshire Show Ground, on the A15, five miles north of Lincoln. There will be extensive parking, talk-in on 2m, catering and refreshments, trade stands, Bring & Buy, car boot sale, flea market, Morse tests and other attractions. Admission is £2 per person (under 14s free). Contact **John G8VGF** on (01522) 525760

**September 10:** The Telford Radio Rally moves to a new unique location at RAF Museum Cosford, Shropshire - two miles south on A41 off J3 M54, 20 miles NW of Birmingham. Buy, sell and browse amongst the aircraft.

Traders, Bring & Buy, flea market, Morse tests, RSGB & Special Interest Groups, refreshments, disabled facilities, Talk-in on S22. Further details from **Bob M5BWQ (01952) 770922** or E-mail: [bob@somrob.u-net.com](mailto:bob@somrob.u-net.com) Traders enquiries to **Jim G8UGL (01952) 684173** or E-mail: [jim@tweeddale5.freeserve.co.uk](mailto:jim@tweeddale5.freeserve.co.uk) or visit their Web site at: [www.telford-rally.co.uk](http://www.telford-rally.co.uk)

**October 1:** The Great Lumley Amateur Radio & Electronics Society are holding their rally at the Great Lumley Community Centre, Front Street, Great Lumley, near Chester le Street, County Durham, just off the A1(M). There will be free parking, plus easy access, good, inexpensive food and drink, radio, hobbies, electronics, computer, satellite and component stalls, Bring & Buy in two sections - junk and good buys. Doors open 1100 (1030 for disabled visitors). Admission is £1, free of charge to under 14s accompanied by an adult. Talk-in. Further details on 0191-384 2803 or 020-8937 2772 or from Rally Organiser **Nancy Bone G7UUR**, 49 South Street, Durham City DH1 4QP.

**October 15:** The Blackwood Radio, Computer & Electronics Rally is to be held again at the Newport Centre, Newport, South Wales, which is about 2km from J25A on the M4. Opens at 1030/1100, there will be a Bring & Buy, Talk-in, car parks, trade stands, special interest groups, licensed bar, catering, disabled facilities and family attractions. Further information can be obtained from **Stuart Instone GWONPL** on (01495) 240260/(07970) 777756 (combined telephone/FAX number) or E-mail: [fireham@aol.com](mailto:fireham@aol.com)

**15th October:** The Hornsea Amateur Radio Club Rally will be taking place on this day. For more details on where it is and what will be taking place, please contact **Duncan G3TLI** on Tel: (01964) 532588.

**October 29:** The Galashiels & District Amateur Radio Society are holding their Annual Radio & Computer Rally at The Volunteer Hall, St Johns Street, Galashiels, Scottish Borders, from 1100 till 1600. There will be traders, Bring & Buy and refreshments, etc. More details from **Jim GM7LUN** on (01896) 850245 or E-mail: [jimk@gm7lun.freeserve.co.uk](mailto:jimk@gm7lun.freeserve.co.uk)

**November 4/5:** The 14th North Wales Radio & Electronics Show will be held at the North Wales Conference Centre, Llandudno. The show opens at 1000 both days and the entrance fee is £2 for adults and under 14s free when accompanied by an adult. There will be a club room and an extensive Bring & Buy. **M. Mee GW7NFI** on (01745) 591704 (combined telephone and FAX number).

**November 12:** The Midland Amateur Radio Society are holding their 12th Radio & Computer Rally at Stockland Green Leisure Centre, Slade Road, Erdington, Birmingham. Doors open at 1000. There will be a large, free car park, special interest exhibits, local clubs, etc. More trader information from **Norman G8BHE** on 0121-422 9787 or general information from **Peter G6DRN** on 0121-443 1189.

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

The Editorial Staff of PW cannot be held responsible for information on Rallies, as this is supplied by the organisers and is published in good faith as a service to readers. If you have any queries about a particular event, please contact the organisers direct. - Editor



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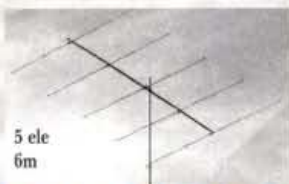
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QT-500 GF 144/70, 8.5/11dB (5.4m)	£125.95
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80 mtrs Traps	(a pair) £19.00 P&P £4
10 mtrs Traps	(a pair) £19.00 P&P £4
15 mtrs Traps	(a pair) £19.00 P&P £4
20 mtrs Traps	(a pair) £19.00 P&P £4

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1 1/2" Dia	£7.50 per metre	Delivery £10
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Weight approx 6kg Weight approx 8kg

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CX-401	4 way (SO-239)	£49.95
CX-401 'N'	4 way (N TYPE)	£54.95
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**£8.95** + P&P £2.00

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24" T&K Brackets	£20.00 P&P £8
U bolts (1 1/2" or 2")	£1.10 each
8 nut universal clamp (2" - 2")	£5.95
3-way guy ring	£3.95
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100m roll of RG-213 coax  
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★ 2m + 70cm hand-held with built-in packet modem ★ 6W output on 13.8V D.C. ★ CTCSS + 1750Hz tone ★ Optional wideband receive.

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## SONY SW-100E

Award winning miniature portable all mode SW receiver. ★ Station presets for 50 frequencies (with station names) ★ Single side band system ★ Multi-function LCD display ★ FM stereo via headphones ★ Synchronous detector ★ Sleep function ★ Short wave tuning in 5Hz & 1kHz steps ★ Includes compact antenna/stereo earphones/carrying case/comprehensive short wave handbook. Due to over stocking at Sony UK we are able to offer for a limited period the Sony SW-100E at £100 off retail price. RRP £299.95.

**SPECIAL OFFER £129.95 P&P £10**









# The 18th Annual Practical Wireless 144MHz QRP Contest

0900-  
1600UTC,  
Sunday  
18 June  
1999

NEILL TAYLOR G4HLX IS BRINGS YOU  
THE RULES FOR THE SPECIAL 2000 PW  
144MHz QRP CONTEST



You know that summer's well and truly on its way when *PW* announce the rules for their annual 144MHz QRP Contest. So, the waiting is over for another year and just what's in store with the first contest of the new century? Well, long-serving adjudicator, Neill Taylor G4HLX, brings you the rules for this year's contest.

**T**his year's *Practical Wireless* 144MHz QRP Contest is going to be a rather special one and as usual, the event will offer a day of low power (3W) activity on the 144MHz band. Those taking part will enjoy the friendly spirit of competition that has become the hallmark of this contest and can expect to make many QSOs with some very good distances to be worked, thanks to stations sited on hilltops all around Britain.

## Extra Bonus

This year, to mark the start of the new millennium, there's an extra bonus: every individual or group entering the contest will receive a special silver Millennium Certificate courtesy of **Chris Rees G3TUX** of **The QRP Component Company**, to mark their participation in this millennium contest. To receive your certificate, **be sure to send the coupon on the corner of page 30 with your entry.** (All entries are welcome, but to receive a certificate - a corner flash is required.)

The second special feature of this contest is that since last year Novice licensees have been given access to the 144MHz band and we're delighted to welcome them to the QRP Contest - an ideal event for the Novice operator. As encouragement, I'm personally offering a **new trophy to be presented to the leading Novice station entering the contest** (either an individual, or an all-Novice group).

On top of all this, of course, we have our usual awards and prizes for the other leading stations. The outright winners will receive the **PW QRP**

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

Other Prizes will include a **TH-G71E dual-band hand-held** (see **Fig. 1**) donated by **Kenwood UK Ltd**

and also **Bob Keyes GW4IED** of **Key Solar Products** will be donating a special prize for the runners-up.

If you're an experienced v.h.f. contest operator, you'll know what fun there's to be had, but if you've never tried a contest before, now is an ideal time to start! Because of the 3W power limit, all you need is a simple station.

Most of the activity will be on s.s.b., but if you only have an f.m. transceiver, it's still worth seeing how many contacts you can make. It would be nice to see some more c.w. activity, too.

You might find it worthwhile getting together with some friends - ideally take your portable s.s.b./c.w. transceiver, with an efficient antenna, up to the top of a local hill. Expect to be surprised as, year after year, operators in the QRP Contest write to say how amazed they are at what they managed to work with just 3W!

## Entries By E-Mail

Last year, many stations sent in their entries by E-mail, which worked well. I encourage this again this year, although I'm happy to receive them by post, too.

**Remember, if you send your entry by E-mail, you'll still need to send in the coupon from this page to claim your special certificate** (see the rules for details). There's also more advice and information, hints and tips for newcomers, as well as results of many past contests, on the contest Web site: <http://home.neill.org/contest>

Make sure you and everyone in your group, reads the rules thoroughly before the contest. Check them again before sending your log in, to be sure that you've included everything needed. Remember to include the coupon for your certificate, then sit back and wait to see your callsign in the results, in *PW* later in the year.

Let's hope that the mid-June weather is kind to all portable stations, that the propagation gives us some excellent DX and that this millennium contest really does become one to remember, with your special certificate a lasting memento.

*Neill Taylor G4HLX*

Practical Wireless, June 2000

Fig. 1: The Kenwood TH-G71E kindly donated as a prize by Kenwood UK Ltd



QRP CONTEST 2000



# Contest Rules

Fig. 2: Simple power reduction circuit (see text).

## 1. General

The contest is open to all **licensed** Radio Amateurs, fixed stations or portable, using **s.s.b., c.w. or f.m.** in the **144MHz (2m) band**. Entries may be from **individuals** or from **groups or clubs**, etc. The duration will be from **0900 to 1600UTC on 18 June 2000**.

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

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

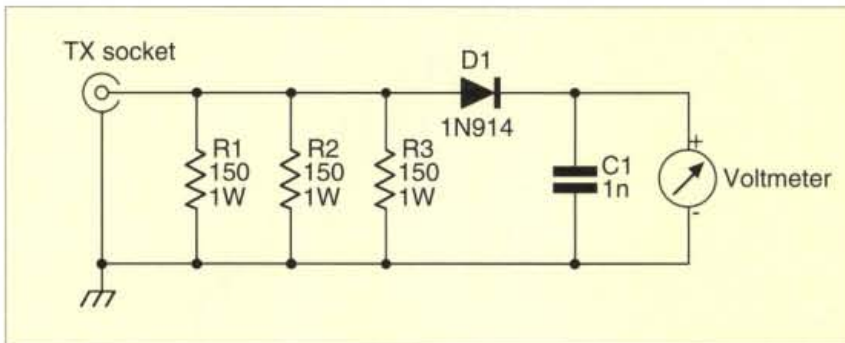
## 2. Contacts

Contacts will consist of the exchange of the following **minimum** information:

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

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

If a non-competing station is worked and is unable to send his full universal locator, his location may be logged



instead. However, for a square to count as a multiplier (see rule 4), a full six character IARU universal locator must have been received in at least one contact with a station in the square.

**Contacts via repeaters or satellites are not permitted.**

## 3. Power

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

The output power can be accurately measured using the simple circuit of **Fig. 2**. Connect this to the 50Ω output of the transmitter and adjust the power so that the voltmeter does not exceed 16.7V on a good whistle into the microphone.

## 4. Scoring

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

For example: 52 stations worked in IO81, IO90, IO91, IO92 and JO01

squares; final score =  $5 \times 52 = 260$ .

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

## 5. Log

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

- time GMT;
- callsign of station worked;
- report and serial number sent;
- report and serial number received;
- locator received (or location).

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

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

Fig. 3: Sample log sheet for PW 144MHz QRP Contest (see text).

Practical Wireless 144MHz QRP Contest 2000				
Date	Callsign	Locator	Sheet No Of	
Time UTC	Callsign	Report & Serial No Sent Received	Locator	



## Contest Rules continued

The sample shown on p. 31 (Fig. 3) illustrates how each sheet should be headed. Log sheets and covering information sheets which may be used for paper-based entries are available for downloading from the contest Web site.

A log sent by E-mail may be a file generated by logging software, provided it contains all the information listed above, or a file in any other suitable format (plain text is fine) which, if printed, would be equivalent to a paper-based entry.

Preferably, give the file a name including the station callsign (e.g. g4hlx.log) and send as a standard E-mail attachment - all common encodings can be accepted. If there's any problem with your entry you will be contacted by E-mail.

### 6. Entries

In addition to the log, the following information must accompany each entry:

- (a) name of entrant (or of club, etc. in a group entry) as it is to appear in the results table and on the certificate;
- (b) callsign used during contest (including any suffix);
- (c) name and address for correspondence;
- (d) details of location of station during contest. For portable stations, a national grid reference is preferred;
- (e) locator as sent;
- (f) whether single-operator, or multi-operator (a single-operator is an individual who received no assistance from any person in operating the station, which is either his/her permanent home station or a portable station established solely by him/her). If multi-operator, include a list of operators' names and callsigns;
- (g) total number of contacts and locator squares worked;
- (h) list of the locator squares worked;

- (i) a full description of the equipment used including transmitter p.e.p. output power;
- (j) if the transmitting equipment is capable of more than 3W p.e.p. output, a description of the methods used (i) to reduce and (ii) to measure the output power;
- (k) antenna used and approximate station height a.s.l.

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

Failure to supply the required information may lead to loss of points or disqualification. The following declaration must then be written and signed by the entrant (by one responsible person in the case of a group entry), or included in the E-mail text: "I confirm that the station was operated within the rules and spirit of the event and that the information provided is correct".

Entries by post should be sent, with the log sheets, to: **Practical Wireless Contest, c/o Dr. N.P. Taylor G4HLX, 46 Hunters Field, Stanford in the Vale, Faringdon, Oxon. SN7 8LX**, or by E-mail to: **g4hlx@breathemail.net**. Entries must be postmarked or sent by E-mail **no later than 3rd July 2000**. Late entries will incur a heavy point penalty or may be disallowed.

Any other general comments about the station, the contest and conditions during it are welcome, but should be written on a separate sheet of paper.

**Photographs of the station are also invited** (but please note that these cannot be returned). If these aren't available by the time the entry is submitted they may be sent later, to arrive by 7th August 2000.

A summary of the results will be published later this year in *Practical Wireless* and the full detailed results list will be available on the contest Web site

soon after publication in *PW*. If you would like to receive this list by post, please enclose an s.a.e. when sending in your entry.

**A certificate will be sent to every entrant who encloses the coupon on page 30 with their entry.** If you're sending your entry by E-mail, to claim your certificate you **must** post the coupon to the contest entry address with a note giving the callsign of your station in the contest. Please make sure that we have the address to which the certificate should be posted.

### 7. Miscellaneous

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

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

Make sure your transmitter is properly adjusted and isn't radiating a broad or poor-quality signal, e.g. by over-driving or excessive speech compression. On the other hand, be aware that your receiver may experience problems due to the numerous very strong signals it will have to handle and that this may lead you to believe that another station is radiating a poor signal.

Before reaching the above conclusion, try heavy attenuation at the receiver input. The use of a high-gain r.f. pre-amplifier is likely to worsen strong-signal problems, so if you do use one, it's best to be able to switch it off when necessary.

### 8. Adjudication

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

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

**The 18th Annual PW 144MHz QRP Contest 0900-1600UTC, Sunday 18 June 2000**

Entries by post should be sent, with the log sheets, to: **Practical Wireless Contest, c/o Dr. N.P. Taylor G4HLX, 46 Hunters Field, Stanford in the Vale, Faringdon, Oxon. SN7 8LX**, or by E-mail to: **g4hlx@breathemail.net**

**Join in and have a great day!**



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With the *PW* 144MHz QRP Contest just around the corner, Neill Taylor G4HLX - long-term adjudicator of the contest - brings you a review of two very useful pieces of kit. He says that this antenna rotator and inverter should help you become more efficient and save some of your own energy!

# Antenna Rotator & 12V Inverter For Portable Stations

**W**hen operating portable on the v.h.f. bands, either in a contest or DXing, it's usual to use a beam antenna. Of course, you need to be able to turn the antenna to point in the direction you're working.

Turning the antenna is particularly important in a contest like the **PW 144MHz QRP Contest**, with a score multiplier based on the number of locator squares worked, as you need to move the antenna around quite a lot to make sure you pick up all the squares you can. So, how do you rotate the antenna on its mast?

The common means of antenna rotation for a portable station is the 'arm-strong' method, i.e. manually - by turning the entire antenna mast by hand. But this isn't always very convenient.

Typically, having been called by a station too weak to copy, you rush out to turn the antenna. This

means extracting yourself from headset and cables, clambering out of the car, tent or caravan, tripping over various other cables on the way, grabbing the pole and twisting it in the direction you hope is best (you can't hear the receiver or see the S-meter from here).

You then have to climb back into your operating position and don the headphones, only to find that the station has given up and moved away. Worse still, someone else has taken your frequency in the meantime and (since it's pouring with rain out there) the water is now dripping down the back of your neck and you realise that you dropped the log sheets in a puddle on the way out!

You find a new frequency and call CQ for 15 minutes with no response, and then realise that this is because the wind has got up and blown the antenna into a dead-end direction. You think there must be

a better way? There is!

A small rotator is the answer, so you can operate portable with the same convenience that you enjoy in the shack at home. But many portable stations these days run entirely from 12V, so instead of a 240V a.c. generator, you're likely to use a 12V battery of some sort, or maybe the vehicle supply itself. The snag here is that antenna rotators tend to be mains-electricity powered.

NEILL TAYLOR G4HLX  
REVIEWS THE ALTAI  
ANTENNA ROTATOR AND  
SKYTRONIC INVERTER FOR  
PORTABLE USE

## The Solution

So, here's the solution - a lightweight rotator, quite powerful enough to support and turn a modest v.h.f. antenna. Plus an inverter unit to convert your 12V d.c. supply into 240V a.c. to power it.

It may seem like a round-about way of achieving the goal, particularly because the first thing that happens to the 240V inside the rotator control box is to be transformed back down to about 30V but in fact, the arrangement turns out to be very practical and surprisingly efficient. Plus, the inverter could be useful to power some other mains-driven equipment, up to 150W or so, should the need arise - for example a soldering iron for those unexpected repairs!

I tested out this combination and found it to be very effective. The rotator I had for review was the **Altai HT127** (see header picture and **Fig. 1**). Of the offset style, it fits onto a pole of up to 44mm diameter according to the instructions. (Although I just managed to get it onto my 50mm mast). It accepts a stub mast also up to 44mm (this really is the maximum).

The rotator needs only a simple 3-conductor cable to connect the rotator to its control, **Practical Wireless**, June 2000



● The Altai HT127 antenna rotator and SkyTronic inverter reviewed by Neill G4HLX.





Fig. 1: The Altai HT127 antenna rotator which attaches to your mast and will fit onto a pole of up to 44mm diameter (though Neill managed to fit it on his 50mm mast) - it will also fit a stub mast up to 44mm (though this is the maximum).

being based on synchronous motors at each end to maintain alignment. It weighs just 1.9kg and I found that, together with a 13-element 144MHz Yagi atop my 6.7m mast, I could very easily erect the system single-handed, using the excellent **Tenna-Tourer** mast base.

A complete 360° rotation took 75 seconds and it handled my **Tonna 13-element** with ease. (see Fig. 2). In fact, it could've supported a considerably larger antenna.

The inverter unit - from **SkyTronic** - is neat and silent and well-protected by a cut-out against over-heating or over-loading. So it's no use trying to plug in your kettle for a brew-up - you really will need a 'Kelly's Kettle'!

Another nice feature is a loud

beep that sounds if your d.c. input voltage falls to about 10.5V. If you're using your car vehicle battery to supply your station, this should warn you to start up the engine before you have completely flattened the battery - thus avoiding the embarrassment suffered by our

the rotator is rated at 45W, it suggests a highly efficient conversion.

Since only a small total length of time is spent turning the antenna, this modest current drain should be tolerable from a portable station's supply. While idle, the inverter draws about 0.4A, so if you're on a tight power budget you might want to switch it off when not actually rotating the antenna. (See Fig. 4).

Since the output from an inverter is basically a square wave, there will be harmonics, so I wondered if there was any

potential for radio interference, even though the base frequency is only 50Hz. I ran the inverter output cable quite near to a receive antenna and checked for unwanted signals.

On the h.f. bands there were some very significant signals, particularly on the lower frequency bands (7MHz and below), where the noise was broad band. Even up to 28MHz there were some noticeable signals.

But at v.h.f., where it matters for the use we are

discussing here, the situation was much cleaner. A few signals were detectable on 50MHz and, at lower level, on 70MHz, but virtually nothing on 144MHz or above.

In practice, with the antenna some distance from the device, this is unlikely to be a problem at all, but if it does arise, it's another reason for switching off the inverter



Fig. 2: The antenna rotator fitted onto Neill's Tonna 13-element antenna.

Editor in last year's QRP Contest!

The inverter-rotator combination (see Fig. 3) worked very well in practice, with the rotator turning, the current consumption from the 12V supply was 3.8A. This is 46W and, since



Fig. 3: The Altai HT127 antenna rotator and SkyTronic inverter - an energy and time-saving combination!



Fig. 4: The SkyTronic inverter end panel. Here you can see where the rotator plugs in and you can also see the ON/OFF switch.

## Product

### Altai HT127 Antenna Rotator & SkyTronic Inverter

**Altai rotator:** Offset style, it fits onto a pole of up to 44mm diameter according to the instructions. It accepts a stub mast also up to 44mm (this really is the maximum). The **SkyTronic inverter** is neat and silent and well-protected by a cut-out against over-heating or over-loading.

## Accessories

None known of.

## Pros & Cons

**Pros:** Saves you from having to keep getting in and out of the car and losing a contact because you have to rotate the mast by hand, highly efficient, modest current drain. The **SkyTronic inverter** gives a loud beep that sounds if your d.c. input voltage falls to about 10.5V.

**Cons:** Some interference on certain bands.

## Summary

In conclusion, this combined inverter-rotator system provides a **very practical means** of v.h.f. antenna rotation for a portable station based on a 12V d.c. supply. It will make the operation of a portable station significantly easier, as well as providing a source of 240V a.c. for other unforeseen needs.

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PW



# Filtering With Fourier!

Les May  
G4HHS looks  
into a subject  
that often causes  
confusion - the  
selective  
performance of  
receivers. And in  
this article he  
takes a  
particular  
interest in s.s.b.  
reception.

The selectivity of a single sideband (s.s.b.) receiver is frequently expressed as the bandwidth at 6 and 60dB below the peak response. The ratio of these two parameters gives the shape factor, which ideally is equal to one. Where, as is usually the case, the selectivity is determined by a multi-pole crystal filter then it can be measured by feeding a variable frequency, but constant amplitude, signal into the input of the filter and noting the output response at various frequencies.

If the 'pre' and 'post' filter mixing processes are linear, you could be justified in assuming that audio output is directly proportional to the r.f. input at the antenna. If this is so then a considerable simplification is possible, with the added bonus that you can determine the position in the pass-band by measuring the frequency as well as the amplitude of the audio output.

Note, however, the problem of 'negative' frequencies that occur when the injected signal is further away from the centre of the filter response curve than the b.f.o.

## Specifically Designed

The a.g.c. circuit is specifically designed to ensure that the audio output **is not directly proportional to the input level**. The effect in this case would be to reduce the output when the injected signal was in the centre of the pass-band and enhance the output when it was on the skirts of the response. This would mess up our measurements, so it would seem that we must carry out the required measurements with the a.g.c. switched off.

If you could carry out all your measurements of audio output at the same time, by injecting multiple signals covering the entire pass-band, the changes in gain caused by the action of the a.g.c. circuit would affect all the signals equally and could be ignored. This doesn't seem to be much help because

you would then have to sort out the many audio signals in the pass-band!

