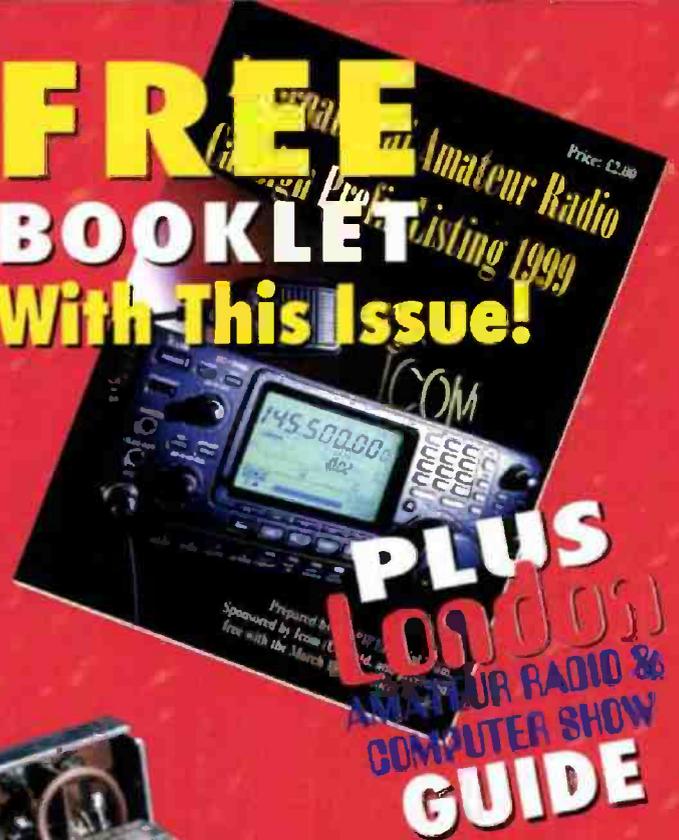


Practical Wireless

# PW

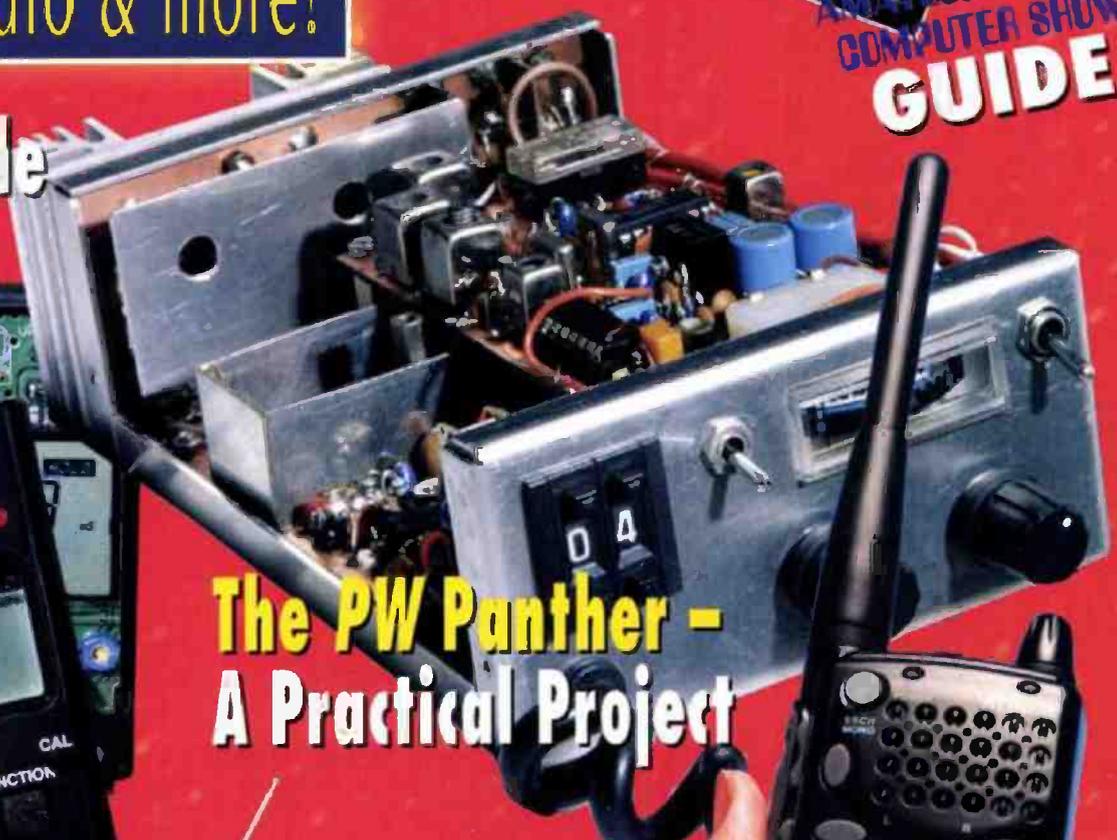
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**BOOKLET**  
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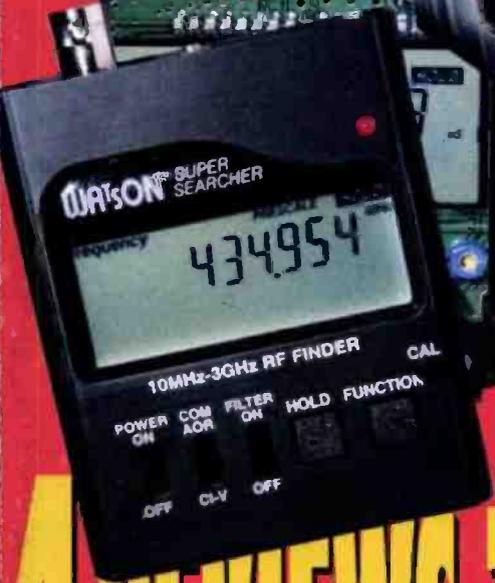


**PLUS**  
**London**  
**AMATEUR RADIO &**  
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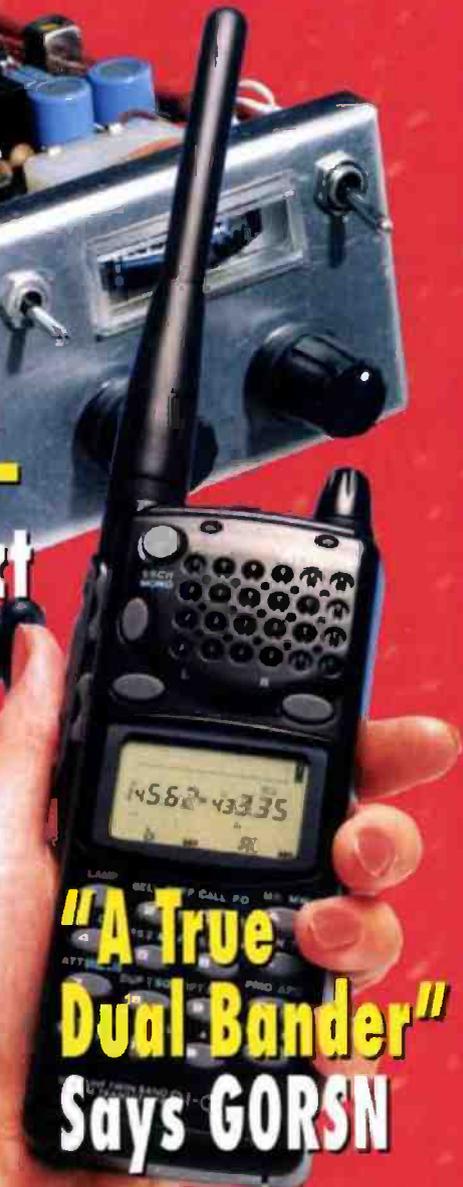
A Look Inside  
With **GITEX**



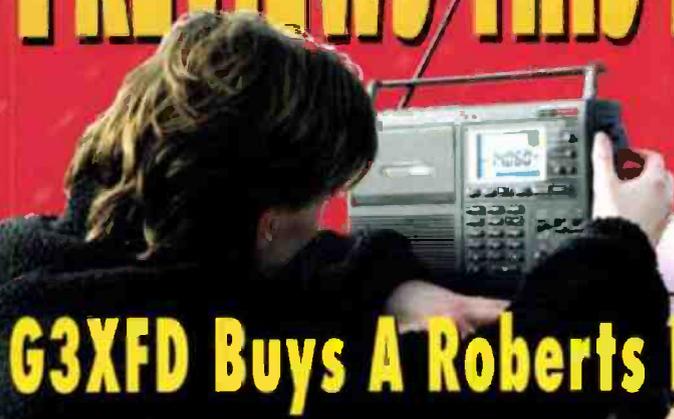
The **PW Panther** -  
A Practical Project



**4 REVIEWS THIS MONTH**



"A True  
Dual Bander"  
Says **GORSN**



**G3XFD Buys A Roberts RC 828**

March 1999 £2.50



# Waters & Stanton PLC



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 350mW Output

£89

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ICOM IC-706  
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Great Value

20 Memories  
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 Keypad Entry  
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- \* Radio Controlled Clock
- \* Date, Day Month
- \* Cable Free Remote Sensor
- \* Inside / Outside Temperature
- \* Air Pressure
- \* Weather Forecast

£69.95



**YAESU FT-847** *it's Here!* ~~£1599~~  
 1.8MHz to 432MHz  
 + FREE 25Amp PSU!  
 Worth £94.95



**Includes 70MHz Transceive**

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

**YAESU FT-920 1.8 - 54MHz** ~~£1299~~  
 + 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 £2199)** ~~£1899~~  
**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

**YAESU Special FT-41R 70cms Handheld**  
~~£119.95~~ Includes FREE Hod Charger



430 - 450MHz  
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 3.5 Watts (12V)  
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 Ni-cad Pack & Charger  
 BNC Antenna  
 Yaesu 2 Year Warranty

*A chance to make a huge saving - but hurry as we have purchased the lot!*

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Now enjoy the benefit of a built-in TNC and APRS (Automatic GPS Packet Reporting System). The handheld that takes you into the Year 2000!

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\* 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

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All in one small package.  
 \* 5W output (13V)  
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 \* Nickel Hydride batt  
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 \* AM for airband  
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 \* Alphanumeric

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 50 Watts on VHF  
 20 Watts on UHF  
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Buy From The Company you can Trust

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**Price Smash**



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**ICOM IC-207H 2m/70cm Mobile** ~~£339~~  
**PRICE MATCH**



\* 2m & 70cm  
 \* 50W - 30W  
 \* Detachable head

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



With Switched 12.5kHz & 25kHz

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  
 email: sales@wspic.demon.co.uk

**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)

# Waters & Stanton PLC



**WATSON**

25 Amp Power Supply

**MFJ-969UK**



**MFJ Factory Direct**  
With 2 Year Warranty  
The only guarantee that is supported by MFJ  
MFJ-969 covers all bands from 1.8 - 54MHz with very accurate PEP meter. Rated 300 Watts Max.

**MFJ-986UK**



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**MFJ-16010UK**



Long wire ATU covering 1.8 - 30MHz and rated at 300 Watts. Great value

**We stock every single MFJ model!**  
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\* Offers you a full 24 months peace of mind. \* Guarantees the latest stock (not old version grey imports!). \* Assures your purchase is brand new (not refurbished secondhand items!). \* Provides MFJ USA back-up (not send it back to the factory sir!). \* Has CE certification (which we can advertise as we hold the certificates!). \* Has the backing of an ISO 9002 company which means we have been vetted by outside inspectors - NUFF SAID!

**W-25AM**  
The most respected power supply for HF 100W transceivers. Rated at 30 Amps peak, it coasts along.

**£89.95**

Other Models:

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W-10AM	10 Amp Variable	£59.95
W-10SM	10 Amp switch mode	
W-30AM	30 Amp variable	£119.95



UK's Most Widely Used Power Supply



**£22.95**

**LX-8 Hands-Free Microphone**  
Single earpiece with adjustable boom mic., the PTT can be locked into position. PTT box has clip for attaching to clothing. Versions for all makes of handsets.

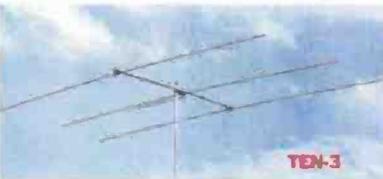
**£22.95**

**W-184 HF Headset & Boom Mic**  
The HF operator will appreciate the convenience of hands-free operation with this high quality headset and boom mic. Requires appropriate plugs and we can also supply optional PTT if required - otherwise use foot switch. MOX button on rig, or VOX.

**£32.95**



**Cushcraft - The Full Range**



**TEN-3**

**Work the DX on 10M**  
**£139**

This very compact antenna from Cushcraft will get you lots of DX. Fits almost any gardens and very light weight, yet can handle up to 2kW. Boom 2.44m, longest element 5.5m.

R-7000	10m - 450m vertical	15-4CD	4-element 15m Yagi
R-6000	10m - 20m vertical	10-4CD	4-element 10m Yagi
D-3	Classic 3-element tribander	D4	3-element triband + 7MHz
20-3CD	3-element 20m Yagi	D-3W	3-element WRC bands
20-4CD	4-element 20m Yagi	X7	7-element tribander
40-2CD	2-elements on 40m	X-9	9-element tribander
15-3CD	3-element 15m Yagi		

Looking for a Compact Loop?



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**Give us a call**

Frequencies from 7MHz to 30MHz and a diameter size of just 36 inches. We worked Africa from inside our workshop!

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Navigate your car around Europe using the highly accurate GPS system and the built-in map. Works on the car dashboard. No external antenna is normally required. Also gives speed and altitude plus route and trip information. Requires 4 x AA cells or external 13.8V from optional DC lead.



**RADIO WORKS of USA**  
Carolina Windom 80 Special



**£89.95**

Offers you 8-Bands in just 66ft of garden space!

Radio works have pioneered the modern Windom antenna and produced this latest model that offers complete HF coverage for the small garden. It offers low angle radiation from its short vertical element, and at the same time gives some high angle for local contacts. Most users agree it is way ahead of the G5RV, particularly on the higher bands. Includes special matching unit and RF line isolator.

**RM-913 Radio Controlled Clock**

**£19.95**

Ideal for the desk top, it locks onto MSF Rugby and provides the most accurate time available. Also offers date and alarm function. Requires 4 x AAA cells (not included).



**SP-2000 Sun Visor Speaker**

The really neat way to mount your mobile speaker. Just clip onto the sun visor and run the cable back to the rig. Includes volume control.

**£19.95**



**Hunter Frequency Counter**

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**£59.95**

Offer ends 28th Feb. 1999

10MHz - 3GHz  
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BNC Whip  
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For Order information see previous pages

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Packet, AMTOR, CW SSV, Fax, RTTY NAVTEX, SYNOP PC Software included. Connect between Transceiver and PC and feed with 12V DC. Includes receiver audio filtering and tuning indicator.

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**OptoCom VHF & UHF Receiver**



The new OptoCom receiver offers true PC control plus a host of additional features that sets it apart from other similar models. Covering 25-250MHz, 760-823MHz, 849MHz - 869MHz and 894MHz - 1300MHz, it offers AM, NFM and WFM reception. The big feature is its Motorola and LTR Trunk tracking and is supplied with TrakStar software. The CI-5 PC interface allows auto tuning using the Scout or Super Searcher counters. There's also a built-in speaker and power is from 12V DC.

**£499**

Watson W-7900 Dual Bander £32.95  
A quality whip covering 2m & 70cm - 5 & 7 feet 1.50m long

**MARCH 1999**  
**(ON SALE FEBRUARY 11)**  
**VOL. 75 NO 3 ISSUE 1104**  
**NEXT ISSUE (APRIL 1999)**  
**ON SALE MARCH 11**

## EDITORIAL OFFICES

Practical Wireless  
 Arrowsmith Court, Station Approach  
 Broadstone, Dorset BH18 8PW

☎ (01202) 659910

(Out-of-hours service by answering machine)

FAX: (01202) 659950

### Editor

Rob Mannion G3XFD

Technical Projects Sub-Editor

NG ("Tex") Swann G1TEX

News & Production Editor

Jo Williams

## ADVERTISEMENT DEPARTMENT

### ADVERT SALES & PRODUCTION

(General Enquiries to Broadstone Office)

Chris Steadman MBIM (Sales)

Steve Hunt (Art Director)

John Kitching (Art Editor)

Peter Eldrett (Typesetting/Production)

☎ (01202) 659920

(9.30am - 5.30pm)

FAX: (01202) 659950

### ADVERTISING MANAGER

Roger Hall G4TNT

PO Box 948, London SW6 2DS

☎ 0171-731 6222

FAX: 0171-384 1031

Mobile: (0585) 851385

## BOOKS & SUBSCRIPTIONS

Michael Hurst

### CREDIT CARD ORDERS

☎ (01202) 659930

(Out-of-hours service by answering machine)

FAX: (01202) 659950

## E-MAIL

PW's Internet address is:

[pwpublishing.ltd.uk](mailto:pwpublishing.ltd.uk)

You can send mail to anyone at PW, just insert their name at the beginning of the address,

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# 75 RadioScene

Nine pages of band reports from all your favourite authors.



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Come and choose an aerial from our fantastic range at below normal retail prices

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CD318B	5 Ele Yagi 10-15-20M 2kW PEP 28.0'LE 20.8'B	£471
CD318C	6 Ele Yagi 10-15-20M 2kW PEP 20.0'LE 29.9'B	£719
CL10	5 Ele Yagi 10M 2kW PEP 18.2'LE 23.7'B	£239
CL15	5 Ele Yagi 15M 3kW PEP 24.3'LE 31.6'B	£360
CV730V-1	V-Dipole for 10-15-20-40M 1kW PEP 19.0' ele	£183
CY103	3 Ele 10M 2kW PEP 18.5'LE 13.0'B	£143
CY104	4 Ele 10M 2kW PEP 18.5'LE 13.1'B	£191
CV48	40M Vertical 2kW PEP 40.3'ELE	£220
AD385	40/80 Switch Box for Use with CV48	£55

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204CD	4 element 20m beam	£367
A103	10MHz extension kit for A3WS	£68
A3S	14-21-28MHz 3 ele yagi 8dbd	£311
A3WS	18-24MHz 3 ele yagi 8dbd	£239
A4S	14-21-28MHz 4 ele yagi 3 per band	£375
AP8A	3.5-28MHz 8 band vertical	£183
APR18A	Radial kit for AP8A, AV3, AV5	£43
D4	7/14/21/28MHz rotary dipole	£207
D40	40 Metre rotary dipole	£183
D3W	24/18/10MHz rotary dipole	£159
R7000	10,12,15,17,20, 30&40M Halfwave Vertical	£311
R80	80m add on kit for R7000	£159

#### TELEX HYGAIN HF ANTENNA

DX88	10-80m vertical	£252
DX77	10-40m vertical	£295

#### SMC WIRE ANTENNAS

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OSTBT	7mhz potted traps	£20
OSG5RVF	Wire full size G5RVF 80/40/20/15/10mtrs	£29

#### HOKUSHIN HF ANTENNA

HF3VNB	Vertical 12-17-30M 1000W PEP 16.0'H	£47
28HS-2HB	Horizontal 10M 2 Ele HB9CV 6dBi	£52

### ANTENNAS VHF/UHF MOBILE

#### COLT MOBILE

SG7000	144/430Mhz 2.15dBi/3.8dB 100W	£12
SG7200	144/430MHZ 3.2dB/5.7dB 150W	£14
SG7900	144/430Mhz 5.0dB/7.6dB 150W	£23

#### TAIWAN SERENE MOBILE

TSM1005	144 7/8 wave 5.2dB 200W 1.89m	£24
TSM1309	144/430 3.0/5.5dB 120W 0.93m	£20
TSM1312	144/430 3.0/5.5dB 50W 0.89m	£18
TSM1314	144/430 3.8/6.2dB 150W 1m	£28
TSM1316	144/430 2.15dBi/3.8dB 100W 0.44m	£14
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DAX3000	144/430 3.5/6.0dB 1.06m	£27

#### SMC, HOKUSHIN and COMET

HR50	50MHz 1/2 wave centre loaded 2.15dB 2.13m	£32
SB-7	144/430 Mobile 4.5/7.5dB 1.4m	£33
CX-702	50/144/430 Tribander 2.15/6.0/8.4dB 2.1m	£46
88F	144MHz 8/8 wave 5.2dB/1/4 6.5'	£13
OW150/450	144/432 On glass mobile antenna	£30
HS-727VMS	144/432 1/2 + 2 x _ shortened mobile antenna	£26
Z740	144/432 2.15/5.2dB with locking collar	£28
CHL21J	2m/70cm 0dB/2.15dB	£15
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X200N	144/430Mhz 6/8dB 2.5m long N connector	£61
V2000	50/144/430Mhz 2.15/6.2.8.4db 200w 2.5m long	£52

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0dBd	£22	
8XY/2M	Yagi 8 ele crossed, length 2.8m 9.5dBd	£59
10XY/2M	Yagi 10 ele crossed, length 3.6m 10.8dBd	£79
PMH2/C	2-way phasing harness for circular polarisation	£5
PMH2/2M	Harness 2-way 144MHz	£5
PMH4/2M	Harness 4-way 144MHz	£5

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CLP5130-3	Log periodic, 90-220MHz, 12 element, LE1.6m B1.7m	£135

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17B2	2m, 17 ele boomer, 18dbd	£159
AR270	2m/70cm dualband vertical, 1.13m long	£49
AR270B	2m/70cm dualband vertical, 2.3m long	£59
AR2	2m vertical, 1.2m long	£31
AR6	6m vertical, 3.1m long	£47
A14410SN	2m, 10 ele Ultramatch with N connector	£69
A144-20T	2m, 10 ele crossed yagi, 12.2dbd	£84
A148-20T	2m, 10 ele crossed yagi	£84
A50-3S	6m, 3 ele yagi, 8dbd	£71
A50-5S	6m, 5 ele yagi, 10.5dbd	£119
A50-6S	6m, 6 ele yagi, 11.6dbd	£200
22XB	2m Oscar 22 ele c/w polarisation switch	£183
719B	70cm Yagi, 19 ele N connector	£88
738XB	70cm Oscar 38 ele c/w polarisation switch	£167

#### SMC VHF ANTENNA

2HB6	HB9CV 6M 2 element (both driven) antenna	£33
HS-GP62	6m _ 2-step colinear, 6dbi, 6.57m	£55
CA350DB	6m/10m dualband colinear 2.15/6.5dB 6.9m	£119
GP23	Colinear 2M 3 x _ wave, 7.8dB/1/4 14.6'	£31
SQ144	2M Swiss Quad (vertical polarised standard)	£36
GP714	Colinear 70cm 14 step coaxial, 10dBi 11.8'	£52
WX1/N	144/432 g/fibre 4.5dB 2m, 7.2dB 70cm 'N' socket 5.8'	£71
WX2/N	144/432 g/fibre 6.0dB 2m, 8.0dB 70cm 'N' socket 9'	£92
WX4/N	144/432 g/fibre 7.8dB 2m, 10.8dB 70cm 'N' socket 14'	£119
WX6S	144/432 G/Fibre 9.2dB 2M, 13dB 70cm SO239 23.4'	£151
GP9N	144/432 g/fibre 8.5dB 2m, 11.9dB 70cm 'N' socket 17.5'	£108
GP9S	2m/70cm/23cm colinear 6.5/9/9dB 200W 10.1'	£95

#### TAIWAN SERENE BASE STATION

TSB3301	144/430 G/Fibre 6.5/9.0dB 200W 3.18m	£54
TSB3303	144/430 G/Fibre 3.0/6.0dB 120W 1.15m	£34
TSB3304	144/430 G/Fibre 6.0/8.4dB 120W 2.43m	£42
TSB3305	144/430 G/Fibre 8.5/12.0dB 120W 5.4m	£67
TSB3603	144/430/1296 G/Fibre 6.5/9.0/9.0dB 3.07m	£68

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# SMC welcome Mr.6M Geoff Brown



Yes it's true! Mr 6 Metres Geoff Brown (GJ4ICD) has joined us to run the retail division at SMC's HQ in Southampton.

Geoff used to run the SMC Jersey branch in the early 80's when Amateur Radio was at it's peak, so for us it is an old long friendship renewed.

Whilst running SMC Jersey he designed, built and tested many high power linear amplifiers for all bands from DC to light, this helped Geoff become one of the most successful VHF/UHF Amateurs in the Country. His current radio CV includes 166 Countries worked on 50MHz which is currently the highest score in the World, however, Geoff caught the bug of Amateur Radio over 40 years ago and has been sharing his knowledge with many other fellow Amateurs ever since including teaching and developing new ideas, he also has a vast technical knowledge of electronics as an engineer and also on today's current band conditions and propagation both on HF and VHF.

SMC Ltd are proud to have Geoff as part of their new professional team so that sound, clear, technical advice can be passed on to you the purchaser, no other dealer can offer such expertise in the fields of Geoff's proven experience, and that's why SMC have introduced a new range of power amplifiers for both HF and VHF, come along and talk to him for professional advice on this new range of products.

We are also pleased to welcome Derek Hitchins, who is working alongside Geoff, and has been one of SMC's longest standing customers. Derek has held his amateur licence for 18 years and has a wealth of technical knowledge.

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**F**ollowing my 'Editor's Comment' at the end of a reader's letter in the January issue of *PW* ... I've received some very interesting feed-back. The letter in question, on page 13 under the heading 'Illegal Operation On 28MHz', was written by **Don Kirby GWOPLP**.

In his letter Don drew attention to the amount of non-Amateur Radio activity on the 28MHz band particularly from CB radio operators who have moved up from the 27MHz allocations, etc. My reply drew much attention and although most of the readers who reacted to the reply also supported my obvious general concerns, only one of the half dozen letters, E-mails and comments within QSOs, actually agreed with me that we cannot rely on help from the Radiocommunications Agency.

One writer, **Peter Pitt G3ICH** (Peter and I only live about two kilometres away from each other!) took me to task and firmly stated that I had "virtually given the all clear" to the illegal operators on 28MHz. Peter and I then chatted about the letter, his reply and any future action in *PW* and he agreed I could quote from his letter to me.

Peter went on to state that "If the Radiocommunications Agency don't take action in the circumstances ... as they have before ... surely we as licence fee payers can consider them as taking the money under false pretences"? He went on to say that he thought I was being 'Apathetic' in his opinion.

Well, in answer to Peter and the other letter writers I have to deny any apathy whatsoever. Apathetic I'm not - realistic I am! And at this point I have to remind everyone that the Amateur Radio Service is 'unprotected'. In other words, for the most part if we suffer from interference - from non Amateur Radio sources - officialdom cannot do much to help us generally speaking.

Of course, in reality the RA, often with the help of the Radio Investigation Service and the

back-up of the Baldock Monitoring station, will do their best help and we must remember that many Radio Amateurs still work within the RA. The limit must come - in my opinion - when 'real money' has to be spent because we really 'don't pay our way'. If we were to pay 'commercial rates' I wonder how much that would mean and how much the interference would be reduced at the same time!

### Answer In Our Hands

I really do think that the answer to the 'illegal users' on the Amateur Radio bands does lie in our hands. I say this because - although they will obviously be respected - it's just as likely that British 'official' sources may well not get the same co-operation from a foreign country than would a discussion between two like-minded people (Radio Amateurs) perhaps both separated by continents and the Equator!

The foreign Radio Amateur could then direct pressure to their own administration (if it's their country deemed to be an offender) or get their Government Departments to act on their behalf (that's the truly difficult bit) if the problems seem to come from a nearby country. All this could be done effectively through the International Amateur Radio Union where our approaches would be seen as being from friends acting on behalf of our hobby rather than what could be seen as an extension of a nation's 'own interests' and 'foreign officialdom'.

Am I right or just indulging in pious hopes? What do you think? Please write into our 'Letters Page', or if you want it to be purely private between you and I - to me directly. I'll honour your privacy and perhaps we'll also get some reaction from someone in the Radiocommunications Agency too?

### New Series

It's always a great pleasure to announce a new series in *PW* - especially if it's to be from

someone so well known as **Gordon King G4VFX**. Gordon's books on radio, TV, audio technology and other technical subjects are known the world over and I'm delighted to say that his new *PW* column 'Looking At...' is bound to be just as interesting as all his other work.

Gordon's first article 'Looking At The RF Amplifier' starts his tour of the receiver, beginning at the 'front end' and ending up no doubt in the power supply - with everything else between!

An enthusiastic writer, QRP c.w. operator and radio enthusiast, Gordon is able to convey the knowledge, and to instil a zest and thirst to know more in readers. I speak from experience because I first got interested in his many articles published throughout the 1950s in *Practical Television* (now *Television* magazine). Many specialist - although very informative - writers are 'flat' in their style approach and the reader is often left wondering when the author last handled a soldering iron. Not so Gordon, he's a keen and very active radio enthusiast and I hope you enjoy his series as much as I expect you to!

### Letter Competition

If you're interested in entering our 'Morse-No-Morse' letter writing competition please do so! Your letter (letters only - no E-mail please), typed or carefully hand-written and fully addressed should be clearly marked 'Morse Letter Competition', be no more than 200 words long and the contents should clearly argue for or against the use of Morse in the Amateur Radio hobby or as a continued qualification for h.f. operations.

The Editorial team will look for reasoned argument and innovative and original ideas when reading the letters. The closing date will be **June 1st** and the winners will be announced in the next available issue of *PW*. Winner of the 'For Morse' category will receive a Watson gold-plated hand 'Pump' Morse key (kindly donated by **Jeff Stanton G6XYU of Waters & Stanton**) and the winner of the 'Against Morse' category will win £50 worth of *PW* vouchers. So, get writing and good luck! (Prizes to be

presented to the winners or their representatives at the Leicester Show in September). My decision on the winners will be final and no correspondence will be entered into.

### Club Visits

If you'd like to meet up with me this year for a chat, my 'club visit' and show schedule for the first half of the year is as follows: **Chester Club, February 23rd, Aberystwyth March 4, Silverthorne Club (East London) March 12th, London Show (Picketts Lock) Saturday/Sunday 13/14th March, South Normanton (Derbyshire) March 29th, Dublin QRP Rally (Easter time, dates to be confirmed) and Colchester Radio Amateurs, 15th April.**

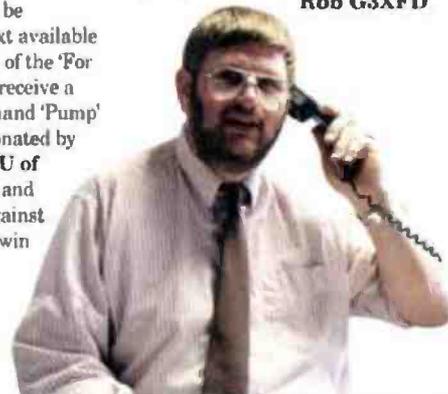
I'm due at the South Birmingham Club on 5th May and the Yeovil Club on the 27th of May. It's off to Wales I am Bach ... to the Highfields Club in Cardiff on June 3rd, followed by the East Kent Club on June 21. So, if you can make it to any of the venues mentioned - I'd like to meet you! (More details of my other planned visits in a later issue).

### Grand-Dad 'Stripe'

I'm delighted to say I earned another 'Stripe' as a Grandfather on January 17th when my first Grandson ... **Frederick Alexander Robinson** was born. Obviously my wife **Carol** and our younger daughter **Alexandra** were also delighted.

However, **Charlotte** (his mum) and **Alex** (Dad) will have their hands full as baby Frederick weighed in at just over 4kg (9lbs). Older sister **Georgia** (two and a half) already wants to know when she can take him for walks and I've already thought about buying his first train set as he's too young to use a soldering iron just yet!

**Rob G3XFD**





COMPILED BY ROB MANNION



The Star Letter will receive a voucher worth £10 to spend on items from our Book or other services offered by Practical Wireless. All other letters will receive a £5 voucher.

### Beacon Project Article

Dear Sir

Full marks to Martin Harrison G3USF for his lucid and absorbing feature in your January issue concerning the International Beacon Project. He opens up a fascinating new aspect to our hobby, the logging of IBP beacons on 14, 18, 21, 24 and 28MHz, now that h.f. conditions are on the up and up.

The chart which Martin gives can provide hours of interest in the listening mode alone. As a retired ship's Radio Officer, to log the beacons in sequence takes me back to sea when I used to enjoy taking Direction Finding bearings in co-operation with the bridge. It gave me a great kick out to reduce the 'cocked hat' of triangulation to its smallest possible size. To copy beacons on a global scale provides even greater satisfaction.

Yes, we are indebted to these founder operators of IBP for their dedication and expertise in providing us with such an excellent service

I would recommend all DX buffs to cut out Fig. 2 of the feature and paste it prominently close to their rigs.

**Reg Prosser G4BUS**  
Bedfordshire

**Editor's comment:** It was a truly fascinating article wasn't it Reg? It was published as soon as possible to the November issue of PW which carried the 'Lo-Bands' Data Card which also contains full information on the h.f. beacons. Incidentally, I'd like to take this opportunity to ask readers to follow Martin G3USF's request that we (politely) ask anyone occupying the beacon frequencies to move off the frequency. It can be quite a problem on 18.110MHz but most stations - realising their error - will move if asked. The QRM on 14.100MHz, caused by Packet radio is another matter though. Any suggestions, readers, as to how this problem can be overcome?

### BBC Engineering History 1922-1972

Dear Sir

I managed to obtain your recommended *BBC Engineering History 1922-1972*, I am not disappointed. There is so much nostalgia in the first two chapters it makes you want to read them again.

I can remember as an eight year old, listening late at night to the BBC and Continental transmitters on my crystal set using SG Brown headphones. There are certainly a lot of listeners still out there and that includes many who hold amateur licences. Thanks.

**Geoff Drewe G4CAO**  
Surrey

**Editor's comment:** It's a good read isn't it Geoff? Any other reader interested in reading this out-of-print book is invited to write to me as I may be able to help.

### HaRP Plays The Game

Dear Sir

In November 1998, I was at the North Wales Radio & Electronics Show in Llandudno working (for want of a better word!) on the Bring & Buy stall. On the Sunday afternoon, I 'skived' off and purchased a couple of computer diskettes to add to the two I purchased on the Saturday and with which my ancient Amstrad PPC would be happy.

When we were packing up, the two disks had vanished, probably falling off the shelf into a box of rubbish. I dashed back upstairs to try and replace them, only to find that the vendor concerned had packed everything and was ready to leave. When I explained what had happened, **Keith Roden of HaRP Shareware**, from Stourbridge in the West Midlands, asked me for my name and address and said that he would post me the two replacement disks on the following Tuesday after the show. When I produced my wallet I was told "no charge". The two replacement disks arrived by First class delivery on the Wednesday morning.

The disks which I purchased on the Saturday ran without any problems, but the other two beat me (I am not much good with computers, apart from switching them on and off!). A letter to Keith at HaRP Shareware produced a reply by return post offering instructions and advice, with the result that it is now 'all systems go'!

I hope that you will give HaRP Shareware the publicity due after

such kind service. I will, of course, use this company for any future requirements.

**A F Foxall**  
Denbighshire

### Mystery Receiver

Dear Sir

A few months ago, I found a receiver which I'm still trying to find out how it works! It's got small valves. I have included two photos with this letter to give you some idea of how it looks. Can you or your readers help?

It had no power supply - it must have had its power supply outside, apart from the radio - it had no speaker either. I would appreciate it very much if you could tell me anything about this receiver.

**Charles Fenech**  
Malta



**Editor:** I think (from the photographs) that your receiver is probably a 'home brewed' effort Charles. However, somewhere out there I've no doubt a PW reader will be able to identify it for you!

### Slow Scan Television?

Dear Sir

I am very puzzled about the seeming total misuse of the term Slow Scan Television (SSTV). It seems that, at least within my area of operations on air, SSTV has come to mean the transmission of a previously prepared still picture. That is not SSTV but should be more correctly defined as Facsimile (FAX) transmission/reception.

Slow scan TV is just as the term implies, a changing scene of the

## Picketts Lock - Can You Help?

**Dear Sir**

Could you please help? I attended the Picketts Lock Radio Rally in November and must complement the promoters on the organisation of every facet of the event, it really was an excellent show.

On the Bring & Buy stand, I noticed an unusual h.f. transceiver and meant to enquire further about it but got side tracked with other matters and never got round to contacting the seller and it has been irritating me ever since!

The rig in question was all black with a very distinctive, round S-meter, frequency entry was by the integral keypad and the rig overall was approximately the same size as a Kenwood TS-120. I did not make a note of the brand name, but it was not one of the proprietary Japanese makes.

I would dearly like to contact the vendor, if the radio is still available, so we could perhaps 'haggle' a little! I would be very indebted if you could mention this in the letters column.

Thankyou for a great magazine, I eagerly look forward to each and every issue. May I take this opportunity to wish everyone at PW a very happy and prosperous New Year!

**Mike F. Swift G4MJA**  
Co. Durham

**Editor's comment:** Thank you Mike! The 'Bring & Buys' always fascinate me (perhaps you read my article 'Bring & Buy' published on page 49 of the March 1998 issue?). Anyone who could help Mike is asked to ring him directly on 0191-389 2822.

moment or from video recording where the complete scan of each frame of the picture is undertaken in several seconds as against fast scan which is instantaneous to the eye (25 frames a second or thereabouts).

The early amateur SSTV signals used a system similar to the Baird Televisor but displayed on a very long persistence display cathode ray tube (CRT). But that has developed and changed through time to horizontal scanning with greater numbers of lines and now as with most of the data modes, displayed on a computer monitor screen.

The misuse of the term SSTV probably developed through attempts to gain higher resolution and colour, but now the single scan takes so long it is totally impractical to consider it a moving image anymore. However, the development has strayed so far away from the original intent so that it is actually a FAX transfer and thus should be correctly identified as such. After all, it's doing the same operation as you would expect from a FAX machine anyway. Developments are all very well and good, but when they have strayed so far away from the original intent as to become a completely different being, it's logical that it should be identified. Now, is there anyone left who is still operating Slow Scan TV as it should be, the transmission of a slowly changing and updated image?

**David Turtle**  
Erith

## Covert Fiddles

**Dear Sir**

I was a touch amused to read the communication from **R McGregor** (PW January 1999), regarding the covert 'fiddles' of obtaining an Amateur Radio Licence. I say amused, because I was always led to believe that this surreptitious method of getting an amateur licence - be it 'A' or 'B', was unfortunately prevalent long before the welcome imposition of the 'Two Passport Photo Rule'.

I should say, though, that having come face-to-face with one or two of these persons who, for one reason or another, appear to find some sort of perverse credibility by indulging in moral criminality, I can happily report that those persons I met are no longer active Radio Amateurs! I suppose the moral of this sad tale is that those who try to gain by stealth and by cheating will, in the end, be forever denied the ultimate prize - knowing you did it all by yourself! Perhaps now R McGregor will sleep easier in his bed at night?

On a different subject, I agree with **Carmel Fenech 9H1AQ** (her letter in the same issue). Yes, it is "sheer nonsense" to suppose that "young people" are kept out of our hobby because of a simply learnt thing called Morse code and I can't imagine why or how this apparently conditioned response is still perpetuated. It beggars belief!

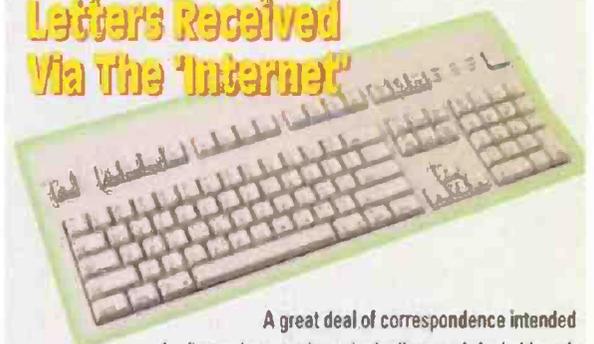
As Carmel points out, the modern day obsession with all things computerised is at the root cause of the problem and the eternal spectre of the Internet

which is constantly force-fed down the throats of both old and young alike by a compliant media, even more so. If people are really interested in Amateur Radio, they will win through - Morse test included. Amateur Radio without a Morse test is like a cowboy without a gun! Although I agree that spending £1000 on a "black-box" is daft, as 9H1AQ suggests, using the same sum as a deposit on a car is absolutely crazy!

**Ray J Howes**  
Weymouth

*More letters over the page...*

## Letters Received Via The 'Internet'



A great deal of correspondence intended for 'letters' now arrives via the 'Internet'. And although there's no problem in general with E-Mail, many correspondents are forgetting to provide their postal address. I have to remind readers that although we will not publish a full postal address (unless we are asked to do so), we require it if the letter is to be considered. So, please don't forget to include your full postal address and callsign along with your E-Mail hieroglyphics! All letters intended for publication on this page must be clearly marked 'For Publication'. Editor

### The Great Morse Debate

**Special Prize Competition!** Because of the continued (and sometimes controversial) interest being shown in the Morse/No Morse debate within the PW letters pages, we will be running a competition for the best letter supporting the use of Morse within the Amateur Radio Service. The winners will receive a gold-plated Morse key (kindly donated by Waters & Stanton PLC) and prize vouchers. Full details and conditions can be found on the 'Keylines' editorial page. Good luck with your letters and so, it's time to get on with the debate.....

### An Ex-Patriate Point Of View

Dear Sir

We have read with interest, over numerous issues, the continuing debate on whether Morse Code should remain part of the Radio Amateur Examination, whether the speed should be dropped, whether it will attract more people into the hobby, etc. However, we feel that in the main, reasons and arguments being given are akin to trying to find a disease for the cure!

Firstly, let's consider what quality of Radio Amateur are we looking for? Do we want it that simple that it deteriorates to the level of operating we hear on the CB bands and may we include, some Repeaters? Alternatively, a person that has had to make an effort to gain the facility is more likely to take a pride in the way they use it and less likely to abuse the privilege, whereas with a readily available 'A' licence these shortcomings would be broadcast world-wide!

Already the gradual simplification of obtaining a Licence seems to have produced enough bad operating on the bands. Many Stations identify incorrectly with G9XYZ Over, over and M3XXX Returning. Also expressions such as Over, Over or Over 'n Out and occasionally Stan Ding by and other Aussie sounding punctuations! It is also common place for Stations to tune up equipment on frequencies without first checking and asking if they are occupied and even calling CQ. We neither argue for or against keeping Morse code, but certainly against reduced content of the Examination.

Perhaps a practical examination on Good Operating Techniques would be a suitable subject to use as a replacement if it is inevitable the Morse code goes, plus of course a sound knowledge of Digital Techniques, but surely not further simplification?

The current Radio Amateur Examination and Morse test is not difficult (let's be honest) and with a modicum of common sense and basic knowledge can be achieved as was proven by this letter's co-author, having started with knowledge of 'O' Level Physics only and had her 'A' licence in 18 months!

Without wishing to become too contentious, we don't think any amateur worth his salt wants to make it easier for those who just want to extend the range of CB to the full Amateur Radio Frequency spectrum. It always has and I feel always will be, a hobby for those with a genuine interest and not something to boost the head count and subsequently the figures presented to the Directors of some Organisations.

If people do have a **real interest** then they

will fulfil the requirements to gain an Amateur Licence and be proud to do so. Of course, we would welcome an increase in the number of licensed Amateurs, but perhaps an increased effort in making the Hobby more interesting to people and not changing the 'Goalposts' as a cop-out would be a more suitable approach.

Finally, an interesting answer received from an OZ5 Station that was responding to this question was "If they decide to drop the Morse code then perhaps English should be included". I think that puts a new slant on the debate!

**Tony (F5VBY/G3TZH) & Ann (F5VBX/G0SYH) Dolby  
Tarn-et-Garonne, FRANCE**

### And More!

Dear Sir

That everlasting and controversial topic, the Morse requirement, has been raised once again in recent months on your 'Letters' page.

It has not, at any time, been suggested that the use of Morse should be prohibited, merely that it should no longer be the qualification for h.f. operation. The test is required under an international agreement although the actual test speed is left to the discretion of individual administrations. The RSGB has suggested 5w.p.m. as an interim measure pending full consideration at a future International Conference.

The main reasons for retaining the Morse test are said to be as follows:

It prevents overcrowding on the bands;  
Learning Morse proves commitment to the hobby;  
Simple and inexpensive equipment can be used;  
It facilitates communication with people in other countries;  
"I did, therefore you must" - the NIMBY (Not In My back Yard) syndrome is another guise.

Clearly, the last three reasons have nothing to do with regulation, so what about the other two?

It is possible for someone with no radio background to pass the RAE and the Morse test and become active on the bands within twelve months. On the other hand, there are amateurs with 30, or more, years in the hobby who obtained Class 'B' licences in the 1960s - have they shown less commitment than the newcomer? I rather think not, so that leaves overcrowding.

Up to the present day, I have been unable to trace the references but both the RA and the RSGB would like to attract many more entrants to the hobby, with the possibility that a good proportion would later take up science based careers to the benefit of the country as a whole. These newcomers plus many Class 'B' operators could eventually progress to Class 'A' status and become operational. This would seem to stand the overcrowding argument on its head, as it is hardly possible to claim that the bands are now at full capacity whilst at the same time encouraging a lot more people to join in.

In the *RAE Manual*, page 91, the RSGB admits that "... the major portion of amateur traffic is now carried out using telephony". What, then, is the point of compelling people to learn Morse if they are not required to use it as the principal method of communication?

At the present time, Class 'B' amateurs can use Class 'A' amateur's equipment on the h.f. bands under his supervision. Would this not be a good way to determine whether a Class 'B' operator or a newcomer is suitable for the full licence? No doubt local clubs and many individual amateurs would be willing to provide, let us say, ten hours of supervised and certified operation as a service to the hobby, after which the aspiring Class 'A' could be allowed restricted access to the h.f. bands for perhaps six months, before being granted full Class 'A' recognition.

It will be a relief when this matter is finally settled, one way or another.

**W. Parkin G8PBE  
Cheshire**

### And Even More!

Dear Sir

In her letter: "Morse and a Maltese Opinion" (January 1999) **Carmel Fenech 9H1AQ** wrote a heartfelt letter in support of Morse code/c.w. and, for myself, in part I agree Morse/c.w. is an art, is very good in poor conditions and can be sent and received with simple equipment.

