

# Practical Wireless

# PWN

## amateur radio & more!

**NEWS**

**KEYLINES**

**CLUBS**

**RADIO BASICS**

**VINTAGE**

**VHF**

**ANTENNAS**

**PRACTICAL**

**HF**

**BROADCAST**

**BARGAINS**

May 1998 £2.20



**NEW LOOK**

# REVIEWED

## THE ALINCO DX-77 'BUDGET PRICED' RIG



# WIN!

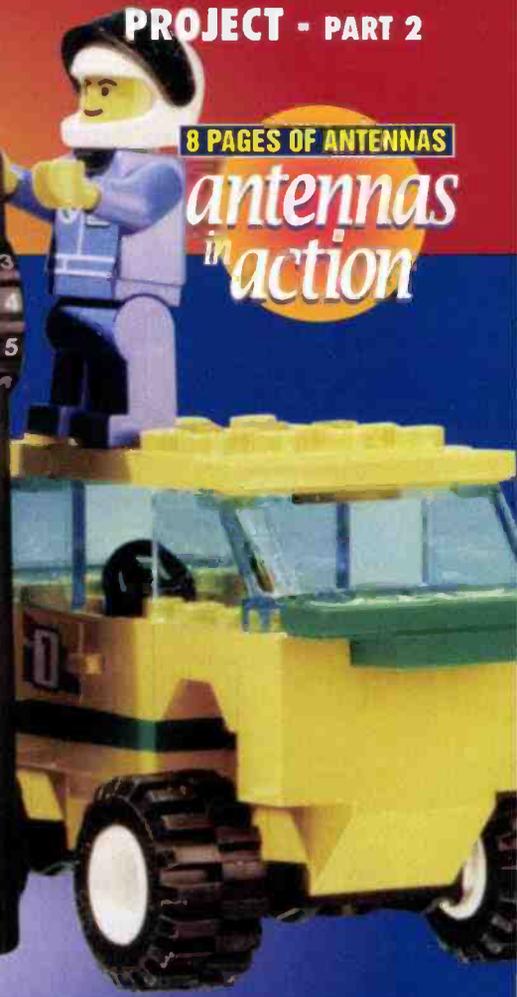
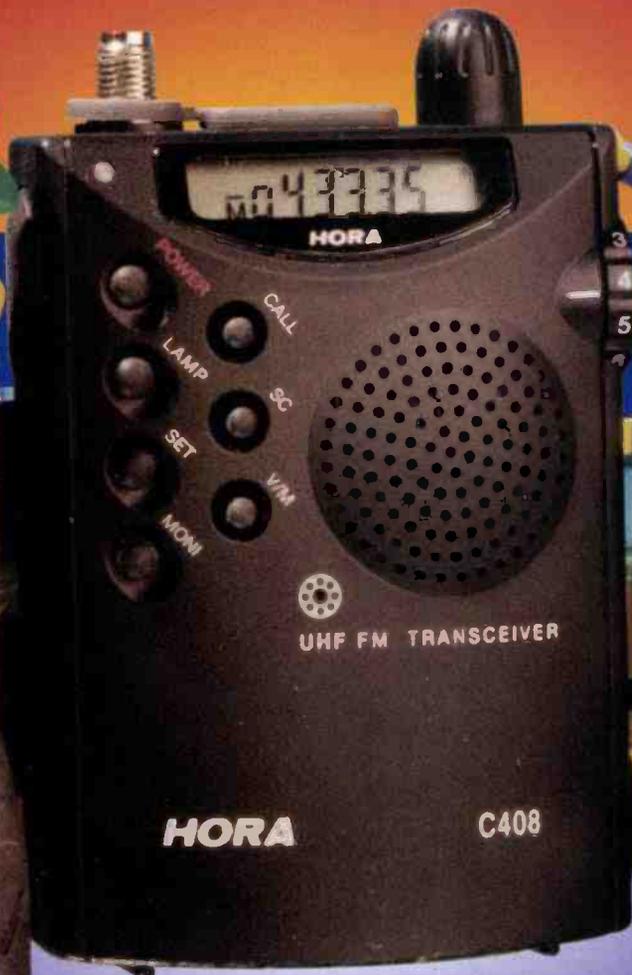
## A COPY OF StripboardMagic THE LAYOUT DESIGN PROGRAM

# BUILD!

## THE GDP-430 HAND-HELD PROJECT - PART 2

8 PAGES OF ANTENNAS

# antennas in action



# REVIEWED

## THE HORA C408 'MINIATURE' TRANSCEIVER



# Waters & Stanton PLC

FREE-PHONE ORDER LINE

0500 73-73-88



Peter Waters G3OJV / G0PEP

Part Exchange Welcome

Download our latest second hand list from our web site



22, Main Road, Hockley, Essex. SS5 4QS  
Open Mon-Sat 9.00AM - 5.30PM  
New Web Site:- <http://www.waters-and-stanton.co.uk>

## 25<sup>th</sup> YEAR of Service to UK Amateurs

This is our 25th Year of retailing Ham Radio equipment - unmatched by any of our competitors. We shall be offering some unique deals - also unmatched by our competitors! **UK's TRUE Number One Dealer**

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**NEW** C-408



From **HORA**  
70cms  
Handheld  
Full  
CTCSS

**£89.95!**

FREE Postage

SPECIAL OFFER PRICE

Full CTCSS; 20 memories; 1.6MHz repeater shift; Priority channel, Scanning; Dual watch; Dual mode squelch; PTT lock; 12.5/25kHz steps, 230mW output - all from just 2 x AA cells

**SGC-2020 QRP HF Transceiver**



**NEW** £599

1.8 - 30MHz

0 - 20 Watts SSB and CW with full break-in. Can run from 12 volts or internal pack. Delivery expected at the end of March

## 1998 Catalogue



- Largest In Europe
- 176 Colour Pages
- 1000 Photographs
- 1400 Products
- Technical Specifications
- News Snippets

Now established as the foremost equipment guide this edition is completely new with every page in full colour and almost every item illustrated. For the cost of a magazine you can get the best guide ever.

£2.95 plus £1 postage

**WATSON**

## Hunter Frequency Counter



**NEW**

- Features:
- 10MHz - 3GHz
- Ni-cad Pack
- AC Charger
- BNC Antenna
- Full Instructions

**£59.95**

Add £2.50 Post & Ins.

Check your base or handheld transceiver, or hunt out frequencies of nearby transmitters or handhelds. The "hold" button lets you lock on and store the frequency.

UK's Top Dealer for YAESU, KENWOOD & ICOM

## Kachina 505DSP HF Transceiver

Send for Brochure

A complete PC controlled remote HF rig - In stock

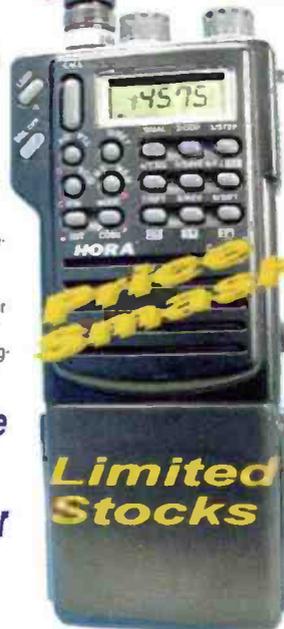


Main Features

**£1995**

100W HF All bands + Receive 100kHz - 30MHz  
Filters for SSB 3.5, 2.7, 2.4, 2, 1.7kHz  
Filters for CW 1kHz, 500Hz, 200Hz, 100Hz  
Band Scope, DSP filter, Memory keyer, log book, VSWR meter, Smith Chart, pre-amp, 20dB attenuator, plus many software controlled functions.

**NEW** HORA C-150  
2m FM Handheld



**£99.95**

Can you believe your eyes?

- 25 / 12.5kHz Steps
- 130 - 170MHz Rx
- 1750Hz Tone
- 20 Memories
- Scanning
- Battery Save
- 5W (Ext. 12V)
- LCD Readout
- Keypad Entry

Includes:  
6 x AA cell case  
Antenna  
Instruction Book  
12 Month's Wtly.

**WATSON** W-MM1 Multimode Modem



- Packet, AMTOR, **£69.95**
- CW, SSTV, Fax, RTTY
- NAVTEX, SYNOP
- Transmit and receive
- Powered from RS-232 port

Phone For Details

Extended Warranty Now Available

## KENWOOD TM-451E 70cms Mobile

Save £210!



£459

**£249**

A chance to purchase this top range 70cms mobile at a silly price! 35 Watts output, 41 memories and CTCSS encoder gives you all you need to enjoy mobile or base station operation. 12.5kHz/25kHz steps are featured together with a clear LCD.

## ADI AR-146 2m 50W

FULL CTCSS



**£199**

- 3 Power levels - Wideband receive
- 40 Memories plus call channel
- 7 Programmable steps
- Channel or frequency display
- The best sensitivity in the business
- Keypad mic and mounting kit
- CTCSS Encode and Decode!

## ADI AT-600 Dual Bander

New Low Price **£249**



AM Air Band

PW says: "an incredibly well priced radio - amazingly sensitive - audio - worked very well with 12.5kHz channel spacing - An Absolute Cracker"

- 2m / 70cm
- CTCSS encode/decode
- Full DTMF + 1750Hz tone
- Alphanumeric memories
- Full duplex
- CTCSS tone reader
- 29 programmable features
- AM airband receiver
- Rx up to 990MHz
- Ni-cads and charger

## ADI AT-201 2m FM Handy

FULL CTCSS

**£149**



- 40 Channels
- 5W on 12V
- Illuminated keypad
- Full CTCSS
- 1750Hz tone
- DTMF
- Channel Reasout or
- Frequency Readout
- Set to Set Cloning
- Uses AA cells

W&S

**YAESU FT-847** *it's Here!*



**Includes 70MHz Transceiver**

**£1495**  
1.8MHz  
to  
432MHz  
Plus  
**FREE**  
Base Mic

100W 1.8 - 50MHz \* 50W 2m/70cm \* SSB - CW - FM - AM \* CTCSS \* Alphanumeric \* 0.1Hz steps \* Packet ready 1200 & 9600 \* DSP filtering \* Dual display \* squelch \* IF shift \* Notch filter \* Power control \* Tx monitor \* Electronic keyer \* 12.5 / 25kHz switched FM filtering \* Switchable pre-amp \* Size 260 x 86 x 270mm \* weight 7kg

**ICOM IC-706 Mk II 1.8 - 146MHz** **£995**



**Plus FREE DSP**  
**PRICE MATCH**

**DSP Module Separately £59.95**

The IC-706 Mk II transceiver as the best compact hi mobile bar none. It out performs and out specifies any other model. The only choice left is which dealer you buy it from! We offer you an unbeatable price and an unbeatable back-up service plus optional extended 5 year warranty for an extra £98!

*This Month* **Lowest Yaesu Prices Ever!**  
10 Day Approval 24 Month's Warranty

**YAESU FT-920 1.8 - 54MHz** **£1269**



**Free FM board & AM Filters**  
**PRICE MATCH**

\* 1.8 - 54MHz 100W \* DSP filter \* MOSFET PA \* Internal ATU \* Auto notch \* Twin VFOs \* Auto glow display \* Shuttle jog \* Digital voice memory \* Electronic keyer \* RS-232C converter \* Quick memory bank + lots more phone or e-mail for colour leaflet

**YAESU FT-1000MPDC (AC)** **£1895**



**PRICE MATCH**

\* 1.8 - 30MHz 100W \* SSB - CW - FM - AM \* Rx 100kHz - 30MHz \* Message memory \* Dual In-band rx \* EDSP filter \* RF processor \* RF pre-amp \* Electronic keyer \* IF shift width \* Collins filters \* comprehensive menu system \* RS-232 interface and more - send for details

**IC-77E Dual Band handy** **£199.95**



- \* 2m & 70cm Handy
- \* 70 Memories
- \* Full CTCSS
- \* Tone scan function
- \* Up to 4W out
- \* 8 tuning steps
- \* DTMF
- \* Auto power saver
- \* 600mA 7.2v ni-cad
- \* AC charger and helical

**Alinco Prices Down!** **£139.95**  
Normally **£169.95**

**DJ-C1E 2m FM**

Credit card size with full CTCSS - 300mW  
20 memories - AM Air  
[Review February RadCom](#)

**ICOM IC-746 1.8 - 144MHz** **£Phone!**



**PRICE MATCH**

**YAESU FT-8100 Dual Bander Mobile** **£369**



**Save £100!**

**Price Slashed**

**DJ-C4 70cm FM** **£99.95**  
Normally **£169.95**

Slip it into your pocket for rally use or the local repeater. Earpiece and AC charger included.  
See page 52 of Feb RadCom

\* 100W 1.8 - 146MHz \* SSB - CW - FM - AM \* Electronic keyer \* Gen. cov receiver \* Spectrum scope \* DSP noise filter \* Notch filter \* IF pass band tuning. *Delivery from stock.*

**ICOM New IC-2100 2M Mobile** **£269**



With Switched 12.5kHz & 25kHz Filters  
**New Model**

**YAESU FT-50R 2m/70cms Handy** **£229**



- \* Wideband Rx (AM Airband)
- \* FM Broadcast receive
- \* CTCSS & 1750Hz
- \* 112 Alphanumeric Memories
- \* Dual Watch - Military rated
- \* 5W from 12v DC Input
- \* Ni-cads and AC Charger

This is a very solid rig that is proving one of the most popular dual band handhelds

**KENWOOD THG-71E Dual band** **£279**



**Special Price**

- \* Dual Band 2m/70cm
- \* 200 memories
- \* Alphanumeric Display
- \* Full CTCSS
- \* DTMF
- \* Up to 6W out
- \* Wideband Receive
- \* Illuminated Keypad
- \* PC Compatible
- \* Windows Programming

**Send For Brochure**

The IC-2100 Mobile transceiver from ICOM features switched filtering, 55 Watts with 113 memories. And all this at a very competitive price. In stock NOW

**ICOM IC-207H 2m/70cm Mobile** **£329**



**PRICE MATCH**

**ICOM PCR-1000 HF - UHF Receiver** **£349**



New DSP Module Available **£59.95**  
Computer controlled Receiver 10MHz - 1.2GHz  
SSB CW AM WPM WFR Unlimited Memories  
FREE Software, AC Supply and ribbon cables

**PRICE MATCH**

**YAESU VX-1R Dual band** **£219.95**



**Save £50!**

The world's Smallest HT From the UK's Biggest Dealer!

Our best selling dual bander and one we would be happy to own.

- \* 2m & 70cm
- \* Packet 9600 bps ready
- \* 50W / 30W
- \* 180 Memory channels
- \* Detachable head
- \* CTCSS & 1750Hz tone

**KENWOOD New TM-G707** **£349**



**New Model**

**Rechargeable Alkaline Cells For Starter Kit** **Now £13.99**



- \* Rechargeable Alkaline
- \* 1.5v cells
- \* No memory effects
- \* Charge mid cycle is OK
- \* 5 year charge shelf life
- \* 3 x capacity of ni-cads
- \* Very low cost

In stock now! *Note: you must use the special charger supplied with Starter Kit.*

**Starter Kit:** Comprise 4 x AA cells and dedicated AC wall charger **£13.99 + £2 p&p**

- 4 x AA cells (ready charged) **£5.99 (£1.00 post)**
- 8 x AA cells (ready charged) **£10.99 (£1.50 post)**
- 4 x AAA cells (uses standard charger) **£6.25 (£1.00 post)**

**ICOM IC-T8E Dual Band handy** **£349.95**



**6m 2m 70cms**  
**PRICE MATCH**

All in one small package.

- \* 5W output (13V)
- \* 25 / 12.5kHz ready
- \* Wideband Rx
- \* Nickel Hydride batt
- \* Wide FM broadcast
- \* AM for airband
- \* Rapid scanning
- \* Alphanumeric

- \* 144 & 430MHz 50/35W
- \* 180 Memories
- \* AM / FM Rx
- \* Detachable front head
- \* RX 118-174/300-524/800-1000MHz
- \* CTCSS & 1750Hz Tone

# MFJ

## Ham Radio Accessories

### The Best DSP Filter in the World!



Hear those weak signals - Get rid of the QRM - works better than any internal rig DSP - 16 memories - totally programmable

### DSP Data Audio Filter



- \* CW 50, 100, 200, 500Hz filter
- \* Suits all data modes
- \* Full adjustable pass band & filter

### Rotary Inductor ATU



- \* 1.8 - 54MHz 300 Watts
- \* Built-In 300W Load
- \* Wire - balanced or coax
- \* Roller Coaster Inductor
- \* Active PEP meter (PP9 Batt)
- \* 4-way Antenna Switch
- \* Cross Needle metering

### UK's Top-Selling Linear

- \* 160 - 10 Metres
- \* 600 W linear 7.5dB Gain
- \* Like a 3 element Monobander!
- \* Uses low cost 811A tubes
- \* Built-in rugged AC Supply
- \* Instant by-pass switch
- \* PA V/A meter + Grid meter
- \* Over rated variable capacitors
- \* Fan cooled for long life

### The DX Machine Ameritron AL-811X



### FREE 48 Page Catalogues With Discount Vouchers

Just phone, write or e-mail for your copy of the complete 48 page MFJ UK catalogue with discount vouchers. Your chance to see the huge range plus save money on normal prices - and it's completely FREE!



### Perfect CW Tutor



- \* Displays words, letters and numbers
- \* 3 to 35WPM with natural CW note
- \* Various modes including Farnsworth
- \* Enormous vocabulary of words
- \* Actually sends QSOs as well!
- \* Individual characters or groups
- \* Headphone socket; Power from PP3
- \* Sends text just like an actual test.
- \* A tutor that displays what it sends.

"It's an Amazing Ideal!" Nothing Compares £79.95

### The Famous Antenna Analyser

1.8 - 170MHz £229.95  
 There's nothing else like it!  
 Connect to aerial or coax and adjust it in seconds. Turns hours into minutes and ideas into antennas! Give your antenna system a complete check out. Over 500 sold so far! A great piece of kit.  
 \* 1.8MHz - 170MHz \* Digital Readout  
 \* Resonance \* VSWR  
 \* Impedance \* AA batteries or \* 12v external



### 1.8 - 30MHz 3kW ATU £349.95



- \* 1.8 - 30MHz with roller coaster
- \* Cross needle VSWR & PEP
- \* "T" network with 4:1 balun
- \* Long wire, coax and balanced feed
- \* By-pass and Antenna select switch
- \* 270 x 375 x 115mm

### 1.8-30MHz 300W ATU



- \* 300 Watts PEP 150W CW
- \* 1.8 - 30MHz - with ease!
- \* Wire, coax or balanced line
- \* Balun included for best match
- \* 30 / 300W power meter - PEP / RMS
- \* Antenna selector, by-pass etc

£129.95

### Work DX on 50MHz



6M SSB Transceiver £249.95  
 10W Complete & Ready to Go!



Same as MFJ-948 above but with internal dummy load. £149.95

### New QRN Noise Filter



- \* Phases out noise at the antenna socket
- \* Kills local QRM - lets signals through
- \* No more electrical interference!
- \* Rf sensed for transceiver use (150W)
- \* Up to 20dB noise reduction
- \* Recovers signals below the noise!
- \* Adjust to suit local problems
- \* Kill that thermostat problem

£149.95

### Auto ATU Matcher



Lets your Auto ATU match any coax aerial. £59.95

Auto-Tuner Extender  
 Connect between transceiver and antenna - no more problems with G5RVs and all those difficult antennas - 160 to 10 metres

## MFJ Warranty Warning!

MFJ USA wish it to be known that only stock imported by Waters & Stanton PLC and supplied to approved dealers carries the official UK warranty.

All future MFJ stock will carry the official UK warranty cards (which have to be returned to us). If your item does not have this card, phone us for guidance. If a product is purchased that does not come through the official channel, you could find yourself at the mercy of a dealer who has no service information, is supplying old versions or non European models, has no access to factory parts or the backing of the UK service team! THE CHOICE IS OBVIOUS!!

### Vectronics VC-300DLP ATU



- \* 1.8MHz - 30MHz 300W ATU
- \* Balanced, coax, long wire
- \* PEP, Average and VSWR
- \* 3-way antenna selector
- \* Built-in dummy load
- \* Thru position \* Size 257 x 85 x 197mm

£129.95

### Vectronics 2.5kW Load

DL-2500 £189.95



- \* 2.5kW (1 min) 50 Ohm Load
- \* 500W Continuous (50% cycle)
- \* DC - 150MHz
- \* Fan cooled (AC adaptor included)

### 200W Low Pass Filter



- \* 1.8 - 30MHz 200W PEP
- \* 50 Ohms impedance
- \* 50dB @ 50MHz 0.5dB at 30MHz
- \* SO-239 connectors

£29.95

### Data Decoder



- \* Decodes CW, RTTY, ASCII, AMTOR FEC
- \* LCD 2 x 16 characters
- \* 8000 character RAM
- \* Key input for CW practice
- \* Epson compatible printer port
- \* Requires 12V at 300mA DC

£179.95

## Waters & Stanton PLC

22, Main Road, Hockley, Essex SS5 4QS  
 Orders FREEPHONE 0500 73 73 88  
 Technical 01702 206835

E-mail sales@wsplc.demon.co.uk  
 Web http://www.waters-and-stanton.co.uk

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## RadioScene



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# DX-70TH

100 Watt HF Transceiver  
plus 100 Watts on 6 mtrs

# Award winning HF Performance

- TX - all HF + 6mtr
- RX - general coverage  
150kHz - 30-MHz  
50MHz - 54MHz
- SSB, CW, AM, FM and digital modes
- 100 memories
- Detachable faceplate and remote mounting kit available
- Speech processor standard
- Narrow filters fitted as standard
- 100W output on HF & 6mtrs
- Selectable 4 stage RF gain  
20dB to +10dB
- Superb TX audio and RX
- Excellent RX sensitivity
- Full break in on CW
- All mode squelch
- Scan facilities
- CTCSS encoder
- Noise blanker
- Quick offset for DX pile-ups
- IF shift control
- Separate HF & 6M antenna sockets

The DX70 TH packs a hefty 100W punch on all Ham bands 1.8 - 50MHz. It is backed by a superb receiver with narrow filters fitted as standard. Make no mistake - this is a real DX operators transceiver ideal for use at home, in the car, or for that portable DXpedition. General coverage receive is included and wideband transmit facilities for export customers. The detachable front panel allows remote mounting and additional security.



**£775.00**  
LB P&P

## EDX-1 HF Antenna Tuner

The EDX-1 is a coaxial tuner with built in Power and SWR meters. The ATU is rated at 120W and covers 160-10 meters including WARC bands.



**£159.95**  
LB P&P

## EDX-2

Automatic Random Wire Antenna Tuner



**£289.95**  
LB P&P

Quickly matches random wire antennas, mobile whips, verticals, inverted Ls. Wired for DX70 - but can be used with most HF Transceivers.

- 1.6MHz - 30MHz
- 200W PEP

# DX-77

- Covers all HF Amateur Bands
- General coverage receive (150kHz - 30MHz)
- 100 memories
- 100W, SSB, CW & FM, 40W AM
- Built in speech compressor
- Computer control with optional ERW-4
- Full QSK in CW modes
- QRM/QRN reduction with IF shift, RF attenuator and optional CW filter
- Two VFOs + memory operation mode
- Basic model upgradeable to (T) model with



- EJ33U Electronic keyer
- EJ34U CTCSS
- EJ35U CW filter

DX-77(E) Standard

DX-77 (T) with options

**£675.00**  
LB P&P

**£775.00**  
LB P&P

## DR-430 UHF Mobile

A rugged easy to use 70cm mobile transceiver with optional extended receive coverage.

- 400 - 490MHz
- 35W RF output
- CTCSS encoder
- 20 memories expandable to 100
- Frequency or channel display

**£259.95**  
LB P&P



## HFM-1

HF stainless steel mobile antenna complete with spring base.

Covers: 3.5 - 30MHz (when used with EDX-2 auto ATU)  
Length: 2.7 metres

**£59.95**



Send in SAE 4 x 1st Class Stamps) for latest collection of Alinco leaflets, our catalogue & magazine

**ALINCO OFFER**  
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Hampshire, PO2 9AE

# NEVADA®

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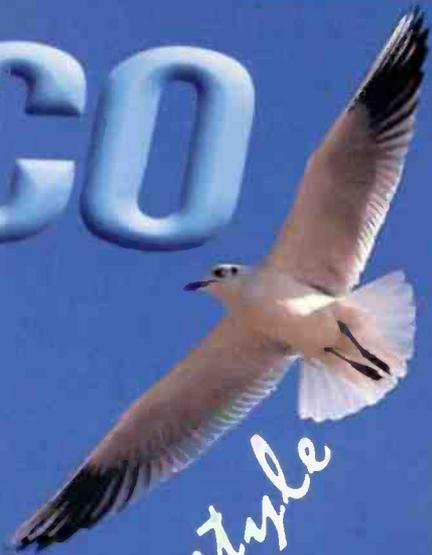
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# ALINGO

*innovation, quality, style*



## DJ-G5EY

Dual Band Handheld

A brilliant twin band handheld that does everything including spectrum display of adjacent channels. The RX has a superb front end that does not suffer with breakthrough like some other handhelds. It has CTCSS/DTMF built in as standard.

- Spectrum channel display
- Optional extended receive including Airband 108-173.995MHz 400-511.995MHz 800.999.990MHz
- Full VHF/UHF Duplex
- Over air cloning
- Cross band repeat
- Up to 5W RF output
- 100 memories

NEW LOWER PRICE **£269.00** (S&P)

## DJ-191E

2 Metre Handheld

A new slim line 2 metre handheld that's easy to use and has an enormous clear display.

- Up to 5W output (with 9.6V NiCad pack)
- 40 memories channels
- Cloning capable
- CTCSS encoder
- DTMF fitted
- Battery save facility
- Scan functions
- Time out timer

**£169.95** (S&P)

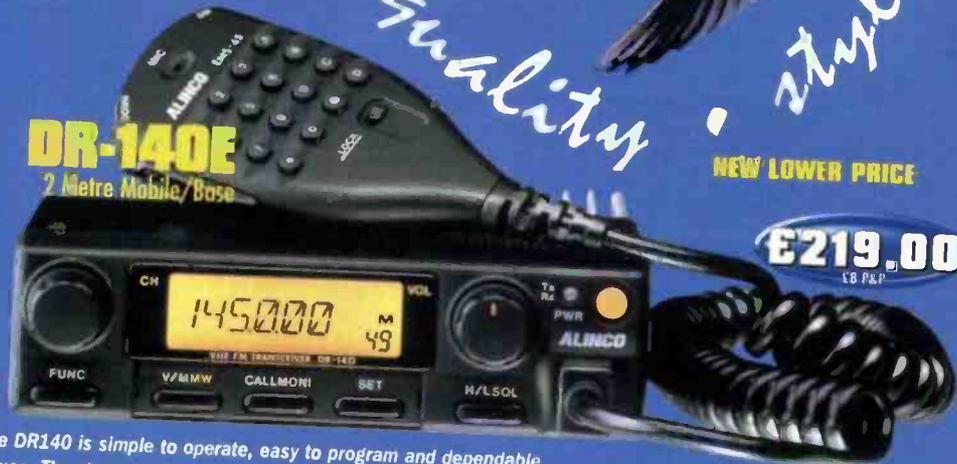
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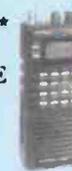
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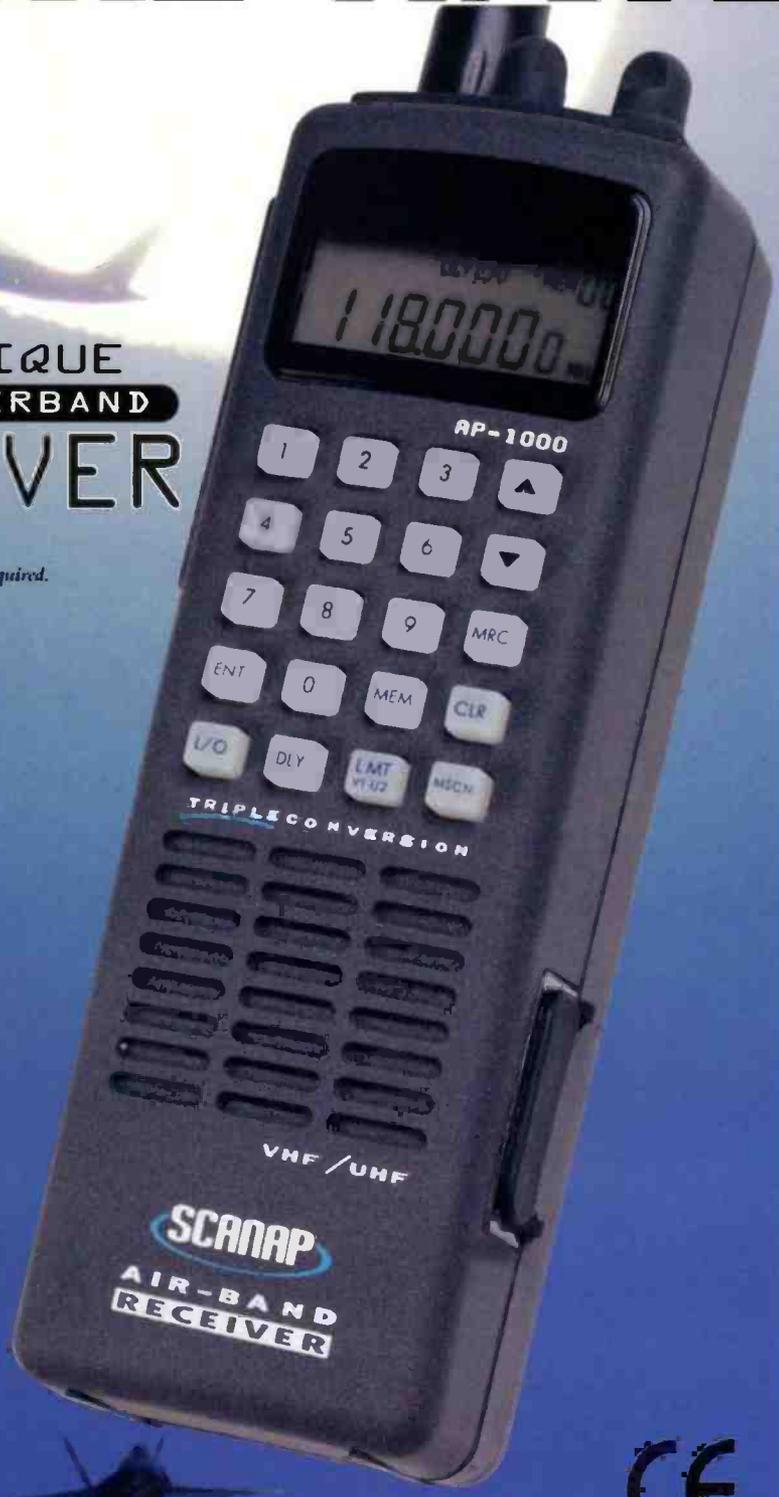
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As to previous issues, a second issue, Club Column Card will be available to members and other friends of the club. It will be sent on a regular basis. You can get a copy of the magazine by sending a cheque for £3.00 to the Editor, Club Column Card, 100, London Road, London SE16 5JH.

This price of the CARD is just £3.00 and is available from all branches of Lloyds TSB. A copy of the new Club Column Card will be sent to you if you send a cheque for £3.00 to the Editor, Club Column Card, 100, London Road, London SE16 5JH.

As it has been some time since we have had a 'Radio Basics' column, we are pleased to announce that we have a new 'Radio Basics' column. It will be written by Ray Fautley, G3ASG, and will be published in the next issue of the magazine.

The magazine's financial stability is a result of the support of our readers and advertisers. We are pleased to announce that we have a new 'Radio Basics' column. It will be written by Ray Fautley, G3ASG, and will be published in the next issue of the magazine.

# Keylines

**It's a sad fact of life in my job that I have to regularly mention the passing of yet another Amateur Radio 'personality'. This time I have to pass on the sad news that another wonderful character - Basil O'Brien G2AMV has passed on.**

Unfortunately, I did not hear of Basil's death until after his funeral had taken place. On hearing the news about this highly respected former President of the RSGB, I immediately wrote to his widow Eileen G3WIO expressing the sympathy I felt.

Basil was a marvellous character and great fun to be with. I always thoroughly enjoyed the company of the O'Briens at the various RSGB Presidential Installation ceremonies I've attended.

The G2AMV sense of humour will live on however, thanks to Basil's funny pre-Second World War story (involving Fred Camm the founding Editor of PW and Austin Forsyth G6FO, founding Editor of Short Wave Magazine) I regularly share during PW 'Club Talks'. But you'll have to wait to hear that when I visit your club - and as always with Basil's humour - it's worth waiting for! We'll miss you Basil...but you'll not be forgotten!

**Positive Feed Back**  
Our readers often let us know - often with positive feedback - when they've enjoyed articles in the magazine. Such was the case with Ray Fautley G3ASG's article on 'Batteryless Calculators' - dealing with slide rules, and published in the February 1998 issue.

While not directly connected with radio as such - slide rules were essential for those of us playing around with 'radio mathematics' before the pocket (battery powered) calculators arrived. The article brought a good response to the Broadstone

offices and direct to G3ASG's home in Norfolk.

Because there has been so much interest, Ray has very kindly prepared an information and fact sheet and further instructions on slide rules. If you want a copy they're available free (thank you Ray) if you send an s.a.e. (with 39p stamp) to him at: **7 Kingfisher Road, Downham Market, Norfolk PE38 9RE.**

**Radio Basics**  
Many of you will realise how much I enjoy my work in leading the Editorial team on PW. But I must say that thanks to my 'Radio Basics' column I'm enjoying even more by re-discovering the pleasure of my early days in the hobby.

Building, testing, preparing and writing the 'Radio Basics' column is proving to be very rewarding. Nothing is more discouraging for the newcomer to the hobby to build something - only to find it does not work. So, I do my best to ensure everything is as simple and straightforward as possible, enjoying myself in the process!

In the office we're not 'slaving over hot soldering irons' (just hot word processors!) so it's a wonderful change to get busy in the evening at home testing, assembling and trying ideas for the monthly beginner's series. And although I've been a keen constructor for well over 40 years - things have got rather difficult for me recently.

But believe it or not...my problems aren't caused by my artificial arm. No! - in fact the versatile 'split hook' I wear on my artificial arm provides an excellent 'heat shunt'. But I admit it's frustrating when I lose a transistor - only to find I've been clutching it in my hook all the time!

No, my real problems are because I'm now at the 'bi-focal' age! Middle aged eyes - plus diabetic eye problems are my disabilities. **But, if I can**

I've always wanted my Amateur Radio call sign as the registration number for my car. It's been a dream ever since I first had the call sign (just over 30 years ago).

Call it an ego trip if you wish - but it's something I've always wanted. It would have been useful on many occasions when I have met other Radio Amateurs on the road - and they've wondered who the strange person waving at them was! With the call sign number plate all would be explained!

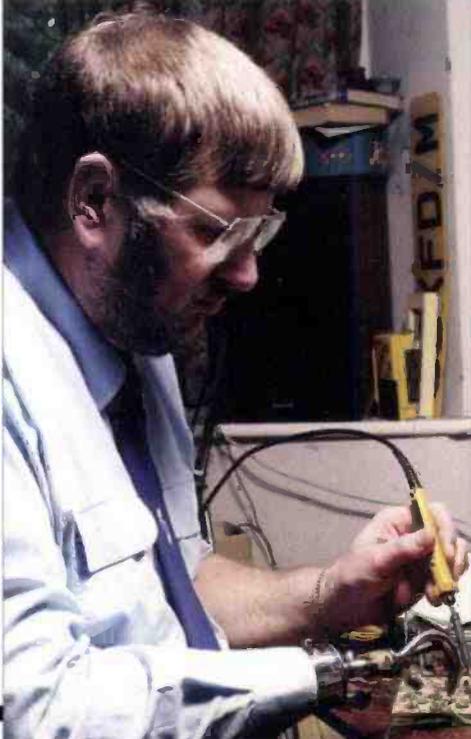
As keen as I am to have G3XFD on my car - I was truly shocked when a letter arrived from the Driver & Vehicle Licensing Agency (DVLA) in Swansea in mid-March. From the price quoted - and bearing in mind it's a Government Department - it seems as if the DVLA is being very greedy indeed!

The absolute minimum (non-negotiable) reserve price for the number plate G3XFD will be £330 (the eventual price depends on demand at the auction). However, to this price VAT will be added, plus the auctioneer's 'Buyer's Premium' (which also attracts VAT) PLUS the department's assignment fee of £80 which is due every time you change the vehicle!

Keen as I am for G3XFD - I don't want to be 'stung' by a greedy Government Department by paying a minimum of £496.83 (all the money goes straight to the Treasury). They' (the 'invisible' money makers) have the power to dispense with 'VAT-on-VAT' - and this they should do in my mind. **By all means charge me for the privilege (after all - I don't have to buy it!)...but there's no need for a Government Department to engage in 'Highway' robbery!**

**manage to do the projects...so can you!** Come and join me - you can start by sending a 50p s.a.e. for the free Radio Basics Reader's Guide (Issue 1) - and join in the fun!

**Rob Mannion G3FXD**



THANKS FOR ALL YOUR COMMENTS ON LAST MONTH'S MAGAZINE - WE'RE GLAD YOU LIKE IT!

# Letters

COMPILED BY

ROB MANNION G3XFD & ZOE CRABB

## STAR LETTER

### Not Invented Here!

Dear Sir

May I be permitted to comment on Mr Byrne's letter in the March issue of *PW*? Radio waves themselves are a natural phenomenon and as such were not 'invented' by anyone!

Their existence was predicted by Maxwell in the 1860s and first demonstrated by Hertz some twenty years later. These two men should therefore take the credit for the discovery of radio waves.

The question of who first applied radio waves for communications purposes is an international controversy which I would rather not enter into!

John Leak GOBXO  
Halifax

### Radio Amateur's Examination

Dear Sir

I must add my support to the comments by Ken Davies (Letters 'Shabby Treatment' March 1998) with regards to his letter about the Radio Amateur's Examination (RAE). I also passed part one paper and for the last two exams have tried to pass part two without any success. Surely there is still time for the City & Guilds to reconsider and give us one final chance to pass part two after all the exam is not till May.

The reply given by the City & Guilds is that the paper is being brought into line with the Driving and Heavy Goods Vehicle (HGV) papers, will this mean we will be told what we failed on, I personally cannot see any comparison. I, like millions of others, took the driving test so that we can move about, get jobs and take our wives and families out, etc.

But the RAE is just a hobby that gives those people who sit on the Committee the right to change the syllabus about without first consulting the past and future radio amateurs. This I am sure could have been done through a questionnaire placed in all the relevant magazines, *Practical Wireless*, etc.

I am sure the editors would have been only too glad to help, instead, it is left up to others to make the decisions for us. I would be very interested also to know if the said persons have themselves taken the RAE and are qualified.

Bill Ross  
Gloucestershire

### Up The Ladder

Dear Sir

May I say how much I am enjoying the occasional article in 'Antennas In Action' under the title of 'Up The Ladder' by Allan Wightman. The article has clearly shown me that any time you get a complaint of TVI your first action must be to check that the complainer's TV antenna system is correctly installed.