The most obvious way to separate multiple signals is by multiple filters placed at the output, allowing you to determine the desired response at a glance, i.e. by 'sampling' once. And although many of us may be reluctant to build them on hardware, a piece of clever mathematics called the 'Discrete Fourier Transform' (DFT) lets us synthesise virtual filters, if you are prepared to allow many samples to be taken.

The more samples you take, the more filters you can build and the narrower the response of each filter. It's worth the bother!

## Of Identical Amplitude

Ideally, in carrying out the tests it's preferable to inject as many signals of identical amplitude, as there are filters in the pass-band. **This, however, is only the minimum number of signals required.**

Provided you ensure that the same number of signals are present in each filter pass-band, there's no upper limit. However, if you're happy enough to relax this condition somewhat so that on average there are the same number of signals of the same amplitude in each filter pass-band in (let's say) a couple of seconds, then you can use a completely random assortment of signals, or 'noise'.

'Taking a sample' consists of reading and storing the instantaneous amplitude of the output with a suitable analogue to digital (A to D) converter. The more frequently a sample is taken, the greater the bandwidth of the signal can be dealt with.

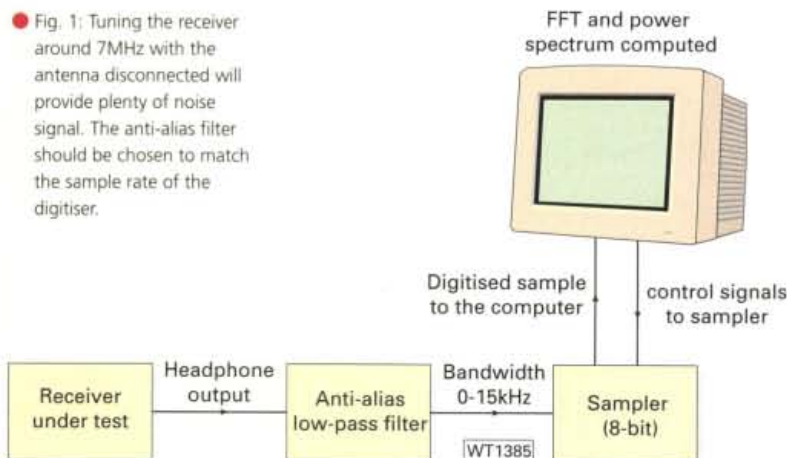
The rule is that the process **must always sample at more than twice the highest frequency present at the input**. Even a poor s.s.b. filter would have negligible frequency components at the output 10kHz off tune so, provided the sample is taken at more than 20kHz - every 50 microseconds (50µs) you'll avoid problems. In this case, we would say the highest, or Nyquist frequency, is 10kHz.

In essence, what the DFT does is to take all the amplitude samples in time and change them into measures of the amplitude of the components of the signal at many different harmonically related frequencies. Simply stated (and avoiding the jargon) by using the process we have transformed the samples from the time domain to the frequency domain.

For ease of processing, there are significant advantages in making sure that the number of samples (or points) for which the DFT is calculated, as a multiple of two. If this is done, it's possible to use a special version of the DFT called the 'Fast Fourier Transform' (FFT).

The fundamental frequency, of which all the other frequency components are multiples, is calculated from the equation: **twice the Nyquist frequency divided by the number of points in the FFT**. These harmonics can be considered as equivalent to filters centred on each harmonic.

● Fig. 1: Tuning the receiver around 7MHz with the antenna disconnected will provide plenty of noise signal. The anti-alias filter should be chosen to match the sample rate of the digitiser.





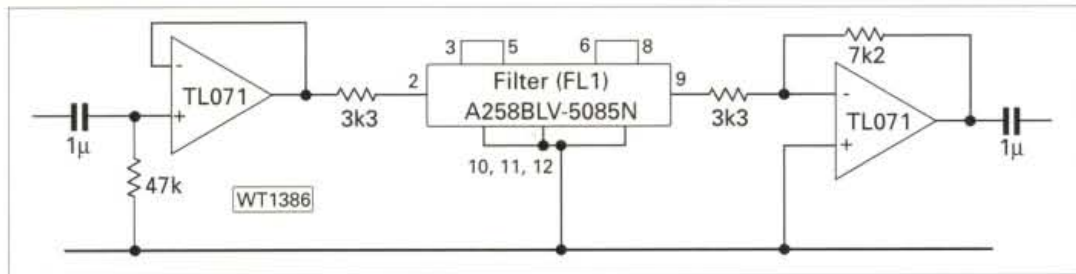


Fig. 2: The anti-alias filter has a sharp cut off at 15kHz. Filter block FL1 is available inexpensively from Maplin.

## Sample Frequency

For a sample frequency of 20kHz and a 1024 point sample ( $2^{10}$ ) we would know the contribution of each of 512 harmonics with frequencies of 20, 40, 60, 80Hz right up to about 10kHz.

Clearly some harmonics will contribute nothing because those frequencies are outside the pass-band of the receiver. While others will contribute a great deal because they are in the centre of the pass-band.

By separately adding together the output for each harmonic (or as we now think of it: each filter) over a period of several seconds it's possible to build up a picture of the pass-band of the receiver at 512 equally spaced frequencies.

A practical system is shown in **Fig. 1**. This consists of a digitiser sampling every  $24\mu\text{s}$ , a Nyquist frequency 20.8kHz, interfaced to a 4Mb A5000 computer running RISC OS 3.1.

The digitiser was originally intended for computer music applications and its 8bit resolution will only allow the response to be followed down to 48dB below the peak. Aliasing is prevented by the use of an Inductance and Capacitor (LC) filter block, **Fig. 2**, which has a sharp cut-off at 15kHz. In the absence of a suitable noise source removing the antenna and tuning the receiver to about 7MHz will provide a super abundance of noise!

The headphone output of the receiver is sampled at 41.6kHz for several seconds. At the end of the sampling period a 256 point FFT is performed using a Hamming window and the resulting sine and cosine components used to create a sound spectrogram, i.e. frequency versus time.

All the amplitude components in a 1.5s block of the spectrogram are processed to yield a power spectrum of the noise passing through the filter, averaged over about 250 separate measurements. Displaying this as Decibels (dB) below peak against frequency gives the plot of the filter response, **Fig. 3**. In this case the frequency resolution is about 160Hz.

The earlier comment about the action of the b.f.o. being to 'fold' signals lower down the skirt into the pass-band should be noted. The response curves with the b.f.o. in upper and lower sideband positions should also be compared to build up a true picture of the filter response.

Strictly speaking, the response which is plotted is the response of the entire receiver, not just of the i.f. filter. An audio filter following the product detector will alter the apparent response.

## System Optimised

The system I've described has been optimised for the analysis of bird calls in the range 0-10kHz which

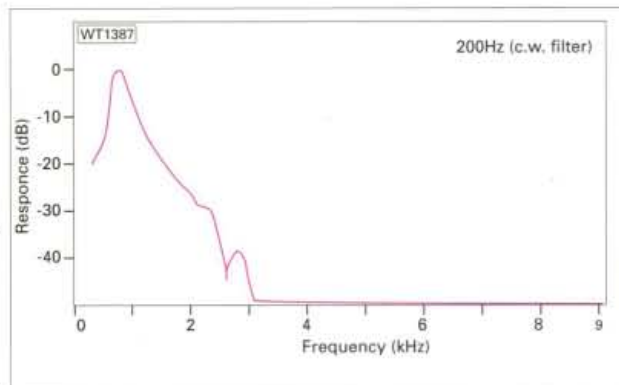
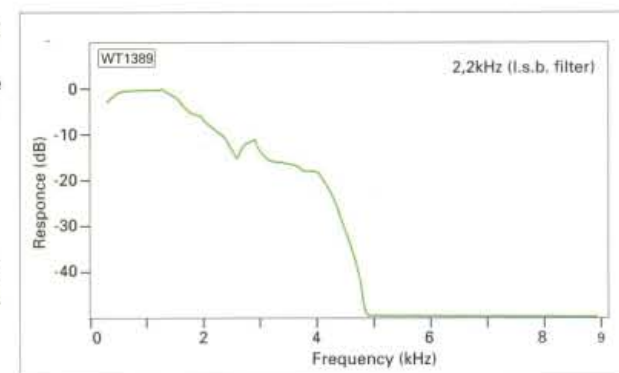
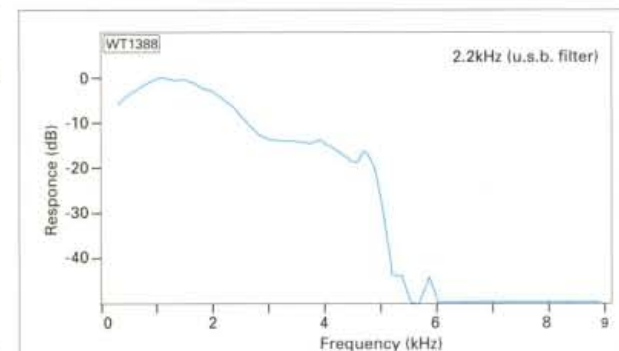


Fig. 3a, b & c: Selectivity curves of the author's commercial receiver for c.w., u.s.b. and l.s.b. filters. The gap in the curve below about 300Hz is an artefact of the measuring system which is normally used to analyse bird calls. Frequencies are with respect to the b.f.o. frequency which can be considered to be 0Hz.



accounts for the particular combination of sampling rate, anti-aliasing and frequency resolution used. Frequency resolution could be improved by increasing the number of points in the FFT to 1024.

Analysis is performed so quickly that the added time penalty would be very small. The frequency response could be followed further down the 'skirts' by the use of a 10 or 12 bit A to D converter in the digitiser.

If you do decide to use 'band noise' as your test signal remember that any peaks in the response may in fact be signals too weak to be detected conventionally. Amateurs attempting to detect signals over 'impossible' paths, like USA to UK on 144MHz, might use this approach to search for very weak signals.

PW



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# Electronics-In-Action

Hello and welcome to Electronics-in-Action (EiA), the bi-monthly column that follows the path that you, the readers, determine. This time, I'll be looking again at Wheeler's formula for calculating the inductance of a coil, dealing with the basics of power supplies, and of course there'll be a few books



So let me first look at the problem I posed in a previous issue of EiA, and that was how to determine the inductance of a single layer coil if you know the number of turns, the coil's length and its diameter. As I found when I first looked for information the traditional Wheeler's formula, to be found in many text books, is defined with all dimensions in inches. I said at the time that I was unable to find a 'metric' version of the formula.

Since then several readers have sent in their metric versions of Wheeler's formula, saying that conversion is quite easy. The original Wheeler's formula that I used then is:

$$L = \frac{a^2 \times n^2}{9a + 10L} \text{ (}\mu\text{H)}$$

where:  
L coil length (in)  
a coil radius (in)  
n number of turns

If we now multiply the various inch measurements by the millimetre from inches conversion factor 'c' (which is

of course 25.4) then we arrive at the following:

$$(i) L = \frac{(ca)^2 \times n^2}{9ac + 10cL}$$

$$(ii) L = \frac{(c^2a^2) \times n^2}{9ac + 10cL}$$

$$(iii) L = \frac{c^2(a^2 \times n^2)}{c(9a + 10L)}$$

$$(iv) L = \frac{c(a^2 \times n^2)}{(9a + 10L)}$$

which, as you see, varies only in a value factor 'c' greater than the original formula derived by Wheeler.

So, if we take all measurements in millimetres then our calculated inductance is a factor of 'c' (or 25.4 in our case) **too large**, all we need to do to correct the calculation is to **divide** the answer by the same factor of 25.4 to arrive at the correct value for the 'Metric version' of Wheeler's formula.

$$L = \frac{(a^2 \times n^2)}{25.4(9a + 10L)} \text{ (}\mu\text{H)}$$

where:  
L coil length (mm)  
a coil radius (mm)  
n number of turns

My thanks go to all those who wrote in to me pointing the above method out. Normally I would put your 'name in lights' but there were rather too many of you to do that this time.

## Power supplies

One thing that we need to carry out our hobby is a power supply (p.s.u.) with a suitable output voltage and current rating. The '12V' p.s.u. is to be found in most radio shacks, with an output current rating of anywhere up to 30A. The output voltage is more usually about 13.5V, in line with a reasonably well charged car battery, which is often the voltage chosen by designers. But what if we need a differing output voltage?

If you need a different output voltage, then very often you are left hunting around for a p.s.u., you may be offered a commercial unit that may

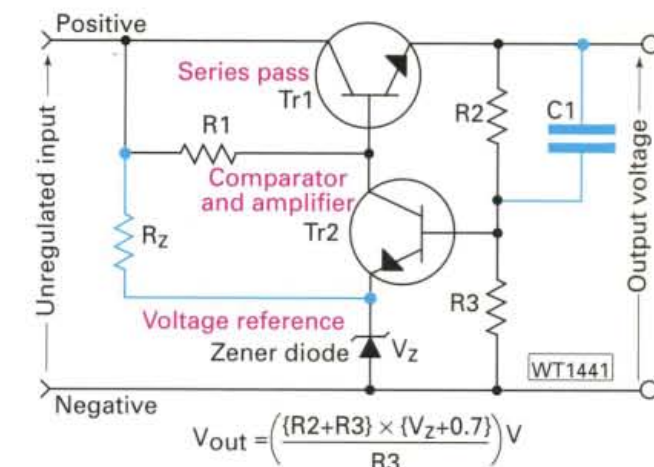
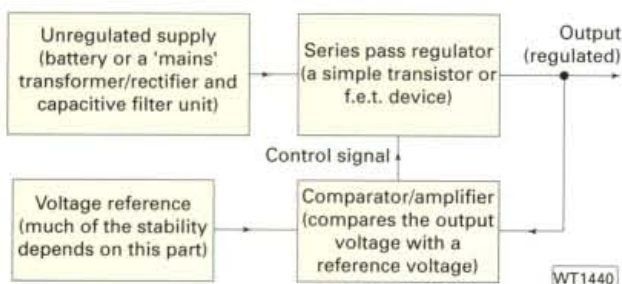


Fig. 2: The circuit of a simple Zener stabilised voltage regulator. See text for more detail.

## Starting Up

Often the most difficult part to explain is what happens as the circuit starts up, so, I won't try to! Let me assume that the circuit is working normally to begin with. I'll also assume, for now, that resistor R2 is a short circuit and the output connects

well be (extremely) expensive. So, why not build your own then? Surely it cannot be that difficult? The answer is that it's **not difficult** to design your own p.s.u. but you must approach it in the right way to ensure that it does the job you want.

First of all, what is a p.s.u.? And how does it work? Well, in simple terms, a 'stabilised' p.s.u. is a source of voltage (or sometimes current) that does not vary whatever the load applied to it. So it needs certain parts to work. Have a look at the

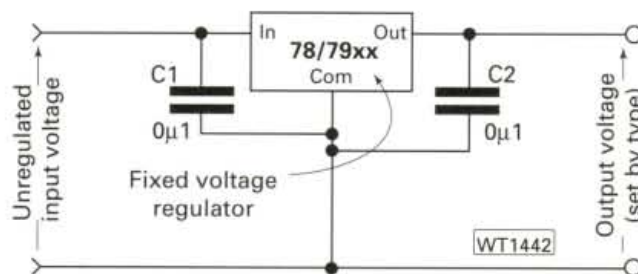


Fig. 3: If a simple fixed voltage output is all that is required, then there are complete regulators i.e.s available.

illustration of Fig. 1, a block diagram of a very basic power supply. The p.s.u. that you need may be a simple Zener diode stabilised low current supply, or it might be an extremely complicated one but, in essence, it's still like the block diagram I've shown.

So, let's translate the block diagram into a working circuit. I've shown the circuit diagram of a simple voltage regulated p.s.u. in Fig. 2, where I've labelled the various functions (from the block diagram of Fig. 1) in red. As you can see it's still very simple, although the formula shown to work out the output voltage might seem rather overpowering at present. So, let's forget that for the time being. You can also forget about the components shown in blue just for now as well as how we supply the regulator itself.

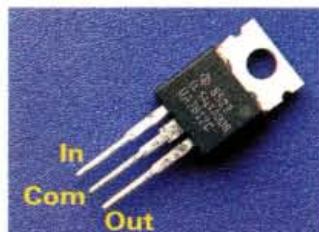
Fig. 1: The simple block diagram of a p.s.u. No matter how complicated the circuitry, this is how it works!

directly to the base of Tr2, the comparator transistor. All voltage levels that I'm going to quote are referenced to the negative rail, and I shall assume that this has an 'earth' level of zero volts.

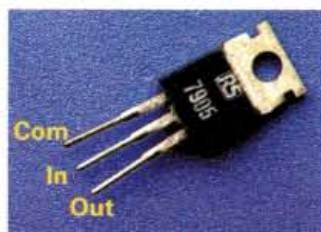
Some of the current flowing through R1 is flowing through Tr2 and the Zener diode. A voltage is present at the emitter of Tr2 equal to Vz, the design voltage of the Zener diode itself. So, if current is flowing through Tr2, then its base terminal must be forward biased, and I'll assume that it's 0.7V 'higher' than the emitter voltage. So, the voltage on the base of Tr2 is (Vz + 0.7) volts. But this is connected to the output terminal so, the output must have the same value of voltage.

The state of affairs where the output

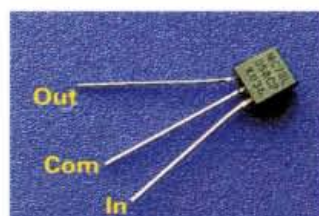




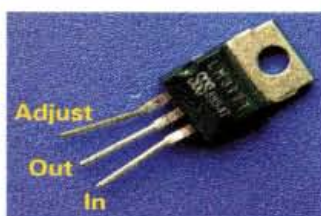
● Fig. 4a: Pin out for a '7812' 12V/1A regulator i.c. that costs very little but offers an excellent specification.



● Fig. 4b: A negative voltage regulator, this time with a -5V output at up to 1A. Note the differing pin-out to Fig. 4a.



● Fig. 5: If the current needs are less than 100mA, then a smaller package can house a 5V regulator chip.



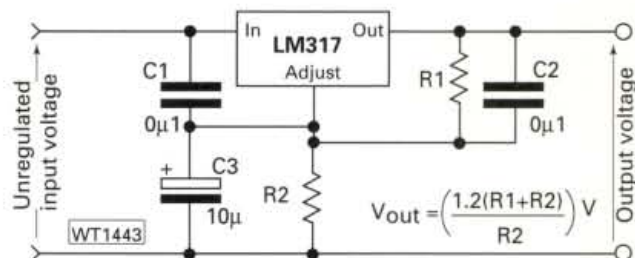
● Fig. 6: With a limit of one ampere, and a basic 1.2V stabilised output, this LM317 i.c. can still become the basis of a higher voltage regulator. See the method shown in Fig. 7.

remains at 0.7V higher than the reference level of the Zener diode will be maintained as long as the output current loading is less than a certain amount. That amount may be taken as being equal to the total current flowing through R1 multiplied by the gain of the series pass transistor Tr1. Let's assume that this gain figure has a value of 100 and in 'normal' use 10mA flows through R1. Then the output will be held at its nominal value of  $(V_z + 0.7)$  volts, for output currents of up to one ampere.

The problem with this simple supply is that, as the load approaches maximum, the current flowing

through the Zener diode drops and the diode no longer holds the same voltage across itself. To maintain the Zener reference action, a certain minimum current should flow through the diode so, it's often arranged to have a supplementary current flow through the diode supplied by R<sub>2</sub>. Care must be taken not to allow too much current to flow through the diode, which might destroy it through overheating. Result - one 'dead' p.s.u.

In essence, the above description holds if we now introduce the resistor R<sub>2</sub> into the feedback loop.



The voltage at the base of Tr<sub>2</sub> is still held at  $(R_z + 0.7)V$ . To achieve this the output voltage will rise, due to the 'potentiometer' action of the values of R<sub>2</sub> and R<sub>3</sub>. As this increases in voltage 'gain' the ripple often goes up as well. In an effort to reduce the output ripple, a capacitor C<sub>1</sub> is introduced into the loop.

## Fixed Voltages

Very often, all we need is a simple fixed voltage such as 5, 6, 9, 12 or 15V supplies for our projects, and for this option the ubiquitous '78xx' (or the complimentary '79xx' negative regulator) series of fixed value regulators are available very cheaply. They are available as 7805, 7806, 7809, 7812 and 7815 variants in three maximum current types. The circuit of a simple voltage regulator using one of the '78' or '79' series of regulators is shown in the diagram of Fig. 3.

The two capacitors shown in Fig. 3 are to ensure stability under all conditions and should be mounted within 15mm of the 'chip' itself. The complimentary negative voltage regulator, available in the '79xx' series, is functionally the same as the '78xx' series, but with a negative supply. The two series of i.c.s have different pin-outs, see Fig. 4a and b, so care must be taken in your design

● Fig. 7: By using two resistors it's possible to increase the LM317's basic 1.2V regulated output up to around 36V, still with a 1A capability.

when using one of these regulators.

A low power device in the '78Lxx' and '79Lxx' series Fig. 5, is available. Looking rather like a plastic encapsulated transistor, but not to be mistaken for one. This series has a 100mA maximum current level if the requirements are more modest. Again capacitors should be kept close to the i.c. in your layout if the regulator is on a p.c.b. away from the main power source.

There is another regulated i.c. that I'll mention at this time and it's one I shall be incorporating into the design I shall be presenting in the near future. This i.c. is the LM317 and all its variants. The LM317T is shown in Fig. 6 is almost exactly the same as the '78' (there is a complimentary i.c. to the '317' type). The LM317 has a nominal output voltage of 1.2V. Although an output voltage of only 1.2V may not seem very useful, it was designed to be used in the circuit of Fig. 7, to create higher output levels. This is a circuit I'll deal with in greater detail in coming issues.

TEX

## Suitable Books

As I've been dealing with power supplies in this column, I thought I'd find some suitable books from the PW Book Service to enhance on some of the ideas I've touched on today. The first one is a book that is published by Newnes in association with Maplin, meaning that the circuits, shown in *Power Supply Projects* are designed to be practical rather than demonstrations of techniques.

The book *Power Supply Projects*, a collection of previously published articles is broken into four main areas of designs, 'Laboratory Power', 'Chargers', 'Inverters', and 'Miscellaneous'. In the first section on 'Laboratory Power' there are three circuits described in detail, with many diagrams. These three circuits are of varying levels from the simplest multi-output p.s.u. to a more comprehensive 30V 8A unit with digital displays.

In the section on 'Chargers' there are again three



circuits described, a Lead-acid battery charger and two NiCad cell chargers. There are two chargers described suitable for NiCad batteries, a slow 'overnight' charger and a faster charger suitable for the type of cells often found in electrically powered models. In the 'Inverter' section there are two circuits, a 230V a.c. supply, driven from a car battery, and a smaller inverter suitable for driving small fluorescent lamps.

The final section has again two circuits, an 'Intelligent Split Charger' suitable for the second battery commonly fitted to caravans, but charged from the car alternator when coupled up. This circuit would be ideal for a secondary battery for the radio on field days so, as not to discharge the main car battery. The final circuit in the book is a supply suitable for a valved audio power amplifier - not for the faint-hearted with around 350V at 100mA capability. All items are identified by Maplin Part numbers.

## Second Book

The second book, *More Advanced Power Supply*

*Projects*, by R.A. Penfold is from the Babani range and is in spite of its title rather more modest than the first. It does however, cover more ground albeit in rather less detail, in its three 'chapters'. This is a book that acts more as a 'vade mecum' of ideas and data, rather than explicit details of 'how to build'.