However, "Music to the ear"? One persons' music is sheer bedlam to another. A plea to Carmel and others of the same ilk: **Allow the freedom of choice to others as they allow you** in the mode and radio frequency that they wish to use.

The new Radio Amateur intake had been falling before the Internet became popular, the fact that Morse code proficiency was, and is, mandatory for the h.f. bands did not prevent this decline, so something new has to be tried. Time does move on and when people don't change with the times then both they and their hobby will go the way of the Blacksmith or, before them, the Bow and Arrow maker.

Let's bring back the good old days? What? Blow your own glass envelopes for tubes, draw your own wire from lumps of copper. Remember, before you others were saying don't allow change and before them others still. Let history be that, history. Let Amateur Radio move on and stay interesting.

Incidentally: some of the experts who have passed the Morse test are behaving as what they are, hooligans. Try to hear the beacons at times, try to hear a clean SSTV signal or a rare DX Station. There ARE a lot of decent people out there, on h.f., or the real high frequency users, many of whom do not have Morse proficiency but do have a high degree of skill and technical ability.

**Bob Johnstone, Inverness-shire**

**Editor's comment: The Morse debates brings us an ever expanding post-bag! Incidentally, the final letter this month from Bob in Inverness-shire mentions the Blacksmith and Bow and arrow makers. It's important to remember that both crafts are still very much with us - but they quietly and professionally operate very specialised (particularly the general Blacksmith and the Farrier - a blacksmith specialising in equine footwear!) services. I think there is perhaps some parallel with their specialisations and those which appear in own activities.**

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



COMPILED BY JO WILLIAMS.

# Headline News

## TURN ON, TUNE IN AND BOOT UP?

Icom (UK) Ltd have informed the *Practical Wireless* News desk about their brand new PC-based radio scanner - the IC-PCR100.

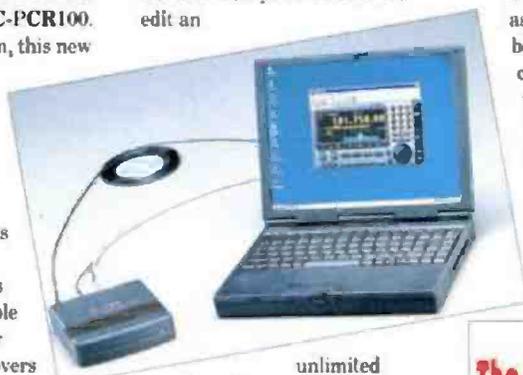
According to Icom, this new radio scanner is mainly targeted at the PC enthusiast with an interest in radio and is the baby brother of the IC-PCR1000. They tell us that this wide band receiver, which covers 0.010-1300MHz, is able to give your computer access to radio and covers a.m., f.m., wide band f.m.(w.b.f.m.) and f.m. stereo modes.

The IC-PCR100, according to Icom, allows you to scan and listen to broadcast stations or Amateur Radio bands, emergency services, airband - including air traffic control and marine band. You can even listen to terrestrial TV stations!

The scanner comes in a "compact, black plastic case, which is smaller than many PC modems" and has two user-interface screens, Icom states. Icom go on to say that the multi-function panel gives control of all the functions whilst the toolbar style 'simple panel' is straightforward enough for beginners to run

alongside other applications.

According to Icom, further screens allow you to create and edit an



unlimited number of memory channels, view adjacent frequency activity, control the scan functions and select the receiver settings. Other functions include tone-squelch for use with CTCSS, a built-in r.f. attenuator to reduce interference, six different scans and a tuneable band-pass filter.

The IC-PCR100 comes complete with floppy disks, power supply, antenna and connection lead. Installation, Icom say, is simple through the use of plug-n-play technology. At just **£199.99 including VAT**, Dale Blackman - Marketing Manager for Icom (UK) Ltd - says that the IC-PCR100 "... offers exceptional value for money and is a great choice for the entry-level listener".

Some other news from Icom now, they have



announced that they have been awarded accreditation to ISO9001 (a universally recognised standard) by the Swiss certification body, Société Générale de Surveillance (SGS). This means, Icom tell *PW*, that they are one of the few radio manufacturers around the world to carry this certification which offers a high level of quality assurance and they will now be able to carry out self-certification of products when the appropriate legislation has been adopted within Europe, therefore improving the 'time to market' for many products.

Not only that, but Icom have also told us

about two new appointments which they have made to their marketing and sales division. Ian Lockyer has been appointed as Marketing Assistant and Wendy Dagnall as 'Ham' Sales Assistant. Dale Blackman, Marketing Manager for Icom, says: "Ian and Wendy's appointments reflect the rate at which Icom is expanding. They will be a vital part of our marketing and sales team and we expect to see great things

from them in the future" (and all



here at *PW* would like to wish them both the best in their new appointments).

For further information on any of Icom's products, you can reach them at Tel: (01227) 741741. Sea Street, Herne Bay, Kent CT6 8LD.

### The RSGB Visits Dorset

Peter Kirby G0TWW, General Secretary of the Radio Society of Great Britain (RSGB) will be visiting Dorset in order to talk to all Radio Amateurs about the proposed plans for the future and to answer questions.

The Bournemouth Radio Society has been in contact with *PW* to tell us that they have booked the large hall at

Kinson Community Centre, Pelhams Park, Millhams Road, Kinson, Bournemouth BH10 7LH at 7:30pm on Friday 5 March 1999. Peter Kirby's talk will begin at 8pm. They tell us that there will be free tea, coffee and refreshments - a bar will also be open after the talk.

You can contact Mike Stevens G3CPN (Chairman of the Bournemouth ARS) on (01202) 872692 for more details.

### Kits From Kanga

Dick Pascoe G0BPS of Kanga Products has told *PW* all about his new catalogue which has few changes to it. Dick tells us that they now display their prices in both UK pounds and Euro's in order to help their European customers.

Also, Dick tells us that there are two new a.t.u. kits available from Kanga Products. The 'Classic ATU' (£29.95 plus £2 P&P) where the components are supplied for the builder to select anyone of the three most famous circuits for an a.t.u.: the 'T' match; the 'L' match or the 'Pi' match and the builder can select the one most suitable for his system.

The American 'Super T' a.t.u. (£24.95 plus £2 P&P) is the other new kit available - full instructions are given. You could also get your hands on Rev. George Dobbs G3RJV's famous 'Six-Pack' (£30 plus £2 P&P) of kits which includes a simple receiver, a transmitter and test equipment units.

For more information, or a copy of the catalogue, you can contact Dick at Kanga Products on Tel: (01303) 891106. FAX: (0870) 0568608. You can E-mail him: [sales@kanga.demon.co.uk](mailto:sales@kanga.demon.co.uk) or alternatively you can visit his Web site: <http://www.kanga.demon.co.uk>





COMPILED BY JO WILLIAMS

### "What's New At W&S"?

**Waters & Stanton PLC** (W&S) of Essex have been in contact to tell *Practical Wireless* about some of their new products: the **Opto Com** wide-band, PC controlled, communications receiver and data decoder from Optoelectronics and the **Watson FC-36A 36A** portable p.s.u.



First up, the **Opto Com**. This PC controlled receiver and data decoder, according to W&S, now comes complete with software. With a frequency range of 25-250, 760-823, 849-869, and 894-1300MHz, this receiver covers the a.m./n.f.m./w.f.m. bands. There's a whip antenna included with the package, W&S state and it comes complete with Motorola and LTR Trunk Tracking, built-in speaker, power supply and C1-5 PC interface/Scout and Super Searcher. W&S say that all this costs only **£499 including VAT**.

Their new Watson micro-controlled p.s.u. - the **FC-36A** - is being

produced in Spain for Waters & Stanton, the press release mentions. It has a dual digital readout, keypad control, warning set of l.e.d.s. front connections, rear terminals, short circuit protection and much, much more, W&S tell *PW*. With an output voltage of 9-15V d.c. and a current output of 36A, the **FC-36A** also has an internal 8Ω speaker. The price of the **FC-36A** is **£169.95 including VAT**.

For more information on these, or any other W&S products, you can contact them on Tel: **(01702) 206835**, FAX: **(01702) 205843**. **Spa House, 22 Main Road, Hockley, Essex SS5 4QS**.

### YEDA Gets New Support

The **1999 Young Electronic Designer Awards (YEDA)** programme was announced this

month by the **YEDA Trust** and they say that they have received financial backing from **Combined Precision Components plc (CPC)**, the **Department of Trade and Industry (DTI)**, **Engineering and Marine Training Authority (EMTA)**, **Institution of Electrical Engineers (IEE)**.

The **YEDA** has been staged annually since 1985 with the enthusiastic support of **HRH The Duke of York** (patron since 1994). They state that: "YEDA challenges young people (between the ages of 12 and 25) at schools and universities, to design and build an electronic or communication device, or piece of software that answers an everyday need, which they have identified".

Regional judging takes place in

### A New 'TEAM' FOR NEVADA!

**Mike Devereux** of **Nevada** has been in touch with *PW* to tell us about three new products which they are promoting at the moment: their new 80 channel CB base station - the **Team Euro 8000**; a 136kHz radio called "**The First**" and the **Scanmaster HF-2 Coaxial Masthead Switch**.

According to Nevada, the **Team Euro 8000** is the UK's first 80 channel base station and is packed with extra facilities including a scan facility which allows fast scan of EU or UK channels, a dual watch allowing you to monitor activity on a second channel, last channel recall, a noise blanker and there is also a provision on the back for the connection of a large external S-meter.

Nevada also state that the radio has "... a particularly sensitive receiver for long distance contacts and a variable r.f. gain to optimise



reception of both distant and local stations". Nevada tell us that the **Euro 8000** will cost **£169** and will be available from CB dealers throughout the UK or direct from them.

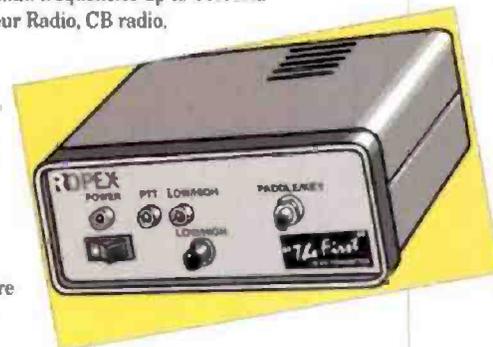
Nevada also tell us that they have been appointed UK distributor for **Ropex** of Holland and "**The First**", a 136kHz transmitter, will be available from the end of January 1999. It is a crystal controlled transmitter with a

power output of 30 or 130W switchable, Nevada say. It operates in Class D and has built-in current protection for the antenna circuit, the power requirements are 13.5V @ 13.5A. "**The First**" will cost **£179**.

The **Scanmaster HF-2 Coaxial Masthead Switch** appertently uses a 10A low loss relay, fibreglass PCB and Teflon low loss SO239 sockets or 'N' type sockets, depending on the version and is suitable for a wide variety of uses at h.f. and v.h.f. frequencies up to 440MHz including Amateur Radio, CB radio, scanners, commercial, professional use, etc. It requires 12V d.c. and the d.c. input has been fully decoupled, according to Nevada, to ensure

that no r.f. pickup on the d.c. cable when used with a transceiver.

For more information on these, or any other, Nevada products, you can Tel: **(01705) 662145**. **189 London Road, North End, Portsmouth PO2 9AE**.



the UK from 17-28 May and the finals will be held at the Science Museum in London from the 29 June. YEDA say that they aim to promote "knowledge of business", by asking the questions which industry ask before taking on any product: "Is there a market need?"; "Can it be made at the right price?"; etc.

The prizes for winning? YEDA tell us that there is a prize fund totalling over-£10 000, as well as trophies, certificates and other awards. Schools should have received forms about this competition at the beginning of January, if you have children around this age, why not encourage them to ask about the YEDA competition at school - it could be good experience for them.

## NTL Announces Acquisition

The multinational company, NTL (well known for transmitting ITV and other services) has announced that it has agreed to acquire Eastern Group Telecoms (EGT) from Eastern Group plc, for £91 million. NTL say that EGT comprises of a telecoms division which utilises 1800km SDH fibre-optic network across the south-east and east of England and the radio sites division with 121 radio masts across East Anglia which serves the UK's major mobile phone network operators. NTL go on to say that EGT will operate as a wholly owned subsidiary of NTL.

More news of NTL in that they and CTI (the private company which transmits BBC programmes) informed the RSGB Repeater Management Committee, at the end of 1998, that they will be increasing site fees for repeater and beacon stations in a "... phased program to reflect true commercial costs". They both state that due to increasing demand for space on their masts and towers from other users, it is becoming increasingly difficult to justify to their commercial customers.

## RAE To Change - For Better Or Worse?

Every month, *Practical Wireless* receives in its post bag, the GB2RS News Broadcast which is prepared by the RSGB and intended for all Radio Amateurs and short-wave listeners. The week beginning the 17 January 1999 carried the news that: "Following representations by the RSGB, City and Guilds look set to agree to three major changes concerning the Radio Amateurs Examination (RAE)". The item went on to say that from September 1999, they will release past RAE papers for the first time, provided the bank of questions is sufficiently expanded.

There was also a mention that, the examination body will be making it "easier and less costly" for Amateur Radio

why Amateur Radio should receive favourable terms for site sharing.

The press release we received from the RSGB Repeater Management Committee regarding this matter goes on to comment that "Whilst there is no doubt that most groups will find the cost increases a serious problem, there are some advantages with the situation. Firstly, neither company have given notice to quit for any installation. The payment of appropriate site fees will give amateurs equal status to the professionals regarding protection of apertures, ground space and minimal service interruption".

The RSGB Repeater Management Committee state that both NTL and CTI have shown further understanding by not increasing charges straight away. This will enable groups to plan their finances accordingly. For groups occupying CTI sites the increase became effective

from 1 January 1999 but groups occupying NTL sites will see an increase effective from 1 April 1999.

## Vann Draper's DM-100

Vann Draper Electronics Ltd have announced the introduction of their new high specification bench digital multi-meter. The DM-100 microprocessor controlled multi-meter's main functions include a menu system which allows the measurement speed to be selected (fast or slow) plus selection of relative and mathematical modes including decibel readout, Vann Draper states in the press release.

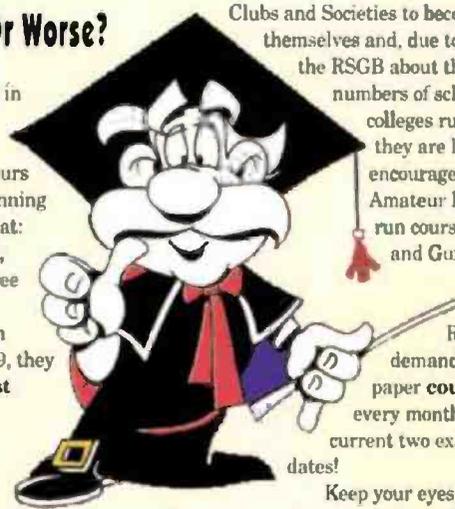
They also say that the design of the DM-100 allows the instrument to be set or operated with minimal adjustment - with only four controls on the front panel and a group of l.e.d.s which indicate control selection.

Finally, Vann Draper state that "An RS-232C standard

Clubs and Societies to become test centres themselves and, due to the concerns of the RSGB about the falling numbers of schools and colleges running the RAE, they are looking to encourage a network of Amateur Radio Clubs to run courses. Also, City and Guilds are

considering making the RAE available on demand. A new RAE paper could be available every month, instead of the current two examination dates!

Keep your eyes trained on the PW News pages for more updates on this.



PW News pages for more updates on this.

interface enables the instrument to be controlled individually from a personal computer or with the optional software and controller can be used in combination with other instruments to provide a fully automatic test system". The DM-100 costs £349. For further information on this or other Vann Draper products, you can contact them on Tel: 0116-277 1400, FAX: 0116-277 3945, Unit 5, Premier Works, Canal Street, South Wigston, Leicester LE18 2PL. Alternatively, you can E-mail: sales@vanndraper.co.uk or visit their Web site: www.vanndraper.co.uk

## "Four Days In May"!

Rev. George Dobbs G3RJV, our regular 'Carrying On The Practical Way' author, has asked PW if we would inform our readers about the QRP Amateur Radio Club International (QRP ARCI)

"Four Days In May" QRP Conference which will be commencing from Thursday 13 May 1999. PW readers are invited to register early for this "not-to-be-missed" QRP event of 1999!

George gave PW some idea of what can be expected at the 'Four Days In May' QRP Conference: Amateur Radio QRP presentations, workshops and demonstrations will be the focus of Thursday's QRP Symposium to be held at QRP ARCI headquarters -

*continued on page 14*



# NEWS

continued from page 13

"the Days Inn Dayton South".

There will also be the annual Friday night QRP ARCI Award Banquet honouring QRP dignitaries for their service to the Amateur Radio community, George goes on to say. Saturday will be an evening social for QRPers to meet the many regional North American and International QRP club members and the evening will culminate with a building contest! You're invited to bring your latest kit, home-brew project, antennas - whatever.

To find out more about Thursday's activities, you can contact Philip Specht, 925 Saddle Ridge, Roswell, GA 30076 USA or E-mail: k4pqc@bellsouth.net for more information (send an SAE). Registration for that day costs \$10 by May 13 1999, \$12 thereafter, (payable to QRP ARCI).

The Awards Banquet costs \$25 (payable to QRP ARCI) and

requires an SAE by May 1 1999 to Scott Rosenfeld NF3I, QRP ARCI Banquet Tickets, 2250 Paterson St 50, Eugene, OR 97405-2988 USA.

For registration information about Saturday's Social evening, please contact Jim Stafford W4QO, QRP Vendor: Evening Chairperson, 11395 West Road, Roswell, GA 30075 or via E-mail: w4qo@amsat.org

Finally, the Days Inn Dayton South (DIDS) will be the 1999 FDIM QRP headquarters. Hank Kohl K8DD has arranged a special block of reduced-rate rooms to be held at the hotel for FDIM attendees wishing to stay there. Rooms are \$72/night (plus tax) with as many occupants as desired. Hank can be reached at: QRP-ARCI Rooms, 1640 Henry, Port Huron, MI 48060-2523 USA, or via E-mail: k8dd@contesting.com

## A Plea From Practical Wireless

Please, please, please continue to keep *PW* up-to-date with any news that you think may be of interest to our readers. All news items are considered and

## Accomodex's Attractive Accomodation

The *Practical Wireless* News desk received a press release from Accomodex Ltd of Coventry. They wrote to tell us about their "Affordable Accommodation For 'Hams'".

The company tells us that they have introduced an "... attractive, fully insulated new garden building, designed especially as practical and affordable accommodation for radio 'Hams'". They say that the structure is built onto a strong - height and level adjustable - galvanised steel floor frame which, they state, can be placed on a concrete pad or paving slabs without foundations.

The walls are made up of exterior grade composite board which Accomodex say is the same material used in American house-building and, apparently, comes with a 20 year guarantee. This board is then embossed with a 'grain' pattern which, Accomodex claims, gives the effect of real timber "... but without the maintenance problems".

What the photograph doesn't show, is the interior which Accomodex says is lined with a faced laminate in a choice of colours. Thermal insulation between wall and ceiling claddings and a



moisture barrier is also incorporated.

Accomodex states that the cabin is eight feet wide and can be any height from eight feet upwards (in increments of two feet). Delivered in flatpack form, Accomodex say that self-assembly is easy and that planning permission is not normally required, but you should check with your local authority anyway. Prices start from £2295 plus VAT.

For more information, you can telephone Accomodex on Tel: (01203) 301301.

## AN APOLOGY

The Yeovil Amateur Radio Club have been in touch with *Practical Wireless* to tell us that we made a mistake in our 'Radio Diary' pages concerning the date of their 15th QRP Convention which will be taking place at Digby Hall, Hound Street,

Sherborne, Dorset from 0900 to 1700. It will be taking place on the 18th April 1999. If you would like to know more about the event, you can contact Mike G7SDD on (01963) 250594. *Practical Wireless* apologise for any inconvenience caused.

remember - any mention on these pages is FREE so you can't afford to miss out! Free publicity for your business, club or club event is extremely hard to come

by these days so grab the opportunity with both hands. Items which come with photographs and other illustrations are especially welcome.

## New Venue For Blackwood Rally

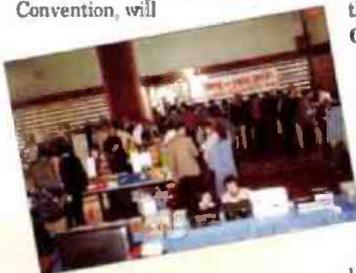
The Blackwood & District ARS has been in touch to tell us about their anniversary plans for their rally in October this year.

The Blackwood Radio, Computer & Electronics Rally, formerly the Welsh Amateur Convention, will

be celebrating its 25th Anniversary this year and to mark the occasion, they're having a complete change of venue. The venue for this year's event will be the Newport Centre with 1300 square metres of floor space and the rally will take place on the 17 October 1999.

Well known for its many celebrated speakers - Tony England W0ORE, Space Shuttle Astronaut being one of the past speakers - it soon became an annual event in the RSGB President's diary.

The Newport Centre is located in the centre of Newport, Gwent and it has an adjoining free open air car park (Sundays) and is fairly close to the bus and train stations. It is one mile from junctions 25A, 26



and 28 of the M4 and only 15 minutes from the Second Severn Crossing so there's easy access from the motorways.

The Blackwood & District ARS say that the centre has a swimming pool, bar and catering facilities and an adjoining shopping centre so there's enough for the whole family. So, why not join them this year and become a part of the fun. Further information can be obtained from Mr S Instone GWONPL, Tel: (01495) 243824 or (07970) 777756 or you can E-mail: FIREHAM@AOL.COM

**Radios with Megabytes!**

# The Fairhaven RD500VX 2MByte RADIO DATABASE

## Bring Your Scanning Directory to Life

The RD500 is more than a scanner and more than just a receiver

**HF/VHF/UHF video/stereo/am/fm/ssb/cw/sync modes  
0 to 1750MHz. Built-in database, PC software CD.**



FAIRHAVEN ELECTRONICS Ltd. 47 Dale Road, Spondon, Derby DE21 7DG (01332) 670707

### The RD500 - the new kind of radio receiver.

Now it is possible to have a receiver which not only holds your own station selections in memory, but has a complete knowledge of its spectrum. 54,700 station records can be stored and retrieved from the receiver itself, just type in a description, city, or the type of station you are looking for and the receiver finds the stations of interest to you.

The RD500 is a scanner an HF receiver, a versatile database system and a digital sound recorder/editor. It can tune in smooth 5Hz steps (or any step size), and has 99 scan bands, 8 scan modes, auto memory write, 99 skip frequencies, auto-tuning-AFC, variable notch and peak filter, 60 level S-meter, I.F. noise blanker, cassette control, AVC, selectable AGC, pass band tuning, high selectivity, and sensitivity, world time clock/timer, tuning meter, stereo variable bandwidth CW. Also includes 45 key alphanumeric remote, 12V PSU Hamcom interface, and supports p.c. keyboards, Collins filters available.

**Modes:**  
AM/FM/USB/LSB/WBFM/STEREO  
FM/Video/TV sound/Sync-AM/CW, and comes complete with Windows database editor and frequency list word processor software on CD.

**What the magazines said:** "Powerful, carefully arranged to be easy to use...How can I listen to CW again without stereo?...Hot little receiver...I enjoyed it immensely" JW (SWM). "Superb control facilities...Good selectivity" HRT.

Available direct or from major dealers. 2 year Guarantee.

**Price: £799 inc. postage**

Web site <http://www.fair-radio.deidip.co.uk>

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RADIO**

## ANTENNA RANGE from MOONRAKER

### HB9CV 2 Element Beam 3.5 dbd

- 70cms (Boom 12") .....£15<sup>95</sup>
- 2 metre (Boom 20") .....£17<sup>95</sup>
- 4 metre (Boom 23") .....£27<sup>95</sup>
- 6 metre (Boom 33") .....£34<sup>95</sup>
- 10 metre (Boom 52") .....£60<sup>95</sup>

### Halo Loops

- 2 metre (size 12" approx) £12<sup>95</sup>
- 4 metre (size 20" approx) £18<sup>95</sup>
- 6 metre (size 30" approx) £24<sup>95</sup>

### 1/2 Wave Vertical Fibre Glass (GRP) Base Antenna (without ground planes)

- 70 cms (Length 26") .....£15<sup>95</sup>
- 2 metre (Length 52") .....£20<sup>95</sup>
- 4 metre (Length 92") .....£34<sup>95</sup>
- 6 metre (Length 126") .....£44<sup>95</sup>

### G5RV Wire Antenna (10-20/80 metre)

- Economy Full (Length 102") £16<sup>00</sup>
- Economy Half (Length 52") £14<sup>00</sup>
- Standard Full (Length 102") £18<sup>00</sup>
- Standard Half (Length 52") £16<sup>00</sup>

### Magnetic Mounts

All come complete with Felt or Rubber Base please specify

- 3/8 Mag Mount 3.5" .....£7<sup>95</sup>
- SO239 Mag Mount 3.5" .....£9<sup>95</sup>
- 3/8 Mag Mount 5" .....£9<sup>95</sup>
- SO239 Mag Mount 5" .....£11<sup>95</sup>
- 3/8 Mag Mount 7" .....£12<sup>95</sup>
- SO239 Mag Mount 7" .....£14<sup>95</sup>
- 3/8 Tri-Mag 3x5" .....£39<sup>95</sup>

### Mounting Brackets, Poles, U Bolts and Clamps etc.

- 6" Stand Off Bracket (complete with U Bolts) .....£6<sup>00</sup>
- 12" T & K Bracket (complete with U Bolts) .....£10<sup>95</sup>
- 18" T & K Bracket (complete with U Bolts) .....£12<sup>95</sup>
- 24" T & K Bracket (complete with U Bolts) .....£14<sup>95</sup>
- 1 1/4" x 5" Heavy Duty Ali Swagged Poles (set of 4) .....£19<sup>95</sup>

All Prices Plus £6.00 P&P per order.

### Vertical Fibre Glass (GRP) Base Antennas

- BM100 Dual-Bander .....£29<sup>95</sup>  
(2 mts 3dBd) (70cms 6dBd) (Length 39")
- SQB100\* Dual-Bander .....£39<sup>95</sup>  
(2 mts 3dBd) (70cms 6dBd) (Length 39")
- SM200 Dual-Bander .....£29<sup>95</sup>  
(2 mts 3.5dBd) (70cms 6.2dBd) (Length 62")
- BM200 Dual-Bander .....£39<sup>95</sup>  
(2 mts 4.5dBd) (70cms 7.5dBd) (Length 62")
- SQB200\* Dual-Bander .....£49<sup>95</sup>  
(2 mts 4.5dBd) (70cms 7.5dBd) (Length 62")
- BM500 Dual-Bander Super Gainer .....£49<sup>95</sup>  
(2 mts 6.8dBd) (70cms 9.2dBd) (Length 100")
- SQB500 Dual-Bander Super Gainer .....£59<sup>95</sup>  
(2 mts 6.8dBd) (70cms 9.2dBd) (Length 100")
- SM1000 Tri-Bander .....£49<sup>95</sup>  
(2 mts 5.2dBd) (6 mts 2.6dBd) (70cms 7dBd) (Length 74")
- BM1000 Tri-Bander .....£59<sup>95</sup>  
(2 mts 6.2dBd) (6 mts 3.0dBd) (70cms 8.4dBd) (Length 100")
- SQB1000\* Tri-Bander .....£69<sup>95</sup>  
(2 mts 6.2dBd) (6 mts 3.0dBd) (70cms 8.4dBd) (Length 100")

\*SQB1000/200/100/500 are Stainless Steel, Chromed and Poly Coated. Full 2 year Warranty on these Antennas

### Yagi Beams

- 2 metre 4 Element (Boom 48") (Gain 7dBd) .....£19<sup>95</sup>
- 2 metre 5 Element (Boom 63") (Gain 10dBd) .....£31<sup>95</sup>
- 2 metre 8 Element (Boom 125") (Gain 12dBd) .....£41<sup>95</sup>
- 2 metre 12 Element (Boom 186") (Gain 13dBd) .....£65<sup>95</sup>
- 4 metre 3 Element (Boom 45") (Gain 8dBd) .....£34<sup>95</sup>
- 4 metre 5 Element (Boom 128") (Gain 10dBd) .....£54<sup>95</sup>
- 6 metre 3 Element (Boom 72") (Gain 7.5dBd) .....£49<sup>95</sup>
- 6 metre 5 Element (Boom 142") (Gain 9.5dBd) .....£69<sup>95</sup>
- 70 cms 13 Element (Boom 76") (Gain 12.5dBd) .....£50<sup>95</sup>

### Crossed Yagi Beams

- 2 metre 5 Element (Boom 64") (Gain 7.5dBd) .....£64<sup>95</sup>
- 2 metre 8 Element (Boom 126") (Gain 11.5dBd) .....£79<sup>95</sup>
- 70 cms 13 Element (Boom 83") (Gain 1.5dBd) .....£49<sup>95</sup>

### ZL Special Yagi Beams

- 2 metre 5 Element (Boom 54") (Gain 9.5dBd) .....£31<sup>95</sup>
- 2 metre 7 Element (Boom 60") (Gain 12dBd) .....£39<sup>95</sup>
- 2 metre 12 Element (Boom 126") (Gain 14dBd) .....£65<sup>95</sup>
- 70 cms 7 Element (Boom 28") (Gain 11.5dBd) .....£24<sup>95</sup>
- 70 cms 12 Element (Boom 48") (Gain 14dBd) .....£39<sup>95</sup>

### Mobile HF Whips (with 3/8 base fitting)

- AMPRO 160 metre (Length 7' approx) £49<sup>95</sup>
- AMPRO 80 metre (Length 7' approx) £18<sup>95</sup>
- AMPRO 40 metre (Length 7' approx) £15<sup>95</sup>
- AMPRO 30 metre (Length 7' approx) £15<sup>95</sup>
- AMPRO 20 metre (Length 7' approx) £15<sup>95</sup>
- AMPRO 17 metre (Length 7' approx) £15<sup>95</sup>
- AMPRO 15 metre (Length 7' approx) £15<sup>95</sup>
- AMPRO 12 metre (Length 7' approx) £15<sup>95</sup>
- AMPRO 10 metre (Length 7' approx) £15<sup>95</sup>
- AMPRO 6 metre (Length 4'6" approx) £15<sup>95</sup>

All Prices Plus £6.00 P&P per order.



MOONRAKER (UK) LTD. UNIT 12, CRANFIELD ROAD UNITS, CRANFIELD ROAD, WOBURN SANDS, BUCKS MK17 8UR. TEL: (01908) 281705. FAX: (01908) 281706



# ROBERTS

SEE PAGES  
18 & 19 IN  
THIS ISSUE  
FOR REVIEW!



**RC828**

- PLL multi-band digital preset stereo world radio cassette recorder
- 5 tuning methods: direct frequency keying, auto-scan, manual scan, memory recall and rotary
- TIME RECORDING START
- 45 preset stations
- Dual time clock/alarm
- Receive single side-band and CW transmissions
- Continuous AM coverage 150kHz - 29.999MHz

**£220.00**



**R861**

- RDS Multi-band digital preset stereo world radio
- PLL digital tuner with FM/MW/LW/SW wave band coverage
- 307 memories - (261 on SW, 18 MW, 18 FM, 9 on LW plus priority

station) ● RDS (Radio Data System) station name ● SSB (USB/LSB) 40Hz/step fine tuning AM RF gain control ● Five tuning methods - direct frequency tuning, auto scan, manual tuning, memory recall, rotary tuning ● ATS (Auto Tuning System) - auto scan and pre-set stations in signal strength priority (FM/MW/LW) ● Continuous AM coverage 153kHz - 29.999MHz.

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**R881**

- PLL multi-band digital pre-set world radio
- APS (Automatic pre-set system) on MW and FM - automatically selects and stores stations in pre-set memories
- Direct frequency tuning via key pad
- Auto scan tuning

- Memory scan tuning
- Direct access to your favourite SW band
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- LCD display for all important functions
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- Dual time clock/alarm with precise setting

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- 5 tuning methods and 54 preset stations
- Dual time display
- Clock/alarm
- Complete with soft carrying pouch
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# Rob & His Roberts - An Inseparable Pair!

## The Roberts Radio RC 828

Rob Mannion G3XFD reviews the Roberts RC 828 multi-band radio cassette receiver, and ends up suggesting it would be ideal for any radio enthusiast let alone someone just starting off in the hobby!

Jo Williams, the PW 'Medium Size' (her description!) News & Production Editor operating the Roberts RC 828 outdoors. The carrying handle recesses into the top of the receiver.

I was fortunate enough to get my Roberts RC 828 in November, which coincided with a period when I was unwell - so I was able to use it to great advantage immediately! And even after several months of continuous use the fascination provided by this remarkably versatile portable receiver has not worn off.

What I would have given to own one of these sets when I was starting off in the radio hobby when I was at school! (My first 'proper' set was an old R1155 set courtesy of a surplus shop). However, as you'll find out in this review, the RC 828 in my opinion is able to provide a great deal for a wide cross section of owners including G3XFD himself.

So, let's get on with it and take a look at the fascinating 'package' offered by the Roberts RC 828. It's certainly got a lot to offer the radio listener and even the transmitting Radio Amateur too!

### All Band Receiver

The Roberts Radio RC 828 is promoted as a 'Professional Digital All Band World Receiver' - without mentioning (on the front cover of the manual) the fact it also offers a cassette recorder facility too! And although it may not actually come up to what I understand to be 'professional' standards in the full sense of the word - my RC 828 has proved itself to be a truly excellent receiver, so much so it's 're-vitalised' my short wave listening and has provided a great deal of general broadcast listening pleasure.

Providing continuous coverage from 150kHz to 29,999MHz and also covering Band II from 87.5 to 108MHz, the receiver is based on a double conversion superhet, using a 55.845MHz first i.f. and a 450kHz second i.f. The receiver is single conversion only on Band II v.h.f. f.m. coverage incorporating a 10.7MHz i.f.

Fully synthesised, the receiver provides a large and truly excellent liquid crystal (l.c.d.) tuning display which indicates either 1kHz tuning steps (the minimum tuning rate) or the standardised European channel spacing on long and medium waves. Tuning, carried out by the rotary tuning knob is at a minimum 50kHz on Band II.

When the front panel **Up/Down** buttons are used the frequency changes are in increments of 100kHz (Band II v.h.f.), 9kHz (long wave), 9 (European) or 10kHz (North American channels) and 5kHz on short wave. The same tuning rates are available with the rotary tuning control steps when **Fast** tuning is selected.

With the **Slow** tuning selected, the tuning step rate is as follows: 50kHz per step on Band II v.h.f. f.m. The rate per step is 1kHz on long, medium and short waves.

The large l.c.d. panel provides three basic display colours on a standard light grey l.c.d. background. On the left hand side of the display the (dual time) clock numerals are



displayed and below, taking up 75% of the width of the bottom of the l.c.d. is the combined bar graph S-meter and power supply status/Battery state indicator. A pale orange square on the top right provides the surrounding background for memory indicators.

Also provided on the RC 828 is a full stereo cassette player/recorder. Although not specifically mentioned in the manual, this provides stereo record (direct from Band II v.h.f. f.m. multiplex transmissions) with play-back via headphones.

When stereo headphones are plugged in, the appropriate l.c.d. annunciator automatically indicates 'stereo'. There's also a **FM Stereo/FM Mono** control provided so that the operator can disable 'stereo' where reception cannot provide a good 'clean' decoded multiplex stereo signal with a 'hiss free' background.

The fitted audio cassette recorder is fully automatic in record mode and can be set from the receiver's clock to turn on automatically, although switching off time cannot be controlled (It's decided on by the length of the tape itself). The audio quality on record and play back is very good indeed and the 'auto stop' mechanism - which also operates on fast forward and rewind - is exceptionally quick and efficient.

Provided with an external 'plug in' type of mains adapter the RC 828 is also powered by internal batteries.

The radio comes complete with a well written and produced very useful guide to short wave radio listening, together with an *Operator's Manual* which does not seem to be anywhere as good as the receiver itself. Having said that - it does do the job while at the same time rather 'hiding the light under the bushel' when it comes to describing the RC 828 and its many features.

### With Us in Mind

Special facilities - with us (the specialised radio enthusiasts) in mind, features provided on the RC 828 include a beat frequency oscillator (BFO) - (more about that later) - and an **AM Narrow/AM Wide** control. Additionally (wonder of wonders!) this receiver also comes with a traditional fully adjustable - **RF Gain** control rather than the all-too-common switched attenuator which most manufacturers seem to go for nowadays. (Even my beloved little Alinco DX-

ROB SAYS HIS RC 828 IS A TRULY EXCELLENT RECEIVER... WHICH PROVIDES MUCH PLEASURE

70 transceiver does not have an adjustable r.f. gain control!).

There's also the previously mentioned variable speed tuning control, and here, it must be realised that the RC 828 does not offer the **apparently continuous** synthesiser tuning provided by the majority of receivers/transceivers on the market. Instead, the receiver 'steps' in a minimum of 1kHz steps using the rotary shaft encoder (tuning control) on the right hand side of the receiver.

Also provided are 54 memory presets, along with a scanning function. This is backed up with a 'direct entry' keypad function and rapid Up/Down controls.

## Using The Receiver

I quickly found that using the Roberts Radio RC 828 is a sheer joy and simplicity itself. Despite having a relatively small loudspeaker system the audio quality is truly excellent for a relatively small 'portable' radio.

There are two speaker apertures behind the front grill but other than the fact that the maximum audio output is quoted at 800mW at 10% Total Harmonic Distortion (THD), the manual says nothing about how the 25mm and the much larger 75mm diameter speakers produce such a pleasing audio. In fact it's so pleasing I often have the '828 on because it's often more convenient to control than my main 'hi-fi' units in my lounge!

On Band II v.h.f. f.m. the receiver is excellent indeed. It's both sensitive and selective - bearing in mind it is a single conversion receiver on this band. Audio quality - as

Illustrating the well laid out main controls. The main rotary tuning control is at the top right, with tuning rate selector (and 'lock') below. The extremely useful and effective RF Gain control is set in the centre of the group of three (bottom) right. (see text).

I've said - is excellent and distant transmitters on the band are often easy to receive, despite strong local adjacent channel transmitters, because of the set's good selectivity. The enormous (it really does seem large indoors!) 1.2m long extendable antenna also enabled the set to out perform my other portable Band II receivers.

On long and medium wave I found the RC 828's selectivity and sensitivity to be very good indeed. One challenge I find difficult for most receivers is providing a usable signal from the BBC World Service 648kHz transmissions from the East coast (aimed away from the UK towards Europe) and most evenings the receiver does well, despite

strong adjacent channel interference so I can enjoy the BBC World Service on that frequency.

## The Short Wave Bands

On the short wave bands I really started to re-live my days from over 40 years ago when I 'borrowed' my late father's rather ornate 'art deco' style Telefunken set when he went out on Sunday afternoons visiting friends. That was when I could run my fingers over the piano keys, rotate the tuning controls and listen to the world from his armchair.

Well, with the Roberts I did just the same, but from the comfort of my own arm chair, my office or even just prior to getting off to sleep. Such are the advantages of a truly portable communications receiver!

Very quickly indeed I found myself setting favourite frequencies into the memory. The first was 5.960MHz for Radio Canada International and I now always enjoy half an hour or so of the Canadian 'domestic' programmes transmitted via the short wave service, using only the extendable antenna. It makes interesting listening and as it coincides with the Canadian (Atlantic side) early evenings there's often a UK story involved in the RCI news and from what I've heard I get the distinct impression they think we're quite zany over here!

Selectivity, tuning and sensitivity are excellent for broadcast use and I've found that I can listen to short wave transmissions for many hours. Being battery powered you can even use the set in relatively noisy areas to listen to the lower (75 and 90m) frequency broadcast bands with good prospects of trouble free reception.

Altogether I can honestly say that the 828 helped me 'open my ears' again and rediscover the h.f. broadcast bands. Since I bought the receiver it's not a question of having a quick listen before bed - instead I now often have the receiver on when I'm relaxing downstairs and I want a change from 'domestic service' radio and TV.

## The Amateur Bands

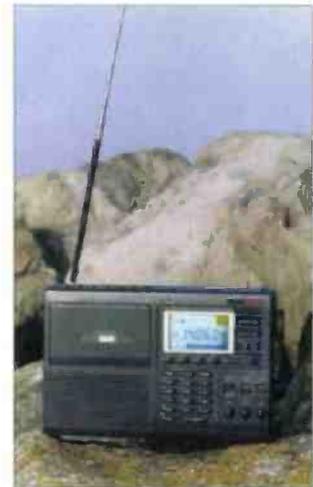
To be fair, at first I thought perhaps it was asking far too much for a (although high quality) non-specialised general coverage broadcast-style receiver to cope with conditions on the crowded Amateur Radio frequencies. However, the RC 828 quickly proved me wrong and showed itself to be far better than I could imagine.

On the 3.5MHz band I found it was relatively easy to listen into both single sideband (s.s.b.) transmissions and c.w. (Morse) using the BFO. This is where I had expected the 1kHz synthesiser 'steps' to become a problem. Not a bit of it though!

Instead, with the BFO switched in, when adjusting it I found it worked in the style of a 'clarifier' or as most of us would refer to it, nowadays - receiver incremental tuning (RIT). So, either side of the 1kHz step I found it was always possible to resolve the Amateur Radio c.w. and lower or upper sideband transmissions.

Operating on an external (wire) antenna the receiver proves to be a good performer and it takes a lot of signal to overload the receiver. Having the **RF Gain** control is a great asset, and the receiver can cope well up on 14MHz s.s.b. with the famous 'splattery' transmissions often heard from southern Europe!

I made a point of trying the



The Roberts RC 828 is a true 'portable' and the large tuning display works well even in bright daylight conditions.

## Manufacturer's Specifications

<b>Receiver type:</b>	Double conversion super-heterodyne (150kHz to 29.999MHz) (Single conversion Band II v.h.f. f.m. coverage)
<b>Intermediate frequencies, long, medium and short wave:</b>	55.845MHz 1st, 450kHz 2nd (10.7MHz i.f. on Band II v.h.f.)
<b>Frequency range:</b>	150kHz to 29.999MHz (continuous coverage) 87.7 to 108MHz
<b>Short wave broadcast bands (Push-button selected)</b>	120 metres 2.3 - 2.495MHz 90 metres 3.2 to 3.4MHz 75 metres 3.9 to 4MHz 60 metres 4.750 to 5.6MHz 49 metres 5.9 to 8.2MHz 41 metres 7.1 to 7.35MHz 31 metres 9.4 to 9.99MHz 25 metres 11.6 to 12.1MHz 21 metres 13.57 to 13.87MHz 19 metres 15.1 to 15.8MHz 16 metres 17.48 to 17.9MHz 13 metres 21.45 to 21.75MHz 11 metres 25.6 to 26.1MHz
<b>Antennas</b>	
Long and medium wave	ferrite rod
Short waves	extendable (telescopic) rod approx. 1.2m long via socket 93.5mm jack plug)
<b>External wire</b>	
Audio	
Audio output	Nominal 800mW at 10% THD (into external speakers)
Cassette recorder	a.c. (r.f.) bias, magnetic erase.
Frequency response	125Hz to 8kHz
<b>Power Sources</b>	
Size 'D' cells	four (main power)
Size 'AA' cells	three (clock and back-up), (supplied) 6V d.c. output (negative to centre)
Mains adapter	
<b>Dimensions &amp; Weight</b>	
Measurements	296 x 192 x 68 mm (length, height and depth)
Weight	2kg (without batteries)

Continued on page 35...



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ICOM	IC-275H 100W MULTI/MODE 2M.....	£675.00	TOKYO	SAGRA 600 750WATT 2M AMP.....	£575.00
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	900MHZ.....	£1,495.00	YAESU	FT 890AT HF Gen.....	£650.00
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ICOM	IC-761 GENERAL COVERAGE HF.....	£750.00	YAESU	FT 290R 2m Multi Mode.....	£195.00
ICOM	IC-706 MK 11.....	£650.00	YAESU	FT 290R 2m Multi Mode.....	£225.00
ICOM	IC-575A 50MHZ BASE.....	£575.00	YAESU	FT-1000 MP AC LATE SERIAL	
ICOM	IC-271E MULTI-MODE 2M BASE.....	£395.00		No. 8F DISPLAY.....	£1,695.00
KANTRONICS	KPC-3 TNC.....	£100.00	YAESU	FT-767 HF GEN COV + 2M + 6M.....	£750.00
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KENWOOD	TS 711E 2m Multi Base.....	£425.00	YAESU	FT-10 2M HANDIE.....	£125.00
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# Home-built, but professional-looking

## The Ten-Tec 1260 50MHz FM Transceiver

Keen v.h.f. operator and constructor Colin Redwood G6MXL tried his hand building an interesting 50MHz kit from the famous Ten-Tec stables in the USA and ended up with a very professional looking transceiver. And like any 'parent' he's very proud of the end result!

If there's a single trend in Amateur Radio over the last 30 or so years, it's probably the reduction in the amount of home-built equipment being used on the air. Even finding a design for a home-brew transceiver for any of the v.h.f. bands is getting quite hard. When was the last time you saw a 6m transceiver design published? Anyone wanting to build certainly has a limited choice.

The feature-rich 1260 50MHz f.m. transceiver kit from Ten-Tec has virtually all the facilities, including memories, CTCSS and a digital frequency display, that could be expected from one of the main Japanese black box manufacturers, with looks to go with it. It certainly should help revitalise home construction and may also encourage a bit more activity on 50MHz f.m.

### Impression Of Quality

The kit gave an impression of quality from the moment I started to unpack it. The well-packed box had numerous plastic bags containing components - the quality, screen-printed, through-hole-plated, double-sided printed circuit board (p.c.b.) and bits of hardware, etc., were all bubble wrapped to provide additional protection during transit.

As often happens with other kits, it was nice not to have to spend time searching through component catalogues and junk boxes trying to source those ever-more-elusive components - everything was there.

Also included was a metal case, with front and rear panels, all painted, punched and nicely labelled. Only basic assembly is required to produce a very nicely finished transceiver that most amateurs would be proud to own. The finished transceiver is similar in size to a small modern mobile Amateur Radio transceiver or CB radio set.