My only problem is that with so many 'cowboys' in the TV & radio antenna business, how can you find a competent firm?

Gerald Stancey G3MCK  
Rutland

**Editor's reply: Thank you Gerald...we'll pass on the comments - Allan Wightman will be pleased! To help your search for a competent antenna installation service I suggest you contact the Confederation of Antenna Industries (CAI) who operate a strict code of conduct for their members. They have special adverts in your local 'Yellow Pages' (Complete with Satellite dish 'logo') and you can write to them (requesting a list of members in your area) at Fulton House, Business Centre, Fulton Road, Wembley Park, Middlesex HA9 0TF. Tel: 0181-902 8998.**

### Electronic Sentry

Dear Sir

John Brown G4UBB is on the right track with his electronic sentry to protect the 'shack' (*PW* page 42 March issue). But may I suggest an alternative version which I have used for some time.

Last year we had the house painted and the painters broke the outdoor Passive Infra Red (PIR) spotlight on the front wall with their ladder. The spotlight casing was smashed so I harvested the undamaged PIR base unit and fitted it in my workshop so it switched a small light on when anyone came in after dark. This saves fumbling for the switch if you are carrying something.

It's photo-electrically controlled and switches the 'pilot' lamp off a few minutes after the main lights come on. The sensor could also sound an alarm in the house if required. As soon as the main lights are switched off, the pilot light comes on again so I can see to lock up and goes off after a few minutes if there is no-one inside. I'm sure readers will think of other variations!

Tony Hopwood  
Worcester

### Lack Of VHF Projects

Dear Sir

I'm not having a go, but how ironic that you publish a letter complaining about the lack of v.h.f. projects in the edition you promised would conclude the GDP-430 u.h.f. hand-held project! Okay, u.h.f. isn't v.h.f., but it is one of the few Class 'B' projects for a while!

Come on Mr Editor...it's not like you to break a promise, at least not without an explanation. Whilst v.h.f. projects are thin on the ground, there are good reasons for this - v.h.f. construction is not as straightforward as h.f.! However, here is an idea using an older *PW* project in a slightly different way.

The *PW* Meon was a very popular project when 50MHz was first opened up to UK amateurs and many were built. However - by changing the crystal and a little retuning, a UK CB radio can be used to get onto 50MHz Amateur Radio f.m.

The Meon is a fairly straightforward project which I can personally recommend for the Class 'B' licensee, full or Novice. New crystal frequency = 22.80875MHz gives channel read out which equated to 50MHz frequency e.g. channel 11 will be 51.510, channel 13 will be 51.530. I'm sure Meon reprints are available from the *PW* Book Store.

The second idea which I have been toying with for a while but not yet tried is to use a simple 3.5MHz d.s.b./c.w. transceiver to drive the Meon. This will require some

### Happy PW Memories

Dear Sir

A friend of mine walked in recently and handed me three *PWs*, circa 1957 and what happy memories flooded back. Those wonderful treks down to Lisle Street in London which was indeed a gold mine for us in those days. I wasn't licensed at the time, but still enjoyed the hobby and *PW* was a great help.

These *PW* magazines have given me the courage to have another go at getting back on the air as since I moved into sheltered accommodation, antennas were taboo. I spent a great deal of time getting round the Warden, a pretty lady in her prime and in the end she relented saying she would look the other way on condition no one complained.

I decided on an end-fed wire

reworking of the crystal oscillator to 46.5MHz, but should provide some good DX opportunities.

As you may be aware, I have had a couple of articles published in the G-QRP Club's newsletter *SPRAT*. Would you be interested in sponsoring some practical research into making this WAGI work? In return, *PW* would have an h.f./v.h.f. dual mode project!

**Steve GOFUW**  
Bath

**Editor's reply: My apologies to all concerned Steve, and you'll see that we are finally able to continue publishing the long-awaited hand-held u.h.f. project. And of course we are very interested in any v.h.f./u.h.f. constructional project and I'll write to you on the matter.**

### A Former Prisoner Writes

Dear Sir

With reference to your 'Keylines' editorials attempting to assist the prisoners **Keith Winward** and **Don Sobey** reminded me of my experiences back in the late 1960s. This was when I got into a spot of teenage stupidity and ended up in Winchester Prison, 'remanded for medical reports'. I found the experience both enlightening and very frightening. I would also like to thank the Editor for accepting my letter and agreeing to allow me anonymity.

which went up the side of the wall three floors up, hidden behind a non metal pipe with the help of the window cleaner. The rig is a Yaesu FT-747 on loan to me from the RAIBC and at last I can enjoy my hobby albeit rather limited. However, the Continent and even Italy have been logged so it's not too bad. So far, so good.

I have, as you can guess, re-subscribed to *PW*. Thank you for a great magazine.

**Mervyn Cherrington GOKIE**  
Middlesex

**Editor's reply: Good luck on air Mervyn. But readers should be made aware that the Lisle Street area caters for a totally different 'range of interests' nowadays!**

Chronology of events: Arrest at Bank holiday weekend, police can't hold me without charge over time of holiday - night in cells, then taken to another police station where there is a magistrate to order my remand. Next stop is Winchester, late in the evening, no food since lunch time, strip search, into cell on main block.

The next morning, after breakfast, I am taken to see the 'Doctor', I am sat with a few others in the corridor outside (I assume the same has happened to them). We are told to strip off to our underpants while waiting. I suggest (as I am very cold) can I wait to strip off until just before my turn to be examined? I was marched off to a room by two officers on my own, punched several times, told I must "do as I am told or else", and had my clothes taken and then I got to see the 'Doctor'. I was examined for needle marks, told to put my clothes on again and sent up to the hospital wing of the prison, most of the people in the place seemed to do as they liked, laying on beds or sitting around reading or playing cards, etc. (they all seemed to be calm and quiet, probably sedated).

After three days in here and with no glasses, reading was difficult and I was bored stiff. I was now moved to main cell block and put in with two old chaps who seemed nice enough. While chatting, one told me he had spent most of his adult life in and out of prison, and he knew how the system worked - ask to see the governor and then make a request for my college books and glasses to be sent in.

I got to see someone in an office and asked as I am studying engineering it would be helpful to have my glasses and books in here. "What books"? I was asked. I said radio and electronics and was told they would not allow radio books or any radios except m.w. and l.w. receivers. No v.h.f. receivers were allowed as they could be modified and used to listen to their security radios or the police. And they considered the books may be of use to anyone to help them carry out the modifications.

I said that I as an Amateur Radio operator could easily take a couple of broadcast sets and modify these to make a simple 'phone transmitter and receiver system to communicate outside without any books. So I saw no rational point in depriving me of educational materials.

At this point, they seemed upset and I was labelled as a 'trouble maker' and marched off to the cell

### Club Visit & PW

Dear Sir

We all enjoyed your visit to the Plymouth Club on March 3. Hope you got home okay. Than you also for the splendid 'new look' April *PW* - you have got the colour and everything just right. And I liked the April 'Keylines' - especially you happily on the 'Go Kart'. Will you bring it to Longleat?

**Jess Alderman G7PH**  
Cornwall

**Editor's reply: I arrived home okay Jess, we're pleased you like the 'new look' and I'll have the 'Go Kart' if John GOSKR will let me borrow it!**

block again. A couple of days later I was visited by a Welfare Officer, then the Chaplain. I asked if anyone could get me my glasses and next day I got a visit from the Vicar of my home town. He had brought my glasses he also contacted my parents and a local probation service officer.

I had three weeks to wait in prison before being in court and being 'bound over' with one year probation. My conclusion is this, the rules are there to make life easier for the officers and are often contradictory. Anyone who questions the authority or logic of the system is in for a rough time. Additionally, anyone of above average intelligence is considered to be a threat who must be subdued or controlled, and no one may question the rationality of the prison regime.

Thank you all for your time, my apologies for my dreadful typing, but I could not use secretarial assistance on this letter. And I would also like to thank the Editor for accepting my letter and agreeing to allow me write anonymously.  
Thank you.

**Editor's comment: We have a very strict rules regarding 'anonymous' letters in *PW*. In this case the writer telephoned me, describing the experience asking if he could write in and remain anonymous. Now well established in his career, for obvious reasons I agreed to the request. G3XFD.**

### Letters Received Via The 'Internet'

Many letters intended for 'Receiving You' now arrive 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! Editor

EVERYONE HAS AN OPINION - SEND YOURS TO PW AND WIN A VOUCHER TO SPEND ON ANY PW SERVICE



Authority since last November and, based on repeater application clearance times of three to five months, an on-air date of late March, early April is a realistic possibility. This assumes that there are no referrals from either the RA or the National Frequency Allocation Panel (NFAP).

The application for GB3MS was submitted to the RMC during March, and as 430MHz is a shared band this application will also have to be vetted by the MoD, who are the primary users of this band. However, it's hoped that GB3MS will be vetted, approved and on air by the middle to end of the summer.

Anyone who would like further information can contact Dave on (01905) 351568 evenings and weekends or write to 60 Linksview Crescent, Newtown, Worcester WR5 1JJ or alternatively E-mail: DHobro@aol.com or MHRG@aol.com

more details contact the Shortwave Shop at 18 Fairmile Road, Christchurch, Dorset BH23 2LJ. Tel: (01202) 490099 or visit their Website at: <http://www.shortwave.co.uk>

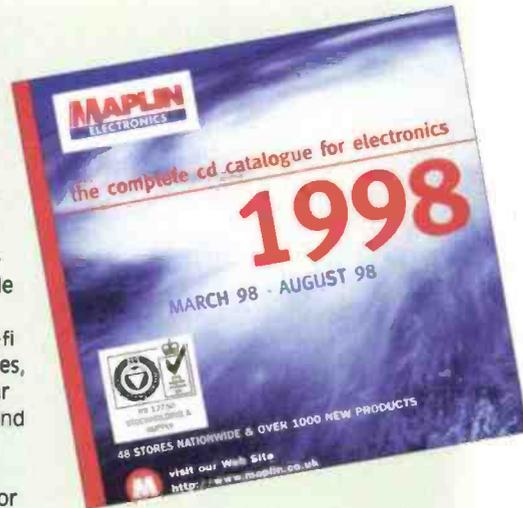
## Portable Electronics Superstore

The latest edition of the Maplin Catalogue has recently been published and for the first time, this 'portable electronics superstore' is also available on CD-Rom. The catalogue features a wide variety of products from the electronics world ranging from hi-fi equipment to computer accessories, through to communications, in-car entertainment and hobbyist bits and pieces.

The CD-Rom version of the catalogue (requiring Windows '95 or Mac OS 7.5 or above) In addition to including the full product range details also includes over 400 semiconductor data sheets, together with full constructional details for over 20 of Maplin's most popular electronic kits. When viewing the CD form catalogue ordering is made easy by the facility to 'transfer' any item you wish to order direct to the order form.

No matter which version of Maplin's catalogue you opt for, you can be assured of receiving same day despatch, free delivery on all orders over £30 and back-up from highly trained staff. The paper version of the portable superstore that takes you into 'electronics and beyond' costs £3.99 and the CD-Rom version just £1.95.

Copies of the catalogue can be obtained from Maplin, WH Smith and John Menzies stores or by calling (0800) 136156. Alternatively visit the Maplin Website at <http://maplin.co.uk>



## Silent Key: Frank Hicks-Arnold G6MB

Yet another 'old timer' has passed on with the death of **Frank Hicks-Arnold G6MB** on February 17 1998 in his 92nd year. Frank was born in Watford, Hertfordshire, on March 29th 1906 and was first licensed in 1920.

Frank gained the callsign G6MB in 1930 and joined the RSGB in the same year. He was the first news reader for the society and also became a Council Member.

During a long association with the electronics industry Frank developed the first printed circuit boards. While working for Qmax Electronics he designed the B4/40 transmitter and the famous Qmax chassis punches. The G6MB 'Antennascope' project was published by the RSGB and he presented a series of lectures on the subject, during a country-wide tour sponsored by the society.

Frank piloted aircraft and even drove racing cars on the famous pre Second World War racing circuit at Brooklands in Surrey! With two daughters, **Anne** and **Jenny** and two sons **John VK4NPM** and **Andrew** from his first marriage, Frank married secondly **Elaine Hartford G0CDZ** three years ago, dying on the eve of their third wedding anniversary. The funeral was held at Downton Parish Church in Wiltshire on February 25, where they were married in 1995.

Our sympathies and respects go to Elaine and Frank's family.

Editor.



TO BE FEATURED ON THESE PAGES SEND YOUR NEWS AND PHOTOS TO DONNA G7TZB AT THE EDITORIAL OFFICES

# club spotlight

COMPILED BY ZOË CRABB

## The 'Spotlight' Is On Again!

It's time to turn the 'Club Spotlight' on again as we invite you to enter your club magazines into the 1998 *Practical Wireless* & Kenwood Club Spotlight Magazine Competition. 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 and a covering letter. The covering letter should make it clear what category of club your club is eligible.

For example, the **British Amateur Radio Teledata Group - BARTAG** - winner of the 1997 national award - can only enter as a 'national' club' section, whereas the **Cockenzie & Port Seton Club** - 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), **Zoë Crabb**, **Dave 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 Wednesday 1st July 1998. This is because the presentations are to be made at the Leicester Show in September (the new venue of course) 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 Zoë Crabb, Club Spotlight Magazine Competition, *Practical Wireless*, 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

## Red Rose QRP Festival

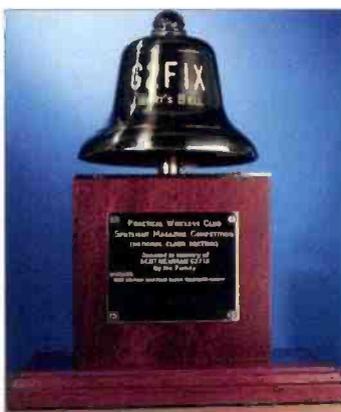
The **West Manchester Radio Club** will be holding its Second QRP festival at **Fornby Hall, Atherton**, on Sunday 7th June 1998. There is easy access to the festival from all motorways, as it's near to M6, 61, 62, 63, 66, A580, A6, A577, A579.

There will be large spacious halls at ground level with ample free parking, disabled facilities and low cost

tables (tables only £5). The entrance fee is £1 and there will be refreshments, including a superb selection of delicious hot and cold snacks at low cost, prepared and served by the club's own volunteers throughout the day.

There will also be an excellent large bar area and lounge, a talk-in station on 144MHz, a Bring & Buy stall, this year a low cost Bring & Buy, no sale, no charge, to encourage sale of items both large and small, especially components. Club stalls include FIST and GQR and there will be displays of Morse keys and also of home-brew equipment.

By the way, club meetings are held each Wednesday evening from 8pm at the **Miners Welfare Club, Meanley Road, Gin Pit, Astley, Tyldesley, Manchester**. Novice and Morse classes are held each week. Further information from **Leslie Jackson, 1 Belvedere Avenue, Atherton, Manchester M46 9LQ**.



## Northern VHF Activity Group

Club Spotlight has recently heard from **Peter Austin G7BXA**, Secretary/Chairman of the **G7UEG Northern VHF Activity Group**. Here in his own words he tells us that the group have decided to go back to their favourite area, the West Coast of Scotland, during 1998.

"After last year's DXpedition to the West Coast of Ireland, we have decided to go back to our favourite area, the West Coast of Scotland. We had good results from EI on h.f., but v.h.f. was very poor. As we have been to the West of Scotland quite a few times now, we know you can get some very good results from there.

"We will be going to the Isle of Barra, which is the most southerly inhabited island in the Western Isles. It is quite a good location for both Locator and WAB square hunters, as there are two large locator squares, IO66 and IO67, plus NF60, NF70, NL69 and NL79.

"We will be basing ourselves on the East Coast of Barra, IO66HX. We also intend to set up a portable station in IO67, which is about three miles away. We will be operating 2m and 6m with the club call GS7UEG/P, yes, it's the Ugly Expedition Group, again! We will also be on h.f. with our new club call of MS0BPG/P.

"We hope to be active from Sunday morning, 5th July to Sunday 12th July 1998. As there are four operators going, there should be someone on the air most of the time, but no doubt someone will complain that they listened for about four hours and never heard a thing, well, you have to eat, drink and go to the toilet! So there will always be someone that complains!

"We will be setting up the main station, consisting of 2 x 13-element & 100W for 2m, 5-element & 100W for 6m and for h.f. a 3-element tri-bander and wires for l.f. and 100W. The portable station will consist of 1 x 13-element for 2m & 180W, 5-element & 100W for 6m, h.f. will be wires and verticals.

"We will be sending out

further information on packet and Internet a little nearer the time, but anyone wanting further information, please contact me, Pete G7BXA, QTHR or **Derek G7DKX**, who is also the QSL Manager @ GB7GBY or **islander@enterprise.net**

"Anyone sending QSL cards direct, please don't forget to include an s.a.e. or IRCs as we are paying for the DXpedition out of our own pockets. As I said, there will be four operators. These are: G7BXA, **G7HSP**, **G4YQW** and **GONES**".

### Rally Success

The **Bangor & District Amateur Radio Society** (BDARS), GI's biggest Amateur Radio club, had such a success with its 30th anniversary rally last year, that it's holding another one this year. The date is **June 14th** - and the venue is the same as last year - the Clandeboye Lodge Hotel, on the edge of town. Doors open between **12 noon and 4pm** (disabled visitors from 11.30am).

**Stewart Mackay G14OCK**, the Society's Chairman and Rally Organiser says, "Last year's event was an outstanding success. The most important thing about getting people to a rally is publicity and this year we're going all out to get news of the event across to as wide a public as possible".

The Bangor & DARS have also recently 'twinned' with **Wigtownshire Amateur Radio Club** (just across the North Channel in Scotland) and a programme of events is being planned. This will include visits to each other's clubs, weekly or monthly Nets and a general exchange of ideas. And, like last year, a large contingent of Scottish visitors will be attending the BDARS rally.

For more details about the Rally, contact **Roy G10WVN** on (01247) 460716 or **Stewart G14OCK** on (01247) 454049.

### Verulam Beware!

Once again **Rob G3XFD** is off on his travels, this time to give a *PW* talk to the **Verulam Amateur Radio Club** on



Happy memories! **Rob G3XFD** shown here after presenting his talk to **Warrington ARC** back in January of this year, where he was presented with a bottle of Vodka after his talk, during which he remembered that **Vladivar Vodka** was made in **Warrington**.

**Tuesday 28th April 1998 at 8pm** at Verulam's meeting place, the **RAFA Club, New Kent Road, St Albans**, which is in the town centre. The Verulam Club would also like to invite all radio enthusiasts in Hertfordshire and surrounds to join them. The hall is a non-smoking venue, but with bar facilities. Contact **Walter G3PMF** on (01923) 262180 for more information.

### Reunion Meeting

The **Siemens Amateur Radio Club** in Nottingham is holding a reunion meeting in the Siemens Social Club. All past and present members of the Siemens Radio Club (formerly known as the Plessey or GPT Radio Club) are invited.

The reunion will be held in a private room at the **Siemens Social Club, Beeston Rylands** on Thursday 7th May starting at 7:30pm. A buffet will be provided at a cost of £2.50 per head.

All those wishing to attend should contact the Club Secretary, **Chris Archer G4VFK** during the day on 0115-943 3387 or in the evening on 0115-903 8230.

### Wednesdays At Wirral

The **Wirral & District Amateur Radio Club** meet on the 2nd and 4th Wednesdays of each month for lectures, etc., at the **Cricket Club, Irby, Wirral**. While on the other Wednesdays, members gather at a local hostelry for 'D & W' (short for drink and waffle!).

Several members have set-up the first RMNC/Flexnet packet node in the UK and another group are interested in v.h.f./u.h.f. contesting (with moderate success). A few members are also into AMTOR/RTTY h.f. communications, while another group is using 23cm for ATV transmissions.

Just a few up and coming events are: April 15 - D&W, 22nd - The Great Egg Race VIII (team construction event), 29th - D&W, May 6th - D&W.

Visitors and guests are always made welcome. However, if you would like more information, contact **Andy** on 0151-677 4448 or **CLUB@GB7OAR** or visit the web pages at:

[www.merseyworld.com/wadarc](http://www.merseyworld.com/wadarc)

### Take Note!

'Club Spotlight' has recently heard from **Mike Street G3JKX**, General Secretary of the Royal Air Force Amateur Radio Society (RAFARS), who would like to point out some misunderstandings about becoming a RAFARS member.

Mike says that membership is open to anyone who has served in the RAF at all, including the reserves and anyone associated with the RAF, including civilians employed by the MOD (AIR), Cadets and instructors of the ATC or the RAF section of a CCF are also very welcome. Commonwealth, NATO and Allied Air Force personnel can also become Associate members.

The Society's 'in-house' magazine *ORV* is published every six months and is a forum for activities and for members to tell of their history and experiences. So, if you fit the membership criteria, contact **Peter Lewin G0JKW**, Treasurer, at 24 Brookfields Road, Wyke, Bradford BD12 9LU for an application form.

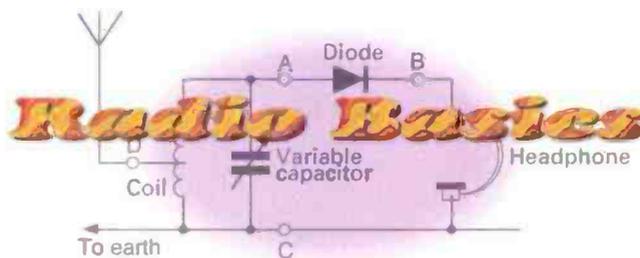
HELP! I'M IN DESPERATE NEED FOR PHOTOS TO ACCOMPANY YOUR STORIES - SO GET CAMERA CLICKING!

Anyone who has built the original 'crystal' diode receiver described in this column and added the single transistor audio frequency (a.f.) amplifying stage I discussed last month - will realise that there's a limit to what can be done with such a simple receiver. Although with the a.f. amplifier added - stations too faint to be heard in the earphone before will be heard.

But it's still only a crystal set with a.f. amplification. So, to progress further I'm going to describe the addition of a very basic radio frequency (r.f.) amplifier.

### Amplifier & Detector

Adding an r.f. amplifier to the 'Basics' receiver turns it into tuned r.f. amplifier and detector receiver. Often referred to as t.r.f. (tuned radio frequency) receivers, the version I'm providing is even more basic than usual, as it uses



need to do is to transfer the original tuning coil and variable capacitor to Tr1's circuitry. The 'drawing pin and board' lay-out, Fig. 2, illustrates connecting details for the f.e.t.

Please use a 'heat shunt' when soldering the f.e.t. to the drawing pins! A pair of pliers gripping the f.e.t. leads (between the soldering iron and drawing pin) will 'shunt' the heat away - avoiding damage to the sensitive transistor.

The tuned input is fed to the 'Gate' of the MPF102 (see Fig. 2 for details of connection and orientation of leads) and the amplified r.f. signal is then fed

(the 'drain').

The r.f.c. 'load' provides a much more difficult 'pathway' for the high frequency a.c. (the amplified r.f. signal) while providing an easier one for the d.c. feed for the transistor. This is referred to as a 'high impedance' and the r.f. is then 'shunted' (via the 500pF capacitor to the detector. The capacitor between the r.f.c. and the 100Ω resistor removes unwanted r.f. which does get through, and helps 'filters' it to 'earth' to stop it reaching the power supply, (more about this later).

Good quality r.f.c.s are often difficult to get nowadays, but you can make your own very simply (as I did to prove the point!), if you don't have a ready made component. All you need to do is wind as much fine enamelled wire (28s.w.g.) onto a 100Ω resistor as it can take, soldering the end to the resistor leads. It's a compromise - but it works well!

When you switch on and listen (the f.e.t. uses the same 9V supply) you'll hear a remarkable difference in the

number of stations received, their signal strength (improved by an approximate factor of three) and that they're much easier to 'separate' (the selectivity has improved). Even without a 'tuned detector' the improvement is impressive!

With the tuning arrangements described last month, I counted over 50 European stations on medium wave, plus Radio 4 on long wave. On short wave I heard stations from all over the world - including China, the USA, Europe and Australia!

Audio output on a simple earpiece was adequate - and on an old pair of surplus headphones it was very 'comfortable'. A very small (8Ω) speaker will operate - okay - but only close to your ear!

Have fun building the r.f. amplifier - you'll certainly enjoy the results! Next time I'll describe a simple audio amplifier that will provide good loudspeaker volume on all the projects I'm planning for you in the near future.

Cheerio until next month.

PW

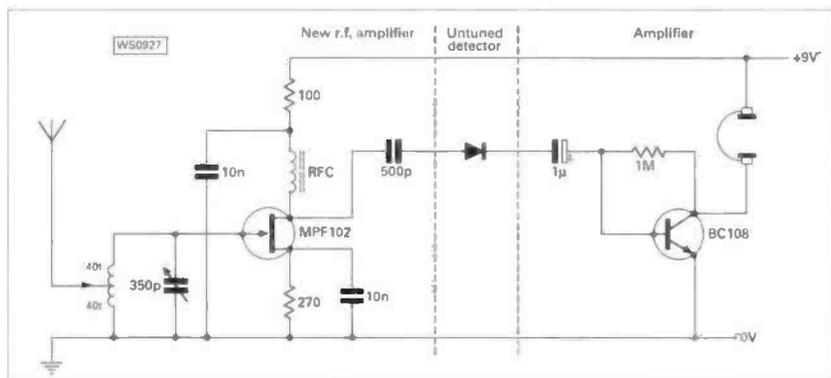


Fig. 1: Circuit of the modified 'Basics' receiver showing the original audio amplifier, untuned detector stage and the MPF102 f.e.t. amplifier (see text).

an un-tuned diode detector. The circuit is shown in Fig. 1. And if you look at the previous circuit of the receiver (as shown in Fig. 1 and 2 in the March issue) you'll see the difference quite clearly. The a.f. amplifier remains unchanged, but the detector instead of being fed by the tuned circuit (L1 and C1) now takes the amplified r.f. from the MPF102 field effect transistor (f.e.t.) via the 500pF capacitor (a nominal value - and you may have to either decrease or increase the value for best results).

### Adding The Amplifier

Adding the amplifier circuitry is simplicity itself - and I've simplified it even further by minimising coil winding and coupling circuitry. All you

to the detector via the 500pF capacitor. However, instead of the complications associated with interstage r.f. coupling - I've used a simple radio frequency choke (r.f.c.) as a 'load' on Tr1's output

### Switch On & Listen!

When you switch on and listen (the f.e.t. uses the same 9V supply) you'll hear a remarkable difference in the

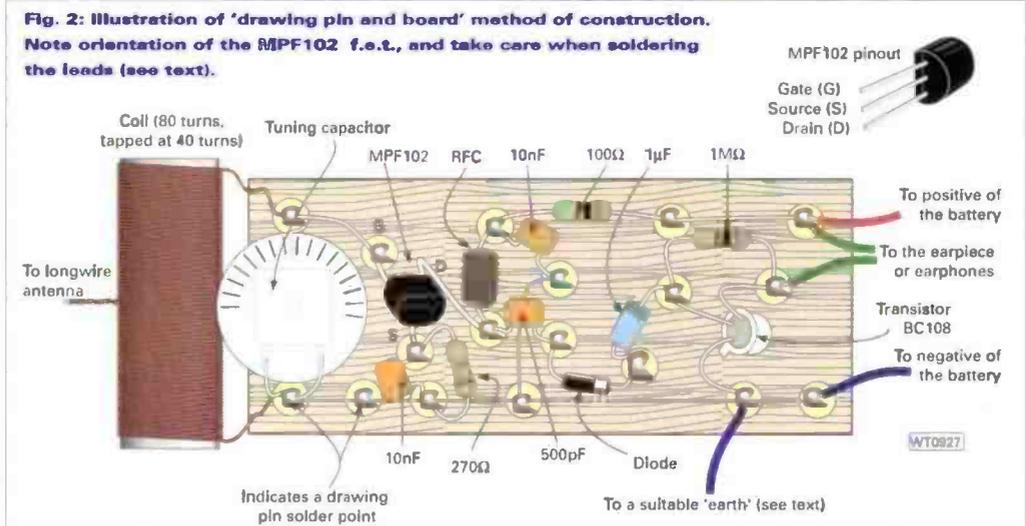


Fig. 2: Illustration of 'drawing pin and board' method of construction. Note orientation of the MPF102 f.e.t., and take care when soldering the leads (see text).

**Rob Mannion G3XFD describes how you can add a radio frequency amplifier to your 'crystal' diode receiver...and you'll really notice the difference!**

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# In War & PEACE

**John Worthington GW3C01 steps back in time and remembers the old 'secret agent' rigs...**

**S**ome 50 years ago you could pick up a Second World War 'secret agent' rig for quite a modest sum, whereas now they are in very short supply and very expensive. The one that I bought was the Type A MkIII and consisted of a crystal controlled transmitter and a small superhet able to receive c.w. fitted in a little suitcase about the same size as a 1990s portable typewriter.

Together with its mains power supply, Morse key and headphones, the unit cost today's equivalent of £15 and looked to be ideal for a weekend's portable operation. It must be noted that I bought the outfit without trial, but trusted its seller and considered that equipment made for use in enemy territory would, of course, be first rate in all respects.

## QSO Filled Weekend

With growing anticipation of a QSO filled weekend, I set off for the small hotel in Torquay that was to be our destination and was pleased to see on arrival that our room overlooked a small front garden, which had some tall bushes about 28m from our window. In a short time, I was switching on, armed with a nice ended wire and concentrating on tuning the tiny receiver



*...under the noses (and ears) of the Gestapo...*

with its 'edge' knob operated tuning.

There was a pleasing amount of audio but backlash was severe on the condenser drive and the 7MHz band was crammed into about 6mm of the dial. I tried out the crystal controlled transmitter, there was no a.t.u. as such, matching being carried out by variable tappings down the tank coil.

I had brought a car bulb with me to insert in the antenna lead and this gave me a true idea of

Practical Wireless, May 1998

maximum output. However, there was a snag in that I had to calculate where I was frequency wise!

The crystal was marked 7025kcs (note the 'c', they were called cycles in those days!) and on the front panel of the receiver there was a neon lamp which lit up when you pressed the key and were tuned somewhere near the frequency. However, it was unusably coarse in operation, which meant that after putting out a CQ call, I had to search as much as possible of the band with the coarse receiver tuning wheel.

### Failed To Hear

As a result, I must have failed to hear many replies and in fact I had only one QSO in a period of hours. I remember thinking at the time of the poor folk who had to operate these rigs under the noses (and ears) of the Gestapo.

How on earth could they have regular two way QSOs and not be detected with their many calls and fruitless replies from the UK? No wonder their survival rate was so low.

I suppose by the very nature of their fate there is literally no one still living who can say what it was like to have to work with these ill designed boxes. It occurred to me that maybe there had been a skilled amateurs among their ranks who would have suitably modified the equipment by fitting a slow motion trimmer to the tuning and some means of netting the crystal.

However, during the Second World War any

amateurs that knew their stuff were usually placed where their expertise would be of maximum value (I came across many instances of this in the RAF) and a spy's job would have been considered less appropriate.

### Famous & Scarce

In my own case, before I had a chance to modify the Type A set, I received an offer I couldn't refuse, the rigs were now becoming famous and scarce! Later on however, I came across a suitable set that looked as if it had been designed by an amateur - it was twice as big as the Type A, but had a powerful Tritet 807 crystal oscillator/power amplifier and a nice little RX that covered 3.5 and 7MHz with slow motion tuning.

In addition to the mains p.s.u., the rig had a vibrator supply for use with car batteries plus headphones and key

all complete in the case, which must have looked suspicious I thought, from a Gestapo point of view. However, I expect the true spy used to have a bit of clothing 'caught' so that it was visible when they were walking around in the streets with the rig.

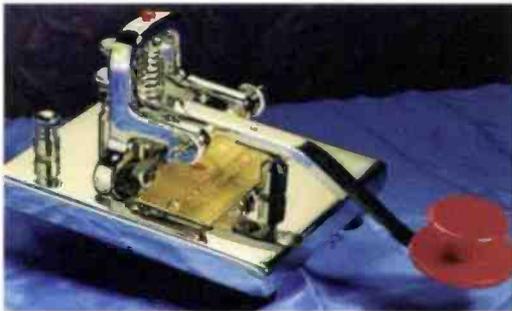
The most famous undercover set was the B2 and I believe it was closely 'related' to the one I have just described. But it shows that like everything else in Second World War designs, it was greatly improved, much to the relief in this case of the incredibly brave people who had to use them.

PW

"It cost today's equivalent of £15 and looked to be ideal for a weekend's portable operation"

SECRET AGENT RINGS ARE NOW IN VERY SHORT SUPPLY

## Gotcha!



Did you spot last month's April Fool Spoof news story? If not I'll put you out of your misery.

For all of you who are still wondering, it was of course 'New Regulations' relating to the supposed changes to the Morse test and the fact that it must now be passed in the English, French and German. The PW offices have been inundated with worried readers calling and writing in to express their opinions on the matter and to try and find out more.

I would like to say to all of you who were 'caught out' by the age old tradition of the April Fool, 'thank you' for taking it in the way it was intended and I apologise for worrying those of you who thought it was genuine. For those of you who haven't

worked it out **Lirpa Loof**, who 'supplied' the New Regulations report is in fact April and Fool both spelt backwards!

Thank you for joining in our little piece of fun and if you want someone to blame other than me you could try **Lawrence GJ3RAX** who sent in the news release!

Donna G7TZB

NEWS  
Extra

## Radio Sends You To Sleep!

It's official radio can send you to sleep! Some of you may have seen *Tomorrows World* on BBC Television a few weeks ago when a new cure for insomnia was featured in the form a 'spoon' that you place in your mouth when trying to go to sleep.

The 'sleep spoon' is connected to a cable, which in turn is connected to a radio transmitter. Radio waves are transmitted through the cable into the spoon (which acts as an antenna) and then emits signals to the brain giving a soothing soporific effect thus helping you relax and go to sleep. The use of radio waves in such close proximity to the brain is naturally a concern, however early trials have shown that the levels absorbed using the spoon are 100 to 1000 times lower than when using a cellular phone.

The man behind this invention Professor **Boris Pashe** says that early trials have shown that using the spoon gives you an extra hours' sleep and that you 'drop off' quicker. He believes that his invention works by restoring a chemical imbalance suffered by insomniacs.

Professor Pashe's invention is still in its early stages and we wouldn't advise anyone to suck on their hand-held's antenna to help them go to sleep!

# New Rig On The Block

"... the Alinco DX-77 provides an excellent 'introductory' transceiver or 'budget' buy ..."

**Rob Mannion G3XFD takes a look at Alinco's 'new rig on the block' - the budget-priced DX-77. And not surprisingly after his experiences with the DX-70...he thinks the new rig has a lot to offer!**

I've been the proud owner of an Alinco DX-70 for several years now - and even under the most arduous operating conditions - it has performed extremely well indeed. In fact - despite initial concerns I mentioned during my review - my DX-70 has performed beyond all expectations. In other words...I think it does a superb job.

Bearing in mind what I've just said, I was delighted to get the chance to try out the latest Alinco product - the 'budget priced' DX-77. I don't often like comparing different rigs together because of differing design, etc. - but in this case as they come from the same 'stable' there's no problem and it's very appropriate in my opinion to compare them.

## Base Station

In effect I think the newly introduced DX-77 - it has just received the necessary CE approval by the way - is a 'base' station' loosely based on the DX-70 and the channelised h.f. DX-701 which I reviewed in 1997. I might be wrong in this assumption - but the DX-77 certainly seems to be 'related' to both previous Alinco products.

So, what do you get in the DX-77 - package? To answer - and before I get stuck into the actual review let's take a look at the rather neat, 'non fussy' little unit itself.

Like its smaller style cousin (the DX-77 measures in at 240 x 90 x 230mm - not including protuberances - compared to the DX70's 167 x 57 x 230mm) has an extremely neat and attractive matt black plastic finished front panel with white and green lettering and a rather attractive yellow coloured On/Off power control.

Unlike the smaller 'mobile' transceiver the DX-



77 has a front mounted speaker with a louvered type speaker fret. The main tuning knob is slightly off-set from centre right - and this I found a delight to use. It felt very good, smooth in operation and I'm sure it will appeal to many 'natural' left-handers. (The DX-70 has a main tuning control on the far right - which makes this control one of the only awkward features for operation by G3XFD!).

The Morse key, external speaker and headphone 3.5mm sockets are mounted very conveniently on the front panel below the speaker. And you'll see from the photographs that the other controls - along with the large clear back-lit l.c.d. type display - are very well laid out. The whole transceiver has a very good 'feel' about it and looks very neat into the bargain.

### Design Features

The Alinco DX-77 design features a published general coverage reception from 500kHz to 30MHz (see note later) and the transceiver is based on a double conversion superhet. Transmission is possible on the 1.8 to 28MHz Amateur Radio bands in a.m., c.w., s.s.b. and f.m. modes.

Maximum power output on c.w., f.m. and s.s.b. modes is quoted at 100W (high) and approximately 10W on low power. Power output on a.m. is quoted at 40W (high power) and approximately 4W on the low power setting.

A built-in audio filter is provided for c.w. (narrow c.w. filter is a user installable option). The operator can select c.w. full break-in, semi break-in and auto break-in (delay times are then automatic depending on keying speed). An optional electronic keyer can be fitted.

The DX-77 has 100 'user' memory channels. These can be used to store mode of operation, filter settings, split frequencies, the a.g.c. settings, attenuation levels (or the pre-amplifier setting) and the noise blander. The transceiver can also be controlled by a personal computer through the serial interfaces connection. With this facility the frequency, mode, power and memory channels can be controlled.

### Controls & Facilities

The main controls are simple and basic - which means they're a delight to use. The **Squelch**, **RIT**, **Audio gain**, **IF 'Shift'** and **RF attenuation** (and r.f. pre-amplifier) are immediately accessible as push-buttons, as are **Mode** switching operations and the **'Hi - Low'** power switching selection.

Everything else on the DX-77 can be selected from the Menu. Here the Function switch is pressed once, and when it's flashing - the menu operation you require is selected. One of the operations selected in this way is the **Speech Compression**. This is a simple operation and it's either On or Off. Another control option is the variable back-lighting for the l.c.d. It's simple and efficient.

Various options will be available. Unfortunately - none were available with the review transceiver but they include: A c.w. electronic keyer, and narrow filtering (again selected by the Menu system).

I do not intend to provide a list of all the various memory and other facilities. For this I suggest you visit your nearest Alinco dealer and see for yourself! Instead I feel it's my job to tell you just how well (or otherwise) this transceiver performs!

Practical Wireless, May 1998

### On The Air

I was fortunate to be able to operate the DX-77 over a relatively long period for a newly launched transceiver. In fact I had it on loan for over a month!

The transceiver provides a very versatile package and I found myself using the general coverage receiver a great deal. And despite what Allinco stated in the promotional material (they claim 500kHz is the lowest tuning limit) - the general coverage receiver **tuned down to 150kHz** before switching back to 29.999MHz.

On the lowest tuning range the receiver seemed remarkably sensitive indeed. I was able to 'winkle out' some really weak airport beacons on the m.f. range. I could even pick up Gatwick - which is usually buried in the noise!