Areas covered include voltage and current regulating and limiting, dimmers, switched mode power supplies, and computer controlled power supplies, with many diagrams and illustrations spread throughout the pages. This is a book of ideas and as such is excellent with many topics covered.

Well that's all I have space for this issue. I look forward to seeing you next time, when I shall expand the power supply project I have in mind. So, if you see a cheap CB style p.s.u. at that car boot sale it might be an idea to grab it while you can.



TEX



# Antenna Workshop

## THE MOXON RECTANGLE REVISITED

**Peter Dodd**  
G3LDO says the 'Moxon Rectangle' is an antenna that could be put up in almost any 'back-yard' and could improve your signals.

The 'wingspan' of a conventional Yagi antenna can often be a problem for many locations. A problem that's often addressed by shortening the antenna with loading coils, introducing additional complexity into the design. A simpler method is to reduce the area needed for the elements by bending them to fit it into a smaller space. But can a beam shortened in this way still retain its beam characteristics?

With antennas there is very little that is actually new! An antenna configuration, where the elements of a two-element beam were bent so that the 'wingspan' was halved, was first suggested by **John Reinartz W1QP**, way back in October 1937. **Burton Simson W8CPC**, constructed such an antenna, the elements of which were supported on a wooden frame, allowing the element ends to be folded towards each other. The 14MHz antenna was constructed from copper tubing with brass tuning rods that fitted snugly into the ends of the elements for tuning.

A wire edition of the W1QP/W8CPC two-element antenna was described in 1973 by **VK2ABQ**. In this configuration, the tips of the parasitic and driven elements support each other in the horizontal plane as shown in **Fig. 1**. The insulators are constructed so that the tips of the elements are 6mm apart. According to the VK2ABQ, this capacitive end, coupling the reflector from the driven element although the gap between the tips of the elements, is described as 'not critical'.

### The Moxon Rectangle.

**Les Moxon G6XN**, did a lot of experimental work with the two-element Yagi antennas with bent elements, particularly in optimising the element spacing. However, some of these structures are complex and



difficult to reproduce. A simplified structure devised by **L. B. Cebik W4RNL** (which he has named the Moxon Rectangle) is shown in **Fig. 2**.

The remarkable characteristic of this Moxon rectangle is a very high front-to-back ratio. With a calculated feedpoint

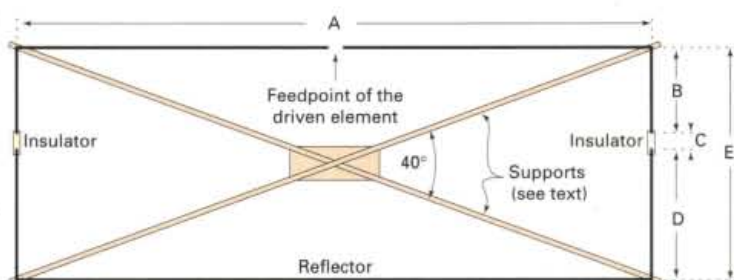


Fig. 2: A single band version of the Moxon Rectangle showing the general construction. The angle of the two element supports is around 40° rather than the 80° often shown elsewhere. See Table 1 for dimensions.

impedance between 56-58Ω, it's close to 50Ω of the ubiquitous coaxial cable. The dimensions for Moxon rectangles for 7-28MHz are given in **Table 1**.

The dimensions are not perfect scaling because the length-to-wire-diameter ratio changes for each band. Free space gain and front-to-back ratio are consistent for all the models, averaging 5.8dBi and greater than 30dB respectively (in free space). The computer model of the W1QP/W8CPC/VK2ABQ arrangement suggests that the driven element/parasitic element coupling is the same as for a wide-spaced two-element Yagi and its performance is shown in **Fig. 3**, where I've compared it to the Moxon Rectangle.

The Moxon Rectangle can be made into a multi-band antenna by interlacing the elements for the different bands on to a common support structure. Unlike the quad, the geometry of the support system ensures optimum spacing on all bands. The dimensions of this antenna are given in **Table 1**. Though I constructed a single band variant to check out the performance of the antenna, to see

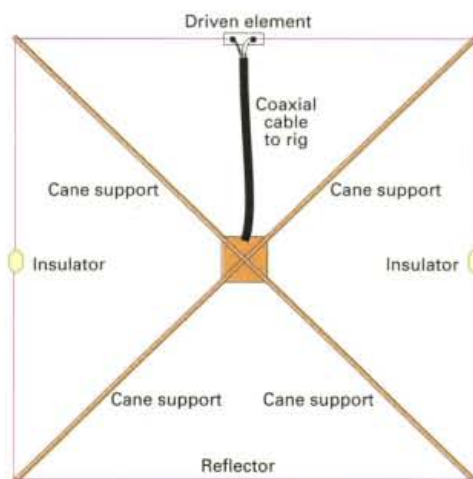


Fig. 1: The basic layout of the W1QP/VK2ABQ antenna.

Table 1

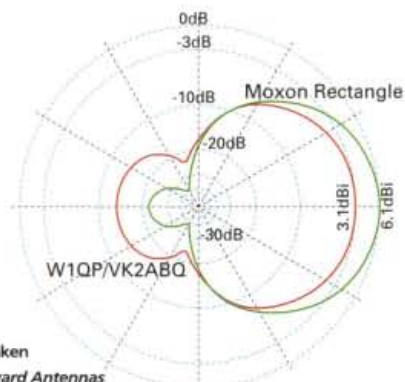
MHz	A (m)	B (m)	C (mm)	D (m)	E (m)
29.50	3.79	0.59	125	0.74	1.45
24.94	4.33	0.67	140	0.84	1.66
21.20	5.00	0.80	158	0.99	1.95
18.12	5.96	0.94	180	1.16	2.28
14.17	7.62	1.22	219	1.48	2.92
10.12	10.66	1.71	305	2.07	4.08
7.05	15.10	2.75	405	2.93	5.73

Table 1: (Left)

Dimensions for the W4RNL designed Moxon Rectangle beam, which has been calculated using EZNEC for a non-critical design. Refer to **Fig. 2**. Allow extra 'wrap-back' wire for fixing to insulators; say, 80mm at each insulator.

Fig. 3: (Right) Computer analysis comparing the performance of the W1QP/VK2ABQ and Moxon Rectangle. (Both antennas have been optimised).

Diagram taken from *Backyard Antennas*





how they compared with the computer model.

## Construction Of Spreaders

The construction of the spreaders for the Moxon Rectangle antenna may be from cane (lightweight bamboo) or fibreglass rod. I chose to use cane because it is easily obtainable from Garden centres and is cheap. The main drawback of cane is that, although it's strong and light, it will deteriorate within a couple of years due to the weather. A view of a single band version of the Moxon Rectangle showing the general construction is shown in the heading photograph.

Most antenna books suggest just using varnish to protect the cane, which is fine provided it does not chip. But if water finds its way under the varnish it cannot evaporate very easily and does its worst. I treat wire antenna cane supports with Cuprinol wood treatment, which displaces water in the cane.

The next problem is fixing the cane to the mast. I use angle section aluminium for this purpose. Two sections, each a little under a metre long, of this aluminium section are required for this antenna. Drill two holes at the centre of each section, their distance apart will depend on the size of the mast or boom and hence the size of the U-bolts. The method of fixing the aluminium angle to the mast is shown in **Fig. 4**.

The support rods are fixed to the ends of the aluminium angle using hose clamps. Rubber or plastic tubing 'cushions' can be used to prevent the clamps damaging the cane or g.r.p. supports. I made the cushions from thin plastic garden hose, cut (100mm long) and sliced longitudinally, making a small plastic rectangle. This is wrapped around the cane and fixed in position with plastic insulating tape.

## Additional Metal

An additional piece of metal is required to complete the construction. Although not absolutely necessary, it is useful to be able to support the coaxial cable between the mast and the wire driven element so that the weight of the cable does not distort the element. This support can be made from aluminium angle although the material shown in Fig. 4 is some sort of curtain rail with a channel, in which I laid the coaxial cable.

Fixing wire element supports at the right angle and finding the exact point to fix the wire elements to the supports is always a problem. This applies to all antennas, such as quads, that use this method of construction. My suggestion is to fix the antenna supports so that the angle in dimension E of Fig. 4 is around 40°, then tighten the U-bolts.

## Single Band Variant

My single band variant is centred on 28.4MHz. The nearest frequency given in Table 1 is 29.5MHz and the total length of both elements is 10.42m. This does not include the additional wire needed to loop back through the insulators. I made a loop of wire with a total length of 10.8m.

Make up the elements in one complete loop complete with insulators. I used 1.5mm



plastic covered wire and stripped the insulation from the ends and fixed these ends to a 'choc-block' style connector to connect to the coaxial cable eventually.

Then, using clothes pegs on the cane where I thought the elements should be fixed, the wire loop was then draped over the element supports and adjusted until the loop was reasonably tight. The antenna should be symmetrical with the connector block centralised.

● Fig. 4: Method of fixing the element supports and the coaxial cable support to the mast.

## Tooth Brush Handles

Two insulators were then made from tooth brush handles. (Don't snigger - the LF (136kHz) group have found this material will take the thousands of volts found on LF transmitting antennas without any problem!). Cut off the brush bits and drill a small hole at each end of the handle large enough to take the wire. You don't have to use toothbrushes, strips of any lightweight insulating material will do for the insulator.

Mark the point on the wire loop that corresponds to where dimensions B and D meet. Cut the wire and insert your insulators. Allow extra wire for length adjustments. You will also have to slightly adjust the position of the clothes pegs.

Connect the coaxial cable to the terminal block and make some initial s.w.r. measurements, during which the antenna should be at least quarter of a wavelength off the ground. You may have to adjust the driven element wire lengths at the insulator to achieve lowest s.w.r. reading at your favourite operating frequency.

## Performs Well

The antenna performs very well with a minimum s.w.r. of around 1.3:1. The front-to-back ratio was around two S-points (12dB). To achieve the front-to-back figures shown in Fig. 2 the antenna needs to be optimised. This procedure is beyond the scope of this article.

Go on! Set up your own Moxon rectangle - it could improve your station! **PW**

## References

- [1] 'Concentrated Directional Antennas for Transmission and Reception', *QST* October 1937, John Reinartz W1QP and Burton Simson W8CPC.
- [2] 'VK2ABQ Antenna' Fred Caton VK2ABQ *Electronics Australia*, October 1973.
- [3] *HF Antennas for all Locations*, 2nd Edn, Les Moxon, G6XN.
- [4] L. B. Cebik W4RNL
- [5] *Backyard Antennas* by Peter Dodd G3LDO.



# A NOVICE IN THE MAKING

Godfrey Bradshaw tells of how he came across the Amateur Radio hobby, almost by accident - you could say that it was through non-encouragement that he stumbled across an interest for the hobby.

"Sea Queue, Sea Queue, Sea Queue. This is gee zero zed zed calling Sea Queue and standing by."

Well, I knew Roy was a little eccentric, but standing on top of a mountain and muttering 'mumbo jumbo' into a little black box seemed a bit much. When this box crackled into life and answered him back, I thought I was flipping my lid!

Such was my introduction to Amateur Radio communication. The magic of that moment along with many others since, finally got me hooked.

We've walked the hills around Lancashire and West Yorkshire for several years now. Once a week, weather permitting, we set off with our packs and roam the hills aided by map and compass - Roy's mobile rig adds significantly to the delights of these walks.

## Polite Conversation

At first, I made polite conversation about his hobby, asking the right sort of questions which Roy answered patiently, never pushing the idea of joining. Over the months, I became more intrigued and my questions more detailed.



My resistance was clearly weakening and the gauntlet was finally thrown down. Beryl, Roy's wife was taking the Novice Licence course and my resistance crumbled.

Following Beryl's success in the course, I joined the Rochdale club, and am now attempting to get to grips with the mystique of Amateur Radio communication. The first night at the club was very friendly but, frankly, rather puzzling.

People were chatting with and at the same time at me about their contacts on 430MHz and saying "Have you tried such and such a frequency Beryl"? These and many other technicalities left me feeling rather bewildered, and very much out of my depth.

However, the enthusiasm of the members was infectious and I just couldn't chicken out, so the next Monday I was there at seven o'clock on the dot! The small science lab, hired from the local community school, was packed - everybody seemed so knowledgeable that I thought I really had made a mistake.

Chris came to the rescue and directed the 'big boys' - those with newly obtained licences and other 'old hands' - to another classroom where Tony would look after them. Us novices grinned sheepishly at each other, while Chris beamed paternally down at us and said: "Yes, I think I can cope with ten of you."

Barbara was the only female at the club, she and her husband have been 'listeners' for a number of years. Harry also seemed 'well up' in certain aspects of electronics, so I still felt under-confident, especially as my 'O' level physics of over 40 years ago was a little rusty - even the six young lads seemed more in tune with the subject!

● "As the evening progressed we all learned some new concepts and the thrill of involvement in a new and exciting hobby took over".

## New Concepts

As the evening progressed we all learned some new concepts and the thrill of involvement in a new and exciting hobby took over. From his 'junk box' Chris emptied a variety of tiny objects onto the desk: "What do you think this is?"

A bit of silvery wire with a coloured blob in the middle was held up. Head-shakes from most of us, Harry ventured: "It's a resistor".

"Yes, it is a resistor. Notice the coloured bands in the middle? They tell us the value of the resistor".

The 'blob' was gingerly passed around and having left my reading glasses at home, the coloured bands were a blur, however, all was not lost. Chris said that unless you were a fanatic, you didn't need to learn the colour code of the bands by heart.

Phew! What a relief. Other objects were passed around for our scrutiny, and knowledgeable guesswork:

"That's a switch".

"Quite right".

"No, that's not a resistor, it's a diode. Its main function is to prevent electric current flowing the wrong way round a circuit".

Bits of elementary physics were coming back now and I understood most of what he was saying. A transformer was held up and I knew what that was - and its function too.

Most of the young lads recognised the capacitor, which still held some mystery for me. Strangely

enough, I felt more comfortable with the shape and idea of a transistor.

## Second Half

The second half of the evening gave some of us the opportunity to show our skill - or lack of it - with the soldering iron. Chris said: "You 'oldies' can start on this, you'll need less supervising". I'm sure he said it tongue-in-cheek and luckily for us, Dennis came in from the other classroom to help out.

"Push the seven brass drawing pins part way into your block of wood, then tin the tops". The first part was easy, years of practice on display boards gave me an edge.

Tinning the tops needed a mite more delicacy of touch though and my joy was boundless as a lovely silvery pool spread over the tops. "Now cut some short lengths of this plastic coated wire, bare the ends and tin them and when you've done that, solder them to the pins".

Cutting the wire - a doddle - just like cutting string. Baring the ends - oh dear: "How much of this wire can we use?"

I managed it without using too much wire and tinning the ends was fairly straightforward. Joining the tinned end to a pin? Again, fairly straightforward.

"Now join two ends to one pin". Having three hands can be a definite asset at certain times in ones life and having three at this moment seemed an absolute necessity.

Dennis to the rescue with a couple of tips: "Lead one wire under the pin, bend the bared end over the top then push the pin fully down. The second wire can then be soldered next to it". So simple really and it works.

"There's a couple of sheets of instructions about the simple radio you've got to make, pick them up on your way out. You won't be able to get all the components this week, the tiny tuning capacitors are hard to get, but the local shop is ordering them specially and they should be in by next week". I could hardly wait to get my hands on them and make a start.

So, that's how I became involved in Amateur Radio and how I got started on my Novice career. I had a lot of fun learning and haven't looked back since - I don't think you ever stop learning in this hobby, I guess that's the beauty of it!

PW



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These trap antennas are made in 2, 4, 6, 8, and 10 trap versions. Standard 2 trap designs have low VSWR on 2 bands, and operate with a higher VSWR on up to another (depending on model) 3 bands. Versions with 4, 6, 8 and 10 traps will have a low VSWR on more bands. An antenna tuner is usually not required.

These antennas are commercial quality, and are built to last. Heavy duty stranded copper-coated steel wire is used, with low loss end insulators, and a choice of Centre Connector or Balun which accept a standard PL259 connector. Band switching is automatic, and the antennas can be used as an Inverted 'V' or flat top antenna.

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# Value & Vintage

This month we welcome Phil Cadman G4JCP back into the PW 'vintage' wireless shop. And he welcomes you with the following question: "Warm sunny Sunday afternoons: what do they remind you of?"

Fig. 1: A thermionic curiosity - to find out what it is ... see G4JCP's comments in the text!

What's the answer to my question? Mobile rallies of course! I have happy memories of driving home from rallies! Car windows open, the aroma of new mown grass mingling with the smell of valved junk strewn all over the back seat.

The rally season is now getting into in full swing and valve enthusiasts are diligently searching for valve-related goodies. So I thought it might be a good time to answer the question: how long do 'n.o.s.' valves last?

Before I give my opinion, I'd better point out that the abbreviation n.o.s. is short for **new old stock**. A bit of a contradiction you might think, but it simply means a valve which is old-stock but has never been used. (Other than, perhaps, for brief tests).

The n.o.s. designation is usually applied to valves made by the major valve manufacturers during the heyday of valve production. So, now you know!

## New In Box

There's a similar abbreviation: 'n.i.b.'. That's short for **new in box** and simply means a valve which is boxed and unused. Although a n.i.b. valve can also be n.o.s. (confusing, isn't it), it's most likely that the valve will be of recent manufacture.

Most n.o.s. valves have their original makers' boxes but occasionally they'll have new, plain boxes. Don't let this put you off if the valve has CV or other military type-numbering.

A huge number of valves were supplied to the British and American military over the years and surplus stocks were periodically sold off. Small valves were often bulk-packed in large trays. It's these you might find in new, plain boxes.

Don't forget, many valves with CV numbers have common equivalents. You do always take a valve-equivalents book with you to rallies, don't you?

So, just how long do valves last if they're not used? The short answer is: **a very long time indeed!** In my experience - and I have to say that because there isn't universal agreement on this

point - old but unused valves suffer from just two real problems: physical damage and the ingress of gas.

Fortunately, both problems can usually be caught by a thorough visual examination. Just how thorough you need to be is, of course, dependent on the number of valves involved and their value.

In essence: if a valve looks OK then it probably is OK. But if you're spending a substantial amount of money, it's advisable to get some sort of guarantee from the seller.

## What To Look For

Although physical damage can lead to air getting into the envelope - hit a valve with a hammer (not recommended!) and you'll see what I mean - that's not **always** the outcome. A valve can be subject to an impact or other stress such that its internal structure is displaced or damaged.

Here's one, rather extreme, example: I was once given several used 813s. They're classic, directly-heated transmitting valves. When I checked, one had an open-circuit filament.

A quick look revealed the cause - the whole of the bottom part of the internal structure was displaced to one side! Although I couldn't quite see, I assume the filament connections had sheared. How the valve managed to withstand such a severe impact without breaking is still a complete mystery to me.

To check for physical damage you should carefully examine the internal structure for any signs of misalignment or movement, including looking for any loose debris within the glass envelope. Ensure that the top cap - if the valve has one - is secure and also check around the pins.

Modern, all-glass valves have soft pins which are easily bent. **Great care is needed** when attempting to straighten severely or sharply bent pins. Without the proper jigs it's all too easy to crack the glass surrounding the pin, so allowing air to enter. I know, I've ruined several valves this way.

## Separate Bases

Valves with separate bases - particularly those over 50 years old - are prone to having their bases come loose. Carefully check for any relative movement between the envelope and the base and if there is anything but the slightest movement, accept the fact that the valve might be faulty.

Apart from being the result of physical damage, air molecules can also find their way into a valve through tiny cracks or fissures. While some might have been present at the time of manufacture, others can be produced by thermal cycling over long periods of time. More controversially, I have heard it mentioned that it might be possible for very light gasses - like helium - **to actually diffuse** through the glass envelope. **Does anyone know if that's true?**

If a significant quantity of gas has got into the valve, the getter will have turned partially, or wholly, milky-white. A portion may even have turned powdery and become detached from the glass. Such a valve is unusable. But hold on ... just what is the getter?

In the early days, engineers found that the vacuum produced by pumping was not maintained for long once a valve was in operation. Investigations revealed that gas molecules trapped (occluded) in the metallic structure, were gradually released while the valve was in use. The hotter a valve ran, the quicker this happened. Naturally, power valves were particularly affected.

Gas molecules are not much of a problem in themselves, but once released they are soon hit by one (or more) electrons. Such an impact can easily dislodge an electron from the gas molecule itself, so producing an ion. With its net positive charge, the ion is strongly attracted to the negatively charged filament.

An ion is an awful lot heavier than an electron, and considerable damage - relatively speaking - can be caused when an ion hits the filament. Early valve

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Happy hunting!





makers soon realised that the continued bombardment of the filament by positive ions produced thin spots. These eventually led to the filament burning out.

The problem is in no way limited to directly-heated valves. Indirectly heated cathodes have fragile emissive surfaces which are very easily damaged by ion bombardment. And regardless of the type of valve, if the ion density is high enough the valve can internally arc over.

Unless power is removed immediately, the problem results in catastrophic damage to the valve structure. It's also quite likely that further damage can also occur to the equipment in which the valve is being used.

To solve the problem of occluded gas, a method known as gettering was devised. With this process a small piece of magnesium is welded on to one of the electrodes during assembly of the valve.

After pumping and sealing, the valve structure is placed in an intense h.f. magnetic field. The large induced currents raise the temperature of the metal parts of the electrode structure so allowing many occluded gas molecules to escape. Eventually, the temperature becomes high enough to turn the magnesium into gas. This is known as 'flashing the getter'.

The tiny explosion drives out atoms of magnesium which come to rest on the inside surface of the glass envelope forming a silver, mirror-like coating. As the magnesium atoms move outwards they capture the gas molecules that have been liberated by the r.f. heating process.

The liberated molecules are then held fast by the magnesium - until the valve gets hot enough for them to escape again. Unfortunately, with power valves and modern miniatures, that's precisely what can happen.

Fortunately, the problem was soon solved by switching to barium as the getter material. Flashing with barium is largely the same as flashing with magnesium but unlike magnesium, barium atoms continue to mop-up stray gas molecules long after flashing.

Valves with barium getters - which are pretty much the only ones you're likely to come across at rallies - have a 'blackish' deposit on the inside of the glass envelope. However, quite often this can take on a silvery look too. But don't be fooled, **it's nothing like the genuine**, all-silver colour of a flashed magnesium getter.

## Thermionic Curiosities

While you're scouting for valves, do keep a look out for Thermionic curiosities like the one shown in Fig. 1. Some time ago I managed to buy two of these intriguing devices for all of 50p each. Both were in rather lovely, unopened, original boxes. (See Fig. 2).

They're type 8012, about which my *RCA Transmitting Manual* simply says: "Power triode for power amplifier and oscillator use".

Full operation up to 500MHz (up to 600MHz at 70% maximum ratings) and 1000V maximum anode voltage; 40W maximum anode dissipation and 80mA maximum cathode current. Forced air cooling is required and the anode shows an orange-red colour at maximum ratings.

As you can see from Fig. 1, the anode structure is very small for a valve with a dissipation of 40W. No wonder the anode glows red at maximum power!

The 'arms' on each side connect with the anode and control grid. The cathode being directly heated with a centre tap. I wonder what it would be like in a 432MHz amplifier ...?

Unfortunately, as I found out, even with n.o.s.

valves you can't be too careful. On opening the sealed boxes, I found one of the valves had a milky getter. Still, for 50p, I wasn't too upset. By the way, if you look where I'm holding the valve in Fig. 1, both the flashed getter and the pinch (where the envelope is evacuated and then sealed) are clearly visible.