Even with everything I've already mentioned ... I really wasn't expecting to find a microphone included, with a nice curly lead and plug already installed, together with a loudspeaker and d.c. supply lead.

A 9V PP3 type battery is used for the memory back-up, which (sensibly) is NOT included in the kit, so that a fresh battery can be installed by the builder. So the Ten-Tec gets off to a flying start for completeness.

### Manual & Instructions

The manual generally gives clear instructions for identifying the components. It even describes the colour code on each of the resistors and moulded inductors as they are encountered and how each of the capacitors is marked.

I found it very helpful to go through the disc capacitors and inductors and separate them into small bags for each



value. Whilst it took a few minutes to do this, I found it saved hours of searching later on. However, with many of the resistors on bandoleer strips, I decided not to do the same with them.

There were a few cases where identification was difficult. The MC7805CT (5V regulator) referred to in the manual, was actually marked LM 340T - 5 QYL807 and some of the diodes supplied were not clearly marked. In a few other cases I could only identify certain components by counting them, a process of elimination, or by the fact that they were the only ones that fitted the board at the correct place.

### The Circuit

Referring to the combined construction and operating manual supplied with the kit, I read about the main elements of the circuit. A pre-programmed PIC (Programmable Integrated Circuit) processor controls all the frequency settings, offsets, memories and the display board. It's the only electrical component that is unique to Ten-Tec.

The current version of the dual conversion superhet receiver uses a BF988 dual-gate metal oxide field effect transistor (m.o.s.f.e.t.) in the front end, with a 10.7MHz first i.f. The second i.f. is at 455kHz and uses a MC3371P f.m. receiver i.c.

The audio amplifier is a TDA1013B. On transmit, the modulation is applied to a voltage controlled oscillator (v.c.o.) and amplified through several stages, with a 2SC1971 power transistor as the output device.

### A Good Candidate?

The manual states that if you've never built an electronics kit before, then you are a good candidate for successful construction of this transceiver, before going on to suggest that good soldering skills are a pre-requisite.

However, I would suggest that a lot of time and patience are also required. With over 300 separate components and over 900 soldered connections to make, this is not a kit that can be built in one evening. I found that breaking the work up into many short sessions worked well for me.

Realistically, I don't feel that this is a kit for the complete beginner. It's probably best suited to someone who has built, say, a number of fairly basic h.f. or v.h.f. printed circuit board projects in the past and wants to move on to something more complex. Having said that, the instructions

are sufficiently detailed and I don't think the ability to follow a circuit diagram is really needed.

## Lighting & Techniques

Good lighting and soldering techniques are certainly called for although the tools required are very basic. These include a soldering iron and solder, wire strippers and cutters being the main requirements.

I found that my normal Antex 25W soldering iron with a small bit was capable of producing neat soldered joints on the board. A screwdriver with six-inch long 3/16 inch wide blade is essential when screwing the display board to the front panel.

However, I wish that Ten-Tec had included a suitable non-metallic trim-tool, as I cut down several from my extensive collection trying to get one to fit!

The only other thing I found useful was a small ruler. This was used to measure the lengths of connecting wires.

## Test Equipment

The main items of test equipment required include a means of measuring a frequency around 4MHz, and a multimeter (preferably analogue) capable of measuring d.c. voltages from 1 to 12V and currents up to about 2A.

A 50MHz signal, such as another 50MHz transmitter or a local repeater is needed to set up the receiver. A power meter capable of measuring the output power of the Ten-Tec is also useful, but not essential.

## Follow The Instructions!

I was able to follow the instructions quite well, ticking the boxes provided as I installed each component. This made returning to the kit the following evening quite easy.

The main manual supplied for review was for 'Release A' of the boards, whilst a supplement deals with the changes as they affect 'Release B' of the boards as supplied for review and a correction sheet addresses mistakes in these. (Release B boards provide additional features such as memory scanning and I'd suggest annotating the main manual, to save any confusion.

The instruction manual, good though it is, is an area where Ten-Tec really need to make some improvements. This kit has more components than most of the other kits in the Ten-Tec range, and it needs instructions that reflect this. I found a lot of time was spent actually finding where on the board a particular component needed to be inserted.

The instruction manual suggested **starting construction with the display board**. I would agree that this is an excellent approach. I found it got me used to the style of the instructions and some of the techniques used before starting the main p.c.b. itself.

After constructing the display board, Ten-Tec recommend that the main p.c.b. is built in eight main phases, with a test at the end of most of them. I found that this approach generally worked well.

Not only did this make fault finding somewhat easier, it was also quite a morale boost when the phase I had been building for two or three evenings worked first time. It certainly encouraged me to progress to the next phase, knowing that the previous one was working.

I found no real difficulties in handling the small traditional components, although resistor and inductor leads needed to be bent very close indeed to the component body to fit the board.

Very careful work is needed if mistakes aren't going to be made. As I progressed through the construction, I got used to finding the diagrams which assist in locating the components. There were also fewer components left to search through and fewer holes in the p.c.b. left to fill, which seemed to speed construction towards the end.

In some places the recommended sequence of

component insertion could be improved. For example the installation of a small trimmer capacitor, where the instructions indicate that the flat side should be facing R21. However, following the instructions, R21 has already been installed, thus covering up the screen printed legend on the board!

The only specific inaccuracy I came across was that transistor Q9 is shown as Q8 in the diagram in the instruction book. The board fortunately correctly labels it as Q9.

## The Display Board

The manual's description of how to orientate the light emitting diodes (l.e.d.s) on the display board refers to small bumps or 'nibs' giving the impression that it is describing the l.e.d.s themselves, when in fact it's only referring to the diagram! The inclusion of an identical component reference (D6) on the same board could easily have confused me.

**Phase 1:** The first main phase after the display board is associated with the display driver and microprocessor circuits. At the end of this stage, on applying power, the display lit up correctly on the right frequency first time! An oscillator frequency has also to be checked, using either a frequency counter or an h.f. receiver on 4MHz. I found the frequency to be spot on.

The description of how to install the plugs (J4 and J5) on the main board which mate with the display board sockets did not make it clear that these have to be installed with the short pins through the main board and the longer pins left to insert in the display board sockets.

Getting the procedure right is critical if the display board is to connect to the main board. A less experienced constructor could easily get unstuck here, as correcting errors is not easy with a through-hole plated board.

**Phase 2:** This includes the construction of the VCO. The components are packed in very tightly, reminding me of the old Pye Pocketphones. It is one of the areas where the sequence of construction is absolutely critical, if all the components are going to fit. Ten-Tec helpfully put the diagram on the page opposite the instructions, which makes the assembly of a more densely-packed part of the board easier than many less cluttered sections.

**Phase 3:** This phase comprises the f.m. receiver and audio section. By the end of this phase I felt that I really was beginning to get on top of things. White noise burst forth from the loudspeaker and the volume and squelch controls were both checked, together with the correct supply to the Busy l.e.d.

**Phase 4:** In this phase the receiver r.f. amplifier and mixer are built. In some parts of the mixer the recommended sequence of component installation really does need to be followed to the letter to ensure that certain components are to be correctly fitted in the confined space between 10.7MHz. i.f. coils.

Having completed Phase 4, the receiver side of the kit is complete apart from alignment. For listeners, it's possible to finish the kit here, resulting in a compact f.m. receiver with some very nice facilities. I suspect that this will make the kit quite attractive as a club project, which s.w.l.s could build as well as Novices and Full Licence holders.

## Receiver Alignment

Despite following the instructions to the letter, my first attempts at the receiver alignment did not yield any detectable signal, even with 10W of 50MHz narrow band



Fig. 1: The well packed kit arrives.



Fig. 2: Checking everything ready to start. Large Oak trees from little acorns grow! (In this case a kit turns into a very professional looking transceiver).



Fig. 3: Above and below, illustrating both sides of the high quality main printed circuit board (with through hole plated interconnections) and component overlay printing.



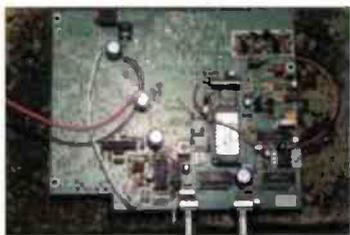


Fig. 4: Well under way with main board assembly.

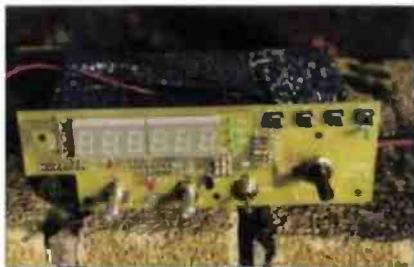


Fig. 5: Main front panel display unit assembled (see text).



Fig. 6: Front panel on, with main display mounted.



Fig. 7: Almost there, the transceiver awaiting attachment of rear panel.

f.m. (n.b.f.m.) from my main rig running into a dummy load barely two metres from my test set up.

Using a more sensitive meter, I managed to detect a signal and attempted to align the kit based on that signal. I really had my doubts as to whether I managed to get the alignment correct as even after careful adjustments, many of the tuning cores were at or very close to one extreme

or the other of their adjustment ranges. I suspected that I may not have hit the right peaks.

**Phases 5 to 8:** The remaining phases of the kit, covering the transmitter, push-to-talk (p.t.t.), CTCSS (tone encoding) and packet circuitry generally went together well. At the end of Phase 5 I could hear ultra QRP signals transmitted from the Ten-Tec on my main rig. (The grounding of the screen on the signal lead to the microphone socket was one of the most difficult soldered joints I have ever made in terms of accessibility).

### Excellent!

There are five coils to wind using enamelled copper wire and Ten-Tec's description here was really excellent, leaving no doubt at all as to what was required. They even provide a former on which to wind the air-spaced coils to help get the correct diameter!

As I came to install what I believed to be the last components on the board, I found I had a couple over. Holding the board up to the light, I soon spotted the holes where they should have gone.

I then checked back through the instructions and had ticked the boxes as having installed them when I hadn't! Other constructors may also find this a useful check.

Testing the output, gave about 4.5W on my power meter, as per the specification. There is no tuning up to

be done on the transmit side.

### Technical & Service Support

The manual makes several references to support from Ten-Tec in America. For UK customers, Adur Communications provide a back-up service, which I was glad to call upon, when I did not get the expected results with one of the end of phase tests.

Adur Communications discovered that I had cracked a core in a variable inductor. While I had followed the instructions to use a suitable non-metallic trimmer it seems that I may have been a little over zealous.

### On The Air

Initial on-air tests gave good reports on the transmit side, with a RS 54 report being received from **Tim MOBHU**, some 5km away. Given that my 50MHz antenna is horizontally polarised and Tim's antenna is a vertical omni, I didn't think this too bad. Tim's favourable comments on

the audio seemed to make all the construction effort worthwhile!

On the receive side, things were not good. Tim's signal was not audible. The next evening I decided to have a go at

re-tuning the whole receiver, this time by ear. Transmitting SSTV into a dummy load from my main rig, I went through the receive path, trying to get everything better. In the end I certainly got it a lot better subjectively, to the extent that I had to turn down the power from the main rig to hear peaks.

Another evening I arranged a sked with **Ian G0RPA**, about 3km away over an obstructed path. I am pleased to say that I was able to receive Ian's signals with no difficulty whatsoever. Ian was running about 5W into a horizontally polarised antenna.

Later the same evening, a CQ call on 51.510MHz brought a reply from **Dave G0WTG**, a little more than 2km or so away. Turning the beam brought Dave's vertically polarised signal up to RS 55 over a path with few obstructions. However, there remained a significant amount of smooth noise.

(In the light of my experiences, I would suggest that anyone building the kit, should try to align the set by a combination of ear and measurement!)

**Tex Swann G1TEX**, the *PW* Technical Sub-editor, checked out the receiver's sensitivity and agreed that it was significantly down on specification. He arranged to have the rig returned to Adur Communications for a second time. Adur diagnosed a faulty capacitor in the front end of the receiver.

With the capacitor replaced the rig tuned up and performed much better, although I still had some reservations regarding sensitivity. Nevertheless **Doug G0CZG**, running 10W some 4km away was almost fully



Fig. 8: Underside view of completed transceiver kit.

quieting on the receiver, while **John G7DKE** some 10km away running 100W (over an obstructed path) was also fully quieting.

### Manual & Diagrams

If Ten-Tec could re-design the manual so that the relevant diagrams could be put in amongst the text to which they refer, it would make the constructors job so much easier. Perhaps laying out the manual on A4 pages (the size of this page in *PW*) instead of A5 (half the size of a *PW* page) would help\*.

\*Editorial comment: The A5 format adopted by Ten-Tec appears to be the 'standard' approach by American kit-

Continued on page 28...

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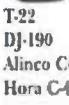
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Deluxe over the ear earpiece.

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# Ten-Tec 1260 50MHz FM Transceiver

...continued from page 24

manufacturers nowadays and most kits I've seen or built in recent years have included A5 sized manuals. **G3XFD**.

I wish that the Ten-Tec instructions could have provided more help on the receiver alignment by suggesting where to position each variable component before tuning up. Likewise an indication of how much to expect to tune each component, the sharpness of the peaks, and whether you are tuning for maximum signal or signal to noise, etc.

Placing the limited number of additional test points and expected voltage and current readings (currently tucked away at the back of the manual) in with the relevant end of phase tests would also help.

## Use In The UK

There are a number of points which should be considered by UK purchasers because on transmit, as the Ten-Tec 1260 covers the 50MHz band from 50.095 to 53.995MHz. The UK amateur allocation only extends to 51.999 MHz.

The extended coverage probably isn't too much of a problem provided you install a PP3 back-up battery. If you don't ... the rig will come on at 52.525MHz each time it's

switched on. This could all too easily lead to accidental out of band transmissions, but to be fair to Ten-Tec many manufacturers 50MHz equipment also extends above 52MHz.

Perhaps the UK importers could produce a UK supplement as the manual is clearly written for the American market. Referring to a quarter inch #4-40 screw, is unlikely to mean much to many UK constructors, whilst the 50MHz band plan covering 50 to 54MHz is at variance with the current UK band plan, which covers the UK allocation up to 51.999 MHz.

## Work Worth It?

Is all the work in assembling the kit worth it? In answering, and in some respects you could say that it's bit of a cheat to review something you have built yourself! So, I'll certainly hold my hand up and admit that I am probably a bit biased, rather like a proud parent showing off their new born baby!

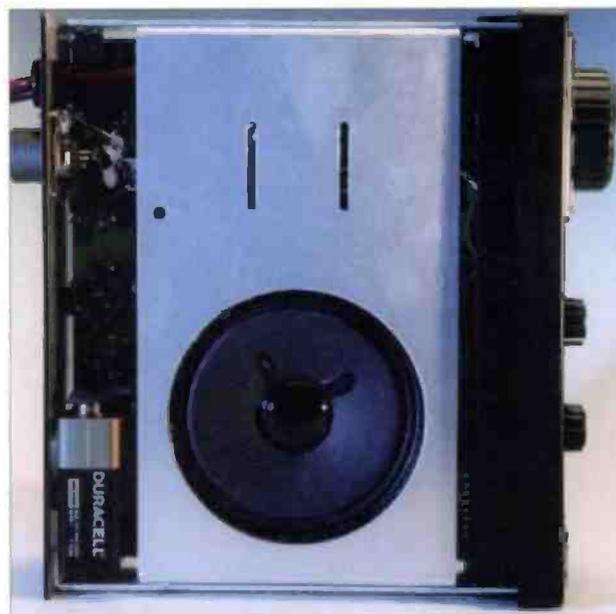


Fig. 9: Top view of completed transceiver showing loudspeaker and 9V battery for memory 'back up'.

## Manufacturer's Specifications

Frequency range:	Receive: 50.095 - 54.100MHz. Transmit: 50.095 - 53.995MHz.
Tuning:	2.5 or 5kHz steps, microprocessor controlled. Choice of direct frequency or memory tuning.
Frequency display:	Multiplexed six digit l.e.d. display.
Transmit offset:	Selected by <b>Shift</b> key.
Memories:	15 memories for frequency, transceiver off-set, CTCSS tone.
Non-standard transmit offset:	Total of 5 available, using memory pairs in Memories 6 to 15.
Mode:	n.b.f.m.
Data interface:	5-pin DIN, protocol per ARRL suggested guidelines.
Power requirement:	13.5V d.c. ± 10% (negative ground).
Power consumption:	Transmit 1.2A. Receive, no signal 200mA.
Memory back-up (9V) battery drain:	Less than 1µA.
Antenna impedance:	50Ω.
T/R Switching:	PIN diodes.
Microprocessor:	Microchip technology Inc. PIC16C57 OTP.
ROM Software:	Ten-Tec Inc.
Semiconductors:	10 I.c.s plus U8 microprocessor, 21 transistors, 23 diodes.

### Transmitter

Output (r.f.):	4.5W
Maximum frequency deviation:	±5kHz.
Modulation distortion:	Less than 5%.
CTCSS tone set:	microprocessor derived from 4MHz clock oscillator with op. amplifier wave shaping and buffering.

### Receiver

Circuit:	Dual conversion superhet: 10.7MHz first l.f., 455kHz second l.f.
Sensitivity:	0.2µV for 12dB SINAD
Dynamic range:	72dB (2-tone 3rd order IMD @ 20kHz from 52.49MHz)
Adjacent channel rejection:	70dB (@ 20kHz from 52.50MHz)
Dimensions	162 x 55 x 148mm (width, height, depth not including projections)
Weight:	1.1kg

In terms of ease-of-use, I really couldn't fault the Ten-Tec. It seemed to have all the facilities I needed to hand, and with no need to resort to a manual to work out how to use them. The controls are all clearly labelled.

I think the transceiver would be an excellent choice for the 50MHz mobile operator. The large l.e.d. display is easily read in daylight, whilst the CTCSS tones make it ideal for use with the 50MHz repeaters (it can handle the UK 500kHz offsets using pairs of memories). Once built, the rig may also appeal to an operator with failing eyesight.

There are a couple of areas where I think the Ten-Tec falls behind most commercial rigs. There are no Up/Down tuning buttons on the microphone, and there's no S-meter of any sort. However, I really don't consider either a major drawback and I would certainly prefer the Ten-Tec's clear frequency read-out to the virtually useless S-meter that's provided on many rigs.

None of the sockets on the Ten-Tec are labelled, but no doubt the microphone and antenna sockets will be obvious to all. On the rear panel the 5-pin din socket is for 1200 baud packet radio use (conforming to the ARRL guidelines of March 1994), while the 3.5mm socket is for an optional external speaker. This is perhaps a minor quibble, but if the constructor labels the sockets it might prevent an expensive mistake one day.

## Good Looking Transceiver

Ten-Tec have produced a good looking 50MHz n.b.f.m. transceiver that certainly doesn't look home constructed. In fact I managed to pass it off as a brand-new, full-price model at the local club, where most members thought it would retail at around £230 to £300!

Certainly no one suspected the Ten-Tec was a home-built kit, which I suppose must be the ultimate accolade for any home construction! It's an ideal mobile or base dedicated 50MHz transceiver. I can also see it being used for around the town rag-chews, packet and SSTV activity. If only all home constructed projects could look like this!

My thanks go to Adur Communications, Belmont Buildings, The Street, Bramber, West Sussex BN44 3WE, Tel: (01903) 879526, FAX: (01903) 879527, for providing the Ten-Tec 1260 kit for construction and review. The kit is available from Adur Communications for £189.95 plus £5.88 P&P. **PW**

# It's a Classic

## The KW 201 Receiver

One of the many fine products of the KW Electronics company of Dartford, Kent, was the KW201 double conversion receiver. The 201, produced from the mid 1960s, was an excellent amateur bands receiver on its own, or as a partner for the equally fine KW Vespa transmitter for instance. Together they formed a compact station capable of covering 1.8 to 28MHz on s.s.b., a.m. and c.w.

On its own the 201 is a fine receiver, whilst being 'lean' in its functions and gadgets by modern day standards. It covers the 1.8 to 28MHz amateur bands (excluding the 10, 18 and 24MHz WARC bands) with a nice, large, easy-to-read scale, provides product detection for s.s.b. and includes a self contained power supply and speaker.

The eleven valved receiver uses a first i.f. of 2.955 to 3.155MHz and a second i.f. of 455kHz which incorporates a mechanical filter. It tunes eleven segments of the spectrum, each 200kHz wide, with two segments for 3.5, 14 and 21MHz and three segments for the 28MHz band.

### Circuit Description

The circuit description is as follows: The r.f. amplifier uses an EF183, automatic gain (a.g.c.) controlled, to provide the sensitivity for the receiver, this being quoted as better than 1 $\mu$ V for 500mW output. The diagram in Fig. 1, details the block diagram for the receiver.

A 6BE6 valve operates as the first mixer with a 6AM6 operating as a crystal controlled first oscillator. The output of this first mixer is a bandpass signal between 2955 and 3155kHz.

The bandpass signal is fed to the second mixer, a further 6BE6 valve, which, along with the variable local oscillator, a 6U8, results in the second i.f. of 455kHz. A 3.1kHz mechanical filter is fitted after the second mixer to provide the main selectivity for the receiver.

Two stages of a.g.c. controlled i.f. amplification are employed, both using a 6BA6 valve. Additionally, there's provision for an external 'Q' multiplier to be connected if required.

The product detector consists of a 12AX7, the b.f.o. using a 12AT7 and semiconductor diodes being employed to generate the a.g.c. voltages. A 12AT7 is also driven from the a.g.c. voltage to provide the S-meter option.

An ECL82 triode-pentode is used as audio pre-amplifier and output stage, driving a built-in 3 $\Omega$  speaker. The receiver has a quoted audio output of 1.7W. A headphone jack is provided on the front panel.

Semiconductor diodes are used in the power supply, again, housed within the receiver case. The styling of the set is the familiar 'G' line, used in so many of the KW range of receivers and transmitters of the period.

### Optional Extra

An optional extra available at the time was the 'Q' multiplier I previously briefly

mentioned. This connected to the second i.f. stages and increased the selectivity and sensitivity of the receiver for use on c.w.

The 'Q' multiplier was connected to a socket on the KW201's rear panel and provided two extra controls, the **Selectivity** and **Tune** controls. The former was advanced until the required selectivity was achieved, the **Tuning** control then being advanced to put the peak response at the frequency required by the operator.

Basically, the 'Q' multiplier works in a very simple but effective way by introducing a controlled amount of r.f. 'feedback'. This greatly enhances the 'Q' of the circuit in the same way as the 'regeneration' used in a regenerative detector.

A crystal calibrator was also available as an optional extra. Even in those days the benefits, money-wise, of offering 'optional extras' was well in hand!

In my KW201, the calibrator is fitted. The unit, employing a 100kHz crystal, plugs into a socket on the main receiver printed circuit board. A push-button on the front panel activates the calibrator, with the dial screws at either end of the scale being loosened and the whole scale slid back and forth to align it to the correct frequency.

### Dial Scale

The KW201's dial scale, is a large glass slide with several horizontal and vertical lines engraved, along with a sloping line between the vertical sections. The diagram, Fig. 2, shows the left hand edge of the dial, the vertical lines being at every 20kHz across the band, the horizontal lines indicating 2kHz increments and the sloping line being the calibration point.

In the example shown in Fig. 2, the dial pointer crosses the sloping line at the same point as the 12kHz horizontal line. As the pointer is between the 0 and 20kHz vertical line, the read-out is thus 012. So, if the receiver is switched to the 14MHz band this gives a frequency read-out of 14.012MHz.

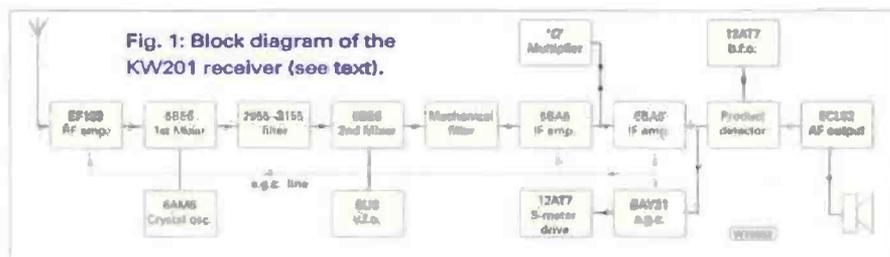
However, if the set had been on the 3.5MHz band, the read-out would be 3.512MHz. At first glance, the system

Ben Nock  
G4BXD looks at another 'classic' item of Amateur Radio equipment. This time it's a receiver which deserves to be better known ... the KW Electronics KW201 double conversion receiver.

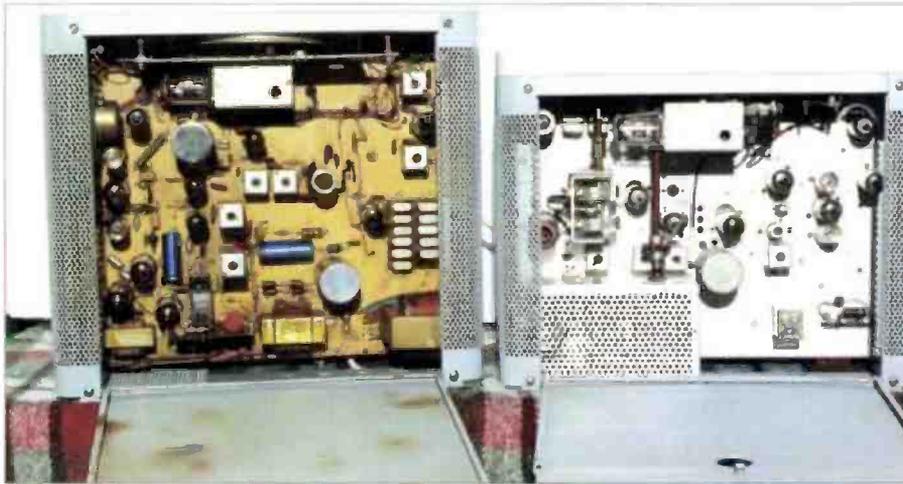


The KW Electronics KW201 double conversion receiver, the indicators on the top right show either upper sideband (u.s.b.) or lower sideband (l.s.b.) is selected. The main tuning knob is on the lower right.

Fig. 1: Block diagram of the KW201 receiver (see text).



TOGETHER WITH THE EQUALLY FINE HW VESPA TRANSMITTER THE KW201 FORMED A COMPACT STATION



Internal view of the KW201 (left of picture) and of the KW 'Vespa' (right of picture). In the KW201 note the v.f.o. box (top centre), power supply (bottom right), calibrator (lower left) and s.s.b. filter below and to the left of the v.f.o. box. In the Vespa the p.a. compartment is on the lower left, with the v.f.o. in the top centre, the s.s.b. filters are glass valve-base types mounted on the centre left.

looks complicated, but after a very short time readings of 1kHz are easily interpreted.

### Need To Calibrate?

If you need to calibrate the v.f.o. on a KW201, you should tune the receiver to 3.7MHz. This can be done by using either the internal crystal calibrator or another known source. If the dial is off frequency you should adjust the core of L13 for zero beat.

The tracking of the v.f.o. is also checked using the calibrator or other source. If however, the v.f.o. is 'over tracking' (i.e. the readings are getting further apart across the band) then the trimmer inside the v.f.o. should be adjusted anti-clockwise. And if the v.f.o. is 'under tracking' the trimmer should be adjusted clockwise.

I suggest you make each adjustment a small one and retune to 3.7MHz and 'zero beat' the v.f.o. by adjusting L13. Repeat the process until the v.f.o. tracks accurately across the band.

To check the Upper/Lower sideband switching you should 'zero beat' a signal source whilst the receiver is switched to u.s.b. Then switch to l.s.b. and check for 'zero beat' again. If it is off frequency, adjust C21 (This is reached via a hole in the v.f.o. box), for 'zero beat'. Recheck by switching between l.s.b. and u.s.b. for 'zero beat', adjusting as needed.

**Crystal Oscillator:** The first oscillator, the crystal controlled h.f. oscillator 6AM6 stage, is adjusted using an r.f. voltmeter (a high impedance voltmeter with r.f. probe for instance).

This is connected to pin 1 of V2. The various settings are given in Table 1.

**Pre-selector alignment:** Connect the high impedance voltmeter, measuring negative voltage, to the AVC 'test point'. With no signal at the antenna, a voltage of 0.3V should be obtained.

Ensure the pre-selector pointer is located at the lower edge of the 3.5MHz segment with the receiver tuned to 3.5MHz. Inject a 50µV signal from a suitable generator. Next, adjust the cores of T3 and L6 for peak voltage reading (note that T3 has two cores in it, the bottom one is for T3 and the upper one is for L1).

Then you should adjust the signal generator to 3.155MHz and increase its output until a signal is heard from the receiver. Adjust L1 for the best reduction in this signal. Next set generator and receiver to 3.6MHz, adjust pre-selector for peak in signal, re adjust T3 and L6 for peak meter reading.

**For 'Top Band', 1.8MHz:** Tune the receiver to 1.9MHz and then inject a signal at 50µV, adjusting pre-selector

pointer to centre of the 1.8MHz segment. Adjust C3 and C10 for peak meter reading, which should be about 2.5V for a 50µV input.

**For 14MHz:** Set the receiver and generator to 14.3MHz with the pre-selector pointer to mid segment. Then inject 50µV, adjusting L3 and L8 for peak meter reading (2.5 V or better).

**For 21MHz:** Set receiver and generator to 21.4MHz, pre-selector pointer to mid segment and adjust L4 and L9 for peak meter reading (2.5 V approximately for 50µV input).

**For 28MHz band ('10 metres'):** Set receiver and generator to 28.5MHz, pointer to mid segment, adjust L5 and L10 for maximum meter reading (about 2.5V again for 50µV input).

**First i.f. alignment:** The first i.f., 2.955 to 3.155MHz, is aligned using the signal generator and a special tool, termed a 'swamping tool'. The tool consists of 0.01µF 400VW capacitor in series with a 1kΩ 0.5W resistor.

Tune the receiver and generator to 3.6MHz, injecting 50µV of signal, with voltmeter connected to AGC test point. Connect the swamping tool between pin 4 of IFT 1 and earth. Adjust bottom core of IFT1 for peak meter reading.

Transfer the swamping tool to pin 6 of IFT1, adjust top core of IFT1 for peak meter reading. Now place the swamping tool to pin 4 on IFT2, adjust bottom core of IFT2. Then place

Table 1: Alignment

Band	Crystal Freq	Adjust C/L	Reading
1.8	4955kHz	L19	2.5V
3.5	6655	C61	1.5V
3.7	6855	C61	1.5V
7	10155	C60	3V
14	8755.5	L16	3.5V
14.2	8677.5	L16	3.5V
21	12077.5	L15	2.5V
21.3	12227.5	L15	2.5V
28	15577.5	L14	2V
28.4	15777.5		
28.6	15877.5		

the swamping tool to pin 6 of IFT2 (Note that there is h.t. on this pin, so take care) and peak top core of IFT2. Repeat the process. Peak the cores of IFT3 and L12. The meter should now read 2.5V for 50µV input. You can now remove swamping tool.

### Vespa & KW201

For anyone wishing to operate on the bands, the KW Vespa transmitter, styled in a similar fashion to the KW201, is an ideal transmitter to complete a station set-up. Incidentally, The KW Vespa is basically a cut down version of the KW2000 transceiver.

Again produced around the same period as the KW201, there are two versions of the Vespa. The Mark I version has a power output of 90W p.e.p. and the Mark II produces 220W p.e.p.

Housed in a similar styled case, the frequency coverage matches the KW-201 and is also limited to the six old bands, (1.8, 3.5, 7, 14, 21 and 28MHz in 200kHz segments in a total of 11 ranges).

In use with the KW 201, the Vespa makes a very nice unit. Into a dummy load, 100W of r.f. power is generated on single tone (c.w.). A rear apron socket is used to mute the receiver and provides the actuation for the change-over relay in the matching KW 600 or 1000 linear amplifier.

Considering the high price of modern 'Eastern delights', and that rigs such as the Vespa and 201 can be bought quite cheaply, then operation on the h.f. bands need not cost an arm and a leg. You don't even need a second mortgage to get on the air!

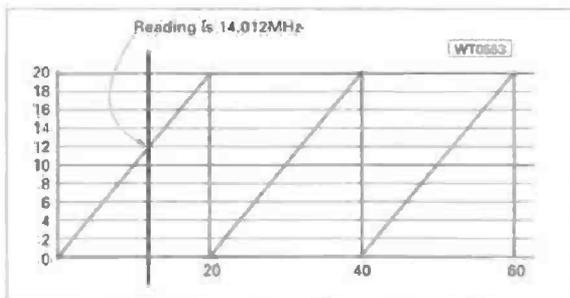
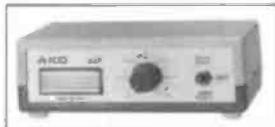


Fig. 2: Diagram illustrating tuning scale interpretation (see text).

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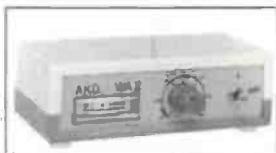
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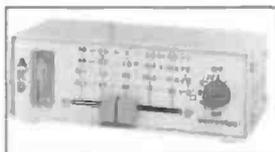
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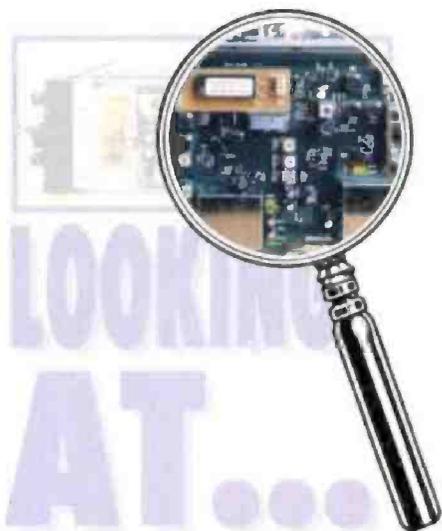
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# New Series!



# The RF Amplifier

In this series I'll be taking a close look at all the major circuitry of modern receivers. It's a 'guided' tour if you like ... and it makes sense to start 'at the front' with the radio frequency (r.f.) amplifier, so off we go!

The radio frequency (r.f.) amplifier lies between the antenna and the input of the mixer, **Fig. 1**. It undertakes the primary tasks of coupling and amplifying the weak antenna signal with the least addition of random noise to attain the best possible signal-to-noise ratio (S/N) and hence the least background 'hiss' on weak signals (commonly called 'white noise').

The need for such an amplifier arises because the antenna signal is rarely strong enough to drive the mixer direct for adequate results. However, some receivers are equipped with a switch to bypass the r.f. amplifier when a very strong signal is encountered, which might otherwise cause overloading.

## Improved Image Rejection

The r.f. amplifier also provides improved image rejection. This problem arises where unwanted signal of frequency other than that to which a

receiver is tuned gets through to the mixer and is added to or subtracted from a frequency of the local oscillator, thereby yielding an interfering signal within the intermediate frequency (i.f.) pass-band.

When equipped with so-called pre-selection, or even fixed band-pass tuning, the r.f. amplifier can attenuate unwanted signals such as images, etc., while also reducing the interfering effects of spurious frequency combinations in general.

The possibility of the local oscillator signal being radiated from the antenna is also reduced when a receiver includes a stage of r.f. amplification.

A couple of decades or so ago, all

communications receivers would boast at least one tuneable r.f. amplifier stage using a multi-section tuning capacitor ganged to the local oscillator tuning. More specialised receivers might still use a variation of this arrangement with high-Q tuned circuits.

There are also transceivers employing so-called pre-selection, constituting a form of manual r.f. tuning. This, in receive mode, provides a distinct improvement in the rejection of out-of-band spurious signals when peaked on the wanted signal.

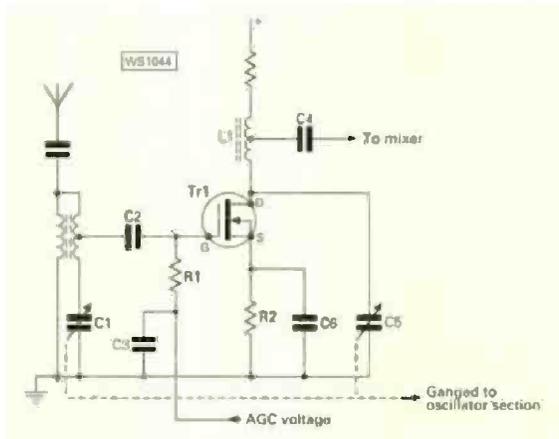
With the advent of frequency range scanning receivers, however, r.f. amplifier stages have become essentially 'aperiodic', being pretty well wide open to signals from d.c. to light! This can make life difficult for the transmitting Radio Amateur whose near neighbour happens to be scanning receiver buff, as well I know from personal experience!

## Basics Principles

In f.e.t.s, the current is conducted by one type of carrier only, the carrier (electrons or hole) depending on the type of semi-conductor material used in the device. The basic principles of a variably tuned r.f. amplifier are illustrated in **Fig. 2**. This shows the active device as a field effect transistor (f.e.t.), which are now

Continued on page 35...

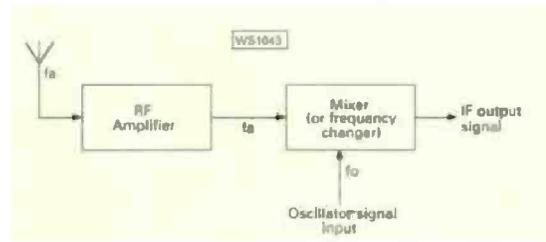
**Fig. 1:** Block diagram showing the r.f. amplifier between the antenna and mixer, where 'fa' is the antenna signal, 'fo' the oscillator and i.f. the intermediate frequency signal.



**Fig. 2:** Basic principles of an insulated-gate f.e.t. r.f. amplifier circuit with variable ganged tuning.

Gordon King G4VFX, the internationally known technical journalist famous for his books on television, radio and audio technology and engineering, begins his new regular series 'Looking At ...' by taking a close view of that all important element of any receiver ... the radio frequency amplifier.

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## ...continued from page 33.

commonly used for r.f. front-ends because they have the advantages of low noise and high input and output impedance, being more on a par with the thermionic valve in the latter respect than a bipolar transistor.

Incidentally, a bipolar transistor is so named because it exploits both electrons and holes as current carriers. An f.e.t. uses only one kind of carrier - electrons or holes, depending on its polarity.

The f.e.t. in Fig. 2 is an insulated gate (i.g.f.e.t.) device receiving signal via the antenna coupling transformer. This transformer is used both for 'matching' the low antenna impedance to the gate's high impedance and for front-end tuning in conjunction with C1 section of the tuning gang.

Coupling to the gate is through C2 from an optimised tapping on the secondary transformer. The gate is biased from the automatic gain control (a.g.c.) line through R1 and decoupled by C3.

The amplified signals appears across L1 in the drain circuit and are then fed through C4 to the mixer. Tuning of L1 is by C5 section of the gang.

In the illustrated circuit, the f.e.t. Source is loaded by R2 and 'earthed' to r.f. by C6. The gain of the amplifier is automatically controlled by bias voltage applied to the gate from the a.g.c. line, but can be up to around 25dB (18 times voltage), depending on signal strength.

The circuit of an r.f. amplifier used in a commercial 144MHz transceiver is given in Fig. 3. This uses a dual gate f.e.t., with the control bias fed to gate one (G1) and the antenna signal to the

positively-biased gate two (G2).

The basic principle of operation is similar to that of the previous circuit. The difference is that the antenna coupling transformer is fixed tuned over the 144MHz band, while the amplified signal across L1 is fed to the mixer through a four-stage band-pass coupling.

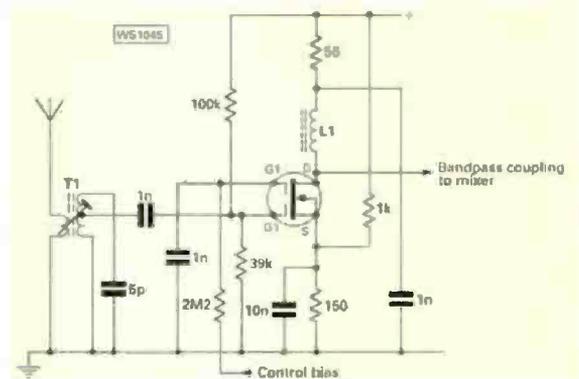
## Best Noise Figure

Maximum sensitivity results when T1 is tuned by its dust iron core on a signal at the centre of the pass-band. For the best noise figure, the tapping point on the secondary needs to be carefully chosen.

The choosing of the tapping point is a design job in itself! However, from first principles and in the absence of test equipment, an improvement in the S/N ratio can sometimes be achieved subjectively by tuning to a very weak carrier and then slightly adjusting the core of T1 first one way and then the other for the least 'hiss'.

The r.f. amplifier certainly has an important role to play in a receiver and in the next in the series, I will be looking at the mixer, which is the next stage in line. *PW*

Fig. 3: r.f. amplifier stage of a 144MHz transceiver using a dual-gate f.e.t. with band-pass coupling to the mixer.



# New Series!



## ...continued from page 19

receiver on my main antennas, and was pleased at the results. Operating on my 'long wire' (a true 'long wire' at well over a half-wavelength on 3.5MHz) the RC 828 did not overload and there were no problems with cross-modulation even on strong local signals.

Using the built-in extendable antenna (this is by far the most convenient mode and can bring surprising results) I can often tune into 7MHz and listen to the s.s.b. and c.w. transmissions with ease from my armchair. In fact, just after midnight in the first few minutes of 26th of January I was listening on 7.009MHz on c.w. when I heard a lonely VK5CW (Kensington, South Australia) calling 'CQ'. He was Readability 5, Strength 6 and no-one answered him! My antenna was the extendable antenna with a short length of tinned copper wire attached, which then runs along the top of the bedroom curtain rail - not bad reception eh?

Higher up the scale - on the '20' metre band - there awaits a serious challenge for any receiver in the form of Packet radio transmissions adjacent to 14.1MHz. As many of you will know, 14.100MHz is where the International Beacon Project transmissions are.

It's often difficult on 14.1MHz with receivers as good as the Kenwood TS-870 and my own (very good) Alinco DX-70. But, the RC 828 did well and mostly the beacons were readable ... despite Packet radio interference either adjacent or sometimes even on 14.100MHz itself.

## Opinion & Criticisms

My opinion of the RC 828 you will have realised by now - is very high indeed. In fact I wish I'd bought one a long

while ago! However, I do have some criticisms, albeit minor in nature.

To start, I really would have liked the clock numerals to be slightly larger. The tuning display numerals are of an ideal size, but the clock display would have been better slightly larger.

The S-meter l.c.d. display is optimised for use with the receiver laid back on its rear or case 'stand'. However, because of this and the effect of incident light, the display can appear darker when the set is operating when fully upright - where I prefer it to be.

For night-time use it's a pity (when the receiver is running from the mains) that it's not possible to keep the l.c.d. 'backlight' on rather than having to keep pressing the (auto-off) backlight button control. Perhaps for 'night owls' (insomniacs) like me Roberts could perhaps provide a 'night light' modification?

As synthesised receivers of this type are often 'current hungry' I would have liked some facility to fit - and use - rechargeable batteries for extended portable use. However, even after three months of use I'm still on the original set of batteries - so perhaps I won't get round to fitting a rechargeable battery pack after all!

So, in summing up I've got to say "well done Roberts Radio - you've got a little winner with the RC 828". I can thoroughly recommend the receiver to anyone, beginner, general short wave listener or someone that needs a really versatile, portable radio.

The Roberts RC 828 has provided me with a great deal of pleasure and will no doubt provide even greater pleasure when I'm 'out and about' travelling to and from club visits in future. We really are an inseparable pair! *PW*

# The Roberts Radio RC 828



I bought my Roberts Radio RC 828 from Waters & Stanton Electronics PLC of Hockley in Essex. They can supply the RC 828 for £219, plus P&P.

"Rob's Review Score: 10 out of 10"

# DHF Constructional Project!

# The PW Panther 144MHz FM Transceiver

## Part 1

Mike Rowe G8JVE, the designer behind the PW 'Panther' 144MHz f.m. transceiver provides the first part of the project by describing the design ideas behind the rig and presenting the synthesiser's circuitry.

**T**he PW 'Panther' is a synthesised 144MHz narrow band f.m. (n.b.f.m.) transceiver covering the whole band in 25kHz steps. It has good sensitivity and a power output of approximately 12W and can be built in a case measuring approximately 150x100x25mm. It operates from 12V in its basic form and is small enough to fit directly in many vehicles.

The synthesiser block, less the power amplifier (p.a.) stage, could be used as a transportable unit (battery powered). In this form it is capable of running approximately 1.5W on its own, the antenna changeover being on the receiver board.

### Six Sections

The Panther may be split into six sections: the synthesiser, transmit driver, p.a., modulator and receiver.

The synthesiser, the circuitry of which is shown in Fig. 1.1, is a dual modulus type is basically the same as used on the successful PW 'Martlet', but with a reference frequency of 12.5kHz and different divide ratios in the MC145152.