Reception of the medium wave band was good and selectivity more than adequate with the filtering provided as standard. Sensitivity was also good and the audio quality was perfectly adequate using the built-in speaker. I didn't bother to use an external speaker much, other than trying one to check the comparison. (It was obviously better with a larger external speaker - but the convenience of the built-in speaker made me realise it wasn't worth the bother of using the external unit).

Using the DX-77 on the h.f. bands - particularly the short wave broadcast bands - proved it had an excellent receiver. The audio bandwidth was just about wide enough for pleasant listening to my favourite stations (Radio Netherlands from Holland and the BBC World Service).

On the Amateur bands I found that the sensitivity was excellent and the selectivity was good on s.s.b. with the standard crystal filtering. However, for c.w. the narrows (optional) filtering will be a necessity.

I've become rather spoilt by my Alinco DX-70 with its built-in higher specification filtering, and on the busy 3.5, 7 and 14MHz bands in particular I found the 'splatter' from adjacent channels more noticeable on the DX-77 than on the better equipped DX-70 (even though the filters are ceramic types on the DX-70).

However, working on s.s.b. on the 3.5, 7 and 14MHz bands I never lost contact with any station I worked. Even under weekend conditions (where everyone in Europe appear to be trying desperately to work the USA - and using hard-driven linear amplifiers into the bargain).

I had a total of 156 QSOs with the DX-77, and approximately half were on c.w. and the other half on s.s.b. The transceiver coped very well indeed with extended 'on' periods and apart from my **firm opinion that the narrow filtering (for c.w.) is a 'must'** - I was entirely happy with the excellent performance for what is of course a 'budget' rig.

Dominated by the massive heat-sinking, this above chassis photograph illustrates how straightforward it will be to fit the optional narrow c.w. filter on the prepared area of p.c.b. (the white rectangle to the left of the crystal, in the top right of the photograph).



"The whole transceiver has a very good 'feel' about it and looks very neat into the bargain".

ROB G3XFD SAYS ALINCO'S 'NEW RIG ON THE BLOCK' HAS A LOT TO OFFER

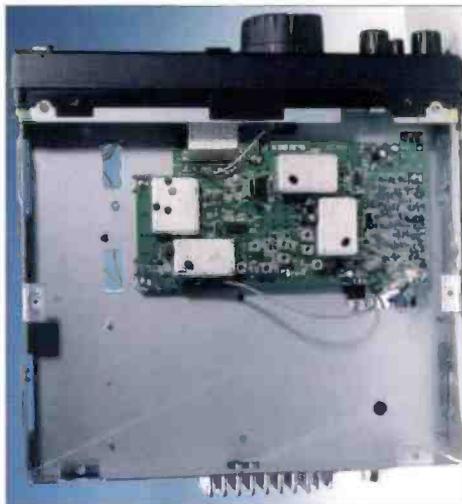
To find out more about the Alinco product range or indeed to find out more about Nevada's vast range of radio products, why not check out their Website? Point your browser at: <http://www.nevada.to.uk>

Under chassis view of the DX-77.

### Audio Reports

I consider audio reports to be very important in reviews. As the *PW* style of reviews is to avoid the 'Specification Listing' approach of some reviewers - so we can convey to you what an experienced and trustworthy author's opinion on each rig is - I've arranged for some simple and straightforward comparisons to be made each time I review a new rig.

**Max Bacon G3WMB** runs a Kenwood TS-870 (my 'Top Choice' transceiver) and consistently puts an excellent signal - with very good audio I might add - into my home in Dorset from his home in Hertfordshire. Max has a special audio cassette of my voice - made on semi-professional audio equipment at my home - and he can compare this



with my incoming signal. Additionally, we met recently at the London Amateur Radio Show at Picketts Lock. I was able to confirm that the audio on his transceiver 'provided a good likeness' of his voice, and he was able to reciprocate regarding my recordings and previous telephone conversations.

Max's comments on the received audio from the DX-77 follows, and were decided on during a long QSO on 3.5MHz where **Andy GW0UZK** from South Wales joined in (sorry to leave you 'out in the cold' for long Andy!)

Max writes: "Concerning the testing today your voice on the new Alinco was easily recognisable. The speech quality I preferred was without the processing switched in and with the microphone about 125mm away from your face with

you speaking across rather than into it.

"On comparison, the audio from your own Alinco DX-70 was slightly better - but when the microphone from that transceiver was tried on the DX-77 it improved a little. So maybe the microphone has an influence...which it does of course!"

Thanks for your help Max - and I hope we'll be able to use this 'on air' and 'tape' comparison more in the future. It's only a compromise but it is done under real working conditions!

### My Opinion

After an extensive period of on-air testing and evaluation it's my opinion that the Alinco DX-77 provides an excellent 'introductory' transceiver or 'budget' buy for anyone contemplating getting going on h.f. And in the same package the fortunate owner will also get a very reasonable general coverage receiver and portable transceiver (yes - even though it is approximately 30% larger than the DX-70 it's still very neat, portable and convenient).

Another reason for seriously considering the DX-77 is that it's easily expandable. You can install the c.w. filter, electronic keyer and other options very easily indeed.

To be very honest the **DX-77 in my opinion does not come up to the same performance mark of the Alinco DX-70** - and I would not expect it to because the DX-70 is so very special. However, I cannot remember anything in the same price range which has so much potential and provides so much 'as it comes' as this new product from Alinco has demonstrated.

In my opinion the Alinco DX-77 will prove to a favourite 'starter rig' for many years to come. And it's my hope that many readers will discover the h.f. products of this manufacturer soon - because they just don't know what they are missing until they do!

My thanks go to **Nevada of 189 London Road, North End, Portsmouth, Hampshire PO2 9AE. Tel: (01705) 662145** for the loan of the DX-77, which is available from them for **£675** (standard model) or **£775** (with options fitted).

PW

### Manufacturer's Specifications

#### General

Operating mode	J3E (l.s.b., u.s.b.), A3E (a.m.), A1A (c.w.), F3E (f.m.)
Number of memory channels	100
Antenna impedance	50Ω
Power requirement	13.8V d.c. ± 15% (11.7 to 15.8V)
Ground method	Negative ground
Current drain	Receive 1.1A max Transmit 20A max
Operating temperature	-10°C to 60°C
Frequency stability	±10 ppm (-10°C to 50°C)
Dimensions	246(W) x 94(H) x 228(D) mm (247 x 100 x 268mm with projections included)
Weight	Approx. 3.8kg

#### Transmitter

Frequency coverage	All Amateur Bands 1.8 - 29.699MHz
Power output	s.s.b., c.w., f.m. 100W (high) Approx. 10W (low) a.m. 40W (high) Approx. 4W (low)
Spurious emissions	Less than -50dB (-45dB in 30m band)
Modulation system	s.s.b. Balanced modulation a.m. Low power modulation f.m. Reactance modulation
Carrier suppression	More than 40dB
Sideband suppression	More than 50dB (at 1kHz)
Maximum f.m. deviation	±2.5kHz
Microphone impedance	2kΩ

#### Receiver

Receiver circuitry	Double conversion superheterodyne
Intermediate freqs.	1st 71.75MHz, 2nd 8.875MHz, 3rd (f.m.) 455kHz
Receiver frequency range	500kHz to 30,000MHz (see note in text).
Sensitivity	s.s.b., c.w., f.m. 0.5 to 1.8MHz 0dBμV (1μV) 1.8 to 30MHz 12dBμ (0.25μV) a.m. (1kHz 30% mod) 0.5 to 1.8MHz 20dBμV (10μV) 1.8 to 30MHz 6dBμV (2μV) f.m. (12dB SINAD) -6dBμV (0.5μV) s.s.b., c.w., a.m. (narrow) 2.7kHz (-6dB), 4.7kHz (60dB) a.m., f.m. 8kHz (-6dB), 30kHz (-50dB)
Spurious and Image rejection ratio	More than 70dB
Audio output power	More than 2.0W (8Ω, 10%THD)
Transceiver RIT range	±1.0kHz

## New Rig On The Block

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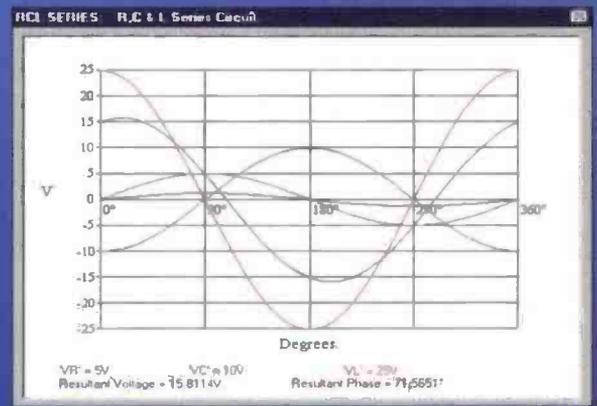
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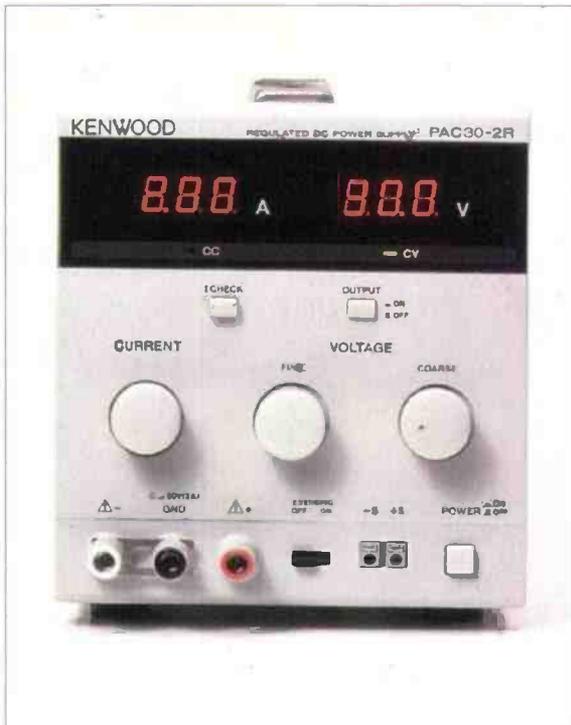
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# A Century of Amateur Radio Equipment

CELEBRATING  
100 YEARS  
1898 - 1998  
OF AMATEUR RADIO

*Phil Cadman G4JCP takes a break from his 'Valve & Vintage' column to briefly chronicle the evolution of Amateur Radio equipment design over the last 100 years.*

A typical 19 Set - the epitome of wartime surplus radio equipment.

The KW200B transceiver is a good example of the 'classic' s.s.b. transceiver.

The Icom IC-706 is typical of today's modern mobile transceivers.



PHIL G4JCP  
LOOKS AT THE  
EVOLUTION OF  
AMATEUR RADIO  
EQUIPMENT  
OVER THE LAST  
CENTURY

**C**ondensing a century of progress into a few pages of typescript is difficult. So, my article is very much a personal view of the subject matter! I've deliberately concentrated on h.f. equipment. My apologies to those who consider frequencies below 30MHz to be akin to direct current!

The world's first 'Amateur' Radio station is generally accepted to be the one established by **Lt M. J. C. Dennis** at Woolwich Arsenal in London, in 1898. He used a spark transmitter which was then the only practical way to generate useful amounts of power at radio frequencies.

## Spark Transmitter

A spark transmitter is basically a tuned circuit excited by a repetitive spark discharge. Each spark producing damped oscillations in the tuned circuit, as in **Fig. 1**.

Naturally, the bigger the spark the more r.f. the transmitter produces. Increasing the spark frequency also has the same effect and many ingenious devices were invented to create the sparks as fast as possible.

Most receivers were basically variations of what we now call the crystal set and the number of stations heard was generally

dependent on the efficiency of the detector. A great deal of effort was put into finding materials and techniques that produced the most sensitive detectors.

Ironically, the crystal sets were only capable of providing audible reception of spark transmissions because these transmitters produce what's effectively a modulated signal, a crude form of modulated continuous wave (m.c.w.).

Antennas followed the early maxim: as much wire as possible and as high as possible. While this is still essentially true today the first Radio Amateurs - and professionals, too - had little antenna theory to guide them.

## First World War

Development of the spark transmitter and passive receiver continued until the First World War interrupted amateur experimentation. However, throughout the war commercial development of the thermionic valve continued apace both in the UK and abroad and by the time amateur licences were re-issued in 1920 Amateur Radio was well into the thermionic era.

When the Marconi Company's Writtle station 2MT began broadcasting early in 1922 most people only had a crystal set to listen

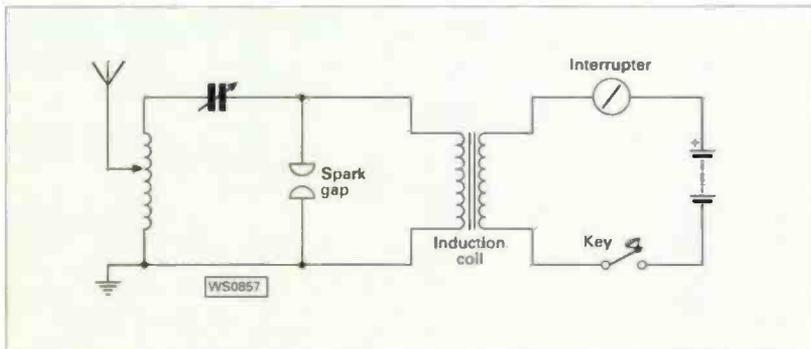


Fig. 1: Circuitry of an early spark transmitter circuit.

with. The 'crystal' was usually galena (lead sulphide) with a point contact (the 'cat's whisker').

It was with the birth of broadcasting for entertainment purposes that Amateur Radio split from the more general pastime of radio listening. From then on there would always be many more people simply listening to broadcast radio than pursuing the now distinctly separate hobby where equipment increasingly paralleled developments in the commercial radio communications industry.



Fig. 2: A typical 'self excited' oscillator transmitter from the 1920s.

### The 1920s

Throughout the 1920s the 'straight' or tuned-radio-frequency (t.r.f.) receiver using battery valves reigned supreme. Low-powered transmitters also used batteries, whilst amateurs who could afford them used large transmitting valves fed from mains electricity or from generators and Fig. 2 shows a typical 'self-excited' transmitter of the early 1920s.

The simplest receiver (excluding the crystal set) was a regenerative detector which had to be adjusted into oscillation to receive c.w. transmissions. Quite often the detector was followed by one or more stages of audio amplification to provide loudspeaker listening.

High-performance receivers used several stages of r.f. amplification before the detector and audio stages using separate beat frequency oscillator to detect c.w. signals. As the beat frequency oscillator (b.f.o.) had to be tuneable over the full range of the receiver both amateurs and professionals must have had considerable problems with the frequency stability of these oscillators!

Superhet designs had emerged in the

early years of the decade following Armstrong's patenting of his 'supersonic heterodyne' principle in 1918. But these had quickly fallen from favour due, in part, to the only available amplifying device being the triode valve and to the superhet's relative complexity.

### The 1930s

By 1934 however, the superhet receiver had all but dominated the domestic market. Smaller, more efficient valves had become available and production techniques had improved.

The screened-grid valve, which had made stable h.f. amplification possible, was quickly superseded by the pentode. With the introduction of the vari-mu pentode and the multi-grid frequency changer the superhet finally came of age and was to last throughout the whole of the valve radio era.

Until the early 1930s almost all Amateur Radio equipment was home-constructed. But the adoption of the relatively complex superhet created a demand for commercially produced 'amateur' equipment. Manufacturers responded and in 1932 commercial Amateur Radio communications receivers became available in the USA.

### Classic Valves

In the final few years leading up to the Second World War, developments in valve technology produced many of the now 'classic' valves. In the USA, in 1936, RCA introduced the metal 6L6. The glass version, the 6L6G, appeared the following year and the ubiquitous 807 dates from around the same time.

The 6V6 and 6V6G followed in late 1937. The 'GT' version, introduced in 1939, remained in continuous production for over 40 years. In the UK, the Marconiphone Company (GEC) introduced the KT66...a valve much cherished by 'hi-fi' enthusiasts..

In 1939 Mullard introduced the EF50 r.f. pentode, specifically for use in TV. Its all-glass-base construction made it useful well into the v.h.f. spectrum making it particularly popular with amateurs experimenting above 30MHz.

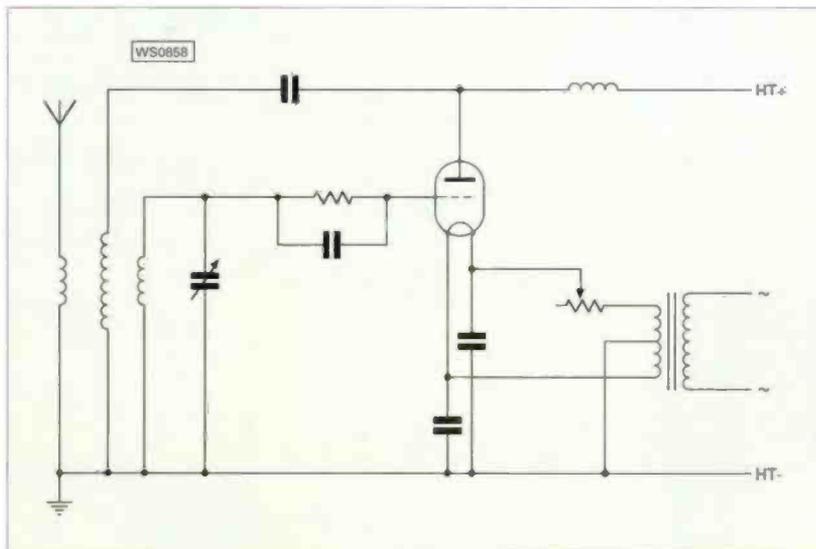
The diagram, Fig. 3, shows the typical arrangement found in communications receivers - both amateur and professional - from the late 1930s through to the 1950s. Some manufacturers used two r.f. stages for improved sensitivity and front-end selectivity while all had between one and three stages of i.f. amplification.

Transmitters had changed little in essence from the early days but they were now far more stable and easier to use. The illustration in Fig. 4, shows the fundamental parts of a 1930s a.m./c.w. transmitter.

### Post-War Decades

The Second World War put a hold on the development of amateur equipment. But development and production of professional communications equipment continued, particularly in America. Later, amateurs were able to take advantage of the war-surplus receivers, transmitters and components.

The rapid increase in the number of Radio Amateurs following the war led to the



problem of heterodynes when working on 'phone' (radio telephony) becoming intolerable in the 1950s.

The solution was suppressed carrier single-sideband working (commonly referred to as s.s.b.). Not only did the annoying heterodynes disappear, but s.s.b. transmissions took up less than half the bandwidth of a.m. transmissions.

Watt-for-watt, s.s.b. possessed a significant advantage over a.m. But the drawback to s.s.b. working was that it required more complex equipment, particularly with regard to the transmitter.

The inevitable change from a.m. to s.s.b. took some time. This was partly due to the additional complexity of s.s.b. equipment discouraging home construction, and to the lack of commercial amateur equipment.

However, even when commercially made equipment did become available it was expensive. The abundance of war-surplus a.m. and c.w. equipment must also have had a restraining effect.

Long after the initial war-surplus stock had been sold off, and even as late as 1970, quantities of ex-Admiralty B40 receivers, amongst others, were still readily available. And, in amateur magazines, constructional articles still favoured a.m. and c.w. over s.s.b.

Eventually however, s.s.b. working and the crowded nature of the amateur bands placed new demands on amateur receivers and transmitters. The single-conversion receiver shown in Fig. 3, gave way to the double conversion receiver as shown in Fig. 5.

## Double Conversion

Two forms of the double-conversion superhet receiver were developed. One was for general coverage work, and the other for where only certain segments of the r.f. spectrum needed to be covered, as in most commercial and amateur applications.

For general coverage use the frequency of the first local oscillator is varied to produce a constant first intermediate frequency, often around 1.6MHz. The second mixer is fed from a crystal controlled source.

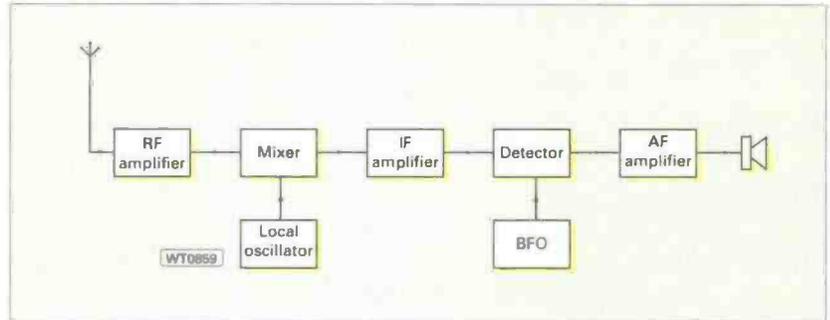
The crystal controlled oscillator results in yet another constant intermediate frequency, usually around 465kHz, although it can be as low as 100kHz. This arrangement gives good second-channel rejection but the stability of the first local oscillator is critical.

More suited to the requirements of single-sideband (and c.w.) working is the second arrangement. In this design it's the first local oscillator which is crystal controlled.

The results is a variable first i.f. whose bandwidth is equal to the width of each of the receiver's band segments. These are usually 200 to 600kHz wide. The whole of the receiver to the right of the dotted line in Fig. 5, is then designed to receive just this relatively narrow range of frequencies.

Although more complex than the first arrangement the alternative approach gives both good second-channel rejection and good stability. And because the v.f.o. has only a single limited range dial calibration can be accurate to within 1kHz or so.

The real advantage for communications work becomes apparent when the alternative Practical Wireless, May 1998



approach is used within a transceiver, and Fig. 6., shows the block diagram of a simple s.s.b. transceiver. Notice how the oscillators and crystal filter are used on both receive and transmit thus giving accurate co-channel operation with single v.f.o. control.

The end of the post-war period of steady Amateur Radio equipment development came to an end in the late 1960s with the introduction of imported s.s.b. gear from Japan.

## Quartz & Mechanical

For many years quartz crystals had been used in receivers to provide extremely narrow passbands for c.w. reception but it was the introduction of the crystal (and mechanical) filter that provided the key to the design of the modern s.s.b. transceiver.

On receive, the filter takes the place of several i.f. transformers which, were they present, would be difficult to align. On transmit, the filter simply 'picks-off' the wanted sideband from a double-sideband (d.s.b.) signal. The d.s.b. signal having first been produced by a balanced modulator.

Alignment of early s.s.b. transceivers was by no means a simple task. But it was considerably eased by the inclusion of a crystal filter and by employing common oscillators in both the transmit and receive circuitry.

So successful was the arrangement illustrated in Fig. 6, that it formed the basis of nearly every s.s.b. transceiver from the late 1950s until the advent of the frequency synthesiser in the early 1980s.

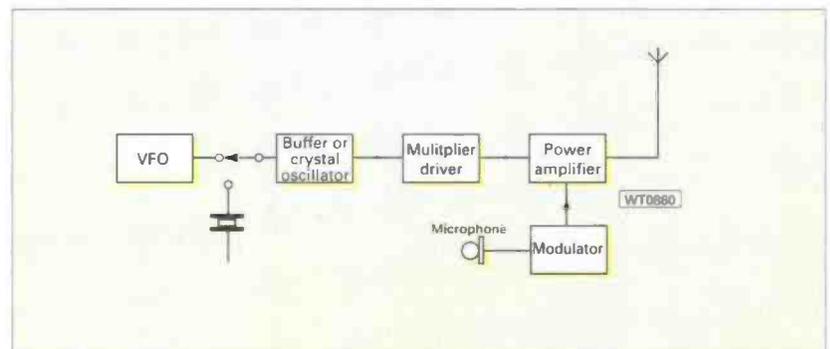
## The 1970s

Much of the development in the 1970s was associated with the change from valves to transistors and the inclusion of various operator conveniences. The change to transistors was quite rapid and soon every stage in the receive/transmit path - with the exception of the transmit driver and power amplifier (p.a.) stages - was solid-state.

Fig. 3: A typical design arrangement found in communications receivers - both amateur and professional - from the late 1930s through to the 1950s (see text).



Fig. 4: The fundamental block diagram of a typical 1930s a.m./c.w. transmitter (see text).



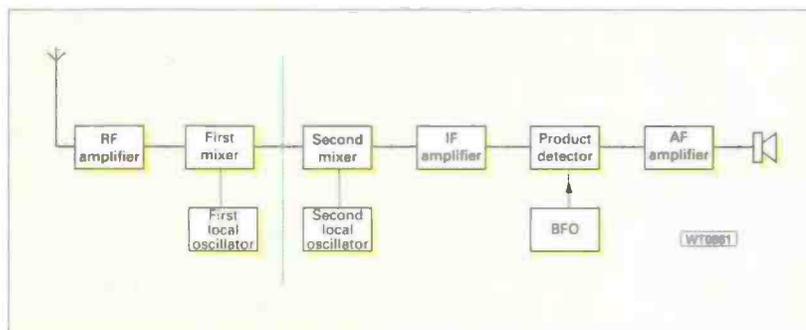


Fig. 5: The whole of this receiver circuitry to the right of the dotted line is designed to receive a relatively narrow range of frequencies (See text).

However, by the start of the 1980s sufficiently rugged (and inexpensive) r.f. power transistors were readily available and the 60 year reign of the thermionic valve in Amateur Radio equipment came to an end. On reflection however, perhaps that last statement is not strictly true as valves are still used in high-power linear amplifiers but even their days must surely be numbered?

### Digital Revolution

The adoption of the solid-state, broad-band r.f. p.a. and the introduction of digital electronics now produced the next revolution in Amateur Radio equipment design.

At first, digital electronics were simply used to enhance the operation of equipment, for example by providing a digital frequency readout. However, by the early 1980s the development of the frequency synthesiser resulted in a new approach to transceiver design.

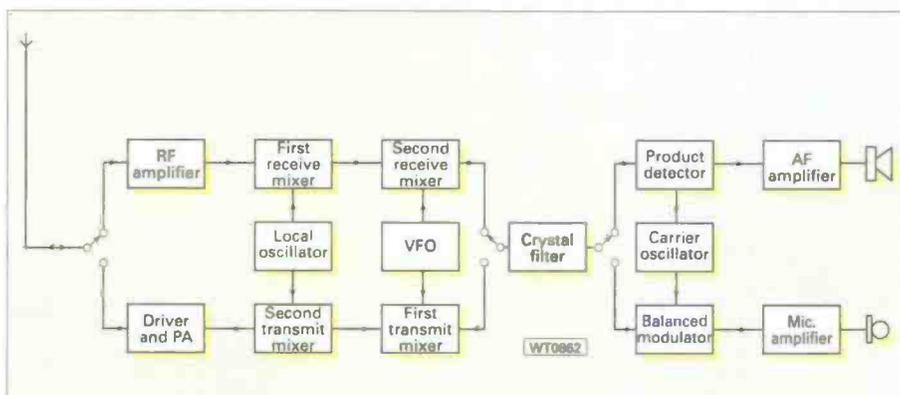
All the oscillators shown in Fig. 6, were replaced by a frequency synthesiser. This generates all the required local oscillator frequencies through a combination of voltage controlled oscillators and digital techniques.

Although there's no fundamental difference between the old and new approaches there are significant differences in implementation. The classic approach relies on conventional tuned circuits 'peaked' to follow the transmit and receive frequencies. In contrast, the new approach uses broadband techniques with band-pass filters to provide (very) coarse selectivity and crystal filters to provide fine selectivity.

The first i.f. is made significantly higher than the highest working frequency of the transceiver. Second channel and moderately-close-in selectivity is provided by a 'roofing' filter, while the main i.f. filtering is provided by a crystal or mechanical filter at the second (and a possible optional third) intermediate frequency.



Fig. 6: Block diagram of a simple s.s.b. transceiver (See text).



The use of microprocessors in Amateur Radio equipment paralleled the adoption of the frequency synthesiser. Indeed, nowadays the two are seemingly inseparable!

Throughout the 1980s manufacturers continued to add ever more facilities. And occasionally, because of this I think they've sometimes compromised the r.f. performance of their products.

### Recent Developments

The most recent significant development in transceiver design is the incorporation of digital signal processing (DSP). A digital signal processor is, at least in theory, able to replace the multiple crystal filters that are normally required to provide different i.f. bandwidths.

Naturally, incorporating DSP simplifies the design of equipment. It also obviates the need to purchase expensive add-on filters for serious DX or c.w. working.

The other main preoccupation of Amateur Radio equipment manufacturers seems to be the quart-into-a-pint-pot syndrome. More and more facilities, modes and bands are being packed into physically smaller and smaller boxes. This is true in all amateur equipment design, be it h.f., v.h.f., base station, mobile or hand-held.

### Past, Present, Future?

Amateur Radio equipment design began in the radio rooms of the very first radio enthusiasts where every piece of equipment had to be home-constructed. It passed through the inter-war years and on into the latter half of the 'swinging' 1960s.

The latter periods were, perhaps, the 'golden age' of Amateur Radio. It was when home design, development, modification and construction both paralleled and complemented both new products and ex-government gear.

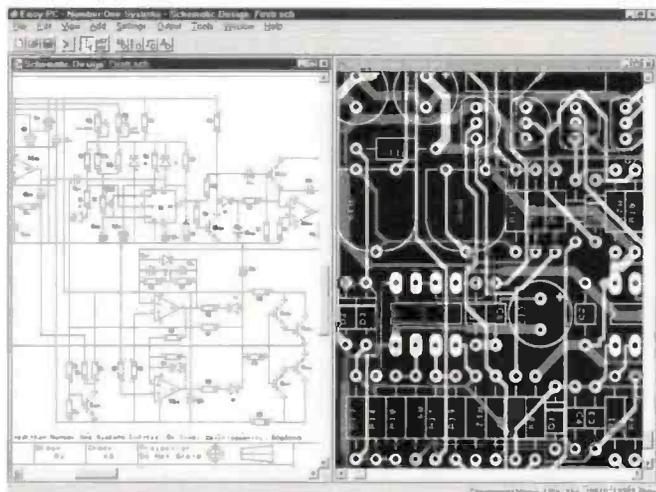
Since the beginning of the 1970s the demise of a.m. below 30MHz and the availability of Japanese equipment has led to the near extinction of home design and construction of high-performance amateur communications receivers and transmitters.

And it's inevitable that commercial products will continue to use ever-more specialised components and techniques that are simply not suitable for home construction.

Component failures in commercial equipment manufactured 50 years ago are often rectified with ease. But what happens if a custom integrated circuit/surface mount device fails on a modern transceiver? How long will spares be available and at what price?

And what of the next 100 years? Perhaps Icom's IC-PCR1000 receiver computer interface is a portent of the future. It may well turn out that soon it will simply be a matter of plugging a transceiver module into our computer to get on the air. That is, if we're still bothering to communicate via radio at all!

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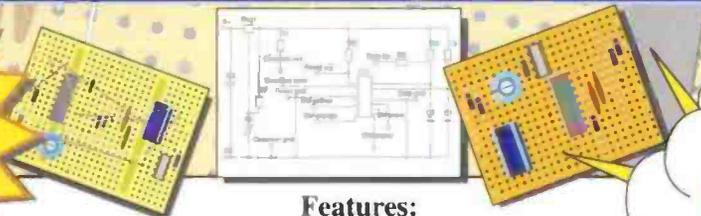
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# 'Real' Radio In Mini

**With the continuing trend towards miniature rigs we set Dick Pascoe GOBPS on the review trail of the Taiwanese made HORA C408 430MHz transceiver.**

**F**irst impressions on any new transceiver are very important and in Hora C408's case my 'gut' reaction was "this is well built". It has a solid feel about it, that some of its competitors lack. It fits in the palm of the hand and despite its small size feels like a 'real' radio.

Each control is clearly marked with a row of seven tiny buttons on the left of the front panel. These provide the main functions, which are: **Power, Lamp, Set, Moni, Call, SC** and **V/M**. The numbered rotary control on the right of the rig sets the audio out level.

The antenna is just 70mm long and is a solid screw fitting onto the body. This also had a real radio feel about it. Already, after just a few minutes I was getting good 'vibes' from this little set.

The physical size of the C408 also begs the question, 'is there a competition among the black box builders to make the worlds smallest rig?' I remember last year 'playing' with the Alinco DJ-C1E and the DJ-C4. I thought these were small but in comparison the HORA feels like a **real radio** in miniature. It feels like all the solid hand-helds I have tried in the past, and all this in such a small package!

Many of the 'older style' rigs came with a manual that in some cases was a single sheet of paper in the famous Japanese version of English. In the C408's case there are 41 pages of instructions. The English is very good but with the occasional lapse such as 'it may lead to a trouble' and the 'SET' list of controls need close examination.

Like many of the modern hand-held transceivers of today the HORA C408 does not use an in-built rechargeable cell but relies on standard AA size Zinc Chloride batteries. However, it can use both Alkaline and Manganese standard AA size batteries. The

rig will work with a battery level of between 2 - 3.5V and will fail at 1.8V or less. And it's nice to see this voltage level written in the manual.

The push-to-talk (p.t.t.) is set into the left side of the radio and has a comfortable feel to it. As it's so small, there's a danger you might miss the microphone, so the manufacturers have put a mark around the minute hole, which is to be found right in the centre of the front panel. The speaker is mounted just above the microphone and is about 25mm in diameter.

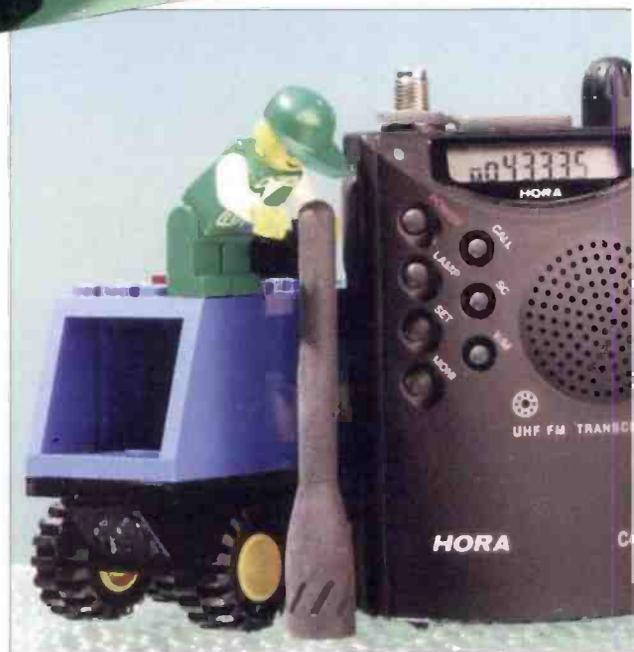
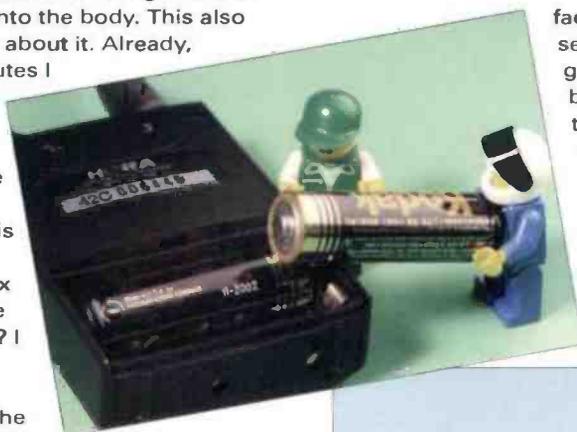
The button on the top of the rig is the frequency control and the display can be clearly seen in the front panel. There is also a facility for adding a speaker microphone.

I spent a fair amount of time reading the manual on how to set the offset frequencies for my local 430MHz repeater. There are 23 separate operations adjusted by the **Set** control and the frequency knob. So, it's worthwhile reading the manual!

As you search for the operation you want, you have to scroll through the other 22. I eventually got onto the frequency and offset that I wanted and sat monitoring the repeater.

Additionally, there is a facility for auto repeater selection when the v.f.o. goes into the repeater band. Unfortunately on the C408 this is set for 439MHz and above. It must be remembered that to select a repeater frequency the offset must also be entered as well as the CTCSS tones.

The C408 offers 20



*"... despite its small size it feels like a 'real' radio."*

memories and obviously the best bet is to program each of your favourite frequencies into these. One delight was the ability to select channel numbering, which enabled each repeater or other frequency to be seen as a number rather than a frequency in the display.

## Useful Facilities

Another useful facility offered by the C408 is the 'scan' mode and there are two types of

# miniature!

scan available. The first, 'Pause Scan' hesitates at any received signal for five seconds and then returns to scan mode. The second 'Busy Scan' stays on any active frequency, but if that 'busy' signal disappears for two seconds the scan resumes.

The range of frequencies scanned can be selected. You may select a 1MHz range perhaps for the repeater band or a specified frequency range and of course memory scan is also available.

The C408 radio also provides a 'dual-watch' facility where the v.f.o. frequency and one other may be checked at an interval of three seconds. The other can be either the 'Call' channel or one of the memories.

Other facilities include the monitor button (Moni), VFO to memory button (V/M) and the SC button for scan. Some of the commands are quite complex and

an hour or three with the manual helps enormously. (I ended up reading it several times to get



the best out of this radio).

The usual battery save options are featured in that where the rig only operates for a pre-settable time and then switches to standby. In effect it only listens for up

to one second in five. There is also a facility to enable the rig to switch itself off after a pre-set time interval when it is not being used. (Automatic Power Off).

At the required 3V level the rig draws about 230mA on transmit and just a measly 30mA on receive. This is improved dramatically with the power save mode on and drops to 0.5mA and a miserly 80µA with Automatic Power Off (APO) in use.

The dimensions of the C408 are 58 wide Practical Wireless, May 1998

by 80 high by 25mm front to back. The height does not include the antenna, which adds a further 70mm. And the internal 8Ω speaker is easily 'man' enough to do the job.

But, what is really impressive is the weight, which is quoted as 100 grams. I was amazed to find that the batteries equated to 50% of the total weight. Yes! The little rig weighs-in at just 50g.

The C408 works from 430 to 439.995MHz with F3 (f.m.) mode transmission. The receiver is quoted as a double superhet with a first IF of 23.05MHz and a second at 450KHz.

Receive sensitivity is stated to be -12dB (12dB SINAD) with a signal to noise ratio of 30dB or more at 1µV. And I have no reason to doubt these claimed figures.

The transmitter gives about 230mW output and contrary to many people's thoughts this is a high enough power level for chats around the town or the local rally. Being a dedicated QRP man I had no doubts about the effectiveness of low power, after many milliwatt chats into Europe.

*"... this is maybe the best yet."*

## Very Impressed

My wife is not licensed but after several years trading at the rallies knows a fair bit about hand-helds. She was very impressed with the

Hora C408, she even said "this is maybe the best yet".

Using the C408 I had a chat with **Stan G6ZNW** across the town of Folkestone with good signals both ways. Good audio reports too!

**Ian G3ROO** had already bought a C408 for his wife **Margaret 2E1DFH** who loved it as she said "It fits into the handbag and you hardly know it's there."

Ian told me that the one drawback for the Hora was the lack of a carrying strap. So, Ian in his usual way put one together quickly that worked extremely well.