## Grundig 700L

Returning briefly to a previous subject - that of valved tape recorders - I now have in my collection something of a minor classic.

It's a Grundig 'Reporter', model 700L. A two-speed, twin-track mono machine. You can see a photograph in Fig. 3.

As you might guess from its name, the recorder is meant for portable use. With sturdy case, strong carrying handle and, inside, shock-absorbing chassis mounts. Only trouble is - it weighs over 35lbs (16kg to you youngsters) and that's without tape and accessories!

I'd imagine any newspaper or radio reporter who used the machine for any length of time probably ended-up with one arm a good deal longer than the other!

One interesting point is the method of changing speed. Most tape recorders usually have a stepped pulley with two (or more) different diameters. Not so here.

The 700L uses an electrically-switchable, two-speed deck motor. While this simplifies the mechanical design of the tape deck, it has the unfortunate consequence of halving the fast-forward and rewind speeds as well as the capstan speed. Annoying, if you're in a hurry!

When I first saw the recorder I couldn't find the volume control\*. Common sense said it had to have one somewhere, but it took me an embarrassingly long time to find it. It's shown in Fig. 4 and is the knurled ring surrounding the recording level indicator ...!

*\* Phil and I shared the joke here - I had the same problem in finding the volume control on the 700L in my own collection. A very clever idea - until the numbering on the escutcheon ring fades with time!*  
**Editor.**

Ah, seems I'm about to be 'gettered' by the end of the page. So, cheerio until it's my turn in the 'shop' again.

PWW



● Fig. 2: A valve 'new in box'... but how new? Phil explains the meaning behind 'n.i.b.'



● Fig. 3: Just right for 'strong-armed' journalists! The Grundig 'Reporter' dating from the 1950s (see text).



● Fig. 4: Believe it or not - there IS a volume control hidden around the 'Magic Eye' recording indicator! It fooled G4JCP and G3XFD. In fact Phil G4JCP even had to check on the circuit diagram to see if there was a volume control fitted! (see text).



## A Simple

# Antenna Test Setup

Or, as its author Dave Coomber G8UYZ says "Home - Home on the (Test) Range"

You're probably fed-up of hearing it, but summer and warmer weather is fast approaching and with this in mind, Dave Coomber G8UYZ says it's about time that you took another look at that antenna design you've been working on over the long, dreary winter days. But first, take a look at his idea for 'A Simple Antenna Test Set-Up'.

The warm weather can often bring with it thoughts of realising that antenna design, dreamed up, or read about during the winter months. Whilst most of us get by with adjustments to v.s.w.r., it's a fact that not all antennas radiate as efficiently as perhaps they should. This project is to show you how to check the effectiveness of any antenna.

An antenna should present a good match to the feeding coaxial line, provided that it is the correct impedance. Note! That whilst it is possible to get a reasonable match by tinkering with the length of the feeder, you'll be dissipating some of your hard-won r.f. in the coaxial cable with the resultant loss of signals generally and the potential for TVI, etc.

What we need, is some way to ensure that the new antenna has maximum radiation, before erection. The purpose of this article is to show you a simple bit of kit to test your new antenna design for effectiveness before you stick it on the chimney.

You will need enough space in your garden to mount a test dipole, a bit of half-decent coaxial cable\* and some sort of field strength meter (f.s.m.). Just how much space is needed will depend on which bands your antenna is for. The f.s.m. should be used in the

'far field' of the antenna under test (a.u.t.) and this is dependant on the frequency used and type of antenna.

To be in the far-field, a rule of thumb is to take the wavelength, multiply it by six, giving about 12m for a 144MHz antenna. However, adequate measurements can usually be taken at a slightly lesser distance, particularly for simple antennas such as the 'Slim-Jim' and the like. In the case of a beam type of antenna, you'd be better off at least ten wavelengths away.

## Test Dipole

The prototype simple receiving test dipole was made for 144MHz band operation but dimensions can easily be scaled to suit. The antenna boils down to a simple dipole feeding into a sleeve balun (constructed from a quarter wavelength of copper water pipe) which is also useful to mount the antenna on a stand. The elements are secured by plastic cable clamps in an insulated box mounted at one end of the pipe forming the balun as outlined in Fig. 1.

Just how you build the antenna is down to what you may have in the way of bits in your 'junk-box'. I used two seven-section telescopic antennas making it easier to store away. The whip antennas themselves are about 6mm in diameter at the bottom section and fit very well into the cable clamps. However, you could use thick wire and banana plugs (or a terminal block) almost as easily.

## Construction

Now to the construction. Drill two opposite sides of the plastic box to take the cable glands and a suitable-sized hole in the box to mount the copper pipe. It's important that the copper pipe is thoroughly clean, inside and out so, if you found a bit of spare pipe, clean it out with wire wool or some similar abrasive. The pipe should be at least twice the

diameter of the coaxial cable used inside the balun, so don't try and use a bit of UR67 in a 15mm pipe. It can ruin the action of the balun section.

You will need a 495mm length (for a 144MHz test system). I used a water tank fitting to terminate the pipe into the box, but you can file a few notches in the end, bend them over to form tangs and fit to the box with a few screws. Cut or file off the surplus, making sure that the pipe is 495mm long and the ends are smooth and clean so, the cable doesn't get damaged on entry into the box. A length of surplus plastic sleeving over the end of the cable will ensure that there is no damage where it enters the box.

The type of the coaxial socket is down to personal taste, I use a BNC type because I had one and I've found it solders nicely into 15mm pipe. If you use 22mm pipe, an N-type plug will fit quite well. I've found that other types of connectors is a bit of a trial, unless you can get the cable-entry types. If you use 22mm pipe and an N-type plug, you'll need a good vice to press the knurled ring into the pipe and use a back-to-back socket to terminate the cable's plug. The copper of the pipe will expand slightly to take the plug's ring.

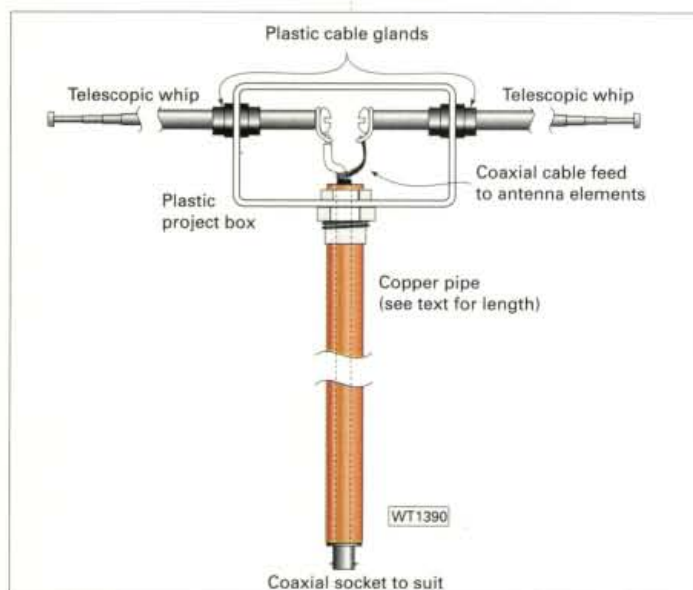
## Coaxial Socket

Connect the cable to the coaxial socket and mount it in the copper pipe, leaving just enough to work with. Separate the inner from the outer. Tin the ends and fix solder tags, where used. Solder the coaxial socket into the free end of the pipe. If you want a belt-and-braces approach to the balun, use a ferrite sleeve inside the pipe, secured by plastic grommets on the cable and wrapped up in a bit of good tape (or heat shrink).

Ferrite sleeves are available from a variety of sources. However, if you make the balun the right length (quarter wave) the ferrite sleeves will not be necessary. Mount the telescopic whips into the cable glands. I

Test your own antennas and separate fact from fiction!

Fig. 1: A simple testing dipole will cover one or more bands depending on dimensions and building method. See text for more details.





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# A Simple Antenna Test Setup

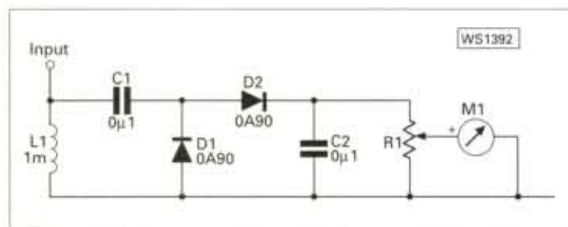


Fig 2: A simple variable relative field strength meter. For best results the meter, with this simple set-up, should be a 50-100µA movement. For more accurate matching, change L1 to a 51 or 75Ω non-inductive resistor.

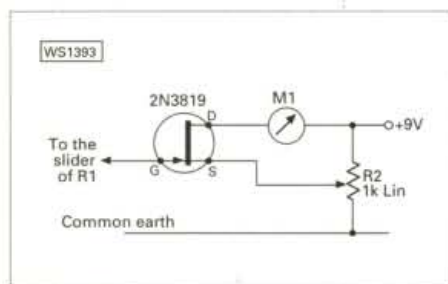


Fig 3: Adding a simple d.c. amplifier can increase the sensitivity of the f.s.m. See text for adding this to the f.s.m. Meter M1 may be between 200µA and 1mA full scale deflection.

separated the whips about equal to the diameter of the pipe. Screw the

solder-tags to the end of the whips (M3 screws on the Maplin whips). Take care not to over-tighten the screws, then use insulated material to give the unit stability.

Clamp up the cable glands and fix the front of the box in place. Your antenna is now ready for use. Each element should be about

500mm long, including the bit in the box. If you decide to test it with a v.s.w.r. meter, you should get a reading of about 1.4:1 (it's a basic 72/75Ω antenna). Don't use a lot of power, one watt is more than enough. You might get the

v.s.w.r. down by careful adjustment of the whip element lengths but frankly, I found it not worth the effort.

If you want to add a touch of individuality, try some heat-shrink tubing on the balun pipe section, but take care not to melt the plastic of the box - or your fingers! All you need now is some coaxial cable to connect it to the field strength meter. Almost any cable will do, even old foam-filled TV feeder.

I used 50Ω coaxial just because I had some lying about. I realise that the antenna impedance is 75Ω, but the mismatch is tolerable, since it is not intended definitive reading only comparisons. If you build this unit for 430MHz use, low-loss cable would be better, although you won't need quite as much of it because the far field boundary is that much closer.

## Mounting The Antennas

Another problem often encountered by many, is mounting the antennas somewhere suitable. Unless you are blessed with a very co-operative neighbour in the matter of using the garden fence, some sort of stand for the antenna will be of use. A simple plate of wood (I used a piece of old kitchen work-top) and a couple of metres of 38mm white or grey plastic waste pipe make an adequate mount.

Using an Aluminium pipe to

mount the antenna, will probably degrade the performance, but I've not checked that out thoroughly. Drill a suitable hole in the pipe big enough to take the balun section. You want the centre of the antenna to be about two metres from the ground.

Siting the antenna is as much a matter of cable length and taste as circumstances. It should be as far away from surrounding objects or foliage as possible. At my location, the nearest wall is two metres away from the usual position and it seems to work well enough.

Lastly, do remember to make sure that the antennas are in line. It's no good mounting your test antenna on the garden shed roof, only to try and read what's going on from the lawn, some six feet below the axis (I know, I've tried it!)

## Field Strength Meter

Finally you need the f.s.m. (which I've already mentioned) for which there are many circuits around for this useful piece of test gear. Magazines like *PW*, *ARRL Antenna Manual* and others have illustrated so many, that it is almost possible to re-invent the wheel. A little care with making this can repay a hundred-fold and a good-quality meter (often found at your local rally for a modest sum) can make life a great deal easier. Remember: the bigger the meter, the easier it is to see.

The meter circuit is rather like a crystal set. This particular circuit is a simple full-wave detector, chosen to overcome the lack of sensitivity in the original meter used. See Fig. 2 the circuit. Carefully made, it should respond to signals above

500MHz. You can match the diodes easily using an analogue ohm meter; they need to be about the same forward resistance (using a digital meter can be a bit tricky). When wiring it all up, remember to keep the connections as short as possible, at least before the d.c. gets out to the meter.

Put it all together using a bit of wire in the antenna socket, place the box somewhere near a source of r.f. (a hand-held radio is very useful). You should see the meter flick when you briefly transmit. Adjust the sensitivity control, R1, for a less than end-stopping reading. If you fear that you will probably do just that in one day, put a couple of silicon diodes back-to-back across the meter terminals.

## Options

It should be possible to build the complete works, including the d.c. amplifier into the test antenna box, in which case all you need is an external box to take the meter, battery and its sensitivity pot, using ordinary twin flex to connect the two.

Naturally, there is no need for the balun and associated coaxial. It is also possible to fit a switch which can direct the d.c. to an external meter, but these sorts of options are best left to the individual constructor.

A simple d.c. amplifier is shown on Fig. 3. It connects in place of the 20kΩ variable variable resistor, R1 (Fig. 2). I've found that a 1mA meter works very well with this circuit, but a lower value (say 200µA) will probably extend battery life. Optionally the amplifier input could come from the slider of R1 instead.

## In Use

In use, mount the f.s.m. antenna in position with the element lengths set to 495mm. Erect the antenna to be tested (a.u.t.) so it is in line with and as far away as you can get from the f.s.m. antenna. Using as short a lead as possible from your transmitter to the a.u.t. and adjust its orientation for maximum signal strength, which should occur at the point of best matching, but not always.

Use the minimum transmitter power to achieve an adequate reading. Don't forget that you should not be too close to the TX antenna, not only for safety, but because the human body will often detune an antenna.

Well that's a simple antenna 'test-range' set up - it's not as difficult as you thought now, is it? So, get out in the garden testing those antennas for maximum efficiency!

**PW**

*"... Puzzled by the claims of antenna designers and manufacturers? Build this evaluation project and you won't be any more! ..."*



# Book Profiles

## Backyard Antennas Peter Dodd G3LDO

Sub-titled 'Antenna solutions for your location', **Peter Dodd G3LDO's Backyard Antennas** is just the book for those of you seeking to learn more about the right antenna set-up for your particular location. This is especially so if you have to "overcome site (usually size) restrictions".

One of *Practical Wireless*' most respected 'Antenna Workshop' authors, Peter Dodd has some excellent ideas in which you can make the best of your radio equipment with what sometimes turns out to be the most compact of antennas. On page 42 of this issue he discusses the 'Moxon Rectangle' antenna, so if you would like some idea of what you can expect from his book, take a look at the article.

The Moxon Rectangle antenna is just one of the antenna ideas covered in this first class book. In the Preface, Peter Dodd states: "This book is not a comprehensive book about antennas. The number of different antennas described is limited to those whose performance is well known

and whose construction is relatively easy". So, if you're looking for complicated designs, or the A-Z of antennas then this book isn't the one for you.

However, if you would like some easy-to-build antenna designs which you can have a go at then *Backyard*

*Antennas* is the book for you.

Some of the chapters of this book cover the following topics: 'Overcoming the limitations'; 'Centre-fed antennas for HF'; 'End-fed and Marconi antennas for HF and LF'; 'Matching and tuning'; 'Loops and slot antennas for HF'; 'Small

rotary beam antennas for HF'; 'VHF and UHF antennas'; 'Antenna materials, construction and supports'; 'Transmission lines and baluns' and 'Estimating and measuring antenna performance'.

At £18.99, this antenna book will be a very useful addition to your shack book

shelf and is well illustrated with clear diagrams and pictures. *Backyard Antennas* comes **Highly Recommended**.

## Antenna Impedance Matching Wilfred N. Caron

In the introduction of this American book, *Antenna Impedance Matching*, Wilfred Caron states that "Proper impedance matching of an antenna to a transmission line is vital to the design of radar, ECM, radio and communication equipment and systems". He goes on to say that despite the importance of correct impedance matching, it is one of the least understood aspects of "electronics and radio engineering".

If you are one of the Radio Amateurs who doesn't understand impedance matching, then perhaps this ARRL book is a good place for you to start. The book starts in the most logical place - with 'The Transmission Line' - and takes you through 'The Transmission Line As A Circuit Element', 'The Smith Chart', 'Impedance Matching Techniques', 'Matching Over A Band Of Frequencies'.

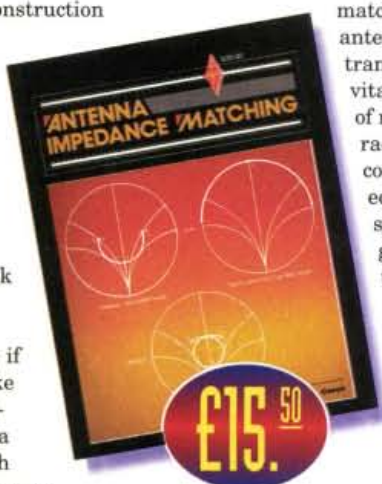
The book finishes up with the biggest chapter in the whole book dedicated to 'Matching Solutions' and also has a seventh and final chapter entitled 'Construction Of Overlay Tracing Box'. Altogether, this book would be a useful addition to any shack, but if you specifically need to brush up on your antenna impedance matching then why not consider this well illustrated book (always keeping in mind its American

As usual, the PW Editorial staff have arranged some interesting 'Book Profiles' for you this month, ranging from books covering antennas to books on scanning. We have three new books from the RSGB this month, one of which is by one of our very own 'Antenna Workshop' authors: Peter Dodd G3LDO.

So, if you would like to more about what's in Peter Dodd G3LDO's *Backyard Antennas*, Ian Poole G3YWX's *Guide To VHF/UHF Amateur Radio*, Richard Allport's *Ultimate Scanning Guide* (in conjunction with *Radio Today*), Bill Robertson's *Scanners 4* and Wilfred N. Caron's *Antenna Impedance Matching* - then cast your eyes over these two pages.

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PAGE 74





## Telephone (01202) 659930

origins of course!). *Antenna Impedance Matching* comes **Recommended**.

### Guide To VHF/UHF Amateur Radio Ian Poole G3YWX

Ian Poole G3YWX, PW's regular 'What Is A?' author has written another helpful book for Radio Amateurs, this time it is simply called *Guide To VHF/UHF Amateur Radio* and is just that - a guide to v.h.f./u.h.f. radio. As Ian states in the book, these two bands are "some of the most interesting, useful and challenging" and if you would like to learn more about operating on these bands then this book could be worth a second look.

The purpose of this guide to v.h.f./u.h.f. Amateur Radio is to help you, the reader, "get the most from your v.h.f./u.h.f. station". Making the most of your station can be done in many ways, Ian says, of which "studying the weather to predict greatly enhanced propagation" is just one aspect.

The book carries a very useful introduction which explains the different reasons why many Radio Amateurs and short wave listeners (s.w.l.s) use the v.h.f. and u.h.f. bands. It also looks into the growth in popularity of these bands and how you can combine radio and computing on the v.h.f./u.h.f. bands.

Some of the chapters in *Guide To VHF/UHF Amateur Radio* include: 'Propagation'; 'Bands and band plans'; 'Receivers and transmitters'; 'Antennas'; 'Mobile and repeater operation'; 'DXing' and 'Data communications'. If you are a regular follower of our monthly 'VHF Report' column, then it could be worth

your while to boost your knowledge of the v.h.f./u.h.f. bands with this book. *Guide To VHF/UHF Amateur Radio* comes **Recommended**.

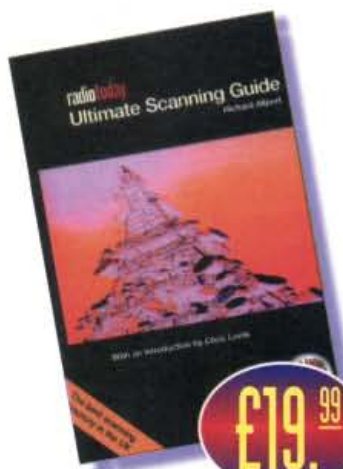
### Ultimate Scanning Guide Richard Allport

Published by the RSGB under the *Radio Today* umbrella, the *Ultimate Scanning Guide* claims to be "The best scanning directory in the UK" and also carries a free CDROM. The CDROM does, however, only contain **exactly** the same text as the book so if you expected any little extras

then you may be disappointed.

The v.h.f. and u.h.f. bands - the bands that operate above 30MHz - contain a collection of varying services - from broadcast, amateur and emergency services to taxis, pagers and anyone using radio for short range communication. "It is

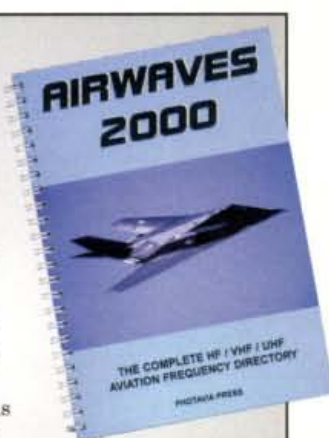
easy to monitor these signals with an inexpensive receiver" - a receiver termed as a scanner, so the book claims.



### New In Airwaves 2000

As this issue of PW goes to press, this brand new book has just arrived at the PW offices. *Airwaves 2000* - 'The Complete HF/VHF/UHF Aviation Frequency Directory' is now in stock here at the PW Book Store.

The seventh annual edition of *Airwaves* has had its "annual overhaul and hundreds of additions and changes have been made", the introduction to the book claims. So, if you would like to get your hands on a copy then please call **Shelagh or Jean** on (01202) 659930 or write to the **Book Store, Arrowsmith Court, Station Approach, Broadstone BH18 8PW**. *Airwaves 2000* costs just **£9.95 plus £1.50 P&P** (one book **UK only** - for details of overseas postal charges please see the Order Form on p.74.).



£9.95

"The *Ultimate Scanning Guide* contains a huge listing of thousands of frequencies and who uses them, as well as reviews of scanners, an introduction to scanning and what's legal to listen to". If you just want an up-to-date scanning guide then this book would be a useful addition to any scanning enthusiast's book shelf. *Ultimate Scanning Guide* comes **Recommended**.

### Scanners 4 - Scanning Into The Future Bill Robertson

"The *Scanners* series of books have been consistently bestsellers, achieving the reputation of being the most comprehensive guides ever published on the subject in Britain". Published by **Nexus Special Interests**, *Scanners 4 - Scanning Into The Future*, is the follow up to *Scanners 3* and if you have ever read any past *Scanners* books and found them to be useful, then this book won't disappoint you.

*Scanners 4* has "added a number of sections incorporating new communications techniques thus giving this book its title of *Scanning Into The Future*". Details of changes to the radio spectrum as well as new frequency allocations are given so that you the scanning

enthusiast will know exactly where to listen.

Further sections on trunked radio systems and pagers and their frequency allocations has been included in this edition of *Scanners* in response to the "increase in digital and computer-controlled radio communications". Some of the chapters in this book include: 'Understanding radio'; 'Aerials'; 'Radio systems explained'; 'UK frequency allocations'; 'Satellites on your scanner' and many more.

So, if you would like to look into the scanning part of the radio hobby, why not consider adding a copy of *Scanners 4* to your radio reading? *Scanners 4* comes **Highly Recommended**.



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# RadioScene

## VHF REPORT

REPORTS & INFORMATION BY THE LAST SATURDAY OF EACH MONTH:

DAVID BUTLER G4ASR  
YEW TREE COTTAGE  
LOWER MAESCOED  
HEREFORDSHIRE HR2 0HP

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E-MAIL: g4asr@btinternet.com

THIS MONTH DAVID BUTLER G4ASR  
TAKES A LOOK AT RECENT DX OPENINGS  
TO AFRICA ON THE 50MHz BAND AND TO  
SPAIN ON THE 144MHz BAND.