*\*Editorial note: The 'Martlet' was also designed by Mike Rowe G8JVE.*

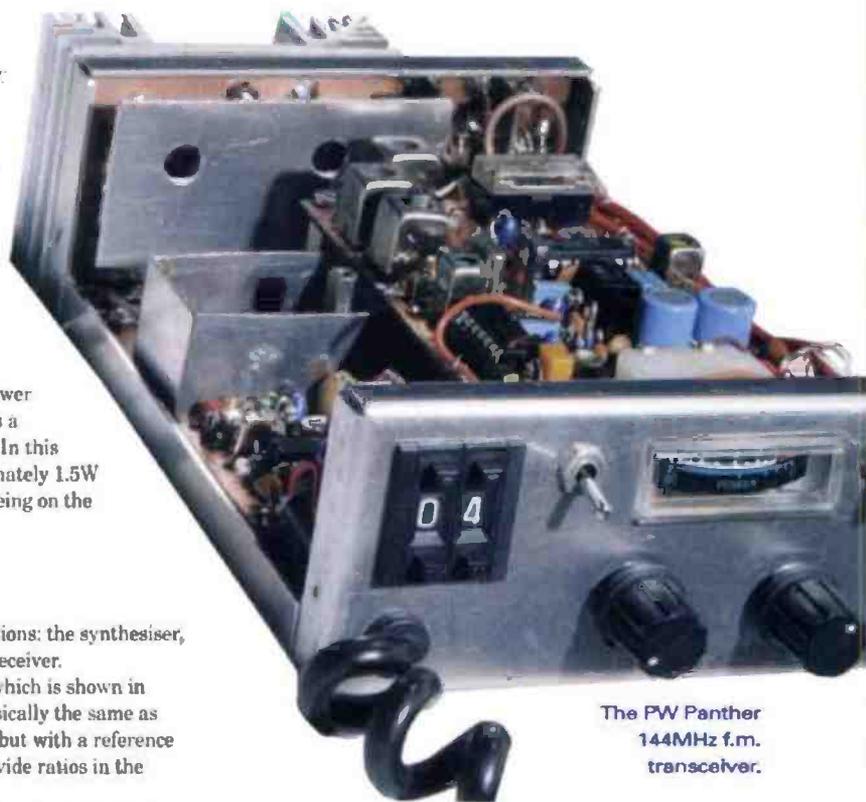
Programming this time is by an EPROM, input data for which is provided by two BCD coded thumbwheel switches. The switches are arranged to give the following (old designation) channels:-

00 - 07	R0 - R7
08 - 23	S8 - S23
30 - 39	145.800 - 145.975
40 - 79	144.000 - 144.975
80 - 87	Reverse R0 - R7

On receive, the output control voltage from the synthesiser is fed via a filter around L4 to the voltage controlled oscillator (v.c.o.), only one varicap being used on this occasion. D8 is the frequency determining varicap, D9 being associated with the modulation, more of which later.

On transmit, the output from the v.c.o. is fed to the buffer amplifier, the output circuit is diode switched (D11) to bring the tuned circuit L6/C62 into play. The coupling link L6b feeding the transmit driver stages.

Transmit positive voltage is also fed to Tr6 and the EPROM, altering the programming and divide ratios.



The PW Panther  
144MHz f.m.  
transceiver.

On receive, positive voltage is supplied to D10 via R45/46 causing it to conduct bringing C56 into circuit in parallel with the oscillator tuned circuit lowering its frequency. The output from the v.c.o. is again fed to Tr8, this time L7/C67 are switched into circuit by D12, output to the receiver mixer is by a coupling winding L7b.

The transistor, Tr8 also provides the necessary feedback input voltage to the pre-scaler IC8.

Power for the synthesiser at 5V & 8V is by on board regulators.

On transmit, the output from the synthesiser is fed to a class A amplifier with its collector tuned. The driver is matched to the amplifier by the ratio of the tuning capacitors.

The output circuit of the system is passed to an L/C pi-match circuit (not shown on the circuit diagram). It forms a low pass filter primarily when the Panther is used when the Panther is used as a transportable rig.

*Editorial note: The preceding text dealt mainly with circuitry, techniques and components encountered in the*

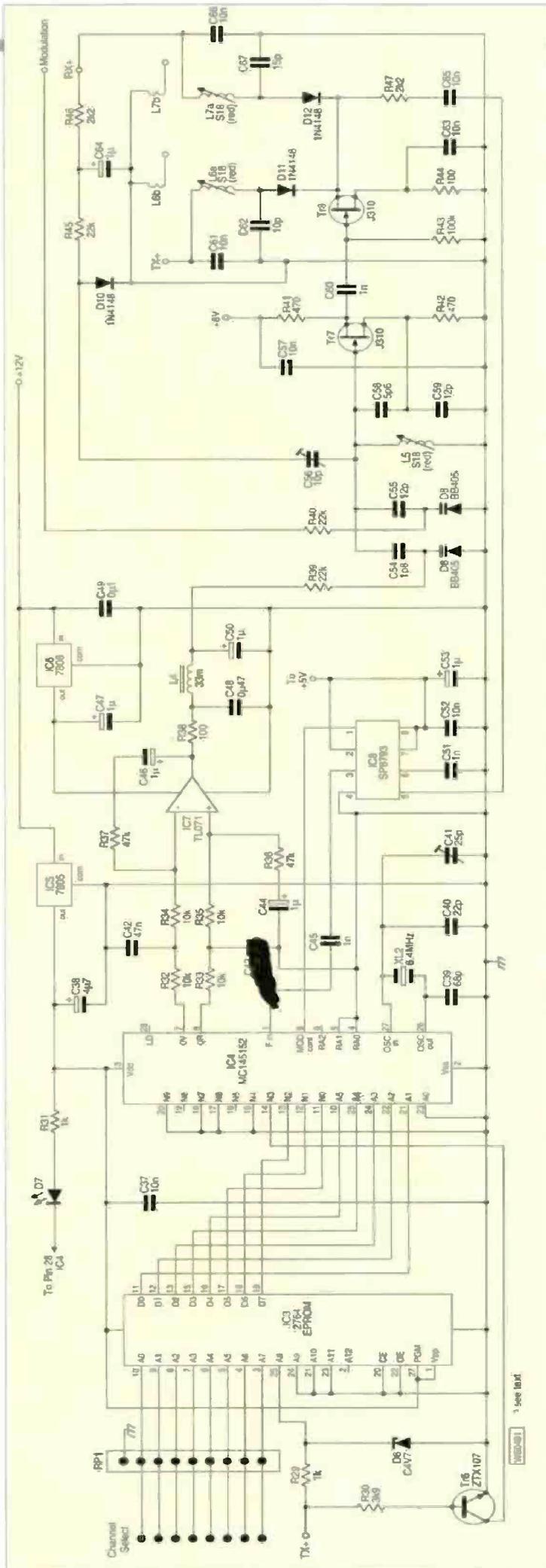


Fig. 1.1: Circuitry of the synthesiser used in Mike Rowe G8JVE's 'Panther' 144MHz f.m. transceiver.

circuit shown in Fig. 1.1. Because of this the full circuit references are quoted. However, the following description (Power amplifier, etc.) will only deal with the circuits mentioned in general terms and the specific component references will not be quoted. The full circuit component references will be provided when the relevant circuits are published. G3XFD.

### Power Amplifier

The power amplifier (which is on a separate board) is a single class C amplifier following standard practice. The output has a low pass filter which in practice reduce the third harmonic to a level of -55dB.

Modulation is achieved by feeding the audio from the modulator to a diode. The microphone audio is amplified in the first half of an i.c., and the microphone gain is controlled by a preset potentiometer.

The amplified audio is passed to an audio clipper and associated components to prevent the microphone modulating the v.c.o. on receive, a resistor is supplied from the transmit (TX) line and an associated diodes only conducts on transmit

### Tone Burst

The tone burst generator for repeater access is situated on the receiver due to lack of space on the synthesiser board. It's configured around a 4060 c.m.o.s. divider i.c.

The required frequency is generated by a 455kHz ceramic resonator. Once divided down it provides an output of approximately 1750Hz which is filtered and attenuated before passing to the modulator.

The duration of the tone is governed by the time constant of a combination of resistors and capacitors Control of the tone burst is achieved by switching its supply.

### The Receiver

The receiver has an r.f. amplifier with band-pass filtering between it and the mixer. The output from the mixer is filtered by a 15kHz crystal filter before being amplified. Second conversion and i.f. amplification together with the detector and squelch functions are served by an integrated circuit amplifier.

Muting of the audio utilises the mute output of the receiver i.c. This effectively short circuits the audio at the volume control.

The output of the second filter is also connected to the S-meter amplifier. This action not only gives readings of received signals but is also very helpful in aligning the receiver.

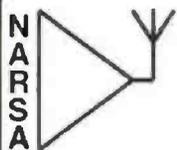
Relays which serve the antenna/d.c. changeover functions and also the power switching are also fitted on the receive board, together with an 'idiot' (protection) diode. Fusing is by an in-line fuse.

The loudspeaker is external to the set being connected by a 3.5mm jack socket on the rear panel.

In Part 2 I'll be presenting the circuits for the project. See you then!

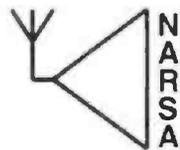
PW

**Editorial note:** A printed circuit board for the Panther is not being produced by PW. Instead, following the publication of the circuits, we intend publishing the constructional stages in photographic form (in a similar fashion to the GDP-430 u.h.f. hand-held transceiver published by PW in 1997) so that readers building it can adopt their own techniques or make their own p.c.b. from the author's original designs.



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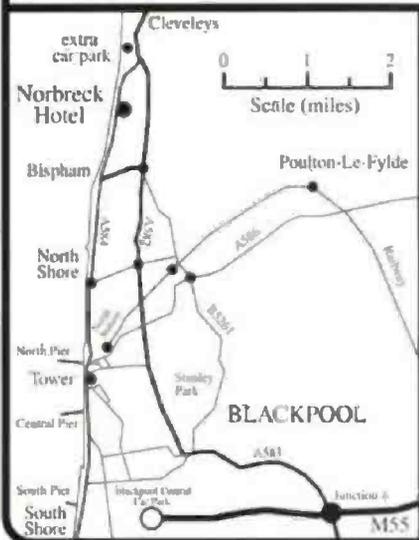
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The reference section is particularly useful and if you're keen on working American States and counties - everything you need is there. Some information (particularly on 'traffic handling') doesn't apply here in the UK but - as Rob says in the 'Prefix Listing' - having this book in your reference section will be extremely useful!



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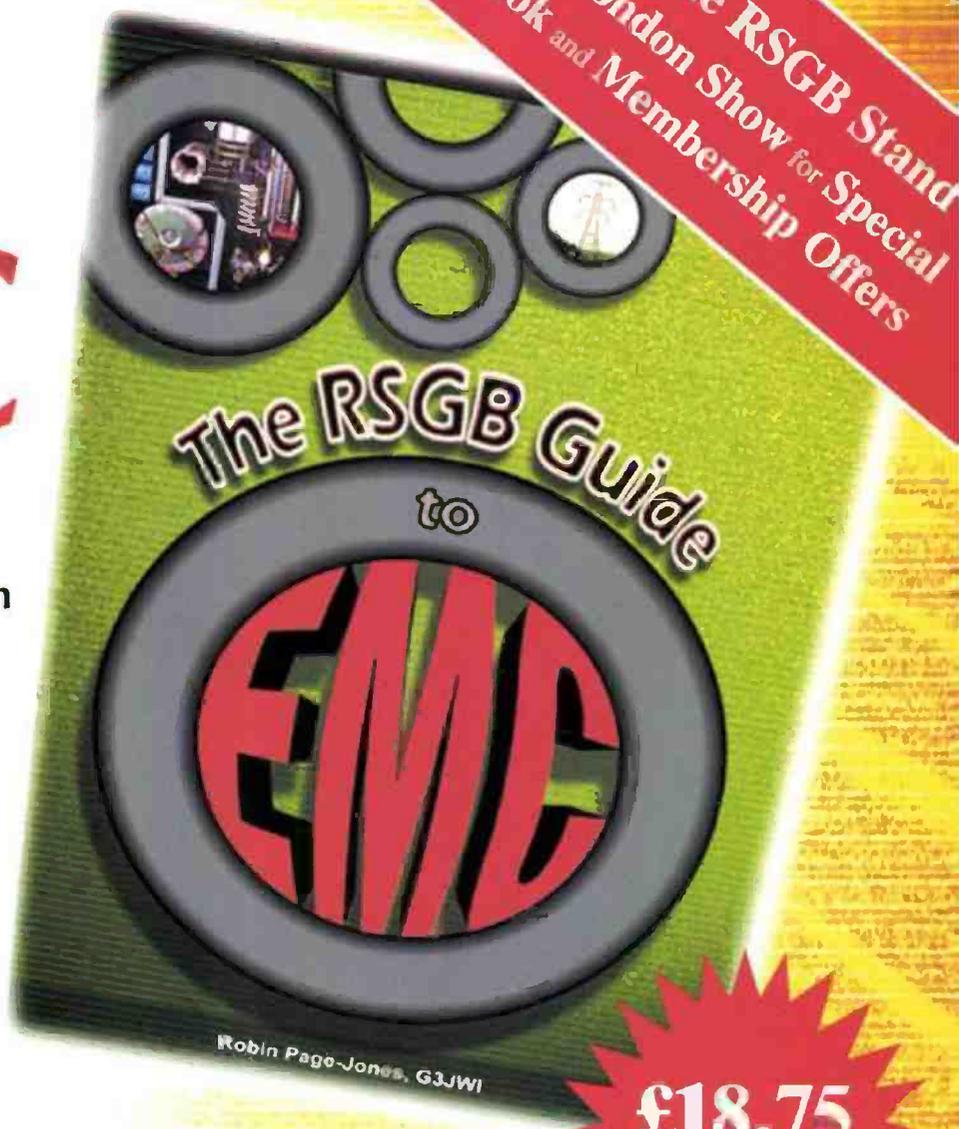
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See the review in *RadCom* February 1999, p41

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This month the Rev. George Dobbs G3RJV describes a 'universal variable crystal oscillator' project suitable for a range of bands - immediately following the usual appropriate quotation of course!

# Carrying on the Practical Way

**P**rovision of a stable variable frequency source is a common Amateur Radio requirement. It's also a requirement that's often thought to be difficult for the home constructor. Small crystal controlled QRP transmitters are very easy to build but being limited to a single frequency can be frustrating. Fortunately though, there's a simple way to overcome this by adding a variable capacitor in series with the crystal to allow a little frequency adjustment. This is the simplest form of Variable Crystal Oscillator (VXO).

I recall having a long conversation with the late Doug DeMaw W1FB, who was an advocate for the use of the VXO in home built equipment. His contention was that the VXO is a very viable option for home built Amateur Radio equipment especially for miniature or portable stations.

Some of the ideas presented this month come from the scribbles I made at the time. What's offered here is a utility VXO circuit that can be used as

a frequency source for a transmitter, or even a receiver, on a range of amateur bands.

## The VXO Circuit

The circuit for the VXO is shown in Fig. 1. In essence, it's a bipolar transistor oscillator followed by a bipolar tuned buffer stage. My prototype used 2N2222A transistors for both Tr1 and Tr2 but many similar types would work. (I used 2N3904 devices in an earlier version).

The oscillator has a stabilised supply derived from an 8.2V zener diode. I had intended to use a 9.1V zener but couldn't find one. Other constructors might like to use a three-pin voltage regulator chip of similar voltage.

Based on the popular Colpitts circuit, the capacitive feedback is provided via the capacitive divider provided by C3 and C4. These values vary according to band, Table 1. Capacitor C1 is used to minimise the effects of capacitors, C3 and C4.

Without C1, the upper frequency range of the oscillator would be restricted. By using an inductor, L1 and a variable capacitor, C2, the crystal should pull slightly above its nominal frequency.

The value of C1 will depend upon individual crystals. I found that around 100pF served very well for the 7MHz band. Try 100pF as a starter value on other bands and experiment.

Suggested values for L1 and C1 are also given in the band values table. The suggested inductors are standard moulded inductors.

In an early transmitter circuit in this series, 'Carrying On The Practical Way' (April 1998), I described 'the Utility Transmitter'. In this article I discussed the use of two inductors to increase the pulling range of a VXO.

The two inductors were connected in series to add their total inductance and are physically mounted side by side to allow interaction between the fields. This idea came from Ha-Jo Brandt DJ1ZB, in the G QRP Club journal *Sprat*.

Values which have worked well for the required bands are as follows:

3.5MHz : 39µH plus 39µH.

7MHz : 39µH plus 33µH.

10.1MHz : 22µH plus 15µH.

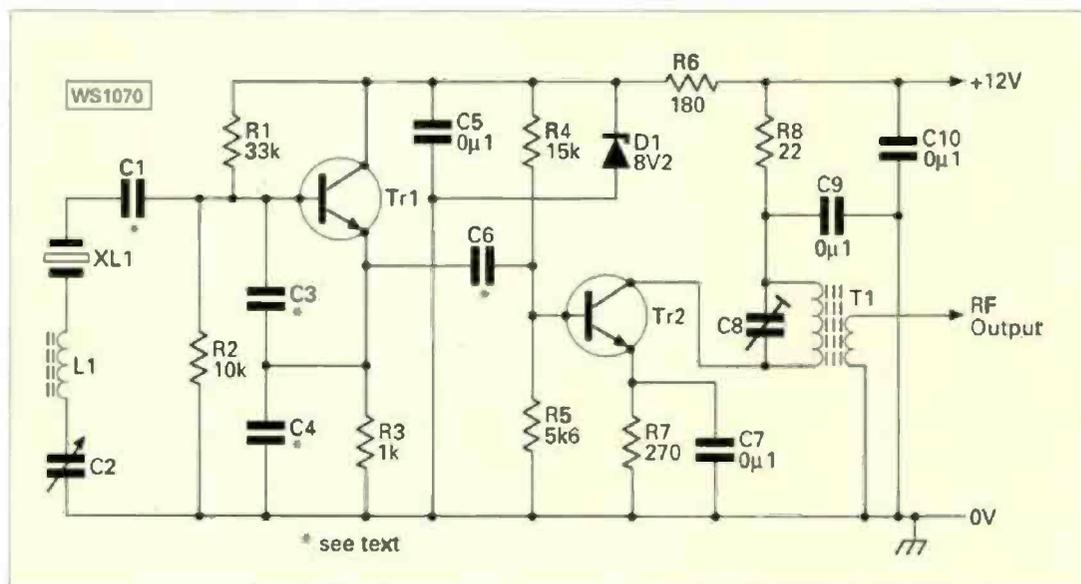
14MHz : 15µH plus 15µH.

I think it's worth experimenting with this idea as many constructors have reported very significant

Fig. 1: Circuit of the G3RJV 'Universal VXO' project (see text).

".....on crystal rocks ye rove"

William Blake 1757-1827 To the Muses





increases in frequency shift.

The oscillator stage is coupled to the buffer via C6, the value of which is ideally changed to suit the band. The table shows suitable values for C6. The buffer stage is tuned for the band in use by using a tuned transformer, T1. These values for T1 and C8 are chosen to resonate at the frequency of the crystal. The buffer amplifier operates in Class A to encourage a spectrally clean output.

The values for T1 and C8 can be taken from Table 1. To save additional calculations, I used the same value of inductance for all the bands from 7 to 14MHz.

For the 3.5MHz band, L1 is a larger inductance tuned with a larger capacitor. The figures in the table show the calculated values for C1 to hit the International QRP calling frequencies on the four bands. These are 3.506, 7.030, 10.116 and 14.060MHz. These are the places where the QRP operators come out to play!

### Trimmer Capacitors

In practice, the constructor's junk box may not have trimmer capacitors to suit the requirements of the circuit. So, it's probably better to make up C8 from fixed capacitance and a trimmer connected in parallel.

The actual value of C8 will vary from the suggested value in the table because the inductance of T1 may vary as it's hand wound. The higher frequency version of T1 (7, 10.1 and 14MHz) can be made using about 600mm of 26s.w.g. enamelled copper wire wound to occupy about three-quarters of the core. (The version of T1 for 3.5MHz will need 32s.w.g. enamelled copper wire).

The transformer is designed to offer a low impedance output, in the order of 50Ω from the buffer. Roughly speaking, this will need to be a 10:1 impedance ratio.

The table suggests 10 turns for the low frequency version and 12 turns for the 3.5MHz version. Add this winding over the 'cold end' of the tuned winding. (That's the end that goes to the supply).

It can sometimes be tricky to add link windings. In this case I used a smaller gauge wire, 32s.w.g. for the higher frequency version of T1 and wound the link turns between the turns of the tuned winding.

The combination of T1 and C8 should peak the output of the VXO at the desired frequency. This resonance ought to be fairly flat over the whole range of the VXO. If this is not so, the bandwidth of the tuned circuit can be increased by damping it with a resistor.

This month's project - the G3RJV 'Universal VXO'.

Connect a resistor, try 4.7kΩ or perhaps as high as 10kΩ, across the tuned winding of T1.

### Ugly Construction

The heading photograph shows a prototype I built for 7MHz using ugly construction techniques over a piece of blank circuit board. The variable capacitor, C2, is a three gang 20pF variable capacitor, with built-in reduction drive, of the type used in older commercial Band II v.h.f. f.m. tuners.

The trimmer for C8 is a Murata 5mm ceramic trimmer type MTC-BLA (black) which has a range of 10 to 120pF. I mounted the core for T1 on a small self-adhesive foot to raise it from the circuit board material. The core and the windings are secured with a few blobs of bee's wax melted with the soldering iron.

The prototype shown, when using a 7.030MHz crystal, gave a frequency range of 7.0065 to 7.0305MHz. The output was a little over 2V peak-to-peak and the second harmonic was better than 35dB down on the fundamental output.

It's a useful little circuit for a whole range of projects. You may even be tempted to build it and join the QRP 'action' on the air - and of course you'd be welcome! *PW*

Band (MHz)	L1 (μH)	C2 (pF)	C1	C3/4 (pF)	C6 (pF)	T1 (μH)	C8 (pF)
3.5	100	100	See text	220	100	10.3	200
7.0	47	60		100	47	5.2	100
10.1	33	60		68	39	5.2	48
14.0	16	60		47	33	5.2	25

WT1073

**Table 1:**

Notes: T1 for 7/10.1/14MHz is 5.2μH (36 turns on a T50-6 core, link winding is 10 turns.

T1 for 3.5MHz: 10.3μH (45 turns on T50-2 core, link winding 12 turns.

The capacitor C8 is a trimmer capacitor. The value given is the theoretical capacitance to resonate T1 on the QRP calling frequencies for the band in question. The main tuning capacitor, C2, can be a mix of fixed and variable capacitance (see text).

# THIS ADVERT CONTAINS

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**RRP £399**  
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Or £9.01 deposit & 13 x £25 p/m.



## rig of the month

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## Kenwood's Compact TS-50S



Once again, ML&S bring you their commitment towards lower cost Amateur Radio. We have secured a batch of the very popular Kenwood TS-50S HF transceivers at a very low price. For those of you that appreciate Kenwood Quality and aren't bothered about VHF/UHF bands, then read on.....

- 160m-10m All mode 20 standard
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LF Shift and CW reverse mode help reduce interference, while TF-Set facilitates split frequency operations. Ensuring user-friendly operation on the move is a convenient menu system, which can also be accessed via the multi-function microphone. Add the matching AT-10 Automatic Antenna Tuner, a 500Hz CW filter and an INRAD High Performance SSB 2.1kHz filter and you have a system that has "versatility" written all over it.

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  - YK-107 CW 500Hz CW Filter £61.95
  - SO-2 Ultra Stable Master Oscillator £122.95
  - INRAD 2.1kHz SSB replacement filter £79.95

RRP £999.95 ML&S £599.95  
or £13.77 deposit & 30 x £25 p/m

### Yaesu VL-1000

When Yaesu first told me about the new VL-1000 amplifier and discussed the specification I was amazed. Over 1kW on all HF, with Auto ATU, no tune up, matching PSU, fully computerised control of all parameters - I was even more excited. Then they told me the price. Three months later I came round and now only suffer from a slight twitch. Like the IC-775DSP you invest in the VL-1000 for life. (Just as well - you'll be paying for the rest of it). However We have a small quantity in stock that you won't have to part-ex the house for. Seriously interested? Give Chris or myself a call



### MyDel antennas

**M-DEL MULTITRAP**  
Built exclusively for MARTIN LYNCH, the new wire antenna is trapped for 80 through to 10 metres, uses heavy gauge multi strand plastic-sheathed wire, heavy duty 1 kW traps and totals only 20 metres in length. It's very easy to install, takes minutes to tune, guaranteeing an SWR of less than 1.5:1 on spot frequencies throughout the entire 5 bands. A far better alternative to the old GSRV antenna. Impedance: 52 Ohm. Overall length: 20m. Power Handling: 1kW. Max SWR: 1.5:1. Weight: 2.5Kg. Input socket: SO239.

### M-DEL MEGATRAP

160M - 40M

£79.95  
RRP £7.50

£99.95  
RRP £7.50

### Yaesu FRG-100



RRP £499  
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### Kenwood TM-G707E

TWIN BAND 2/70 MOBILE



RRP £349.99  
ML&S £299

Or £9.01 deposit & 13 x £25 p/m.

### morse update

Please note that as from February 1999, the 12 & 5 wpm Morse Test is now available on demand at ML&S on the last Saturday of every month, between 10:00 - 13:00hrs. Opening times: 9:30-18:00hrs, Mon-Sat.

### Yaesu FP1030A

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WE LOOK FORWARD TO SEEING YOU AT THE PW STAND AND HOPE YOU ENJOY THE SHOW

# 10th London AMATEUR RADIO & COMPUTER SHOW

Saturday March 13th & Sunday 14th of March 1999. Show times Sat: 10am - 5pm Sun: 10am - 5pm

The London Amateur Radio & Computer Show will be held on Saturday the 13th and Sunday the 14th of March 1999. Radiosport and Computer World will be there to tell us that it's the Tenth Anniversary of the London Show. Along with many of the regular London Show attendees, *Wave Magazine* will be there in our usual place - by the radio section and say hello. It's always nice for us to meet our readers and see what special offers available over the weekend (see page 48 of this issue). On these pages you will find some information which I hope you will find interesting and what you can expect to find on their stands.

## Syon Trading

Robin Sykes G3NFV was very excited to be telling me about the goodies which he'll have on his stand at the London Show this year. You might remember the review we did in last July's *Practical Wireless* of the Funktechnik portable G.R.P. mast and loop antenna. Well, this system from Germany will be on show at his stand and there will be demonstrations on how it works.



The loop antennas, Syon tells *PW*, are very effective DX antennas due, they say, to their low radiation angle which is achieved at relatively low heights. Syon also says that this antenna offers good signal levels on all bands (7-28MHz).

So, if you would like to get a closer look at this Funktechnik portable mast and loop antenna then why not visit Syon Trading's stand at the show. You will find Robin in the Red Hall on Stand B.

## Radioworld

David Hayward GILBE told *Practical Wireless* that Radioworld will be at the show again this year. You may remember them from last year's 'London Show News'. They were fairly new to Amateur Radio then, but now they are regular advertisers in *PW* - you can find their advert on pages 20 and 21 of this issue this month.

Coming all the way from the West Midlands (they are situated, they tell us, just five minutes away from junction 11 of the M6), Radioworld are official dealers for Alinco, Icom, Kenwood and Yaesu. They also have a large selection of special second-hand equipment so if you're interested in finding out more about Radioworld, why not visit their stand at the show.

## Roy Barrett

All of us here at *PW* know how fond you all are of the 'Radio Basics' series written by Rob Mannion G3XFD. You may remember that in the October 1998 issue of *Practical Wireless*, Rob G3XFD explained how he used a 'Delco' car radio as a "tuneable intermediate frequency".



Well, it just so happens that Rob actually discovered these radios and their supplier at the London Show last year. Roy Barrett has supplied these radios for a number of

years and he also supplies the synthetic resin bonded paper board (SRPB) p.c.b. material which Rob Mannion uses a lot in 'Radio Basics'.

So, if you are a big fan of the 'Radio Basics' series and enjoy building the projects along with Rob, then why not visit Roy's stand and see what goodies you can pick-up in order to help you with them.

## Nevada

Nevada will have their own stand again this year. Mike Devereux G3SED has told *PW* that they will have a number of interesting things on show.



Firstly, you could get a closer look at the Palstar PS50 p.s.u. which, according to Nevada, delivers 40A continuous output (50A peak) with high stability. It features both short circuit and overload protection and has a thermostatically controlled fan cooling system.

As the newly appointed distributor for the Holland-based Ropex, Nevada will also have on show Ropex's "The First", 136kHz transmitter, available from the end of January 1999. This crystal controlled transmitter has a power output of 30 or 130W switchable, Nevada says, operates in Class D and has built-in current protection for the antenna circuit, the power requirements are 13.5V @ 13.5A.



Finally, you will also be able to see the TRX 100LT scanner and the Daiwa miniature antenna for the VX1. If you would like to see these products on show then a visit to the Nevada stand is a must!

## AKD

Val Wagstaff has informed *PW* that taking pride of place on their stand this year will be the latest Target receiver: the HF3S. This receiver supercedes the HF3 and comes with a supplied long-wire antenna, p.s.u., data lead and JVFAX 7:1 and HAMCOMM 3:1 software. It has ten memories, she says but, even with all these changes, the price hasn't changed "... making the HF3S even better value ...".

Val goes on to say that they will also have their AKD transceivers: the 2001, 144MHz transceiver with 12.5kHz spacing; the 6001, 50MHz transceiver now with CTCSS tones for repeater access; the 4001 70MHz and the 7003 430MHz transceivers.

A kit will be available if you want to upgrade your old AKD 6001 for the CTCSS tones and also an offer to upgrade older 144MHz transceivers (model 2001) for the 12.5kHz spacing which will have to be carried out at the factory. However, some models can't be upgraded - please state the serial number when enquiring after this service at the AKD stand.

Finally, Val says that they will also have their popular range of TVI

14th 1999  
10am - 5.00pm

will be taking place at **Picketts Lock** again this year on Saturday the 13th. We are organising quite a jam-packed schedule this year with a lot to look forward to at the London Show this year so I think that quite a gathering can be expected. There will be the lectures to look forward to. **Practical Wireless** and **Shortwave** area in the **Red Hall** on **Stand T**. So please make sure that you come and deal with any comments which you may have. We will have a number of issues (see issue) so it will definitely be to your advantage to come and see us. We have managed to draw out of some of the dealers who will be at the show

filters, toroid rings, clamp-on chokes and filter kits on display. **John** will be on hand to give advice on the correct filter for your rig over the weekend. Sounds like you can't afford to miss a look around this stand! They can be found in the **Blue Hall** on **stand K**

## Haydon Communications

**Mike Haydon** of Haydon Communications have sent *PW* a lot of information concerning the London Show and it seems like a visit to this stand will be almost unavoidable for most of you! Firstly, they have a few **Q-7Es** left to sell and there will be a special price of **£149.95** at the show. The same size as the **IC-R2**, the **Q-7E** comes with a built-in scanner and covers 25-1300MHz with switchable a.m./f.m./w.f.m. The 144 and 430MHz transmit includes CTCSS.

Also on offer at the London Show will be a small quantity of **IC-PCR1000s**, they will be selling these for the reduced price of **£249** - whilst stocks last! Amongst all this, they will also have their **Q-Tek Yagis** on sale. **Haydon** say that the reviews have been good and they will have copies of the reviews to hand on their stand, so why not take a look for yourself?

**Haydon's** "aircraft grade" aluminium mast sets will also be on show/sale. These 9m masts will be available for **half their retail price at £35**. A large quantity of 100m rolls of **RG-213** and **RG-50** at "very silly" prices to clear. Apparently it's "first come, first served"! An offer you might not be able to refuse!



## Linear Amp UK

**Linear Amp UK** will have a couple of interesting items on show on their stand this year. Firstly, they will be taking their **Challenger II** which they say is "... a real DX machine!" The nine position band switch covers all the h.f. bands from 1.8-28MHz.

They say that there are a couple of improvements from the original **Challenger**. One is the **Papst blower** which is mounted internally, just under the transformer, so while forcing air through the valves it is also cooling the transformer. Tuning for the higher bands has been improved so that 28MHz is as good as the lower bands and finally, the new toroid is designed specifically for the **Challenger** which does not 'sag' on load.



The **Hunter Six** will be the other main attraction on the **Linear Amp UK** stand. This linear amplifier is the latest addition to their range of v.h.f. amplifiers, they tell us. An output of 800W can be achieved with approximately 80W of drive. Soft-start is fitted as standard and the 3-500ZG doesn't require the three minute warm-up time of ceramic valves hence you will be up and running almost instantly. You will find **Linear Amp** in the **Blue Hall** on **Stand V**.



## Martin Lynch & Sons

**Martin Lynch** has been in touch with *PW* to tell us what can be expected from their stand at the London Show this year. He states that on their stand they will have the "full range" of replacement filters which **International Radio (INRAD)** have produced - including the 400Hz c.w. filter - for **Yaesu**, **Icom** and **Kenwood**.

Also on their agenda, he says, will be the **Icom IC-2800** base/mobile dual-band transceiver "... with a difference". Apparently, the front panel of the **IC-2800** carries a big TFT colour screen and incorporates slow scan transceive/receive system. **Martin** says that this will be on demonstration throughout the weekend.

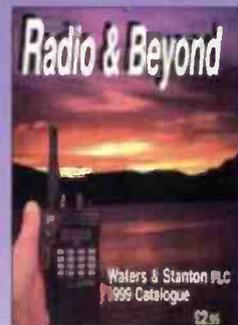
The **Yaesu VX-5R** hand-held will also feature. With three bands (44/50/430MHz) in "... one tiny package", it can produce 5W of transceive power. **Martin** says: "Add h.f. receive to 16MHz, air band and even a barometric pressure and altitude read-out and you really have a true 'out door' radio!" Also on display will be their "monster array" of used equipment and accessories. You will find **Martin Lynch** in the **Red Hall** on **Stand R/U**.

## Waters & Stanton

**Jeff Stanton** of **Waters & Stanton** has told *PW* that, as usual, they will be manning their enlarged stand in the **Blue Hall** on **Stand W** at **Picketts Lock** and they hope to display a lot of the many items which they stock.

Their new catalogue will be on sale along with the latest products from **ADI**, **Cushcraft**, **Diamond**, **MFJ**, **Optoelectronics** and **Watson**. Especially the new **Watson WMM-2** multi-mode modem with filters and the **Optoelectronics Opto Com** wide band receiver and multimode decoder which will be on display. The **Opto Com** is a PC controlled receiver and data decoder and **W&S** say that it now comes complete with software. There's a whip antenna included in the package and comes complete with **Motorola** and **LTR Trunk Tracking**, built-in speaker, power supply and **CI-5 PC interface/Scout** and super searcher.

If you fancy getting a closer look at what **W&S** have on offer, then why not visit their stand - they say that the products on show will all be at the best possible prices.



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The Fibreglass Telescopic Mast with an overall length of 33ft. (10m) is designed to construct antennas for portable purposes, such as field day events, during holidays and weekends away.

Unassembled it is compact and light and only 3ft 10ins. (1.5m) in length and weighing (3.3lbs./1.5Kg.). The telescopic segments need only to be pulled out. No tools are required.

The fibreglass Telescopic Mast has been specially developed for antennas. All 10 segments are reinforced three times. The intensive black pigment of the outer material makes it UV-resistant and the segments are individually ground to guarantee the vertical load bearing capacity.

**PRICE £57.95**

**VERTICAL LOOP ANTENNA (10-40 METRE)**

Loop antennas are very effective DX-antennas due to their low radiation angle which is achieved at relatively low heights. They even surpass comparable short wave beams.

They are very simple to assemble. The balun-housing is fitted over the mast which is automatically held in place by the right conical segment. Additional horizontal fibreglass segments can then be slid through the housing. The antenna wire is fixed to the mast and horizontal elements, which form a cross. The wire is equipped with eyes which simply fit over the outer fibreglass segments.

As opposed to long wire antennas this solution offers good signal levels on all the classical short wave bands (10-28MHz). The vertical polarization is achieved by two feeding points at the side via symmetric wires. The 1:4 balun with SO239 socket enables you to connect 50 ohm coaxial cable.

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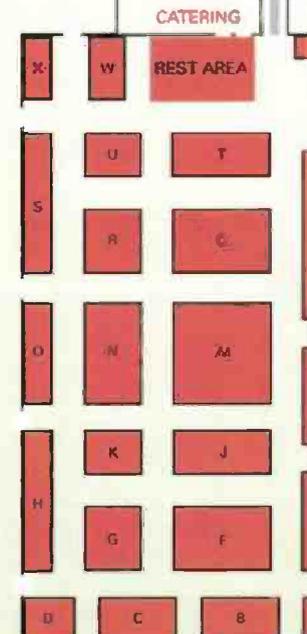
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**MAIN  
ENTRANCE**



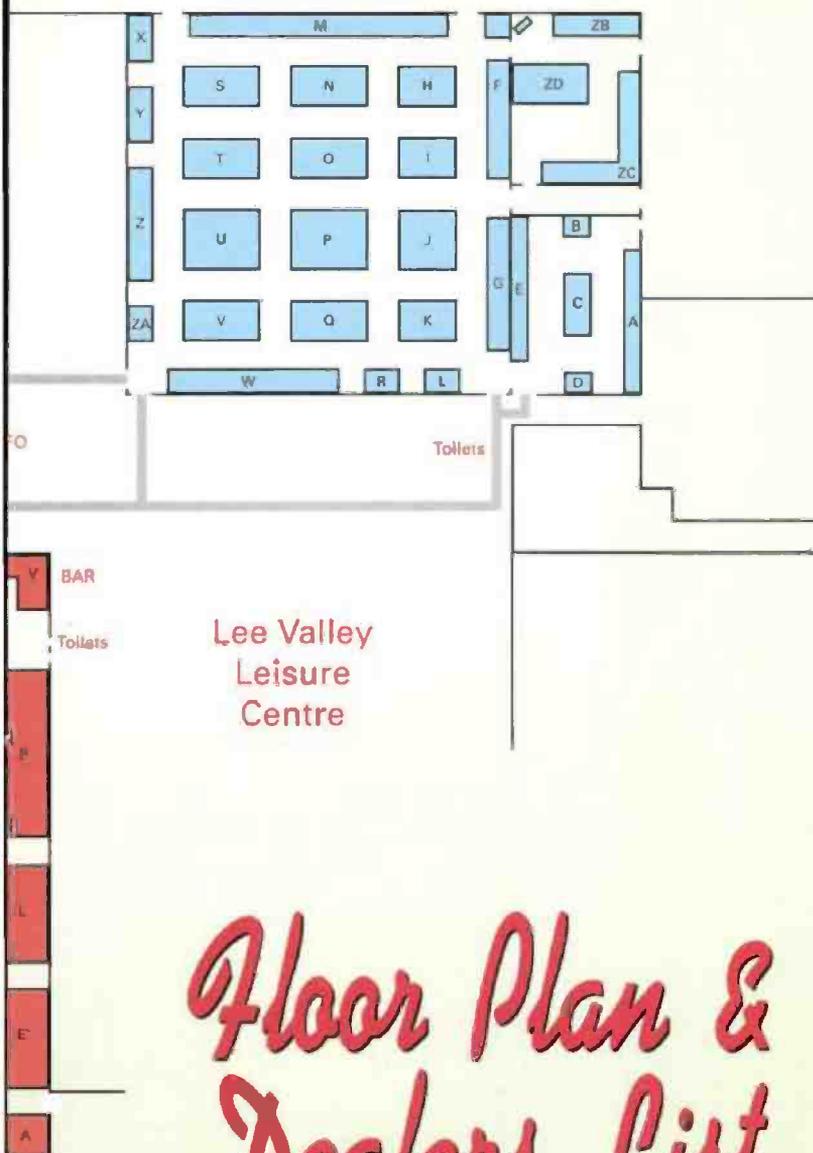
**RED HALL**

Linear Amp UK  
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 Mailtech  
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 Military WARS  
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 Multicomm 2000  
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 TK Electronics  
 TLX Electrical Ltd  
 Vortex  
 Waters & Stanton  
 Westlake W H Ltd  
 Yaesu UK Ltd

(Provisional list based on last year's show)

## BLUE HALL



# Floor Plan & Dealers List

# Show Lectures

If you are interested in travelling up (or down) to The London Show this year, you may be interested to hear something about the lectures which will be taking place in one of the side rooms. **Steve White G3ZVW**, Editor of *RadCom*, has kindly sent *Practical Wireless* some information about some of the lectures taking place. (Correct at time of publication).

### Saturday 13 March: 12pm 'PC Workshop for Radio Amateurs' by **Bob Fuller G6PWS**.

Do you have a problem running DOS applications under Windows 95? Are you considering upgrading your PC, but don't want to spend too much money on the job? If the answer to these questions is "Yes!", then here is **YOUR** opportunity to discuss these and other PC-related matters. There will be plenty of time for questions and answers and you can help the expert to help you by bringing along copies of your autoexec.bat and config.sys files.

### Saturday 13 March: 2pm 'Planning Permission - Are You 5/9 With The Council?' by **Geoff Bond G4GJB**

**Chairman of RSGB Planning Advisory Committee.** Geoff Bond, will provide details of what kind of antennas and satellite dishes you do and don't need planning permission for, plus Planning Appeals, the 'Four Year' rule and how to deal with Enforcement Orders and Breach of Condition notices.

### Sunday 14 March: 12pm 'From Top Band to 10GHz - ATV in Focus' by **John Douglas G4DVG**

Come and hear the **Secretary of the North London ATV Repeater Group** detail the history of ATV, describe present day amateur TV practice and present an update on the proposed London ATV repeater GB3EN.

### Sunday 14 March: 2pm 'QRP - Past, Present and Future' by **Dick Pascoe G0BPS**

Well-known QRPer Dick Pascoe will provide a potted history of low power operation, which will include a few surprises and revelations, then take a look at how and why QRP operation has become so popular. Thirdly, he will look at what developments might shape the future. The talk will conclude with a discussion entitled 'Where do we go from here?'

VISIT OUR STAND AND CHAT TO ROB MANNION - YOU'LL NEVER GET AWAY!

# 10th London AMATEUR RADIO & COMPUTER SHOW

## The PW London Show Book Store

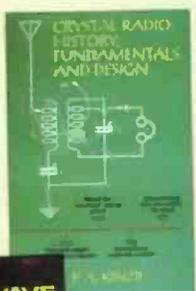
Don't forget *Practical Wireless* when you visit the London Show over the weekend of 13th/14th March. We can be found on **Stand T** in the **Red Hall**. The following six books are all going to be at a special price for our readers. *Practical Wireless* would like to stress that the following book titles at these prices will **ONLY** be available at Picketts Lock over the weekend. They must, therefore, be paid for (and collected from) the *PW/SWM* stand.

### World Radio TV Handbook 1999.

The *World Radio TV Handbook* is packed full of all the information you need on radio and television anywhere in the world! Completely updated, it is one of the most extensive handbooks around. One of the main attractions of this book, is that it has more than 350 pages of international radio station listings with a graphical guide to English programmes, along with world-wide TV station contacts and addresses. Usually £19.50, we will be selling the book at the London Show for a special price of £16.

### The ARRL UHF/Microwave Experimenter's Manual.

The *ARRL UHF/Microwave Experimenter's Manual* has a theoretical and practical approach to microwave devices and you will find information on both equipment and antennas between the covers of this book. With information on design and fabrication techniques, propagation, antennas and feed lines and transmission media, this book truly is an 'Experimenter's Manual'. Illustrated with

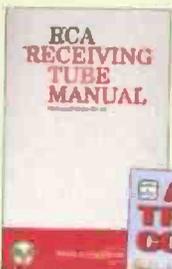


### Crystal Radio: History, Fundamentals And Design

This book claims to chronicle the "fascinating history and development of the crystal detector, including the reasons for its brief dominance of the radio market after the turn of the century". P.A. Kinzie, the author of the book, states that "Radio fundamentals such as antennas, ground lightning protection, tuned circuits and detection are covered for the beginner. The unending compromise between selectivity and sensitivity is discussed for the crystal set designer. Advanced topics such as the use of multi-tuned circuits and wave traps follow for the more experienced experimenter". Basically, the author claims that there is something in this book for everyone. *PW* original price: £8, London Show special price: £6.

### RCA Receiving Tube Manual

This popular re-print, put together by the Radio Corporation of America (RCA), comes in a well-presented paperback format and is essentially a designer's handbook. Prepared, it claims, in order to assist "... those who work or experiment with electron tubes and circuits. It will be found valuable by engineers, service technicians, experimenters, students, Radio Amateurs and all others technically interested in tubes". It comes complete with 'thumbnail' design data for the RCA's receiving 'tubes' (the American term for 'valves').



# Show Specials

## Subscription Offer

All subscriptions taken at the London Show (and only at the show) will qualify for a special offer of 14 issues for the price of 12, i.e. you pay for one year but get two extra issues. **OR 42 issues for the price of 36**, i.e. a three year subscription will get you six extra issues!

### UK Subscription Rates: Practical Wireless

£25 for a one year subscription  
£65 for a three year subscription

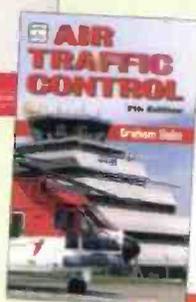
### Short Wave Magazine

£30 for a one year subscription  
£75 for a three year subscription

Not only this, but it covers application notes, theory, practical circuits, base pin-outs, internal circuitry and much, much more. Normally costs £10.50, London Show special price: £8.

### Air Traffic Control : 7th Edition

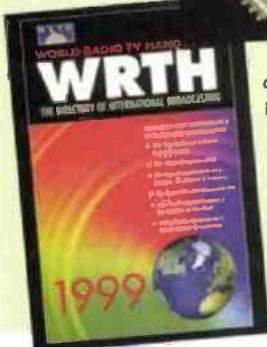
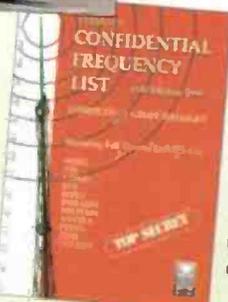
This seventh edition *Air Traffic Control* book has been fully updated to take account of all the latest developments. It provides comprehensive data on the subject of air traffic control including: Airspace structure; Aviation language; Charts and publications; The North Atlantic; Weather; Future developments; Airline call-signs; Useful addresses. Usual *PW* price: £8.99, London Show special price: £6.



### Ferrell's Confidential Frequency Listing: 11th Edition

This 11th Edition of the *Ferrell's Confidential Frequency Listing* is a comprehensive list of all identifiable utility stations and is now produced in a new format with the aim of

improving clarity and transmission modes details. There's a marine section which includes details of all the world's commercial, government and naval coast stations, whether they use c.w., u.s.b. or digital modes, aviation channels (civil and military) are fully covered and much, much more. *PW* usual price: £19.95, special London Show price: £16.



circuits, drawings and black and white photographs and is a fairly accessible volume. Our usual price is £15.50, special London Show price: £12.

