

Practical Wireless

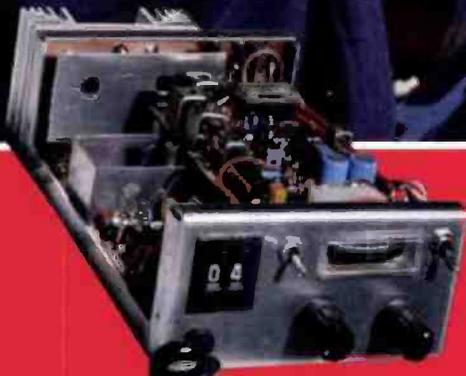
# PW

amateur radio & more!

UP  
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WITH  
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**BREAKING  
THE ICE  
WITH UA9MCM**



**PW PANTHER  
PROJECT Pt.2**

August 1999 £2.50



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### YAESU FT-1000MP 160 - 10m All Mode



Super  
Discount  
Phone!

The radio that has stood the test of time and used by the worlds top DXers and DXpeditions. Its excellent receiver combined with its superior transmitted signal makes this a natural choice for the HF enthusiasts. AC and DC versions in stock.

### ICOM IC-746 160 - 2m All Mode



£1695

This base station transceiver offers wide band capability and includes an automatic ATU. Its 100 Watts output on all bands makes this a very attractive purchase and offers full CTCSS, electronic memory keyer,

alphanumeric memories, DSP, Band Scope, VSWR meter etc. Leaflet available.

### YAESU FT-100 160 - 70cm All Mode



£1259  
Phone

See Radcom Review

Now available from stock, this rig is now the smallest all-band available. We

have used it extensively and it is absolutely great. Read Radcom's in-depth review and then come to us for the best deal around.

### ICOM IC-706IIG 160 - 70cm All Mode

Plus FREE Triband Handheld  
Offer ends 31/7/99



£1199  
Phone

The IC-706II G is the latest model of this classic transceiver. Great for mobile, portable or base use. Its got a great pedigree and offers 100 Watts on all bands up to 50MHz with 50 Watts on 2m and 20 Watts on 70cm. CTCSS encode and a lovely display with removeable front panel. It's the tops! Ask for leaflet.

### YAESU FT-847 160 - 70cm All Mode



£1500  
Phone

The FT-847 has firmly established itself as a true all-band, all-mode transceiver. Loved by the VHF & UHF operators, and superb for satellite operation, it also offers great HF performance. We have sold more than any other dealer, which says a lot about our reputation and our price. Phone for free leaflet today.

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



£849

Probably one of the most underrated rigs. We love its superb receiver and amazing selectivity, particularly for CW. Then look at the price and remember you get a 100 Watts of pure delight. Why not phone for leaflet?

### YAESU FT-840 160 - 10m All Mode



£659

The FT-840 offers 100 Watts of well engineered RF together with a receiver that can more than hold its own. The large LCD readout makes for easy reading and the low price makes this the perfect first-HF rig buy. We have used this extensively and nobody will know you are running a sub £1,000 radio except your wallet!

### KENWOOD TS-870 160 - 10m All Mode



£1495

Now offered at a greatly reduced price, this digitally designed transceiver offers amazing receiver flexibility. Benefitting from the latest DSP technology, you will experience excellent receive performance and crisp clear transmitted audio. Phone!

### Linear Amp UK "Ranger" HF Linear

160 - 10m 800W Output.

We are now stocking the full range of Linear Amp UK models. Illustrated is the popular 811H 800Watt model covering 160-10m. Using low cost 811A tubes, it is economical to maintain. Up to 9dB of gain is available to you! (Subject to UK 400W licence limit). This desktop model is a great investment and can immediately be switched in and out of circuit as required.



£895

# We will **BEAT** Competitor's Prices

ICOM IC-R75 Receiver

By up to £100 **£629**



The IC-R75 has received rave reviews in the Amateur Radio Press. It's a very serious short wave receiver with coverage right up to 6m. What is more, the price is quite amazing compared to the competition. We have never sold so many SW receivers in quite a while!