DAVID BUTLER G4ASR  
BRINGS YOU LOADS OF  
VHF BAND REPORTS  
FROM AROUND THE  
GLOBE.

In previous months I've been discussing the reasons for the lack of any substantial DX activity on the 50MHz band. I did note that for a few weeks either side of the spring equinox the path via trans-equatorial propagation (t.e.p.) to central and southern Africa should be much improved.

The reason for the improvement is that the t.e.p. mode utilises two F-layer ionised belts located 10-15° north and south of the geomagnetic equator. Although the position of these ionised regions are independent of the time of year, they're normally unbalanced in intensity as the Sun will favour either one or other region.

However, during the period of the autumn and spring equinoxes (September 23 and March 21) when the sun crosses the equator, the intensity of the two regions are at their greatest. This is because the length of day and night everywhere are of equal duration and therefore the ionisation effects are similarly balanced.

For a few weeks either side of March 21 then, the intensity of the two regions enhances the possibility of stations located around 4000km either side of the geomagnetic equator to contact each other. Fortunately this did indeed prove to be the case with QSOs being made from the UK with stations located in Botswana (A22), Equatorial Guinea (3C), Gabon (TR8), Namibia (V51), South Africa (ZS) and Zimbabwe (Z22).

High latitude east-west contacts, such as between Australasia and Europe via F2-propagation were virtually non-existent. Having said that, there were some extremely brief openings from the UK to Australia (VK), Hawaii (KH), Indonesia (YB) and Sabah, Malaysia (9M6).

## BAND REPORTS

Now on to band reports and I'll take a look at some of those openings on the 50MHz band. From your reports it seems that the band was open to areas outside of Europe on March 2, 7-9, 12-13, 19-20, 24 and 27.

On March 2 there was a Sporadic-E (Sp-E) opening into the Mediterranean area with a number of stations reporting contacts with IS05WW (JN40) on Sardinia. This enabled signals to be coupled into the southerly t.e.p. path extending propagation into South Africa.

Neil Carr G0JHC (IO83) reports



Fig. 1: The 144MHz antennas at the QTH of EA3LL.

that he worked into the ZS6 call area and heard stations in Namibia and Zimbabwe. The linked propagation extended as far north as Scotland allowing the station of GM3WOJ (IO77) to contact ZS6AXT (KG33) over a path of 9700km.

Openings were reported on March 7 and March 9 to Equatorial Guinea (3C5I), Gabon (TR0A beacon) and South Africa (ZS6PJS), but these events were very brief and geographically selective. Propagation was slightly better between these dates with an hour-long opening around midday on

March 8.

Among the stations worked from G, GM and GW were ZS3C (KG21), ZS6AVP (KG44), ZS6AXT, ZS6PJS (KG46), ZS6RWD (KG33), ZS6WB (KG44) and 3C5I (JJ43). Jamie Ashford GW7SMV (IO81) reports that before the opening he was hearing (very strongly) Arabic communications around 45MHz and then a little later he copied video signals at 48MHz peaking up to S9.

The video signals, by the way, are detected with the receiver operating in c.w. or s.s.b. mode and often sound like a multitude of ringing carriers. At 1115UTC Jamie turned his antenna to the south and immediately heard the ZS6DN beacon (50.050MHz) peaking 599.

Jamie then went on to work a total of five South African stations, the best being ZS3C at a distance of around 9200km. Similar openings were recorded on March 12-13 with stations in central and southern Africa being worked from the UK and the station of TR8CA put in an appearance during the afternoon of both days.

## DORMANT STATE

The 50MHz band then returned to its dormant state for one week before opening up again on March 19. The first signs of any DX came at 0830UTC when stations in southern England began copying Australian video signals on 47.172MHz.

Unlike the southerly propagation to Africa, this east-west path was made possible by ionisation in the F2-layer. At 0900UTC the expedition team 9M6BAA, operating from Sabah, Malaysia (OJ85) worked eight Dutch stations PA0HIP, PA3HDP, PA5EA, PA5TA, PA7FM, PA9KT, PE1LCH and PE1MCD.

The team, consisting of G4MJS, G4SHF, G4XUM and G6YIN from the Blacksheep Contest Group, ably assisted by local stations 9M6CT, 9M6DU, 9M6MV and YB0US, were on their first day of a two week operation. For use on the 50MHz band they had a Yaesu FT-847 transceiver, a Henry Radio 2006A amplifier and an M-Squared 6M7JHV long Yagi on top of a 20m high tower.

At 0952UTC the station of G8TIC (IO82) heard a meteor enhanced burst of signal from 9M6BAA peaking 419 but unfortunately nothing else. Bert PA0LPE reported that around the same time he managed to work a total of ten VK4 stations all with very strong S9 signals.

For over an hour, stations in Belgium, Holland and Germany were able to make contacts into the VK4 and VK6 call areas although no signals were reported in the UK. However, at 1035UTC Keith G4FUF (JO01) heard YC1EHR in Indonesia peaking 559 on c.w. and at 1037UTC he made an s.s.b. contact

with the station of YF100.

Keith mentioned that the signal had a very distinctive auroral buzz-type sound. A few minutes later at 1050UTC Keith heard YB5QZ on c.w. but couldn't make a two-way QSO.

Throughout all of these events there was reported to be a Sp-E opening, although it was a possibility that this was actually backscatter from the F2-layer. Countries worked from the UK via this propagation mode included Germany (DL), France (F), Switzerland (HB9), Czech Republic (OK) and Poland (SP).

To round off the day there was a brief t.e.p. opening to Gabon between 1530-1600UTC with the station of TR8XX (JJ40) making a few c.w. contacts into southern England. On the following day, March 20, yet another t.e.p. opening to South Africa was reported.

The opening commenced at 1130UTC and lasted for about two hours. Hal ZS6WB (KG44) reports that he worked many stations in DL, G and PA and then, following a contact with G3HBR (IO91), he was called by OY2VO (IP61) located on the Faroe Islands. This is the first time that Hal has worked that far north, over 10000km!

A very good t.e.p. event was observed on March 24, indeed the band was open on two occasions, around midday and later in the day between 1600-1800UTC. Countries known to have worked into mainland Europe and the UK included Botswana (A2), Madagascar (5R), Namibia (V5), Zambia (9J), Zimbabwe (Z2) along with the regular ZS stations.

Stewart Reeve G1HHO (IO90) was pleased to catch the opening at 1650UTC. Running 100W from a Yaesu FT-650 transceiver into a 3-element Yagi he made s.s.b. contacts with the stations of ZR6ZL (ZR is a v.h.f. licensee), ZS6VR, ZS6XJ and ZS6Y. A week earlier, on March 13, he also contacted 3C5I in Equatorial Guinea.

## EXCEPTIONAL OPENINGS

Finally, to round off the month's reports, I have reports of an exceptional series of openings on March 27. The start of this remarkable day was an early morning opening to the Hawaiian Islands.

Located high on a hilltop overlooking the Pacific Ocean sits one of the Pacific's dream stations, that of KH7R. Ken's station is a fully equipped multi-multi contest station and his line-up of transceivers includes the Icom IC-781, the Yaesu FT-1000MP, the Kenwood TS-930 and various other h.f. radios - six full operating positions are each equipped with a 3kW Henry Classic amplifier.

The antenna farm includes six towers, a rotatable dipole on 3.5MHz, 3-element and 2-element beams on 7MHz, three stacked 5-element beams on 14MHz, three stacked 8-element beams on 21MHz, three stacked 8-element beams on 28MHz and a Hygain



TH7DX beam at 30m above ground for casual operating. The equipment on the 50MHz band is equally ambitious, running a serious amount of output power into a stacked Yagi array.

During the opening on March 27 the operators at KH7R (in locator square BL01) were fortunate to work stations in Albania, Austria, Belgium, Bulgaria, Czech Republic, Germany, Macedonia, Netherlands, Poland, Slovenia, Yugoslavia and the UK. In central Europe, the Hawaiian beacon KH6HME was also heard at good strength.

**Mike Wills G3OIL** (IO91) mentions that he heard KH7R in and out of the noise for over an hour. Every time the signals peaked he was asking for specific countries such as Estonia (ES) and Sweden (SM).

Up in north-west England, **Conrad Farlow G0RUZ** (IO93) heard KH7R for a seven minute period but he was only peaking around the S2 level. I don't have any positive confirmation that KH7R actually worked into the UK, although the rumours said he did. Does anyone **definitely** know?

Lengthy openings via the t.e.p. mode commenced around 1130UTC and continued on and off throughout the day to 1945UTC. Stations in central and southern England reported working into the ZS3, ZS4, ZS5, ZS6 call areas, Botswana, Gabon and Namibia.

Some of the stations worked from the UK included ZS3C, ZS4NS (KG32), ZR5ADQ (KG50), ZR6JRN (KG33), A22BW, TR8CA and V51KC. Conrad G0RUZ mentioned that the ZS stations could be received at his QTH for over four hours but it took him nearly two hours to work ZS3C for a new locator square.

The station of V51KC who was heard at a steady 539 on c.w. for 20 minutes would've also been a new one but he was giving 599 reports to strings of DL stations and not looking for the weaker DX further north. He also reports hearing the c.w. stations of A22BW and TR8CA with signals fleetingly popping out of the noise, nevertheless Conrad said it certainly got the blood flowing again!

In the afternoon around 1630UTC a number of UK operators claimed to have worked ZD9ZZ on the island of Tristan da Cunha. However, there has been some doubt cast on the validity of this station.

The beam heading for the station was not correct (although skewed-paths can often be observed on this band) and the QSL manager quoted was actually disputed by the owner of the callsign given. The stations of G3OIL and G4IGO both mention that ZD9ZZ peaked on a beam-heading of between 160-170° from southern England and that the correct heading should be around 190°.

## AURORAL BACKSCATTER

Openings via auroral backscatter were reported on March 11, 30 and

31, all of these were weak openings, termed 'Scottish auroras'. They're called this because stations in central UK often only hear stations in Scotland and northern England during such openings.

The reason why GM stations are heard is that the aurora is relatively close to Scotland and the physics favours contacts where one of the stations is closer to the reflection point. The frequency with which auroras occur decreases very rapidly with distances southwards of the auroral oval. (The auroral oval in the Northern Hemisphere rotates around the magnetic North Pole, presently near Thule in north-west Greenland).

During March the stations heard on the 50MHz band included the GB3RMK beacon (IO77), G0MPWS (IO68) and M00AMW (IO75). On the 144MHz band the station of G4LOH (IO94) located in northern England reported hearing the LA4VHF (JP20) and SK4MPI (JP70) beacons.

## TROPOSPHERIC PROPAGATION

There were also periods of enhanced tropospheric propagation on the v.h.f. and u.h.f. bands, notably between March 10-12 and March 19-23. The lift in conditions on March 10 enabled stations in southern England and Wales to work deep into France and Spain.

At 1045UTC the stations of EA1DDU and EB1EHO (both in IN73) reported hearing the Cornish beacon GB3MCB (IO70) peaking 599 on the 144MHz band. Conditions deteriorated during the day but picked up again later in the evening with the stations of EA1FCF, EB1DNA and EB1DPB making s.s.b. contacts with stations in south Wales.

The bands were still 'up' on March 12 with GW7SMV hearing, on the 144MHz band, the stations of EA1CRH (IN73), F5OJN (JN05), F6ANW and F6AQI (both in JN06) and F6FHP (IN94). On the 430MHz band the stations of G0FIG (IO90) and G3LQR (JO02) mentioned hearing the Swiss beacon HB9F (JN36) and G3JHM (IO91) heard EI5FK (IO62) and the low power beacon EI2WRB (432.870MHz).

The lift also extended up to the microwave bands. **John Quarby G3XDY** (JO02) reported hearing the beacon PI7GHG (JO21) peaking 569 on the 2.3GHz band and the beacon ON4RUG (JO11) at 529 on the 10GHz band. John also heard s.s.b. signals from PA3CEG (JO33) on 10368.100MHz over a path of 360km.

## THE 70MHz BAND

In a Packet radio bulletin, **Trevor G7IXA** reported that he has recently acquired an AKD 4001 transceiver for the 70MHz band and intends using it for both 'phone and Packet. Running 25W output into a quarter-wave vertical whip on top of his car, he spent an hour or so static mobile at the top of a local multi-storey car park.

Trevor put out a few CQ calls on the f.m. channels and eventually made contact with the station of G3VPS located 105km away. He reports that he was very pleased with the results and thinks that the band has great potential.

He observed that, compared to the 144MHz band, a substantial range could be worked on f.m. simplex with low power and a small antenna. There is much surplus private mobile radio (p.m.r.) equipment available in addition to commercial transceivers such as the AKD model. The antennas are quite manageable and a quarter-wave vertical on the car does not look out of place.

## BEACON NEWS

Michel F6HTJ passes on the news that the beacon F5XAL, operating on 144.476MHz, is now beaming towards South Africa. It's hoped that ZS stations might receive the beacon signal via trans-equatorial propagation during the peak of the sunspot cycle.

In case you think no one will hear it I should remind you that on March 30 1979 (two solar cycles ago) the station of I4EAT (JN54) made a two-way c.w. contact on the 144MHz band with ZS3B (JG73) over a path of 7784km. The beacon, located on the Mediterranean coast (JN12), is in an ideal location for this type of propagation and it runs 100W e.r.p. from a 5-element Yagi and is active 24-hours a day.

Another beacon in an ideal location is even more ambitious in its aims and is to be sited in Newfoundland on the eastern edge of North America. It is specifically designed to test for transatlantic propagation on the 144MHz band.

According to **Joe Craig VO1NA**, the technical committee of the **Society of Newfoundland Radio Operators** have agreed to operate a high power beacon VO1AA on 144.400MHz. The plan is to locate it atop the same hill from where Marconi heard the first transatlantic radio signal in 1901, more news of this exciting project as and when I receive it.

Whilst on the beacon theme, I have a report from the keeper of the GB3BUX beacons - both the 50MHz and 70MHz units are currently off the air due to antenna damage sustained during the winter storms. During the summer period the repeater group intend a major overhaul of both the beacons and the GB3HH and GB3SF 430MHz voice repeaters.

## DEADLINES

That's it again for another month. Please forward any news, views, comments or photographs to the address and by the date given at the top of the column.

**THANKS FOR YOUR LETTERS AND GOOD LUCK WITH THE DX. SEE YOU AGAIN NEXT MONTH.**

*73 David G4ASR*

**CARL GWOVSW  
TAKES OVER 'HF FAR & WIDE'  
AFTER THE RELUCTANT  
DEPARTURE OF LEIGHTON  
SMART GWOLBI**

## WELCOME TO CARL GWOVSW

The Editorial staff here at *PW* would like to welcome new reporter, **Carl Mason GWOVSW**, to the *PW* fold. After Leighton's reluctant decision to stop writing the column, Rob Mannion G3XFD approached Carl as he has become a valued contributor to recent 'HF Far & Wide' columns.

Ex-Royal Navy, Carl is now a TV cameraman with BBC Wales, based in Cardiff. Since 1999 he has been Petty Officer (Communications) Instructor in the Sea Cadet Corps with Training Ship (TS) *Encounter*, Neath & District Sea Cadets - they have applied for the callsign MWONSC (Neath Sea Cadets) and they hope to be active on the amateur bands in early April.

Carl is also a member of RNARS, BMARS, MFCA, GQRP, GW-QRP, ARCI, FISTS, UKSMG and CDCX and is a Morse Test Examiner for West Glamorgan. We would like to welcome Carl to the pages of *PW* and wish him all the best as 'HF Far & Wide' author and compiler.

## HF FAR & WIDE

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**THIS MONTH, AFTER THE DEPARTURE OF LEIGHTON SMART GWOLBI, CARL MASON GWOVSW TAKES OVER THE REINS OF THE 'HF FAR & WIDE' COLUMN. LEIGHTON WILL BE A TOUGH ACT TO FOLLOW, BUT REST ASSURED THAT CARL**



# THE *PW* PERSONAL ORDER FORM

*Roger Hall G4TNT – PW's Advertising Manager – describes how we're launching the PW Personal Order Form service to help readers buy with extra confidence from advertisements in this magazine.*

**M**any readers will have noticed how the battle for their custom has become more intense as the popularity of the hobby has declined. Fewer amateurs buying less equipment means there are now some great deals to be had but it also means that some dealers may try to cut corners when it comes to honouring their commitments. Also, as the real cost of Amateur Radio equipment has fallen and the competition for your custom has increased, some of the smaller shops have either gone out of business or been swallowed up by the bigger companies. In some areas, it's almost impossible to find a local shop and now the trend is towards mail order purchasing.

This, in itself, is not a bad thing but it does mean you'll probably be buying from a shop you've never visited and from a salesperson you've never met. So, how do you know who to trust with your money? You could go on air and ask about the dealer you're thinking about buying from, but the risk

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is that there may be one or two vociferous individuals who will be happy to tell the world about their grievances while the majority of satisfied customers just keep quiet. The same is true of the Internet. The various radio related newsgroups are a good place to ask but, again, you may not get a representative (or honest) selection of answers.

The truth is, there is no real way of telling beforehand how your transaction will be handled, how well the equipment will perform or whether it will go wrong. All you can do is to take reasonable precautions before you buy and know what to do if the worst happens. This is where we aim to help. First of all, take a look at the Top Ten Tips in the Buyer's Guide box. If you follow those guidelines before you buy, you'll have minimised the chance of something unforeseen cropping up and you'll be prepared should the worst happen and you have to return the goods.

## Top 10 Tips

- 1:** Telephone first to confirm the price and details are as in the advertisement. Dealers often have to send in copy up to 8 weeks before the magazine is published and prices and availability can change in that time.
- 2:** Ask if it's a parallel/grey import or if it came from the authorised UK importer.
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- 6:** Ask for a written quotation if it's a large order.
- 7:** Make a note of all calls and who you spoke to and keep copies of all paperwork.
- 8:** Pay by personal credit card whenever possible as the card company has insurance to cover all transactions above £100 and you will almost certainly get your money back from them should something go wrong.
- 9:** Check everything as soon as it arrives. Open all the boxes and check that you have been sent everything exactly as ordered. If there is a problem, contact the supplier immediately.
- 10:** If a problem develops later, write the supplier a concise and accurate letter outlining the problem and asking them how they intend to rectify it. If that fails, write to us with copies of all relevant paperwork and we'll take it from there.



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MASON WILL CONTINUE THE COLUMN IN THE SPIRIT THAT LEIGHTON UPHOLD.

Hello and welcome to this month's 'HF Far & Wide' column. As you will probably have noticed by now there's a new name and call sign at the top of this column, although I'm sure you all recognise it from previous reports on this page.

I was sorry to learn from the Editor of *PW* that **Leighton Smart GW0LBI** had reluctantly decided to finish compiling your reports but I was pleased when I was asked to follow in his footsteps. I only hope that I can do the job as well as he has done over the last five years. I'm sure we all wish him well with his new endeavours.

## NOVICE NEWS

Some Novice news now from **Mike Evans MW0NCA** in Swansea, Vice Chairman of the **Mid Glamorgan Amateur Radio Group**. The group have just put nine members through their Novice licence and are all hoping to take the full RAE and Morse test in May. I would like to wish them all every success for the future.

## YOUR REPORTS

Let's get straight on to your reports now, and first off this month is **Sean Gilbert G4UCJ** in Milton Keynes, Buckinghamshire, who is very pleased with his success on 1.8MHz at the moment. Using the Alinco DX-70, 30W of c.w. and a 27m long piece of coaxial which, to all intents and purposes, is on the ground, Sean worked VE1ZZ (Canada) and W8JJ (Georgia, USA) for a new country, both contacts were around 0200UTC.

On 3.5MHz, Sean worked OX3FV (Greenland) at 0033, FG5FR (Guadeloupe) at 0157 and UA9AX (Asiatic Russia) at 0120UTC.

## THE 7 & 14MHz BANDS

On to the 7 and 14MHz bands now and **Ted Trowell G2HKU** on the Isle of Sheppey in Kent says that "the bands have improved considerably this month with just the odd 'off' day". Ted's 7MHz c.w. log shows contacts with JA7FKX (Japan) at 1600 and VK6VZ (Australia) at 2000UTC.

Next up is **Robin Trebilcock GW3ZCF** of Bishopston near Swansea who has been using a 40m horizontal loop with great success. Robin also comments on the "good conditions" and has used s.s.b. on 14MHz to work FM5BH (Martinique) at 1958, P40K (Aruba) at 2018, VK7GK (Australia) at 2032 as well as PY2BDY (Brazil) at 2042UTC.

Sean G4UCJ worked VR2LC (Hong Kong) at 1638, ZD8Z (Ascension Island) at 0021 and had a 3W QRP contact with HF0POL (South Shetlands) at 0054UTC. Well done Sean!

Also on 14MHz was new reporter **Brian Parsons GW0KZK**



Fig. 1: The new 'HF Far & Wide' author, Carl Mason GW0VSW.

## THE 24 & 28MHz BANDS

The 24 and 28MHz bands have shown the biggest improvement this month and Bob M0BOB had s.s.b. contacts on 24MHz with YB0RP (Indonesia) and AP2JZB (Pakistan) around 1600UTC. Ted G2HKU, on the other hand, used the key to bag A45XR (Oman) at 100 and 5N3CPR (Nigeria) at 1600UTC.

Sean G4UCJ was also busy on the 24MHz band. His huge log

shows contacts with 6W6/K3IPK (Senegal) at 1109, 9G5CW (Ghana) at 1140, 3B9FR (Rodriguez Island) at 1431, S21VJ (Bangladesh) at 1439 and XW2A (Laos) at 1505UTC.

Finally, the 28MHz band is where most of the action's been, judging by all our reporters this month. **Steve Bunting M0BPQ** from London has been having a good time on this band despite some antenna restrictions.

Steve says: "My house is in south London and I have no access to the roof and only have a yard 4m x 4m square. I can't even use a vertical without upsetting the neighbours so I have disguised a full wave loop for 28MHz as a washing line only 2m above the ground".

Using his Alinco DX-70 and just 10W of s.s.b., Steve worked 9K2HS (Kuwait) and HZ1AB (Saudi Arabia) at 0950, A41LZ (Oman) at 1045, KL1V (Alaska) at 1051, OD5NX (Lebanon) at 1235 and VP5C (Turks & Caicos Islands) at 1802UTC. Whereas JF5HV1 (Japan) at 1006 and DL7DF/H19 (Dominican Republic) at 2034UTC were just a few of his c.w. contacts - looks like the antenna is working well Steve!

Also on the band was Robin GW3ZCF who had s.s.b. contacts with 5R8GB (Madagascar) at 1540, V31DE (Belize) at 1623 and CX5BE (Uruguay) at 2032UTC.

Meanwhile Bob M0BOB used his s.s.b. to work ZP5CGL (Paraguay), V2KH (Antigua), Z21CS (Zimbabwe), 9Y4TD (Trinidad & Tobago), FY5HY (French Guyana), A71A (Qatar) HL2DBP (South Korea), ZD7VC (St. Helena) and CP6EB (Bolivia) between 1200 and 1700UTC.

Finally, last - but by no means least - is Ted G2HKU who, despite

intentional jamming, was able to work TU2CI (Ivory Coast) at 1100, CE0Y/UA6AF (Easter Island) J3/K4LTA (Grenada) both around 1500, HS0GBI (Thailand) at 1530 and CE0ZY (Juan Fernandez Island) at 1900UTC.

## SIGNING OFF

Well, that about wraps it up for this month. Many thanks to all our reporters for your time and effort for the column. You've certainly been working some good DX!