# "A 'True' Dual-Band Radio!"

## The Alinco DJ-G5 Hand Held

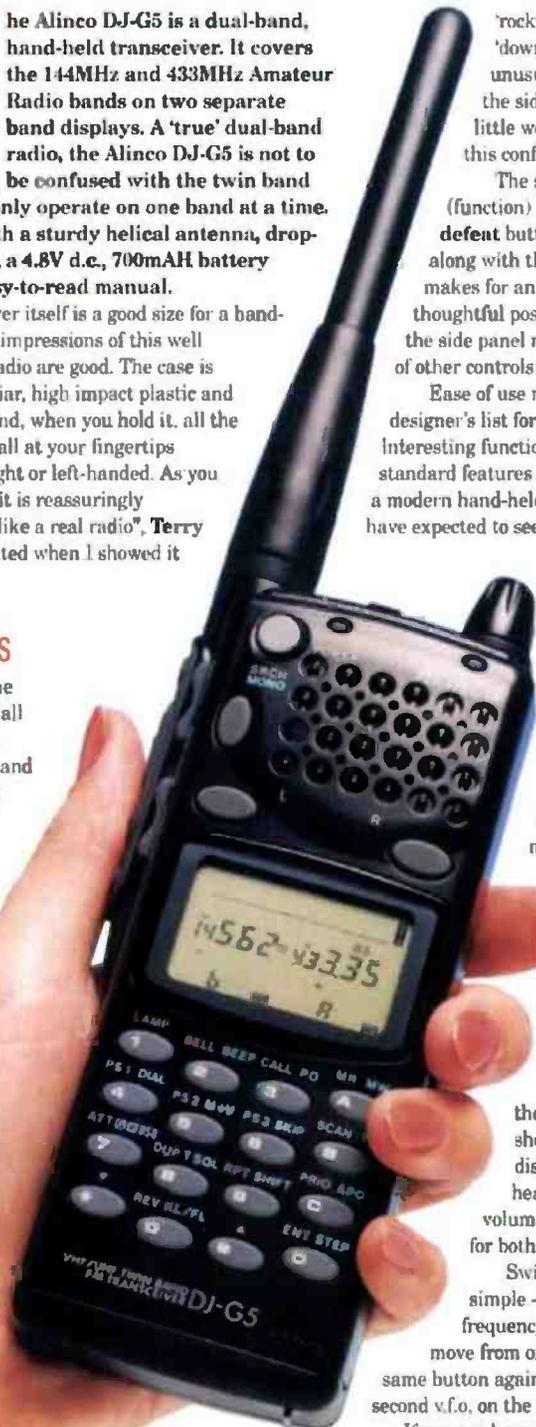
RICHARD NEWTON GOSRN REVIEWS THE ALINCO DJ-G5 HAND-HELD WITH PLEASING RESULTS!

**T**he Alinco DJ-G5 is a dual-band, hand-held transceiver. It covers the 144MHz and 433MHz Amateur Radio bands on two separate band displays. A 'true' dual-band radio, the Alinco DJ-G5 is not to be confused with the twin band radio that can only operate on one band at a time. It's supplied with a sturdy helical antenna, drop-in slow charger, a 4.8V d.c., 700MAH battery pack and an easy-to-read manual.

The transceiver itself is a good size for a hand-held and my first impressions of this well finished, robust radio are good. The case is made of the familiar, high impact plastic and metal heat sink and, when you hold it, all the controls seem to fall at your fingertips whether you're right or left-handed. As you pick the radio up it is reassuringly weighty: "It feels like a real radio", Terry 2E1EJC commented when I showed it to him.

### The Controls

The controls on the Alinco DJ-G5 are all well labelled. The buttons are large and those on the front keypad of the radio can be backlit. The volume and squelch buttons are both



The Alinco DJ-G5 v.h.f./u.h.f. twin band f.m. receiver: "A 'true' dual-band radio".

'rocking' push buttons with 'up' and 'down' all in the one control. They are unusual in design and are situated on the side panel of the radio. This seemed a little weird to begin with, but I soon found this configuration to be very user friendly.

The side panel is well laid out, the 'F' (function) key, p.t.t. tone burst and squelch defeat buttons are all on the side panel. This, along with the squelch and volume control makes for an excellent configuration. The thoughtful positioning of the 'F' key on the top of the side panel made using the secondary functions of other controls very easy indeed.

Ease of use must have been at the top of the designer's list for the Alinco DJ-G5. It offers some interesting functions as well as having all the standard features that everyone has come to expect of a modern hand-held. All the functions that I would have expected to see as touch buttons were provided as just that!

One little point that I was impressed about was that the Lamp control is on a key of its own. I liked this facility a lot, it made operating in poor light so easy. I once owned a hand-held which had a two key press for the back light and the worst I've ever seen is a transceiver (on the market at the moment) which only allows you to control the light from the menu settings! Not so with the DJ-G5!

### The Bands

The Alinco DJ-G5 has two bands which are normally configured as 144MHz and 433MHz - although you can have them both as v.h.f., or both as u.h.f. should you wish. Both bands are displayed at once and receive audio is heard from both simultaneously. The volume control can be independently set for both bands.

Switching between the bands is very simple - there's a button above each frequency display, just press these once to move from one band to another. If you press this same button again it will give you access to the second v.f.o. on the selected band.

If you are happy to do without the 1750Hz tone burst which is assigned to a small button within the p.t.t. configuration, then you can reassign this button to sub band transmit. This gives you instant transmit access to both bands. Anyone who has operated a dual-

Richard Newton GOSRN takes his turn at the reviewer's desk this time around and reveals his thoughts and feelings for the Alinco DJ-G5 hand-held transceiver.

Continued on page 51...



# London AMATEUR RADIO & COMPUTER SHOW

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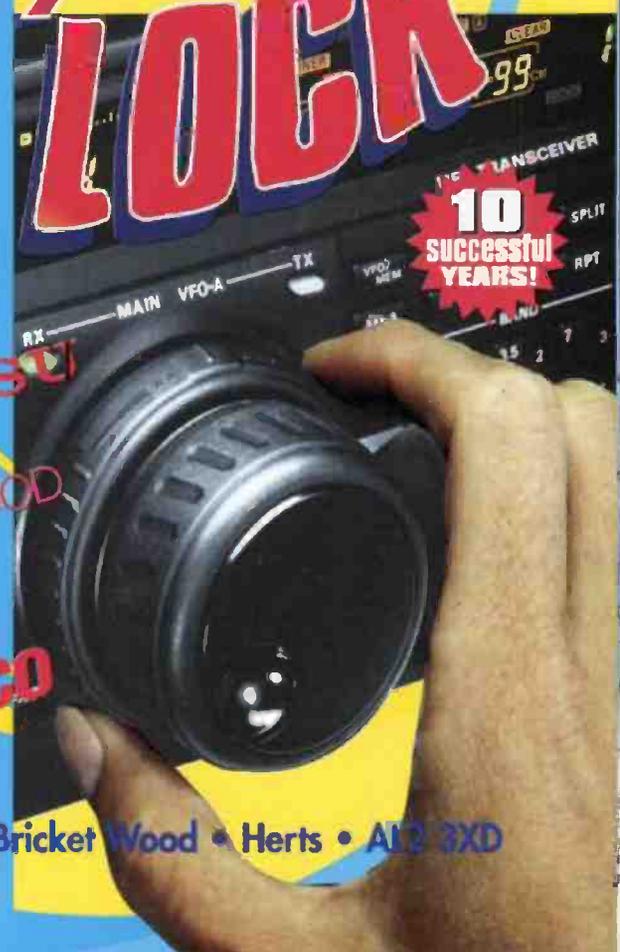
# 10th Anniversary Show PICKETTS LOCK

## SPRING '99



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# "A True' Dual-Band Radio!" The Alinco DJ-G5 Hand Held

...continued from page 49

band hand-held to the full will like this little touch - well I hope you will because I certainly did!

I have never used a hand-held with dual v.f.o. before and I found it to be very useful. Both bands have an 'A' and 'B' v.f.o. range. I used this in several ways: one was to put the calling frequency in v.f.o. 'A' and a simplex channel in v.f.o. 'B'. When you make a contact, you just hit the band button and QSY.

The other way in which I used it, was to put the local repeater on one v.f.o. and my local 'chat' frequency on the other. You may think that you could do this using memories and you can, but I found toggling between the v.f.o. ranges extremely easy when using the DJ-G5.

## Memories On The DJ-G5

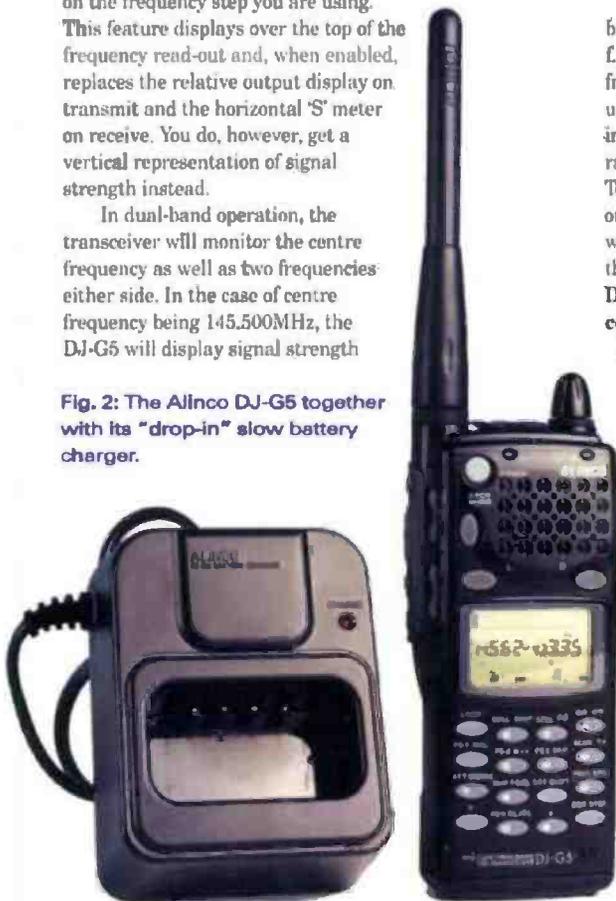
The memory allocation and configuration on the DJ-G5 is very generous. It has 80 memories, one 'call' memory and no less than three programmed scan limits on each band. As if that wasn't enough, if you're happy to do away with some auto dial memories you can increase your memory allocation to 100 memories on each band. Hmm ... I wonder which is best? I know which one I would choose!

Another really good feature on this Alinco DJ-G5 is its Channel Scope Search facility, where the radio will monitor signal reception levels on frequencies up and down from the centre frequency while still outputting audio on the centre frequency. This can be on either, or both, bands at the same time.

The frequencies monitored depend on the frequency step you are using. This feature displays over the top of the frequency read-out and, when enabled, replaces the relative output display on transmit and the horizontal 'S' meter on receive. You do, however, get a vertical representation of signal strength instead.

In dual-band operation, the transceiver will monitor the centre frequency as well as two frequencies either side. In the case of centre frequency being 145.500MHz, the DJ-G5 will display signal strength

Fig. 2: The Alinco DJ-G5 together with its "drop-in" slow battery charger.



of received signals on 145.450, 145.475, 145.525 and 145.550MHz, if the tuning steps are set to 25kHz.

However, if you then configure the DJ-G5 to be mono band, then monitoring increases to six frequencies either side of the centre. This feature can also be used in memory mode. Very useful for keeping an eye on band usage and what repeaters are active. As with all the other interesting features on the DJ-G5, Band Scope can be toggled on and off with the single touch of a button.

Another feature of the DJ-G5 that impressed me was the Programmed Scan (PS).

There are three programmable band Scans per band. This is where you set two edge frequencies for the DJ-G5 to scan between. Most hand-held radios I have either owned or reviewed only ever have one or maybe two. To have the luxury of three per band is very useful indeed.

I set up programme scan edges for the 144/145MHz band. One PS band for the repeaters, one for the simplex f.m. portion of the band and the other I set up to cover from the end of the side band up to the end of the repeater inputs. I can't commend this radio enough for ease of use. To scan a PS limit you have one button to press, wonderful! The Alinco has all the normal features such as DTMF, CTCSS and DSQ code squelch. It has a 1750Hz tone burst and various scan types.

Having established that it's very simple and easy to operate the DJ-G5 and having easily programmed in the memories I wanted, I decided to give it an 'on-air' trial.

## 'On-Air'

I started by getting a report from Terry G7VJJ. Terry is my father-in-law and we use a frequency on the 145MHz band to keep in contact from house to house, a distance of only a few hundred metres as the radio wave flies.

I set the DJ-G5 to low power - it has three settings - High, Medium and Low. 'High' power is approximately 1.5W

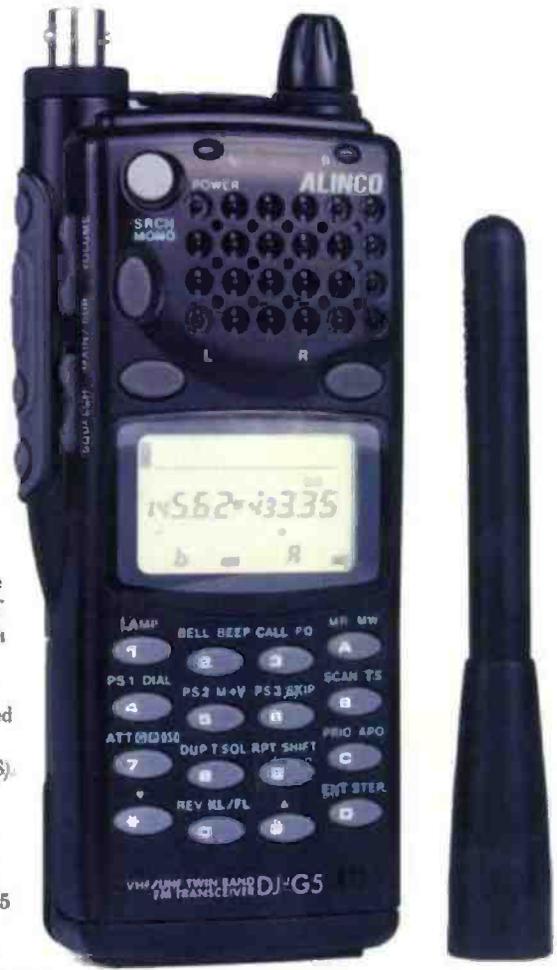


Fig. 1: The Alinco DJ-G5 v.h.f./u.h.f. twin band f.m. receiver with its "...sturdy helical antenna..."

"If you want a good, solid and sturdy, 'do the business' hand-held radio, I recommend that you consider, and take a good look at, the Alinco DJ-G5".

"... when you hold it, all the controls seem to fall at your fingertips ...".

# "A 'True' Dual-Band Radio!" The Alinco DJ-G5 Hand Held

"Ease of use must have been at the top of the designer's list for the Alinco DJ-G5".

on 145MHz with the supplied battery pack (5W with external 13.8V d.c. See Fig. 1). I am not sure what 'Low' power is, as the user manual does not seem to

specify the level. In any case, Terry heard me loud and clear and I used the DJ-G5 for a good few days chatting to him - we did take the occasional break! Terry was very complimentary about the transmitted audio and the little transceiver seemed to receive well and the received audio was pleasing to the ear.

Steve G1YNY was next via the local repeater. The DJ-G5 got into the repeater without a problem and I was receiving the repeater reasonably well, with a little background noise. I did, however, have to put the power up to 'High' to get a workable signal in - I was still just using the DJ-G5 with the battery pack and supplied helical whip (See Figs. 2 & 3).

The next contact was interesting. My wife, Diane, had decided we were to go Christmas shopping in London. So, we decided to stay for the weekend and Terry and his wife Barbara also came along. We were talking car to car keeping in touch on 145MHz and low and behold another voice came on. It was Dennis G0OSE (what a super callign! Very seasonal!).

Dennis was situated about 26km from me. I

was mobile using the Alinco DJ-G5 on 1.5W on the helical antenna inside the car. Dennis gave me a good report and said that he and some of his local net had heard Terry and I on our journey sometime before. Dennis was using a W2000 Hi-Gain tri-band vertical.

Following that, me being the international traveller and man of mystery I am (hmm ...), Steve G1YNY talked me into a day trip to France. The purpose of our journey was one of cultural exchange. We sailed from Poole and I couldn't resist the temptation and took the DJ-G5.

When sufficiently out of Poole on our journey of discovery, I put out a CQ call on both 145 and 433MHz. "CQ ... CQ ... CQ this is G0RSN Maritime Mobile and listening ..." and I listened and listened and resorted to GB3SC, the repeater in Bournemouth. I called through and got a reply from Sheila G0VNI. Sheila was just crossing Junction Two of the M27. She reported that the DJ-G5 had a "nice

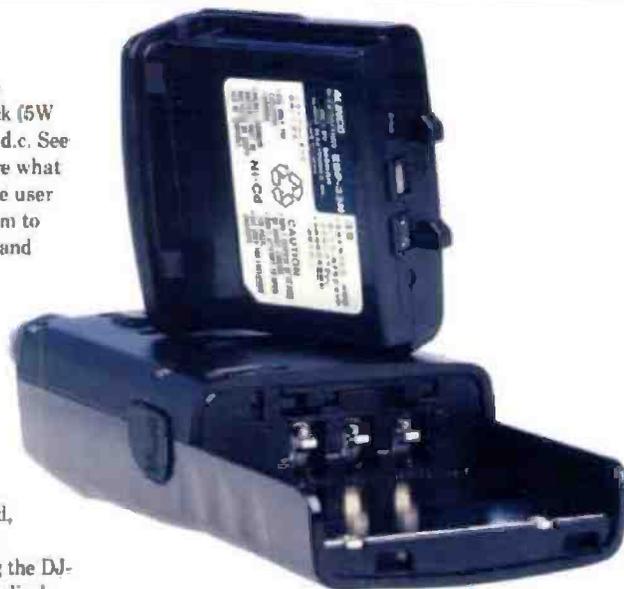


Fig. 3: The Alinco DJ-G5 with its "4.8V d.c. 700mAh battery pack".

clear tone" and we had a very enjoyable chat before she lost the repeater.

Robin G8ZVS in Weymouth then called me. Robin told me that he could hear me on the input so we moved to 145.525MHz and held a very enjoyable simplex contact. Robin told me that I was "4 and 3, up and down but good clear audio".

My good friend Terry 2E1EJC, helped me out with the test on 433MHz. Terry pops down to see me now and then from his home near Blandford Forum. He normally calls me on a 433MHz simplex frequency so that his NATO standard cup of tea can be ready when he arrives. He was delighted with the DJ-G5 because when I was using it for this important contact, he was able to make contact with me much sooner than normal. This meant his tea was made by the time he'd arrived! Now if that's not a good report what is?

## Performance

The DJ-G5 performed very well indeed, it seems to have a fair receiver, the transmitted audio was always reported as being of good quality. When I connected it to the WX1, it rejected the local pager nest well and sat next to my v.d.u. whilst I typed this with only the occasional break through of noise.

The DJ-G5 is a very impressive looking radio. It has the feel of a well-made and robust unit that would do its job. It's wonderfully easy to use, all the major functions and features can be selected with ease and normally a one-button press. It has an easy to read display and good back light. Some readers may find the characters a little small, however I have seen smaller. The controls are lovely and large and well labelled.

It's good to see a true dual-band radio come back on the market. If you want a good, solid and sturdy, 'do the business' hand-held radio, I recommend that you consider, and take a good look at, the Alinco DJ-G5.

My thanks go to Mike Devereux of Nevada, 189 London Road, North End, Portsmouth PO2 9AE. Tel: (01705) 662145 for the loan of the Alinco DJ-G5. The price of the Alinco DJ-G5 is £269 including VAT. PW

The Alinco DJ-G5 hand-held transceiver gets "seven out of ten"! from Richard Newton G0RSN.

## Specifications

### General

Receiver Range	144.000 - 145.995	430.000-439.995
Transmitter Range	as above	
Modulation type	F3E (f.m.)	
Antenna impedance	50	
Operating temperature range	-10°C to +60°C	
Supply voltage external	4.5 to 16.0V d.c. (13.8V d.c.)	
Supply voltage NiCad	4.5 to 16.0V d.c. (4.8V d.c.)	

### Current consumption

	v.h.f.	u.h.f.
Transceiver high on 13.8 external	approx. 1.4A	Approx. 1.5A
Transceiver high on 4.8 NiCad	approx. 1A	Approx. 1.2A
Receiver Squelched twin band	85mA	
Receiver Squelched mono band	50mA	
Receiver Battery save ON	25mA	
Ground	Negative	
Microphone Impedance	2kΩ	
Dimensions without projections	W57 x H138 x D27.5mm	
Weight	approx. 350g	

(Antenna belt clip strap and NiCad Included)

### Transmitter

	v.h.f.	u.h.f.
Output power		
High 13.8 external	Approx. 5W	Approx. 5W
High 4.8 NiCad	Approx. 1.5W	Approx. 1W
Modulation	Variable Reactance	
Max. Deviation	± 5kHz	
Spurious emissions	not more than -60dB	

### Receiver

	v.h.f.	u.h.f.
System	Double conversion superheterodyne	
First I.f.	38.9MHz	45.1MHz
Second I.f.	455kHz	455kHz
Sensitivity	better than -18dB	better than -16dB
Sensitivity (bands reversed)	Better than -12 dB	
Squelch sensitivity	better than -20 dB (0.1V)	
Selectivity (-6dB/-60dB)	more than 12kHz / Less than 30kHz	
Audio output (@ 10% distortion)	100mW (8Ω load).	

# Signal Searching



There isn't a simple answer to the question "what's the most useful piece of test equipment for every shack"? But I suppose that of the many differing pieces of test equipment that might be in the shack, a frequency counter must rank very highly on any list.

Frequency counters come in a variety of shapes, sizes and accuracies. I have an Italian-made counter at home that counts up to at least 1.3GHz and it has a very good reading stability in terms of temperature, but it's sensitive to voltage changes. Frequency readings may vary by almost 4kHz at 145MHz. Not very good at all!

However, the Watson Super Searcher hand-held digital counter runs on its own internal four-cell NiCad rechargeable batteries. And, although it also runs from an external (nominal) 9V supply, it doesn't seem to suffer a reading change like my own counter.

The easily read digital display shows a reading that remains stable over a range of temperatures when tried on professional quality test equipment. To prove this I found that from cold switch on to being in use for almost an hour the display changed only in the last digit.

However, all oscillators also change frequency over time and this applies to the internal crystal reference oscillator controlling the counter. So, for calibration purposes (with a known accurate signal) a variable trimmer capacitor, sitting behind a small hole in the front panel, adjusts the internal crystal oscillator.

## Specification Range

With a specification range of 10MHz to 3GHz, I wasn't able to check the whole range, but I did check the sensitivity with the test equipment I had available. The supplied unit produced a stable reading with under 2mV of r.f. input up to over 1GHz, which is far better than my own counter.

With the supplied telescopic antenna, 'sniffing' a signal from a nearby transmitter is very easy. An inbuilt 16-segment bargraph signal strength display allows the user to gauge the level of signals arriving at the unit. Although the displayed level is frequency dependent, anywhere in the 'middle' gives a rock solid display of frequency.

I have a problem with strong local p.m.r. transmitters at home, and they can occasionally cause breakthrough.

Knowing where the interfering transmitters were located, I wandered out with the Super Searcher to find out what frequency they were on. I attracted a few inquisitive looks as I 'lurked' near the sites waiting for a burst of activity from the stations, but now I know the interfering frequencies!

Although the counter can be used to tune-control a receiver such as the AOR

AR8000 to match the counters displayed frequency, I didn't take the receiver with me on the clandestine 'wander'. I only wanted to know what frequencies I had to deal with, not what was carried. This unit can also tune-control other receivers that conform to either the Icom or the CI-V interface standard. The Super Searcher has different 'gate' times, controlled by the Function key. The various gates allow

for speed of response or a more accurate display of the frequency. Another function for this key also the ability to display the time period of the incoming signal.



Taking off the case, reveals a single uncomplicated looking board and a large display.

## Opened Up

Curious to have a look inside, I opened up the solidly constructed metal case of the Super Searcher expecting to see a complex unit similar to other hand-held counters I've seen. But what I found, as the photographs show, is clean and simple. The easily read display is large compared to the whole unit. A very nicely and well constructed unit.

Even with the advent of digitally controlled fancy graphical display enhanced modern rigs, your licence conditions requires you to

show that you are transmitting within the designated amateur bands. An independent counter is a suitable method of verifying the accuracy of the dial reading. Can you afford to be without one?

My thanks go to **Waters & Stanton** for the loan of the Watson Super Searcher frequency counter (and the AOR AR8000 receiver). The Super Searcher costs £99.95 inclusive of VAT.



The display clarity may be appreciated in this shot.

## Manufacturer's Specification

<b>General</b>	
Size	80(h) x 68(w) x 31(d)mm (excluding antenna)
Weight	210g (including 4-cell NiCad battery)
<b>Electrical</b>	
Frequency range	10MHz to 3GHz
Sensitivity	>2mV (100MHz - 1.2GHz)
Maximum input	+15dBm (800mV approx)
Input impedance	50Ω (BNC socket)
Typical accuracy	<1p.p.m (±1 count) at 20°C
Interface	AOR, CV-1 and Icom receivers
<b>Signal Display</b>	
Numerical display	Seven digit L.c.d.
Signal strength	16-Segment bargraph display 5-200mV (frequency dependent)



Coupled up to tune-control an AR8000 scanning receiver.

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# Broaden Your Amateur Horizons

## Amateur Radio On The Norfolk Broads

Tony Fishpool G4WIF and his friend, Graham G3MFJ took their families on holiday to the Norfolk Broads. However, they had absolutely no intentions of taking a break themselves - at least not from Amateur Radio! Tony G4WIF describes how they had to overcome a few antenna problems.

My family, along with that of Graham G3MFJ, decided that we were going to take a holiday on the Norfolk Broads in July 1997. We decided that a week was a long time to go without having access to any Amateur Radio, so I supplied the antennas and Graham provided the radios.

### Which Antenna?

Previously, I'd consulted the collective wisdom of the G-QRP Internet Conference regarding suitable antennas for use on a boat to answer the question "Which Antenna?". Many of the suggestions, involving verticals, required loading up against the hull, or dropping a wire overboard. This idea was not as practical as it may have seemed, as the boats are mainly non-metallic. Dangling a wire anywhere near propellers made us think that perhaps a horizontal antenna was a better idea. If we were to achieve an effective antenna on 3.5MHz, we needed to get a reasonable amount of wire as high as possible.

I went to the Dayton HamVention in 1997 and bought myself a telescopic fishing pole which extends to nearly five metres in length. It was decided that this would support an inverted 'V' doublet.

The idea of loading coils was dismissed due to the weight the pole would have to support, so myself and Graham G3MFJ used a method advocated by L.B. Cebnik W4RNL in his lecture at Dayton in 1996 on 'Linear Loading', Fig. 1 shows the general idea.

### Plastic Rod

A drilled plastic rod (just like on volume controls) was used to keep the wire spaced approximately 51mm apart and liberal application from a hot glue gun kept it all together. The antenna wasn't cut to resonate on any particular frequency as it was thought that it would be bound to change when installed on the boat. Having worked out the trigonometry - from the length of the boat and the height of the pole - the antenna was made as long as possible (approximately 8.5m).

An MFJ antenna analyser reported that the 'antenna'



The rig built by Graham G4MFJ for use on the boat on the Norfolk Broads.

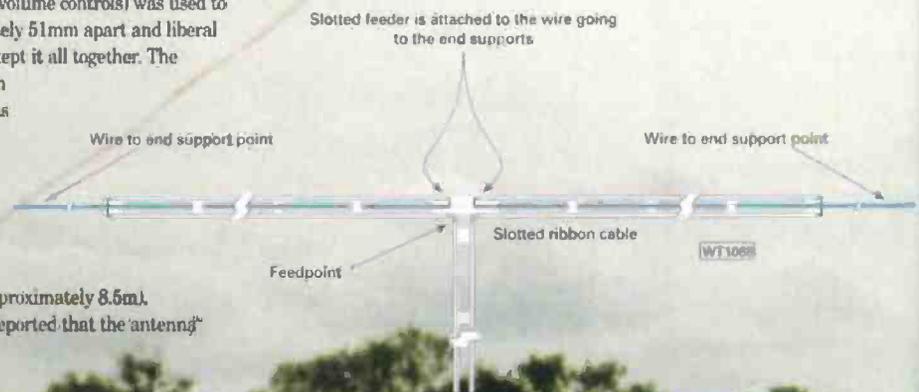
resonated at 4.2MHz. At 3.6MHz it presented (at the end of the twin feeder) an impedance of 67Ω, which was not hard to match with the antenna matching unit that Graham G3MFJ was to build for the trip.

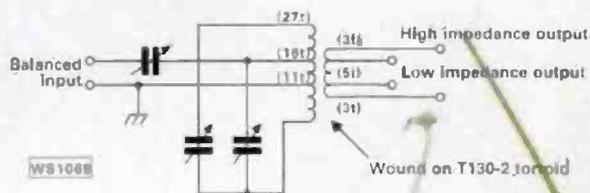
The antenna was temporarily set-up in my garden in Kent and I was able to have a two-way QRP QSO with G0WAY in Wolverhampton. It apparently radiated, but how efficiently, we would see later.

### Preferred Mode

We had decided that even though c.w. was the preferred QRP mode, we should also take some a.s.b. equipment. To combine the

Fig. 1: The 'Linear Loading' method as advocated by L. B. Cebnik W4RNL





**Fig. 2:** Circuit of the antenna tuner unit. Note that the two variable capacitors shown side-by-side are actually a twin ganged (double 500pF) single unit.

two, Graham G3MFJ had been working on the idea of converting his home-brew 'Epiphyte' (as seen in the July 1997 *Radcom*) 3.5MHz s.s.b. transceiver for c.w. as well.

The 'Epiphyte' is an amazing little rig, 5W peak envelope power (p.e.p.) s.s.b. from a p.c.b. only a few inches square, but it was a shame that it was s.s.b. only and this got Graham thinking. Firstly, it needed to be converted in order to cover the c.w. end of the band as well as the s.s.b. section. This turned out to be easy, as he just paralleled the two halves of the tuning varicap. Then it covered 3.5 to 3.8MHz - exactly what we wanted.

The next part was to generate the c.w. The way this is usually done, in an s.s.b. transmitter, is to unbalance the balanced modulator. Unfortunately, the design of the 'Epiphyte' doesn't allow this.

During the 1997 Dayton HamVention, we'd both purchased some TiCK (Tiny Integrated Cmos Keyer) chips, from Gary and Brad of Embedded Research. A TiCK chip is an 8-pin PIC chip programmed to be a complete iambic-keyer with sidetone and costing only US\$5!

Graham G3MFJ decided to incorporate a TiCK into the rig and use its square wave audio output (filtered with a low pass filter using a single 741) to produce (a near) sine wave and then inject this into the microphone input. The result? Instant c.w.! See photograph of extra board (perboard) in Fig. 3.

The a.t.u. needed to be compact and was made to complement the 'Epiphyte'. Graham already had a Kanga Oner s.w.r. bridge and he decided to incorporate this with the a.t.u. in one box. An a.t.u. with 'switched taps' on the coil is the conventional way of doing things, but an idea based on an article in the G-QRP journal *SPRAT* (Issue 84) suggested a simpler solution. A previous project yielded a couple of 500pF twin gang variable capacitors, so all that was needed, was to wind a toroid and then box it all in a Maplin's box. (See circuit in Fig. 2).

You can tell from the photograph (Fig. 4) how the antenna looked when mounted on the boat. Out of curiosity, it was checked again with the antenna analyser and we were surprised to find that not much had changed.

The antenna was still not resonant on 3.5MHz and the feed impedance was much the same as before. It wasn't considered a problem though, as resonance is no qualification of a good antenna and vice-versa. The important thing was to

minimise feeder and a.t.u. losses, then most of the power generated should go where intended, but could we make QSOs?

## Did It Work?

So, you may ask, did it work? In answer, during daylight, reports from stations all over the country verified that the 5W of s.s.b. was acquitting itself well. We had contacts with stations all over the country. During the evenings, our families seemed to want us to take them out to dinner, even so, the more effective c.w. mode made a few night time European QSOs possible.

Perhaps if you have a postage stamp sized garden, linear loading could help provide a general purpose antenna. On some bands, the s.w.r. on the feeder may be a little high, but remember that this doesn't necessarily equate to high losses where open wire feeder is used. The same cannot be said for coaxial fed systems.

Amateur Radio was also very handy for maintaining contact between our two boats. Our 144MHz hand-helds proved very effective while we were several kilometres apart.

Radio and boating proved to be a great combination. Of course, you need to have understanding XYLs, or perhaps our wives and families are simply resigned to living with a couple of radio addicts. **PW**

**Overhead Power Line Safety Warning:** When using any form of telescopic antenna, pole or wire antenna in the countryside, please be aware of the danger from power lines. In rural areas - especially 'cross country' (particularly when crossing open fields) as pole routes carrying high voltage power lines can be mounted relatively close to the ground and within reach of portable/telescopic mast. **Please remember that a Radio Amateur was killed in the UK during 1998 when a portable mast touched an overhead line.** When using canals (particularly) because of the low clearances required for the narrow boats - power lines passing over the waterway can be lower than usual. So take care and be safe and enjoy your hobby afloat! **Editor.**

**Fig. 3:** Internal view of the home-brew rig built by Graham G4MFJ, based on the 'Epiphyte' design introduced in *RadCom* (July 1997).

**Fig. 4:** (Background photo) This photograph illustrates how the antenna looked once fixed to the roof of the boat.

TONY G4MIF DESCRIBES HOW HE AND GRAHAM G3MFJ TACKLED AN ANTENNA PROBLEM.

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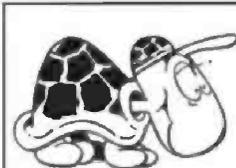
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**W**elcome to my first column of 1999! I've lots to get through so straight on to business... The other day I came across a commentary - published in the February 1961 issue of 73 magazine - by Edwin K. Cole W7IDF. Good grief! Another E. K. Cole - and yes, there was (and still is) an Amateur Radio magazine simply called 73.

Edwin mentioned the fact that for a time, back in the 1940s, many valves had their type numbers clearly marked on the base as well as on the glass envelope. (We're talking 'G' and 'GT' octals here). Anyone who has found a new-looking valve which has had its type number erased from the envelope will agree that marking the base was a very good idea. Pity it wasn't continued.

There must be innumerable valves, many in good condition, which have no visible type-markings on them. Fortunately, most rare and/or valuable valves have sufficient distinguishing features for valve aficionados to be able to identify them blindfold in a darkened room. This is fine, but what if you're just a beginner, what then? My only answer is wait and ask. In time, either you'll be able to identify the valve yourself - by sight or by measuring its characteristics - or you'll find someone who can.

## Identification Marks

Paranoid types might suspect a conspiracy here as certain identification marks - like batch numbers - can be found on most valves either etched or otherwise permanently imprinted into the glass envelope. Now, I wonder why manufacturers seldom etched the type number into the glass too?

Was it because the glass envelope could be used for different valve types? Or was it because a missing type number meant that the perplexed owner wouldn't be tempted to keep it as a spare? Then maybe he'd have to buy a new valve? Hmm ... I wonder?

## Classes Of Operation

In a later issue of 73, there was a discussion about valve-amplifier stages and classes of operation. Considering the somewhat confusing descriptions I've read recently in the

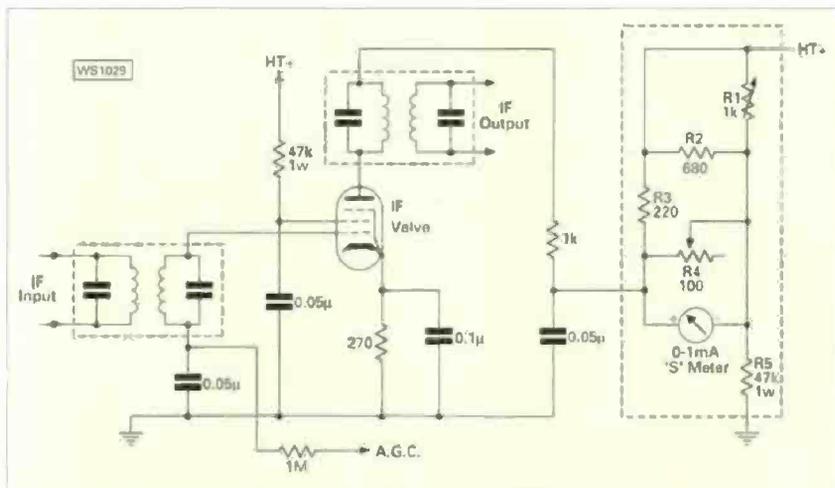


Fig. 1: A typical 'gain controlled' i.f. stage and S-meter circuit (see text).

hi-fi press, it suggested to me that a brief review of the various classes might be useful.

By the way, the classes of operation apply to all amplifiers, but I'm going to talk about them purely with regard to valve amplifiers. I should just define one term: 'cut-off bias'. This is the value of control grid bias (negative voltage with respect to the cathode) that reduces the valve's anode current to some very small value.



The class of operation is all to do with anode current and whether it flows during the whole of the cycle of the driving waveform or for just part of that cycle. Where a complete amplifier is given a class designation, it's assumed to be that of the output stage.

The various classes are as following: **Class A:** Here, anode current flows throughout the whole of the cycle (360°). The valve will be biased so that its operating point lies near the centre of its linear operating region and the output from the stage (or amplifier) will be a reasonably accurate copy of the input. Small signal and linear driver stages usually operate in class A as this class offers minimum distortion and high power gain.

**Class B:** The strict definition of class B is that anode current flows for exactly one half cycle of the driving waveform (180°). For this to happen, the valve is biased precisely at cut-off. If the input signal makes the grid more negative, nothing happens to the anode current. Only when the input signal goes positive will anode current begin to flow. Class B operation is much more efficient than class A operation. Unfortunately, the output from such a stage looks

like a somewhat distorted, half-wave rectified version of the input. Yet class B audio power amplifiers are common.

The distortion caused by a class B stage is almost eliminated by a push-pull arrangement. Here, one half of the output stage handles positive-going excursions of the input waveform while the other half handles negative-going excursions. Of course, this second half does

need a phase inverter to drive it. Fortunately, push-pull operation is not essential for r.f. power amplifiers due to the 'flywheel' effect of the output tuned circuit.

**Class C:** When anode current flows for less than one half cycle of the driving waveform (less than 180°) the stage is operating in class C. Typically, the angle of conduction (current flow) is arranged to be 140° or thereabouts. The valve is biased way beyond cut-off and driven hard so that only the positive peaks of the driving waveform cause appreciable anode current to flow. The output looks like a sequence of pulses which

The numerous copies of 1950s vintage PW magazines on the counter provides a clue to who's in charge of the vintage 'wireless shop' this month - it's Phil Cadman G4JCP. Phil has some interesting information on valve markings and advice on signal strength meters to offer his 'customers'.

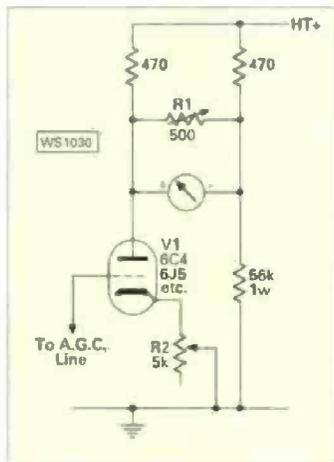


Fig. 2: An S-meter circuit using a general purpose triode (see text).

bear little resemblance to the input.

Class C operation can achieve very high efficiencies but is only suitable for r.f. amplifiers (and similar) where the flywheel effect of the output tuned circuit 'fills in' the missing bits of the waveform. **Please note that linear r.f. amplifiers (for s.s.b.) cannot operate in class C!**

**Class AB:** As you might guess, class AB denotes a stage operating somewhere between class A and class B. The bias typically resting closer to cut-off than to the class A bias point. The output waveform will still be highly distorted so push-pull operation is again required for audio applications. The advantage over pure class B is that the region of severe non-linearity near cut-off is avoided without unduly sacrificing efficiency.

**Subscripts.** Applying only to valves, the subscripts '1' and '2' are sometimes added to the class designation. The subscript '1' signifies that no grid current flows during any part of the grid-voltage cycle. While the subscript '2' denotes that grid current does flow over at least part of the cycle.

In reality, class A stages are assumed to operate in class A1 (no grid current) and almost all class C stages operate in class C2 (lots of grid current). However, large audio triodes might well work best in class A2 while c.w. transmitters that use television receiver line output valves

(sweep tubes), can operate very effectively in class C1.

Subscripts are used mainly in relation to class AB amplifiers. Sometimes it's not obvious as to whether an output stage is designed to draw grid current or not. Adding the subscript avoids any ambiguity.

## Signal Strength Meters

Following on from the topic of my previous column - magic eye tubes - it occurred to me that some valved communications receivers were never fitted with any kind of signal strength meter. Even when magic eye tubes became popular, most broadcast receivers never incorporated them.

Fortunately, adding an S-meter to a receiver isn't all that difficult. However, please don't mutilate a receiver just to add an S-meter; put it in a small external box.

For those of you who might like to add an S-meter to an old valved receiver, I thought I'd republish some circuits originally featured in the May 1961 issue of *PW*. Before I describe them, let me make it clear that **they are only suitable for superhet receivers with gain controlled stages.**

So, no t.r.f. sets and no 'funny' superhets with only manual i.f. gain control. (See 'Carrying on the Practical Way' in the January 1999 issue of *PW* for an audio S-meter that's suitable for these types of receiver).

## The Circuit

The circuit shown in Fig. 1 shows a typical gain controlled i.f. stage. The additional components required for the S-meter are enclosed within the dashed lines. These components form a bridge circuit which becomes unbalanced when the current taken by the i.f. valve decreases.

The only bit of surgery required is the breaking of the h.t. feed to the gain controlled i.f. valve. **But please do be**

**very careful where you tap into the h.t. supply,** you only want to monitor the current to one stage. By the way, the (1k $\Omega$ ) resistor in series with the i.f. transformer might not be present; that's no problem. However, the (50nF) decoupling capacitor certainly should be there. If it isn't, add one yourself.

While receiving no signal, adjust R1 for zero on the meter. Resistor R4 sets the meter's sensitivity; I'd either use a calibrated signal generator to set the 'S9' point or else compare readings with another receiver. Take great care when making these adjustments as both resistors are at full h.t. potential.

In case you're wondering, you can't simply put the meter in series with the anode to save all the twiddling. Unfortunately, current through the gain controlled stage **decreases with increasing signal strength** and so you'd end up with an S-meter that read backwards.

There are ways around the 'backwards' problem: You could use a meter with a right-hand zero (expensive) or turn an ordinary meter upside down. You have to redo the scale upside down too but that's a relatively cheap option. (Now you know why some receivers have inverted S-meters).

A somewhat better way to add an S-meter is shown in Fig. 2. Here, a general purpose triode is connected to the receiver's a.g.c. line specifically to drive the meter. Adjust R1 so that the meter is fully deflected when the triode is removed. Then, with the triode back in circuit, short the a.g.c. line to ground and adjust R2 for zero deflection. This arrangement is supposed to give a linear 'S' scale.

Another amplified S-meter circuit is shown in Fig. 3. The bridge is made up from the two halves of a 12AU7 (ECC82) and this time it's the cathode voltage of the gain controlled stage which is used as an indicator of signal strength. Adjust R2 for zero deflection with no signal and R1 for full scale deflection when the anode of V1a is temporarily disconnected.

## Easiest To Add

Out of the three circuits, Fig. 1 is clearly the easiest to add to an existing receiver. The other two circuits, although giving better results, are more complex and need both heater and h.t. power.

If you're contemplating adding an S-meter to an a.c./d.c. set then go for Fig. 1. However, take note of this **Safety Warning:** Remember to take appropriate precautions when working on a set which doesn't have a double-wound h.t. transformer.

**While on the subject of a.c./d.c. sets, or any piece of valved equipment which does not use a double-wound h.t. transformer, I would strongly recommend that you use it with a mains isolating transformer.** When such sets were commonplace it was easy to remember that they could 'bite' and were (hopefully) treated accordingly. These days, the habits of the past are largely forgotten and it's all too easy to receive a nasty shock in an unguarded moment.

Having said that, there is a bit of a paradox here. We are told to fit earth leakage trips in our workshops to protect against the more serious effects of electric shock. But clearly, such trips cannot protect us while working on the secondary side of high voltage equipment that has a double wound h.t. transformer. Indeed, do earth leakage trips give a false sense of security when such equipment is being serviced?

Ironically, an earth leakage trip would seem to offer **some protection** when working on an a.c./d.c. set providing an isolating transformer is not used. I wonder what the experts think?

On that rather serious note, I'll say cheerio until it's my turn 'in the shop' again. Please send your comments and letters to me either via the *PW* offices, via E-mail to [phil@goldpark.demon.co.uk](mailto:phil@goldpark.demon.co.uk) or direct to: 21, Scotts Green Close, Scotts Green, Dudley, West Midlands DY1 2DX.

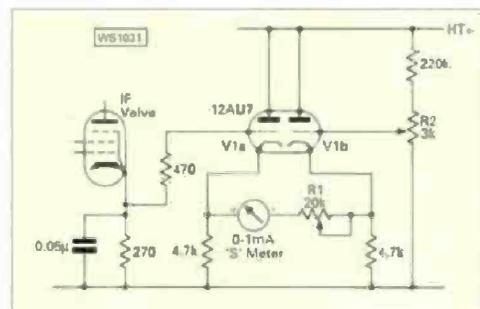


Fig. 3: An example of a bridge circuit form of S-meter using a double triode (see text).

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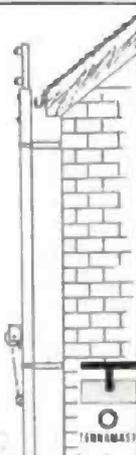
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Layout of 2 trap sloper

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Due to space limitations in this issue, Antennas-in-Action is somewhat shorter this month. So, I'll get on with it! In this issue you'll find some books for your library, an antenna for you to build for the 430MHz band, a dual-band Yagi antenna and one answer to a plea for help in a previous AiA. But let's start with the books that are on offer.