**Alan G4YFP** was amazed at the compactness of the rig. "How much further can they go in miniaturisation" he asked? "It's a real radio that's been shrunk."

## Bottom Line

So, the bottom line is that I have used several of the small rigs offered from various sources over the past few years. Each time using my own Icom IC-2SE as the standard to compare the rigs against.

I have owned my little Icom for about five years and during that time have found little to beat it. A couple have got close but none have tempted me enough to change until now.

My nearest 430MHz repeater is 34km away, but my local 144MHz repeater is just 5km away. If this had been a 144MHz model I would have kept it!

I loved this little rig, it has all that I would expect of a compact transceiver. I not only liked it, I liked it a lot and would like to thank **Lowe Electronics Ltd.** for supplying the review model.

The **HORA C408** is available for just **£89.95** from **Lowe Electronics Ltd., Chesterfield Road, Matlock, Derbyshire DE4 5LE.** Tel: (01629) 580800, FAX: (01629) 580020.

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# antennas in action

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## Hallicrafters Lives

The well-respected name of Hallicrafters lives on in the guise of antennas for the 144MHz band. Their unusual collinear 5λ/8 over 5λ/8 base station antenna was on show at the London (Picketts Lock) show. The antenna is unusual in that the elements are in a helically wound form, with an adjustable top section (costing £24.99). Also using an unusual Gamma matching system the antenna gives a good gain and flat s.w.r. over the whole band and is said to be able to withstand 500W f.m. or 1kW s.s.b. and may be directly mounted onto any pole of 25 to 40mm diameter.

Also on display, alongside the 144MHz antennas at the show, was a base station collinear antenna for the 430MHz band (priced at £19.95), several mobile antennas for 144 and 430MHz (costing £10.99) and a collinear base station antenna for 50MHz, costing £34.99, all very reasonable prices. More information on the Hallicrafters series of antennas is available from **B. Havenhand G3OOP** at **11 The Coppice, Booker, High Wycombe HP12 4SA.**

## Saintly Six

An antenna that is rarely seen, but may be about to make a comeback is the

halo type of antenna. **Moonraker** have recently introduced a halo antenna suitable for the 50MHz band with a maximum dimension of one metre or less. The halo is one of a series of antennas for the 50MHz band that **Moonraker** can supply, but it's the only one you could put in the car without taking it apart or skewering a passenger! Just the sort of thing for those days out.

For more information about their range of 50MHz antennas, or their wide range of antennas for other bands, contact **Moonraker** at **Unit 12, Cranfield Road Units, Cranfield Road, Woburn Sands, Buckinghamshire MK17 8UP, or Tel: (01908) 281705, FAX: (01908) 281706.**

## Alford Viewing

Unable to find a suitable antenna for his Amateur TV setup, **Clive King G6MYT**, decided to make his own version of the Alford slot antenna for the ATV portion of the 1.2GHz band. Accurately machined out of high quality alloy, the antenna needs only your own feedline and connector to complete. The antenna was on display at the recent **Shortwave Shop Open Day**. It costs £38 plus P&P, direct from **Clive King** at **112 Rolls Drive, Bournemouth, Dorset BH6 4NA. Tel: (01202) 422441.**

## Qtek Verticals

Available from **Haydon Communications** is the new **Qtek Penetrator**, multi-band (1.8 to 28MHz) vertical antenna. Ideal for portable operation the 3.5m high antenna breaks down into a 1.5m length for carrying. Capable of withstanding 200W the antenna is simple to erect, needing no tuning in use. For more information contact **Haydon Communications** at **132 High Street, Edgeware, Middlesex HA8 7EL. Tel: (0181-951 5781/2 or FAX: 0181-951 5782** or at their West Midlands showrooms at **Unit 1, Canal View Ind.Est., Brierly Hill, W. Mids. Tel: (01384) 481681.**

## From The Vine

Now available from **Vine Antenna Products** is a new tri-band beam antenna, the **C3-SS** covering the 14, 21 and 28MHz. The antenna is in reality a set of three 2-element mono-band antennas sharing the same 3.6m boom, with a turning circle of 8.25m. The longest element has a length of a little under 7.5m, there are no traps or coils to absorb r.f. energy, and it's claimed to offer excellent performance.

For more information about the **C3-SS** antenna or other products contact **Vine** at **The Vine, Llandrinio,**

**Powys SY22 6SH, Wales. Tel: (01691) 831111 or FAX: (01691) 831386** or by E-mail at: **ron@gw3ydx.demon.co.uk**

## Low Profile Antenna

A new low-profile antenna for either the 144 or the 430MHz bands (for both together) is available from **Antenna Marketing (UK) Ltd.** The result of two years development the 510 series LPA antenna gives all-round directivity without the need of a separate ground plane. The unit may combine v.h.f. and u.h.f. antennas in the same housing, fed by the same coaxial cable, but separate for tuning purposes. The antenna can be supplied with either a GPS antenna, or a complete **Garmin GPS** system incorporated. For more details contact **Antenna Marketing (UK) Ltd., at 1 Resthaven Road, Wootton, Northamptonshire NN4 0LF, England. Tel:+44 (0)7000 247928, or FAX: +44 (0)7000 710124 or E-mail to: airwaves@mcmail.com**

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8 pages of  
antennas

## welcome to AiA!



Welcome to 'Antennas in Action'. I mentioned in the last Antennas-In-Action that I would be bringing you the results of the questionnaire that we ran some time ago. After a little bit of fun arranging the data into a tabular form, I found that my first impressions were broadly correct.

You seem to think that we are doing it about right - and your other comments and ideas will be incorporated as appropriate.

There are however, at least two readers out there who think I should throw 'Tex Topics' away and let other authors have the space. Perhaps if we had more readers who wrote in with their ideas then maybe I could. Remember any readers ideas can win a copy of *More Out Of Thin Air* or the equivalent to spend in our Bookstore (whatever your views on 'Tex Topics' are).

G1TEX

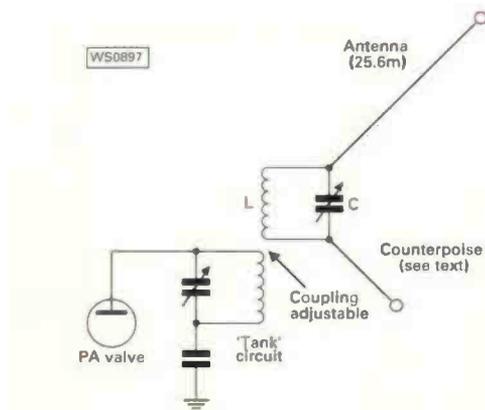
# antenna workshop

When I was first licensed in 1946, my shack was up in the attic of a boarding house on the sea front at Hastings. There was no way that I could put antenna wires more than a couple of metres above the roof but, using no more than 10W of transmitter power, one antenna gave me my first taste of DX working. Using c.w. I'd contacted stations in all continents after a few weeks. The one antenna that helped me achieve all this was the W3EDP antenna design developed in the mid-1930s by the holder of that call Mr H.J. Siegel.

## Unusual History

The W3EDP antenna has an unusual history. For some reason, Siegel never wrote anything about his 'own' antenna design which, when being developed, was in a world where Radio Amateurs had no rotary beams, no coaxial cables and no a.t.u.s. Long wires and resonant 'Zepp' antennas were in universal use.

The first descriptive article on the W3EDP antenna was published in the RSGB's *Bulletin* (it's now called *RadCom*) in February 1936. It was written by Siegel's friend Yardley Beers W3AWH. Beers produced a similar article that appeared the following month



**Fig. 1: The simple coupling circuit suggested by G2WD in 1936 for coupling the valved transmitters of the day to a W3EDP antenna. Although capable of extremely good matching it would be considered very complex and difficult to use, by today's amateur, needing adjustment of three interactive controls to achieve best results.**

in the American *QST* magazine.

Yardley Beers told how his friend W3EDP, started his painstaking experiments by using 30.5m (100ft) of end-fed wire. He gradually reduced this inch by inch until the very best results were obtained. It is said that he used up more than a thousand feet of wire at that time.

Not liking simple end-fed wire antennas, Siegel then began 'cut and try' techniques to determine his ideal length for a counterpoise. A lot of judicious wire pruning revealed that a

counterpoise length of 5.18m (17ft) gave the best results. This wire ran out at right angles to the main wire, which was only 6m (20ft) high.

Siegel then found that the antenna design worked well even when strung up close to the ceiling of the first floor room. At the time W3EDP's transmitter ran 50W input

power, but in a short time his new antenna, used on 7 and 14MHz, gave him contacts with 75 countries in all continents. This was an achievement not equalled by many higher powered US stations of the time. A QSL card, dated May 12th 1935, confirming contact with G5JO by Siegel, shows that Siegel used 50W. By that date W3EDP had worked 60 countries. He was most certainly then using his new antenna.

The December 1936 issue of the RSGB's *Bulletin* carried an article by G2WD which detailed ways to couple the W3EDP antenna to the output stage of a transmitter. The simplest circuit can be seen in Fig. 1 where a tuned circuit couples inductively to the valve p.a. output or 'tank' circuit. In his article, G2WD stressed that for the best results the coil L must be resonated with a small value of capacitance.

The antenna coupling circuit has no earth connection and if modified by using a link coupling could be used today. A suitable 'Faraday screen' link

made with coaxial is shown in Fig. 2. On some bands the counterpoise is not needed and Table 1 gives details of counterpoise lengths for the nine h.f. bands

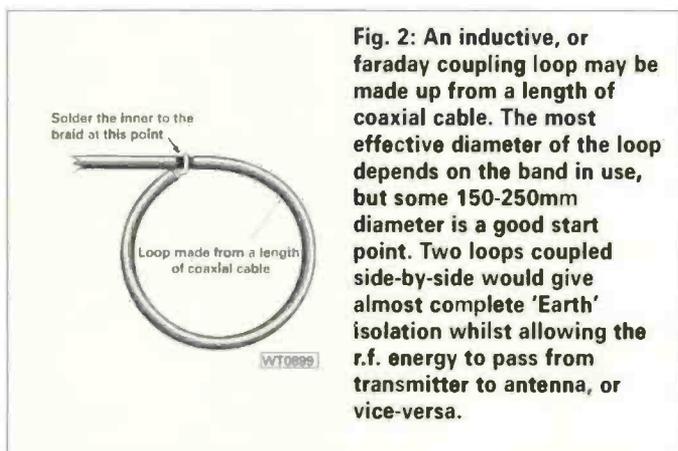
## Nine Bands

Although the W3EDP antenna may be used on the nine major h.f. bands, when he developed his antenna, Siegel only envisaged its use on four bands: 3.5, 7, 14 and 28MHz. Fortunately for us, his design has since proved to be very versatile and can be effective on all our h.f. bands from 1.8 to 28MHz. No doubt it could be made to work on 50MHz too!

For use on the bands it was originally designed for Siegel's wire lengths hold good. But today for our 'new' bands gained since 1952 onwards, there must be a few changes to the counterpoise arrangements. The W3EDP antenna has a medium impedance feedpoint impedance. Having neither a very low nor a very high impedance at its feedpoint end, that is usually inside the house or shack.

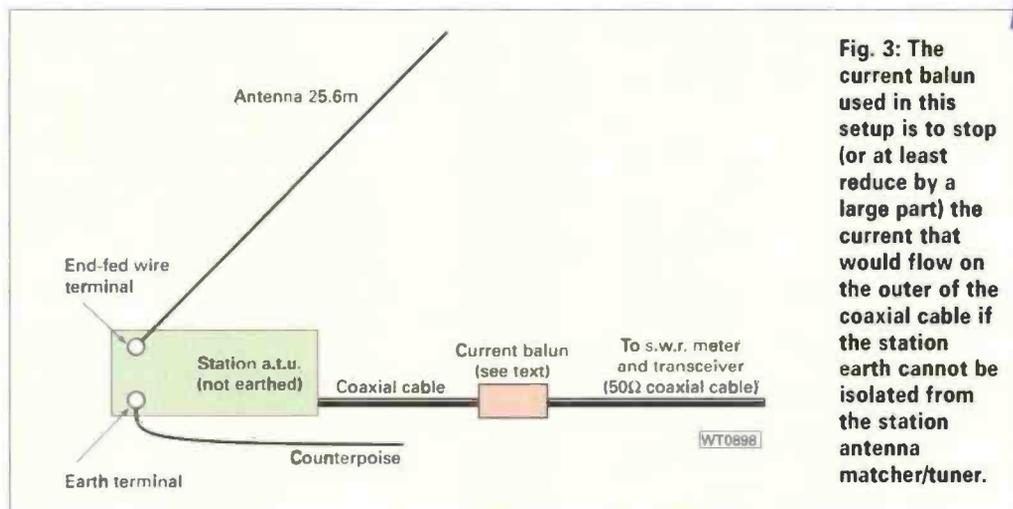
Feed-points of medium impedances are always much easier to match than high or low impedance points, and they also limit any r.f. feedback problems. On some bands the antenna is best when used as a simple long wire, but on others a counterpoise will be needed. The counterpoise behaves as one leg of a very widely spaced open wire feed line making the antenna like an end-fed 'Zepp'. This puts its high impedance points well away from the operating position. As our bands are now no longer all harmonically related, a single counterpoise length will not suffice.

On 'Top-band' (1.8MHz) the antenna element is only about one sixth of a wavelength long



**Fig. 2: An inductive, or faraday coupling loop may be made up from a length of coaxial cable. The most effective diameter of the loop depends on the band in use, but some 150-250mm diameter is a good start point. Two loops coupled side-by-side would give almost complete 'Earth' isolation whilst allowing the r.f. energy to pass from transmitter to antenna, or vice-versa.**

# antennas in action



**Fig. 3: The current balun used in this setup is to stop (or at least reduce by a large part) the current that would flow on the outer of the coaxial cable if the station earth cannot be isolated from the station antenna matcher/tuner.**

and must be tuned against a conventional quarter wave counterpoise of about 38.65m (126ft). Although this counterpoise is short for this band, one of my local amateurs **GOAKY** has used a W3EDP antenna with success from several caravan sites in the West Country. He can put an \$9 s.s.b. signal all over the UK when using it. This is good, particularly as the antenna is no more than 6m (20ft) up (usually into a convenient tree). The counterpoise wire he just lays on the ground.

### Practical Considerations

Let's have a look at some practical considerations of using the W3EDP antenna, the versatility of which is remarkable. The 25.6m (84ft) wire does not have to be arranged to run out in a straight line, but can be 'dog-legged' or even arranged in the shape of a 'Z' and yet will still give good results. Bends kept in the horizontal plane are fine however, bends that bring the wire nearer the ground are not recommended. The wire may be arranged as an inverted 'L' or run out away from the shack horizontally or sloping upwards.

The antenna will still perform reasonably well when its average height is under 6m (20ft) but ideally it should not fall below this height. Its far end will always be at high r.f. potential so good end insulators are a 'must'. Just throwing the wire into a tree induces losses and detunes the system. The counterpoise will work best

when running at right angles to the direction of the main wire. But the antenna will still perform reasonably well when it isn't running in the 'correct' directions or even when the counterpoise run is bent. Remember that Siegel used an indoor counterpoise, as I did some 50 years ago. For a time I lived in a small cottage in the heart of an urban area and had no garden or even a back yard. I devised an 'invisible' W3EDP by using thin enamelled wire from an old transformer winding.

For the 'invisible' W3EDP I tied the end of the wire to a piece of modelling clay, and flung it over a neighbouring roof top. It could not be seen and it coped well with 75W of power until the wind induced metal fatigue and breakage. Whatever happened to the launch-weight I never found out!

### Circuit & Matching

The simplest matching circuit can be borrowed from the original method shown in Fig. 1. A link coupling as mentioned earlier in the text can be used to connect to the transceiver via an s.w.r. meter. By sliding the link coil over 'L' the best s.w.r. reading can be found. Plug-in

coils for each band or a single tapped coil can be used.

The inductance used for each band must be high and should be tuned with quite a small value capacitor. The original article suggested that on 3.5 and 7MHz no more than 30pF of capacitance is needed and this reduces to 10 or 20pF on the higher frequency bands. So a capacitor of a maximum value of 150 or 200pF would be suitable to cover all bands.

I've received letters from amateurs having trouble with the W3EDP on one or more bands. Mostly they write that they've experienced r.f. in the shack with attendant feedback problems. In most cases I've suggested that they set up the matching arrangement shown in Fig. 2. Here the antenna has no earth connection and the earth wire must be removed from the a.t.u.

The counterpoise is connected to the 'earth' terminal on the a.t.u. in the place of the station earth. When the a.t.u. itself is earthed, the W3EDP antenna is detuned, corrupting the essential working of the antenna. The braid of the connecting coaxial will of

course earth the a.t.u. and to prevent r.f. running along the outer surface of this braid a current balun is needed. The layout using this option is shown in Fig. 3.

A suitable current balun can be made by winding the coaxial cable along a thick (12mm) ferrite rod (try about 15 turns). Another for could be tried by stacking three large ferrite toroids (the type used to counteract TVI on TV cables) and then winding the coaxial cable with as many turns as possible on the toroids. A further possibility is to slip a large number of ferrite tubing rings over the coaxial cable close to the a.t.u.

If you are using ferrite tubing 'beads', then I think using about 15 beads should be enough for the higher h.f. bands, although, for 1.8MHz working I'd use at least twenty beads. If you are using the balun method, the earth wire must of course remain connected to both the transceiver and the power supply.

Like all antennas, the higher the antenna is placed, the more effective it will be for the DX work. And in every case, where possible, it's best kept away from the screening effects of buildings or large trees.

A W3EDP does not show any marked pattern in its radiation and on the lower frequency bands is an 'All Round' radiator. Many QRP stations in the UK and overseas use W3EDP antennas and despite the low power levels used, achieve remarkable results. Don't you think it's time you tried one?

**Table 1**

Band (MHz)	Counterpoise (m)
1.8	8.65 (126ft)
3.5	5.18 (17ft)
7.0	5.18 (17ft)
10	7.00 (23ft)
14	1.98 (6.5ft)
18	1.98 (or none)
21	5.18 (17ft)
24	None
28	None

**Table 1: With our 'modern' bands some changes are needed on the length of the counterpoise needed to give best efficiency on the bands. The dimensions are given in metres (and feet for the non-metricated).**

# Vertical Or Horizontal

*Ashamed of using 'only' 100W and a dipole antenna?*

*Dick Bird*

*G4ZU/F6IDC says*

*there's really no*

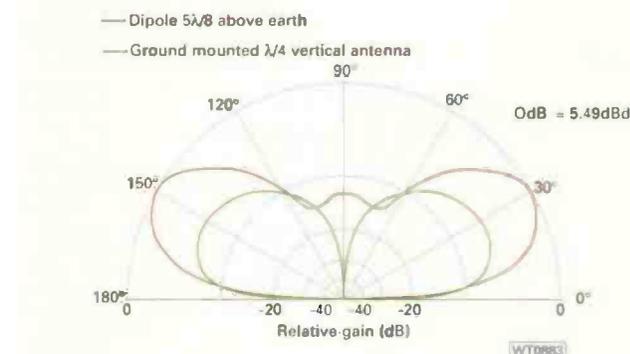
*need, your set-up*

*could be better*

*than you think!*

Newcomers to the h.f. DX bands are often heard, sometimes almost apologetically, to remark 'I've only got 100 watts and a dipole'. But I say there's really no need to be ashamed of such a set-up, it may be better than you think it is!

Nearly all propagation forecasts are based upon the assumption that the set-up is a 100W transmitter and a dipole antenna at each end of the QSO. So, the monthly charts give quite



**Fig. 1: A comparison between a dipole (red) and a ground mounted monopole (Marconi) antenna.**

a good idea of what is possible with simple, low-power installations. You must however, when making use of the charts, take care to pick the right frequency band, and to respect the recommended times-predicted for best communication.

Professional antenna consultants, when asked to evaluate the relative gain, (or loss!), of some new-fangled, and maybe rather expensive antenna innovation generally use the half-wave dipole as their main standard reference antenna! Following their advice can often save you wasting a lot of hard-earned cash!

**Editorial Note:** When the gain (or loss) figures are given for an antenna, there should be a reference included. So,

when referred to a dipole, in this case 'dBd' (literally dB-dipole) should appear after the quoted figures. So, you would see '5.6dBd' or similar in the gain parameters. Giving gain figures as 'dB' has no real meaning as the reference used is not given. If the reference is the theoretical isotropic antenna, then the figures should be labelled 'dBi' (literally dB-isotropic) and the gain figures are about two and a half dB higher (so appearing apparently better) than when a dipole is the reference. **Tex.**

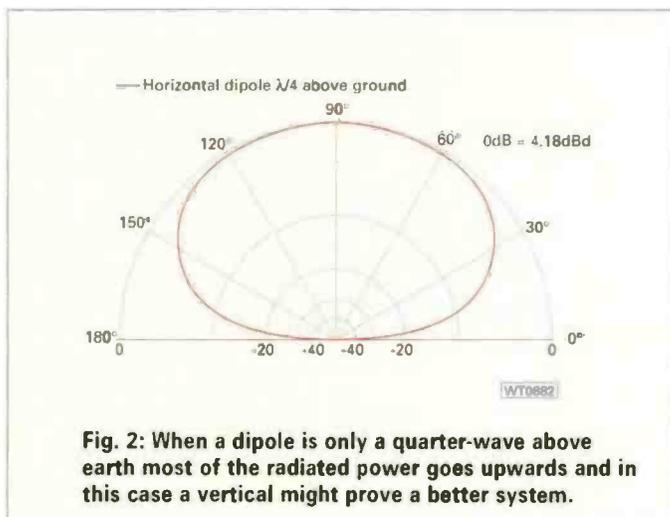
However, it seems that one or two self-appointed 'experts' have recently been decrying the common dipole, and have suggested that vertical antennas are a much better choice, because of certain very special 'low angle' advantages. As

a result of an expert's suggestions, you might even have been contemplating the purchase of, let us say, 10m of 50mm (2in) dural tube. You may have also contemplated digging up your nice green lawn to lay down a large number of wire radials, with a view to installing a self-supporting quarter-wave vertical for 7MHz.

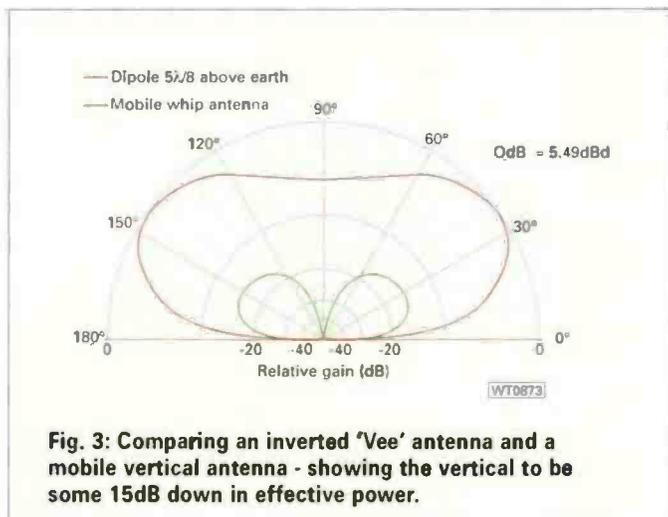
But before going to a large amount of trouble and expense, it would be wiser to investigate just how much you are likely to gain, (or lose!), in return for all the hard work. Rather surprisingly, computer analysis shows that an ordinary wire dipole, half a wavelength above ground, will have about 7dB more gain than a quarter-wave vertical, and that the vertical does **not**, in fact, have any significant low angle advantages (see Fig. 1).

So, with your nice new vertical, you would most likely finish up with a 7dBd loss (Note the 'd' reference). This is quite a substantial loss, (less than 25W from your precious 100W output is actually radiated). Not only that, but the loss would be even greater if you chose a trap-loaded vertical, to provide multi-band coverage.

Let me assume that your main interests on 7MHz happened to be short to medium range contacts in daylight, if so a dipole at quite a low height above ground might be all that is required (see Fig. 2). The ground below acts a reflector, giving useful additional gain



**Fig. 2: When a dipole is only a quarter-wave above earth most of the radiated power goes upwards and in this case a vertical might prove a better system.**



**Fig. 3: Comparing an inverted 'Vee' antenna and a mobile vertical antenna - showing the vertical to be some 15dB down in effective power.**

# ntal?

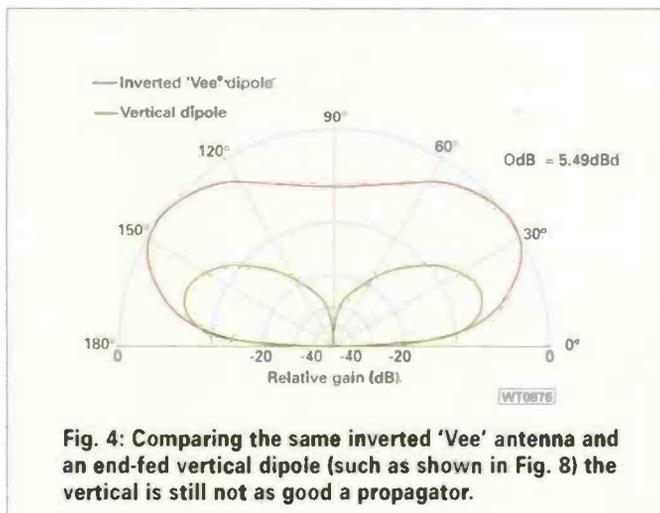
# antennas in action

for medium distance propagation. For increased gain at somewhat greater distances, you could try putting a wire reflector, almost lying in the grass, below and to the rear of your existing half-wave dipole. I have conducted a number of interesting experiments, with the help of HB6VW, and various VK and ZL stations, using this laid out reflector technique, so I know that it is quite effective.

### Intelligent Use

If you make intelligent use of vertical polarisation, then you needn't completely write-off vertical antennas. I feel that, in all fairness, there are one or two rather special cases where a vertical does make sense. Take 144MHz (or 430MHz) f.m. for example, the fixed relay stations, and nearly all the mobiles, use vertical polarization, so you would certainly be the odd man out, if you didn't follow their example. All the same, the more experienced 'two metre' operators generally switch over to a horizontally polarized beam antenna when it is a question of DX contacts using s.s.b. or c.w.

For mobile work on the h.f. bands, (Radio Amateur or CB), a shortened vertical whip is also just about the only practical solution, although, particularly on the lower frequency bands such as 1.8, 3.5, or 7MHz, you may have to accept losses of some 10-20dB, along with very narrow bandwidth and matching problems (see



**Fig. 4: Comparing the same inverted 'Vee' antenna and an end-fed vertical dipole (such as shown in Fig. 8) the vertical is still not as good a propagator.**

Fig. 3 and Fig. 4). The radiation resistance will generally be little more than 5 - 10Ω, and it's obvious that the only earth return is through the capacity of the vehicle down to ground!

For fixed station work on 1.8MHz, most of us are more or less forced, by lack of space, to use some sort of top-loaded vertical antenna. The radiation efficiency will, admittedly, be very low, and the only consolation is that most other band users are working with a similar disadvantage.

Maritime mobile operation is probably the one exceptional case where a vertical does render very good service. A large expanse of salt-water 'earth' most certainly gives the vertical a 'shot

in-the-arm'. And as a vertical is nondirectional in the horizontal plane, any sudden change of course when backing-up into the wind, is less likely to cause communication problems.

From what I've said, I hope you will now be convinced that, for most purposes, we should not under-rate the classic half-wave dipole. All the same, it would be nice to have greater directivity, so as to reduce noise and QRM coming in from unwanted directions.

### Improved Directivity

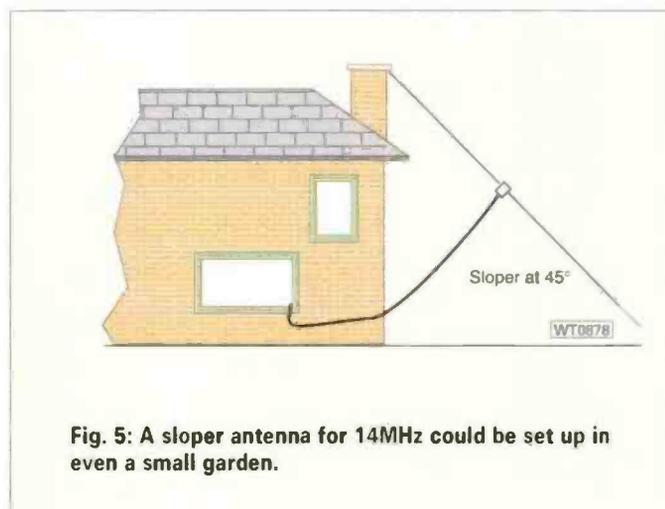
Sometimes we need either improved directivity, or gain, or both. And for this a two or three element Yagi on a 30 or 35m tower is not to be despised, (XYL, neighbours, planning officer and bank

balance permitting of course). But for the moment, I want to examine simple and less-expensive solutions. For a start, if you are prepared to concentrate your efforts on some particular area of choice, you can more or less forget the lattice towers and rotating mechanisms.

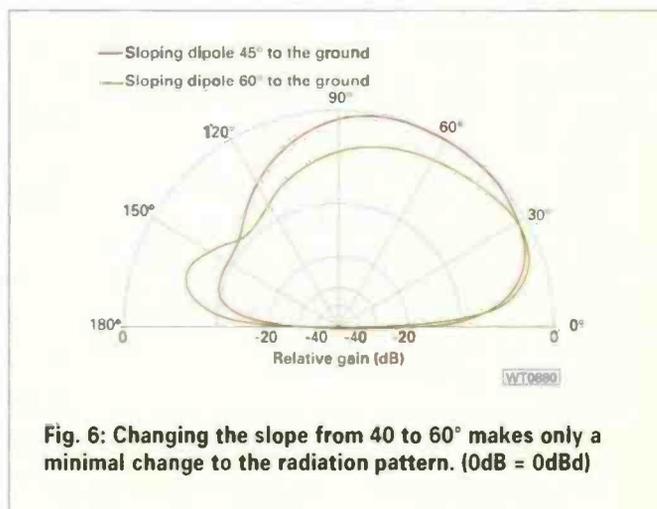
I make extensive use of fixed wire antennas for the 14MHz band, because of the low visual impact, and anyone with limited space (and finances) might possibly be interested in some of the things I have used with reasonable success. It may sound rather paradoxical, but the first design, a sloping antenna, I'm going to offer, combines the gain of a dipole in the favoured direction, with the ability 'to lose' signals from unwanted directions! The intention, in my particular case, was to reduce European QRM when contacting VK/ZL on the long-path, or keeping 'skeds' with friends just across the Atlantic Ocean.

In the simplest form of sloper antenna, you just attach one end of your 14MHz dipole to a convenient chimney, and slope it down towards the ground at an angle of between 45 and 60° (see Fig. 5). If you have no young children running around, the lower extremity can come down to within a metre or so of the ground, or be tied, with a nylon or similar cord to the garden fence.

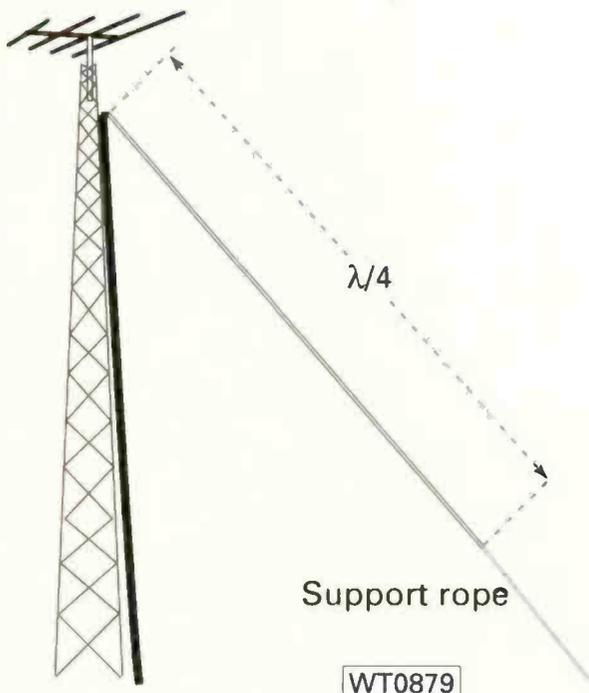
A sloper antenna system can be fitted into a back-yard which is less than six metres long, and when you get bored



**Fig. 5: A sloper antenna for 14MHz could be set up in even a small garden.**



**Fig. 6: Changing the slope from 40 to 60° makes only a minimal change to the radiation pattern. (0dB = 0dBd)**



WT0879

Fig. 7: A 'half sloper', as shown here, is very popular in America.

with one particular heading, you can relocate the lower end to favour some new direction. The directivity plots, Fig. 6, show the sort of gain and directivity which can be obtained with such a simple set-up, with the lower end only 300mm off the ground, and with full allowance for wire resistance and ground losses. It is interesting to compare these two plots with the earlier ones.

The gain of the sloper antenna is about half a dB down on a horizontal dipole suspended at much greater height, which is, for most purposes, immeasurable. The gain is still well up on any sort of vertical system, and you have quite good suppression of high angle QRM from the rear half of the system. Which just goes to show how small changes can have quite dramatic effects, if you know exactly where you are heading. The 'half-sloper' variation, as shown in Fig. 7, is quite popular in North

America (where real estate can be much larger). The normal practice is to run some 50Ω cable up a lattice tower and bind the outer screen to the tower

metalwork. Then extend the inner with a quarter-wave sloping wire which is pulled out at around 40° with the aid of a nylon cord.

The screening of the coaxial cable that is bonded to the top of the tower, provides a return path down to ground. It seems to me that this technique could possibly be adapted for use by Radio Amateurs who happen to live in a

multi-story tower block. There is almost certainly a old-water pipe in the bathroom and in most cases the bath-room is on an outer wall. A coaxial-fed quarter-wave could therefore be slung out of the window with the earth return being made to the old-water pipe. As there will be little opportunity for 'fine tuning' it would be best to make the wire just a little more than a

**"For mobile work on the h.f. bands a shortened vertical whip is just about the only practical solution."**

**"A sloper antenna system can be fitted into a back-yard which is less than six metres long."**

quarter-wave long and bring it to exact resonance by means of a series capacitor. Try to avoid letting the wire dangle in front of the window of a lower floor apartment. With a little ingenuity it could probably be pulled out at an angle with nylon fishing line to a convenient stack-pipe.

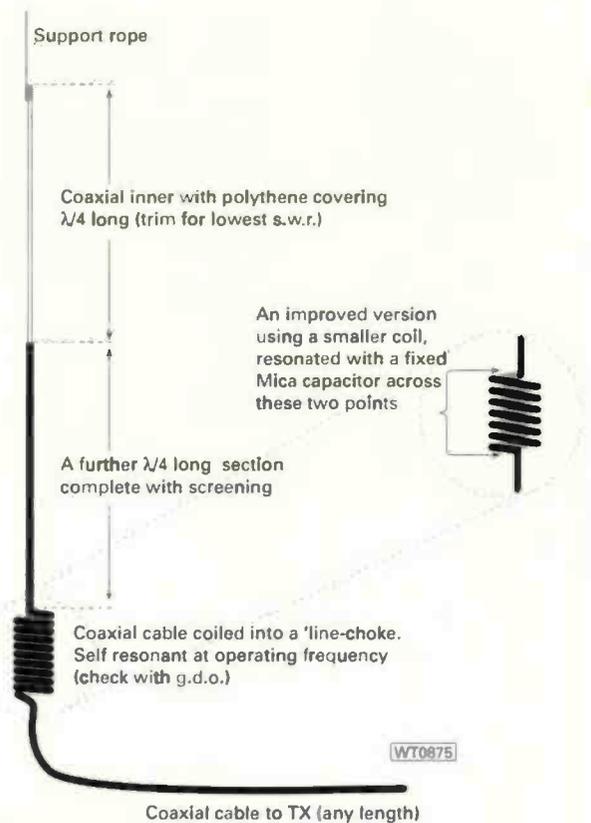
There are so many unknown factors that it is quite impossible to make a computer evaluation with pretty polar diagrams but the r.f. will obviously have to go somewhere and I see no reason why it shouldn't work. If you are in a really lofty tower-block the height above ground might work

wonders. Well worth a try

Space permitting, you could further improve upon this rather primitive example by installing a sloping wire reflector, pulled out to the rear. I hope I've given you hope for your station with a simple antenna system, and I hope to

publish full details of additions and other unusual solutions in another article.

73 Dick Bird.



WT0875

Fig. 8: An end-fed half-wave vertical may be made simply and easily as shown. You could even try 'sloping' this antenna as well.

win..win..

Win yourself a copy of the new *More Out Of Thin Air*. Get writing, the next one we give away may be yours - but without an idea - it can never be yours.

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Send your ideas and tips to: **Antennas in Action, PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.**



In Ray Fautley G3ASG's 'Antenna Workshop' in the March issue of *A-i-A*, there was a slight problem with the illustration of the calculator keys to press. On page 53 there were two references to a key symbol with 'Esc' on it. This should have been the  keystroke (X raised to the power of y). My apologies for letting it appear. *Tex*.

**MORE ON THE BOBTAIL AND THE T2FD ANTENNAS, AND AN OFFER FROM MICHAEL IN THE BOOKSTORE**

# tex topics

Back in the January 1998 issue of 'Tex Topics' (TT), Duncan Head G7PNE warned readers of a problem he had found with N-type plugs ('N-Type Warning' page 45 January 1998 PW). Since then I've made a few enquiries about finding a supplier of plugs that have a retaining ridge on the centre pin, and at the Picketts Lock show I found one.

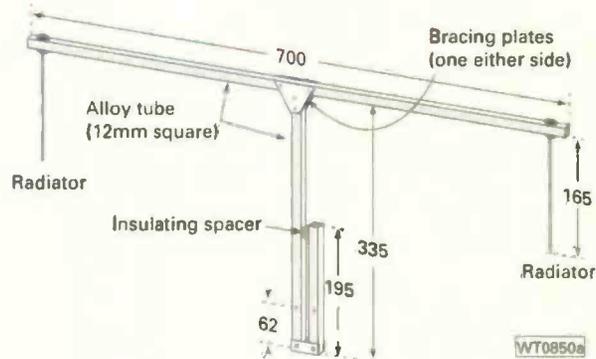
The supplier I found who can supply N-type plugs with retaining ridges on the centre pins is **Westlake Electronics**. I found the plugs amongst the many plugs, sockets and other items on offer at the show costing £3 each (inclusive of VAT). If you cannot find Westlake at a show post and packaging is another 75 pence. A small price to pay for peace of mind.

## A Better Bobtail

Back in the January 1998 issue of TT there was a design from **Brian Williams GWOGHF** for a Bobtail antenna suitable for the 144MHz band. From **Frank Cox G1OPW** comes the design for a Bobtail antenna suitable for the 430MHz band shown in Fig. 1. Frank wrote "many years ago I made a Bobtail antenna from the materials and to the dimensions suggested by the late Fred Judd G2BCX, published in *PW* dated March 1986". Frank went on to say that it proved to be a very good antenna, but due to its size he could only use it mobile.

The results of Frank's experiments resulted in the design of Fig. 1. The elements of the feed-point line and top line are made from 12mm square aluminium tubing. The two radiators were made from 4mm diameter studding with a length of 165mm from the bottom of the top element. These elements are mounted through holes drilled 15mm in from each end of the 700mm long top element and held in place with suitable nuts.