REPORTS, INFORMATION AND PHOTOGRAPHS (LET'S SEE YOU AND YOUR AMATEUR RADIO EQUIPMENT) TO ME PLEASE BY THE 15TH OF EACH MONTH. DETAILS AT THE TOP OF THIS COLUMN.

73. Carl GW0VSW

## FOCAL POINT

### REPORTS & INFORMATION TO:

**GRAHAM HANKINS G8EMX**  
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ACOCKS GREEN  
BIRMINGHAM B27 6LE

E-MAIL:  
graham@ghank.demon.co.uk

PACKET: G8EMX@GB7SOL

THIS MONTH GRAHAM HANKINS G8EMX IS BACK TO BRING YOU ALL THE LATEST ATV NEWS, VIEWS AND EVENTS. HE TELLS YOU ALL ABOUT THE SUCCESS OF THE LONDON SHOW FOR THE BATC & HE ALSO HAS A PLEA FOR READERS.

GRAHAM HANKINS  
G8EMX IS BACK WITH A  
PLEA FOR READERS!

The London Amateur Radio and Computer Show

(Picketts Lock) happens twice a year - in Spring and late Autumn - and the **British Amateur Television Club (BATC)** always tries to be one of the Special Interests Groups represented at the weekend exhibition. For the Spring 2000 event, the BATC wanted to try something special - a live both-way link to GB3EN, the local 1.3GHz (24cm) ATV repeater in Enfield.

The Enfield repeater had actually been switched on exactly 12 months previous to the Saturday morning of the Spring 1999 Show at Picketts Lock. To receive pictures from GB3EN and transmit to access it from a BATC stand would be a





**Fig. 1:** Helical antenna used to access ATV repeater, GB3EN, at the London Amateur Radio Show this year.



**Fig. 2:** The British ATV Club (BATC) stand at the March 2000 Picketts Lock Show. Left to right: Roger G8IUC, Brian Summers G8GQS (BATC Treasurer) and Tom Mitchell G3LMX.



**Fig. 3:** Home Counties ATV Group at the Sandown Show. Left to right: Tony Hornby G1HBD, John Stockley G8MNY, Mike Sanders G8LES.

great way to celebrate the repeater's first birthday.

Such an event would also be a good demonstration of real, on-air ATV to potential newcomers into the hobby and seemed a logical thing for the BATC to do, with an ATV repeater only a couple of miles away! But could this actually be achieved in practice? That was the big question!

Letters, E-mails and telephone calls were sent to **RadioSport** - the show organisers - the local club - the **Southgate ARS** - and the **North London Television Group (NLTG)**. This correspondence established that an antenna could be mounted on the roof of the exhibition hall and that around 50m of feeder would be needed to reach the BATC table. (See Fig. 1).

Further calls from the secretary of the NLTG, **John Douglas G4DVG**, were encouraging - not only could the group provide all hardware, but he and NLTG member **Roger Glover G8IUC** were available to set-up on the Friday afternoon before the show opened, which is what happened on the day, virtually without any problems!

Throughout the London Amateur Radio Show weekend, visitors to the BATC table (see Fig. 2) could watch the output of GB3EN, transmit into it and discover how easy it has become to join the world of 625 line PAL colour Amateur Radio TV (ATV)! If you didn't make it to the show, find the BATC on the Web at <http://www.batc.org.uk>

## BRIEF ITEMS

Now some brief items from ATV group newsletters recently received. The **Sevenside ATV Group** in Bristol has been busy and the antennas at 24cm repeater **GB3ZZ** have been renewed and improved.

Next, transmitter deviation has been set close to the specification maximum, by very precise measurements with accurate equipment. The **GB3ZZ** repeater can be remotely controlled and the group's **P5** newsletter lists 11

categories of **Dual Tone Multi Frequency (DTMF)** keypad codes, which select a multitude of repeater functions.

The **Home Counties ATV Group** was at the **RSCG VHF Convention** at Sandown Racecourse, with live pictures from its 24cm repeater, **GB3HV**. The Home Counties Group announced that they hope to be at the Middlesex County Show in June. (See Fig. 3).

Meanwhile, members of the **Kent Television Group (KTG)**, together with members of the **Dover Radio Club**, crossed to France to attend the AGM of the **Radio Club Branly-Marconi F5KBM** at Wimereux. The KTG repeater, **GB3KT**, continues in service, 1249MHz in - 1310MHz out.

## A STABLE TIME

Unfortunately, not all ATV repeaters, or repeater projects, are enjoying a stable time at the moment. The **Beacons Repeater Group** in the West Midlands needs to find a different site for its proposed 24cm repeater due to forecast radar problems if it is installed at the anticipated location north of Birmingham. Two further places have been offered, so the group has to see what the results of Path Loss Projections to Clee Hill radar may be.

Yet another Repeater Group foresees difficulties ahead - the **Leicester Repeater Group (LRG)** maintains three voice repeaters plus ATV box, **GB3GV**, group income has always been substantially dependent on LRG members volunteering to help at the **Leicester Amateur Radio Show**.

**John Senior G7RXS**, LRG chairman explains: "Over the last couple of years the group has seen its income substantially reduced and a shadow is now beginning to creep over the long-term future of the group. Part of the problem is that whilst the repeaters have a good site on high ground with an 18m mast atop, which gives them good coverage, the site is expensive to

maintain. Rates, rent, electricity and insurance eat up over £600 per year whilst the LRG members' subscription income falls well short of this".

John continues: "The main source of income for the LRG has always been the Leicester Amateur Radio Show, formerly held at Granby Halls in Leicester and now at the International Exhibition Centre at Castle Donington. Members of the various Leicestershire radio clubs, groups and societies volunteer their services to the Show Committee to perform all the various stewarding tasks associated with the successful running of a large show of this nature.

All volunteers gain free admission to the Show and, depending on the number of hours they put in, may get free meal and tea breaks. After the Show any surplus funds are distributed to the clubs providing volunteer workers on a basis proportionate to the number of hours of support provided. Put more simply the more hours the more funds".

For various reasons, the Leicester Repeater Group's share has reduced considerably over the last two years and, in spite of many expenditure cuts and cost saving measures put into place by the committee, the future is still uncertain. To help save the LRG and keep four repeaters from closure, John Senior has a suggestion:

"The only way forward is for the Group to somehow increase its numbers of members attending the show in September as volunteer stewards and this is where readers can help. If you join the Group (membership £10 per annum, concessions £7.50), necessary for insurance purposes and turn up at the Show you will both help the Group and help keep the **GB3GV** TV repeater on the air, plus the voice ones".

While some repeater groups may be fortunate to enjoy free or very low running costs for their machines, the Leicester Repeater Group's struggle to maintain its four

repeaters, amply illustrates the time and money sometimes involved. If any readers in the Leicester area can help out, please contact John Senior on Tel: 0116-284 1517 or, preferably, send an E-mail to [seniorja@aol.com](mailto:seniorja@aol.com)

Well, that's all for another month. I will be back as usual in the August 2000 issue of *Practical Wireless*.

**UNTIL THE NEXT TIME I'M IN PW, ENJOY THE WONDERFUL ATV HOBBY AND PLEASE, IF YOU CAN HELP THE LEICESTERSHIRE REPEATER GROUP, GET IN CONTACT WITH THEM!**

*73 and P5 de Graham*

*G8EMX*

## DATA SCAPE

NEWS, VIEWS & PICTURES TO:

**ROGER COOKE G3LDI**

TEL: (01508) 570278

E-MAIL: [rcooke@g3ldi.freemove.co.uk](mailto:rcooke@g3ldi.freemove.co.uk)

PACKET: G3LDI @ GB7LDI

THIS MONTH ROGER COOKE G3LDI BRINGS YOU A WEB ADDRESS CORRECTION, NEWS ABOUT THE WIRELESS APPLICATION PROTOCOL (WAP), SOME NEW APRS SOFTWARE, ANOTHER RTTY PROGRAM AND FINISHES OFF WITH A 'SMILE OF THE MONTH'!

**ROGER G3LDI TELLS YOU ABOUT APRS SOFTWARE AND AN RTTY PROGRAM AVAILABLE FOR DOWNLOAD ON THE INTERNET**

In early March, **Bill Brennan G3CQE** was admitted to Yeovil hospital and subsequently died within a week. Bill was one of my 'Elmers' in the 1950s and was the first 'G' station on h.f. RTTY, closely followed by yours truly.

Bill wrote a series of articles for

## Web Watch:

The BATC Web site: <http://www.batc.org.uk>





Fig. 1: The Blaster TeLetype home page can be found at: <http://www.geocities.com/SiliconValley/Heights/4477>

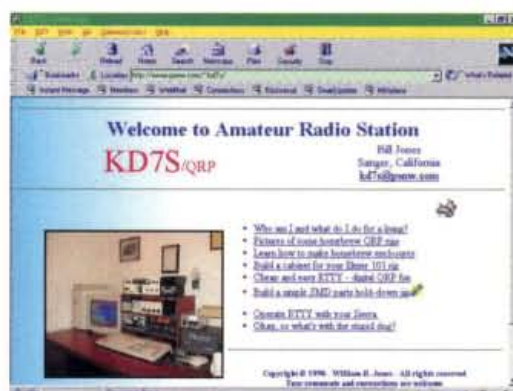


Fig. 2: Bill Jones KD7S' very neat station as seen at: [www.psnw.com/~kd7s/](http://www.psnw.com/~kd7s/)

Short Wave Magazine at the time, encouraging others onto the mode which rapidly expanded of course. But, in those days, we were using machinery: the stalwart Creed 7B being the workhorse of RTTY at that time. Bill leaves a wife, Daphne and a son David and will be sadly missed.

## WEB CORRECTION

I have had several requests for a correction to a Web site that I gave some months ago. The URL was <http://web.inter.nl.net/hcc/pa0nc>. Now this looks quite normal and I would have thought it wouldn't have presented a problem. Wrong!

I tried the address myself, after having been told that it didn't work and sure enough, I got the usual "Cannot find" message back. I rechecked my notes and tried several times yet again - still no result.

I was sent a Packet by a friend who suggested that I put the call sign in upper case, which I tried and 'Bingo', it worked. Now, I was always under the impression that URLs and E-mail addresses all had to be in lower case - obviously I'm mistaken in assuming this.

So, if you're having difficulty in obtaining the PK232 or PK900 software from this site, try this: <http://web.inter.nl.net/hcc/PA0NC>. When transposing an address or URL, it's very easy to leave out an essential comma, colon, or misinterpret a letter, so great care must always be taken - you have been told!

## NO SUCH THING ...?

On the basic assumption that there's no such thing as a free lunch, I don't really object to paying some charge for Internet access. Obviously, using Freeserve, I get this "free access", but have to pay for the phone call, with the 5p charge up front EVERY time I connect, this charge is shared with the ISP and BT, thus providing both with an amount each time.

However, the battle lines are now drawn to provide free local phone calls as well, for access to the Internet. Several offers have already been made, with lots more to follow I feel!

**LineOne**, owned by BT and United News and Media, stole a march on rivals **NTL** and **AltaVista** by announcing that it will launch unmetered access on March 31, linking up with **Quip**, a discount telco. The deal offers unmetered access in return for users spending £5 a month on metered calls - they must also purchase a £20 adapter unit, which will re-route voice and FAX calls via Quip.

Given LineOne's existing subscriber base of 800 000 users, the demand for connections and bandwidth is expected to be colossal from the outset. This is just another of the offers that I think will become common over the next few months, so don't be rushed into signing with any of them and remember, there's always a section with very small print that should be read first.

Here in the UK, mobile networks are currently buying up millions of **wireless application protocol (WAP)** enabled handsets and high-street retailers are selling set-top boxes and budget PCs in volume - devices that rely on cheap, readily-available Internet connections to deliver two-way commerce and information services into homes and users' pockets.

The likes of **Freeserve** will certainly benefit as content providers, but will almost certainly lose out as access providers. This is because a significant proportion of Freeserve's revenue comes from a share of the per minute call charge levied by the telephone companies.

AltaVista has already taken more than 200 000 registrations in the two weeks since it announced its free service and NTL has already signed up more than 100 000 people, due to launch on April 17. By the time you read this, those figures will probably be many more and NTL has had to run a series of

adverts in national newspapers warning of possible delays as it tries to cope with demand.

To deal with the expected pressure, all three ISPs are imposing inactivity time-outs. AltaVista is the least tolerant, allowing only five minutes of inactivity, followed by LineOne at 30 minutes and NTL at two hours.

This sudden rush of Internet deals poses a quandary for the consumer: how to compare the costs of the complex bundles on offer. (The same quandary exists in the mobile phone market, with users never ever sure if they have a good deal or not). The IT services giant, **ICL**, handles support and infrastructure services for many of the leading ISPs in the UK, including **Freeserve**.

**Telewest**, which became the first company to launch a heavily promoted unmetered access deal in February, has been beset by technical problems since its launch. While capacity problems are easing, many technical problems remain unsolved, while the cap on new accounts is still in place at the time of writing.

With all this in mind, make sure that when you sign, you're getting the deal you want and not the deal that the supplier wants you to have. As I said, **there is no such thing as a free lunch!**

## NEW VENTURES

The company, **IBM**, is launching a number of new ventures aimed at making it one of the biggest suppliers of **wireless Internet solutions** for corporate users. The company has put into place a series of initiatives and partnerships that give it an end-to-end mobile sales story, from servers and software to mobile devices and consulting.

They intend to develop a

wireless infrastructure for service providers to offer to their customers through partnerships with **Nokia**, **Motorola** and **Cisco**. Alliances with **Ericsson** and **Intel** will focus on creating hardware, while a joint development centre with **Symbia** in Japan will work on integrating enterprise software with the **Epoc** platform for the lucrative Asian market. In this new venture, **IBM** will also work with **Motorola** to build a voice and data engine that will allow companies to develop real-time applications on smart phones.

With the advent of all the WAP technology, I hope that good use is being made of our u.h.f./s.h.f. bands. There will be an enormous pressure from commercial enterprises such as this for frequencies that don't appear to be much used. Indeed a lot of money can be made in "selling off" these frequencies.

## REVERSED POLICY

**Microsoft** has dramatically reversed its policy of being only a technology supplier by making an aggressive move into selling services to large firms. Microsoft is forming a joint venture with **Andersen Consulting**.

The venture, **Avanade**, will target enterprise customers in areas such as financial services, telecoms, healthcare and utilities. It plans to hire 3000 staff, aiming at revenues of \$1 billion within three years.

## FLURRY OF ACTIVITY

With the advent of the free ISP and the flurry of activity to provide users with free telephone calls too, I can't see why anyone would wish to access the Internet via Packet radio. This, to my mind, is totally counter-productive.

If the aim of allowing this is to encourage newcomers to Amateur Radio, then I fail to see how on earth this would do so. If the aim is to encourage users of Packet to gain access to the Internet, again I fail to see why anybody would wish to access the Internet via a 1200 baud radio link.

I use both systems, so I don't object to either, however, mixing the

## Web Watch:

**PK232 or PK900 software:** <http://web.inter.nl.net/hcc/PA0NC>  
**XASTIR 0.1.3 APRS program:** [ftp://ftp.tapr.org/software\\_lib/Linux/ham/xastir/](ftp://ftp.tapr.org/software_lib/Linux/ham/xastir/)  
**Blaster TeLetype:** <http://www.geocities.com/SiliconValley/Heights/4477>  
**Bill Jones KD7S' QRP RTTY home page:** [www.psnw.com/~kd7s/](http://www.psnw.com/~kd7s/)



two now would seem to be a waste of time. It's so easy to use the Internet with a modem and doesn't cost that much - in fact, it would cost more to set up the radio link in the first place and much better use could be made of the radio link than accessing the Internet.

Of course, it is just my opinion, but I would be interested to hear from those in favour of the idea. Let me know why it's such a good idea, I would like to hear from you!

## ASSOCIATED APRS SOFTWARE

For those of you interested in Automatic Position Reporting System (APRS) and associated software, try **XASTIR**. This program is an APRS-like program that is Open Source and free to use and pass out to others and uses GPS tracking/maps and Amateur Radio to convey position reports, messaging, weather and much more.

Currently, the program is in development and shouldn't be seen as a finished product and your help will be needed to make **XASTIR** a better program. If you have the skills and the time, why not give it a try.

The author doesn't have the time to do too much development himself, so if you think you can add something to the program, write to **Frank Giannandrea KC0DGE**. The program, **XASTIR 0.1.3** is now available on the TAPR FTP server: <ftp.tapr.org> in [/software\\_lib/Linux/ham/xastir/](/software_lib/Linux/ham/xastir/)

**Note:** When I checked this Web site, I had difficulty logging on at this address. However, if you have similar problems, do as I did and first visit the Google Search Engine at [www.google.com](http://www.google.com) and do a search for **XASTIR** - from there you should be able to log on to <http://www.eazy.net/users/fgiannonn/linux/> - **Joanna Williams**

Currently, **XASTIR** is partially converted to two other languages, French and Dutch, so if you're capable of converting to another language let Frank know. You should be able to contact him via the site.

## CANADIAN NEWS

The following news came courtesy of the **Victoria Amateur Packet Association** newsletter. An interesting news item came from Alberta, where APRS is gaining interest.

**Bill VE6OLD** woke one morning to find his van missing from his driveway near Bentley. He ran down to the computer and had a quick peek - apparently **VE6OLD-15** was driving around the city of Red Deer - he could see this via the APRS lgate in Alberta.

A quick call to the local **Royal Canadian Mounted Police (RCMP)** detachment and the boys in red serge were dispatched to the scene. It seems the young teens needed a vehicle to haul their loot from a recent spate of burglaries to a new location.

Not only did the young

hooligans get caught red-handed for grand theft auto, but the stolen 'goodies' in the van tied them to a number of other crimes as well. Bill's only complaint was that the beacon rate was to five minutes and it took too long to get position updates from the stolen vehicle. Quite a neat story though and a novel use for APRS!

## ANOTHER RTTY PROGRAM

**Blaster Teletype (BTL)** is another RTTY program and written by **Robert Glassey ZL2AKM** and if you fancy trying it, it's available for download. **Blaster Teletype** modulates and demodulates non-encrypted Baudot Radio Teletype (RTTY) found on the short wave bands and provides a multi-featured, user-friendly user interface.

This RTTY program uses a SoundBlaster compatible sound card and your PC to demodulate RTTY audio tones from an s.s.b. radio receiver and generates audio tones for an s.s.b. radio transmitter. **Blaster Teletype** uses the PC to perform modern DSP processing, giving outstanding demodulation performance and to provide clean, sinusoidal and phase continuous tones for transmission.

The BTL program has many features including extensive on-line help which describes all the features available in BTL and gives additional information on getting BTL to work on your PC. You can run BTL with or without a sound card to access this help.

Press F1 when you see the main screen in BTL to get help. If you still have problems or just want to know a little more about BTL, you can read the FAQ and Trouble Shooting Guide, **FAQ.TXT**.

The program is a DOS program and requires an 80386DX-based IBM PC compatible or better to run. To decode or generate RTTY you will also need a SoundBlaster 1.0 or greater, compatible sound card and of course an s.s.b. receiver or transceiver.

It sometimes works in a DOS box under Windows, however no attempt has been made to make BTL work under Windows, so all credit must be given to Microsoft! Initial BTL defaults are set to the European standard of u.s.b. and 1275/1445Hz - it's easy to change these defaults to the US or other standard. Refer to the on-line help or FAQ. The program will save these new defaults in the config. file for the next time you run BTL.

**Blaster Teletype** is Copyright 1996,1997 by Robert Glassey, ZL2AKM, All rights reserved. It's free for amateur use, see the on-line help for conditions of use and distribution and information on voluntary registration.

Some of the features include:

- High performance RTTY Reception and Transmission using a SoundBlaster compatible sound card;
- Function key TX buffers with on-line editing while receiving simultaneously;

- Text file transmission, with the ability to include function key text, end of file, and end of transmission symbols;
- Word buffering during TX, allowing backspace editing during live transmissions;
- On screen tuning and level indicators;
- Fully adjustable centre frequency and shift, with selectable preset standards;
- User definable preset shift and centre frequency;
- Fully adjustable baud rate, 25 to 200 Baud;
- upper side band (u.s.b.) or lower side band (l.s.b.) default Mark/Space polarity for receive and transmit;
- RXR Mark/Space tone reversal on receive;
- Narrow/Wide tone filter option;
- Unshift on Space (UNS);
- All printable ASCII characters available with extended Baudot;
- Fixed case option for Extended Baudot decoding;
- Upper or lower case toggle for received text;
- Received and transmitted text logging to a file;
- 43/50 line mode selectable;
- Manually forced letters or figures shift during RX;
- Manually forced New Line and Clear Screen on demodulation screen;
- Demodulation pause key (Hold);
- Adjustable input sensitivity and output levels;
- MIC a.g.c. toggle and input selection;
- Function states and settings saved between sessions;
- Support for SoundBlasters version 1.0 through AWE32;
- Compatible with most SoundBlaster compatible cards;
- SoundBlaster parameter validation;
- On-Line help;
- Bright Colours.

**Blaster Teletype** has a home page at: <http://www.geocities.com/SiliconValley/Heights/4477> see Fig. 1 for the opening page. E-mail: [robglassey@geocities.com](mailto:robglassey@geocities.com)

## FANCY QRP RTTY?

Ever fancied running QRP RTTY? Perhaps you do already, **Bill Jones KD7S** from Sanger California is very interested in running QRP RTTY and rarely uses more than 5W. He has a very neat station, as can be seen from Fig. 2 which was taken from his home page.

Check it out, as there's a lot of useful information on both RTTY and QRP there. The URL is: [www.psnw.com/~kd7s/](http://www.psnw.com/~kd7s/)

## SMILE OF THE MONTH

This month's 'Smile Of The Month' came from a Hewlett Packard engineer. I do like this one!

"I had been doing Tech Support for Hewlett-Packard's Deskjet division for about a month when I had

a customer call with a problem that I just couldn't solve. She couldn't print yellow.

"All the other colours would print fine, which truly baffled me because the only true colours are cyan, magenta, and yellow. For instance, green is a combination of cyan and yellow, but green printed fine. Every colour of the rainbow printed fine except for yellow.

"I had the customer change ink cartridges. I had the customer delete and reinstall the drivers. Nothing worked. I asked my co-workers for help; they offered no new ideas.

"After over two hours of troubleshooting, I was about to tell the customer to send the printer into us for repair, when she asked quietly, 'Should I try printing on a piece of white paper instead of this yellow paper'?"

**THAT'S ALL FOR THIS MONTH, BUT I'LL BE BACK NEXT MONTH WITH MORE DATA & INTERNET NEWS FOR YOU - PLUS, OF COURSE, SOME MORE ANECDOTES TO MAKE YOU SMILE!**

*Roger G3LDT*

## BROADCAST

**REPORTS & INFORMATION TO ME PLEASE:**

**PETER SHORE**  
C/O PW EDITORIAL OFFICES  
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STATION APPROACH  
BROADSTONE  
DORSET BH18 8PW

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**THIS MONTH PETER SHORE BRINGS YOU SOME NEWS OF TWO NEW SHORT WAVE RECEIVERS, SOME INFORMATION ON SOME UP-AND-COMING UK DIGITAL RADIO STATIONS AND WINDS UP WITH MORE GLOBAL BROADCAST FREQUENCY NEWS FOR YOU.**

One of the key problems with short wave (s.w.) is that from time to time, solar storms play havoc with the bands. In some cases, the havoc renders just about every frequency unusable for hours at a time.