917EX

As many of you may be aware, I love books (and not just on radio and electronics - old medical books are, I find, particularly fascinating). A good library is a wonderful source of ideas when the dull dark days of winter are (still) upon us. One series of books that should be found in everyone's library is the *Antenna Compendium Volumes 1 - 5*. Published by the ARRL, I feel that they represent a splendid cornucopia of ideas for your next antenna, whether for h.f. or v.h.f./u.h.f. no matter what space you have available

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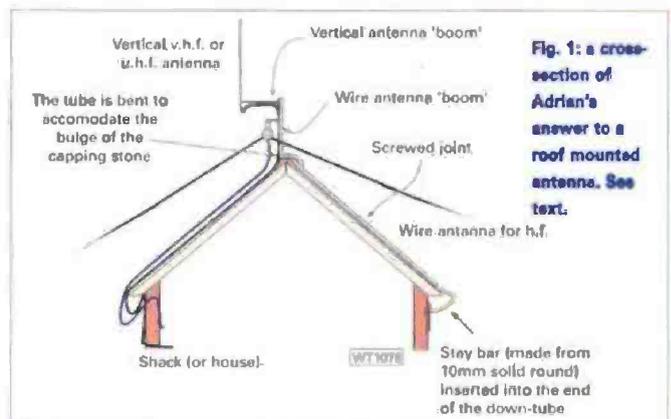


Fig. 1: a cross-section of Adrian's answer to a roof mounted antenna. See text.

### One Answer

I've had a letter from Adrian MOABY, in answer to a plea for help in finding a roof mounted

mast by Christophe Pierre F6IVT back in the November 1998 issue of A-i-A. Adrian says in his letter, that the subject of his sketches, and the 'rather poor photograph

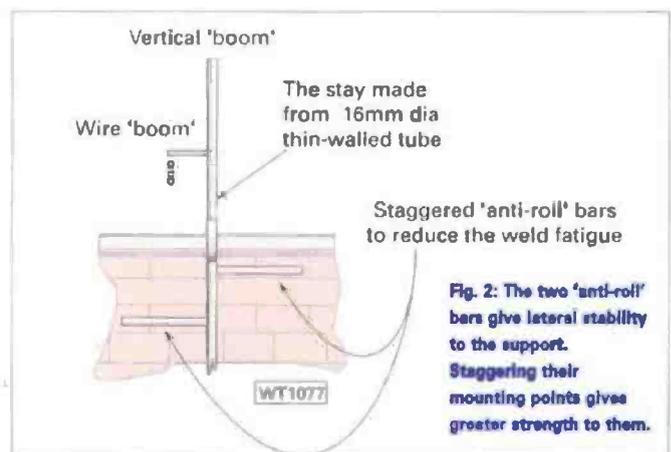
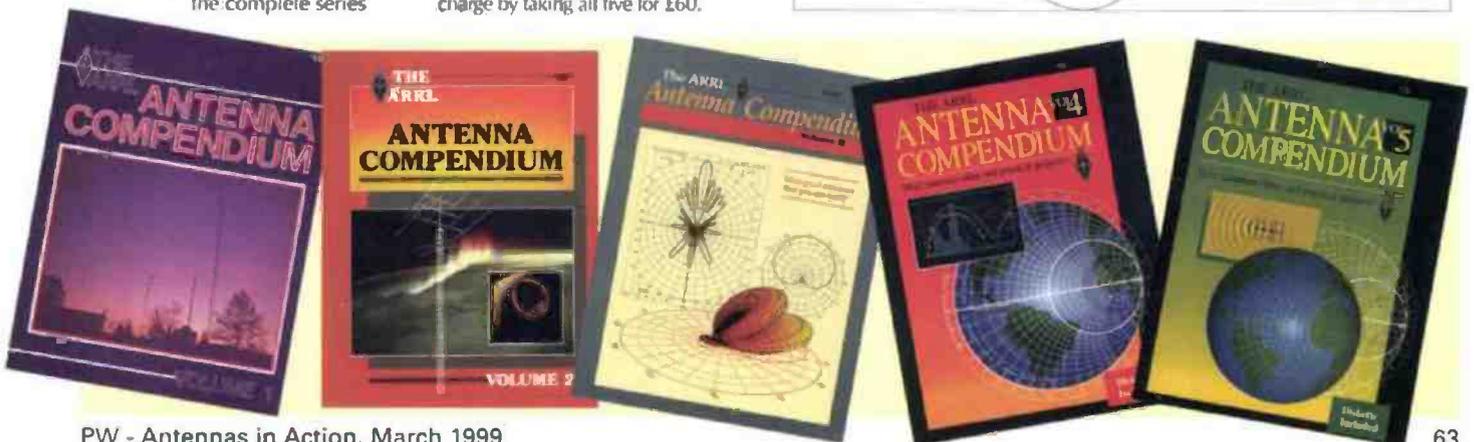


Fig. 2: The two 'anti-roll' bars give lateral stability to the support. Staggering their mounting points gives greater strength to them.



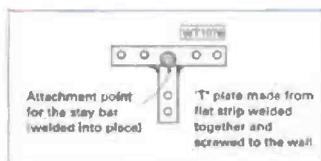


Fig. 3: The 'T' shaped stabilising plate, is made from plates welded together, is screwed to the wall of the building.

has now been on our roof for nearly three years and has remained stable in spite of some strong winds".

Adrian tells me that his solution to the roof mounting support "... was conceived by my wife Mavis GOXBC as a way to avoid getting up on the roof, as I have no head for heights. The whole contraption was pushed up from the top of a ladder at gutter height". Adrian also mentions that the actual support was made from 16mm metal conduit for electrical wiring, which is welded together.

The whole assembly, shown in the illustrations of Figs 1, 2 and 3, was given three coats of anti-corrosion paint and had Waxoyl sprayed over and inside it before it was put on the roof, where, in use, the coaxial cable for the v.h.f. antenna runs down the other side of the roof and combined with the h.f. wire antenna they both serve to give stability and to hold the unit in place.

Fig. 4: The full-sized 'Halo' for 430MHz was first described over 30 years ago by Eric G4AC.

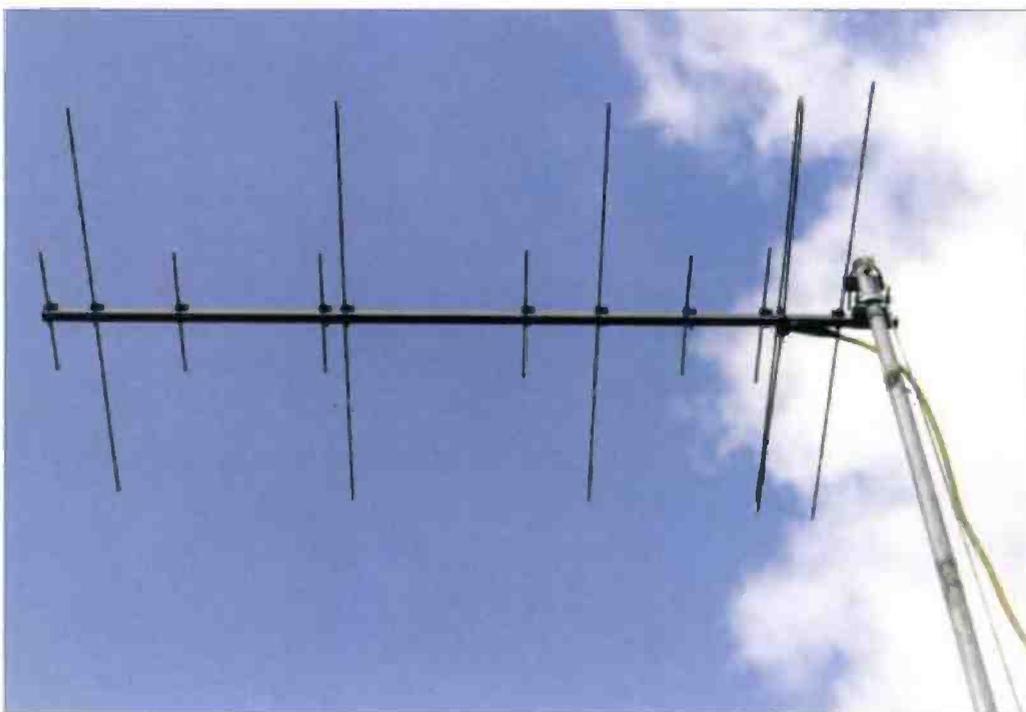
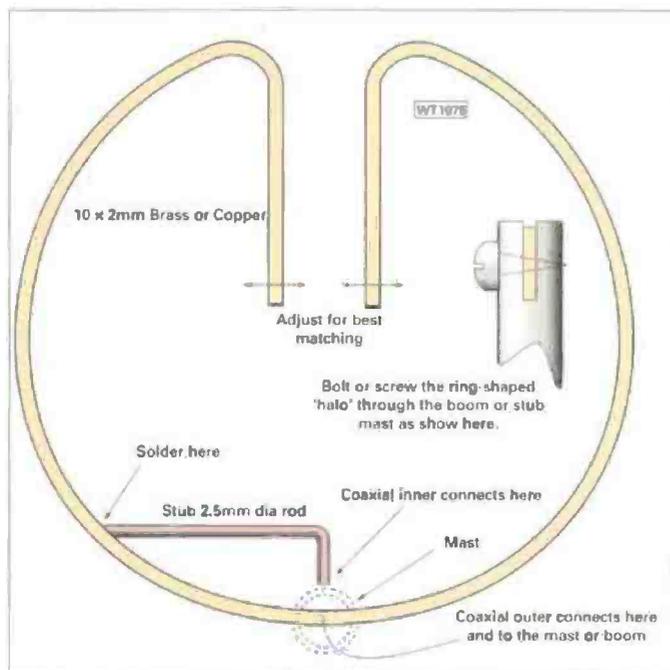


Fig. 5: The VUH1 dual-band antenna at the top of the mast.

I would imagine that if your location is, unlike Adrian's sheltered spot, especially windy, then an additional polypropylene rope running in parallel with the coaxial cable would give additional stability. Adrian went on to say that if Christophe is looking for support for a larger mast, then stronger tubing would be needed as well as a steel guy rope to help pull the unit up onto the ridge of the roof (and as a stabilising method).

Finally, Adrian said in his letter "if he (Christophe) lived near here, I could probably make something for him". Well with that offer on

hand - I wonder if Christophe will consider moving over here, to take up Adrian's offer?

### Higher Halo

I've had a letter, with a design of a 'Halo' antenna for the 430MHz band, from John G4BYV. In his letter John says that the design is one that came from Eric G4AC (sadly now a 'silent key') some 30 years ago! Eric's design uses a 305mm length (one foot in Eric's days) of brass curtain rail strip bent into the shape shown full size in Fig. 4.

John says in his letter "the brass strip he (Eric) used was a curtain rail in those days, I think copper water pipe used for oil heating would be OK. Eric ran the coaxial cable down the mast centre, bringing the inner conductor out to connect to the matching stub". As to how it works, John mentions that in his first CQ call, whilst on his way to the Ipswich rally, he was answered by a PA0 station who was using an IC-402 rig running only 3W. The report that John received was '5&9' in spite of the simplicity of the antenna.

Thanks for the simple idea John! I know at least one of my radio club's members who will want to have a go at that one.

### Unusual Antenna

I've had the opportunity to play with an unusual dual band Yagi antenna available from Chris Rees

G3TUX of the QRP Component Company. The VUH1 antenna although dual-band has only one driven element. The folded driven element is resonant on 144MHz band, but can cover the 430MHz band too, as parasitic elements are interleaved with those for v.h.f.

For the 144MHz band, the antenna acts as a five-element Yagi with a folded driven element. The spacing for the reflector is very short, whilst the spacing for the directors is very open as you will be able to see in the photograph of Fig. 5. I've shown the feedpoint in a little more detail in the photograph of Fig. 6, where (counting from the support mast) you see the simple director and the driven element.

In between the driven element and the first (144MHz) director are two parasitic elements forming part of the 430MHz beam. For the 430MHz band there's no short reflector, this function being taken over by the two 144MHz elements. I wouldn't like to quote how many elements it has for the 430MHz band, let me just say there are six short elements - and five long ones!

### Italian Made

When I came to assembling the Italian-made antenna, I had to do quite a bit of pre-planning as the

# antennas in action

original assembly instructions are somewhat spartan. In fact they're more diagrammatic than written. However, since importing the antennas Chris TUX, says that he's had time to prepare a rather more understandable set of instructions.

To assemble the antenna from the supplied items and the original instructions, needed a great deal of care on my behalf. Unlike the instructions however, the supplied components are good quality. Each of the actual elements themselves are made from solid aluminium rod with a 'pop-mark' showing the centre of each

Each mounting saddle is a well made two-part plastic component with a 'moulded-in' screw with wing nuts that made assembly onto the pre-drilled square section boom easier. There were only two element mountings that required the use of a spanner and these were the very closely mounted driven element support and the saddle for the 430MHz parasitic element. They really are mounted tightly spaced!

## One Niggle

I have only one niggle with the whole antenna. The mast

by the rearward fixing point could be minimised by adding a mounting section underneath the middle of the antenna. I think I shall try to make one something along the lines of the one shown on Fig. 7. The photograph of Fig. 7 shows the secondary boom from a 1.2GHz antenna that also acts as a strengthener for the two-section boom. But such an addition should allow a much better central support position to be achieved, with a reduced chance of bending my mast.

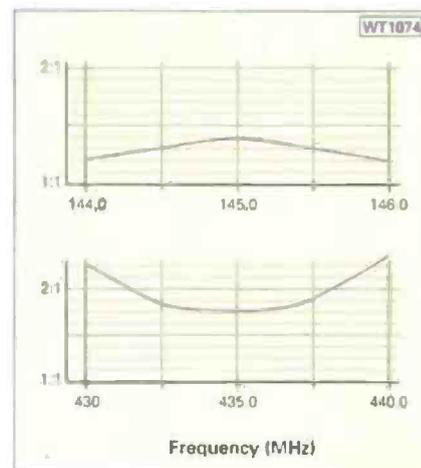


Fig. 8: The s.w.r. curves for both the 144 and 430MHz bands for the VUH1 antenna tested by G1TEX.



Fig. 6: More details of the feed-point and mounting arrangements for the VUH1 antenna.

element. The driven elements has a moulded on N-type socket, rather than the more usual SO-239 type, which combined with the solid metal elements, gives a feeling of quality to the whole antenna.

Fig. 7: An alternative support and bracer bar idea to be tried out on the VUH1 antenna, allowing a more central mounting point to be achieved.



mounting is behind the reflector element. Again this should be more visible in Fig. 6 and this position does make the antenna rather difficult to mount onto my telescopic mast. As the antenna's boom a just little under two metres long, my mast swayed somewhat alarmingly in the recent winds with quite a high torsional strain too when the antenna was sideways to the wind.

I've decided that one answer to the high torsional stress imparted

## In Use

A combination of workload and a lowered mast due to high winds, has meant that I've not had much chance to do much operating with the antenna, but overall my impressions of its operation are favourable. The antenna has a reasonable gain and fair front to back ratio on both bands. I checked the matching of the antenna on both v.h.f. and u.h.f. when I first put the antenna up and found them as shown in the two curves of Fig. 8.

After being out in the wind, rain and storms of the past couple of months, I thought I'd carry out the same tests again, to see how the s.w.r. had changed after 'weathering' for this time. To carry out these tests, I removed the antenna from the mast and mounted it about 2m above ground pointing straight up. I wanted to get the same conditions as I had when I made the original tests.

My initial tests gave the same readings on the 144MHz bands so, no change there, but on trying the 430MHz band the matching seemed to be very much worse. But the antenna was not at fault! In my haste to carry out the tests whilst it was still sunny (or at least reasonably dry), I'd picked up a different lead.

## Take Note

Now, please take note of my mistake! I'd assumed that a lead that I'd used before many times was still in good condition - and on 144MHz it was! But on the 430MHz bands one of the connectors was no longer in good electrical condition. It was causing a mismatch - which gave a very poor result overall. So, be warned - don't assume that leads are in good condition just because they look right. The connectors themselves may tell you down!

But after changing to another lead, I carried out the u.h.f. s.w.r. tests again and they were as before - a little on the high side for purists, but still capable of good results even in 'flat' conditions. My thanks go to Chris Rees G3TUX at the QRP Component Company, who supply the VUH1 dual-band antenna for £59.95. They may be contacted at: PO Box 88, Haslemere, Surrey GU27 2RF, or Tel: (01428) 661501, FAX: (01428) 661794.

Well, space has run out once more this month. I'll see you all again in the May 1999 issue of 'Antennas-in-Action'

**Tex**

# RADIO BASICS

This month Rob Mannion G3XFD describes the use of the 'Tinny Dipper' dip meter to help modify the 'Radio Basics' 3.5MHz converter to 7MHz. But to start off ... he takes time to answer some reader's queries.

It's always good to receive 'feedback' when we publish projects in PW and I was pleased to get some letters and telephone calls from readers regarding the 'Tinny Dipper' dip meter project. However, it seems that the majority of the enquiries result from a little misunderstanding regarding firstly the coil units for the 'dip' meter and secondly the method of providing the earthing centre tap point for some of the coils.

So, without further ado, I'll do my best to sort out any misunderstandings.

## Centre Tap Coils

Several readers called me to ask about the centre tap connection and earthing point immediately after the February issue of PW had been published. However, following their calls I realised ... that if these people had been confused it meant there were

others who needed help. So, here we go!

I adopted the centre tap coils to ensure the oscillator was as free running as possible, one that would give plenty of current flowing through the indicating meter at lower

frequencies. This meant that a centre tap earthing point had to be provided, by extending a fixing bolt (the bolt which the crocodile clip is attached to in the heading photograph in January's issue).

The bolt was then 'grounded' to the p.c.b. 'chassis' by soldering it. This will take a little heat but if you carefully clean (using a file or fine sandpaper) the bolt it will take the solder providing of course it's brass (preferable) or steel.

In use, the centre tap 'flying lead' complete with crocodile clip attaches to the bolt. The centre tap connection is soldered to the end of the flying lead and the joint is then held down and attached to one right-angled corner of the cruciform coil former by the rapid setting epoxy resin adhesive. (I used 'Rapid' Araldite).

## Coil Formers

Several readers also asked me about the second (shorter) section of synthetic resin paper board (SRPB) material used on the cruciform coil formers. They were

wondering whether or not all the copper cladding had to be etched away. In short the answer is yes!

All the copper is removed on the shorter section. The only copper remaining should be that on the longer section which forms the coil connection p.c.b. 'tracks'.

Incidentally, one reader said that he'd used the copper cladding on the shorter section to etch reference letters for his coils. He also added very short p.c.b. 'tracks' to anchor the centre tap flying lead. (I did the same myself but in

everybody, and I hope I've cleared up any problems. Thanks also for the photographs of your own completed projects - including one that arrived at my home in the shape of a QSL card!

## Calibrating The Dipper

Before we get busy using the 'Tinny Dipper' in earnest, I should perhaps give some further guidance on roughly calibrating your version of the project. And although a digital frequency

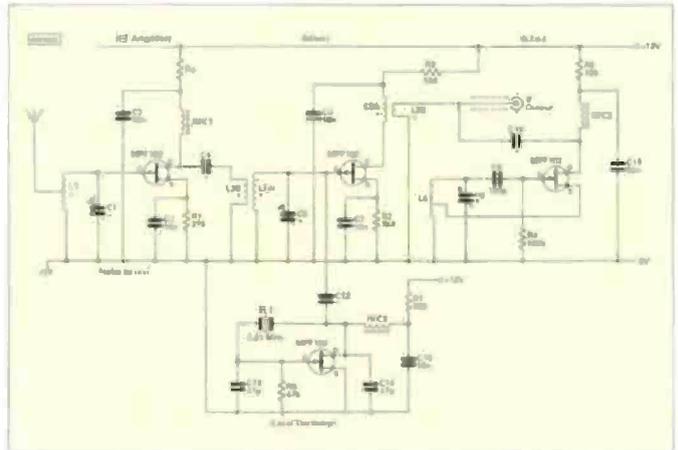


Fig. 1: Circuit of the original 3.5MHz to medium converter unit. For use on 7MHz the oscillator crystal has to be replaced (see text) and L1 and L2B have to be returned. See text for detailed instructions.

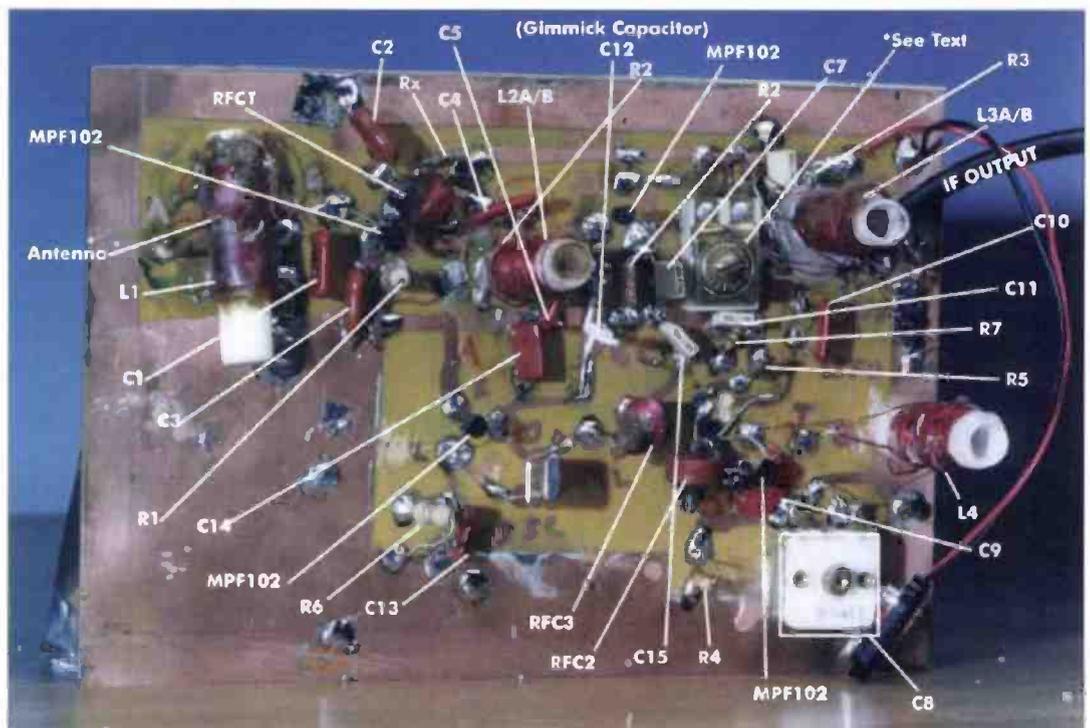
the long run thought it could make the coil fabrication more complicated than necessary, but you can see my soldered 'track' points in use on several of the coils.

So, thanks for all your letters

counter will be very useful ... a modern 'all wave' general coverage receiver will do nicely!

Before you start 'calibrating' (it's only a 'rough & ready' technique but perfectly suitable for our purposes) you must be

Fig. 2: Annotated photograph of original converter unit. The coils, L1 and L2A and B can be replaced with smaller inductors (to advantage) with the help of the 'Tinny Dipper' dip meter project (see text). The crystal (4.43MHz) to be replaced by the recommended 8MHz crystal is located between C13 and RFC3 (see text).



aware of several drawbacks using receiver technique. The most important is that it's all too easy to calibrate on the wrong signal that's received on your radio as you tune the dipper and the receiver across the bands. So, be warned - you'll save a lot of trouble if you are aware of the possibilities!

To avoid problems try and use a modern general coverage receiver **with the highest intermediate frequency possible**. By doing so you'll reduce the ever present problem of 'image frequencies' and plain old fashioned 'breakthrough'.

To see what I mean, I suggest you place your 'Tinny Dipper' (or any dip-meter for that matter) alongside an ordinary medium wave receiver, leave the set tuned to a fairly strong station in the middle of the medium wave band (try 300 metres or around 1MHz/1000kHz). Now tune your dipper (with the medium wave coil in place (Coil No. 4 if you followed my detailed instructions) over its complete tuning range.

What did you notice? Not just one 'swish' and beat note ('heterodyne') as you tuned over the frequency - but many. In fact, you're likely to hear so many the receiver will seem to really 'pop' with signals. Try it and see!

If you're forced to 'calibrate' your dipper using a simpler receiver (the problem outlined virtually disappears with modern receivers using i.f.s of 40MHz and over and this includes sets like Roberts, Sangean, Grundig, etc.) there's only one way to do it - and that's by carefully starting at the **lowest frequency of each dipper coil's range** and working your way up in frequency. In this way you're very unlikely to suddenly lose track of the 'wanted' signal from your dipper and discover an 'image' or other problem.

Start with long wave, tune the receiver to BBC Radio 4 and tune the dipper across the frequency (198kHz). When you're satisfied you have got the right signal (and not an image) mark your calibration dial/notebook (a good idea this, as you can record the frequency/tuning reference number on the dipper dial for each coil). Then continue the process for all your coils. If you take care and listen for the strongest signal you should be okay and you will eventually learn to differentiate between the really strong 'true' signal and unwanted 'image' and breakthrough signals.

It will take time - I spent nearly 40 hours calibrating coils on the 'Tinny Dipper' using a simple receiver (plus my Alinc

DX-70, with its 69MHz first i.f. and a frequency meter to double check) to ensure readers could duplicate my results. But it is worth it in the end!

So, when you've completed the calibration of the full range of coils or the selection you've opted for (although again **I very strongly recommend** you make the complete range) you're ready to modify the 'Radio Basics' 3.5MHz to medium converter to work on 7MHz.

## Changing Frequency

Changing the frequency of the converter we built last year (full details, including circuit, component lay-out, f.e.t. pin-out and p.c.b. design were presented on pages 14 and 15 in the November 1998 *PW*) to work on 7MHz ('Forty Metres') is very simple and the same tuning system is used.

The only difference is that instead of using a 4.43MHz crystal to generate a 'difference' signal between it and the incoming 3.5MHz signals, we're going to 'mix' the incoming 7MHz signals with a 'local oscillator' signal of 8MHz - thus producing a 'difference' signal of 1MHz which we can then tune into on a medium wave receiver (preferably a shielded input receiver such as a car radio).

The output signal we're to tune is very conveniently slap bang in the middle of the medium wave again, as in the original project. However, to modify the project we've got to make the changes but fortunately they're not at all difficult.

## The Changes

The changes involve the new oscillator frequency (the 8MHz crystal as already mentioned) plus altering the tuned circuits so that they resonate where we need them. So, the first job is to get the local oscillator on frequency.

The diagram, Fig. 1, shows the circuit for the original project, the only difference is that you have to change the original crystal (visible to the left of RFC3) for the 8MHz version (see end panel for supplier information) and that the r.f. amplifier coil, L1, and the L2A coil have to be wound for the new frequency. Nothing else has to be changed because the converter's output is basically on the same frequencies.

Using the standard paper coil former and 100pF fixed capacitor I suggest that you wind 30 turns of around 28s.w.g. enamelled copper wire to form the coil. Then, with the appropriate coil in place (Coil

No. 7 in my series) we'll aim to get the best and 'deepest' dip possible on 7MHz.

## Best Results

Generally speaking, the deeper the 'dip' (as indicated on the meter on the instrument) the better the 'Q' (approximating to 'Quality') the coil will be. To enable the coil and the dip meter's coil to be 'coupled' to best advantage you should experiment by placing them almost side-by-side (but not touching if you can avoid it) and adjust the tuning until you get the deepest 'dip' on the meter. This indicates when the circuit under investigation is absorbing oscillatory (r.f.) energy from the dip-meter.

Next, you should check where the dip-meter is actually tuned to by either listening for the signal on an accompanying receiver, or by checking your calibration notes. If it's too low (let's say 6.5MHz) you should remove one or two turns. If too high (let's say 7.5MHz) just add one or two turns.

The r.f. stage coupling winding (L2B) can stay at the same ratio as described in the November *PW*, but you can if you wish experiment with L1 (in the original I suggested a centre tap antenna coupling) by providing a suitable antenna coupling similar in fashion to L2B. The choice is yours!

Another choice, now that you have a method of finding where your home wound coils tune to, is to replace the fixed value 100pF tuning capacitors across L1 and L2A with variable 'trimmer' capacitors. In fact I've prepared the way here because in the original circuit drawing both C1 and C5 are shown as trimmer types and marked with an asterisk and referred to in the text as either fixed or variable.

If you do opt for trying a variable capacitors for C1 and C5 be prepared to use your dipper to locate where they resonate. You might be surprised how far off frequency they can be! However, it's very useful experience indeed and you'll have the advantage of knowing that the circuit will be 'peaked and tweaked' on frequency to your satisfaction and best interests.

Incidentally, now that you have access to a dip meter you will be able to experiment with different forms of coils and formers. Now that it's relatively easy to find just where a coil and capacitor combination tune to, it's also possible to experiment to find the best possible combinations of coil former, former sizes, wire gauge size and using adjustable dust-

cored coils.

It's a truly fascinating area and backed up by practical experience you will (I have no doubt) then be encouraged to work with the host of published mathematics on the subject to achieve the best results possible. You can have fun and learn at the same time!

## Local Oscillator Choice

Although I've recommended an 8MHz crystal to provide the necessary 1MHz i.f. output, there are other choices. But by choosing the 8MHz local oscillator frequency the output of the converter will be **tuned down in frequency** from 1MHz in the same fashion as the original required when it was working on 3.5MHz.

However, as many surplus 6MHz crystal are around in junk boxes and at rallies you may end up using one instead of the suggested (8MHz) crystals. If you do, there's no need to alter anything in the modification process already mentioned, but you must remember that because the 6MHz local oscillator is below the 7MHz input, the **final output on medium wave has to be tuned upwards** in frequency from 1MHz on the car radio. In other words the tuning is reversed compared to the original project.

In rounding off this month's 'Radio Basics', transmitting amateurs who read the column may be interested to know that I'm incorporating the 7MHz converter idea into a transmitter-receiver project for portable/mobile use. The project is being built into an older car radio by removing a cassette player. This leaves room for the converter unit and the necessary transmitter (around 5W) is v.f.o. controlled from the front panel, b.f.o. style. The v.f.o. also acts as the b.f.o.!

Hopefully I'll end up with a useful transmitter-receiver that looks like a car radio. Portable, easy to use and to replace and **useless to any opportunistic villain!** I'll keep you posted on how it progresses.

Cheerio for now!

## Component Source

A suitable 8MHz crystal for the modified converter project is available for 90p plus 25p p&p from **Robin Sykes G3NFV of Sycam Components at 16 The Ridgeway, Fetcham, Leatherhead, Surrey KT22 9AZ. Tel: (01372) 372587, FAX (01372) 361421** (callers by appointment only). Robin can also provide selections of coil formers and inductor cores suitable for experiments and welcomes enquiries (office hours please, answering machine at other times).

This month, the Practical Wireless editorial team have arranged a gathering of Crystal Set Society Books for you to cast your enthusiastic eyes over. We have it on good authority, 'crystal' addicts, that these books will be a vital addition to your shack or bookshelf. There's also the added bonus for this month only, that if you order three or more, we will pay the postage (UK only). Now there's an offer you can't refuse!

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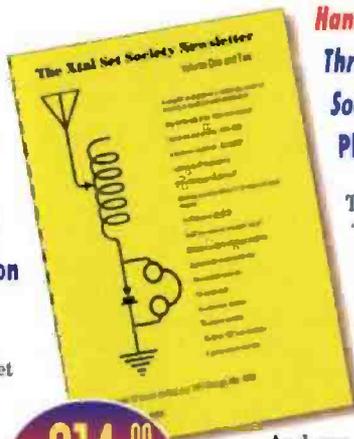
# Book PROFILES

Crystal sets and their simplicity fascinate a lot of Radio enthusiasts - and in our quest to satisfy every single one of you, we have bought together some of the best books on the subject which are all available from the PW Book Store. From these books you will discover that there is a lot to be said about the simplest receiver!

Sets, 'The Universal Crystal Set', 'The Electrolytic Detector', 'The Miller 595 Tuner Revisited' and 'A Galena Detector From Italy'.

This spiral-bound, photocopied style collection is in a very approachable style and its clear explanations and diagrams make this a helpful reference source. **Recommended.**

**The Xtal Set Society Newsletter (Volumes One & Two)**  
Phil Anderson WOXI



£14.00

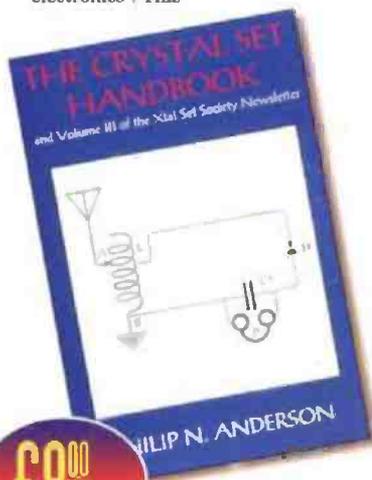
The Crystal Set Society was founded in 1991 and Phil Anderson, author of this newsletter, states in the beginning that they are dedicated to "... once again building and experimenting with radio electronics, often with the crystal set, the basis for much radio apparatus".

In the preface to this edition, Rebecca Hewes (the Editor) claims that this newsletter is "packed" full of projects and information about crystal radios and other "simple" radio circuits. Being a collection of six of the society's newsletters dating from July 1992 to May 1993, you can imagine the diversity of the content. The various newsletters cover topics such as the 'Lead Pencil Detector', 'Double-tuned Circuit Crystal

**The Crystal Set Handbook (Volume Three of the Xtal Set Society Newsletter)**  
Phil Anderson WOXI

This book claims to be "... dedicated to the thousands of crystal set enthusiasts who have built and experimented since Marconi's time". The author of this book, Phil

Anderson, says "When you grasp the rules-of-thumb and concepts that the crystal set can teach, you obtain a good foundation in modern radio electronics". This



£8.00

statement really lies at the heart of this book, claiming to be written for crystal set enthusiasts, first-time radio experimenters, electronics students and Radio Amateurs it covers design, building and experimentation.

With chapters covering subjects such as 'Who Invented Crystal Radio?', 'The Simplest Crystal Set', 'A Simple Shortwave Crystal Set', 'Coil Q and Coil Capacitance', 'Detector Loading', 'Matching Antennas And Detector' plus many more, this volume of the *Crystal Set Society Newsletter* carries on in the same format as the first, with the exception that this volume is in book form and is fully bound unlike the first which was only spiral-bound.

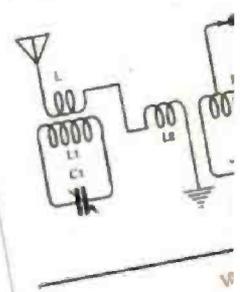
A good reference source and history lesson this book, at a mere £8, comes **Recommended.**

**The Xtal Set Society Newsletter (Volume Four)**  
Phil Anderson

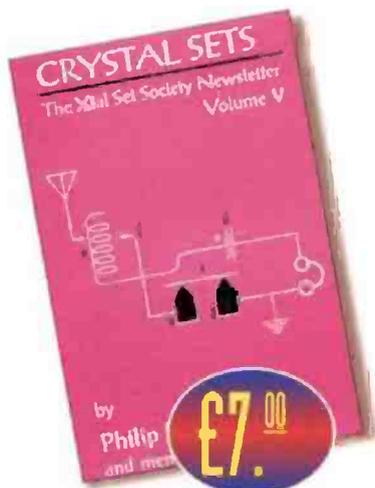
This book follows the same formula as the other two previous volumes. It contains six issues of the *Crystal Set Society Newsletters*. In this case, topics cover "... hints on measuring coil capacitance, two building projects using Quaker oats boxes, information on home-brew headphones and curve tracers, a discussion on how crystal earphones work and a description and review of ten basic crystal sets".

Again, this volume is properly bound with clear diagrams and good further references. Slightly smaller than the last two, it nevertheless has a lot of information packed in. At only £7, this book is also **Recommended.**

**The Xtal Set Society Newsletter**



£7.00



**Crystal Sets: The Xtal Set Society Newsletter (Volume Five)**

**Phil Anderson and members**

Although they seem to get smaller as the volumes go along, there is no doubt still a lot of information in this little 88 page book. In this case, the newsletters included are dated from January to November 1995. They cover various crystal set topics such as: 'The Design Of Unpowered AM Receivers (Parts 1-3)'; 'Radio Outfit In A Headset'; 'Marconi Type 107 - A Tuner' and a 'Grounded Loopstick Tuner'.

Strangely, the chapter headed: 'Radio Outfit In A Headset' was an article which **Phil Anderson** discovered whilst digging through the periodical guide at his local library dated October 1925. It turned out to be a crystal set which perches neatly on the head - definitely worth a read!

Although small, if you are interested in crystal sets, this would make a fascinating addition to a growing crystal set library. **Recommended.**

**Crystal Set Building And More**

**(Volume Six and Seven)**

**Various Authors**

With various contributions from different authors, this volume of the *Crystal Set Society Newsletter* has a

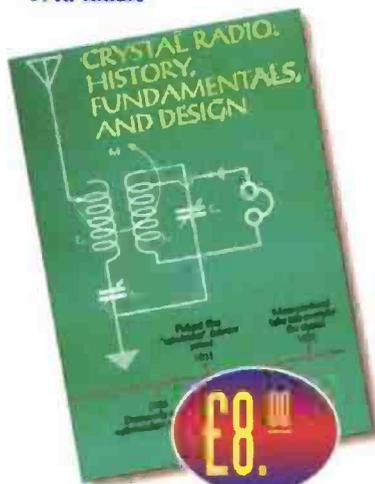


number of varying topics. Some of them follow the same sort of line as Rob Mannion G3XFD's beginners series 'Radio Basics', for example, 'A Crystal Headphone From A Cat Food Can'. In this newsletter, **William E. Simes** states: "The instructions that follow are intended to demonstrate just how simple building a functional high-impedance crystal headphone can be ...". He goes on to describe how he uses a cat food can for this project.

Once again, another interesting book from the Crystal Set Society with the emphasis this time on the building of crystal sets. If you are interested in building a crystal set yourself, this book would be a useful starting point. **Recommended.**

**Crystal Radio: History, Fundamentals And Design**

**P. A. Kinzie**



This book claims to chronicle the "fascinating history and development of the crystal detector, including the reasons for its brief dominance of the radio market after the turn of the century".

**P. A. Kinzie** states that "Radio fundamentals such as antennas, ground lightning protection, tuned circuits and detection are covered for the beginner. The unending compromise between selectivity and sensitivity is

**N**ow that Christmas and the New Year are well and truly over and we are getting closer to the ever present Year 2000, let the Editorial Team at *Practical Wireless* take your mind off those New Year blues by giving you something else to think about - **CRYSTAL SETS!**

discussed for the crystal set designer. Advanced topics such as the use of multi-tuned circuits and wave traps follow for the more experienced experimenter". Basically, the author claims that there is something in this book for everyone.

Beginning with 'The History of the Crystal Set', the book moves through the 'Fundamentals of Receiver Systems' to 'Crystal Set Design' and 'Crystals for Detectors'. With an informal style and clear diagrams, this book comes **Highly Recommended.**

**Crystal Set Projects: 15 Radio Projects You Can Build.**

**Various Authors**

This book is a collection of radio projects designed by members of the Crystal Set Society. With such projects as: 'Low Budget Xtal Set'; 'A Loop Antenna Crystal Set'; 'Benjamin and David Goldenberg's Very-Fine Old-Time Crystal Radio'; 'Build A Matchbox Crystal Radio'; 'A Krystal Kludge' and many more.

The book came about because members of the Crystal Set Society were looking for more crystal set designs and the Editor set them a challenge to design some of their own. The result was, apparently, more designs than they could use. An interesting piece of reading. **Recommended.**



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KENWOOD TS-680S	HF + 6 .....	£479
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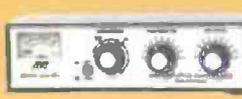


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**Radio Shack DX-493** h.f. receiver, only three months old, boxed, unwanted gift, £75. Or swap for MFJ h.f. 6m (50MHz) a.t.u. or antenna rotor. Tel: Brian M1BTP (0850) 631036 or E-mail: m1btp@aol.com

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a.m./s.b., mint condition, £250. Sony 2001, v.g.c., a.m./s.b., £50. AOR-7030, excellent radio, mint condition, boxed, £450. Racal 17 MkII, first class condition, £100. Tel: West London 0181-813 9193.

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**Toko 50MHz linear amplifier** with built-in pre-amplifier, 1-15W input, 8-65W output, 12V, s.s.b. and f.m. excellent condition, boxed, £60, plus P&P. Type HL366V. Tel: Brian GWOGHE, QTHR (01222) 703429.

**Trio R1000 communications receiver**, a.m./u.s.b./l.s.b./c.w., two clocks noise blanker, attenuator, with manuals, box, good condition, only £140. Tel: Frank (01608) 662488.

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**TS-430S transceiver** h.f. and manual Manson p.s.u., EP-925, 25-30A, all as new and boxed, £450 the lot. Tel: (01246) 236496.

**TS-850S**, v.g.c., manual, boxed, £650. multi-mode transverter, 10-2m (28-144MHz), £40. Tel: Barry GOONH on Halesowen, West Midlands 0121-559 9734.

**TS-870** h.f. d.s.p. transceiver, hardly used, boxed, as new, £1350. FT-8500 2m/70cm (144/430MHz) transceiver, never used, mobile, £210. Icom T-7E hand-held, 2m/70cm speaker, microphone and case, £140. All v.g.c. Tel: Terry G4OXD (01462) 435248, after 6pm.

**Two Cushcraft vertical antennas**, one APA eight band, £125. One HV5 five band, £100.

Also have one radial kit for either antenna, £25. All in good order, no time wasters. Tel: Mr Barry Mawn G0BKD QTHR 0181-646 3422 or (0973) 687712.

**Two ZX Spectrums**, small raft of software, £20, the pair. Spectrum Plus two, Wafadrive with spare wafers, manuals, p.s.u., software, clean, good condition, computer functionally tested, £40. Buzzer, signal training, g.w.o., clean with data plate, believed 40's, unwired, £20. All monies to local Nautical Training Corps Unit - youth charity. Tel: Peter G4LEG (01293) 437814, after 6pm.

**Valves for sale**, many different types; audio; vintage, etc., all tested and at reasonable prices, swaps available and new, boxed valves wanted. Tel: Dave (07957) 935907, FAX: (01606) 871082.

**W91NN 80-10m (3.5-28MHz)** dipole with all instructions, only used four months, £90 o.n.o. MFJ artificial ground, £35. MFJ-1284B d.s.p., as new, £130. Wanted: 3kV a.t.u. Tel: Dave (01226) 792421.

**Westover free-standing heavy duty**, 23m, four section, till over telescopic mast with rule, electronic winch rotator, three band, h.f., 4-ele JEMOUAD?? plus 2m (144MHz) array, good condition, buyer collects, £950. Tel: Mike (01285) 841221, evenings only.

**WS No. 19** p.s.u., r.f. amplifier, variometer and all connecting leads, headphones, etc., switch missing from r.f. amplifier, £200 o.n.o. Also, Polyskop 400MHz with manual and leads, £150 o.n.o. Tel: 0181-384 9199, evenings only.

**Yaesu FL/FR DX400** transceiver and receiver, fitted 144MHz and 50MHz receive converter, also Yaesu speaker, need space so £200, o.n.o., could possibly deliver (50 mile radius). Tel: John G6YDN on Buxton (01298) 812172.

**Yaesu FRG-7700** g.c. receiver, excellent condition, £160. Racal

TRA 931X Syncal 30, 1.6-30MHz, 5/20W, u.s.b./l.s.b., a.m. voice c.w., c.w./microphones antenna, etc., v.g.c., £355. TA-940B, 100W h.f. amplifier, £175. (01202) 668446.

**Yaesu FT-101EE** h.f. 1.8/30MHz with 10/18/24MHz. Yaesu FT-902 h.f. 1.8-30MHz. Yaesu FT-480R 144/430MHz multi-mode, the lot for £575. Tel: (01302) 859451.

**Yaesu FT-101Z transceiver**, WARC fan, speaker, boxed, manuals, all cables, very good order, £200. Tel: John G3LNK on Stoke-on-Trent (01782) 618410.

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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: david.j.butler@bt.com

Packet Radio @ GB7MAD

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THIS MONTH DAVID BUTLER  
G4ASR CONTINUES WITH THE  
SECOND PART OF HIS REPORT  
ABOUT THE RECENT LEONIDS  
METEOR SHOWER.

Last time around, I reported about the tremendous activity on the 144MHz band during the Leonids meteor shower which took place between 2300UTC on November 16 to 1200UTC on November 17 1998. Regrettably there wasn't enough space in the column to include the multitude of reports received from stations in 20 countries outside of the UK. So, this time I'm going to take a brief look at what happened in the rest of Europe, South Africa, North America and also provide details of what occurred on the 50MHz and 430MHz bands.

But first a very quick re-cap of what I had previously reported. In a nut-shell, the 144MHz band experienced intermittent conditions very similar to Sporadic-E (Sp-E). Sp-E propagation, though, is very geographically selective. Normally, on the 144MHz band, the path may be restricted to one or two countries or perhaps just one locator square in a particular region. Then, you hope that the Sp-E cloud will move or form elsewhere to give propagation into different areas,

The ionisation produced by the Leonid meteor trails was very intense, covering all of Europe (and other parts of the world of course). Last time I said it was possible to work stations via forward scatter, back-scatter and side-scatter. However, on reflection (!) I realise I didn't give a full explanation of this.

Normally, if you want to contact a station via meteor scatter (m.s.) you beam towards that station. (Theoretically both stations should beam slightly one side or the other from the great-circle heading, perhaps up to 15°. However, the beamwidth of most small Yagis probably makes this

mechanism for both of these is exactly the same).

Back-scatter is also observed during other propagation modes. The most common of these is auroral back-scatter but it may also be detected during other periods of high ionisation such as Sp-E or F2-layer openings. As I've just explained, stations were being worked during the Leonids meteor shower via all sorts of scatter paths on the 144MHz band. Operators in the UK reported, for example, working into North Africa (EA9) whilst beaming towards Scandinavia and others working into Portugal (CT) whilst beaming towards eastern Europe.



Fig. 1: Diagram illustrating one station transmitting towards the station being contacted via m.s. - forward scatter. (See text).