The spacing between the legs of the matching feedline should be kept 10mm apart with a suitable insulating spacer. The feed-point should be made with coaxial cable to two points some 62mm up from the 'closed' end of the matching line. The outer of the coaxial



**Fig. 1: A Bobtail antenna for the 430MHz band and ideal for Novice operators as it has some gain broadside to the antenna, improving the signals in those directions.**

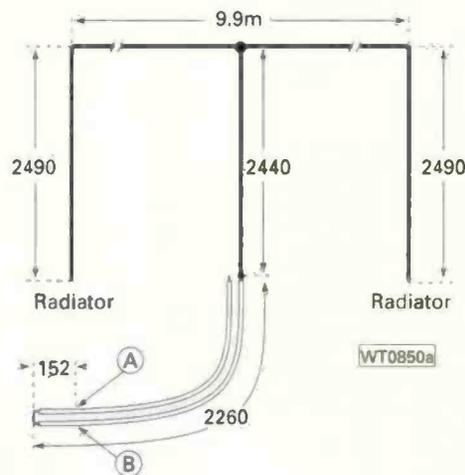
cable should be connected to the open leg. The area around the feed-point should be weatherproofed, and if possible should be within a weatherproof plastic box.

good quality N-type (or silver plated BNC) plug should be used, making handling easier.

## Ten Metre Bobtail

For fixed station use, the coaxial cable should be of best quality and as short as possible. For portable use a short (electrical  $\lambda/2$ ) length of cable with a

Brian Williams then sent in another design, his Ten Metre Bobtail, though this time for the 28MHz band, Fig. 2. Brian says this design is centred around 28.5MHz, but the s.w.r. should be



**Fig. 2: A Bobtail antenna for the 28MHz band - could be a useful antenna with the conditions improving over the next couple of years. (Note - not to scale).**

# antennas in action

acceptably low over the whole of the 28MHz band. For the 'purist' he suggests that to optimise it for the f.m. portion at 29MHz+ then the dimensions should be reduced by some 25mm overall.

Brian says the antenna should fit in all but the smallest back yard and should, ideally, be supported on a polypropylene catenary rope above 5m high, and mentions that the matching feeder could be made up from open wire feeder but he hasn't had time to do those experiments yet.

The design Brian sent in shows that the matching feedline is made up from 300Ω slotted twin and has an overall length of 2.26m. For a 50Ω feed-point impedance he suggests that the coaxial cable is connected at 152mm up from the closed end with the inner of the coaxial cable going to the side **not** connected to the centre vertical of the antenna. The diagram of Fig. 2, is not drawn to scale.

## T2FD Antenna

Another antenna that seemed to raise quite a bit of correspondence when it was mentioned in the column was the T2FD originally offered by Glenn Ross G3MWR in the March 1997 issue. The arguments as to how efficient the antenna was went back and forward for several issues. Now you have an opportunity to see if the T2FD antenna works for you!

At the Picketts Lock show John Badger of Badger Boards presented me with his new T2FD centre piece with load resistor fitted. The centre, made from a section of heavy duty g.r.p. tube, a little under one metre long, needs only 15.25m of copper wire each side to complete your own T2FD antenna. The Badger Boards T2FD centre should cost in the region of £8 + P&P from Badger Boards, Tel: 0121-681 4168 for more details.

## Good Library

I keep saying that I think a good library is an absolute necessity for anyone with a hobby. And Amateur Radio is no exception so, I asked Michael in our Book Store to come up an month's offer on some suitable books. Readers ordering any two of the following books

can save the post and packing charge of £2.

The partnership of William Orr W6SAI and Stuart Cowan W2LX, has produced many antenna books, and the one I think is an ideal reference for Yagi antenna design is the *Beam Antenna Handbook*. In this A5 sized book are packed 12 chapters dealing with all aspects of directional beam antennas. It's not just antennas though, as the first chapter deals with radiation and propagation and how this affects your signal.

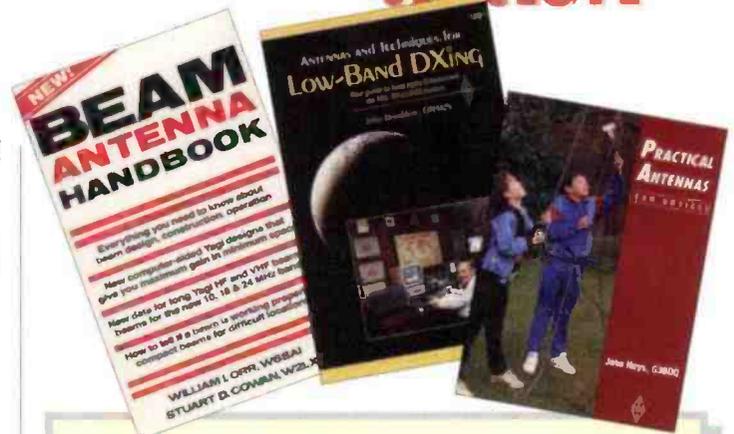
Next there follows four chapters on Yagi antennas from h.f. to v.h.f. These chapters deal with the effects of element diameter and taper effecting dimensions, before discussing several designs. There's a chapter discussing the problems associated with 'tri-band' Yagi arrays and methods of getting multi-band antennas to work properly.

The second half of the book deals with the principles of matching antennas to the feedline, how to build, install and evaluate antennas and, what test equipment makes installation and evaluation easier. The final chapter is a round-up of other directional antennas designs for a variety of bands. Well illustrated throughout, this is a good book to have in your library.

Written by John Devoldere ON4UN *Antennas and Techniques For Low-Band DXing* covers more than just basic antenna structures. This book is specifically aimed at those who like 'winkling out' the DX on the three lower h.f. bands of 1.8, 3.5 and 7MHz.

There are 14 chapters in this (almost) A4-sized book covering all aspects needed to chase the DX on these bands, propagation, techniques, equipment and the use of a computer to aid to improving your station. On the antenna side, dipoles, vertical, Yagi, and quad and large loop antennas along with arrays of all types are discussed, each with their own section within the book. This book is useful to more than people than the name alone would suggest - well worth the space on the shelf.

For those with less real estate or simpler antenna requirements, two books, from



## Books Mentioned this month

<i>Beam Antenna Handbook</i> .....	£8.95
<i>Antennas and Techniques For Low-Band DXing</i> .....	£15.50
<i>Practical Wire Antennas</i> .....	£8.95
<i>Practical Antennas For Novices</i> .....	£6.30

Choose any two or more, and get them **post free** within the UK. Please use the Bookstore form elsewhere in this magazine quoting the reference 'A-i-A05'.

the pen of PW columnist John Heys G3BDQ cover using 'simple' wire antennas with your station. The seven chapters in *Practical Wire Antennas* cover the many aspects of using 'long-wire' antennas high in the air to antennas strung underground.

If you thought that a wire antenna was just a wire antenna - then you have not had the opportunity to read John's book. The list includes: dipole, monopoles, Zepp, G5RV, W3EDP, Half-wave, Windom, Marconi, quad and Steeple antennas and so on. The steeple antenna was the subject of a search by Brian Lowe VE3TJE back in the November 1997 issue of A-i-A.

Holders of a Novice Amateur Radio licence have a restriction placed on the amount of r.f. power they may generate and use. This means that any antenna system in use must be efficient for an

effective station. *Practical Antennas For Novices* is the second book from John G3BDQ dealing with (mainly) wire antennas for the various bands that a Novice may use.

There are suggested antennas for the 1.9, 3.5, 10, 21, 28, 50 and 434MHz Novice allocations, but the designs will work for any radio amateur whatever licence is held. Although these books seem slim compared to the 'thumb-busters' we've become used to, they shouldn't be dismissed - they are good value as practical designs. Should be on everyone's shelf.

Sadly I've run out of space again for this month - so I'll see you again in the July issue for the next Antennas-in-Action. But don't forget my 'Electronics-in-Action' column in next month's magazine.

That's all I have time for this session. See you all in the next issue of A-i-A.

TEX





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 <b>IC-PCR 1000</b> <del>£349.00</del> <b>£349.00</b>	 <b>FT-VX 1R</b> <b>£228.00</b>	 <b>TH-G71E</b> <b>£249.95</b>	 <b>AR3000A</b> <b>£679.00</b>	 <b>DJ-G5EY</b> <del>£269.00</del> <b>£269.00</b>
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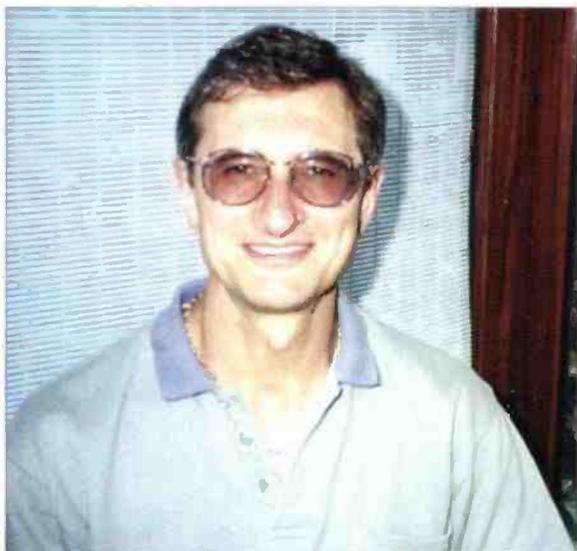
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# LY96BDX

## A Great Radio Holiday!

**John Podvoiskis GONPI/LY1GI is involved in the Baltic DX Group Meetings and during 1996 the group visited Lithuania. In his article John recalls the 'highs and lows' of a trip that turned out to be a 'great radio holiday'.**



John GONPI/LY1GI pictured at home before setting off for the Baltic States.

**T**he Baltic DX meeting (BDX) has become something of an annual tradition and the July 1996 one was the fourth in the series. Even though we did not spend every waking hour at a transmitter and made only 3208 QSOs, we did quite a lot in those 10 days. It was

definitely a 'great radio holiday'.

The main organisers of the BDX are **Willy Vaseikis LY2PX**, **Linus Balsys LY2BHP** and **Tadas Vysniauskas LY2BAW**. I help co-ordinate in the United Kingdom. The BDX theme has always been to 'Enjoy radio and to see Lithuania'.

The 1996 group comprised of **Boris**



A house full of radio! Just one of the many transmitter set-ups to be found at LY2ZZ (see text).

have also included Americans, Germans and Scots to name a few.

What the 1996 summer's group lost in size it certainly gained in mobility. This helped when crossing the country, working from two of the 'mountains'; enjoying QRO from the super LY2ZZ station, working from the centre of Europe and joining the LY Hamfest. We also found time for visits to the two main BBSs in Lithuania, to meet local amateurs in their QTHs and to sample the very good local beers!

Tadas LY2BAW provided the 4-by-4 vehicle and the very effective mobile and static station equipment while Linas helped with the extra car and second mobile 144MHz rig. We used the special call **LY96BDX**, when operating together, and, under the newly implemented CEPT regulations, LY/own call for local working.

**Rodin RW3AY** and his wife **Irena**, **Dave Reid PA/GOBZF**, myself **John Podvoiskis GONPI**, **Robin Hewes G3TDR** and **Steve Wilkins GONIF**. The attendees are not always the same although some people have returned more than once. Previous groups

**"The LY amateurs thought we were crazy for drooling over it!"**

You can find out more about BDX by contacting:

UK: John G0NPI, Tel: 0161-793 5922  
DL: Mike DF1ZE, Fax: 06028 996711  
LY: Willy LY2PX, Fax: +370 2 221255

The BDX Web site can be found at:  
<http://ourworld.compuserve.com/homepages/drcp/homepage.htm>

### Week's Highlight

The highlight of the week was definitely the all-night stand at LY2ZZ in Siauliai. This club

station has more awards than walls to hang them on! Each room in the detached house is packed with radio.

The 3.5 and 21MHz desks are in one room. The 1.8MHz desk is in the back room together with a small workshop. The 7MHz desk is on the landing and the 28MHz station is in the kitchen - but at the time of our visit was QRT.

Each operating position has its own linear and its own antenna. These are as follows: two 5-element Yagis for 21MHz, a 6-element Yagi for 14MHz, a 3-element Yagi for 7MHz and a vertical delta loop for 1.8MHz. They are held up by a tower farm, almost 50m high. This is some shack by any measure!

Robin observed the closed band situation as he took on 21MHz. But it wasn't quiet for long, day or night. Steve had never worked a 'pile-up' before but after 13 hours on 7MHz had to be peeled from the rig! "I feel really - what's the name" (he said) he was elated.

John battled on 1.8MHz against heavy QRN in west Europe and finished up in Canada by dawn. We left the 'super' pile-up on 14MHz to Dave for which he was richly thanked on air.

If you've never done this kind of operating before, I suggest you should try it at least once in your life. The LY2ZZ station offers good training for beginners and good practice for experienced operators too.

The station is looked after by **Jonas Paskauskas LY2PAJ**. Most of the equipment is (was) soviet military. Although it's not pretty, its performance leaves many 'oriental' rigs standing. What a delight to try something like this. The LY amateurs thought we were crazy for drooling over it!

### Mobile From Mountains

During our stay in Lithuania we operated from two 'mountains', Medvegalis and Satrijos. Operation was on the 144 and 430MHz bands but with no tropo, results were poor. On 430MHz we only made one f.m. contact because the band is still 'empty' in Lithuania.

These rounded hills are all less than 300m a.s.l. and smaller than the Vilnius TV tower. The country is not as flat as Holland but once you get above the trees, the signal should go for miles.

Operation was from the 'centre of continental Europe' was good fun. The actual spot where we operated from is on a hill, off the main road. The inscription stone has been stolen but the signposts are still there.

We worked on the h.f. bands up to 28MHz using the call LY96BDX/E and, in the short time we stayed there, made over 40 contacts. Not bad with 100W into a 2.5m vertical on the roof!

Incidentally, the 'centre' is one of a Practical Wireless, May 1998

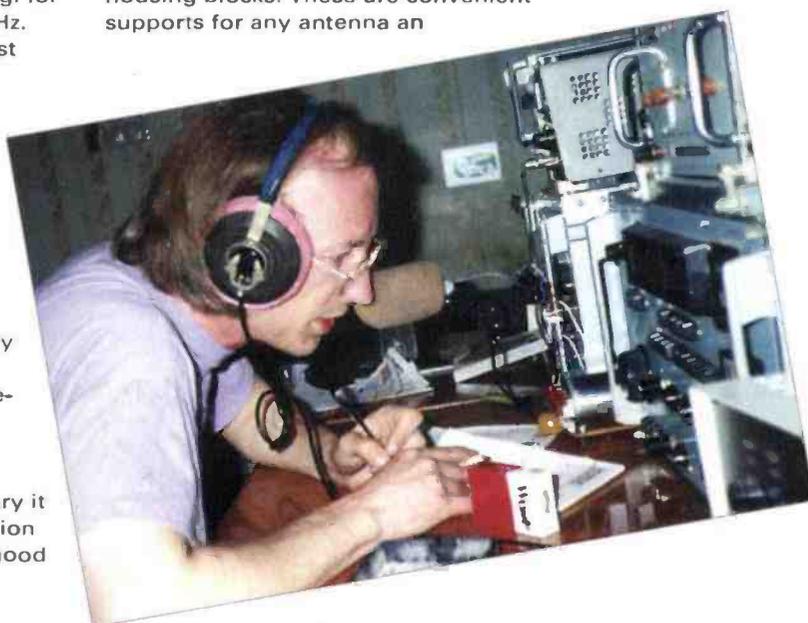
number of centres of Europe, apparently, and was determined by the French Academy of Science. We learnt about some of the others from contacts.

### City Tours

Because our base was outside Vilnius, at the Villon Hotel, we booked a guided walk-about tour around Old Town. Some of the excavations behind the cathedral have surprised even the local historians.

The city has a mixture of styles and looks, well, European. As you move away from the centre you see groups of concrete high-rise housing blocks. These are convenient supports for any antenna an

Dave G0BZF working the 14MHz band during the 'super pile-up'.



amateur needs.

The Technical School station in Vilnius is **LY1BZB**. Their antenna is a self-built cubical quad rotated by a re-cycled grinding wheel motor. The view from the roof of the 9th floor is completely unobstructed.

The LY1BZB BBS is the only packet link between LY and the world. Its port is on 14MHz.

The current sysop at the time was **Romans Rancys LY2BKF** and he switched it off for a while so we could work on single-sideband. We managed the Falkland Isles and Alaska amongst many South Americans. One operator from Argentina said 'good luck in the

" ... meet local amateurs in their QTHs and to sample the very good local beers!"

basketball' as Lithuania were playing them in the Olympics that night!

You can't visit Vilnius and not go up the TV tower, it's the 4th highest in the world. The tower houses an exhibit downstairs in memory of those who died during the coup in 1991.

The 'upstairs' is a revolving restaurant offering panoramic views. And most importantly, the 144MHz repeater **LY2WR** is there, together with the Packet node **VILN**.

### Another Visit

Another city we visited was Kaunas. **Leonas Klimukas LY2AE** led us along *Laisves Aleja*, the pedestrian walkway through to Old Town. **Dalija**, our tour guide, explained about Kaunas's medieval importance as a market town on the confluence of two rivers.

Later we met some of the local amateurs including **Vytas**

Lithuania is located around KO15 square and is one of the Baltic States. It has about 1400 radio amateurs in a population of some 3.8 million.

Most of the amateur activity is on h.f. with c.w. being the most popular mode. However, 144MHz f.m. operation is spreading quickly with a number of repeaters. Packet radio has limited coverage and the v.h.f. and u.h.f. bands have their dedicated enthusiasts.

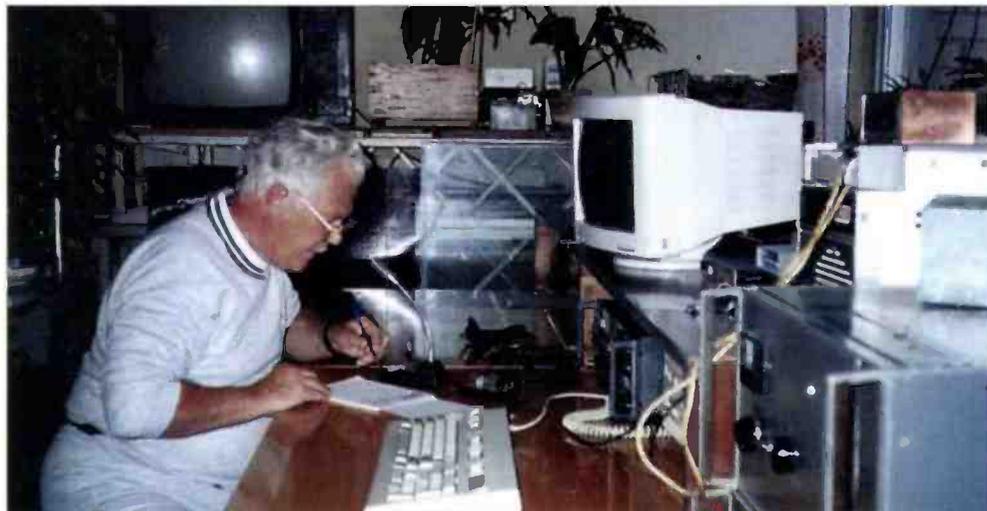
Internet is now being used by some as a way out.

### Annual Hamfest

The culmination of **BDX96** was near **Moletai**, in the east of the country (**KO26**), where most of Lithuania's radio amateurs were attending their radio society's annual Hamfest. We set-up station in a detached house on the site, which is in a clearing in the forest near a lake. This is actually a holiday camp belonging to the national fertiliser company **Azotas**.

Antennas and supports were everywhere, some for the 144MHz contest, some for meteor scatter and some for listening. The blast from the 1kW camp station on 14MHz, **LY96RMD**, forced us work the other h.f. bands

Robin G3TDR on the 'centre of Europe' (see text).



**Mickevicius LY2PU** who was sysop of the next biggest BBS in LY. Its only port is on 144MHz.

**Vytas** told us the Packeteers in the south of Lithuania were attempting to get a 430MHz link to the Polish BBS **SP4KTO** in Suwalki. The Packet network in LY is growing slowly and is still inadequate for many of the smaller centres of population. In fact,

The Technical School station, **LY1BZB**, is situated in Vilnius. Robin G3TDR is pictured here busily making contacts.

No visit to Vilnius is complete without a trip up the TV tower.



instead. However, the chat, the beer and the barbecue reduced our operation even more.

Anyway, we did rather nicely on 50MHz, working around Europe and quite a few G's too. We were joined here by **Mike Staff DF1ZE** and **Hei-Jo DJ1OJ** with their mobile 'shack'. They were just beginning their tour of the Baltic States (LY YL ES) opening QRA squares.

Apart from radio and the city tours, we visited the seaside at **Palanga**, a flying club near **Prienai** and the wireless Museum in **Siauliai**. We did so much during our 1996 visit and had such a good time we arrived home tired, but very satisfied.

### Many Thanks

The **BDX96** group thank the organisers for their energy, those who looked after us for their patience and the people we met at different stages in our tour of Lithuania for their friendliness. Thanks also to all the local amateurs with our apologies for any QRL and QRM from us on the 144MHz calling channel and the repeaters.

Thank you for such a good time. Best 73 to you all.

PW

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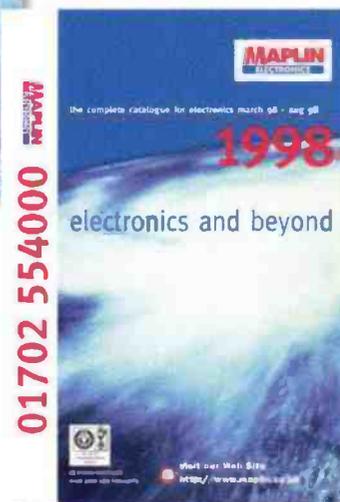
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# The GDP-430 Hand-Held UHF Transceiver

**This month Geoff Pike G10GDP describes the first constructional stages on the prototype of his low power hand-held u.h.f. transceiver project.**

**T**his time I'm describing the first part of the construction stages of the u.h.f. project, right up to receiver alignment. Part 3 will deal with the final construction and transmitter alignment.

From the photographs you'll realise that for my prototype all the circuit boards were housed in a hand-held case. The case for a hand-held will need to be made-up and will probably involve quite a bit of work....if it's the first time that you have made a case for yourself.

However, it may well suit the individual constructor to build the project into a larger 'desktop' type of case. These are often available from components catalogues. Or you can make one for yourself!

All the p.c.b.s I used in the prototype are made from glass fibre backed material. The transmitter and receiver are both made from double-sided p.c.b. material as a ground plane is mandatory for reliable and repeatable u.h.f. operation.

Home construction of the p.c.b.s is possible and quite straightforward using only a 'Dalo' etch-resist pen and some i.c. pad transfers. Holes can be either 0.8mm or 1mm and the isolated areas on the ground planes can be made with a 3mm drill.

The p.c.b.s for this project **will not be available from the PW PCB Service.** However, further information on the p.c.b.s and the project will be available from me at the address shown at the end of the article.

To help you build your version of the transceiver, all the sub-units and assemblies have been photographed. This approach provides enough information to

be used in conjunction with the circuit diagrams already published (**\*see note below**) to build your transceiver.

The photograph, **Fig. 1**, shows the prototype transceiver out of its casing and partially dismantled to show the sub-units.

**\*Note:** An 'errors & up-dates' on the transceiver circuitry will be published with the final part of this project. **Editor.**

## Case Details

The actual casing you decide on is your choice of course, but I'll describe my own version to provide some guidance so you can make your own. In practice mine was made up from a single piece of 22g aluminium sheet measuring 300 x 200mm.

The sheet was then cut into two pieces and then folded between two wooden blocks. I then made the tops and bottoms from 18g aluminium sheet and some lengths of 6 x 6mm aluminium angle.

## Receiver & Decoder Boards

In the prototype, both the receiver and n.b.f.m. decoder boards bolt through onto the back case using counter-sunk screws. It should be possible to achieve a flush back when finished.

In my version the tone burst/audio amplifier board, **Fig. 2** (above board), **Fig. 3** (track side) needed a brass strip soldered to the LM380 end to act as both a heatsink and a mounting point (this is not shown in the photograph but the point where it is soldered to, is indicated). This also doubles as the top of the battery compartment. (The track side was suitably insulated from the batteries with a strip of p.t.f.e. or polythene).

The remaining boards are fitted on the case sides. This does however, cause a few problems in mounting them, but I'll describe how to overcome the difficulties in Part 3.

## Board Interconnections

Now let's look at the required board interconnections to help you decide on your own transceiver. And before you start I suggest you look at the relevant diagrams and photographs and decide the positions

Practical Wireless, May 1998



# ver part 2

and runs of coaxial cable, which will of course depend on your choice of case and lay-out.

For the a.f. connections I recommend you use audio coaxial cable with on-board connections. This is to avoid earth loop problems

The power supply connections focus on the change-over relay with the 'common' being fed with battery and +ve from the **On/Off** switch. The **Normally Closed** (NC) connection feeds the receiver side and the **Normally Open** (NO) side feeds the transmitter. (This may be a convenient point to mount the supply line decoupler between battery +ve and ground (1000µF @ 16V).

## The Alignment

Time to look at the alignment now, and I think it's probably best to do the receiver first. I'm sure this will be the first part you tackle and I recommend this approach because at the end of the process you should be able to hear something!

Initially, you should check for a 12V supply and a regulated 8V to the oscillator. Initial current consumption will be in the order of 20mA, rising to about 45mA when a suitable crystal is fitted into the socket.

Preset inductor L104 so that the slug is about 3mm into the former. The oscillator should start. However, if it doesn't start you should then add about 2.7pF across C140 until reliable starting is achieved. (The upper limit to this slugging capacitor is about 4.7pF, any bigger and the amount of feedback will become excessive and the crystal stability will be compromised).

Next, you should adjust L104 for the appropriate frequency and if possible measure the output at the end of the 3dB pad. It should be in excess of 10dBm (but **do not peak L104** to achieve this level).

You should now optimise L104 for **frequency and not drive level**. This is because there is plenty of drive to excite Tr105.

Now set L105's core flush with former and C148 almost fully unmeshed. With a good frequency meter you can read the final frequency. However, don't be surprised if only a 'times four' crystal

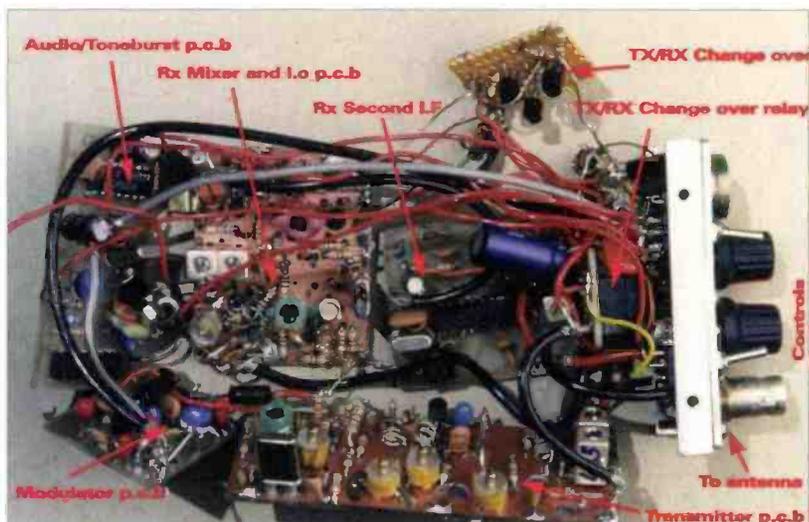


Fig. 1: The prototype GDP-430 u.h.f. transceiver partially dismantled to illustrate the multi-board approach adopted by the author (see text).



Fig. 2: The audio output and tone burst board from component side.



Fig. 3: Audio output and tone burst board viewed from the prototype track side. The combined fixing tag and heatsink is normally attached, but is removed for photographic purposes (see text).

frequency is read instead of a 'times six'.

Final adjustment can be done when receiving a signal. At this stage the receiver board will draw about 45-60mA from a 12V NiCad supply.

With the local oscillator working satisfactorily, you should then preset C101 to about 35% meshed and both the helical and i.f. 'cans' may left as they are. With a voltmeter, check for a 5V drop across R102, 105 (i.e. about 5mA collector current). Incidentally: the quadrature coil (T101) will probably be close to the desired setting.

Next, using an analogue voltmeter on pin 10 of IC101 you should check for about 3.5 to 4V. Adjust T101 as necessary.

Final adjustment for best sound quality can be done when you're receiving a signal. Then you should verify the frequency using a digital frequency meter that XL10 is 10.245 or 11.155MHz as required.

Finally, set the squelch control so that it is close to opening

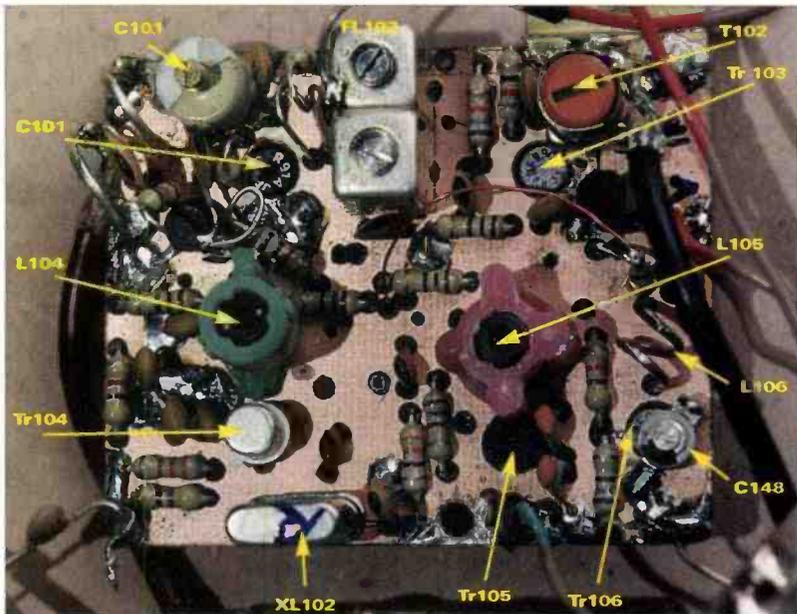


Fig. 4: Receiver local oscillator and first mixer board.

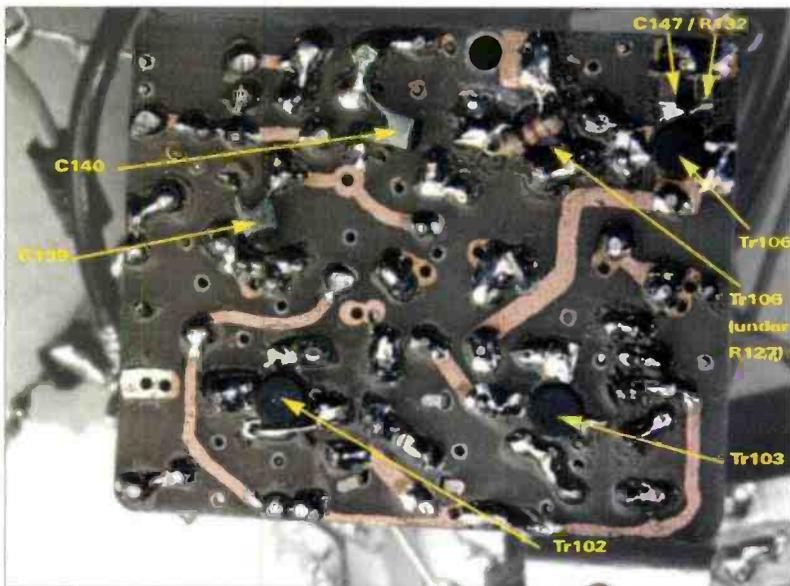


Fig. 5: The copper track side of receiver local oscillator and first mixer board.

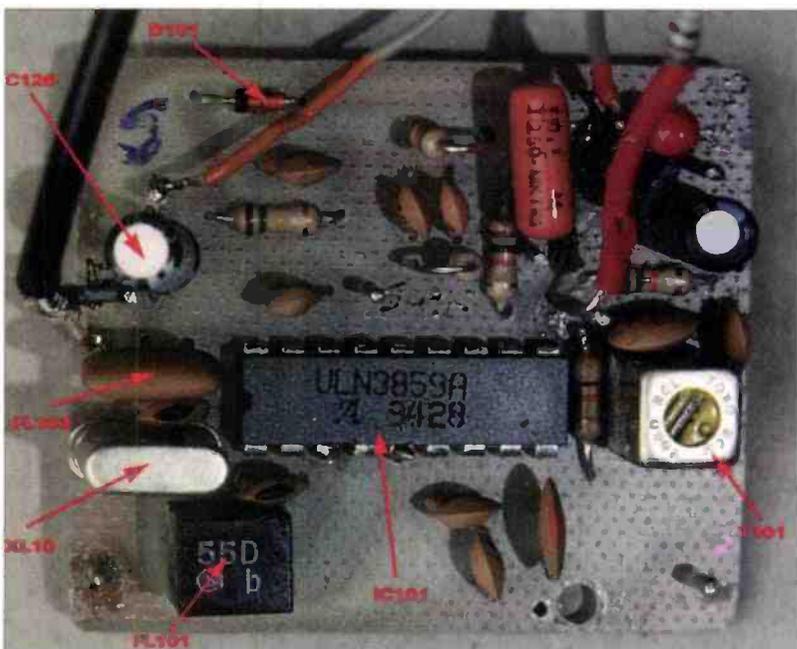


Fig. 6: Receiver second i.f. board from component side.

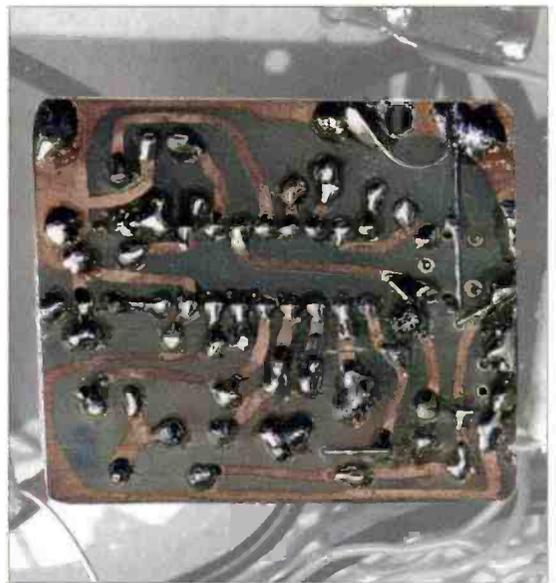


Fig. 7: The underside (copper track) of the receiver second i.f. board shown.

(about 0.66V on the wiper of R115). If another transmitter is available, then set it to the appropriate frequency and connect a scope to pin 18 of IC101 and peak C101, helical, and T102 for maximum signal. Arrange to keep the signal at this point below about 50mV to avoid overloading and to make it easier to see a peak. This completes the alignment and it should now be producing a good signal.

**Next Time**

Next time, in Part 3 I'll be describing the final construction stages and transmitter alignment. But in the meantime if you need advice and further information on the project - you're welcome to contact me.

The GDP-430 is a versatile little project and I have no doubt that other versions produced will take into account what you need out of the rig. So, it will be interesting indeed to see what 'variations on a theme' occur!

You can write to me at the address shown here, and I'll be delighted to help you.

**However, I'm not available on the telephone** and would appreciate if you could supply a large s.a.e. (with 50p stamp) so I can enclose extra information and updates on the project.

Write to: **Geoff Pike G10GDP, 2 Windslow Drive, Carrickfergus, County Antrim, Northern Ireland BT38 9BB.**

I look forward to helping you on the air with your very own GDP-430 transceiver!

PW

Please accept my apologies for the delay in presenting the final parts of this project. The delays have been unavoidable but with the assistance of the author we're now able to publish the final instalments of the project. My thanks go Geoff Pike G10GDP for his help and his kind offer to assist readers wishing to build this interesting transceiver. **Rob Mannion G3XFD, Editor.**

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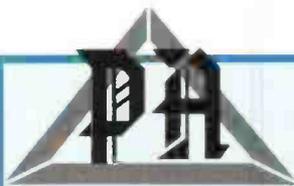


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This month the Rev. George Dobbs G3RJV takes a look at one of his 'pet' subjects - matching transmitter outputs into the antenna, building a Z match, 'flying the flag' for open wire feeder and of course launches off with his usual appropriate quote!

# Carrying on the Practical Way

**M**any years ago when I first attempted to release an Amateur Radio signal on the unsuspecting world, my transmitter used valves. (How things have changed!).

"... nor seeks nor finds he mortal blisses,  
but feeds on the antenna kisses"

Shelley: Prometheus Unbound

My valved power amplifier (p.a.) was connected to the outside world from a link on the anode-loading coil. The end-fed antenna was moved up and down this variable tapping to light a small bulb in series with the wire. It seemed to work and I had many happy contacts on the lower short-wave bands.

As time moved on I was introduced to transistor p.a. stages with their low impedance output and to the use of 50Ω coaxial feeder. But by the time I was actively building QRP transmitters 'the tail was wagging the dog' and 50Ω was king!

The power amplifier outputs were not at 50Ω and most antennas did not have a 50Ω impedance. **But 50Ω was the approved impedance for the transfer of radio frequency (r.f.) power.**

If it wouldn't go through a length of coaxial cable, an r.f. signal was of no use to the average radio amateur.

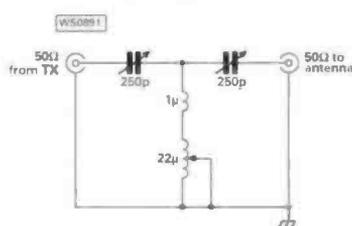


Fig. 1: The 'T' match (see text).

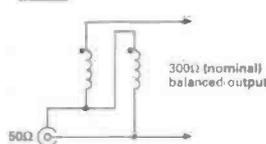


Fig. 2: Circuit for the four-to-one (4:1) balun (see text).

The usual approach was to adjust the output of the power amplifier to represent 50Ω impedance, then to configure the antenna to accept a feeder impedance of 50Ω. This is fine in the case of a half-wave dipole for a specific frequency but most other antennas require a matching network.

The diagram Fig. 1 shows the 'T' Match Antenna Tuning Unit commonly used for matching a transmitter to an antenna. The values shown here will work for any amateur bands in the range 1.8 to 30MHz feeding into a whole variety of antennas. The 22μH inductor can be a variable coil of the 'roller coaster' type or a coil with taps along its length to select sections of the winding.

## Balanced Feeders

Balanced feeder line is two parallel wires spaced somewhere between 25 and 50mm apart. (It can be bought but it is more commonly home-made).

I normally use pvc covered multistrand wire: two lengths held apart by insulated spacers. My spacers have been all kinds of things and plastic plant labels work very well! And for the last 20 years the only consistent antenna at G3RJV has been a doublet made from two 20m lengths of wire fed with a parallel feeder lines.

So, what about those transmitters which have been adjusted to supply 50Ω coaxial cable? To find out the answer....read on!