A solar storm can mean that listeners like us can't tune in to broadcasts from around the world, but for some users of the high frequency bands the problems are more pronounced. There are still a wide variety of users - like

**PETER SHORE BRINGS YOU ANOTHER PAGE OF BROADCAST NEWS THIS MONTH**



airlines and the military - who use high frequency communications links, so spare them a thought when there are major disturbances to the s.w. band.

Such a problem happened in early April when, for four days, there was a massive geomagnetic storm. This made listening all but impossible across much of the earth for long periods and the maximum usable frequency (m.u.f.) on s.w. fell by more than 50%, forcing any activity to the lower frequency bands.

Despite this unpredictability, s.w. remains a good means of communication. This is borne out by consumer electronics manufacturers who are introducing new receivers aimed at broadcast listeners.

## NEWEST MILLENNIUM RECEIVER

The newest model to be released is the long-awaited **Grundig Satellit 800 Millennium receiver** (see Fig. 1). It has been developed by Grundig's North American distributor, **Lextronix** in association with the renowned communications equipment manufacturer, **R. L. Drake**.

The Satellit 800 is big in terms of physical size and price and is currently only available in North America where it retails for US \$699.95 (around £440), but you do get a lot of machine for that price. The set measures 520mm wide by 240mm high by 210mm deep and weighs well over 6kg.

The circuitry seems to have been developed by Drake and may be based on the popular SW8 model, but with a typical Grundig case. The 800 resembles its predecessor, the Satellit 650 that was built in Grundig's Portuguese high-end manufacturing facility.

The new Grundig has a giant custom l.c.d. with easy-to-read frequency display that also shows metre bands. There's switchable bandwidth, s.s.b. and synchronous a.m. detection to ensure that every listening condition (with the possible exception of solar storms) is catered for.

If you're travelling to the USA or Canada this year and fancy bringing a new s.w. receiver home, then the Grundig Satellit 800 may be for you.

## ANOTHER NEW SET

Another new set is the **Sangean ATS-505**, a sleek-looking silver portable receiver. It's about the size of a paperback book and offers comprehensive coverage including l.w., m.w. and continuous s.w. from 1.711 to 29.999MHz.

The new Sangean has s.s.b. and a whole raft of memories divided into 'pages' which has become the industry's standard way of making s.w. receivers more user-friendly. It's likely to appear as a Roberts model in the UK this year, but will probably be priced higher than the £100 or so charged by UK importers of Sangean products.



Fig. 1: The brand new Grundig Satellit 800 Millennium receiver.

## DIGITAL RADIO BOOST

Digital radio receives a boost in London this month with the launch of two commercial DAB multiplexes (or groups of services) - **CE Digital**, the joint venture between **Capital Radio Group** and **EMAP Radio**, launches just ahead of **Switchdigital**, the co-operative set-up that encompasses **Virgin Radio**, **TalkSport's** owner **The Wireless Group**, US radio owner **Clear Channel** and the **Carphone Warehouse**.

At a stroke, 18 new digital radio stations will be on the air, including London-wide favourites like **Capital FM** and **Capital Gold** (which will enjoy much better fidelity than its existing m.w. outlet), **Heart FM**, **Jazz FM** and **Sunrise**. There'll be new digital-only stations, particularly from **Switchdigital**.

Perhaps it will prove the start of the commercial success of digital radio in Britain and encourage more people to buy DAB receivers for the car and the home. The price of receivers is starting to fall and by the end of the year there will be a whole range of different digital radio sets available at a range of price points.

## BACK TO SHORT WAVE

Back to the short wave bands and here's some frequency information for you to travel the world with:

**Radio Budapest** in English (all times are in UTC): 0100-0130 on 9.56MHz; 0230-0300 on 9.835MHz; 1900-1930 on 6.025 and 9.75MHz; 2100-2130 on 6.025MHz; 2130-2200 on



3.975MHz. Web link:

[www.kaf.radio.hu](http://www.kaf.radio.hu)

**Radio Vlaanderen Internationaal (RVI)** in English (all times are in UTC): 0400-0430 on 15.565MHz; 0700-0730 on 5.985MHz; 1130-1200 on 9.865 and 9.925MHz; 1730-1800 on 5.91, 9.925, 13.71 and 17.735MHz; 1930-2000 on 5.96MHz and 1512kHz m.w.; 2230-2300 on 15.565MHz. Web link: [www.rvi.be](http://www.rvi.be)

**Swiss Radio International** in English (all times are in UTC): 0100-0130, 0400-0430 and 0430-0500 on 9.885 and 9.905MHz; 0400-0430 and 0500-0530 on 9.61MHz; 0730-0800 on 15.545, 17.685 and 21.75MHz; 0830-0900 on 9.885 and 13.685MHz; 1000-1030 and 1200-1230 on 15.315MHz; 1100-1200 on 13.735 and 21.77MHz; 1400-1500 on 9.575 and 17.67MHz; 1900-1930 on 6.110MHz; 2000-2030 on 13.71, 13.77, 15.22 and 17.58MHz. Web link: [www.swissinfo.org](http://www.swissinfo.org)

**Kol Israel** in English (all times are in UTC): 0400-0415 on 9.435, 15.64 and 17.535MHz; 1030-1035 on 15.64 and 17.535MHz; 1400-1430 on 15.65 and 17.535MHz; 1900-1925 on 11.605, 15.64, 15.65 and 17.535MHz.

That's all for this month. Please let me have any notes about stations that you've heard recently, along with any experiences that you've had during ionospheric disturbances and solar storms.

UNTIL NEXT TIME, GOOD LISTENING

Peter



Fig. 3: Sticker from Radio Vlaanderen Internationaal (RVI).

Fig. 2: A Radio Budapest QSL card.

## AUSSIE ORACLE

LETTERS & REQUESTS FOR TOPICS YOU'D LIKE COVERED TO ME PLEASE:

CHRIS EDMONDSON VK3CE  
BOX 123  
EAGLE HEIGHTS  
QUEENSLAND 4271  
AUSTRALIA

E-MAIL: [editor@radiomag.com](mailto:editor@radiomag.com)

THIS MONTH SEES THE RETURN OF CHRIS EDMONDSON VK3CE'S QUARTERLY COLUMN IN WHICH HE REPORTS ON THE AMATEUR RADIO HOBBY DOWN UNDER. THIS MONTH HE TELLS YOU ALL ABOUT ARCS - A COURSE WHICH HAS BEEN INTRODUCED ON THE INTERNET IN ORDER TO ATTRACT MORE PEOPLE INTO THE HOBBY - PW THINK THAT THIS IS DEFINITELY SOMETHING TO TRY OUT IN YOUR ISLANDS - SEE WHAT YOU THINK!

'G'Day' and 'howyergoin' from Sunny Oz.  
'Didjeravagoodweegend'? Well, now I've completely trashed the spell checker on **Rob Mannion G3XFD's** computer and given harried **PW News & Production Editor Joanna Williams** her first few grey hairs, (that's what you think **Chris - Jo**) let's have a look at the practical world of wireless in the Antipodes ... but this month I suspect we're looking at some wider issues, like the survival of Amateur Radio on the world front.

Practical Wireless call me the

CHRIS VK3CE RETURNS  
THIS MONTH WITH SOME NEWS  
OF AN INNOVATIVE INTERNET  
PROJECT AIMED AT ATTRACTING  
NEW PEOPLE TO THE HOBBY.

'Aussie Oracle', presumably because they couldn't find anyone else mug enough to own up to it. I'm always delighted to hear from readers and you can E-mail me at: [editor@radiomag.com](mailto:editor@radiomag.com) - I can usually be counted upon to deliver a reply of sorts, depending on just how late I am with the next issue of my magazine, **Radio and Communications**.

I'm afraid I'm rather slow to reply to written letters, but love receiving them at **PO Box 123, Eagle Heights, Queensland 4271, Australia** and while we're at it, if you'd like to see what we do radio magazine-wise in this part of the world, feel free to visit our Web site at <http://www.RADIOMAG.COM>

I know it's a bit on the, well smallish side, but I put a national wireless magazine together on my own, which means my time is sorely limited! OK, now that the small



talk's out of the way, we have an important piece of news for you this time around.

## FIVE WPM MORSE

Australia is poised to join many other countries, the UK included, in moving to a five words per minute (wpm) Morse code speed for a full-privilege amateur licence. While the date for this development has yet to be finalised, it is now a 'fait accompli'. It will happen - and soon, certainly before the Olympic Games which is to be held in Sydney later this year.

My in-tray has been burdened with a lot of comments about the Morse code issue ever since this news broke. (What on earth am I talking about? It's been the hottest issue for reader comment in all of the 13 years I've been Editor!).

The decision has been made to differentiate between those with a ten wpm qualification and those with 'only' five wpm. The **Wireless Institute of Australia (WIA)**, our representative body, requested this of our equivalent of your **Radiocommunications Agency (RA)**, the **Australian Communications Authority (ACA)**, to avoid any problems with reciprocal licensing issues.

Effectively then, our Intermediate class licensees will get exactly the same licence conditions as full call holders, allowing them access to all h.f. bands at our legal maximum output power of 400W p.e.p. However, has it occurred to you to wonder about this development in the overall scheme of things - specifically, what impact will a reduction in Morse speed have on our hobby's slowly declining numbers?

In the May 2000 issue I posed a number of questions to the readers of my Australian magazine in our first reader survey in some years and I would've been a fool not to include questions on Morse. You'll be pleased to learn that I am not a fool.

A survey of readers can provide some interesting and useful information about the likes and dislikes of a surprisingly disparate group of people. Oh, and just to sweeten the deal a little, not only did I offer some 20 prizes for those participating in the survey, but also promised to **print** the results, warts and all ...

The most likely course of events for the Morse code issue is that the move to five wpm will be an interim measure only. The next **World Radio Conference**, scheduled to be held in either 2002 or 2003, is likely to remove the requirement altogether and many administrations will follow that decision by removing it from their amateur testing procedures as well.

Some people think the move will spell an end to the use of Morse code on the amateur bands - I say that's a most **unlikely** outcome indeed. Morse will be with us for a long time to come, it is, when all's said and done, an effective and valuable communications medium

and can give its 'die-hard' users a great sense of achievement and accomplishment.

The only thing that has changed is that many people no longer see Morse as being of relevance to **all** modern amateur operators, particularly if they intend to never, **ever** use it. Many others believe that our administrations' continued adherence to testing one's abilities in the mode are killing the hobby.

So, let's say that the Morse test is at a reduced speed for the next two or three years, then is dropped altogether, what effect would its **total** removal have on the amateur service? Ah, glad you asked, it's time to remove the blinkers, folks.

Amateur Radio is in trouble, **big** trouble - just look at the numbers! Where are all the newcomers to the fraternity? I mean, where **are** they?

Oh sure, there are a few 'newbies' coming in, but where is the growth? Well, there isn't any, is there? Not the real, sustainable, necessary growth we need in order to survive and I really, honestly, have to doubt that dropping the code test speed to five wpm is the answer. It may help a little, but only a little.

A lot of the so-called computer 'nerds' get their 'jollies' from playing on the Internet, they look at my radios and shrug their shoulders, saying that they too can talk to people around the world and they don't have to put up with the crackle and noises. But OK, it's not bad, it looks almost like fun.

So, how do I get on the air with you? Oh, I need a licence? Aha and how do I get that? What?! MORSE CODE?! The laughing usually takes a while to abate, then the sad shrug of the shoulders speaks volumes.

My youngest brother is a computer nerd, he would make a fine amateur and assures me he will consider joining us when the Morse code is no longer on the agenda. He would not ever **use** it, so he will not ever **learn** it. It's that simple.

Let's be brutal, the sense of ground-breaking tradition is no longer the issue, the question of survival is of far greater importance - I mean it. Amateur Radio faces its greatest ever threat - **death through indifference**, from an ageing population of operators not being replaced in large enough numbers.

## PROTECT OUR FUTURE

Perhaps the question should now be how do we protect our future? Is it merely a question of waiting for the inevitable, of being swept aside as an irrelevance of the past?

Can we do anything to quell the tide? Yes, I believe we can and I for one am trying to initiate the steps on this side of the globe which may help to **do** something.

Historically, the Amateur Radio operators were the ones who took the great steps, who made the important discoveries, who forged the way for others to follow. These days, the minds of our youth are attracted more by exposure to computers in schools than the lure of our sort of personal

accomplishment - it's easy to use your computer for fun things, heck, they **must** be good if the schools use them.

The Internet is a powerful ally, but is almost an addictive drug for a young mind, can we somehow turn the young's infatuation with the computer to our advantage? In Australia, we believe we can and **we are doing something** about it right now.

Imagine, if you will, that the curious were to be introduced in school to a rewarding course of instruction which was a part of their computerised itinerary. I say 'rewarding' because there is an incentive built in, from the outset, to recognise accomplishment. The incentives include formal recognition of achievement in the form of certificates and in discounts on electrical goods, mainly kits, from a major electronics chain.

The course is called **ARCS**, which stands for the **Australian Radio Certificate Scheme**, a three-level course of study aimed initially at youth and, later, at young adults curious to learn about wireless. Downloaded from the Internet as a self-contained '.pdf' file, the first stage of ARCS has about 20 000 words and almost 100 pictures - we're talking to schools and youth organisations around the country to make them aware of the course and will distribute it, free, as widely as we're able.

Its predecessor, a complete, free-of-charge on-line course of study written by my friend, a canny educator named **Ron Bertrand, VK2DQ** (E-mail [vk2dq@radiomag.com](mailto:vk2dq@radiomag.com)) has generated a huge level of interest and the ARRL recently added the course to its list of recommended study for prospective 'new hams'. One simple classified advertisement was placed in a local newspaper: **LEARN ELECTRONICS FOR FREE!** The reaction was astonishing and it has snowballed ever since.

One person alone cannot make such a scheme work, so Ron then asked a number of people to act as course 'facilitators', who would oversee each candidate's progress on the studies, offering advice and counsel as the work progressed. In every case, the work is voluntary - no money changes hands at any stage of things.

Perhaps you know some people in your part of the world who may find the course useful and I've no doubt whatever that there would also be people prepared to act as course facilitators there, too? Look at the following Web sites: <http://www.qsl.net/vk2dq/amateur.html> or at <http://members.xoom.com/ronber/amateur.html> (the sites are mirrored) for the course details and decide for yourself ...

In each case - both Ron's brilliant on-line course and our all-new ARCS - whether or not the candidates finally choose to adopt Amateur Radio as their hobby is not the issue. Many of them **will** choose it, of course - in fact, many already have thanks to Ron - and the

ultimate removal of the Morse code component of the amateur entrance examinations should ultimately mean that we have achieved our goal ... to rescue Amateur Radio from oblivion.

## HUGE AMOUNT OF INTEREST

So what we are doing in these courses is getting a huge amount of interest and response and doing so by making the greatest possible use of the very thing which so threatens our hobby - the Internet itself. ARCS starts out by explaining the most basic of electrical theory and, throughout, its candidates perform basic experiments to cement their learning in the various subject areas.

We guide them through such projects as making a lemon battery and a basic electric motor, introducing them to radio only at the very end of the first certificate stage. A field task involves a visit to a radio station of some type, or a facility in which radio is used for communication.

An assessment of each candidate's work is provided in the form of a multiple-choice quiz, which can be overseen by **any** responsible person. Once all parts of the work requirement have been completed, a certificate is issued to formalise that stage of their training.

We invited the WIA to be involved at this stage of the proceedings, both because it could arrange sufficient numbers of volunteers to perform the purely paperwork role and to lend some sort of credibility to the overall scheme. The first part of the ARCS course should be available for download from my Web site: <http://www.RADIOMAG.COM> by the time you read this. We invite you to download the file and look at it yourself. By all means, if you have a youngster who may be interested in doing the course themselves ... well, why not?

We really can't tell you what face Amateur Radio will have ten, 20 or 50 years from now. We fervently hope that ARCS and other brave new steps like it may help to arrest then reverse a trend which is being seen all around the world.

If Ron Bertrand and I have created something which will have a lasting impact on our hobby, then that's a good thing. It means we were able to use our talents in a way we hope **all** may benefit from, not just here in Australia, for many years to come.

I look forward to seeing you next time ... and hey - we might just get to talk about the wonderful DX opportunities once again crowding onto our bands. Have fun with your hobby. Enjoy it, and remember to share the joy ...

**A WARM 73 FROM CHRIS EDMONDSON VK3CE, PUBLISHER OF RADIO AND COMMUNICATIONS MAGAZINE.**

*Chris*



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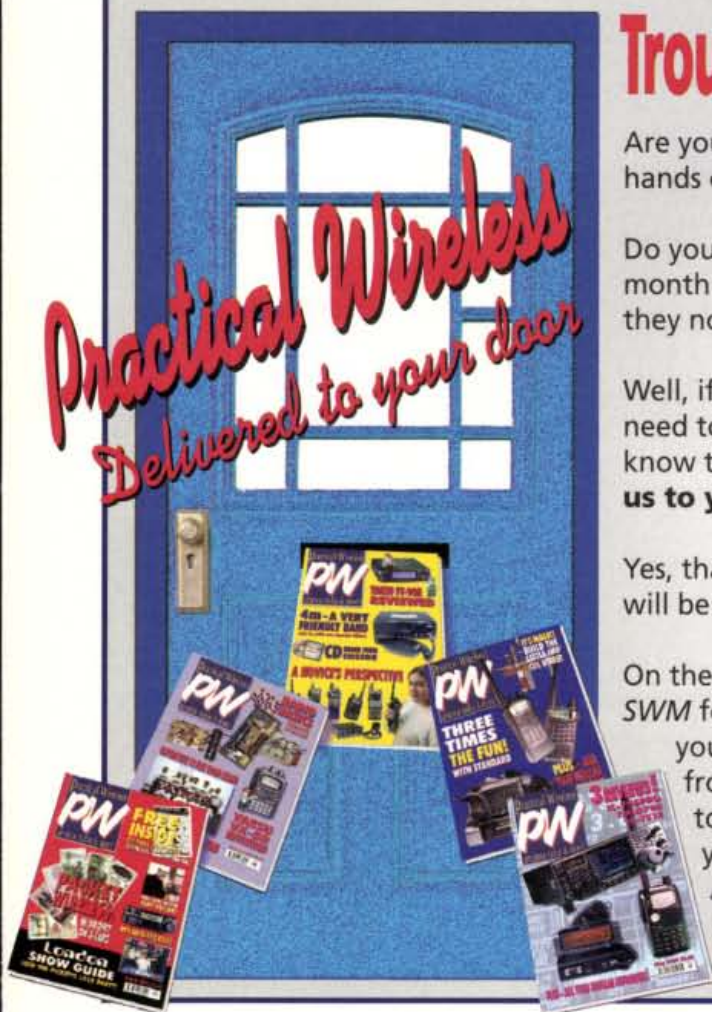
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speakers, Windows 95, 16Mb RAM, Internet ready, £140. Demodulator, JAFAX, receive, ACARS, SSTV, Packet, WXFAX, etc., £20 or exchange for R2000 with v.h.f. Tel: (01608) 662488.

**Drake R4A receiver**, £200. Eddystone 640, £75. Trio 2m (144MHz) transceiver TR-2200G, £40. Dressler ARA60 active h.f. antenna, unused, £100. All with handbooks/instructions. Tel: (01245) 381961.

**Drake R8E** fitted v.h.f. converter, mint, boxed, manuals, £500 only if collected pair. Leake Sandwich speakers, large 300W, £50 collect. Tel: Chas (01502) 711880.

**Entire collection** vintage radios and ex-WD and test equipment, manuals and books, selling as complete lot, uplift from Glasgow. Tel: 0141-632 1236 for list.

**ETM9C** x 3?? keyer with built-in twin paddle, speaker for sidetone, new, in box, £80 (cost £139.95). Watson WM308 Deluxe base microphone, new, never used, in box, £40. Tel: (01709) 850517.

**Fairhaven RD500** radio database receiver, 2Mb memory, good condition, £525. JRC NRD-525 receiver, excellent condition, £450. Yaesu FRG-9600 scanning type receiver with Raytec h.f. module installed, good condition, £250. Tel: Stockport (07974) 953018, after 6pm weekdays or pot luck at weekends.

**FT-1000MP** extra 2.00 s.s.b. filters and high stability TCXO?? hand microphone, mint, £1200. ATU 200W meters, £65. Home-brew p.s.u. 30A, £35. 70A p.s.u., £65, switch mode. Tel: West Wales (01974) 251420.

**FT-101ZD MkIII** transceiver, £275. FT-690R multi-mode 6m (50MHz), £150. Heathkit SB100 transceiver, £100. Heathkit SB101 transceiver, £100. Tel: Bill G4VMN (01326) 250232.

**FT-101ZD** WARC bands, f.m., £225, buyer to collect. Wanted: CR100, 888A. Tel: Tibbert on Derby (01332) 883035.

**FT-102** very good working order complete with operating manual, £225 o.n.o., a pair of classic Trio twins, Trio 599 TX and Trio 599 RX, both working, complete with desk microphone plus home-brew cable for connecting for transceive operations?? and manual, £120 the pair. Star master keyer, £50. Tel: Ivan M0AYU (01703) 906304, evenings, (01703) 613137, days. Owner going maritime mobile.

**FT-3000M** 2m (144MHz) f.m. transceiver with power supply and dual-band antenna, mint condition, £200. Tel: Leeds 0113-295 5368.

**Galvanised Tennamast Adapt-A-Mast** with winch and brackets, £150. CobWebb antenna, 14-28MHz, £40. Buyer to dismantle and collect, seller disabled. Tel: G0NSA (01536) 392870.

**Good home wanted** for Ham-master home base, 2m (144MHz), all mode mains or p.s.u., old but works fine, sensible offers please. Tel: Alan G0HBC (QTHR) 0121-745 1000.

**IC-706** perfect, £450. FDK 750E plus expander, 2m/70cm (144/430MHz) multi-mode, £180. Heathkit SB102, h.f. TX/RX, £75. Kenpro KT44 70cm hand-held, £35. Meteor 600MHz frequency counter, £30. Collect or pay carriage. Tel: Ken G0WBM on Glossop (01457) 855468.

**Icom IC-706MkIIIG** 160m-70cm (1.8-430MHz), all mode base/mobile transceiver with DSP, new 20/02/2000, mint condition, £845. Standard C510 dual-band hand-held, wide band f.m./a.m. receive, soft case, rechargeable batteries/charger, £85. Tel: Les G0FAJ (01202) 460174 or E-mail: g0faj@freenet.co.uk

**Icom IC-R72** receiver 1-

30MHz s.s.b., a.m., c.w., £265. IC-7100 scanning receiver, 25-2000MHz s.s.b., a.m., f.m./w.f.m., new, boxed. IC-255ID 6m (50MHz) s.s.b., a.m., f.m., 1-80W, boxed, £260. IC-735 h.f. mobile fitted f.m. n/c.w. filter, electronic keyer, v.g.c., £400. Part exchange want TS-50, DX-70, IC-970. Tel: G4AFY on Kidderminster (01562) 747480.

**Icom ICR-8500**, boxed, mint, £700. Eddystone 940S, great shape, Eddystone speaker, offers. Exchange Drake, Collins, Rascal, digital h.f. receiver, WHY? Tel: Essex (01279) 815020.

**Iswatsu dual-beam** solid state 'scope, 20MHz, complete with probe set, v.g.c., clear, sharp display, £55. Heathkit r.f. generator, solid state, mint condition, £25. Tel: Coventry 0247-667 2438.