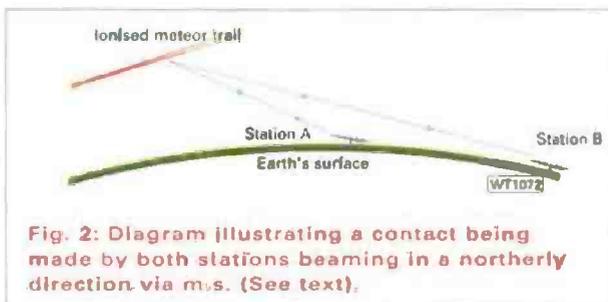


Fig. 2: Diagram illustrating a contact being made by both stations beaming in a northerly direction via m.s. (See text).

unnecessary). When beaming and transmitting towards the other station you are contacting them via forward-scatter as shown in Fig. 1. However, it is possible on m.s. to contact the same station on completely different beam-headings, as shown in Fig. 2. This example depicts a contact being made by both stations beaming in a northerly direction. (In my opinion there is no real distinction between side-scatter and back-scatter as the

Of course, if you beamed in the correct direction then signals were very strong and because of this, most traffic was carried out using s.s.b. rather than c.w. Signal reports of 59 were being exchanged with stations up to 2000km away and many UK stations worked over 20 countries that night.

### REPORTS RECEIVED

Before taking a look at results outside of the UK, there are a

handful of 144MHz band reports that I've recently received. First up is Peter Blair G3LTF (IO91) who may be more well known to you for his pioneering moon bounce (e.m.e.) work.

Peter mentions, however, that he first started his meteor scatter work well over 30 years ago in 1961. He carried out m.s. tests with the stations of SM3AKW and ZS6AXT (then living in Czechoslovakia) and used the mode regularly until 1987. Peter reports that conditions during the Leonids shower was like nothing he has ever experienced before, more like Sp-E than meteor scatter. Peter typified this, for example, by contacting four stations during one meteor burst.

Another station to liken the opening to that of Sp-E was Tom Astbury GM0GMD (IO86). He started listening to the 144MHz band from midnight and alternated between working the DX and going outside to see the visual display. Described by Tom as "shooting stars every minute and larger fireballs trailing right across the sky". Incidentally, at my QTH (IO81) around 0425UTC I saw a fireball which lit up the side of the cottage. I've never seen a meteor casting shadows before. I just wonder what I would have seen if I had been outside all night instead of playing radio. It was really amazing!

Between 0010-0350UTC, Tom worked 20 stations, spending much time looking for new squares or stations not contacted previously. His tally included CT1FAK, LY2WR, S51AT, 9A1CAL, 9A1CCY, 9A3PA and other stations in DL, EA, F, HB9, I, OK and SP. After a few hours sleep Tom came back onto the band at 0700UTC for another session. A total of 15 stations were worked during the morning of November 17 including HA1DLZ, HABUG, OK2DL, 9A2RD and further stations in DL, EA, F, HA, I, OK, S5 and 9A.

Later that night, Tom stayed up looking for more action but nothing was worked apart from the station of S57TW at 0104UTC on November 18. He mentions that he is looking forward to the repeat event in November when m.s. conditions may be just as good. (Or better, or worse - who can tell?).

David Anderson GM4JII (IO86) is also looking forward to the shower and has already planned to take two days off

DAVID BUTLER FINALISES HIS REPORT ON METEOR SCATTER FOLLOWING THE MAJOR EVENT DISCUSSED LAST MONTH.

# RadioScene

work. He reports that the Leonids shower last November was the most amazing meteor activity that he had ever heard. Everyone was 59 and although he was only active for about one hour he made 15 s.s.b. contacts in ten countries, EA, EVV, HA, HB9, I, LY, OK, SP, S51 and 9A.

The meteor shower was so good that some stations just stumbled across the opening and didn't even realise what was going on. This is one side of a conversation that I heard between two operators in the West Midlands: "Cyril - I just opened the bedroom curtains, saw it was foggy and thought that Two Metres would be good today and blow me down, the tropo lift was so good I've just worked a station in Croatia".

**Jim Smith G00FE** (IO90) reports that he discovered the shower when he got up at 0630UTC on November 17. Despite the early morning light he saw half a dozen bright visual meteors in less than a minute and then realised that he should really be on the radio!

Running an Icom IC-746, 100W and a 12-element ZL Special beam, he worked 12MOV, LY2WR, SP2FAX, SP4MPB, S57TW, 9A1CAL and 9A3PA. Gotaways included HABUG and LY1DQ. Unfortunately, Jim could only be active for one hour (he couldn't get leave that day) and wished he had the foresight to get up earlier. Never mind Jim - just remember to book Wednesday 17 November off later this year.

"Where are all the reports for the 50MHz band"? I hear you ask. Strangely, I only received one report for the so-called 'Magic Band'. Perhaps it's not so magic after all. The station of **Gary Hyde G7LXX** (IO93) was active on the 50MHz band from 0830UTC on November 17 so he may have missed the best of the event. However, he did make 70 contacts with stations in DL, ES, F, G, GM, GU, GW, HB9, I, LA, OE, OK, ON, OZ, PA, SM, SP, S5 and 9A so obviously there was a fair bit of activity on the band. During the morning he briefly moved up to the

144MHz band making s.s.b. contacts with stations in DL, I, OH, SP and S5.

## EUROPEAN ACTIVITY

I received details from 53 stations regarding activity on the 144MHz band in the rest of Europe and here are a few snippets of the more interesting observations. At the station of **DDOVF** (JO61) some very long bursts of signals were received. Steffen heard OH7PI with signals ranging between 559 to 599 for ten minutes and HABUG at a steady 55 for a 15 minute period. Best of all, though, was the station of SV1OE who Steffen copied for 30 minutes with signals ranging between 51 to 59.

**Georges F8OP** (JN26) mentions that in 25 years of m.s. work he has never heard such long and very strong bursts on the 144MHz band. It was really 'fantastique'! Running 500W into a 17-element Cushcraft Yagi, he often found it difficult to pull callsigns out of the pile-up after calling CQ.

Georges was active between 0400-1100UTC and worked 52 stations in 22 countries. His best contacts included EA9MH, OH5LK, 9H1CG and UT8AL (KO61) for his best DX at 2163km. This contact, incidentally, being made on slow speed c.w. He observed that the shower stopped very quickly after 1130UTC and that nothing was heard in the afternoon or evening.

During the following night, November 18 between 0300-0800UTC, nothing was heard at all and only five short bursts were received the following morning between 0830-1100UTC. During one of these bursts, at 0831UTC, when Georges was in a local QSO with F6BSJ and F6DO, the station of YU7MS (KN05) broke in. At the time, F8OP was using a bare-foot Yaesu FT-225RD running only 20W. The s.s.b. contact was quickly completed, 59 both ways before the stations of F6BSJ and F6DO also completed with the Yugoslav station.

Also getting good results from using low power was the

station of **Alejandro Pitarch EA5EZJ** (IM98). He was running 10W from an Icom IC-706 transceiver into a 17-element Yagi. He made 21 s.s.b. contacts with stations in DL, F, HB9, I, OE, ON, SP, S5 and 9A. His best DX contacts included 9A1CAL at 1581km, 9A1CCY at 1605km and an excellent contact with SP2OFW (JO93) over a path of 2100km.

The station of **RV3AH** (KO85) just pipped this distance working HB9FAP (JN47) for a 2150km contact. Eduard was running 50W from a Yaesu FT-847 transceiver into a 17-element F9FT Yagi.

**Wolfgang DL5MAE** (JN58) is normally to be found running e.m.e. tests with a large antenna array. During the Leonids shower, this system was not available and he had to use a small station running only 30W into a single 17-element F9FT Yagi. In a one hour period from 0530UTC, he contacted a total of 14 s.s.b. stations. But the best was yet to come.

Driving in to work, with a Yaesu FT-290R transceiver, a 20W amplifier and a simple vertical mobile whip, Wolfgang listened to the activity on 144.200MHz. Many reflections were heard from European stations especially from F/G8MBI (JN04) who was putting in some very strong bursts of signal. Wolfgang answered one of his CQ calls and was rewarded with his first mobile m.s. contact! Signals 59 both ways! He asks if anyone else has made a genuine mobile contact (not from a parked car) via meteor scatter on the 144MHz band.

Interestingly, the station of **Zoli HG1DLZ** (JN87) reported working F5MGD/M at 1216UTC on November 17 but I don't have any details of the French mobile station. Zoli was running 200W into an antenna array of eight 13-element DL6WU Yagis. Obviously with this system he had a great deal of success and between 0610-1243UTC he contacted 91 stations in 20 countries.

One of the more interesting QSOs was a back-scatter contact with 9H1CG (Malta) whilst he was beaming towards England. Many UK contacts were made including 27 G-stations, GM0GMD, GM0HUO, GM4AFF, GM4CXM, GM4LBV, GW5NF and GW8ASA. (An interesting observation is that only seven were B-class v.h.f. licensees. Why? If I was going to be

controversial I would suggest that real v.h.f. DXers use c.w. and that's why the majority of operators are A-class licensees. Any comments?).

**Mate 9A3PA** (JN85) also worked many UK operators during the Leonids shower. In total, he contacted 30 G-stations, GM0GMD, GM4CXM, GM4JJJ, GM8LFB, GU3EJL, GU7DHI and GW4VEQ. Mate was running a Yaesu FT-736R transceiver, a 600W amplifier using a surplus Russian GS31B valve and a group of four 13-element Yagis. A total of 183 contacts in 28 countries confirms it works.

Absolutely brilliant! If my arithmetic is correct then **Tom ES2RJ** (KO29) may have accomplished even better results. Running a Kenwood TS-790E transceiver, Tokyo HL-350VDX amplifier and a single 9-element Vargard Yagi he made a total of 204 contacts with stations in 21 countries. Tom said his list of contacts for this one event looked just like all his m.s. logs from the past 25 years put together.

Many contacts around the 2000km mark were made during the Leonids. The top three distances reported in Europe were G4ASR (IO81) to RW1AW (KP50) at 2231km, EA7GTF (IM87) to SP2FAX (JO83) at 2372km and F5OWN (JN25) to LA3FL (KP19) at 2871km.

In Europe, the levels of m.s. activity on the 144MHz band are very high but spare a thought for those living in areas where there are relatively few v.h.f. DX operators. I note, therefore, with interest that **Paul ZS6PJS** (KG46) made the first ever 144MHz m.s. contact in South Africa when he contacted ZS2FM (KF26) at 0112UTC on November 17 over an 1178km path. Later that morning, the station of ZR1EV (JF96) completed m.s. QSOs with the stations of ZR5ADQ, ZS6HS, ZS6LC and ZS6PT. Congratulations to everyone concerned.

## ULTRA HIGH FREQUENCIES

It's relatively difficult, but not impossible, to achieve ionospheric contacts on the 430MHz band, but m.s. propagation does provide a method of making long distance u.h.f. contacts.

There are two major problems when trying to make QSOs on this band, though.

The first is that a burst of signal that might last ten seconds on the 144MHz band may only exist for one second on the 430MHz band.

The second problem is that antenna beamwidths on the 430MHz band are generally much narrower than at lower frequencies. As a consequence you don't 'illuminate' (or see) as much sky where the meteor trails exist and it's very likely that you won't be pointing your antenna in exactly the right direction for the other station. But, with bursts of over two minutes in duration being heard on the 144MHz band and with increased activity levels, there was always a chance that a contact might be made on the 430MHz band.

Alex DL1KDA was one such lucky station. Surprisingly, it was during an m.s. contact on the 144MHz band with LY2WR that Alex made a sked for the 430MHz band. The 30 minute test commenced at 0220UTC during which time he received three bursts of signal, the best being at S7 and lasting for 20 seconds. Alex, using a Kenwood FT-1000MP transceiver, an LTS705 transverter, 3CX800 power amplifier and a pair of 39-element Yagis, sent an m.s. report of 26 and was very pleased to receive a confirmed R49 report back.

At the club station, LY2WR (operated by Rytis LY2BIL), five bursts of signal were heard from DL1KDA, the best being S9+ for 25 seconds. Later that night, Rytis arranged a sked for the 430MHz band with the station of 15WBE.

Right at the end of one receive period, LY2WR received a S9+ burst of signal lasting for over 40 seconds. Rytis immediately send on slow c.w.: "15WBE de LY2WR S9+ bk". Nothing was heard from 15WBE so another slow c.w. message was sent before resuming on high speed Morse at 400 words per minute. Unfortunately, the contact was not completed although Enrico 15WBE did later report that both slow speed c.w. messages were received at his QTH.

Rytis LY2BIL mentions that the Leonids shower in November 1999 may be the last chance for many to make these extraordinary contacts on the 430MHz bands. (You could wait for the next 33 year peak in 2031 though!). He suggests you listen for periods when frequent two to three minute

bursts are heard on the 144MHz band. You should then switch immediately to 432.200MHz and attempt to make some very quick s.s.b. contacts. An excellent idea! Why don't you try it?

Over in North America, the meteor conditions were just as impressive. Arliss Thomson W7XU/0 (EN13 - South Dakota) not only made his first 430MHz m.s. contact but he also created a possible world record for this band. He had just completed a 222MHz schedule with N6RMJ (DM14 - California) when it was suggested, on the Internet, to make an attempt on the next band up.

Arliss was so surprised to hear N6RMJ booming in at S9 on 430MHz that he immediately became tongue-tied. Fortunately the single burst lasted for 15 seconds and the 2036km contact was successfully completed. The station of N6RMJ was very similar to that used by DL1KDA: an 800W amplifier and a pair of 39-element Yagis. At W7XU/0, the main amplifier was unusable so the contact was carried out using 100W and an array of four 30-element Yagis.

## DEADLINES

That's my lot this month and I promise no more meteor scatter reports for at least six months! The 50MHz band may provide some far-eastern delights during the spring equinox period so keep your beams pointing on a heading of 70°. Please forward any news, views, comments and especially photographs to the address and by the date given at the top of the column. Alternatively, you may find it more convenient to make a simple telephone call.

THANKS FOR YOUR LETTERS  
AND GOOD LUCK WITH THE  
DX. SEE YOU AGAIN NEXT  
MONTH.

73 David G4ASR.

## HF FAR & WIDE

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The month of December has brought some excellent conditions on the h.f. bands and in particular the higher frequency bands, although unfortunately it also brought some appalling weather conditions too. Hopefully PW readers have escaped the worst of the storms and the antennas are still in place!

Our reporters mention again that conditions on the 21, 24, and 28MHz bands have been especially exciting. Good distances have been covered by reporters with both high and low output powers.

Personally, it's been a real pleasure to hear so many Novice stations working the DX on 28MHz; I've literally lost count of the number of DX stations I've heard on s.s.b. working these 3W stations and it's my guess that the Novices must be having a great time now that 28MHz has opened up!

On the subject of the Novice licence, isn't it about time that the 'powers that be' 'loosened up' a little on the restrictions faced by Novice licensees? The tiny band segments that these committed and enthusiastic amateurs are allocated really is rather limited

## PW LISTENING & OPERATING WATCH LIST

(All times UTC)

**Charlie Blake M0AII** listens and operates:

0500 - 0700 on 7.061MHz s.s.b. with an NRD-525 receiver & sloping wire antenna and is also busy with his mobile rig.

**George Woods G3LPT** (Suffolk) operates:

an open net on 29.630MHz n.b.f.m. every weekday morning except Monday at 0930 local time.

**Don McLean G3NOF** operates:

1030 Saturdays on 3.685MHz on the ISWL Net or 1030 Sundays on the Yeovil ARC Net on 3.665MHz s.s.b. using a Kenwood TS-950 & trapped dipole antenna.

**John Wheeler G0IUE** monitors:

28.500 s.s.b. every evening between 1700 and 2200 regardless of conditions using an Icom IC-706 and a 2-element TET triband beam antenna.

**Leighton Smart GW0LBI** operates:

a Sunday evening net on 28.500MHz s.s.b. at 1900 local time and some weekday evenings at around 2100 - 2330 on 1.949MHz s.s.b./1.820MHz c.w. using a Yaesu FT-747 QRP transceiver at 5W maximum and a long wire Marconi antenna.

**Rob Mannion G3XFD** listens and operates:

(weekdays & weekends) 1800 - 1830 on 3.7MHz 100W s.s.b., & 3.530 or 3.560MHz and 18.105MHz QRP c.w. using an Alinco DX-70 transceiver and a long wire antenna. Also at 2300 on either 3.560, 7.025MHz (c.w.) or 3.7MHz s.s.b. (All operation dependent on PW workload!). Now also operating /P during weekend late mornings and afternoons on 7 and 14MHz s.s.b. and c.w. using the Alinco DX-70 and Pro-AM mobile antennas at 5 and 25W power levels.

**Sean Gilbert G4UCJ** operates:

around 0700 to 1100 and 2100 to 0000 seven days a week on 14MHz and 7MHz using an FT307 and Alinco DX-70 transceivers at 3/30W output and a G5RV dipole antenna in the loft space.

# RadioScene

to say the least and this together with the 3W power level doesn't really provide much incentive at all for interested people to take up the hobby.

I'm sure that access to all bands (according to the class of Novice Licence held), plus a power limit of perhaps 5 or even 10W would help to attract more people into the amateur radio hobby and provide it with a reasonable level of 'new blood'. What do our readers think?

## UP, UP AND AWAY!

I received a video this month from the kite antenna expert, **Pat Painting G3OUC**. The tape, made by Steve Painting GOLTJ, shows Pat on one of his 3.5MHz outings on Walbury Hill in Berkshire, using a kite to raise an antenna, which Pat uses in conjunction with his 5W home-made Skyliner s.s.b. rig.

Pat has been flying kites for radio work since 1959 and this wealth of experience shows on the film, with the entire station (antenna as well) being up and running within minutes. With this set-up, he was soon working all over the British Isles with just 5W of s.s.b. and even at one point, with a mere 500mW!

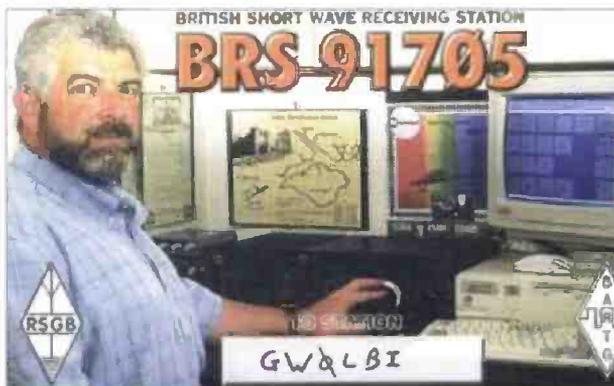
The film certainly made me think about such an endeavour, so much so that a couple of local amateurs who also saw the film have decided that they are going to do the same thing in the spring. Pat is a keen exponent of this facet of radio operation, and anyone interested in the subject can contact him at 15 Turnpike Road, Newbury, Berkshire RG14 2ND, England.

## PROPAGATION REPORT

Now over to the regular propagation report from **Don McLean G3NOF** of Yeovil in Somerset. Don says "On 3.5MHz, north American stations were heard from 2300 onwards, with west coast US stations sometimes coming through at 1600. On the 7MHz band, south American signals were often good from around 2300UTC until the early hours.

"The long path to Australia

and New Zealand on the 14MHz band was open most days between 0800 and 1000, while Asia came through on the long path around 1000 and later via the short path between 1500 and 1700. The band usually closed at around 1800, but on a few days it was open until 2000UTC.



**Fig. 1: Short wave listener Gordon Hurrell BRS 91705 reports from his well equipped station at Wootton Bridge on the Isle of Wight.**

"The 18MHz band was open on the long path to Australia and New Zealand most days between 0830 and 1000, and there were a few long path openings to Asia around 1000, changing to short path up to 1600. This band usually closed by 1700UTC.

"On 21MHz, the path to Asia varied between the long and short path around 0900 and 1500, while north America was heard between 1200 and 1800, with strong west coast USA signals heard around 1600 to 1800UTC.

"The long path to Asia on 24MHz was open most days around 0900 and 1100, with African stations heard during the afternoons. North America came in between 1300 and 1700UTC, when the band closed.

"Finally, on 28MHz the short path to Asia was open most days around 0900 and 1100, while Africa was heard both morning and afternoons. North America came in between 1300 and 1700, with

south America heard during the late afternoons. The band usually closed around 1800UTC".

## YOUR REPORTS

Starting this month with 1.8 and 3.5MHz, the log from **Ted Trowell G2HKU** on the Isle of Sheppey in Kent shows that he's finally 'Worked All Continents' on the 1.8MHz band, after hooking up with VK6HD (Australia) at 2100UTC, using 70W of c.w. Ted says "After all these years, I've finally worked

looks as if he'll be a busy man in 1999!

Sean's log shows a single QRP c.w. contact on 1.8MHz with DF0HQ (Germany) at 0133, while his exploits on 3.5MHz brought him contacts with VP5/N4TO (Turks & Caicos Islands), UK8OM (Uzbekistan), 8P9HT (Barbados), VP2VF (British Virgin Islands) and EA9EA (Spanish North Africa), all between 0100 and 0200UTC.

Yours truly, GWOLBI has been 'milliwatting' this month on the 1.8MHz band, hooking up with DL1ROJ (Germany), GD4UOL (Isle of Man) and F5NQL (France) with 100mW, OK1RP (Czech Republic) with 300mW, HB9HFR (Switzerland), IR4T (Italy) and LX4B (Luxembourg) with 0.5W, while a whole 1W gave a contact with RK3AWL (Russia), all contacts taking place between 2300 and 0100UTC, using a 60m end fed wire strung over my neighbour's gardens.

## THE 7MHz BAND

The 7MHz band log from **Don McLean G3NOF** in Yeovil shows that his s.s.b. has reached out to PT7BZ (Brazil), T2CC (Costa Rica) and YV5GD (Venezuela) all after 2300, while Ted G2HKU mentions c.w. contacts on 7MHz with J3A (Grenada Island), T11C (Costa Rica) and 6Y2A (Jamaica) at around 2200UTC.

Also 'on the key' was Eric GOKRT, who lists his 100W contacts with K3LR (USA), and IK0MHR (Italy), at around 2130, while on s.s.b. he lists a contact with EA6LP (Balearic Islands), at 1830UTC.

## THE 14MHz BAND

I'm starting the 14MHz band report with a very warm 'HF Far & Wide' welcome now to short wave listener **Gordon Hurrell BRS-91705** on the Isle of Wight, see Fig. 1. Gordon's station comprises of an NRD 545 DSP receiver in conjunction with an RF Systems Magnetic Long Wire and a Datong AD270 Active Indoor Dipole.

With his set-up, Gordon reports s.s.b. reception of VK6NZ (Australia) at 1600, VE9AMZ (Canada) working GM0RRK at 1557, 5N8LRG (Nigeria) in contact with RW4PS in Russia at 1400, and EA9AU (Ceuta and Melilla) working UT5DF in Ukraine at 0805UTC.

Don G3NOF was busy on

WAC. I really never expected to work Australia on 1.8MHz with a G5RV antenna - and I don't have a linear either"! Well done Ted! As they say, everything comes to he who waits!

Next comes **Eric Masters GOKRT** from Worcester Park in Surrey, who's been running higher power than usual, with a Kenwood TS-570DG transceiver at 100W and a W3EDP antenna along with a 28MHz sloping dipole. Using c.w. on 1.8MHz, Eric hooked up with GM4JE at 2138, while DL4KBS (Germany) was worked at 2200UTC.

Also upping the power for a change this month was **Carl Mason GW0VSW** of Skewen in West Glamorgan. Using 70W from an Icom IC-737A transceiver and a Sandpiper vertical antenna on 1.8MHz, Carl worked VA1A (Canada) on c.w. at 0600, while using s.s.b. at 1834UTC brought him a contact with EA6IB (Balearic Islands).

Congratulations are in order this month for **Sean Gilbert G4UCJ** of Milton Keynes, on being elected Chairman of the QRP section of his local amateur radio club! Sean tells me that the QRP group will encourage anything to do with QRP, including operating, building, antennas, and whatever else! Already he has set up an awards scheme, so it

the 14MHz band this month, his log showing s.s.b. contacts with AT2PA (India), FR5HA (Reunion Island), T32IW (East Kiribati), VE7DXQ (Canada), VK9LX (Lord Howe Island), W7MAD (Montana, USA), XUTA (Cambodia), ZD7VC (St. Helena Island) QSL via K1WY and 6W6/N3NS (Senegal).

### THE 18 & 21MHZ BANDS

Now it's up in frequency to the 18 and 21MHz bands where I read that Eric GOKRT was as pleased as punch this month. This was because he's worked his best DX ever, contacting ZL4DJ (New Zealand) on c.w. at 0921 on the 18MHz band. Switching to s.s.b. he worked UA2FO (Kaliningrad) at 1231, W4UWC (USA) at 1300, and SM0OVX (Sweden) at 0930UTC.

Meanwhile, Sean G4UCJ again 'on the key' on 18MHz shows low power contacts with KP2AD (US Virgin Islands) at 1652, 8Q7DV (Maldives) at 1100, XZ1N (Burma) at 1200, and J68LH (St. Lucia Island) at 1414UTC.

On the 21MHz band, short wave listener Gordon BRS-91705 reports his s.s.b. reception of BY4ZZB (China) working G4AZN at 0800 and DS5BBL (Korea) in contact with DJ8RC in Germany at 0850. Also heard were VK2KM (Australia) working G0JJY at 1216, 7Z1TS (Saudi Arabia) working U05IBB in Ukraine at 1141. Then came VK5KYL (Australia) in contact with G3SNN at 1250 and A62ND (United Arab Emirates) working UR0VV in Ukraine at 0722UTC.

For my own operations with GW0LBI I used milliwatts of c.w. into a wire dipole on the 18MHz band to hook up with OM6CH (Slovakia) using 200mW at 1300, while 500mW gave contacts with SM4JS/QRP (Sweden) at 1450 and DJ1EF (Germany) at 1505. A switch to 1W of s.s.b. brought a contact with IZ2ACZ (Italy) at 1204 and SM00WX (Sweden) at 1130UTC.

### THE 24 & 28MHZ BANDS

The 24MHz band is 'where it was at' for Carl GW0VSW and is where he spent a great deal of time. His log includes s.s.b. contacts with 3E1DX (Panama) at 1146 and ET3BN (Ethiopia) at 1355, while switching to c.w. brought contacts with VR3GY (Hong Kong) and 5N3CPR

(Nigeria) with JY8YB (Jordan) at around 0930, BV7FC (Taiwan) at 1030, D68WU (Comoros Islands) and CP6/LU9AY (Bolivia) at around 1330 and finally CX3SN (Uruguay) at 1555UTC.

Ted G2HKU mentions just two c.w. contacts on the 24MHz band in the shape of 7Q7LA (Malawi) and KP2AD (US Virgin Islands) at around 1600. Changing bands to 28MHz at 1100 gave him contacts with ZW5B (Brazil), 9H0A (Malta), and P3A (Cyprus). Operating later at 1600UTC gave Ted contacts with CE3FIP (Chile), LU1APG (Argentina), HC5AI (Ecuador), and CO8ZZ (Cuba).

The 28MHz log of Gordon BRS-91705 shows his s.s.b. reception of 4X6UO (Israel) working the USA at 1414, YL80RQ (Lithuania) working G3OLY at 1130, WP4JU (Puerto Rico) working Cyprus at 1436, and WZ8D (USA) in contact with G0WSB at 1331UTC.

The narrow band frequency modulation (n.b.f.m.) mode was 'the mode' for Eric GOKRT this month and he worked WA4BKM (Atlanta, USA) and UA3AEW in Moscow at 1300UTC, while c.w. gave him a contact with K8MP (USA) at 1500. Meanwhile, Don G3NOF lists s.s.b. contacts on 24MHz with AT2CC (India), BD4ED (China). Next came T1HP (Cameroon) QSL via F6FNU, VR98LC (Hong Kong) and 4S7BRG (Sri Lanka), while 28MHz provided him with contacts with BV5BG (Taiwan), K7CO/6YS (Jamaica), S21J (Bangladesh), XZ1N (Burma) and 3B8FG (Mauritius).

Again, operating GW0LBI, I used 1W of s.s.b. on the 28MHz band to hook up with SV1CQN (Greece) at 1500, Z31FK (Macedonia) at 1340 and UR5EP (Ukraine) at 1030. Using 5W of s.s.b. brought in contacts with 9K2ZZ (Kuwait) at 1200, 3V8BB (Tunisia) at 1254, ER4OT (Moldova) at 1320, 5A1A (Libya) at 1532, D44BC (Cape Verde Islands) at 1123, and AA2KD (USA) at 1705UTC.

Finally, to tie up the ribbons for this month, Sean G4UCJ using QRP c.w. on the 28MHz band hooked up with ZF1A (Cayman Islands) at 1600, HI3/DL1GKG (Dominican Republic) at 1630, VP5M (Turks & Caicos Islands), 6V6V (Senegal) at 1144, HF0POL (South Shetland Islands) at 1506, and XE3AJM (Mexico) at 1500UTC.

### SIGNING OFF

That just about rounds things up for this month. It seems like conditions are reasonably favourable on most, if not all of the h.f. bands at the moment and long may it continue! My grateful thanks to all reporters for their time and effort in making the column a success.

**KEEP UP THE GOOD WORK AND GOOD DXING! AS USUAL, REPORTS AND INFORMATION TO ME (AND PHOTOS AS I'M STILL LOOKING FOR PHOTOGRAPHS OF OUR REPORTERS!) BY THE 15TH OF EACH MONTH. SO, LET'S BE HEARING FROM YOU!**

## AUSSIE ORACLE

LETTERS AND REQUESTS FOR TOPICS YOU'D LIKE COVERED TO ME PLEASE.

CHRIS EDMONDSON VK3CE  
BOX 1 YARRA ROAD  
WONGA PARK  
VICTORIA 3115  
AUSTRALIA

E-MAIL:  
radio@vic.bigpond.net.au

THIS MONTH, CHRIS EDMONDSON VK3CE CELEBRATES A WIN OVER ENGLAND IN THE CRICKET ON AUSTRALIA DAY AND TAKES A LOOK AT THE WEATHER, SPACE AND A FEW PIECES OF EQUIPMENT WHICH HE FINDS HE JUST WOULDN'T BE WITHOUT!

Day - and welcome once again from the bloke from Downunder! Here is the cricket news from



Fig. 1: Image of Australia as seen from the NOAA 74 satellite at 1614 hours on December 27 (see text).

Australia - What? Oh, then perhaps we should talk about radio instead ...

I have to start out my report from sunny Australia (34°C here today!) with another word of surprised and grateful thanks to the wonderful letter writers among you. You folk are actually putting my readers in Oz to shame! I rather fear I almost get as many reader letters and E-mails from having one little occasional column in a UK magazine as I do from running a national magazine in this country! Make sense of that ...

In fact, I've received such a lot of mail that I went into a book store to find a large scale map of the UK - the 1999 AA large scale directory of the UK - and I'm now marking in it where the letters come from. One day I'll find the time to get there and I would love to visit all of you!

However, please understand that I put together a magazine which is not all that dissimilar to *PW*, but I do it on my own. Sadly, I am the staff and that restricts my time somewhat! It's sometimes simply not possible to write individual replies to all your letters, but I do most certainly appreciate receiving them, even though the lack of time for replies gives me pangs of guilt! I can generally find a moment or two to reply to the odd E-mail - certainly a lot less fuss! - so, if you have access to that medium you should certainly expect a reply.

Okay, enough embarrassed excuses. On with the fun ...

### WEATHER WATCHING

I have the suspicion that a very good place **not** to be just after Christmas was at the eastern end of Bass Strait, which divides mainland Australia from Tasmania. You may be accustomed to some nasty weather in the North Atlantic, but it's simply **not** what we would expect here!

The Sydney-Hobart Yacht Race fleet also clearly had no idea of what would develop only 24 hours after they left Sydney on Boxing Day at 1300

hours local on their annual run for honour, but within that time the gruesome details would emerge: five dead and more than 50 injured by mountainous

CHRIS VK3CE DESCRIBES SOME OF THE EQUIPMENT WHICH HE WOULDN'T BE WITHOUT ON HIS TRAVELS.

# RadioScene

seas and 80 knot gales.

Emergency flares were the order of the day as yacht after yacht called on the emergency services for assistance, so it wouldn't take an Einstein to work out that radio buffs in this part of the world remained rooted to the spot for many hours as the extent of the disaster became clear.

You may be interested to see



Fig. 2: The Barrett 550 h.f. box as used by Chris VK3CE (see text).

the most unusual weather which hit the region. This photograph was received from NOAA 14 at 1614 hours on December 27 (see Fig. 1). It shows the eastern edge of Australia. At the far left is South Australia, and Queensland's Fraser Island is clearly visible on the far right. But south of that is a huge storm which simply blew up out of nothing over a period of about 18 hours. By this time it was so large that most of Victoria and all of Tasmania had completely disappeared under the cloud mass, which extended right across the Tasman to cover New Zealand as well!

## BACK DOWN TO EARTH?

In the months since I started penning this column (Rob Mannion G3XFD, Editor of PW has one in my magazine too) we've had a brief look at what makes the Amateur Radio scene in Australia so different to that in the UK. I guess the one

sentence definition of the main differences is population. In this country we have one third of the operators spread over say ... twenty times the area!

In fact, the vastness of this country is reinforced simply by considering how far I drove last week alone to visit Adelaide, the capital city of South Australia. I left at 4am on Wednesday morning and

arrived back home at 6am on Sunday. In that time I had driven some 2500km, about as far as driving from Portsmouth in the south of England to Edinburgh ... three times!

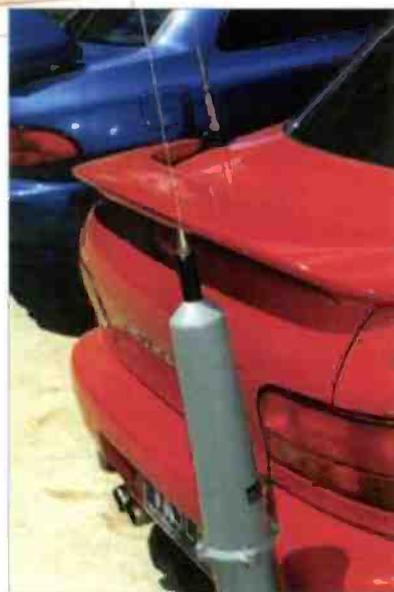


Fig. 3: The Barrett 510 mounted on the back of Chris VK3CE's Subaru WRX (see text).

The largest town I drove through in all that distance was Ballarat, which has a population of about 100 000 - and the road actually bypasses Ballarat these days!

So why all the driving? Simple. I've made a big fuss in the magazine here about Dr

Andrew Thomas, who spent some 20 weeks in Earth orbit this time last year aboard the Russian space station *Mir*. Andy, as he prefers to be known, may be a US astronaut and the last to serve on *Mir*, but he is also an Australian who was born and bred in Adelaide.

Andy issued an invitation to all Radio Amateurs who had spoken to him during that time on *Mir* to meet with him in Adelaide during late January. I had been fortunate enough to work Andy on numerous occasions, usually at two or three in the morning and had actually enjoyed literally hours of QSO time with him. What an incredible privilege, an average sort of fellow like me being able to talk to an astronaut in orbit!

In fact, this recent trip to VK5 wasn't the first time I met Andy. During a flying business trip to Australia last October, I met with Andy in Melbourne during a fleeting one hour stop-over. I recorded the entire interview and have run it over a full six pages in the February issue of my magazine, *Radio and Communications*.

## EXPANSIVE EQUIPMENT FOR AN EXPANSIVE JOURNEY

So, here I was, invited to a video presentation of Andy's stay in *Mir*. Of course I went! But what sort of radio buff would I be if my car wasn't bristling with antennas for the trip, so I kept myself busy by working h.f., plotting my course using GPS and chasing a few satellite QSOs on the way!

My poor car always seems to bear the brunt of my radioactive job.

Radio gear is forever being jammed in, then ripped out (it's usually held in place with sticky tape!) and the h.f. box for this trip - apart from my own radio, which is permanently mounted - was one I doubt you'd have heard of. It's a Barrett 550 (see Fig. 2) and for the trip it was hooked into a Barrett 510 auto-tune h.f. antenna.

The trip was actually quite interesting and fun. Not only was I able to wander at will over all our h.f. bands (and worked a couple of G stations

on 14MHz during the trip), but I could also dial up any of the hundreds of h.f. channels used by ordinary people across Australia for normal communications. You see, as well as having access to two bands of CB frequencies (27MHz a.m. and s.s.b. plus 477MHz f.m.), Australians may also own and operate an Outpost Station.

While I am VK3CE on the amateur bands, I am also VJ433 on such oddball frequencies as 2.020MHz, ranging up all the way to about 25MHz. The services offered here include telephone patches (direct dial if you want!) on Telstra's *Radphone* service (or *Seaphone* for the yachties), direct access to the *Royal Flying Doctor Service*, or special interest groups such as the VK5-737 five-channel cross-country weather and advice service for 4WD owners wanting to explore this vast continent.

On the VK5-737 service I have the callsign Victor 115. It's quite interesting what one does with this service. I can mute the transceiver in scan mode, and it will scan selected frequencies waiting for a SelCall. Even from the UK, you should have no trouble hearing people driving around the most remote parts of Australia, simply by tuning to one of the higher channels and waiting for a SelCall. The highest channel we use is 14.977MHz, while others are 11.612MHz and 8.022MHz. The other channels would be too low in frequency to be good copy to you ...

The review Barrett transceiver has 500 memory channels, which means a lot of room to play with. During the programming stage, some thoughtful soul had also keyed in a lot of BBC, VOA and Radio Australia frequencies, so I was always able to receive broadcast stations. By the way, can you even imagine driving in a place so remote that you can put the car radio into scan mode and have it stop on nothing? There were a few places where I could hear no stations at all on either the a.m. broadcast band or f.m. (we don't have l.w. here), although I must admit to not having taken exactly the most direct roads between Melbourne and Adelaide!

Radios like the Barrett aren't really designed with Amateur Radio operators in mind. For starters, there's no v.f.o. knob,

so tuning is by entering a frequency on the front panel (remote control if you want), but the performance is excellent and every report I received on the amateur bands was of very good, punchy audio, with not too much processing. As an aside, the radio actually runs 150W out.

I seem to recall seeing a review of the excellent SGC SG-2000 radio in these pages. Australian radios like the Barretts and Codans are very similar in design and execution, but they have one very strong advantage - price! Our dollar is very weak compared to both the US\$ and the UK£ and something like the SG-2000, if offered here, would probably cost around \$3500, where the Barrett, complete with antenna, is offered here for only \$2500! Compare that to amateur transceivers like the Yaesu FT-900 for about \$1900 or the IC-706 MkII G for about \$2100. Our dollar buys only about 38p these days, so I guess the equipment is pretty cheap when you consider that.

Given enough room, there's another photo for you to look at now. Fig. 3 shows the Barrett S10 auto tune antenna attached to the back of my Subaru WRX. (If you're wondering, the blue car behind it is the latest SRX STI. I couldn't resist it!).

WHOOPS, THE AUSTRALIA DAY CRICKET IS OVER AND WE'VE KNOCKED ENGLAND OFF, WINNING BY 14 RUNS. SORRY ABOUT THAT ... LIKE HECK I AM!! BUT MY SPACE IS UP AND SO IS MY TIME, SO I LOOK FORWARD TO ANOTHER CHAT VERY SOON. YOU REALLY ARE VERY WELCOME TO WRITE TO ME AT THE ADDRESSES AT THE TOP OF THIS COLUMN. "VY 73 ES GUD LUCK" AND I LOOK FORWARD TO CATCHING YOU ALL AGAIN SOON!

## DATA SCAPE

ROGER J COOKE G3LDI

TEL: (01508) 570278

E-MAIL:  
rcooke@g3ldi.ireeserve.co.uk

PACKET:  
G3LDI @ GB7LDI.#35.GBR.EU

ROGER COOKE G3LDI IS BACK

AGAIN THIS MONTH WITH MORE INTERNET AND COMPUTER GOODIES. THIS TIME HE INTRODUCES YOU TO THE NEW WINEXPLORER SOFTWARE AND TAKES YOU THROUGH THE INTERNET FROM MODEMS TO REGISTERING YOUR VERY OWN WEB SITE.

Well, another month has passed and here I am again with more news and views for you. To begin with this month, I want to introduce you to *WinExplorer*. This is a browser specifically designed for use with *WinPack*. To get the best out of *WinExplorer*, you must run *WinPack V6.41* or later. This version (and subsequent versions) knows about *WinExplorer*. It supports DDE links to *WinExplorer*, both for using it as a viewer and for using it in 'On-line' mode.

*WinExplorer* uses the *Internet Explorer WebBrowser* *ActiveX* component. Therefore, in order to be able to use *WinExplorer*, you must have *Internet Explorer V3* or later installed on your PC.

*WinExplorer* supports the *WinPack* special ax25mail HTML protocol. This protocol is described in *AX25MAIL.TXT* which comes with *WinPack*. The protocol allows links to be put into AX25 HTML Packet messages that support automatic message creation, automatic REQFIL requests, etc. Before *WinExplorer* became available, support for this special protocol was only available via Netscape.

*WinExplorer* has an intelligent file-open feature. If a file is opened with an extension of .TXT, but it appears to contain embedded HTML, then *WinExplorer* will extract the HTML into a temporary file and open that rather than the original text file.

*WinExplorer* can operate in Online Mode. In this mode it links to *WinPack* via DDE and will automatically display any HTML pages that are downloaded by *WinPack*. This mode has been designed for connecting to PMS' or BBS' that have *WinPack* compatible HTML pages set up.

In Online mode, *WinExplorer* supports several special protocols that allow graphics and files to be automatically fetched from the remote PMS or BBS. (Online Mode is the *WinExplorer*



Fig. 1: Saving your pennies? The FINIWARE Web site can be found at <http://www.xs4all.nl/~finiware>



Fig. 2: The title page of the Warehouse Web site which can be found at: [www.software-warehouse.co.uk](http://www.software-warehouse.co.uk)

equivalent of using *WinScope* with Netscape).

### KEEP IT DOWN!

If you are like me and are trying to keep the telephone costs down as low as possible, you might be interested in a program to let you know exactly how much you are spending as you spend an evening on the Internet. This program is available from the Internet and my attention was drawn to it by s.w.l. Gerald Bramwell. It is called *INTERCENT 98* and can be obtained at the following Web site:

<http://www.xs4all.nl/~finiware>

You can set the appropriate rate at the time you are using the Internet. Obviously this has to be done to obtain a correct reading. It starts when the ISP answers and stops when you disconnect. Thus you can keep an exact account of how much you are spending. The FINIWARE introduction is shown in Fig. 1. The text is available in Dutch but you can opt for English, French or Spanish. This program will certainly make you aware of the pennies ticking away!

### THE MODEM

In the last couple of years, the prices of modems have, just like the computer prices, tumbled. Buying a modem is like buying a fridge. The advice I got when buying my first fridge was "Buy the biggest you can afford and get into your kitchen". That was sound advice, although I didn't realise it at that time, until I actually had the fridge.

The same advice applies to modems. Buy the fastest and most versatile you can find and afford. It will pay dividends in saving time on the Internet, with cost of

telephone calls. If, of course, you are also still paying for an ISP, that cost is high! Nearly all modems now come with built-in FAX and voice modems, together with the support software to run them. Make sure that the modem has BABT (British Approvals Board for Telecommunications) approval. It should have a little green circle on it somewhere. If you use one on a BT line without the BABT approval, you will be breaking the law.

External modems are easier to set up and have status lights to let you know what the modem is doing and is easier to get at should it develop a fault. The first modem I bought was a Pace, selling for £165. It was a 14 400bps device and was zapped within two months by a thunderstorm. I replaced it with a US Robotics Sportster Flash, a 33 600bps device and it was priced at £120. I think they are even cheaper now! (There certainly is a good range to choose from and prices do vary).

### THE E-MAIL ADDRESS

At the risk of teaching grandma to suck eggs, here is an

# RadioScene

explanation of that lengthy address that has to be used to send E-mail.

Consider my E-mail address as an example: **rcooke@g3ldi.freemove.co.uk**. The part after the @ is called the 'domain name'. 'uk' means the domain is on a computer in the United Kingdom.

Every country has a two-letter code, known as the 'top-level domain code'. However, you won't see the 'us' code for the USA used very often for the following reasons: 'co' means the domain belongs to a company. Alternatives are 'ac' for academic institutions (such as a university), 'gov' for governmental domains and 'org' for organisations (such as charities - Greenpeace is at [greenpeace.org](http://greenpeace.org) for example).

Just to make things even more confusing, companies in the US just use 'com' instead of 'co.us' and Universities use 'edu' instead of 'ac.us'. Freemove is the domain name that Dixons have registered with the Internet Society, the body that approves of names and hands out Internet protocol numbers to go with them. Every computer on the Net has an Internet Protocol (IP) number and the domain name is mapped to this. Your service provider will have its own domain name which will form part of your E-mail address. **rcooke** is the user name at **g3ldi**. The **freemove.co.uk** computer will deliver all my mail to **rcooke@g3ldi**.

Composing your E-mail offline is eminently sensible, as it costs money to do it when connected. Besides, you have the normal amount of thinking time and are not pressured by the thought of increasing BT's profits again!

You can also have several different E-mail signatures. These can be set up in a file and recalled as required, depending upon the correspondent. DO NOT, however, have endless rows of family history, pet cat's name and pictures of Aunt Nelly's cat. These are NOT appreciated and tend to proliferate on the Packet network. I can forgive the

sending of Christmas greetings in this way, but normal mail during the year should be to the point. (Sometimes the tag at the end is longer than the message).

## SHAREWARE SOFTWARE

An Interesting Web site to look at if you are after programs is [www.software-warehouse.co.uk](http://www.software-warehouse.co.uk) I was after an HTML editing program and a friend suggested I try this site. It really is quite comprehensive. I found lots of programs relating to HTML and downloaded one I thought might be suitable. I have not had a chance to look at the program itself as yet, but looking around the site, this is one worth putting in the bookmark file! Fig. 2 shows the title page.