The T Match Tuner, in Fig. 1, is still usable but it requires a balanced output. This may be achieved by adding a balun transformer. An interesting little word, it means **BALANCED** to **UN**balanced transformer. For this application a 4:1 ratio balun is required. This is shown in Fig. 2.

The transformer is bi-filar wound. Bi-filar winding is simple; it just means two windings side-by-side on one core (a ferrite rod). The technique is to lightly twist two wires together (about eight twists per 25mm) and wind them on the core as one winding.

To make the balun take some pvc covered 'bell wire' and twist two lengths together until they form a 'single' wire. Then wind eight turns on the ferrite rod. Bind the wires to the rod with pvc or amalgamating tape. (The rod can be reduced in size to fit the winding - a saw cut, followed by a sharp tap will break the rod).

The windings must be connected as shown. The dot on the drawing represents the beginning of each winding. It's easy to use an ohmmeter to check the beginning and end of each wire or you may like different coloured wires.

In effect the balanced feeder is connected between the beginning of one winding and the ending of the other. The windings are in series and the 50Ω input is connected to the junction of the two windings. Just connect the 50Ω end of the balun to the antenna output of the tuner and the 'balanced 3 end' to the balanced feeder line.

## Balanced Tuner

The diagram in Fig. 3, shows an Antenna Tuner designed for balanced feeder lines. The transmitter is link coupled into the centre of a coil, which is tuned against ground. The feeder lines are tapped along the coil until a good match is obtained.

In practice L1, L2 and L3 is really one coil with a centre portion used for the coupling with a link over this section to join L1 and L3. **But be**

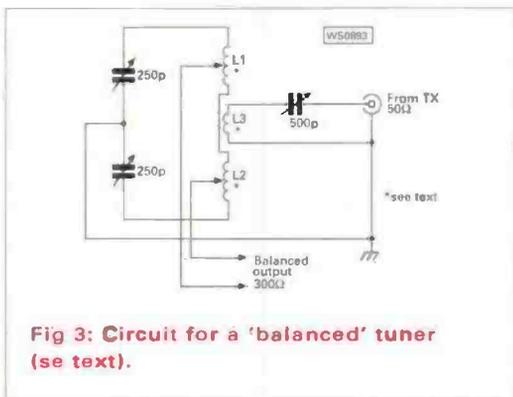


Fig 3: Circuit for a 'balanced' tuner (see text).

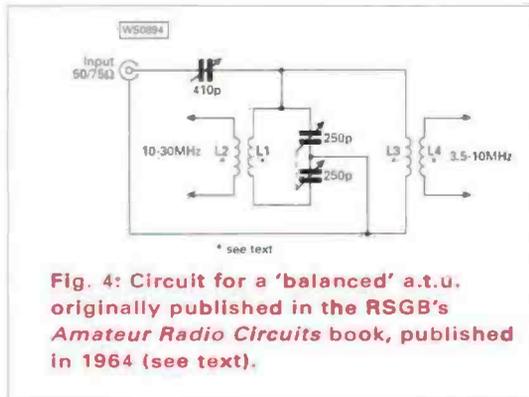


Fig. 4: Circuit for a 'balanced' a.t.u. originally published in the RSGB's *Amateur Radio Circuits* book, published in 1964 (see text).

warned - it is not an easy project to build.

I have tried several using the Barker & Williamson (B&W) airwound coil stock sold in the USA. They all worked well but were a nightmare to tune for the first time.

Once the matches have been achieved for each band they can be marked on the coil and the tuning knobs. These tuners certainly 'suck' r.f. power out of transmitters but they are not for the faint hearted!

### The Z Match

The 'Z' Match is the commonest form of balanced antenna tuner. It's a classic of amateur radio literature and it works very well indeed.

Circuitry of the Z Match is shown in Fig. 4, and in effect it's a tuned balun. Two similar windings are coupled on a common former.

One of the similar windings is connected to the open wire feeders. The other winding is balance tuned against ground. The transmitter is capacitively coupled to the tuned end of the balun.

Because most amateurs will want to use the same antenna across the entire Amateur Radio h.f. spectrum, one set of inductors will not be sufficient to do the whole job.

Some of my Z Match tuners have used three or four sets of coils to cover the whole spectrum. But it is possible with two sets of coils as shown in Fig. 4, by adding a parallel winding - L3 in this case.

The version showed in Fig. 4.

comes from an 'unknown' radio classic, *Amateur Radio Circuits* published by the RSGB in 1964. Even the RSGB deny having produced this book! It is full of useful idea.

The real problem with the Z Match as described is getting the sets of coils right. Ideally they should be open wound and air spaced.

Some time ago I discovered a company in Norfolk called Isoplethics who are producing a very interesting range of radio products. Many being designed for the vintage radio market. When I discovered that they were making some airspaced coils, I enquired if they might produce coils suitable for a Z Match Tuner.

Within a couple of weeks Isoplethics sent me a prototype set of coils which I 'lashed up' on the bench with suitable capacitors to produce a Z Match. It worked well and the company improved the design and the second sets of coils were built into the successful tuner shown in the photograph, Fig. 5.

The tuner is easy to build. Two variable capacitors are required of the sort that was once common in valve broadcast radios. Fortunately Isoplethics can supply such capacitors if you do not have an ageing junk box.

However, please remember that **BOTH OF THE CAPACITORS ARE LIVE WITH RF VOLTAGES** and must not be connected to ground. I used an insulated base and front panel for my prototype. The twin gang capacitor must have its 'frame' ('Chassis') connected to ground and the insulated connections joined to the ends of L1. (My Z Match is suitable for r.f. powers of up to 10W).

### Words Of Explanation

If you have never used a Z Match Tuner before, it does require a few words of explanation. The simplest way is to tune up the antenna with a standing wave ratio (s.w.r.) meter for the minimum return loss.

My method is to roughly tune by using the receiver on a weak signal and adjusting the tune and load controls for maximum signal strength. I then use a low level of signal from the transmitter

in conjunction with the s.w.r. meter to obtain the best match.

In simple terms what I do is: Set the s.w.r. meter in 'Reflected' (Reverse) and 'walk the meter reading down'. This is done by slowly adjusting the two tuning knobs in conjunction with each other - small adjustment of one, then small adjustment of the other.

It should be possible to get a low reading on each band with the appropriate coils. Don't forget to mark the settings for future use!

Try open feeder - it is an easy way to run several bands from one antenna. And please do try a Z Match, they really do work well.

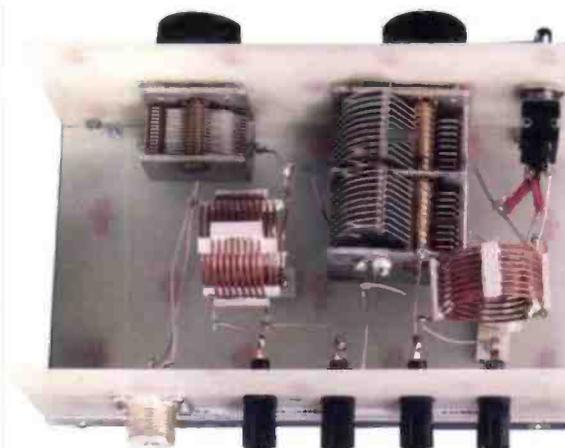


Fig. 5: The G3RJV prototype as built, using variable capacitor and coils supplied by Isoplethics (see text and information panel).

### Constructional Notes

The two gang variable capacitor I used for the Z Match was 180pF plus 180pF and I found I could not quite tune 3.5MHz with L3/4 and 10MHz with L1/2 so I added some extra capacitance. Two 110pF silvered mica capacitors are connected to the outer ends of the two-gang capacitor via a double-pole switch.

Suppliers: **Isoplethics**, at 13 Greenway Close, North Walsham, Norfolk, NR28 0DE. Tel: (01692) 403230 can supply the following:

- Complete Set of Z Match Coils @ £9.90, two gang 180+180pF variable capacitor (1kV spacing) @ £11, and a one gang 410pF variable Capacitor (750V spacing) @£8.
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This month's choice of books from the PW Editorial team start with a selection of Rob Mannion G3XFD's 'personal favourites'. Rob's favourites are in regular use in his own reference library and all those chosen for this month's 'Profiles' come with his personal recommendation.

# BOOK PROFILES

## 'Personal Favourites'

### Introducing QRP Dick Pascoe G0BPS

If you're not 'into QRP' or home-brewing (the two actually go very well together!) Dick Pascoe's delightful little booklet will prove both interesting, informative and entertaining. Dick (rightly) says that "Remember - power is no substitute for skill"! and this comment is carried on the title page of the book, which provides an introduction to the history and skills of low power operating in the United Kingdom.

Dick looks at techniques, circuits, operating practices, getting going with QRP and lists personalities, clubs and useful addresses. If your Amateur Radio interest is flagging - why not give yourself a 'boost' (by reducing power!) and rediscover 'real radio'.

Dick's book and QRP are both a revelation, very enjoyable and highly recommended. If you enjoy a challenge and would like to say "I did it - using a tiny transmitter-receiver I built myself - this book

is for you! Personally recommended by Rob Mannion G3XFD.

### G-QRP Club Circuit Handbook Compiled By Rev. George Dobbs G3RJV

No higher recommendation can come for this book than the fact that it's compiled from the G-QRP Club's 'archives' by G3RJV himself. Packed throughout with tips, hints, full scale projects for transmitters, receivers, transceivers, station accessories and antennas - it's just like having a book full of G3RJV's 'Carrying On The Practical Way' articles.

Printed in a variety of artwork and typographical styles which reflect the different authors and origins, this book concentrates on

circuits and notes (rather than fully detailed PW style constructional articles). Full of 'weekend' projects - it's a classic and very readable - containing enough ideas (including some valved circuits) to keep you going for years! **Highly recommended by Rob Mannion G3XFD.**

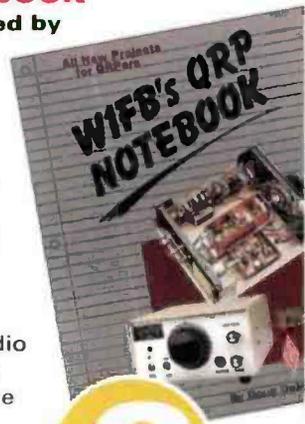
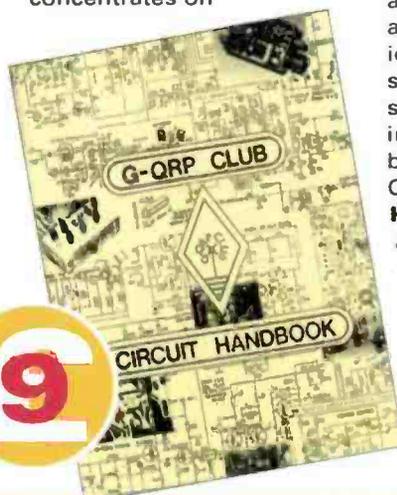
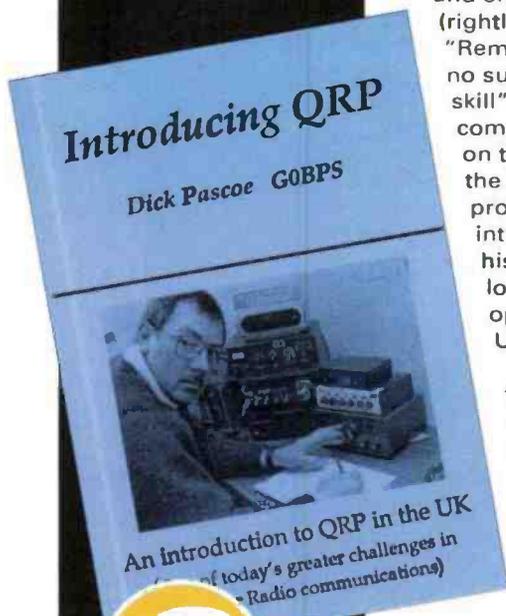
### W1FB's QRP Notebook

Published by The ARRL

The late Doug DeMaw W1FB's work did much to keep 'home-brew' radio alive and well in the USA, Europe and throughout the world. His approach - simple and very straightforward - encourages the reader 'to have a go' themselves. In fact, one of my favourite simple receivers (a little f.e.t. regenerative detector job using a single MPF102 and single i.c. audio amplifier) is featured in this book.

Packed with circuits (receivers, transmitters, antennas, accessories and a host of design tips and ideas) this 'notebook' style book provides superb reading, an introduction to 'home-brewing' and operating QRP equipment.

**Highly recommended, and I wouldn't be without my copy! Rob Mannion G3XFD.**



er form in this issue or telephone Michael or Shelagh on (01202) 659930.

# Listening Guides

**Listening is very much a part of our hobby, so to offer you some guidance on what you can find on the broadcast bands here are three titles you might like to consider for your bookshelf.**

**Radio Listener's Guide 1998 Edition**  
Edited By Clive Woodyear

This substantial booklet provides quite a surprise for the first time reader - because until they see them listed few will have realised there are so many radio broadcasting stations in the United Kingdom. Filled with station details, location, powers and with detailed maps and references - it's an ideal companion for the radio listener and is also a very convenient size.

Information provided also includes programming details (for example - that Asian or Chinese language station you've heard may not be abroad - but could be

here in Britain, aimed at serving 'ethnic minority' communities living here) for all the stations listed. A really important aspect of the book is the comprehensive 'Buyer's Guide' to help you select the right broadcast radio for your purposes. **Highly recommended - a really useful little booklet.**

**Passport To World Band Radio 1998**  
Editor In Chief Lawrence Magne

This heavy-weight soft-backed book provides an annual guide to short wave broadcasts, and broadcasters throughout the world. It's useful 'hour-by-hour' guide is particularly helpful as it assists the listener on where to find stations from particular countries at certain times.

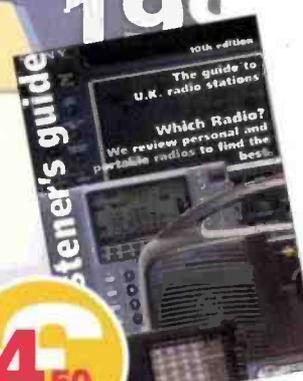
Backed up by comprehensive technical guides, 'best buys' in receivers and complete with background technical information (how to choose your receiver, etc.), this book is for the beginner and

experienced alike. The more experience you gain - the more you get from the book. **An excellent choice for the bookshelf next to your radio.**

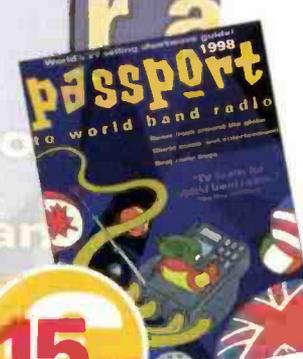
**World Radio TV Handbook**  
Editor In Chief Andrew Sennit

The *WRTH* has rightly become a 'classic' in radio listening guides. Within its 600 plus pages this conveniently-sized soft-backed book contain 300 pages of 'domestic' radio listings, 50 pages of international listing, web sites and addresses of broadcasters and 100 plus pages of listings by frequency.

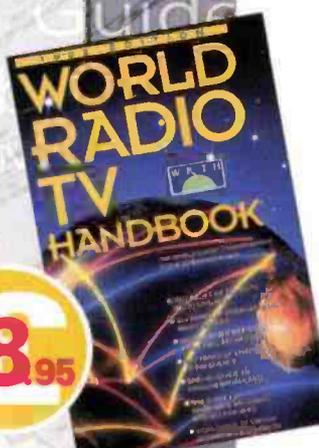
Of particular interest to the English speaker is the special guide to broadcasts in English. Also included is the well-known *WRTH* 1998 survey of short wave receivers and accessories and world-wide TV station addresses and contacts. **Highly recommended for your bookshelf.**



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**April 18:** The SAMS'98 Computer & Electronics Show is to be held in the Bingley Hall, Staffordshire Showground, Weston Road, Stafford (A518 Stafford-Uttoxeter Road), signposted from junction 14 on M6, (bus shuttle from Stafford Railway Station). Doors open 1000 to 1600. Admission for adults is £3, children under 14, 50p, Concessions, OAPs, RSGB Members, Student Card, UB40, £2, (Advance Tickets £2 plus s.a.e.). This is the 10th consecutive year and the 13th AMS (All Micro Show) at Bingley Hall. Last year an attendance of approx 3000 and around 100 trade stands covering the computing spectrum, along with accessories, software, books, components, radio, satellite and much more. There will be masses of free parking a licensed bar from 11am and refreshments, meals and a cafeteria. A great day out! **Sharon Alward, Sharward Promotions, Knightsdale Business Centre, 30 Knightsdale Road, Ipswich, Suffolk IP1 4JJ, Tel: (01473) 741533, FAX: (01473) 741361 or E-mail: services@sharward.co.uk**

**April 19:** The Yeovil ARC 14th QRP Convention is to be held at Digby Hall, Mound Street, Sherborne, Dorset. Doors open 0900-1700. There will be high quality lectures with the Reverend George Dobbs G3RJV as 'VIP', plus trade stands. Bring & Buy and refreshments, etc. Talk-in on S22. Entry is £2, which includes prize draw ticket. **Peter G3COR, QTHR, or telephone on (01935) 813054.**

**April 19:** The 17th Mobile Rally of the Lough Erne Amateur Radio Club will be held at the Killyhevin Hotel, Enniskillen, Northern Ireland. Doors open at 12 noon. Tyrone Amateur Electronics will be there with it is hoped Icom, Yaesu, Waters & Stanton as well as the usual interesting variety of other traders and the Bring & Buy. **Keiran G17NET on (01365) 348063 (daytime) and (01365) 327133 (evenings).**

**April 19:** The Swansea ARS Amateur Radio & Computer Show will be held in the Swansea Leisure Centre on the A4067 Swansea-Mumbles coast road. Doors open 10.30am to 5pm. Attractions include trade stands, Bring & Buy, h.f./v.h.f. stations, special interest groups, a licensed bar and full catering, S22 talk-in. **Roger Williams GW4HSH on (01792) 404422**

**May 4:** The Dartmoor Radio Rally is to be held at the Yelverton memorial Village Hall, Meavy Lane, Yelverton, Devon. There will be parking for 600 cars and access for disabled visitors. There will be trade stands, a Bring & Buy, refreshments, etc. Doors open at 1030, talk-in on S22. There are beautiful views over Dartmoor, so it's ideal for a picnic, so why not bring the whole family? **Ron G7LLG on (01822) 852586.**

**May 10:** The Drayton Manor Radio & Computer Rally will be held at Drayton Manor Park, Fazeley, Tamworth, Staffordshire on the A4091. Main traders are in four marquees, there will also be a large outside traders flea market, a Bring & Buy stall, local clubs and special interest stands.

Doors open 1000 onwards. For Trader information call **Norman on 0121-422 9787**, for general enquires, call **Peter G6DRN on 0121-443 1189**, evenings please.

**May 17:** The Mid-Ulster Amateur Radio Club Rally. The rally will be open to the public from 12 noon, traders will have access from 9am. The venue is again the Silverwood Hotel, Lurgan, Co. Armagh. **Jim Lappin G10ND on (01762) 851179.**

**May 17:** The Dunstable Downs Radio Club will be holding its Annual Amateur Radio Car Boot Sale at the Stockwood Country Park, Luton, Bedfordshire. The site opens at 0900 until 1300. Leave M1 at Junction 10a, turn left and follow signs for 'Mossman Collection'. Talk-in on S22. Note new address for bookings! Please do not use any other address or phone number. **DDRC, PO Box 4053, Dunstable, Beds LU5 5ZJ.**

**May 17:** The Rippon & District Amateur Radio Society (RADARS) are holding their 41st Northern Mobile Rally at The Pavilion, Great Yorkshire

Showground, Harrogate. There will be the usual traders, a Bring & Buy and quality catering (possibly a bar). Doors open at 1030. Access behind Sainsbury's, off A661 Wetherby Road. **Gerald Brady G0UFI on (01765) 640229** (combined phone and FAX number), E-mail: **woody@tangan.demon.co.uk** or packet at **gluxp@gb7cym**

**May 24:** The 22nd East Suffolk Wireless Revival (organised by Ipswich RC, Martlesham RS and the Felixstowe & DARS) is to be held at Stoke High School, SSE of main rail station, map ref: TM164435. This Radio & Computer Rally is open from 10am (9.30am for disabled visitors) until 4pm. Talk-in on S22. Further details from **Sam Jewell G4DDK on (01394) 448495**, E-mail: **jewell@btinternet.com**

**May 24:** The Plymouth Radio Club Rally is to be held at the College of Further Education, Kings Road, Devonport, Plymouth. It will run between 1030 and 1600. There will be Morse testing on demand and there will also be a canteen serving meals, snacks and drinks and a licensed bar also. There is ample free parking at the venue and easy access for the disabled. Talk-in will be on S22 and the venue will be signposted on the A38 'Devon ExpressWay'. Anyone who would like more information should contact **Stephen Ramsden**, during office hours, on **(01752) 662051**.

**May 24:** The Three Counties Radio & Computer Rally is to be held at Pardiswell Leisure Centre, Bilford Road, Worcester. Easy access from junction 6 (Worcester North) M5. There will be the usual mix of trade stands with radio and computer dealers, Bring & Buy, refreshments and a licensed bar. Doors open from 1030 to 1700 and admission is £1.50. Free parking. **Eddie Cotton G4PQZ on (01905) 773181.**

**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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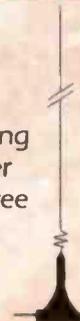
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# New Publications from the RSGB

## The RSGB Yearbook

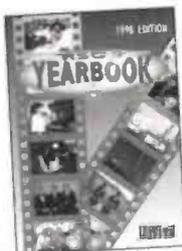
1998 Edition

Edited by Brett Rider, G4FLQ

This new edition of the ever-popular RSGB Call Book and Information Directory has been further enhanced with the inclusion of even more information on amateur radio than ever before!

This year you will find a trade listing, giving details of all the regular advertisers in RadCom, as well as the complete UK callsign listing. Over 100 pages of associated amateur radio information - an essential guide to keep close to hand in your shack.

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## The VHF/UHF Handbook

Edited by Dick Biddulph, G8DPS

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By Colin Redwood, G6MXL

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# Valve & Vintage

**The sound of marching feet and the uniformed figure of Ben Nock G4BXD clearly indicates that there's a 'military flavour' to the vintage column this month. So, pay attention because Ben's looking towards Scandinavia and Europe on this 'parade'!**

**Fig. 1 (Right): The RA-190 'Special Forces' set with transmitter on top and receiver below. The lead on the transmitter unit (top) plugs into the receiver socket and the power supply plugs into the now vacant transmitter socket (see text).**



I'm starting off this month with two rather attractive sets from the Scandinavian countries. The RA-190 is a very nice 'special force's type set, separate receiver and transmitter, very much like the WS No. 128 found in the UK.

The receiver, or 'Mottagare', uses eight one and a half volt heater valves. These, an 1L4, 1R5, 3V4, etc., are in a standard single conversion role employing r.f. amplifier, mixer, separate oscillator, and two i.f. stages, audio detector/a.f. amplifier, audio output and b.f.o. stages.

The heaters, or 'Glod', are wired in series-parallel and fed from a 3V supply. The h.t. voltage of 67.5V is also obtained from batteries, two of these are being used.

## The Transmitter

The transmitter, or 'Sandare', uses two valves, a 3A4 type as crystal oscillator and another 3A4 valve as the p.a. stage. A switch on the transmitter selects either full power transmit using the two 67.5V batteries in series to give 135V, receive, low power transmit with the batteries in parallel, or 'off'.

A grounded parallel tuned circuit is used in the p.a. with taps for the antenna connection. Here a portion of the r.f. is rectified and used to give an indication on a small meter that can also be used to check

**Fig. 2: The RA-200 back-pack set. The antenna tuning unit is at the top, with transmitter immediately below, and the receiver at the bottom.**



on the state of the batteries.

The RA-190 receiver covers 1.1 to 1.7MHz, and then 2.5 to 16MHz in another four bands. The transmitter covers 1.6 to 16MHz in four bands (c.w.) only with an output of 800mW up to 8MHz and 400mW up to 16MHz.

The complete station comes with a 'wrap around' bag which holds a selection of crystals, the headphones, key, antenna and ground wires (and a little 'dangly thing' to throw a wire over trees!) and a few bits of connecting wire.

The batteries to power the set are held in small pouches attached to a belt arrangement which can be worn by the operator. The whole kit is finished in a nice shade of green.

Despite the low power (though of course there's nothing wrong with QRP!), I made several contacts on 3.5MHz, using my long wire antenna. The transmitter has a very nice note and the receiver and b.f.o. are stable enough for a long QSO without re-tuning.

The 'big brother' to the RA-190, is the RA-200. This is a back-pack set, covering 2 to 8MHz and providing c.w. or a.m. modes. Power output is 500mW from batteries and up to 8W with an external h.t. supply from a hand-cranked generator.

I have limited information on the RA-200 at the moment. However, I have tried the RA-200 out on the air, using it on 3.5MHz running just the 500mW with the battery supply. I managed several nice contacts on c.w. including Peter G3RZP in Swindon at 569, Ralph G0JZY in Portishead at 579, Sam G3HVI in Stoke at 519 and even a QRP-to-QRP with Chas G3AJW (he was using 3W) giving me a 569. All QSOs were carried out using my 41 metre long wire.

## Made In Brussels

Next in line is the RST 101, an interesting set made by the MBLE company in Bruxelles (Brussels). The package consists of the set, a transmitter-receiver, a hand-cranked generator, antenna wire, poles and guys, leads, headphones and canvas bags in which to carry everything. A manual I received from Peter ON6PW (see later) is dated 1955.

Six crystal controlled channels are available on the transmitter, which can operate between 3 and 12MHz. The crystals are housed inside the set so changing them requires the case to be opened up (very inconvenient!).

The receiver is a fully tuneable set covering the same frequencies as the transmitter in three switched bands. A small push button (which can be used as the Morse key) is fitted to the set but an external key, which is much easier to use, can be connected via a standard jack socket, as can a set of headphones.

Two valves are used in the receiver and both are 6AG5 types. The first valve is used as a regenerative detector and the second valve as a straight audio amplifier.

In the transmitter, three valves are used one, a 6AG5, as a crystal oscillator then a further two 6AQ5s in parallel as the p.a. stage. Two small lamps, covered with long rubber sleeves, enable the oscillator and p.a. stage trimmers to be adjusted (they are tuned for maximum brightness on the bulbs).

As well as the hand cranked generator, batteries can be used to power the RST 101 (on receive only). To

transmit, the generator supplies 6.3V for the valve heaters and 350V h.t. supply. This is regulated inside the set using an OA2 valve to supply the receiver with a 150V stabilised supply.

Again, I got on to 3.5MHz and tried this set out...with good results, working amongst others. Ray G3IFF near Portsmouth, on the Military Wireless Amateur Radio Society (MWARS) c.w. net. I found that the receiver is a little wide and the tuning control a little slack, but good reports were received from the transmitter making it a very pleasant little set indeed.

## Requests For Help

Quite a few requests for help this month. Firstly there's a note from Robin G3UWP, asking if I or any of you readers out there could identify a mystery set which he was lucky enough to find at an ordinary car boot sale!

The mystery set uses a plug in coil pack (the only one Robin has covers 5 to 9.5MHz) but the set has a second calibration chart in the lid for the range 9.5 to 10MHz. A tag on the rear has the words Mk 26 RBH, but other than a serial number, no markings are evident.



Fig. 4: The G3UWP car-boot sale 'mystery' set.

Next comes a note from Tony G3YNT, with a picture of a strange American low band v.h.f. set. It's an unusual shape, being very thin with the valves mounted on their sides. The set covers 23 to 60MHz and has space at the rear for batteries. Perhaps you can identify this one?

Now it's on to a very interesting set indeed. An initial note came from Guido ON6RL, on behalf of his friend Peter ON6PW (good callsign!), asking for information on what at first sight appeared to be an 18 set. Indeed, the suitcase type mounted transmitter-receiver does have an 18 Set receiver unit but the transmitter, though looking like an '18' has subtle alterations.

The transmitter is crystal controlled, with two crystal sockets being provided. It has a panel mounted send/receive switch, a mounted key and front panel mounted antenna socket. The case also contains an a.c./d.c. mains power supply.

Practical Wireless, May 1998



The transmitter bears the plate 'Sender SSR. Mk. II' and the power supply has a plate 'The MICO Co. Ltd. London'. The lid of the box holds the antenna wire and headphones. A very interesting variation on the basic 18 Set configuration.

As always, if any of the readers can shed

light or otherwise on the sets mentioned I'll be happy to pass the information on.

Next I've an up-date regarding the Collins 32V-1 in my last column and the strange frequency coverage.

Alf Ramsay sent me (thanks Alf) a copy of an old advert for that transmitter and the v.f.o. unit. It clearly states that the v.f.o. covers 1600 to 2000kHz and is then multiplied up for the other bands. (However, the information

still does not explain why the 32V-1 had such a large spread in the first place!) Why not start at 1.75? This would then multiply up to 3.5, 7, 14MHz, etc.

## Diary Dates

A new venue for a militaria fair has opened up at Bromsgrove in North Worcestershire. Though these type of shows are for collectors interested mainly in medals, uniforms and equipment, the odd bit of radio kit turns up every now and then. Dates May 31, August 2 and October 4. Directions: (From M5 south) leave at J4, (from M5 north) leave at J5, from the M42 west leave at J1, and head for town centre market hall.

And finally a date for your diary (or timetable!). July 4/5, is when the Severn Valley Steam Railway hold 1940s weekend in Kidderminster. Plenty of military kit, in vehicles and some on a certain fool's back! (guess who). A good weekend out for all the family while catching sight of some war time military sets. Hope to see you there.

*Editorial note: I'll try and persuade Ben and Gloria to let us publish photographs of them in their 1940s uniforms. They certainly look the part and the whole event seems to be very enjoyable! G3XFD.*

So then, that's all for now. You can contact me as always via the PW offices, or at 62 Cobden St, Kidderminster, Worcestershire DY11 6RP or E-mail:

G4BXD@compuserve.com



Fig. 5: Can you identify the 'odd' low-band v.h.f. set from G3YNT? (see text).

Fig. 6: The very interesting 18 Set variation from Belgian reader ON6PW.

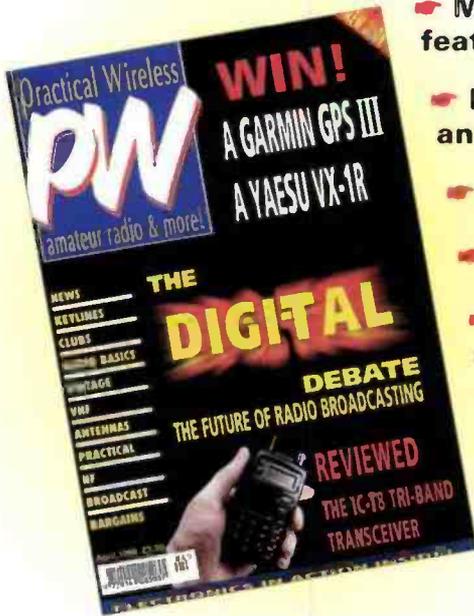


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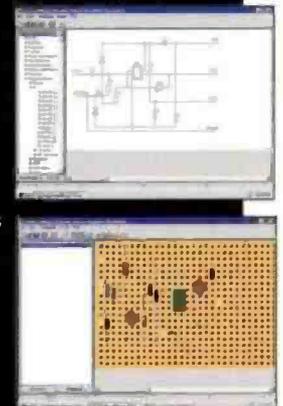
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In 'Electronics-in-Action' (April 1998) Tex G1TEX had the opportunity to review a new computer program called *StripboardMagic* that makes creating a circuit onto Veroboard so very easy. Now two readers have the chance to win copies of this program.



How can you win your copy of *StripboardMagic*? - It's easy, just answer these questions. You will need the April 1998 issue of *Electronics-in-Action* to do this.

- 1) What is the cost of *StripboardMagic*?  
a) £400                      b) £39.95                      c) Free to two winners
- 2) What is the name of the suppliers of *StripboardMagic*?  
a) Amber                      b) Ambyr                      c) Amble
- 3) What did Tex consider the 'magic' action of *StripboardMagic* to be?  
a) Autoplace                      b) Autohome                      c) Autounion
- 4) What operating system does *StripboardMagic* need to run under?  
a) Windows95                      b) Windoze                      c) Windsor Castle

As a tie-breaker how many words of more than four letters can you make from the letters contained within the title *StripboardMagic*?

Send your answers on a postcard, by May 29, giving the four answers and the number of words you have managed to make from *StripboardMagic*. And don't forget to include your name and address, to:

**StripboardMagic Competition, Practical Wireless, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.**

If you win and you already own a copy of *StripboardMagic* Ambyr will refund the purchase price - so did you keep the receipt?

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 TS-940SAT  
 TS-930S  
 TS-930SAT  
 TS-140  
 TS-850SAT  
 TS-50S  
 FT-1000  
 FT-1000MP AC  
 FT-920  
 FT-990 AC  
 FT-890SAT  
 FT-840  
 FT-747  
 FT-77  
 ALINCO DX-70

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TOKYO HL-2K  
 AMERITRON AL-80B  
 AMERITRON ALS-600  
 IC-2KL  
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IC-970H 2/70/+  
 FT-736R 2/70  
 FT-726R 2/70/6  
 IC-275E  
 IC-575A  
 IC-251E  
 IC-451E  
 TS-751E  
 FT-290 II  
 FT-290 I  
 FT-790 I  
 DR-430  
 DR-610  
 DR-605  
 FT-8500  
 FT-8000  
 TM-732  
 TM-231  
 IC-2350  
 IC-207  
 FT-50  
 FT-51  
 FT-530  
 TH-79E  
 DG-5EY

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 AOR AR7030  
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# Trader

## YOUR GUIDE TO SECOND-HAND EQUIPMENT

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Kenwood TS-950S Base Transceiver	£1895
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MFJ MFJ-9406 6m SSB 10w Transceiver	£165
Yaesu FT-2700RH 2m/70cm FM Mobile	£269
Yaesu FT-290R II x4 2m All Mode Portable	£299
Yaesu FT-5200 2m/70cm FM Mobile	£349
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Alinco DJ-F1 2m FM H/Held	£119
Icom IC-24ET 2m/70cm FM H/Held	£179
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Icom IC-M11 VHF Marine H/Held	£219
Icom IC-T7E 2m/70cm FM H/Held	£199
Icom IC-W21E x2 2m/70cm FM H/Held	£199
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Kenwood TH-28E 2m FM H/Held	£199
Yaesu FT-203R x2 2m FM H/Held	£79
Yaesu FT-470R x2 2m/70cm FM H/Held	£199

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Drake R8E x2 Base Station Receiver (P.Sale)	£695
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JRC NRD-525 Base Station Receiver	£549
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Lowe HF-225 x4 12V Base/Mobile Receiver	£299
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Panasonic RFB-65 Portable Receiver with SSB	£109
Roberts RC-818 Portable Receiver with cassette	£119
Sangean ATS-803A x3 Portable Receiver with SSB	£89
Sony ICF-SW55 x2 Portable Receiver with SSB	£189
Sony ICF-SW7600G x2 Portable Receiver with SSB	£135
Yaesu FRG-7700 x3 Base Receiver with FRT-7700	£225

#### SCANNERS MOBILE/BASE

Realistic Pro-2022 68-960MHz (with gaps) 200Ch	£145
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Alinco DJ-X1 100kHz-1300MHz AM,FM,WFM	£139
AOR AR-1000 x2 0.8-1300MHz (with gaps) AM, FM, WFM	£149
AOR AR-8000 500kHz-1900MHz All Mode 1000Ch	£229
Commiel Com-102 68-512MHz (with gaps)	£79
Commiel Com-204 68-999MHz (with gaps)	£129
Netset Pro-46 66-956MHz (with gaps)AM,FM 100Ch	£109
Realistic Pro-26 25-1300MHz AM,FM,WFM 200Ch	£139
Realistic Pro-50 66-512MHz (with gaps)	£59
Sony ICF-Pro80 x2 150kHz-108MHz (no converter)	£79

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Yaesu FT990dc	£1049
Icom IC735 base	£599
Alinco DX70 HF+6m	£549

#### VHF/UHF TRANSCEIVERS

Yaesu FT8000 2m/70cm	£349
Kenwood TM733E 50w mobile	£349
Yaesu FT50R 2m/70cm hh	£199
Yaesu FT51R	£265
Icom IC77E 2m/70cm inc acc	£249
Kenwood TH-G71E 2m/70cm	£199
Alinco DJ190 2m hh	£119
Icom IC260A 10w multimode	£149
Yaesu FT736R base	£899

#### SHORTWAVE RECEIVERS

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Lowe HF225 with keypad	£299
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Realistic DX349	£149
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Icom IC7100 25-2000MHz	£899
Icom IC7000 .5-2000MHz	£699
AOR 3000A 0-2036	£595
Bearcat 9000xlt 25-13000 gaps	£229
Yupiteru MVT8000 8-1300MHz	£249
Yupiteru MVT7100 inc case etc	£179
AOR 8000 boxed etc	£229

#### STATION ACCESSORIES

Diamond GSV-3000 30amp psu	£109
Diamond SX-200 swr/pwr meter	£55
Yaesu FC-10 auto atu	£229
Pakratt PK232MBX inc	£199
Pakratt DSP2232 decoder	£299
MFJ949E 0-30mhz tuner	£109
Autek antenna analyzer	£109

All prices are in sterling.