**Kenwood TH-79E** dual-band hand-held f.m. transceiver, boxed, manual, charger, four antennas, needs new battery, £90. Tel: Paul M0BCL on Taunton (01823) 256090.

**Kenwood TM-732E** 2m/70cm (144/430MHz) dual-band mobile, 50W v.h.f. 35W u.h.f. detachable front panel kit, CTCSS extended receive, excellent condition, £250. Tel: Mick G0NBB (QTHR) on Whitstable (01227) 266460.

**Kenwood TS-790E** 2m/70cm (144/430MHz) with voice synthesiser (c.w., u.s.b., f.m., l.s.b.). This set virtually unused since new, £595. Tel: Tony on Bournemouth (01202) 572494.

**KW s.w.r. meter**, £35. KW p.e.p. meter, £35. KW antenna switch, £20. KW 2000 mobile p.s.u., £20. Global AT-1000 a.t.u., £25. Eddystone caps type 831, £10. No.19 set MkIII, £100. Tel: Wores (01562) 743253 or E-mail: 106312.1035@compuserve.com

**Large collection vintage radios**, h.f. receivers, crystal sets, horn speakers, domestic radios also transistor including

Grundig Amateur Satellite and Satellite 2000 and radiograms. Tel: 0151-343 1013.

**Marconi CR200** l.f. receiver, 16-550kHz and Murphy (Console) pre-war domestic receiver, offers. Tel: 0115-917 8520, evenings.

**MFJ-8100L** s.w. receiver, covers 3.5-22m?? in five switched bands, immaculate condition and in first class working order, boxed with manual, £70 including P&P. Maycom AR-108 hand-held aircraft scanner, also cover 2m (144MHz), brand new, boxed with manual, £55 including P&P. Tel: John (01634) 233058.

**Mirage D3010** 70cm (430MHz) 100W linear, unused, £200 plus P&P, offers for Icom IC-271E with Mutek front end plus '471E prefer sell as a pair. Tel: G3LDI (01508) 570278 or E-mail: rcooke@g3ldi.freeserve.co.uk

**Original Handbooks** for Marconi receiver CR150/3 and Eddystone v.h.f. receiver 770R MkII, offers please. Tel: Syd Fenwick G3AIO (01892) 822836, 28 Gimble Way, Pembury, Kent TN2 4BX.

**Plessey PRS2280** h.f. communications receiver in first class condition this receiver was used for the review in *Short Wave Magazine*, price £750 o.v.n.o. Rascal v.h.f./u.h.f. complete receiver system RA2309B receiver. MA2313 pan adapter. MA2030C frequency range extender with the following tuner heads RA2294C, RA2295, RA2296 which covers 20MHz-1GHz, price £750. Transworld h.f. transceiver u.s.b./l.s.b. a.m. modes full frequency coverage, a work anywhere set, any mains voltage or d.c. 12V 100W output, built-in a Flite case for storage on board aircraft and made for the American DOE agents, price £600. Tel: Peter on 0161-743 9544 after 6pm or at work 0161-876 4153.

**Silent Key G3FVV**: Icom IC-740 h.f. transceiver, Icom IC-SM5 desk microphone, Icom PS20 p.s.u., £350. Yaesu FT-470 dual-band hand-held, £75. Yaesu FT-73R 70cm (430MHz) hand-held, £50. Yaesu FT-2700 RH dual-band mobile, £180. Diawa NS-460 s.w.r./p.w.r. meter, £25. VHF wavemeter, £10. All v.g.c. with boxes and manuals. Tel: G2FTY on Redditch (01527) 546048 (QTHR) or E-mail: geoff@gduffin.screaming.net

**Silent Key G3HII** Tennamast 40ft semi-static tower, cage winch bearing?? Yaesu G-400 rotator and controller, dismantled, located south Warwickshire, £300 o.n.o., buyer to collect. Tel: Phil M5ABR 0115-914 3125.

**Sony ICF5W1** miniature digital synthesised receiver, covers all s.w./m.w./l.w. and f.m. stereo with leather case, £30. Howes ASL5 audio filter in aluminium case, with instructions, £15. Tel: (01902) 790260.







# Trader's Table

## Disclaimer

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## THE SHORTWAVE SHOP

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### HF TRANSCEIVERS

ICOM IC707 HF Mobile+Gen Rx	£375
ICOM 706 Mk2 DSP HF/6/2Meters	£525
KENWOOD TS570 DSP HF+Gen Rx	£525
YEASU FT707 HF Ham Bands	£150
YEASU FT747GX HF+ Gen Rx	£345
KENWOOD TS530S HF Ham Bands	£295
YEASU FT70G Manpack HF+ Gen Rx	£295

### VHF/UHF TRANSCEIVERS

KENWOOD TM741E 6/2/70cm Mobile	£325
YEASU FT290R VHF Multimode	£155
YEASU FT708R UHF 70cm Handie	£65
AKD 7003 70cm FM Transceiver	£95
FDK Multi 700E FM Transceiver	£75
KDK FM2030 VHF 25w FM Tcvr	£75
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KENWOOD TS711E VHF All Mode Base	£495
YEASU FT470 VHF/UHF Handie + Base	£135
KENWOOD TH205E VHF Handie	£85
ICOM IC02E VHF FM Handie	£55
PALSTAR KH6 50mhz FM Handie	£55
ALINCO DJ G5 VHF/UHF Handie	£159

### RECEIVERS AND SCANNERS

ICOM IC8500 c/w SP21 Speaker	£850
ICOM R75 DSP Ex Demo Mint	£575
ICOM R70E HF Receiver	£350
ICOM R71E High Spec HF Receiver	£399
YEASU FRG9600 VHF/UHF all Mode Rx	£195
YEASU FRG 7700M HF Receiver	£175
LOWE HF 125 HF Rx. SYNC AM/FM	£165
LOWE HF225 HF Rx. SYNC AM/FM	£250
LOWE HF225 HF Rx. SYNC AM/FM	£235
KENWOOD/TRIO R1000 HF Rx	£245
YEASU FRG7 Analogue HF Rx	£125
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YUPITERU VT125Mk2. Air Scanner	£85

### ACCESSORIES

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GLOBAL AT2000 SWL ATU	£60
TOKYO HL110 VHF 100W. Amp	£125
SOTA 50W UHF Linear Amp	£85
M/M 100LS VHF AMP. 1-3in-100W out	£80
YEASU FR17700 HF ATU for 7700/8800	£49
DATONG ASP Auto Speech Processor	£65
YEASU FTV700 6/2/70cm Transverter	£155
DATONG D70 Morse Tutor	£15
LOWE AP150 Speaker-Filter for HF150	£135
DATONG FL3 Active Filter	£65
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## NEVADA

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ICOM IC-729 HF 100W TRANSCEIVER	£499
ICOM IC-746 HF + 6M + 2M 100W TRANSCEIVER + FILTER	£999
ICOM IC-746 HF + 6M + 2M 100W TRANSCEIVER	£899
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ICOM IC-707 HF 100W TRANSCEIVER	£329
KENWOOD TS-430S HF 100W TRANSCEIVER + CW FILTER	£399
TRIO TS520 100W HF TRANSCEIVER	£189
TRIO TS-940S 100W HF TRANSCEIVER	£795
YEASU FT920AF HF + 6M 100W TRANSCEIVER	£999

### TRANSCEIVERS VHF/UHF

ALINCO DR-M60DX 6M FM 20W MOBILE	£189
ALINCO DR-510E 2M/70CM MOBILE TRANSCEIVER	£179
ICOM IC-207H 2M FM MOBILE TRANSCEIVER	£229
ICOM IC-3230H 2M/70CM MOBILE	£225
ICOM IC-260E 2M MULTIMODE	£239
KENWOOD TM-231E 2M MOBILE TRANSCEIVER	£135
KENWOOD TM-733E 2M/70CM MOBILE TRANSCEIVER	£295
STANDARD C-8900 2M MOBILE	£185
TRIO TR-2200 GX 2MTR PORTABLE	£59
TRIO TS-700G 2M MULTIMODE	£225
YEASU FT-290R 2M MULTIMODE + ACCESSORIES	£195
YEASU FT-726R 2M/70CM HF MULTIMODE BASE	£549
YEASU FT-726R HF/2M/70CMS BASE TX	£599
YEASU FT-7708R 7CM FM MOBILE	£125
YEASU FT-790R11 70CM MULTIMODE TRANSCEIVER	£225

### RECEIVERS

BEARCAT UBC 860XLT BASE SCANNER	£105
COMMET 510 WIDE BAND HANDIE	£145
RECEIVER	£499
DRAKE R8E HF RECEIVER	£150
ICOM IC-R1E HANDHELD SCANNER	£299
ICOM IC-R70 HF RECEIVER + FM	£599
ICOM IC-R700 WIDE BAND RECEIVER	£599
ICOM PCR1000 PC BASED SCANNING RECEIVER	£219
KENWOOD R5000VHF HF RECEIVER + VHF + FILTERS ETC	£699
SANGEAN ATS-803A S/WAVE RECEIVER	£99
SONY AIR & AIRHAND + SHORTWAVE RECEIVER	£125
SONY ICSW100E SHORTWAVE RECEIVER	£129
SONY ICF2001 SHORTWAVE RECEIVER	£89
YUPITERU MVT 9000 VHF/UHF HANDIE SCANNER	£249

### HANDHELDS

ADI AT400 70CM HANDI TRANSCEIVER	£79
ALINCO ALM-203E 2M H/HELD TX	£99
ALINCO DJ-180EB 2M HANDIE - EX DEMO	£129
ALINCO DJ-C1 2M POCKET HANDI	£79
ALINCO DJ-C5 2M/70CM POCKET HANDI	£125
ALINCO DJ-G9EY 2M/70CM HANDHELD	£195
ALINCO DJ-S41E 70CM HANDIE	£75
ICOM IC-TRE TRI BAND HANDIE	£225
KENPRO KT22 2M HANDIE	£59
YEASU FT-411 2M HANDIE	£125

### MISCELLANEOUS EQUIPMENT

AEA PK80 PACKET TNC	£49
AEA PK88 1200 BAND TNC	£55
AEA SWR121 HF ANTENNA ANALYSER	£199
AMDAT ADC-60 FREQUENCY STANDARD CLOCK	£99
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DATONG FL3 AUDIO FILTER	£59
DATONG PC1 HF CONVERTER	£59
DRAE 24 AMP 24 AMP POWER SUPPLY	£75
ICOM AT160 AUTOMATIC ATU	£159
ICOM PS-15 20 AMP PSU	£129
KANTRONICS KPC3 1200 BAUD PACKET TNC	£99
KENWOOD PS-430 POWER SUPPLY	£80
LESON BASE MIC DESK MIC	£29
MW MODULES MML43250 43250 TCMS AMP	£99
MW MODULES MM-4000BK RTTY TRANSCEIVER INTERFACE	£49
PALSTAR AT1500 ANTENNA TUNER	£239
PALSTAR PS04 24 AMP POWER SUPPLY	£14
SISKIN MULTICAT COMPUTER INTERFACE	£39
STAR MASTER KEYS DEWSBURY KEYS	£45
SYMEK TNC 2H + RF UNIT 9K6 TNC + G3 RUH	£179
MODED 70CM TX	£595
TOKYO HL7006 600W HF AMP 12V DC	£595
TOKYO HL700B AMP 100W 21 - 28MHz FOR FT726 (HF)	£129
TOMO QX50 DATA TERMINAL	£125
TRIO MC50 BASE MIC	£39
TRIO VIF-2200GX 10WATT AMP FOR 2200GX	£39
TRIO VFO 520 REMOTE VFO FOR TS520	£59
YEASU YMA8A & PIN DTMF MIC	£19.95
YEASU PA-3 MOBILE ADAPTOR FT-208, 209 ETC	£12

## SOUTH EAST COMMUNICATIONS

00353 51 871278

### STATION ACCESSORIES

Heatherlite Explorer 1200watt HF AMP	£899
Garmin GPS 45XL handheld GPS	£169
Diamond SX100 SWR/PWR meter 3kw	£65
Uniden 360 lazer radar speed detector	£159
Yaesu FR17700 short-wave A.T.U.	£49
Watson 25amp P.S.U. Demo model	£79
Yaesu FC-20 auto atu for FT847	£169
Kenwood PS-S2 PSU for TS850-etc	£169
Mirage 2 meter amp 5 to 8 watts in 100 watts out	£149
MFJ-451 C/W sender with keyboard	£89
MFJ-207 HF SWR analyzer	£49
MFJ 989C 3KW atu	£199
Ameritron AL-811X 600watt HF amp	£495
Revex WS40 2m/70cm SWR/PWR meter	£49
Garmin GPS 2 plus	£149

### VHF/UHF TRANSCEIVERS

Alinco DR150E 50watt 2m with wide RX	£129
Yaesu FT8500 2m/70cm 50/35watt boxed	£199
Kenwood THG7E 2m/70cm	£189
Yaesu FT767GX HF+6+2+70 built in ATU, PSU all mode, bargain	£899
ICOM IC-2350 dualband mobile 50watt wide RX	£275
Kenwood TS790E 2m/70cm base, multimode	£799
Alinco DJG5E 2m/70cm with drop in charger	£189

### HF TRANSCEIVERS

ICOM IC756 HF+6m ATU, DSP mint	£899
Kenwood TS850SAT auto ATU 100watts	£799
Kenwood TS440SAT HF transceiver with ATU	£499
Yaesu FT847 boxed and mint	£1149
Yaesu FT990DC auto ATU 100watts	£799
Kenwood TS430 100 watts 0-30mhz	£349
ICOM IC746 HF+6m+2m ATU new	£1099
Kenwood TS140S 0-30mhz all mode 100 watts	£399
Yaesu FT767GX HF+6m+2m+70cm, ATU, PSU	£899
ICOM IC706mk2 HF+6m+2m boxed and mint	£599

### SHORTWAVE RECEIVERS

Yaesu FRG 8800, 0 to 30mhz RX as new	£299
Lowe HF225 0-30mhz all mode	£225
Lowe HF150 0-30mhz with keypad	£199
Sangean ATS803A portable receiver	£89
SSB etc	£89
AOR 3030 0-30mhz mint	£329
Sony 2001D HF+VHF airband	£169
Sangean ATS909 HF + sssb etc	£89
Target AKD HF3 0-30mhz sssb etc	£89
Yaesu FRG100 0-30mhz all mode inc PSU	£325

### SCANNERS BASE/MOBILES

Yaesu VR500 latest H/H 0-1300MHz all mode	£219
AOR 8000 0-1900mhz 1000mems all mode	£199
ICOM IC710 all mode with case	£199
ICOM IC7100 25-2000mhz base receiver 1000mem	£799
Bearcat 3000XLT 25-1300mhz 400mems	£149
Yupiteru MVT7100 0-1650mhz charger	£179
Realistic Pro2042 1000 memories base new	£199
AOR5000 0-2600mhz all mode boxed and mint	£799
AOR 8200 0-2000mhz boxed mint	£289

All prices in Sterling

## WATERS & STANTON

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### HF TRANSCEIVERS

ICOM IC-756 HF, 6m All Mode Base with ATU & Gen.Cov. 12V	£995
ICOM IC-761 Base Transceiver with Gen.Cov. Mains	£699
Trio TS-536 Amp (HP) HF TX, 40m Mobile Inc	£299
Tokyo HT-180 80m SSB/CW Transceiver 20W	£129
Yaesu FT-757GX Base Transceiver with Gen.Cov. 12V	£999
Yaesu FT-757GX II Base Transceiver with Gen.Cov. 12V	£579
Yaesu FT-757GX HF/6m, 2m, 70cm All Mode with Gen.Cov. Mains	£799

### VHF/UHF BASE/MOBILE TRANSCEIVER

Alinco DR-M60SX 2 6m FM Mobile 10W	£159
ICOM IC-250E 2m FM Mobile / Base 25W 12V	£149
ICOM IC-2900 2m All Mode Mobile 25W	£299
Kenwood TM-431E 70cm FM Mobile 35W 2m RX, Full Duplex	£299
Kenwood TM-733E 2 2m, 70cm FM Mobile 50W, 35W	£225
Kenwood TM-733E 2 2m, 70cm FM Mobile 50W, 35W Full Duplex	£225
Kenwood TM-6707E 2m, 70cm FM Mobile 50W, 35W Remote Brd	£199
Trio TS-700 2m All Mode Base Transceiver 10W	£249
Yaesu FT-890R 6m All Mode Portable 2.5W	£225
Yaesu FT-736R 2m, 70cm All Mode Base Transceiver mains	£775

### VHF/UHF HAND HELD TRANSCEIVER

ADI AT-18 2m FM Handie	£69
ADI AT-400 2m, 70cm FM H/HELD Wide RX/Full Duplex	£175
ADI Sender 400 70cm FM Handie	£69
Alinco DJ-940 2 2m FM Handie	£99
Alinco DJ-940T 2m FM Handie	£79
Alinco DJ-940T 2m FM Handie	£99
Alinco DJ-940T 2m FM Handie	£119
Alinco DJ-940T 2m FM Handie	£149
Alinco DJ-F1E 2 2m FM Mtn Handie	£69
Dekons VHF 2m FM Handie	£99
Hora C-40R 70cm FM Mtn Transceiver (2 x AA batteries)	£65
ICOM IC-94E 70cm FM Handie with Case	£99
ICOM IC-25ET 2 2m FM Handie	£149
ICOM IC-20XET 2m FM Handie	£119
ICOM IC-24ET 2m/70cm FM Handie	£159
ICOM IC-P2E 2m FM Handie	£100
ICOM IC-P4E 70cm FM Handie	£125
ICOM IC-T8E 6m, 2m, 70cm FM wide RX	£199
ICOM IC-D16T 70cm Handie, 16 Channels	£60
ICOM IC-W2E 2 2m/70cm FM Handie (with up. mt)	£145
ICOM IC-W21E 2 2m/70cm FM Handie	£199
ICOM IC-W21ET 2m/70cm FM Handie	£149
Kenwood TH-23E 2m FM Handie	£100
Kenwood TH-24E 2m FM Handie	£100
Kenwood TH-42E 70cm FM Handie	£139
Kenwood TH-46E 70cm FM Handie	£149
Kenwood TH-75E 2m / 70cm Handie	£149
Kenwood TH-77E 2m/70cm FM Handie with Sp. mic Full Duplex	£225
Kenwood TH-78E 2 2m/70cm FM Handie with Full Duplex	£249
Kenwood TH-232E 2m FM Handie	£95
Kenwood TH-471E 2m, 70cm FM Palm Held with Wide RX	£185
Standard C-136 2m FM Handie	£99
Standard C-528 2 2m/70cm FM Dual Watch/Full Duplex+Charger	£199
Yaesu FT-28E 2m FM Handie	£115
Yaesu FT-41E 70cm FM Handie with Wide RX	£139
Yaesu FT-738 70cm FM Handie	£119
Yaesu FT-813 2m, 70cm FM Handie with Full Duplex	£195
Yaesu FT-811 70cm FM Handie with DC Adapter	£129

### SHORTWAVE RECEIVERS

AKD HF-3 2 Target 0-30MHz 12V Receiver	£99
Grundig YB-206 Portable Receiver with FM	£69
Grundig YB-400P Portable Receiver with FM stereo and SSB	£89
Grundig YB-500 2 0.15-30MHz Portable with SSB + FM Stereo, RDS	£139
ICOM IC-R71 100kHz-30MHz All Mode Receiver Mains	£399
ICOM IC-R72 2 0-30MHz Receiver	£449
ICOM IC-R72 2 0.15-30MHz AM/CW SSB 12V with PSU	£449
Lowe HF-150 30kHz-30MHz All Mode 12V with Keypad/PSU	£249
Lowe HF-225 2 30kHz-30MHz Receiver 12V PC Compatible	£299
Lowe HF-250 2 30kHz-30MHz Receiver 12V PC Compatible	£399
Low SX-50 2 Portable Receiver with AM & FM	£119
Mann M8-4099 Portable Receiver with FM stereo and SSB	£79
Mann M8-4107 Portable 15kHz-30MHz AM/FM WFM 400C	£149
Mann M8-4099 Portable 15kHz-30MHz AM/FM WFM 400C	£149
Sony ICF-571 Portable Receiver with AM & FM	£129
Sony ICF-SW55 2 Portable Receiver with FM stereo and SSB	£139
Sony ICF-SW100E 2 Portable Receiver with FM stereo and SSB	£119
Sony ICF-SW700G 2 Portable Receiver with FM stereo and SSB	£125
Superphone Super M8-4099 15kHz-30MHz AM/FM WFM 400C	£149
Yaesu FRG-101 30kHz-30MHz AM/CW SSB 12V with PSU	£345
Yaesu FRG-7700 15kHz-30MHz All Mode + FT-7700 & PSV-7700	£299

### SCANNERS MOBILE/WAVE

ICOM IC-8250 100kHz-30MHz All Mode Base 12V with PSU	£849
ILS SS-400 26-52MHz AM/FM WFM 30C 12V	£225
Realistic Pro-2044 65.5MHz (with GPS) FM Receiver 90C 12V	£85

### SCANNERS HAND HELD

Alinco TH-X1 2 100kHz-1300MHz AM/FM WFM 100C	£139
Alinco TH-X10 100kHz-300MHz All Mode 1200C	£199
AOR AR-800 100-950MHz 1m with GPS 1-AM/FM WFM 100C	£99
AOR AR-1500 90kHz-1300MHz All Mode 1000C	£125
Black Jaguar BI-3000MK2 26-52MHz AM/FM WFM	£69
Continental Com-510 90kHz-1300MHz AM/FM WFM 400C	£139
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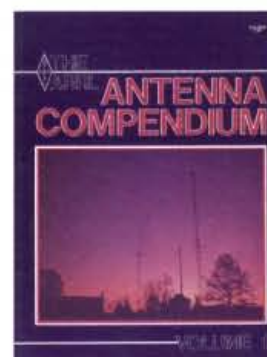
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This month's 'Book Of The Month' comes to you courtesy of the ARRL camp and is the first in a series of six volumes entitled *Antenna Compendium*. Volume One takes a look at a varying number of aspects associated with antennas - their design and their construction.

Some of the chapters in this book include, for example: 'Quad and Loop Antennas'; 'Log Periodic Arrays'; 'Other Beam Antennas'; 'Multiband Antennas'; 'Vertical Antennas'; 'Antennas of Reduced Size'; 'Antenna Construction and Installation' and 'General Antenna and Transmission-Line Information'. The book is well illustrated, although some of the diagrams could be a little clearer.

*Antenna Compendium Volume One* would usually cost £10.50 but, for this month only, we can offer readers the chance to buy it for a mere £7 (a saving of £3.50) plus P&P, (UK only overseas prices on application). Offer closes 30th June 2000.

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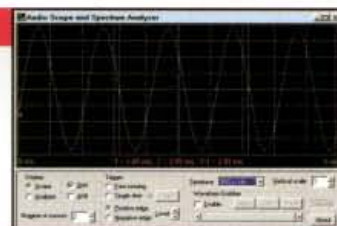
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#### Construction of internals

#### Construction of externals

#### Frequency range

#### Modes

#### Tuning resolution

#### IF bandwidths

#### Receiver type

#### Scanning speed

#### Audio output on card

#### Max on one motherboard

#### Dynamic range

#### IF shift (passband tuning)

#### DSP in hardware

#### IRQ required

#### Spectrum Scope

#### Visitone

#### Published software API

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#### External units

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17 kHz (FM-N), 230 kHz (W)

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200mW

8 cards

65 dB

no

no - use optional DS software

no

yes

yes

yes

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200mW

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70 dB

±2 kHz

no

yes

yes

yes

yes

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