## SPACE INFORMATION

The Goddard Space Centre is a space related Web site with links to other sites as well,

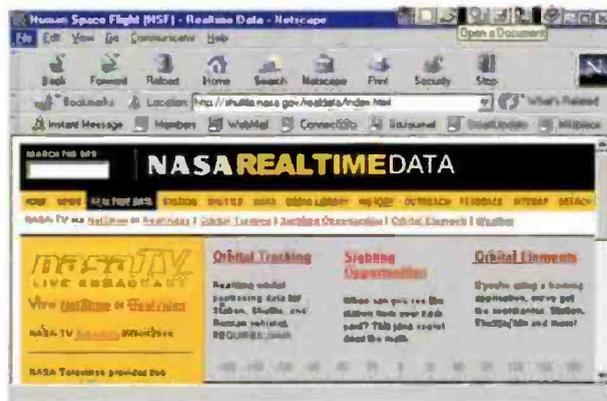


Fig. 3: Goddard Space Centre Web site for up-to-date information regarding any space topic can be found at:

<http://shuttle.nasa.gov/realdata/index.html>

including Amsat. If you want up-to-date information regarding any space topic then try this one: <http://shuttle.nasa.gov/realdata/index.html> Fig. 3 shows the title page of this site.

## SECURITY ON THE INTERNET

For users on the Internet, security can be a problem -

more so if you are contemplating conducting any form of business transaction. Personally, I avoid this like the plague, albeit it is probably safe. I prefer to follow alternative safer routes. However, the openness of the Internet could be seen as a problem, leading to a lack of confidentiality and the thought that intruders might see this field as 'fair game' is something to bear in mind.

There are, however, some well-established solutions now to all the main threats. For a general introduction to the security problem, there is a consultative document **RFC1244**. RFCs (Request For Comments) are a series of some 1700 documents that largely define how the Internet works. They have no prescriptive force, but by asking for comments, can turn into accepted practice, indeed sometimes even rules for particular aspects of the Internet.

Although there is no Internet 'police' to enforce the rules, if you wish to connect and exchange mail with other users, you have to follow the rules, otherwise your connection is effectively useless.

Many of the RFCs are on

connection, you can send a message in the form: **document-by-name rfcxxx to mailserv@ds.internic.net**

## QRO PC

On the technical side, machines become faster and faster. For example, Intel have revealed that the company plans to market the 1000MHz processors in the year 2000. They have also said that by 1999, chips with clock speeds of 500MHz to 700MHz should be available.

## REGISTERING A WEB SITE

There are quite a few adverts now from Web page designers, all waiting for the 'flies' to be attracted to their Web offers. The spider then eats them up and banks the fat profits! It has to be said, that knowledge is required to design a Web site, but that is all part of the fun - not to mention self-education.

I suppose, for a busy business, the time can be spent more profitably. However, for the individual, it is well worth it. I recently won a competition, the prize for which was a 'free' Web page. When the details arrived, it was a two page Web site, an Internet address, six Internet search engines and free changes to the site for the first 30 days. The 'only' cost was £25 per month to host the site and £6 per extra page! I have since seen adverts offering Web pages for as much as £700. I certainly wish I were about 35 years younger ... making money couldn't be easier!

Nominet is the non-profit registration authority for Internet domain names ending in .uk and has cut charges to agents from £80 to £20 a name over the past two years. But some agencies still charge £80 on top of so-called set-up fees. With firms keen to get onto the Internet, UK domain name registrations run at 10 000 a month. The software needed to become an agent is freely available on the Internet. With Freemove, you now get 15Mb of Web page, all free! That'll do me nicely!

Talking Web pages will soon be accessible to everyone with a phone. Speech recognition specialist **Vocalis** has adapted software to allow callers to contact a Web page and have a computerised voice read out its contents to them. An Internet page will first be

assigned a phone number. When a caller contacts the page, the electronic voice will read out information and respond to the callers' commands.

THAT'S ALL AGAIN FOR THIS MONTH. I HOPE THAT YOU ARE ENJOYING THE COLUMN AND LET ME KNOW IF YOU WOULD LIKE TO SEE ANYTHING IN PARTICULAR COVERED ON THESE PAGES.

## BROADCAST

REPORTS AND INFORMATION TO ME PLEASE.

PETER SHORE  
C/O PW EDITORIAL OFFICES  
ARROWSMITH COURT  
STATION APPROACH  
BROADSTONE  
DORSET  
BH18 8PW

E-MAIL:  
petershore@pwpublishing.ltd.uk

PETER SHORE TAKES A LOOK AT SOME INTERESTING DEVELOPMENTS WHICH HAVE TAKEN PLACE IN THE SPHERE OF BROADCAST BANDS OVER THE LAST MONTH. ALONG WITH HIS REGULAR UPDATE ON THE LATEST FREQUENCY NEWS.

**B**roadcasts in French are once again coming from Brussels (albeit relayed from German short wave transmitters of course!) and the RTBF is on the air at 0600-0700UTC on 15.715MHz, 1100-1200UTC on 21.54MHz and 1700-1800UTC on 15.715MHz. All transmissions are directed to Central Africa for French-speaking Belgian expatriates and aid workers in the region.

In Africa, the Libya-based **Voice of Africa** is on the air with English and French on 15.235, 15.415 and 15.435MHz at various times. Voice of Africa seems to be the new name for Libya's external service which until last autumn referred to itself as the **Voice of the Greater Arab Homeland**.

Some reports suggest that the Voice Of Africa may add African languages this year, including Swahili for Kenya and Uganda and Hausa for Nigeria. If you hear this re-named station, please let me know -

(particularly if you receive a QSL card! The address is **PO Box 4677, Tripoli, Libya**.)

Still no developments on the United Nations short wave transmission front which I reported on in last month's column, except to note that the UN has established a transmitter in the Central African Republic. Since November, **Radio Minurca** has been on the air at 9.90MHz with programmes in English - including relays of BBC World Service output - and French. Tune in from around 0600UTC. The station has announced a postal address of **PO Box 2732, Bangui, Central African Republic**.



Fig. 1: WorldSpace's company logo as taken from their Web Site which you can contact at: <http://www.worldspace.com>

### NOW A ROUND-UP OF FREQUENCY NEWS

**China Radio International** continues to use some interesting out-of-band frequencies for its broadcasts, including those in English. The current transmission schedule is:

0300-0400UTC on 9.69MHz  
0400-0500UTC on 9.73MHz  
0900-1100UTC on 15.21, 17.755MHz  
1200-1300UTC on 6.95, 6.955, 7.385, 9.565, 9.715, 11.66, 11.675, 11.98MHz  
1300-1400UTC on 11.66, 11.675, 11.715, 11.98, 15.18MHz  
1400-1500UTC on 7.405, 9.535, 9.70, 11.825, 15.125MHz  
1500-1600UTC on 7.16, 7.405, 9.785MHz  
1600-1700UTC on 9.565MHz  
1700-1800UTC on 5.22, 7.15,

7.405, 9.57, 9.745MHz  
1900-2000UTC on 6.955, 9.44, 9.60MHz  
2000-2100UTC on 5.22, 6.95, 9.44, 9.92, 11.975, 15.50MHz  
2100-2130UTC on 5.22, 6.95, 9.92, 11.975, 15.50MHz  
2200-2300UTC on 7.17MHz

If you have a large satellite dish and a digital satellite receiver, you can now receive **China Radio** on PanAmSat 4 at 68.5° east. The frequency is 3716MHz and the signal is in MPEG2 format.

**Radio France Internationale** still has a minor English-language service via short wave. Tune in at: 1200-1300UTC on 9.805,

11.600, 15.155, 15.195, 15.540, 17.575MHz  
1400-1500UTC on 11.910, 12.030, 17.560MHz  
1600-1700UTC on 11.615, 11.995, 12.015, 15.210, 15.530MHz  
1700-1730UTC on 11.615, 15.210MHz



Fig. 2: WorldSpace's Afristar satellite also taken from their Web Site.

**Radio Vilnius** has English at 0030UTC for 30 minutes on 6.12MHz via Germany and again at 1030UTC on 9.71MHz direct from Lithuania.

A new religious station started up in December. The **WWBS** station is based in Macon,

Georgia and operates on Sunday and Monday between 0000 and 0200UTC on 11.90MHz. The programming is evangelical in content. You can reach the station at **PO Box 18174, Macon, Georgia 31209, USA**, or via E-mail:

[wwbsradio@aol.com](mailto:wwbsradio@aol.com)

A revolution in international radio is just days away now. **WorldSpace**, the Washington-based satellite radio service, starts broadcasting from its Afristar satellite (see Fig. 2) to Africa and the Middle East at the end of this month or the beginning of April (no one is quite sure when!).

In December, WorldSpace unveiled the receivers for its satellite service which incorporate the sophisticated digital audio processing system that WorldSpace uses, together with some short wave bands. The receivers will cost around US\$350; despite this high price tag, WorldSpace believes that it will sell 500 000 sets by the year end.

WorldSpace has developed its own proprietary digital radio system and uses processing on-board the satellite to do much of the 'multiplexing' work. As this edition of *Practical Wireless* goes to press, only a relatively small number of content providers have signed up - the latest additions are **Medi-1** and **CNN Radio**. None of the big international services have yet announced their intention to join WorldSpace's programme line-up.

Analysts are still unconvinced by the WorldSpace proposition. No new technology has ever been rolled out in the developing world, and the broadcasters who have committed to the system are not big names and so are unlikely to drive large volumes of receiver sales. So where is the money coming from to sustain this multi-million dollar operation? It's from the Middle East, probably Saudi Arabia and more is needed to keep WorldSpace afloat (or orbiting) in the coming months. Watch this column for the latest news about WorldSpace as it goes live.

THAT'S ALL FOR THIS TIME AROUND. KEEP IN TOUCH WITH THE BROADCAST BANDS AND LET ME KNOW ABOUT ANYTHING INTERESTING YOU HEAR. UNTIL NEXT MONTH, 73!

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a bit easier on the hobbyist's pocket, we're offering you, the reader, a chance to subscribe to *Practical Wireless* at the old subscription prices. For the next

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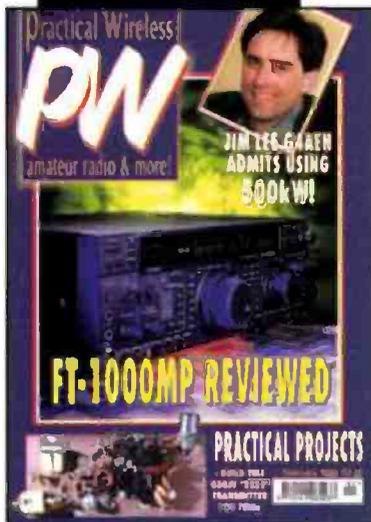
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## HATELY ANTENNA TECHNOLOGY

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### ARE YOU ON HF? THE BANDS ARE SUPER NOW.

Why not enjoy your licence this Spring, now that conditions are so good? Was it the hassle of small garden space, or planners plague that drove you off HF? You should see this plot, Two telephone wires over it to a pole in the corner (yes, they are in the back gardens in Scotland but at least our front streets are more tidy) with about sixteen twins going to it. Perhaps that is what led me to develop antennas which are compact and yet efficient and inconspicuous.

With a Crossed Field Antenna you need not be held back. The MONOBAND CROSSED FIELD LOOPS are so small they can be held up at the roof peak or gutters looking like a fancy TV aerial, the ELECTROMAGNETIC DELAY-LINE RADIATORS can lie concealed in a plastic gutter, or go over the peak of the roof like a TV down-lead. There is a short one for bungalows and tall houses with the shack upstairs, and a longer one for the two or three storey villa. These work on any band so whether you are a night owl on eighty, or a noon-day DX man, you can always get someone somewhere with an EMDR.

Telephone or write for a couple of leaflets. There are prices to tempt all comers.  
Proprietor: Maurice C Hately, M Sc FEE - licenced since 1950 now GM3HAT.

## J. BIRKETT

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£22 pair

EX M.D.D. R.F. MULTIMETERS TYPE CT471C Complete with leads, R.F. probes.

Measures up to 1500MHz with instructions. Takes 3D type batteries. Sold as is but with serviceable label @ £20. (P&P £10)

TRW UHF R.F. POWER TRANSISTORS type TP4577, PT4642. No information both @ £1 each.

PHILIPS CONCENTRIC TRIMMERS 30pF @ 25p.

PIHER CERAMIC TRIMMERS 3 to 10pF @ 10 for £1, 5pF tubular trimmers @ 25p, 10-10pF differential airspaced trimmer @ 25p

VITRAMON FIXED TRANSMITTING CAPACITORS 470pF 2Kv, 680pF 2Kv @ 50p each.

FETS 21C019 @ 25p, J230 @ 20p, J304 @ 25p, J309 @ 50p, J310 @ 60p, MPF102 @ 45p, 2N4221A @ 40p.

SUB-MINIATURE BEAD LEADS Red @ 10 for £1, transistors BC212 @ 20 for £1.

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250-250-20-20-20pF @ £3.50, 350-400pF @ £3.50, 365-365-365pF @ £4.95, C504 types 10pF 25pF, 50pF All @ £3.50 each.

X-BAND GUNN DIODES @ £1.80. X-Band detector diodes like 1N23 @ 50p, SIM2 @ 50p, 1501 @ £1.60, J band gunn diodes @ £1.70, high power version @ £5, 24GHz gunn diodes @ £2.40, 18GHz limiting diodes @ 50p, 1N416C 2GHz diode @ 75p, X-band diode gem @ £1.50, gem2 @ £1.50.

ITT CRYSTAL FILTERS TYPE G24CC 10.7MHz, BW6MHz, 024BF 21.4MHz, BW7.5MHz. Both @ £2 each.

ACCESS SWITCH, BARCLAYCARD & AMERICAN EXPRESS cards accepted.

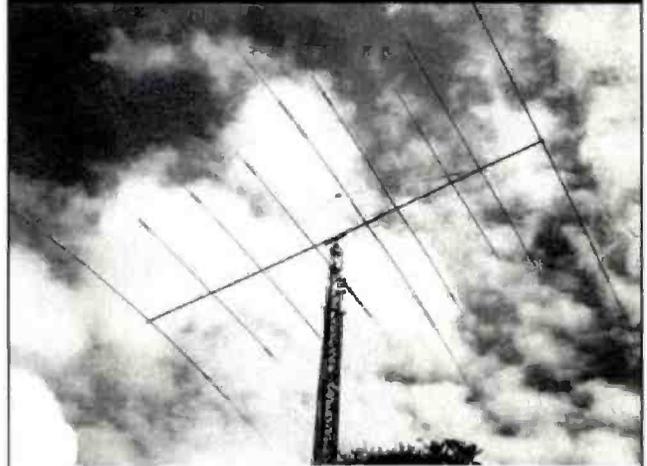
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## MOSLEY H.F. ANTENNAS



Unlike other makes, Mosley Antennas have pre-drilled and colour coded element pieces which makes assembly quick and easy.



Unlike other makes, all Hardware is of Stainless Steel, and tubing is aircraft grade, drawn, aluminium. This means that the telescopic tubing can be of closer tolerance. There is no need therefore for unsightly hose clamps.

Unlike other makes, Mosley's unique design has two traps in each trap assembly. A Mosley 3 element, tri-bander has only 6 trap assemblies, whilst other makes have twelve!

Consider the difference that makes to wind loading and structural stability.

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RV-4-C	10/15/20/40m	£249
RV-6-C-WARC	10/12/15/17/20/40m	£329
RV-7-C-WARC	10/12/15/17/20/30/40m	£349

### STANDARD

TA-33-JR-N	10/15/20m	3 EL	£319
TA-33-JR-N-WARC	10/12/15/17/20m	4 EL	£439

### HEAVY DUTY

TA-33-M-WARC	10/12/15/17/20m	4 EL	£589
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### HEAVY DUTY COMPACT

TA-53-M-WARC	10/12/15/17/20m	4 EL	£649
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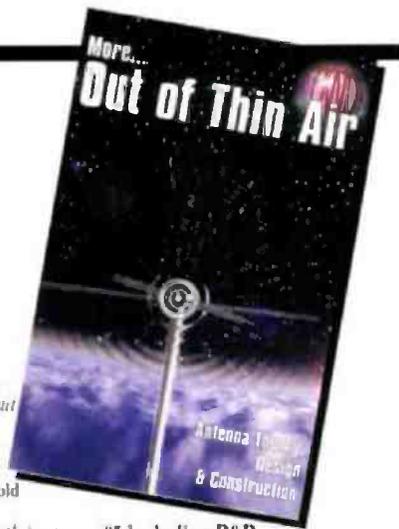
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# International Amateur Radio Collision Prefix Listing 1999

Price: £2.00



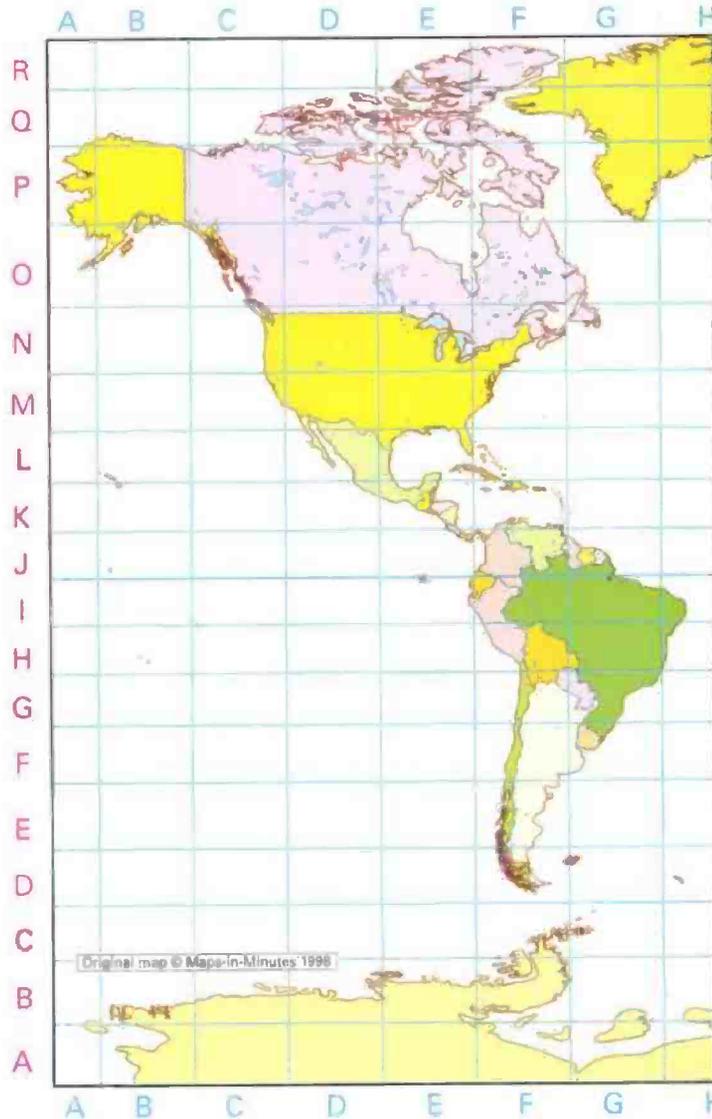
Prepared by the PW Editorial Team,  
Sponsored by Icom (UK) Ltd. and presented  
free with the March 1999 Practical Wireless

Callsign	Allocated to	Map Loc.
2AA-2ZZ	UK and Northern Ireland	IO
3AA-3AZ	Monaco	JN
3BA-3BZ	Mauritius	LG
3CA-3CZ	Equatorial Guinea	JJ
3DA-3DM	Swaziland	KG
3DN-3DZ	Fiji	RH
3EA-3FZ	Panama	E/FJ
3GA-3GZ	Chile	FE/G
3HA-3UZ	China	NM / OM
3VA-3VZ	Tunisia	JM
3WA-3WZ	Viet Nam	OK/L
3XA-3XZ	Guinea	IJ/K
3YA-3YZ	Norway (Bouvet Island)	ID
3ZA-3ZZ	Poland	KO
4AA-4CZ	Mexico	DL
4DA-4IZ	Philippines	PJ/K
4JA-4KZ	Azerbaijan	L/M/N
4LA-4LZ	Georgia	LN
4MA-4MZ	Venezuela	FJ
4NA-4OZ	Yugoslavia	JK/N
4PA-4SZ	Sri Lanka	NJ
4TA-4TZ	Peru	FH/I
4UA-4UZ	United Nations	
4VA-4VZ	Haiti	FK
4XA-4XZ	Israel	KM
4YA-4YZ	International Civil Aviation Organisation	
4ZA-4ZZ	Israel	KM
5AA-5AZ	Libya	J/K/L
5BA-5BZ	Cyprus	KM
5CA-5CZ	Morocco	IL/M
5HA-5IZ	Tanzania	KI
5JA-5KZ	Colombia	FJ
5LA-5MZ	Liberia	IJ
5NA-5OZ	Nigeria	JJ/K
5PA-5PZ	Denmark	JQ
5RA-5SZ	Madagascar	LG/H
5TA-5TZ	Mauritania	IK/L
5UA-5UZ	Niger	JK/L
5VA-5VZ	Togo	JJ
5WA-5WZ	Western Samoa	AI
5XA-5XZ	Uganda	KJ
5YA-5YZ	Kenya	KI/J
6AA-6BZ	Egypt	KL
6CA-6CZ	Syria	KM
6DA-6JZ	Mexico	DL
6KA-6NZ	South Korea	PM
6OA-6OZ	Somalia	LJ/K
6PA-6SZ	Pakistan	ML/M
6TA-6UZ	Sudan	KK
6VA-6WZ	Senegal	IK
6XA-6XZ	Madagascar	LG/H
6YA-6YZ	Jamaica	FK
6ZA-6ZZ	Liberia	IJ
7AA-7IZ	Indonesia	O/PI
7JA-7NZ	Japan	PM
7OA-7OZ	Yemen	LK
7PA-7PZ	Lesotho	KF/G
7QA-7OZ	Malawi	KH
7RA-7RZ	Algeria	JL/M
7SA-7SZ	Sweden	JO/P
7TA-7YZ	Algeria	JL/M
7ZA-7ZZ	Saudi Arabia	LL
8AA-8IZ	Indonesia	O/PI
8JA-8NZ	Japan	PM
8OA-8OZ	Botswana	KG/H
8PA-8PZ	Barbados	GK
8QA-8QZ	Maldives	MJ
8RA-8RZ	Guyana	GJ

Callsign	Allocated to	Map Loc.
8SA-8SZ	Sweden	JO/P
8TA-8YZ	India	MK/L
8ZA-8ZZ	Saudi Arabia	LL
9AA-9AZ	Croatia	JN
9BA-9DZ	Iran	LL/M
9EA-9FZ	Ethiopia	KK
9GA-9GZ	Ghana	V/JJ
9HA-9HZ	Malta	JM
9IA-9JZ	Zambia	KH
9KA-9KZ	Kuwait	LL
9LA-9LZ	Sierra Leone	IJ
9MA-9MZ	Malaysia	OJ
9NA-9NZ	Nepal	NL
9OA-9TZ	Zaire	KI/J
9UA-9UZ	Burundi	KI
9VA-9VZ	Singapore	OJ
9WA-9WZ	Malaysia	OJ
9XA-9XZ	Rwanda	KI
9YZ-9ZZ	Trinidad and Tobago	FK
A2A-A2Z	Botswana	KG/H
A3A-A3Z	Tonga	AI
A4A-A4Z	Oman	LL/K
A5A-A5Z	Bhutan	NL
A6A-A6Z	United Arab Emirates	LL
A7A-A7Z	Qatar	LL
A8A-A8Z	Liberia	IJ
A9A-A9Z	Bahrain	LL
AAA-ALZ	USA	EM(+)
AMA-AOZ	Spain	IM/N
APA-ASZ	Pakistan	ML/M
ATA-AWZ	India	MK/L
AXA-AXZ	Australia	PG
AYA-AZZ	Argentina	FE/F
BAA-BZZ	China	NM / OM
C2A-C2Z	Nauru	RI
C3A-C3Z	Andorra	JN
C4A-C4Z	Cyprus	KM
C5A-C5Z	Gambia (The)	IK
C6A-C6Z	Bahamas	FL
C7A-C7Z	World Meteorological Organisation	
C8A-C9Z	Mozambique	KG/H
CAA-CEZ	Chile	FE/F
CFA-CKZ	Canada	DO / FO
CLA-CMZ	Cuba	EF/L
CNA-CNZ	Morocco	IL/M
COA-COZ	Cuba	EF/L
CPA-CPZ	Bolivia	FH
CQA-CUZ	Portugal	IM/N
CVA-CXZ	Uruguay	GF
CYA-CZZ	Canada	DO / FO
D2A-D3Z	Angola	JH/I
D4A-D4Z	Cape Verde	HK
D5A-D5Z	Liberia	IJ
D6A-D6Z	Comoros	LH
D7A-D9Z	South Korea	PM
DAA-DRZ	Germany	JN/O
DSA-DTZ	South Korea	PM
DUA-DZZ	Philippines	PJ/K
E2A-E2Z	Thailand	OK
E3A-E3Z	Eritrea	LL
EAA-EHZ	Spain	IM/N
EIA-EJZ	Ireland	IO
EKA-EKZ	Armenia	LM/N
ELA-ELZ	Liberia	IJ
EMA-EQZ	Ukraine	KN/O
EPA-EQZ	Iran	LL/M
ERA-ERZ	Moldova	KN
ESA-ESZ	Estonia	KO

Callsign	Allocated to	Map Loc.
ETA-ETZ	Ethiopia	KK
EUA-EWZ	Belarus	KO
EZA-EZZ	Kyrgyzstan	MN
EYA-EYZ	Tajikistan	MM
EZA-EZZ	Turkmenistan	LN / MM
FAA-FZZ	France	I/JN(+)
GAA-GZZ	UK and Northern Ireland	IO(+)
H2A-H2Z	Cyprus	KM
H3A-H3Z	Panama	E/FJ
H4A-H4Z	Solomon Islands	O/RI
H6A-H7Z	Nicaragua	EK
H8A-H9Z	Panama	E/FJ
HAA-HAZ	Hungary	J/KN
HBA-HBZ	Switzerland	JN
HCA-HCZ	Ecuador	FJ/I
HEA-HEZ	Switzerland	JN
HFA-HFZ	Poland	KO
HGA-HGZ	Hungary	J/KN
HHA-HHZ	Haiti	FK
HIA-HIZ	Dominican Republic	FK
HJA-HKZ	Colombia	FJ

Callsign	Allocated to	Map Loc.
HLA-HLZ	South Korea	PM
HMA-HMZ	North Korea	PM/N
HNA-HNZ	Iraq	LM
HOA-HPZ	Panama	E/FJ
HOA-HRZ	Honduras	EK
HSA-HSZ	Thailand	OK
HTA-HTZ	Nicaragua	EK
HUA-HUZ	El Salvador	EK
HVA-HVZ	Vatican City	JN
HWA-HYZ	France	I/JN(+)
HZA-HZZ	Saudi Arabia	LL
IAA-IZZ	Italy	JN
J2A-J2Z	Djibouti	LL
J3A-J3Z	Grenada	FK
J4A-J4Z	Greece	KM/N
J5A-J5Z	Guinea-Bissau	IK
J6A-J6Z	Saint Lucia	FK
J7A-J7Z	Dominica (Island)	FK
J8A-J8Z	St Vincent & The Grenadines	FK
JAA-JSZ	Japan	PM

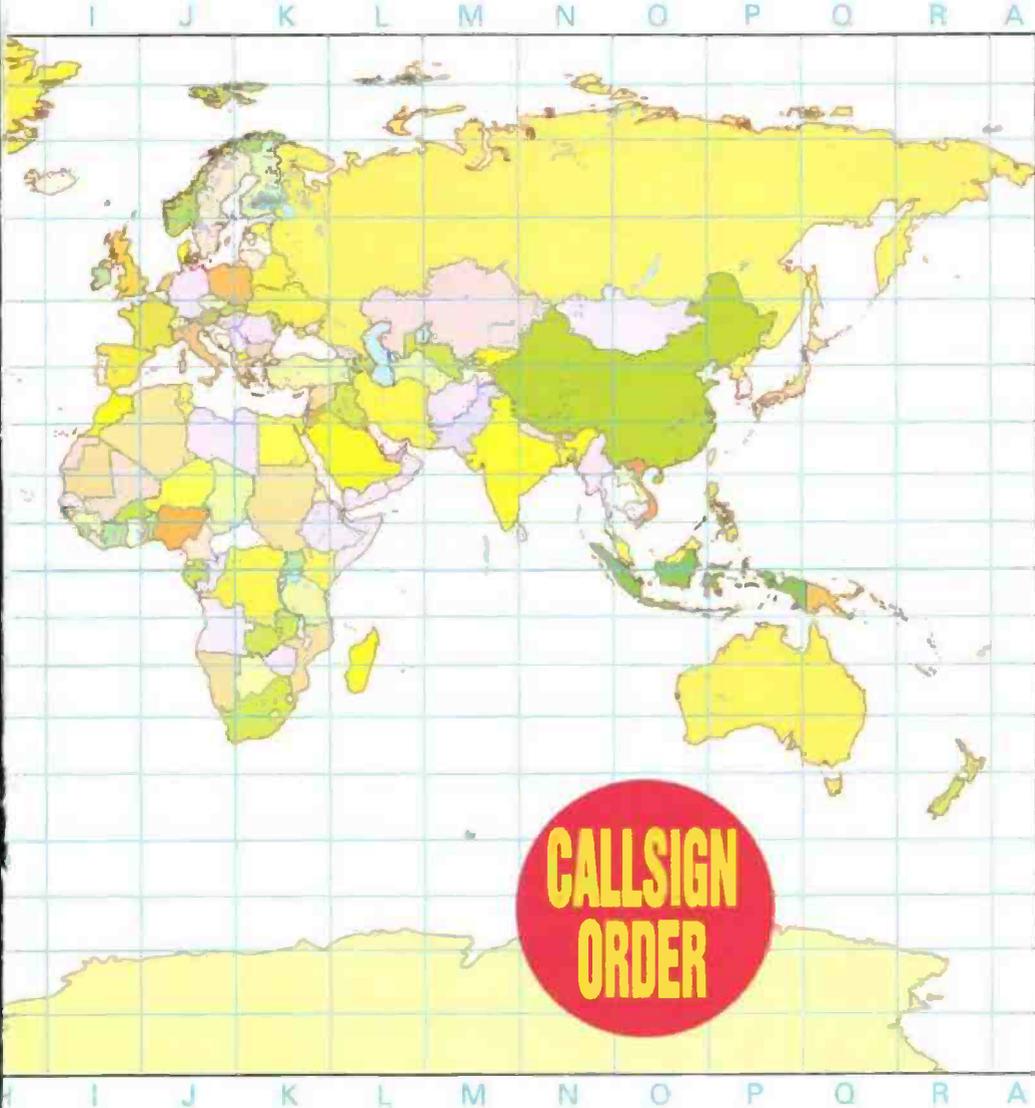


Callsign	Allocated to	Map Loc.
JTA-JVZ	Mongolia	N/ON
JWA-JXZ	Norway	JO/P
JYA-JYZ	Jordan	KM
JZA-JZZ	Indonesia	O/PI
KAA-KZZ	USA	EMI(+)
LZA-LXZ	Argentina	FE/F
LAA-LNZ	Norway	JO/P
LOA-LWZ	Argentina	FE/F
LXA-LXZ	Luxembourg	JO
LYA-LYZ	Lithuania	KO
LZA-LZZ	Bulgaria	KN
MAA-MZZ	UK and Northern Ireland	IO
NAA-NZZ	USA	EMI(+)
OAA-OCZ	Peru	FH/I
ODA-ODZ	Lebanon	KM
DEA-OEZ	Austria	JN
OFA-OJZ	Finland	KP
OKA-OLZ	Czech Republic	JN/O
OMA-OMZ	Slovak Republic	J/KN
ONA-OTZ	Belgium	JO
OUA-OZZ	Denmark	JO

Callsign	Allocated to	Map Loc.
P2A-P2Z	Papua New Guinea	QI
P3A-P3Z	Cyprus	KM
P4A-P4Z	Aruba	FK
P5A-P5Z	North Korea	PM/N
P6A-P6Z	Netherlands	JO
PJA-PJZ	Netherlands Antilles	FK
PKA-POZ	Indonesia	O/PI
PPA-PYZ	Brazil	GH/I
P2A-P2Z	Suriname	GJ
RAA-RZZ	Russian Federation	LO(+)
S2A-S2Z	Bangladesh	NL
S5A-S5Z	Slovenia	JN
S6A-S6Z	Singapore	OJ
S7A-S7Z	Seychelles	LI
S8A-S8Z	South Africa	KF/G
S9A-S9Z	Sao Tome and Principe	JJ
SAA-SMZ	Sweden	JO/P
SNA-SRZ	Poland	KO
SSA-SSM	Egypt	KL
SSN-STZ	Sudan	KK
SUA-SUZ	Egypt	KL

Callsign	Allocated to	Map Loc.
SVA-SZZ	Greece	KM/N
T2A-T2Z	Tuvalu	RI
T3A-T3Z	Kiribati	AI
T4A-T4Z	Cuba	EF/L
T5A-T5Z	Somalia	LJ/K
T6A-T6Z	Afghanistan	MM
T7A-T7Z	San Marino	JN
T8A-T8Z	Palau	PJ
T9A-T9Z	Bosnia and Herzegovina	JN
TAA-TCZ	Turkey	KM/N
TDA-TDZ	Guatemala	EK
TEA-TEZ	Costa Rica	EJ/K
TFA-TFZ	Iceland	H/P
TGA-TGZ	Guatemala	EK
THA-THZ	France	I/JN(+)
TIA-TIZ	Costa Rica	EJ/K
TJA-TJZ	Cameroon	JJ
TKA-TKZ	France	I/JN(+)
TLA-TLZ	Central Africa Republic	JJ/K
TMA-TMZ	France	I/JN(+)
TNA-TNZ	Congo	JJ/J

Callsign	Allocated to	Map Loc.
TDA-TDZ	France	I/JN(+)
TRA-TRZ	Gabon	JJ/J
TSA-TSZ	Tunisia	JM
TTA-TTZ	Chad	JK/K
TUA-TUZ	Ivory Coast	IJ
TVA-TXZ	France	I/JN(+)
TYA-TYZ	Benin	JJ/K
TZA-TZZ	Mali	IK
UAA-UIZ	Russian Federation	LO(+)
UJA-UMZ	Uzbekistan	MN
UNA-UOZ	Kazakhstan	L/MN
URA-UTZ	Ukraine	KN/O
UUA-UZZ	Ukraine	KN/O
V2A-V2Z	Antigua and Barbuda	FK
V3A-V3Z	Belize	EK
V4A-V4Z	Saint Kitts and Nevis	FK
V5A-V5Z	Namibia	JG/H
V6A-V6Z	Micronesia	OJ
V7A-V7Z	Marshall Islands	RJ
V8A-V8Z	Brunei	OJ
VAA-VGZ	Canada	DO / FO
VHA-VNZ	Australia	PG
VOA-VOZ	Canada	DO / FO
VPA-VSZ	UK and Northern Ireland	IO(+)
VTA-VWZ	India	MK/L
VXA-VYZ	Canada	DO / FO
VZA-VZZ	Australia	PG
WAA-WZZ	USA	EMI(+)
XAA-XIZ	Mexico	DL
XJA-XOZ	Canada	DO / FO
XPA-XPZ	Denmark	JO
XOA-XRZ	Chile	FE/G
XSA-XSZ	China	NM / OM
XTA-XTZ	Burkina Faso	I/JK
XUA-XUZ	Cambodia	OK
XVA-XVZ	Viet Nam	OK/L
XWA-XWZ	Laos	OK/L
XXA-XXZ	Portugal	IM/N
XYA-XZZ	Myanmar (Burma)	NK/L
Y2A-Y2Z	Germany	JN/O
YAA-YAZ	Afghanistan	MM
YBA-YHZ	Indonesia	O/PI
YIA-YIZ	Iraq	LM
YJA-YJZ	Vanuatu	RH
YKA-YKZ	Syria	KM
YLA-YLZ	Latvia	KO
YMA-YMZ	Turkey	KM/N
YNA-YNZ	Nicaragua	EK
YOA-YRZ	Romania	KN
YSA-YSZ	El Salvador	EK
YTA-YUZ	Yugoslavia	J/KN
YVA-YYZ	Venezuela	FJ
YZA-YZZ	Yugoslavia	J/KN
Z2A-Z2Z	Zimbabwe	KG/H
Z3A-Z3Z	Macedonia (Ex Yugoslav Republic)	KN
ZAA-ZAZ	Albania	KN
ZBA-ZJZ	UK and Northern Ireland	IO(+)
ZKA-ZMZ	New Zealand	RE/F
ZNA-ZOZ	UK and Northern Ireland	IO(+)
ZPA-ZPZ	Paraguay	GG
ZOA-ZOZ	UK and Northern Ireland	IO(+)
ZRA-ZUZ	South Africa	KF/G
ZVA-ZZZ	Brazil	GH/I



Count on us!

# How To Use The Prefix Listing

Rob Mannion G3XFD describes how to use the International Prefix Listing to best advantage.

Once you've got your copy of the *PW* International Prefix Listing you'll have the most up-to-date prefix information which we've been able to research, on behalf of readers, from the International Amateur Radio Union (IARU) public domain sources.

The list is also in a most convenient form for instant reference and does away with the need to clutter up your desk with heavy reference books and manuals. All the basic information you need - along with a map and reference system - is there waiting to be used. So, get busy listening, transmitting and chasing that DX station!

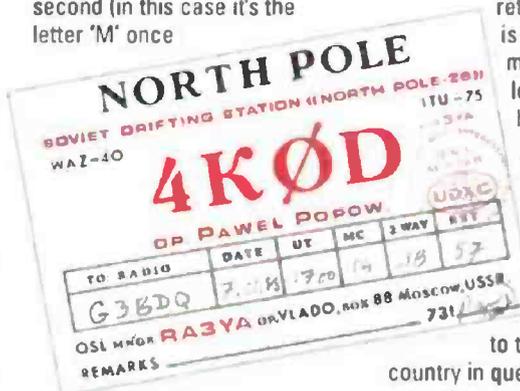
## Using The Listings

Using the listing is simple indeed - and the Editorial team have provided all the necessary map cross references so that you'll be able to find what you need very quickly. Additionally, to speed the process up even more - there's also a 'reverse' listing (More about that shortly!).

The listing is presented in **alphabetic order - first by callsign, then by country**. This means that (for example) if you wish to find out what callsigns are allocated to Afghanistan you will find this particular country at the very beginning of the 'Alphabetical' list. Following the country's name, you will then see the complete up-to-date callsigns allocated (but not necessarily in use) for that country. Finally, this is accompanied with a map location reference for that country. In the case of Afghanistan it's 'MM'. If you hear

an unknown (to you) callsign - you look it up in the 'by prefix' list. It's that simple!

To use the map locator reference all you have to do is identify the letter indicated at the **top and bottom** of the map **first** (in this case the letter 'M') and then locate the other letter either on the **left or right** hand-side second (in this case it's the letter 'M' once



This is from one station who cannot be offended when told they're 'drifting'!

again) to find the square where the country is located. If you're not familiar with the country you can then use a full size Atlas to learn more about the country in question.

Incidentally, I must mention at this stage that I'm a confirmed 'Mapaholic'. I love reading maps and learning as much as I can about my own country and those abroad. However, despite my keen interest (I have a huge collection of maps at home) I get caught out occasionally and sometimes rather embarrassingly. For example, I have to freely (and shamefully) admit that I did not know who or what the country called 'Myanmar' was until we had to

work on this listing. It turns out that it's the newly adopted name for Burma and to help readers we've identified it along with the previous name against the reference NK/L (I never stop learning doing this job!).

## Explaining The References

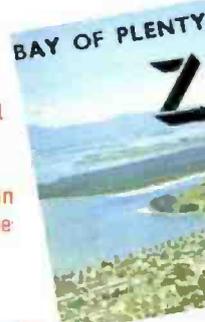
You'll notice that some references (Myanmar is one example) have more than two letters. This is because the country itself occupies more than one 'square' on the map we've presented with the listing and to draw attention to the fact that the country in question does cover more than one square - it will have the reference followed by a '+' sign.

Another country that obviously occupies much more than one square is the United States of America. In this case you'll find the reference letters for the USA followed by the '+' signs resulting in a reference of EM+.

However, complications set in when 'external' political possessions have to be taken into account and the system runs into problems here because in effect such possessions are often 'hidden'. Good examples of this are the American political possessions such as the Hawaiian Island group, the Caribbean Island of Puerto Rico (and other American owned Islands in the Caribbean) and Alaska. Because they are politically counted as part of the



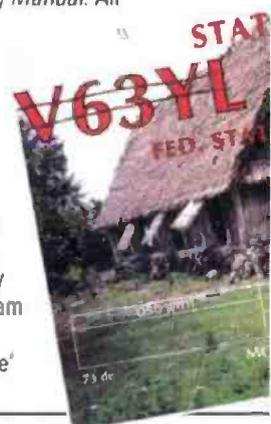
Confirming a c.w. QSO on 1.8MHz between G3BDQ and ZL1AH! The Bay of Plenty in New Zealand can be located on the North Island of New Zealand within map reference square RF.



USA they are not listed separately. (This of course also applies to many other countries).

The Hawaiian group have AH6, NH6 KH6 and WH6 callsigns allocated and 'nearby' (relatively speaking) Midway Island has KH4 allocated. Puerto Rico has KP4 allocated, followed by KP2 for the (almost next indoor neighbour) American Virgin Islands. Alaska and associated territories have AL7, KL7, NL7, WL7 allocated.

My advice for any keen 'USA DX hunter' is that they get the fully comprehensive and up-to-date information on the USA callsign listings and call areas by obtaining a copy of *The ARRL Operating Manual*. All new editions of this very useful book come complete with an extremely useful 'Ham Desktop Reference'

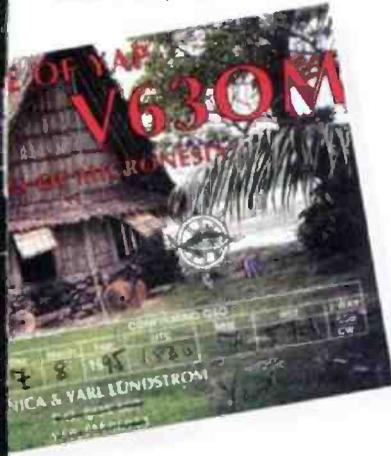


Christmas Island (VK9) can be found in square reference OH. Another (lesser known) Christmas Island can be found in Polynesia (map ref BJ) in call area T32.



booklet. It's highly recommended by G3XFD and has proved extremely useful indeed. (The manual is available from the PW Book Store).

One specific area for confusion is Antarctica and this comes about because no one country has exclusive rights to the whole continent. This has been the case since 1959 when an international treaty was signed and although it's difficult to generalise, the call signs (which aren't mentioned in the IARU general listings) that can be used by the various nations with a presence in Antarctica included: CE9AA-MM, PT/Y, KC4, LU, OR4, VK0, VP8, ZL5, ZS7, 3Y, R1 and 8J. (This



list is not exhaustive and other special calls may be allocated).

Obviously, there are bound to be some other anomalies when it comes to call sign allocations and although it's extremely difficult for any book to be always up-to-date for very long in this respect, I find *The Radio Amateur's World Atlas* to be very useful. This slim atlas provides all the information I need for call areas and it's easy to use and although you don't get a lot of book for the price you pay - the information and ease of use can be considered being 'above' valuation in purely financial terms. In other words if you're a keen DX chaser or listener you'll buy it anyway!

### New Countries

'New countries' can also provide difficulties when it comes to identification and location! However, many 'new' countries of course aren't in fact 'new' at all - instead they are often the result of the fragmentation of nations that have been in existence for a long time. Obvious examples are the various 'new' countries formed following the fragmentation of the former Yugoslavia (Slovenia, Croatia, Bosnia-Herzegovina and Macedonia) and the division of the former Czechoslovakia into The Czech Republic and the now entirely separate Slovak Republic, all of which are included in the most up-to-date form possible.

Occasionally, what appear to be oddities 'surface' and several readers have contacted me in recent years to query 'The Gambia' whenever this country is mentioned in the 'DX worked' listings. However, in this case there's a very simple answer indeed! 'The Gambia' is in fact a small country (very popular

nowadays as a holiday venue and providing superb opportunities for the determined Radio Amateur) literally set on either side of the River Gambia - hence 'The Gambia' which can be located in square reference IK, with the call signs C5A— to C5Z— allocated. (On a large scale atlas you'll find The Gambia surrounded on three sides by Senegal).

Some 'new' countries have also come about because of 'grouping' of scattered Islands. So, don't be caught out by coming across Cape Verde - it is in fact the new name of the beautiful Cape Verde Islands. The same applies to many other 'groupings' and for anyone whose education dates back to the days when we were often studying 'the pink bits on the atlas' - it can be quite confusing but the PW team has worked hard to make the whole identification process as simple and enjoyable as possible!

### Card Examples

To round off the guide on how to get the best from the prefix listing, regular PW author and 'DX-chaser' John Heys G3BDQ has kindly provided some examples of QSL cards from his



The Revillagigedo Archipelago is located in DK square on the Prefix Listing map. The QSL card confirms a c.w. QSO between G3BDQ and XF4T on 23rd November 1989.



Asuncion in Paraguay, South America, can be located within map locator square GG.

extensive collection. My thanks go to John for providing the interesting illustrations, which are good examples for referencing and also provide encouragement to get on the air to chase that DX!

So, good luck with your operating and if you're not quite sure where the specific countries mentioned on the cards are - you can find out with the references provided. The next stage is to start adding to your own collection of 'countries worked', learning about our beautiful world at the same time!

G3XFD

Radio Amateurs in the State of Yap! The QSL card confirms a c.w. QSO between G3BDQ and V630M from Yap during August 1995. Yap is located within the large group of Islands collectively known as 'Micronesia' (Map ref. QJ).

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ICOM

G

# If you've got a G-Spot... the IC-706MKIIIG will find it!

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- Now includes 430MHz (70cm)!*
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- Major function keys are illuminated!*
- Plus all the usual fantastic benefits of owning a '706'!*

*Improved operation for local and DX use, as a base or mobile.*

*Same compact body as IC-706 and IC-706MKII for flexible installation.*

*UT-106 DSP unit supplied as standard, providing noise reduction and auto-notch functions.*

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*Separate call channels for 2m and 70cm.*

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