### NEVADA

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AOR 3000A	£575.00
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ATLAS 350XL HF	£299.00
DAIWA PS304 II PSU	£89.00
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TEN TEC OMNI VI S.O.B	£1495.00
TIMEWAVE DSP 59+	£195.00
TOKYO HC-200 ATU	£99.00
TOKYO HL-1KGX AMP	£699.00
TOKYO HX-640	£175.00
TOKYO HX-650	£199.00
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TRIO TL-922	£1195.00
TRIO TR-9130	£299.00
TRIO TS-830S	£399.00
TRIO TS-930S	£695.00
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YAESU FT-11R	£169.00
YAESU FT-77 FM	£399.00
YAESU FT-107M 100W	£425.00
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YAESU FT-290 I	£245.00
YAESU FT-290 II	£325.00
YAESU FT-411 + EXTRAS	£189.00
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YAESU FT-707	£349.00
YAESU FT-726R	£799.00
YAESU FT-727	£169.00
YAESU FT-747 FM	£450.00
YAESU FT-757 AT	£225.00
YAESU FT-840 + FM	£599.00
YAESU FT-1000D	£1699.00
YAESU FT-2500M CTCSS	£249.00
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HF TRANSCEIVERS	
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Yaesu FT-980	£799
Yaesu FT-101ZD MkIII + FC-902/PCV-901R incl 2m/6m	£799
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Yaesu FT-102	£375
Yaesu FT-101Z	£299
Yaesu FT-757GX + FC-750SAT	£650
Kenwood TS-140S boxed	£499
Yaesu FT-767GX + 2m/70cm/speaker	£899
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Yaesu FT-707	£275
Yaesu FC-700 boxed	£99
Kenwood TS-520	£275
Icom IC-751A	£700

MOBILE/BASE VHF/UHF TRANSCEIVERS	
Kenwood TS-700S	£450
Icom IC-229 - boxed	£225
Icom IC-290D	£300
Yaesu FT-230	£175
Icom IC-271H + 100W internal PSU	£550
Yaesu FT-290R + linear	£TEL
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Icom IC-251E	£TEL
Yaesu FT-290R111 boxed	£325
Yaesu FL-2025	£99
Icom IC-240 + MB/mic/hand book	£99
Kenwood TR-9130	£275
Icom IC-207 - boxed	£199
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Regency MX-7000	£TEL
Lowie HF-225	£299
Icom IC-R7100 boxed	£TEL
Icom IC-R100 - mini condition	£275
Yaesu FRG-7700M + ATU	£325
Pocom AFR-2070	£275
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Icom IC-R7000 + book	£TEL
Fairmate HP-2000 - boxed	£80
AOR AR2700 - VGC	£90

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Kenwood TH-79 as new boxed	£225
Yaesu FT-51R boxed	£275
Yaesu FT-11R 2m handi	£150
Icom IC-W21E Dualbander	£175

MISC.	
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MFJ-784 boxed	£175
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FC-901	£175
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SP-102 speaker	£50
Scout boxed as new	£280
FIF-232	£50
PK-232MBX	£199
PAC Com 220 boxed	£80
Yaesu FC-707 ATU	£TEL
Datong D-707 Morse tutor	£40
Datong FL-3	£TEL

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Kenwood TS850SAT with Matching PSU - MINT	£945
Kenwood TS680S - HF & 6M	£525
Kenwood TS570D - Latest HF with DSP	£875
Kenwood TS120S - 100W HF	£295
Yaesu FT101ZD - Valved PA HF with Digital Display	£250
Yaesu FT77 Basic HF with FM Board Fitted	£295

VHF/UHF	
Alinco DJ-180 Basic 2M H/Hand with Charger	£85
Icom 215 Channelised 2M Portable FM	£65
Icom IC-202S Portable 2M SSB Set	£175
Icom IC-4ET - 70cms H/Hand with AI and Keypad	£135
Kenwood TR751 - 2M Multimode 25W Mobile	£395
Kenwood TH22E - 2M H/Hand c/w Keypad	£175
Plessey PRC-638 30-80MHz Ex-Iraq Army Manpacks	£175
Trio TR9130 - 2M Multimode Mobile	£295
Yaesu FT-4700RH - 2M/70cms FM Mobile	£295
Yaesu FT290R11 - 2M M/Mode Mobile	£325
Yaesu FT290R11 - 2M M/Mode Mobile Amp & Bracket	£395
Yaesu FT76 - Compact 70cms Handheld	£135

RECEIVERS	
Icom PC-R1000 Computer Controlled Scanner	£299
Lowie HF250 - Advanced HF Gen Cov Receiver	£495
Lowie HP225 - HF Gen Cov RX	£325
Lowie HF125 - HF Gen Cov RX	£265
Trio JR500S Ham Band HF Receiver	£85
Yaesu FRG8800 with VHF	£495
Yaesu FRG7700 - General Coverage RX	£295

MISCELLANEOUS	
BNOS 144-5-100M SW->100W 2M Amplifier	£135
Diawa CNA1001 - Auto ATU	£135
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Diawa DK-210 Electronic Keyer Unit	£75
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Siemens RK-702 portable receiver	£49.00
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Realistic DX-394 Receiver	£189.00
Icom IC-R70 Receiver	£449.00

SCANNERS	
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Icom IC-R11 handheld scanner	£169.00
AOR-2000 handheld scanner	£149.00
Fairmate HP-100 handheld scanner	£149.00

HF TRANSCEIVERS	
Kenwood TS-850S	£899.00
Icom IC-720A c/w PSU	£479.00
Yaesu FT-890AT	£689.00
Icom IC-735	£549.00
Icom IC-745 with internal AC PSU	£489.00
Icom IC-751	£589.00
Yaesu FT-757GX	£499.00
Yaesu FT-707 80 - 10M transceiver	£299.00
Alinco DX-70T HF + 6M	£580.00
JRC JST-135 transceiver c/w matching PSU	£999.00

VHF/UHF	
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Kenwood TM-701 dualband mobile	£299.00
Alinco DJ-580E Dualband handheld	£219.00
Alinco DJ-F1 2M handheld	£159.00
Kenwood TH-75E 2m/70cms handheld	£229.00
Kenwood TM-431E 70cms mobile	£239.00
Trio TS-770E 2m/70cms Base station	£469.00
Yaesu FT-50R 2m/70cms handheld	£229.00
Kenwood TH-42E 70cms handheld	£189.00

OTHER ITEMS	
PK-88 Packet terminal	£89.00
FL-2 Audio Filter	£89.00
FX-1 GDO meter	£39.00

### MULTICOMM 2000 01480 406770

HF TRANSCEIVERS	
ALINCO DX-70T AS NEW	£550.00
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ICOM IC-706 MK-1 AS NEW	£650.00
ICOM IC-706 MK-1 AS NEW	£675.00
ICOM IC-735 (BOXED)	£499.00
JRC JST-135+ATU AS NEW	£899.00
KENWOOD TS-140S AS NEW	£499.00
KENWOOD TS-440SAT GOOD CONDITION	£659.00
KENWOOD TS-490SAT GREAT CONDITION	£695.00
KENWOOD TS-690S MINT HF +6	£749.00
KENWOOD TS-850SAT MINT	£399.00
TRIO TS-520 HF TRANSCEIVER	£189.00
YAESU FT-757 AVERAGE CONDITION	£369.00
YAESU FT-757GX (BOXED)	£495.00
YAESU FT-757GX (BOXED)	£375.00
YAESU FT-840 AS NEW	£375.00
YAESU FT-890 WITH ALL OPTIONS	£799.00

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ICOM IC-290 2-MTR. MULTIMODE	£220.00
ICOM IC-290E 2-METRE MULTI-MODE 25W	£249.00
ICOM IC-475 70CMS MULTIMODE	£399.00
KENWOOD TH-28E DUAL BAND	£175.00
KENWOOD TH-79E HAND HELD	£265.00
KENWOOD TR-751 2-MTR MULTIMODE	£299.00
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YAESU FT-290R MK-1 MULTIMODE	£190.00
YAESU FT-3000M (3-WEEKS OLD)	£335.00
YAESU FT-480R (MINT CONDITION)	£369.00
YAESU FT-480R (BOXED)	£259.00
YAESU FT-690R MK-2 (EX-DEMO)	£355.00
YAESU FT-726 270MHF	£660.00

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AOR AR-7030 AS NEW	£575.00
DRAKE RB-E INCLUDING VHF	£689.00
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JRC NRD-535 4-MONTHS OLD	£950.00
JRC NRD-525 AS NEW	£599.00
JRC NRD-535 1-YEAR OLD	£800.00
JRC NRD-535 AS NEW	£879.00
KENWOOD R-2000 GREAT CONDITION	£285.00
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KENWOOD R-5000 DELUXE SW RX	£579.00
LOWIE HF-150 AS NEW	£230.00
SANGEAN ATS-803/SAIS10 M-5000	£69.00
SONY 2010D (BOXED) FAULTY	£55.00
SONY SW-35 AS NEW	£169.00
SONY SW-55 AS NEW	£160.00
YAESU FRG-100 AS NEW	£375.00
YAESU FRG-8800 GENERAL COVERAGE	£299.00
YAESU FRG-8800 AS NEW	£325.00
YAESU FRG-8800 + VHF	£385.00

SCANNERS	
AOR 2800 VHF/UHF S/W MULTIMODE	£215.00
AOR AR-8000 (BOXED) AS NEW	£259.00
AOR AR-8000 (BOXED) AS NEW	£225.00
BEARCAT 220-XLT HANDHELD HI SPEC	£130.00
BEARCAT 3000XLT (EX-DEMO)	£175.00
ICOM ICR-1 (NEW) MINI-SCANNER	£259.00
SIGNAL R-535 AIRBAND RECEIVER	£335.00
SONY AIR-7 AIRBAND RX	£99.00
STANDARD AX-700 AS NEW (BOXED)	£369.00
WIN708 AIRBAND RX	£110.00
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YUPTERU MVT-8000 AS NEW	£199.00
YUPTERU VT-125 MK-2 CIVIL AIRBAND	£125.00
YUPTERU VT-225 (BOXED)	£185.00
YUPTERU VT-225 (BOXED)	£150.00

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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.

◆ TEL: (01873) 860679.

◆ E-MAIL: davebu@mdlhr1.agw.bt.co.uk

◆ Packet radio: @ GB7MAD

◆ UK DX Cluster: @ GB7DXC

THIS MONTH DAVID BUTLER G4ASR HAS REPORTS OF TROPOSPHERIC OPENINGS ON THE VHF BANDS AND DETAILS OF A MICROWAVE ROUND TABLE MEETING.

There was little in the way of any notable propagation reported on the v.h.f. and u.h.f. bands during the month of February. Having said that there were periods of enhanced tropo conditions between February 13-18 and February 25-26 which enabled contacts to be made into central Europe and Scandinavia. There was also a reasonable auroral backscatter opening on February 17-18 allowing contacts to be made on the 144MHz band with stations as far away as Estonia (ES) and Lithuania (LY).

Conditions on the 50MHz band however have been noticeably poor in the UK during this winter season although, as previously reported, there has been an upsurge of activity in other parts of the world. Solar activity is inextricably linked with world-wide F2 propagation on the 50MHz band (and h.f. bands of course).

Many propagation researchers are predicting a surge in solar activity over the next few months. They expect to see a vigorous and energetic upswing in solar indices corresponding to the beginning of accelerated sunspot growth. Indeed spotless days are now becoming quite rare as we continue the climb to solar maximum of Solar Cycle-23.

### TROPOSPHERIC OPENINGS

Reports of tropospheric openings were first reported during the evening of February 13 by stations in central and northern England

who were hearing Belgian, Dutch and German stations at good strengths on the 144MHz band. Fortunately, the good conditions continued into the weekend bringing increased activity to the v.h.f., u.h.f. and microwave bands.

On the 430MHz band the station of **John Quarmby G3XDY** (JO02) reported hearing EA1EBJ/P (IN73) at 59 and the u.h.f. beacons DB0VC (JO54), FX4UHB (JN06) and HB9F (JN36). On the south coast **G1HWY** (IO90) made a number of contacts on the 430MHz band including DL3YEL (JO41), DL4KG (JO31), F1MJC (JN06) and F6APE (IN97).

Conditions on the 1.3GHz band were equally good with John G3XDY working many stations in DL, F, ON and PA. Among the stations contacted on s.s.b. were DJ6JJ (JO31) running 700mW, DL3YEE and DL80BU (both in JO42), DG2BCP (JO43), F1DUZ and F6APE (in IN97), F5HRY and F6CGB (in JN18) and F5JTA (JN08). Later that evening John found the band open across the North Sea to Denmark and made an s.s.b. contact with the station of OZ2LD (JO54).

The enhanced tropo conditions extended right up into the microwave region with the station of PA0WWM (JO22) hearing the beacon at the QTH of **Simon Freeman G3LQR** (JO02) peaking 559 on the 5.7GHz band. Up on the 10GHz band PA0WWM made some excellent c.w. and s.s.b. contacts with G0API (IO80) at 476km, G3FYX (IO81) at 485km, G3ZFP (IO91) at 344km and G4BRK (IO91) at 426km.

All contacts, incidentally, were being made on 10368.100MHz, the centre of narrow band (c.w. and s.s.b.) activity. Even higher in the microwave spectrum **Simon G3LQR** heard the PI7EHC beacon peaking 559 on a frequency of 24192.100MHz (the 24GHz band).

The 'liit' conditions declined somewhat in the following days but picked up again on February 18. **Jamie GW7SMV** reported hearing a number of DL and F stations on the 144MHz band from midday. Later in the afternoon, around 1620UTC, he heard the Swiss station HB9RDE (JN37).

Interestingly there was a fair bit of activity from Luxembourg with the stations of LX1JA, LX2DX and LX/ON1 DHR/P being worked on the 144MHz band by stations in central and north-eastern England. Propagation on the 430MHz and 1.3GHz bands was predominantly to central France with stations in south-east England hearing the FX4UHB (432.886MHz) and

FX4UHY (1296.883MHz) beacons located in JN06.

The best tropo of the month occurred during the period February 25-26. Although short-lived (approximately 15 hours from 1700UTC through to 0800UTC) there was some good DX to be found, especially on the 144MHz band. From your reports it seems that the band was open to DL, LA, OZ, SM and SP. At the QTH of **David Dibley G4RGK** (IO91) contacts were made, mostly on s.s.b., with DK1KR (JO53), DJ4IT (JO33), DL5WG, DF7OG (JO52), DL7ANR (JO62) and DL9OA (JO64).

The ducting also extended into Poland, contacts being made with SP1EOI (JO73) and SP4MPB (KO03), the best DX of the evening at 1485km. Scandinavian contacts were also made with LA2PHA (JO38), OZ5AG (JO56), OZ9ZX (JO65), SM7BOU (JO66) and SM7WT. David mentioned that the propagation, although good, was quite patchy on the 144MHz band and that nothing was heard at his QTH on the 430MHz, 1.3 and 2.3GHz bands.

Up in the north-east of England **Dave Storrs G8GXP** (IO93) found DL3BR5 (JO72), DL5WG (JO52), DL7ULM (JO62), OZ1SY (JO45) and SM6TZX (JO67) on the 144MHz band. Four contacts were made into Poland with SP1EOI at 1060km, SP3IQW (IO94) at 1310km and SP4CHY and SP4MPB (both in KO03) at 1450km.

Also in locator IO93 the station of **John Clark G6YIN** made s.s.b. contacts with OZ1XAT and OZ8Z5 (both in JO55), SM6TZX (JO67), SM7FMX (JO65) and SP4MPB. As mentioned by G4RGK there didn't appear to be any activity on higher frequencies although G3XDY did hear the SK6UHF (JO67), OZ1UHF (JO57) and OZ7IGY (JO55) beacons on the 430MHz and 1.3GHz bands.

### AURORAL OPENING

On February 14 there was a coronal mass ejection (c.m.e.) from the Sun. This caused disturbed conditions a few days later, resulting in planetary geomagnetic A indices of 14 on February 17 and 26 on February 18. As a result of this geomagnetic activity, there were a number of auroral backscatter openings over the period. The main opening was overnight between 2300-0130UTC with weaker phases between 1700-2000UTC on February 17 and 1700-1800UTC on February 18.

Some operators were alerted to the impending opening by auroral observations of TV video carriers in the 49MHz region. Others simply noticed the 'spots' on the DX

Cluster (from 1720UTC) relating to auroral activity on the 50 and 144MHz bands. Among the first such spots was one from **Nick Peckett G4KUX** (IO94) at 1722UTC who heard the SK4MPI beacon (JP70) on 144.412MHz peaking 55A.

In a Packet radio message **Eltje PA3CEE** (JO33) also mentions hearing the SK4MPI beacon at 57A but found activity surprisingly low. He caught the first phase, making c.w. contacts with LA3TL (JO58), OH1XT (KP01) and SM0RUX (JO99) between 1800-1920UTC. By the way, Eltje runs 400W into two 16-element F9FT Yagis at 22m above ground. Others spots on the DX Cluster included those from **Clive Davies G4FVP** (IO94) who reported GMO0BD (IO87), GM4ISM (IO85) and MM0AMW (IO74) on the 50MHz band around 1800-1900UTC.

The main event, though, took place around midnight and was quite intense. Normally there is relatively little activity on the 50MHz band during such late night events but on this occasion the word must have got around. Indeed it was so good that there were even a report of GM4WJA (IO87) being worked by G3XDY on the 70MHz band. (Apart from a very few dedicated enthusiasts it really takes a big aurora before you can find DX activity on the 70MHz band).

In north Wales the station of **GW0GEI** (IO73) worked GM3JII (IO68), MM1AMW (IO75) and MM1BUO (IO87) with signals ranging between 55A to 59A. At the QTH of G4FVP the Finnish beacon OH9SIX (KP36) was heard at 2305UTC with a mixture of aurora (55A) and auroral-E (559).

Clive then made contacts on the 50MHz band with LA2MJA (JP60), LA8WF (JO59), OH3KKW (KP11) and OY4TN (IP62) on the Faeroe Islands. The beacon stations OH1SIX (KP11) and OZ6VHF (JO57) were also heard. However, the Norwegian beacon SK3SIX (JP71), usually an excellent indicator of auroral openings, was not heard. Subsequently, Staffan SM3JGG and Torgny SM3HVU went to the top of the mountain where the beacon is located and discovered that the antenna was completely broken by the wind and snow.

Up on the 144MHz band **Eric Gedvilas G8XVJ** (IO83) made s.s.b. contacts with GM3JII (IO68), GM7UGV (IO87) and GM8LFB (IO88). He also contacted the Swedish station SM4VQP (JO79) who was 59A over the 1290km path.

Showing the value of using Morse code during auroral events **Andy Cook G4PIQ** (JO01) made a number of c.w. contacts which included the stations of ES1AJ and ES2RJ both in KO29 over 1700km away, LY2BAW (KO25) at 1625km, LA3BO and LA5KO (both in JO59) and GM4AFF (IO86). Andy also made one solitary s.s.b. contact with SM4VQP.

In Finland, the land of

perpetual auroras, **Jari OH1XT** (KP01) reported making 44 c.w. contacts on the 144MHz band between 1600-0115UTC. He uses a Yaesu FT-736R transceiver with a 150W amplifier and two 15-element Cuedee Yagis. His best DX was with the stations of GM4DGT (IO85) at 1562km and OY9JD (IP62) at 1500km.

Contacts were also made with stations located in DL, LA, LY, OZ, PA, SM, SP, UA1 and YL. He also made one c.w. contact on the 430MHz band working LY2FE (KO05) over a path of 640km. Of course the correct distance is far greater than this. The path lengths quoted are point-to-point distances and ignore the fact that the signals actually go via the northerly auroral curtain.

What was probably the last UK observation of this auroral opening

50.110MHz but couldn't attract his attention. However, this was wrong. In fact ZL2TPY did eventually work W4DR but it took a telephone call via W6BYA to achieve it!

The main problem seemed to be the 'pile-up' which was ensuing on 50.110MHz, the intercontinental calling frequency. The moral to this tale is to remember not to make QSOs on 50.110MHz, but to just use it as a calling frequency and then move off when someone answers. Better still, don't use it all and prove that you are a real DX operator!

During February the up-turn in conditions on the 50MHz band continued and although it didn't quite reach the UK it was definitely getting closer! On February 15 there was a trans-equatorial propagation (t.e.p.) opening from Italy to Equatorial Guinea.

Malta) at 1330UTC lasting for 30 minutes. Around the same time the station of TR8CA was heard very weakly in Jersey.

Another t.e.p. opening was reported by 3C5I on February 21 from 1230UTC. The event lasted for an hour with Alan making contacts into France, Italy, Greece and Malta. QSL cards for 3C5I incidentally should go via **PO Box 650232, Dallas, Texas, 75265, USA.**

On February 21 Cedric CT3FT (located on the Madeira Islands) reported that he was now getting daily evening openings via t.e.p. to PY2 and PY5 call areas. He also mentioned hearing the Ascension Island beacon ZD8VHF (II22) on most evenings around 2000UTC and that he heard 3C5I on February 20 and 21 in beacon mode.

### SOUTH AFRICAN STATIONS

On February 22 stations in ZS6 (South Africa) had their first major opening into Europe and Asia. The 50MHz band opened up at around 1245UTC and remained in good shape for nearly three hours.

At least six ZS6 operators are known to have caught the opening working stations in F, I, ISO, IT9, OD, YU, 4X4, 5B4, 9A and 9H. **Ian ZS6BTE** reports that propagation into southern Europe was excellent with Italian stations coming in at 59+20dB (don't they always!).

Earlier in the morning Ian heard the ZS11 beacon (28.202MHz) via F2 backscatter. Reception of the European Channel E2 video (48.25MHz) followed an hour or two later complete with Italian 'pirate' radio stations on nearby frequencies.

There were also weak video signals on Channel R1 (49.75MHz), the old OIRT block countries and Russia, indicating that the F2 mode path was limited to Southern Europe. Ian noticed that the maximum usable frequency (m.u.f.) peaked at over 54MHz with strong signals being heard on Channel E2 Audio (53.25MHz) from Spain. He also heard the low power beacons SV1SIX, YU6SIX, 5B4CY and 9H1SIX.

Although none of these openings reached as far north as mainland UK, Ken Osborne G4IGO (IO80) did report positive identification of F-layer television signals on February 21. This occurred between 1005-1043UTC on 49.740 and 49.760MHz and was also observed at the QTH of G4HBA. The incidence of these openings are typical of what has happened in previous Solar Cycles.

The propagation openings appear in a cyclic fashion. First you start with a dead band with no apparent openings. Then there is an outburst from the sun giving rise to auroral backscatter openings for a few days.

Then follows a period of good F2 or t.e.p. openings. This eventually dies out, leaving a dead band before the next (28-day) rotation of the sun when the whole process start again. This is an

extremely crude model of how the Sun affects propagation on the 50MHz band but as a generalisation it's reasonably good. What it means in practice is that there are auroras, followed by F-layer propagation, followed by a few days peace and quiet!

### MICROWAVE BANDS

If the thought of chasing DX on the 50MHz band doesn't quite turn you on perhaps you could try the operating at the other end of the spectrum, up in the microwave region. Although it may sound complicated and beyond the reach of beginners (or even established radio amateurs) this is far from the truth.

Indeed building an f.m. transceiver for use on the 10GHz band can be relatively simple. Although it can't compare to the performance of a modern narrow band (s.s.b./c.w.) transverter built on microstrip with chip components a wide band (f.m.) Gunn oscillator and separate receiver can easily be built in few evenings.

The Gunn oscillator and receive mixer can be based on surplus 10GHz doppler radar intruder alarms. This sort of approach is very inexpensive and far from specialised. The units can be used for fixed line-of-sight audio or video links or, if you wish to extend the range, out portable from local hill tops. The photograph, Fig. 1 shows the station of **Dave Hall G8VZT** operating portable on the 10GHz band.

Some years ago the RSCB Microwave Committee started a series of Microwave Round Table events with the aim of getting inexperienced microwave builders and operators together to exchange knowledge. Round Tables are held at various venues, normally at the Rutherford Appleton Laboratory near Didcot, Oxfordshire, the Crawley Radio Club, West Sussex, the Flight Refuelling Radio Club, Wimborne, Dorset and the BT Laboratory at Martlesham Heath, Suffolk.

The events typically include measurement facilities for checking or aligning equipment, a microwave bring and buy table and a few afternoon lectures. Most importantly it is a meeting place for fellow enthusiasts to get together to discuss latest microwave developments.

The next Microwave Round Table is being held at the **Rutherford Appleton Laboratory (RAL) on Sunday April 26** between **10.00 to 17.00 hours**. The usual programme will take place, an exchange of microwave and related radio equipment, a comprehensive range of supervised test gear operated by experts, informative and informal talks and a microwave forum for you to give your opinions to the Microwave Committee.

Please note that the function is organised on behalf of the RSCB Microwave Committee for microwave operators to exchange items and information pertaining to microwaves. It is not a rally, nor is it

# G8VZT



Fig. 1.

was that made by the station of GM6VIU (IO85) who heard the beacon SK4MPI peaking 52A on the following evening, February 18, at 1800UTC.

### WORLD-WIDE OPENINGS

Last month I mentioned accounts of the first F2-layer openings on the 50MHz band between the USA and Australia and New Zealand. However, there is a small but significant correction that I need to make regarding the results made by the New Zealand station ZL2TPY.

I reported that he had heard the station of W4DR (Virginia) on

A number of Italian stations including IOAMU, IOJX, IKOBAL, IKOFTA and IWOBET contacted **Alan Isaachsen 3C5I (JJ43)** around 1300UTC. Alan confirmed that this was his first opening into Europe on the 50MHz band.

During the hour long t.e.p. opening the station of TR8CA (Gabon) was also worked and the station 9G1AA (Ghana) in beacon mode heard by a few Italian stations. Two days later, coinciding with the auroral conditions in northern Europe, the Spanish station EH7AH (IM67) worked PY5CC in Brazil. This took place on February 17 at 2221UTC with signals of 59 being exchanged.

The next day Alan 3C5I had another t.e.p. opening into Italy (and

LEIGHTON GWOLBI SAYS 'GOOD NEWS THERE'S BEEN VERY LITTLE ANTENNA DAMAGE THIS WINTER'

# RadioScene

a car boot sale. There are no commercial dealers and no computer related bits for sale.

Last year a few people arrived with other expectations so please make sure this is your kind of event. The complex is located adjacent to the A4185, approximately midway on the A34 between Newbury and Oxford. Further details of this popular event are available from the organisers, **Geoff Grayer G3NAQ**, E-mail: [grayer@rl.ac.uk](mailto:grayer@rl.ac.uk), **Jon Eastment GW4LXO**, E-mail: [de@rcru.rl.ac.uk](mailto:de@rcru.rl.ac.uk) or **Mike Willis G0MJW**, E-mail: [mjw@rcru.rl.ac.uk](mailto:mjw@rcru.rl.ac.uk)

That's it again for another month. The first signs of this summers Sporadic-E season will be noticed very soon on the 50MHz band (and later on the 144MHz band) so make sure your antennas and station equipment are working properly now! When the bands open up I want you to let me know what you've been working. Forward any news, views, comments or photographs to the address and by the date given at the top of the column.

THANK YOU FOR YOUR LETTERS AND GOOD LUCK WITH THE VHF DX. SEE YOU AGAIN NEXT MONTH.

73 David G4ASR

## HF FAR & WIDE

REPORTS & INFORMATION (AND PHOTOGRAPHS) BY THE 15TH OF EACH MONTH PLEASE.

- ◆ LEIGHTON SMART GWOLBI, 33 NANT GWYN, TRELEWIS, MID-GLAMORGAN CF46 6DB, WALES.
- ◆ TEL: (01443) 710749 (9am - 6pm)
- ◆ FAX: (01443) 710789 (9am - 6pm)

LEIGHTON SAYS THAT THE MONTH OF FEBRUARY WAS VERY WARM. AND - GOOD NEWS FOR SOME - NOT MUCH ANTENNA DAMAGE HAS BEEN REPORTED!

The month of February must surely have been one of the warmest since records began. Certainly quite a few amateurs have mentioned to me over the air that they've suffered no antenna damage this winter, due to the fact that the freezing temperatures didn't

materialise this year. That's good news for most operators, no doubt, but it also seems that conditions on the bands are steadily improving as we work our way slowly towards the next sunspot peak.

Our reporters this month all indicate that propagation conditions have been reasonably stable, allowing most parts of the world to be heard and worked almost daily. There have been 'patchy' days of course, but it looks as if there is a definite improvement to most of the bands.

### DX NEWS

Over to DX news and the RSCG's *DX Newsheet*, which is edited by **Chris Page G4BUE**. There's news that **Anders SM0ORV** is operating from Vietnam as **XV7SV** until June. He'll be operating on 3.526, 7.026, 10.135, 14.212, and 21.235MHz only, and QSLs should go to his home call address.

From Sri Lanka, **Mario HB9BRM** will be active as **457BRG** until the 3rd of June, QSL to home call. And from the Malagasy Republic I read that **5R8FK** is still active, often on 10MHz around 0000UTC.

Meanwhile, **JA0JHA** will be operating out of Zambia under the call sign **9J2AM** until the 31st of December 1998. He's mostly using s.s.b. using a cubical quad antenna on 14MHz, but he will also be building antennas for the low frequency bands.

Down in the Antarctic, **Dave N2WNB** is the new operator of **KC4AAC** at the American Antarctic Base **Palmer** on **Anvers Island** (QSLs should go to **K4MZU**). While still in the South Atlantic, **CE9AAP** is active again from the Chilean Antarctic Base **Capitan Arturo Prat** on **Greenwich Island**, and QSLs go to **CE2LOL**.

### WHERE'S SEBORGA?

I've received a letter from **Brian Leach G3DXY** of Gloucester, asking for the whereabouts of **Seborga**. He's worked and received QSLs from **T00RM** from the 'State of **Seborga**' but has no idea where it is. Join the club **Brian**!

There have been so many 'new' states formed in and around Europe over the past few years that very often it's been nigh on impossible to keep track with them! I've heard of **Seborga** being worked by various amateurs, but having made a few enquiries amongst the local operators, I'm still none the wiser.

No doubt our intrepid readers will be able to enlighten you. If you can help **Brian**, he can be contacted on **Gloucester (01452) 520779**.

Another interesting letter came this month from **Pat G3OUC**. He's

the chap who uses kite antennas on the 1.8 and 3.5MHz bands, as is well known for his expertise in this field.

Using his series of home-made 'Skyliner' rigs running power levels of 500mW and 5W s.s.b., **Pat** says he's been working all over the British Islands on 3.5MHz of late. But on 1.8MHz and using 'roach pole' (fishing rod) vertical running an output of 500mW on s.s.b., he's racked up contacts with Finland and Germany!

More from **Pat** in the 28MHz slot, but if any readers are interested in kite antennas, then **Pat** is your man! He can be contacted at **15 Turnpike Road, Newbury, Berkshire AG14 2ND**.

### PORTUGUESE PW READER

I also received a letter from **Augusto Cebola CT1ABE** in **Odivelas**, Portugal, who says he's an avid **PW** and 'HF Far & Wide' reader, and he also enclosed a photo of him in his shack. (see **Fig. 1**). **Augusto** managed to visit the **Picketts Lock** (London Amateur Radio Show) last year and enjoyed meeting the **PW** team on the stand.

It's nice to know that we're attracting attention from all places 'Far & Wide' **Augusto**. And of course I look forward to some reports for the column from Portugal!

### YOUR REPORTS

On to your reports now, starting with 1.8 and 3.5MHz, and 'our **Ted Trowell G2HKU** on the Isle of Sheppey in Kent who's been busy on 1.8MHz c.w. of late. His log shows contacts with **W2GD** (USA), **OY9JD** (Faroe Islands), **C31L** (Andorra), **OH0MAN** (Aaland Island), and **C42A** (Cyprus) all between 1800 and 2000UTC. By the way, contrary to information in the February issue, **Ted** is an all c.w. man, through and through!

Next comes the log from **Derek Blunden BRS 171057** in **Westlea**, **Swindon**, who reckons that the DX is pouring in! **Derek's** log shows s.s.b. reception on 3.5MHz of **CP5NU** (Bolivia) at 0740, **VE2PK/VE3** (Canada) at 0841, **ZL1BOQ** (New Zealand) at 0821, **FM5DN** (Martinique Island) at 0834, **VP8CXV** (Falkland Islands) at 0744, **VK3EUL** (Australia) at 0925, and **W2YE** (USA) at 2259UTC.

### THE 7MHz BAND

I'll start the 7MHz band slot with the log from **Sean Gilbert G4UC** in **Milton Keynes**, as he's been having so much enjoyment out of this band recently. **Sean's** log shows c.w. contacts with **LU1ZC** (South Shetland Islands), a QRP contact with **9K2ZZ** (Kuwait), **PJ5AA** (Netherlands Antilles), **WA4DAN/VP5** (Turks & Caicos Islands), **CO8ZZ** (Cuba), **J85M** (St. Vincent Island), **T17/DL6MPG** (Costa Rica), **C56/DL1DWG** (Gambia) and another QRP contact with **7X2RO** in **Algeria**, all contacts taking place between midnight and 0100UTC.

Next comes the log from **Carl**



Fig. 1.

**Mason GW0VSW** in **Skewen**, **West Glamorgan**, who has been QRPing around the bands. **Carl** says he's had so much bad QRN (natural interference) lately that it's been difficult to operate, but he managed low power c.w. contacts on 7MHz with **EA3BCU** (Spain) at 2116, **ZB2JK** (Gibraltar) at 0004, **GD3TNS** (Isle of Man) at 1108, and **SM7DRH** (Sweden) at 1224UTC, all with 4 watts output into a **G5RV** dipole.

### PROPAGATION REPORT

Someone who has been operating on the lower bands for a change is **Don McLean G3NOF** in the town of **Yeovil** in **Somerset**. He's worked **FG5FC** (Guadeloupe) QSL via **F6DZU** and **FM5DN** (Martinique) both on s.s.b. after 2300UTC.

In his monthly propagation report, **Don** says: "7MHz was in good shape most days from 2300 onwards, towards both North and South America" adding that "14MHz has been open most days during daylight hours. From 0700 - 0900 14MHz was open to Australia and New Zealand, while west coast America and Canada came in from 1600 - 1800 with some African countries heard at around the same time.

"On some days the 14MHz band was open as late as 2300. 18MHz was open most days to Australia and New Zealand around 0830 - 1000, while African stations were heard during the afternoons. The band usually closed at around 1800.

"The short path on 21MHz was open between 1000 - 1200 to Asia and Australasia, and some African states were heard during the mornings and afternoons. North Americans were prominent between 1300 and 1700 but the band closed

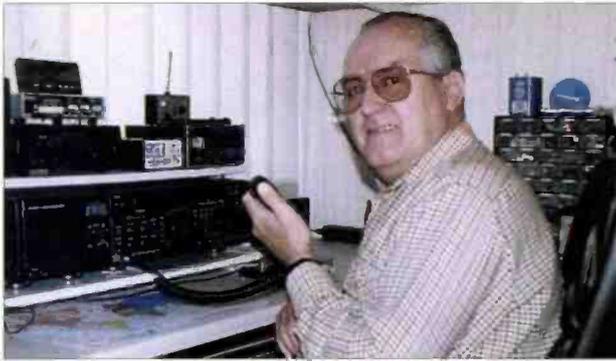


Fig. 2.

around 1800 on most days".  
Thanks for the report Don!

### THE 14MHz BAND

On the 14MHz band, Carl GWOVSW, again using QRP c.w. at 5W output, hooked up with K1GDH (USA) at 1339, 3B8CF (Mauritius) at 1657, EA8/G3IXZ/QRP (Canary Islands) at 1701, and 4X5ORE (Israel) at 0811, while a brief excursion on s.s.b. netted a contact with VE3DOH (Canada) at 1553UTC.

Meanwhile, Don G3NOF worked a nice one in the shape of PA3HEN/MM off the coast of Angola. Next came YB1YMN (Indonesia), ZD7CTO (St. Helena Island) QSL via KB2MS, 5H3HG (Tanzania), and 9X0A (Rwanda) QSL via DL5WMM, all using s.s.b.

Back to Ted G2HKU now again 'on the key' who lists his 14MHz contacts with 9K2ZZ (Kuwait) at 1500. Operating later, at 1700 brought in W6OV (west coast USA), 9X0A (Rwanda), EA8CN (Canary Islands), VE7NH (western Canada), and Z56QU (South Africa).

The 14MHz band is where it was at in February for Sean G4UCJ, who worked 3W5RS (Vietnam) at

1634, YN4/TI5SU (Nicaragua) at 2325, DF5WA/6YS (Jamaica) at 2310. Then came A45XR (Oman) at 1633, 6W1RE (Senegal) at 1741, BV7FC (Taiwan) at 0908, HF0POL (South Shetland Islands) at 2102, HP1AC (Panama) at 1255, a QRP contact with EP2MKO (Iran) at 1357, E21EJC (Thailand) at 1239, and 5X1IZ (Uganda) at 1537UTC.

The 14MHz band also brought in a lot of 'juicy' DX for listener Derek BRS 171057. His log indicates s.s.b. reception of JA6LJN (Japan) at 0830, ZL2UO (New Zealand) at 0920, VK3EUL (Australia) at 0925, RZ0SI (Asiatic Russia) at 0751, and 7X5BE (Algeria) at 0853UTC.

### THE 18 & 21MHz BANDS

The 18 and 21MHz bands have been the main 'hang out' for Charlie Blake M0AII, even though he's been busy with non-radio activities lately! Charlie (See Fig. 2) works all s.s.b. on these bands, and has hooked up with A41LZ (Oman) at 1200 (QSL via Box 2837, Ruwi, CP112, Oman), ZB2AZ (Gibraltar) at 1057, and

special call CT98EEN (Portugal) at 1341, all on 18MHz.

Operation on 21MHz brought Charlie VU2DK (India) at 0935, 3V8BB (Tunisia) at 1234, 9K2OK (Kuwait) at 1259, A61AS (United Arab Emirates) at 1018. Finally there was special event station CT98DNP (Portugal) at 1228.

Down in Yeovil, Don G3NOF has logged s.s.b. contacts with BV5BG (Taiwan), CT3/G3LQP (Madeira Islands), HL3VQ (South Korea), K4TZ/AM (over the Atlantic), JT1C (Mongolia), TF3FK (Iceland). Also worked were TU5GV (Ivory Coast) QSL via F8BEM, VP2EKS (Anguila) QSL via HB9KS, XT2DP (Burkina Faso), YS1X (El Salvador) QSL via OH2BU, 6W1QV (Senegal), and 8Q7AA (Maldives Islands) - (QSL via N7TX).

### THE 28MHz BAND

Last but certainly not least comes the 28MHz band. Here, Pat G3OUC in Newbury, having built a 10W s.s.b. rig for 28MHz, has been having some fun with it on the band. Based on a design from the *Solid State Design for the Radio Amateur* book, in conjunction with a dipole up at 10 metres.

Pat notes contacts with TA3D (Turkey), Z55PT (South Africa), EK4GK (Armenia), 5B4JE (Cyprus), UA4RZ (European Russia), UA9FGR (Asiatic Russia), SV1DKL (Greece), VE3SRE (Canada), and WD4NGB (USA). All were worked in less than five months, with a QRP 28MHz rig - not bad for QRP sideband on an often 'dead' band, eh? Keep up the good work, Pat!

### SIGNING-OFF

Well that just about wraps it up for this month, and it's signing-off time folks. My usual thanks to all reporters and correspondents for

your information and other publication material, that's what makes the column what it is. New reporters are more than welcome, so keep up the good work, and good DXing to all of you!

**Editorial note:** *It's essential - if you wish to have your reports included in this column - to ensure that you provide full information on transmission/reception mode, power levels, frequencies, times of operation and antennas used. The column is aimed at helping everyone to get the best out of h.f. operation and not to provide 'personal score' listings! Help Leighton to help you! Rob Mannion G3XFD.*

THAT'S ALL FOR THIS TIME, SO UNTIL NEXT TIME CHERIO.

73 Leighton GWOLBI

## RADIO 'SCAPE

REPORTS & INFORMATION TO ME PLEASE.

◆ MIKE RICHARDS G4WNC, PO BOX 1863, RINGWOOD, HANTS BH24 2ZD.

◆ E-MAIL: mike.elaine@btinternet.com

◆ WEB SITE: <http://www.btinternet.com/~mikespage>

MIKE G4WNC REPORTS ON THE RADIO RELATED SITES HE'S FOUND WHILST 'SURFING' THE WEB.

Following-on from last month's session on the choice of high speed modems for Internet access, I'm glad to be able to report that we now have an international standard at long last.

Just to refresh your memories, the problem came from the two, incompatible, systems of achieving 56kbs data rates. Rockwell had developed their K56flex system whilst 3Com's system was known as X2™. Although both achieved largely the same result, i.e. a maximum transfer rate of 56k, the systems could not talk to each other. This left modem buyers with the frustrating problem of not knowing which one to buy.

The solution to the ongoing arguments has come from the ITUs Study Group 16 which finally announced the new ITU 56K(a) V.90 standard on February 6 this year. Not surprisingly, the new standard is a compromise between both the K56flex system and X2™.

Following the ITU announcement, the next important step was for the two main players, Rockwell and 3Com, to start tests to ensure their versions of the new V.90 standard really would talk to each other. The initial tests were completed on February 17 and have proved that their new V.90 software

### PW LISTENING & OPERATING WATCH LIST

All times in UTC

**Charlie Blake M0AII** listens & operates: 0500 - 0700 on 7.061MHz s.s.b. with an NRD 525 receiver and sloping wire antenna.

**Steve Locke GW0SGL** operates: 1100 - 1500 most days around 14.180MHz s.s.b. using a Kenwood TS-940 (beam antenna temporarily out of commission due to damage).

**George Woods G3LPT (Suffolk)** operates: an open net on 29.570MHz f.m. every weekday morning (except Mondays) at 0930.

**Don McLean G3NOF** operates: 1030 Saturdays on 3.685MHz on the ISWL Net or 1030 Sundays on the Yeovil ARC Net 3.665MHz s.s.b. using a Kenwood TS-950 & trapped dipole antenna.

**John Wheeler G0IUE** monitors: 28.5MHz s.s.b. every evening between 1700 and 2200 regardless of conditions using an Icom IC-706 and a two element TET triband beam antenna.

**Leighton Smart GWOLBI** operates: Some weekday evenings at around 2100 - 2300 on 1.949MHz s.s.b. using a Yaesu FT-747 transceiver and a long wire Marconi antenna.

**Rob Mannion G3XFD** listens and operates: (weekdays & weekends) 1800 - 1830 on 3.7MHz 100W s.s.b., & 3.530MHz QRP c.w. using an Alinco DX - 70 transceiver and long wire antenna. Also at 2300 on either 3.530, 7.025MHz (c.w.) or 3.7MHz s.s.b. Occasionally on 7.025MHz c.w. between 0100 - 0200. (All operation dependent on PW work load!).

**Sean Gilbert G4UCJ** operates: around 0700 to 1100 and 2100 to 0000 seven days a week on 14MHz and 7MHz c.w., using an FT-307 and Alinco DX70 transceivers at 5/25W output and a G5RV dipole antenna in the loft space.

**T. Ibbiton G0VTI** operates: each evening between 1900 - 2000 on or around 7.020MHz c.w., or 14.035MHz c.w. using a Ten Tec Scout at 50W.

MIKE GAWNC OFFERS SUGGESTIONS ON WHERE TO FIND RADIO RELATED SITES ON THE 'NET

# RadioScene

is a true standard with full interworking between systems.

This is great news for you and I, and means that it is now safe to go out and buy that new 56k modem - provided of course that it has been upgraded to the new V.90 standard. Most manufacturers are well advanced with the release of the new modems so they should be in the shops by the time you read this.

If you've already bought your modem, don't worry, as most modern 33.6k modems are flash upgradable. This is where you can effectively load a new set of software yourself.

The best way to see if your modem is suitable is to look-up your modem manufacturer on the Internet. You should find that just about all the manufacturers have some form of on-line help for software downloads. If it's not obvious from the front page, try going to their support page.

If you want to keep bang up-to-date with what's happening with V.90 take a look at the Internet 56k site which can be found at <http://www.56k.com> If you've any hints or tips to offer please drop me a line.

## FILE TRANSFERS

Whilst most newcomers to the Internet spend most of their time using just their Web browser to get around, there are other systems that can, at least in some cases, prove much quicker. One that I find particularly useful is File Transfer Protocol. Although it sounds complicated, it really is very simple to use and can be a very quick way to find and download software from the Internet.

One of the reasons for wanting to use more than one system to work with the Internet is linked to the way in which your computer handles data travelling to and from the Internet. I mentioned WINDOWS SOCKets or WINSOCK last month and it's this part of the system that effectively gives you a number of connections to the Internet using the same dial-up connection. I know it sounds complicated, but it's best visualised rather like a mains extension block that lets you connect several appliances to the same power outlet.

In the WINSOCK system you can run several different programs that each use the Internet at the same time. The benefit of this system is that you can be looking around the Internet using a Web Browser whilst leaving the File Transfer Protocol (FTP) program to download the latest software.

Let's take a slightly closer look at what this FTP is all about. In order to make use of FTP you first

need to get your hands on some client software. This is not too difficult as most Internet Service Providers included an FTP program in their main software package. If yours doesn't then there's plenty of shareware and freeware systems available on the Internet.

A good place to look for applications is Stroud's

business of moving files, let's take a look at just how you get connected to another computer on the Internet. Once you've got your client software you next need to find a site to connect to.

Now most software clients come ready set-up with most of the larger FTP sites already loaded. If yours doesn't, then try using the following site: [ftp.funet.fi](http://ftp.funet.fi) This popular Finnish archive happens to be particularly good for radio related software.

Once you've typed in the address you can then ask for the program to connect you. Not surprisingly, when you log on to another computer on the Internet there has to be some restrictions as

automatically default to anonymous login.

Once you're logged-on, moving around is really very simple indeed. You can use the small folder icon to move about the computers disk space and to change directories.

When you find a file you want you just double click on it to start the retrieval process. Incidentally, this download is supplemented by a progress bar that usually shows both the transfer rate in bits/second and the progress.

In the more sophisticated FTP programs such as *CuteFTP* you even have the option to make particularly good use of the index file. This index file is simply a text file that contains a one line description of each of the programs in that directory.

With simple systems you have to download and view the index file to find out more about the programs. In *CuteFTP* you can set the program to automatically download this file and display the one line descriptions right next to the program listing in the main window. This really transforms browsing around FTP archives.

## SPECTROGRAM

If you've got *Windows '95* loaded on your PC then one item of radio software that you really ought to get yourself is the excellent *Spectrogram v4.1.2*. This incredible freeware program gives you real-time spectrum analysis at your finger tips.

The latest version of the *Spectrogram* program is particularly useful because of its real-time analysis modes. For the radio amateur the Scan Input mode is probably the most useful because you don't have to make a recording of the audio signal you want to analyse. In this mode the program will analyse and display the signal in real-time without consuming vast quantities of valuable hard disk space.

The most obvious use for the program is as a very sophisticated tuning aid for anyone with an interest in the data modes. However, you can also use it very successfully to look at all types of audio signal.

If you want a copy of *Spectrogram* you should find it at: [ftp.funet.fi/pub/ham/misc/gram412.zip](http://ftp.funet.fi/pub/ham/misc/gram412.zip) If it's disappeared from that site, just search around the popular archives for the filename.

## SPECIAL OFFERS

If you'd like a copy of Hamcomm/VFAX, etc. I've arranged a very special offer with the **Public Domain and Shareware Library (PDSL)**. They have put together a library set of all five disks for just £12 all inclusive.

Using PDSL also makes ordering simpler as they accept all the usual credit cards so you can order by 'phone - you don't even have to write a letter! Please direct all orders and enquiries about this disk set to **PDSL Winscombe House, Beacon Road, Crowborough,**

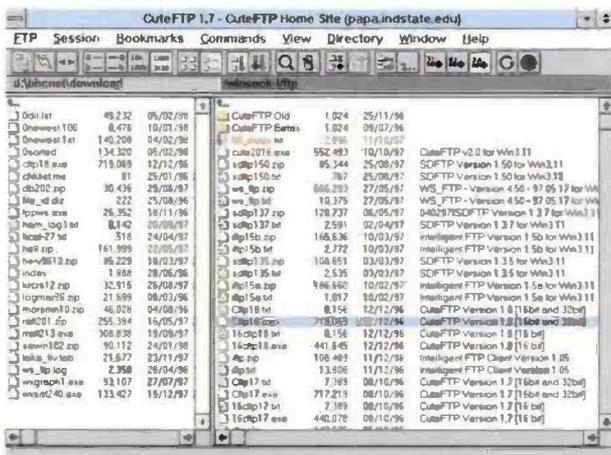
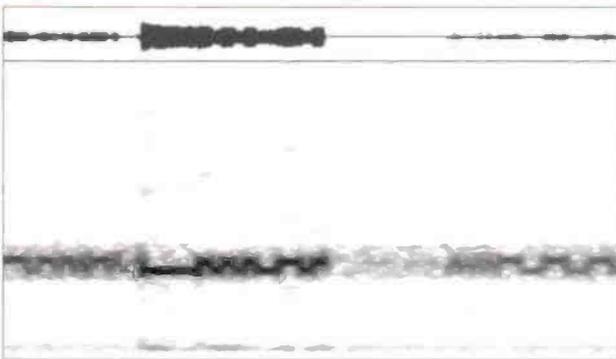


Fig. 1: A screen shot from the CuteFTP program which as you can see is very similar to Windows File Manager or Explorer.

Fig. 2: Spectrogram analysis of a Pactor signal.



Consummate Winsock Site which can be found at <http://www.cws.com> My personal favourite is a neat program called *CuteFTP*. This is one of the most complete FTP applications around and includes a host of really useful features.

I've included a shot of the main screen of the *CuteFTP* program in Fig. 1. As you can see, it looks very similar to a *Windows File Manager* or *Explorer*. This is deliberate as FTP is all about moving files from one computer to another and what better way to show the available files than to use the File Manager format.

However, before I get into the

to what you can do within that computer. Without these limitations you can bet your boots that some bright spark would take great delight in deleting all the files!

The restriction operates by requiring all users to log-on. If you happen to be a fully authorised user of that computer you will have some form of username and special password.

However, you can log-on with read only access by using what's become known as anonymous 'login'. With this system you just use 'anonymous' as your username and your E-mail address as your password. With many of the better FTP packages you will find that they



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73 from Dave G4KQH, Technical Manager.

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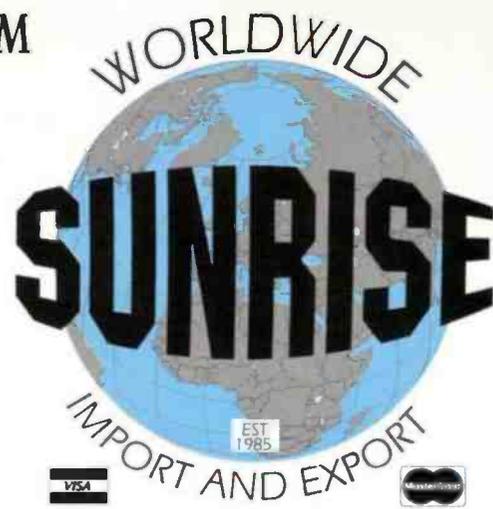
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**Garmin GPS45XL GPS hand-held**, as new, £125 o.n.o. Sony AIR7 scanner, £75. Trio TR-9000 2m (144MHz) multi-mode, v.g.c., offers to Brian on (01977) 684394 evenings.

**Goldstar 20MHz 2 channel oscilloscope** with function generator DS9020G, cost over £400, still boxed with instructions, also probes, only used once, £250 o.n.o. Tel: Middlesborough (01642) 879709 after 3pm.

**Goldstar oscilloscope**, 20MHz, dual trace, built-in generator, 0-100MHz, boxed as new, current model, £295 o.n.o. Win108 airband radio, 108-136MHz, 20 memories, leather case, NiCads, £99. Russ, S. London. Tel: 0181-308 1704.

**Halicrafters S37 wartime u.h.f. RX**, 128-214MHz, g.w.o., £135. V rare model. Fellowcrypt Super, oak-cased, crystal set with original BBC headphones, £280. Rascal RA17L, handbook, leads, £145. Gulf war Iret PRC439 portable, charger, handset, £100. Tel: Yorkshire (01482) 869682.

**Heathkit RA1 receiver**, used condition, working, with manual, £25. G3ZCF, QTHR. Tel: 0181-777 1315.

**HQ30 short wave antenna**, as new, £30. Grid dip meter, as new, £30. Antron antenna, £25. Tel: (01487) 823879.

**Icom 2900**, mint condition, complete with manual and brackets, selling on behalf of silent key owner, just been 'MOTed', any test welcome, £200 + postage. Andy G0VYS on (01904) 789324.

**Icom 290E 2m (144MHz) 10W** u.s.b./s.b./c.w./f.m., boxed transceiver with manual and microphone, £100. Collinear base antenna, preset a.t.u. also available, £20. DRAE v.h.f./u.h.f. wavemeter, £20. PSU, £20. John G4UBB on 0181-868 7684.

**Icom 706 MkI** h.f./6/2 clean radio, only used on six and two, never been used mobile, TX/RX mod done, s.s.b. narrow filter fitted, £650, no offers, post paid. Don GWOPLP, Cardigan. Tel: (01239) 811157 answer-machine (I'm a shift worker).

**Icom 706 MkII**, mint, boxed, manual, etc., £795 o.n.o. Sony Maxica FD7 10X zoom digi camera, £450. Tel: Kent (01232) 528182.

**Icom 706**, £595. KW-107 a.t.u., £95. KW s.w.r. match, £15. Heathkit scope 1018U, £25. RSGB 1997 Calbook, £2. All as new, offers, plus carriage or collect. Ted Trowell G2HKU, Kent. Tel: (01795) 873100.

**Icom 737**, fitted 9MHz & 455kHz c.w. filters, HM10 mic., handbook, boxed, in pristine condition, with DRAE 24A p.s.u., buyer collects or carriage extra, £850. Gordon G3ZFZ, Barrow. Tel: (01229) 827701.

**Icom 820H dual-band all-mode transceiver**, 2m/70cm (144/430MHz), boxed, mint, £850. MuTeK transverter: 2m to 6m (144-50MHz), £130. Martin G7VOX on Tel/FAX: (01725) 517379.

**Icom Z350H dual-band mobile radio**, excellent condition, boxed, £275. Kenwood TH-215E 2m (144MHz) hand-held, soft case, battery and charger, spare AA battery case, speaker microphone, boxed, excellent condition, £140. Mark M0BLT, West Midlands. Tel: (01384) 279662 after 6pm please.

**Icom IC-281H mobile TX**, 144-146 TX, 430 440 RC, as new, £150. Tmeswave DSP9+ audio noise reduction filter, £50. All plus postage. Bill on (01782) 624838.

**Icom IC-725 multi-mode transceiver**, full coverage plus FC-700 a.t.u., £425. Datong Morse Tutor, £50. Hi-mound Morse key, £40.

Transverter RN Electronics 28/50 (new, boxed), £150. AKD 2001 transceiver, £70. Tel: (0976) 642244.

**Icom IC-R7000 v.h.f. receiver**, 25MHz to 2GHz, coverage c.w., a.m., s.s.b., f.m. mods, plus aerial, £495. Also Yaesu FT-23R 2m (144MHz) hand-held transceiver, £150 o.n.o. Both boxed with manuals, excellent condition. Greg on (01926) 336587 or E-mail gregoryfox@compuserve.com

**Icom ICR-71E receiver** with optional IC6X257 f.m. unit and RCII remote controller, boxed with manual, mint condition, cost £1100, want £500, would consider exchange for amateur radio gear. Tel: (01937) 844197.

**Icom R70 communications receiver** with f.m. unit fitted in, mint condition with manual and aerial tuner and amplifier, made by Hamgear, £400. Tel: Nelson (01282) 618548.

**Icom twins IC-215 2m (144MHz) Lm**, portable, fully crystallised and IC-202S c.w./s.s.b. portable, both good condition with manual. Eddystone 750 with Howes digital read-out, original speaker and S-meter. G3HCM, York. Tel: (01904) 608733.

**Kenwood TH-77E 144/430MHz f.m. dual-band**, charger, manual, etc., £180. Netset PR044, still boxed, brand new, £70. Realistic DX-394 short wave receiver, brand new, £110. Alan, Stockton-on-Tees. Tel: (01642) 535621 Ext 261 after 6pm.

**Kenwood TS-440 SAT**, boxed, immaculate condition, leads and mic., internal a.t.u., 40ft Tennamast, telescopic tilt type, 440SAT, £650. Mast, £50. Tommy M0B0C, Rochdale. Tel: (01706) 665435.

**Kenwood TS-50**, fitted c.w. filter, matching auto a.t.u. AT50. PG 4m control lead to boot mount the a.t.u., all as new, original packing, manuals, mic., etc., Manson 30A metered p.s.u., £850. G4FEQ on (01977) 668170.

**Kenwood TS-530SP** c.w. and s.s.b. filters, boxed, manuals, plus VFD230, excellent condition, buyer collects or pays carriage, £500 o.n.o. Mike G3TMB, QTHR. Tel: (01704) 214012.

**Kenwood TS-5700** h.f. d.s.p. transceiver, 100W output, s.s.b. filter fitted, as new, boxed with manuals, bargain, £795 plus carriage. Terry G4OXD on (01462) 435248 after 6pm.

**Kenwood TSU-7 CTCSS board**, unused, £28. IC-575 front panel, new, unused, £18. FT-757, IC-728 front panels, £10 each. MD1 desk mic., £45. Microset 70cm (430MHz) amp + pre-amp, unused, £55. Storno 4000, £25. Tel: Watton (01953) 884305.

**Low HF-150** with manual and p.s.u., good condition, £230 o.n.o., looking for desk top scanner of similar value, make not important as long as it works well. Colin on (01475) 786831.

**Medium duty Emotator rotator** with support bearing and brackets, 2m and 70cm (144/430MHz) Vargarda antennas, cables, etc., buyer inspects and collects, £100 o.n.o. G8BXC, Cheshire. Tel: 0161-962 7927.

**Microwave Modules 144/100LS 2m (144MHz) 100W linear amplifier** with audio

pre-amp, as new, bargain, £120. Pakrait PK232 MBX Packet TNC all mode Packet, RTTY, c.w., etc., as new, £200. MFJ 949E Versa Tuner 2 top of the range h.f. a.t.u., covering all bands, as new, £125. Tel: (01294) 463114.

**Kenwood TS-950SDX digital transceiver**, immaculate, £1750 o.n.o. Ken on 0191-253 0504 anytime.

**Microwave Modules 144/100LS 2m (144MHz) 100W linear amplifier**, as new, bargain, £120. Pakrait PK232 MBX Packet TNC, all mode Packet, RTTY, c.w., etc., as new, £200. MFJ-949E Versa Tuner 2, top of the range, h.f., a.t.u. covering all bands, as new, £125. Tel: (01294) 463114.

**Military radios: R209, £75**. Cossor CC3, £30. A41 manpack, £75. Reddon GR479 transceiver, £195. USA PR6 walkie-talkie, £75. 19 Set, complete with accessories, £285. Ex RAF Rohde Schwarz v.h.f. receiver, £99 o.n.o. Tel: (01482) 654915 after 6pm.

**MM transverters**, all 2m (144MHz) input, c/w info., leads, attenuators 1, 432MHz c.w. repeater shift, £100. 2. 70MHz, £100. 3. 28MHz, £25. All 10W (15W p.e.p.) output, buyer inspects and collects. Barry G4LKF, Corby. Tel: (01536) 260598.

**Moseley rotating dipole 20, 15, 10** heavy duty, new condition, 4 months old, £150. Yaesu G450XL medium duty rotator, 4 months old, £200 o.n.o. Tel: Milton Keynes (01908) 265546.

**New Kenwood AT230 a.t.u. and s.w.r. meter**, £125 o.n.o. AD1 AR-146 2m (144MHz) mobile transceiver, 5-10-50W guaranteed, new, boxed and new W-30 2m (144MHz) antenna, £175 o.n.o. Tel: (01246) 236496.

**Nordmende Galaxy 4404**, 5-18MHz, f.m. not working, hence only, £60 o.n.o. Grundig 3500S solid state 1.6 to 30MHz, £70. Grundig RR-640 professional stereo 6.16 s.w. tape deck, l.w. m.w., f.m., £60 o.n.o. Hacker Herald m.w./w., £60, v.h.f. model, £70. Peter, Cheshire. Tel: (01928) 773628 anytime.

**NRD-515** 0.10-30MHz continuous coverage, three filters (0.6, 2.4 & 6) PBT c.w. matching speaker, excellent condition, boxed with manual, £430 o.n.o. Tel: 0161-283 1689.

**Pair PRCT7 Vietnam 'backpackers'**, £550. Deutscher Kleinempfänger C. Lorenz AG Third Reich Bakelite, £250. Eddystone 740, serviced, £75. Eddystone speaker, round, £38. 88 Sets, £30. 18 Set, £40. Tel: (01326) 241054.

**Philips 1950s reel-to-reel tape recorder**, type E1352704, belts perished, otherwise thought to be OK, contains EF86, ECC83, ECL82 and level indicator DM71, £35. Tel: (01349) 862482.

**Phillips synthesised world receiver** model D2935 including amateur bands with b.f.o. plus f.m. memories, manual, £75 o.n.o. Tel: Middlesex 0181-575 7984.

**Power reducer**, 20W, 10W, £15. 200V to 100V 100VA, £17. Mic. Teardrop, cost £48, accept, £25. Grundig 5000 satellite wireless, offers. Wanted decoder, price around £100-150, low pass filter, 21-30MHz. John on (01263) 221870 after 6pm.

**Rascal 9901 freq. counter/timer**, 50MHz, good condition with manual, £50. Sony AIR-7 airband scanner, also converts broadcast, long, medium and f.m.), boxed with manual, excellent condition, £115 o.n.o. Tel: Yorks (01904) 608733.

**Rascal RA117**, Rascal side-band fine tuner converter, Rascal RA17 power supply, 2 x 6V 2A, matching 19in front panel, all working, must clear, £150 the lot o.n.o. G3PNH, QTHR. Tel: (01249) 653548.

**Rascal RA17L** plus LF, 12-980kHz unit in Rascal case, absolute mint condition and working order, inside like new, buyer can listen but collects only, bargain £295, no offers. Tel: (01535) 630361.

**Realistic PRO-2042 base scanner**, boxed, as new, few hours use, £200 o.n.o. Yupiteru MVT-7100 scanner, boxed, as new, few hours use, £175 o.n.o. Nigel on (01279) 721680.

**RadCons** from mid-50s to current, offers. Tel: (01494) 530018.

**Realistic PRO34**, 200 channel hand-held scanner, a.c./d.c., complete with charger, manual, good condition, u.h.f./v.h.f., all usual frequencies covered, £95 including postage. Dave Wilkinson on (01983) 854766.

**Receiver R7020** by C & N Electrical, 11. 3MHz bands between 600kHz and 32MHz, full data and circuits, £100. Tony on (01905) 641759.

**Receiver, Marconi CR100Z**, 600kHz to 30MHz with manual. Receiver R210, 20-16MHz with circuits, etc. Power amplifier, Zetagi B40 v.h.f. s.s.b./a.m. 35W, electronic multimeter CT471C with manual, reasonable offers please. David on (01634) 220747 any time (leave message if necessary).

**Receivers:** 52, 19 MkII, BC-342N, 88, BC-348, HRO AR88, 2174A, 1307A, TC56, HF-225, NEMS Clarks, DEI, W/J, SDU, a.t.u.s, AT-2000, Redifon, Joymatch, Mizuho KK-2, Hamgear, ERA Microreader 4.2, RS-232, also test equipment. Bob Wright, 247 Sandy Lane, Hindley, Wigan, Lancs WN2 4ER, Tel: (01942) 255948.

**RF coils transformers** and modules by Electronics, Eddystone and Denco, s.a.e. for list. Tony, 19 Jacobson Road, Worcester WR2 6QW.

**RF p.a. valves**, new, boxed 6JE6C USA, £20 the pair. 6146B USA, £20 the pair. P/P £1.50, for valve list, send s.a.e. G. R. Balfour, 6 Kirkden St., Frockenheim, Arbroath, Scotland.

**Scanning receiver JIL SX400 base/mobile**, 12-14V d.c., 26-520MHz, no gaps, all mode, 20 memory channels, 2 speed scan, new, unused, £200. Kenwood R600 150kHz to 30MHz, v.g.c., £175. Eddystone 990S, v.g.c., £80. Tel: Poole (01202) 668446.

**Shack clear out** gear for h.f. 6m (50MHz), 2m (144MHz) and 70cm (430MHz), rigs and bits, please phone for info. Peter on 0117-963 3306.

**Sommerkamp FRDX 500 RX** and Yaesu FLDX 400 TX with manuals plus mic, g.w.o., excellent condition, £175. Richard, Cheltenham. Tel: (01242) 239196 evenings.

**Sommerkamp FT-277ZD** 160-10m (1.8-28MHz), d.c.-d.c. converter, 12V on 240, £300 o.n.o. Yaesu FT-7B 50W out, variable mode h.f., £195 o.n.o. Alnico DR110/T 2m (144MHz) 5/45W mobile, CTCSS, used daily, £100 o.n.o. Alan G40JN, QTHR. Tel: Essex (01277) 624386.

**Sony 2001D** with mains p.s.u. and manual, £100. BND5 2m (144MHz) linear, 10W in, 160W out, £100. Tel: (01392) 274607.

**Swan 100MX 100W 5 band transceiver** with m.c. and handbook, £150 o.n.o. G3KIP, QTHR. Tel: Kent (01892) 547643.

**Sony AIR7**, boxed, inst., excellent condition, £150. Sony ICF-7600D, mint, £75. Panasonic DR22, good performer, many features, £60. Signal RS35 v.h.f.-u.h.f., airband, good condition, £220 o.n.o. Tel: Hull (01482) 353192 evenings.

**Standard C528 hand-held dual-band inc.** CTCSS board, £150 o.n.o. Tel: Doncaster (01302) 852411.

**Tektronix twin beam oscilloscope**, model 2225, 50MHz with probes, £280. Two modern power units, MML 200W, MML 600W by Omega, adjustable O/Ps, offers. Wanted Philco radio model 444. Tel: (01872) 862291.

**Trio TS-530S h.l. transceiver**, spare p.a. valves and handbook, £275. David G4JH on (01403) 252101 after 6pm or weekends.

**TS-430S, PS-430S, SP430**, narrow c.w./s.s.b. filters, mint, boxed, manuals, £800. FRG-100, p.s.u., mint, boxed, manuals, Global AT1000 a.t.u., £300. G0LDM, Hants. Tel: (01705) 601174 evenings and weekends.

**TS-520SE s.s.b. transceiver** with d.c.-d.c. converter for 12V operation, handbook, £225, buyer collects. Tel: 0118-969 3173.

**TS-850SAT**, v.g.c., £800. TS-130S, £300. FT-530R inc. spkr/mic., + spare battery, £260. YK88CN suit TS-830/130, £20. Senal

interface, suit 850/950, £20. All v.g.c., wanted Heil headset/bcom mic, w.h.y.? John, Dorchester. Tel: (01305) 854039. E-mail: swayman@compuserve.com

**Two sectioned 25' steel mast**, rotator, control unit, two 8-element 2m (144MHz) yagis, £150. DRAE power unit, Microwave Modules 30V pre-amp, v.s.w.r. meter, £100. Yaesu Z30R, complete with charger, £150. Tel: Oxon (01865) 374868.

**Watkins Johnson 373a RX**, 500kHz-30MHz v.g.c., £250. Racial RA1772 RX, 0-30MHz v.g.c., £550. Racial RA1752 RX, all filters, 0-30MHz v.g.c., £1050. Redifon R800 v.l.f. v.g.c., £500. Motorola HFI 0-30MHz, all filters, digital professional RX, as new, £1100. Eddystone 1650 all options, as new, £1100. Tel: (01323) 467919.

**Yaesu 1012D MkII**, WARC, f.m., manual, new p.a., FC-902 a.t.u., SP901 speaker, all in perfect condition, selling as full line up, £500. Tel: Cheshire 0161-427 1009.

**Yaesu 7700**, box and instruction book, plus 2m (144MHz) converter, also indoor Datong aerial, model 270, £270 the lot. Also Microreader ERA RS232 with printer port, £160 for both, good reason for sale. Tel: Rochdale (01706) 866363 no calls after 6pm please.

**Yaesu FRG-7 receiver** with fitted extra filter, f.m. squelch and extended cover airband up to 2m (144MHz) amateur band, very clean with all manuals, ideal for newcomer, £130. Alan, Sheffield. Tel: 0114-288 7088.

**Yaesu FRG-7**, 500kHz to 30MHz receiver, fitted with 2kHz selective filter, s.s.b. filters and dry cell battery holders, £110. Timestep DFC7 digital read out for FRG-7, £20. Thander digital CRO adaptor, £45. John G7EJK, Uttuxeter. Tel: (01889) 564477.

**Yaesu FRG-7700 communications receiver**, 150kHz to 30MHz, good condition, book, £185. VHF unit for FRG-7700 or 8800, £35. Global a.t.u., £35, postage extra. Tel: 0181-549 2612.

**Yaesu FT-1012 h.f. RX/TX**, good condition, £250. Multi-band aerial available if required, £60. Tel: W. Yorks (01484) 718353.

**Yaesu FT-1012D**, a.t.u., speaker, £300 or swap for 8 track reel-to-reel tape recorder. Andy, Watford. Tel: (01923) 441866.

**Yaesu FRG-7700 receiver**, 0.15-30MHz with FRT-7700 a.t.u., immaculate, £200. IC-211E 2m (144MHz) MuTel front-end, £250. MML144/100 linear amplifier, £80. All in v.g.c., one owner, original boxes and manuals. Terry M0BLC, Romford. Tel: (01708) 449335.

**Yaesu FT-290 MkII**, boxed, good condition, multi-mode with rechargeable cells, £275 o.n.o. Henry, Kent. Tel: (01322) 274999.

**Yaesu FT-736R v.h.f./u.h.f. transceiver**, 2m/70cm (144/430MHz) voice module fitted, matching SP767 speaker with filters, all mint and boxed, carriage extra, £1050. Craig G1OLT on (01246) 410409.

**Yaesu FT-73R u.h.f. hand-held**, £60. Kenwood TM251E 2m (144MHz) mobile, £200. KPC3 TNC, boxed, £60. Neil, Plymouth. Tel: (01752) 481558 evenings/weekends.

**Yaesu FT-747 c/w mic**, c.w. filter, but no f.m., £330 o.n.o. GW3COI, Abersoch. Tel: (01758) 712675.

**Yaesu FT-747GX f.m. board fitted**, FP21 power supply included, v.g.c., £325. Paul on (01983) 821808 after 5.30pm.

**Yaesu FT-747GX** with f.m., excellent condition, complete with microphone power cable and manual, £375, no offers. Buyer collects or pays carriage, genuine reason for sale. Simon GMDPHS on (01866) 822679.

**Yaesu FT-757GX h.l. transceiver** with FC-757, fully auto a.t.u. unit and 20A power supply, £500 o.n.o. or swap FT-690 and cash, house move forces sale. Stefan 2E1GG, Suffolk. Tel: (01728) 724186 or (0860) 920900, E-mail monza@lanie.demon.co.uk

**Yaesu FT-757GX MkII**, Yaesu FP-757HD p.s.u., Yaesu FC-757 a.t.u., Yaesu desk mic, MD1 B8, Yaesu hand mic., MH1 B8, PDL 2

quad antenna, every single item pristine condition and still boxed, never used, £700 the lot, will not split! Mark on 0181-558 7892.

**Yaesu FT-900AT**, immaculate condition, boxed as new, £900. Alnico DJ-580 twin-band hand-held, case, extension speaker, mic., spare battery, charger and manuals, £195. Outbacker Perth with triple mag mount, £125. Tel: 0181-854 9589.

**Yaesu KR250 rotator** and control box, almost new (rotator has been in loft), includes instruction manual, very good condition and working order, £100, includes postage by registered post. Tel: (01273) 720007.

**Yupiter MVT-7100 scanner receiver**, as new, only a few hours use, bargain at, £175 o.n.o. Lowe PR-150 pre-selector with power supply and manual, excellent condition, £110 o.n.o. Nigel Clarke on (01279) 721680.

**Zetagi B300P 12V 3-30MHz 300W mobile** amp with pre-amp, very little use, as new, boxed, £65. Yaesu MD1 base mic., £45. FT-1012D spares, c.w. filter, £25. FM board, £25. Cooling fan, £20. Tel: Watton (01953) 884305.

**Exchange**

**1155 receiver**, unmodified in original RAF Transit case for Digital short wave radio or Heathkit SV717, Codar CR70A, Eddystone 840, w.h.y.? Tel: (01450) 379217.

**Datong auto speech processor**, D70 Morse Tutor, Microwave 2m (144MHz) pre-amp, Mydel trap dipole (new), Wanted h.f. vertical or exchange, w.h.y.? G3NDC on (01772) 703957.

**Exchange my mint Sony TC-200 3 1/2 ips** speed 4-track professional reel-to-reel stereo recorder in original box for Sony older type (not compact) world zone receiver or sell. Interested party collects. Tel: 0161-743 1570.

**FT-726R dual-band base station**, f.m., c.w., s.s.b., satellite module fitted, totally mint and original inside and out, would exchange for IC-706, must be mint condition or w.h.y.? h.f. gear. Tel: Norfolk (0468) 756762.

**Icom R71E RX** for Racial h.f. comms RX, type RA1792, difference if any settled in cash, will collect. Tel: N. Hampshire 0118-912 476.

**Panasonic NV-R338 VHS-C camcorder**, complete with batteries, charger, tripod, films, in mint condition, used twice only, exchange for solid state h.f. transceiver, must also be in mint condition, Icom 740 type. GW00SQ, Pontypool. Tel: (01494) 757221.

**Swap my varied collection of domestic receivers** (valve), including Bakelite, wooden cases, console sets, portables, etc., (list available) for good h.f. communications receiver or old VOX guitar amp. Tel: (01482) 869682.

**Yaesu FT-77 + microphone**, power lead, mobile mounting bracket + workshop manual and FC-700, manual, a.t.u., leads, operating manual for Icom 6m multi-mode or Icom 2m/70cm (144/430MHz) multi-mode dual-bander G4XP, QTHR. Tel: (01388) 747018 after 1830.

**Wanted**

**2m (144MHz) QRO amp**, home-brew OK 2X 4CX250, must be full working order. Kevin G7SVF on (01983) 296924.

**6m (50MHz) module and CTCSS unit** for Yaesu FT-726R desperately sought by disabled enthusiast, unable to upgrade to less than 10 year old gear, satellite enthusiasts, is yours surplus to requirements? Mr K. Burrows, 10 Basil Street, Stockport, Cheshire SK4 1QL, (messages with luck) evenings only on 0161-477 5303.

**11, 12, 21 Sets**, any military sets, keys, old brass mil. types, crystal sets, basket weave coils, Eddystone EC10, EB35, have spare 128, 46, 19, BE-201, exchange for other sets. Ben on (01562) 743253 or 106312.1035@compuserve.com

**A mini beam for 10m (28MHz)**, also rotator for same, fair price paid, will collect reasonable distance. Tom, Northants. Tel: (01536) 522007.

**All early wireless gear**, crystal sets, valves, horn speakers, top prices paid for items made by Marconi, Burndept, Pye, BTH, Geophone, Ericsson, serious collector, will pay well and collect any area. Jim Taylor G4ERU, 5 Luther Road, Winton, Bournemouth BH9 1LH, Tel/FAX: (01202) 510400.

**Almost given up hope of finding Yaesu** external v.f.o. model FV-200 and Yaesu mobile d.c. power supply model DC-200/250, fair price paid. GW4ZCM, QTHR. Tel: (01633) 857917.

**Bendix TA12C TX**, handle required for front panel (to complete restoration), also mating socket for plug 101, please help. Eric G3LPS on (01254) 812797.

**Circuit diagram for a Motorola MCX100** mobile transceiver or information on how to disable the time out circuit. Paul G0M1H, QTHR. Tel: (01622) 663014 or g0m1h@btinternet.com

**Circuit diagram plus details** for following receiver, Codar CR70A, AR88LF, KW Viceroy TX, instruction book for KP200, Kenpro memory keyer, also wanted Eddystone or any vintage valve receivers or TXs. Ed Kelly, Cregganavar, Breaffy, Castletar, Co. Mayo, Eire, carriage paid.

**Codar T28 RX**, other Codar gear, w.h.y.? Also dual paddle key. Tel: (01453) 845013.

**Coloured plastic sheets to fix in front of** b&w TV to 'convert' to colour! Fine for cricket pitch, but grim for newsreader! (for museum). Douglas Byrne G3KPO, 52 Westhill Road, Ryde, Isle of Wight PO33 1LN, Tel: (01983) 567665.

**Eddystone 850/4 low frequency receiver**, no junk. Harry A. Weber, 4845 West 107th Street, Oak Lawn, Illinois 60453-5252, USA.

**Eddystone 1837Z**, must be as new, good price and carriage. Tel: Dublin 01-4536452.

**Eddystone model 1002**, g.w.o. and condition, urgently required to finalise my small Eddystone collection, also Plinth speaker, type 989. Jim McGowan, 20 Keats Avenue, Romford, Essex RM3 7AR, Tel: (01708) 340304.

**Eddystone receivers**, still seeking EC10, 960, 870A and scrap sets for spares. Peter, Surrey. Tel: (01372) 450381 or (0374) 128170 anytime.

**Grundig Satellit 2400 stereo**, professional 9 band short wave radio or Grundig model 1400 or Grundig model Satellit model 3400 in p.w.a. Hugh McCallion, 8 Strathard Close, Coleraine, Co L. Derry, Northern Ireland BT51 3ES, Tel: (01265) 43793.

**Handbook, memory unit and hand mic.** for Yaesu FT-107S, also 70MHz linear transverter with 28/30MHz i.f. nym or similar. Ian GW8VUG, QTHR. Tel: (01492) 518499.

**HF s.w. receiver** with switched bands, solid state. John on (01634) 233058.

**Icom AT500 a.t.u.**, please write or phone G3PTN, QTHR. Tel: Leeds 0113-265 4644.

**Instruction book or photocopy** for Yaesu FT-207R hand-held receiver, thanks. John on (01983) 521103 after 1730hrs.

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**Instruction manual for Advanced signal generator**, model E2 wanted by novice vintage wireless collector. Tel: Leicester (01530) 831407.

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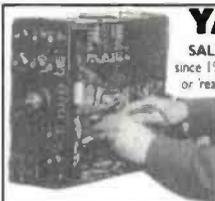
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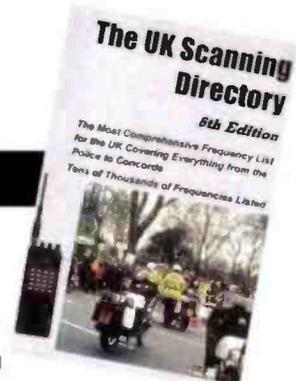
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- Digital Signal Processing filters (Bandpass, Notch, Noise Reduction)
- Simplified tuning with Shuttle Jog control
- Direct frequency keypad entry
- Dedicated satellite memories, with 8-character Alpha Numeric Labels
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- RX Freq. (MHz): 0.5-30/50-54 108-174/420-512
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- Freq. Steps(Min): 0.1Hz for SSB and CW 10Hz for AM and FM
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  - AM: A3E Low-level (early stage)
  - FM: F3E Variable reactance
  - FSK: J1D, J2D, F2D Audio frequency shift keying (external input), F1D
  - Frequency shift keying (V/UHF: external input)
- Options:
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  - FVS-1A Voice Synthesiser
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