## ADI AT-600

**£199**

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



## ADI AT-201

**£129**

- \* 2m Handheld
- \* 5W Output on 13.8V DC
- \* CTCSS Tones Included
- \* 25 / 12.5kHz Steps
- \* 40 Memory Channels
- \* Wideband Receive
- \* Uses 6 x AA cells (not inc.)



## Hora C-150

**£99.95**

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



## Hora C-408

**£89.95**

- \* 70cm Handheld
- \* 230mW Output
- \* CTCSS Tones Included
- \* 1.6MHz Repeater Shift
- \* 20 Memory Channels
- \* Wideband Receive
- \* Uses 2 x AA cells (not inc.)



## YAESU VX-1R

**£169**

- \* 2m / 70cm Handheld
- \* 500mW Output
- \* CTCSS Encode / Decode
- \* 25 / 12.5kHz Steps
- \* 290 Memory Channels
- \* AM Airband Receive
- \* Lithium Cell & Charger



## YAESU VX-5R

**£300**

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



## YAESU FT-50R

**£220**

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



## KENWOOD THG-71E

**£279**

- \* 2m & 70cm Handheld
- \* 6W Output on 13.8V DC
- \* Full CTCSS & 12.5/25kHz Steps
- \* 220 Multifunction Memories
- \* Programmable Features
- \* Rugged Construction
- \* Ni-cads & AC charger



## KENWOOD TH-D7E

**£299**

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



## ICOM IC-T8E

**£349**

- \* 6m / 2m / 70cm Handheld
- \* 5W Output on 13.8V DC
- \* 25 / 12.5kHz Switchable
- \* 123 Multifunction Memories
- \* CTCSS & 1750Hz Tone
- \* Programmable Features
- \* Ni-cads & AC charger



## ICOM IC-Q7E

**£159**

- \* 2m & 70cm Handheld
- \* 300mW Output
- \* CTCSS Encoder
- \* Rx. 30kHz - 1309MHz FM / AM
- \* 200 Multifunction Memories
- \* LCD Backlight & Timer
- \* Runs from 2 x AA Cells



## ICOM IC-T81E

**£309**

- \* 6m / 2m / 70cm / 23cm Handy
- \* 5W Output on 13.8V DC (1w 23cm)
- \* CTCSS & 1750Hz Tone
- \* 12.5 / 25kHz Switched
- \* 124 Alphanumeric Memories
- \* Wideband Rx. FM WFM & AM
- \* Ni-MH Cells & AC charger



## ADI AR-147

**£199**

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



## KENWOOD TM-V7E

**£499**

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



## ICOM IC-2100H

**£299**

- \* 2m Mobile 55 Watts Output
- \* 50 Alphanumeric Memories
- \* Switched 12.5kHz and 25kHz Filters
- \* CTCSS and 1750Hz Tone



## ICOM IC-2800H

**£549**

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



## ICOM IC-207H

**£309**

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



## KENWOOD TM-742E

**£399**

- \* 23cms Option
- \* 2m and 70cm
- \* 50W and 35W
- \* Optional 28MHz, 50MHz or 1296MHz Modules
- \* CTCSS, 1750Hz Tone and DTMF
- \* 101 Memories and Detachable Head



## KENWOOD TM-G707E

**£349**

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



## YAESU FT-8100R

**£399**

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



## KENWOOD VC-H1

**£299**

- \* Full SSTV System
- \* Sends & Receives Video
- \* Built-in Colour camera
- \* Built-in colour Screen
- \* Connect to VHF or HF rigs
- \* Runs all the popular modes



## RF Metering

### Avair AV-600 1.8 - 525MHz 400W



VSWR and power meter. Reads RMS and PEP. The ideal all-band VSWR meter. Reads up to 400W (3 ranges)

### Avair AV-20 / AV-40 Cross Needle

Cross needle meters at a very attractive price. The AV-20 covers 1.8 - 150MHz and the AV-40 covers 140 - 525MHz. Both units have switched power levels of 0-15 / 0-150W. Available during June.



### Watson VSWR / Power Meters.



Measure VSWR and RMS or PEP power. Large easy to read meter. 3 ranges: 5W, 20W and 200W.

W-220	1.8 - 200MHz	£49.95
W-420	118 - 530MHz	£49.95
W-620	1.8 - 525MHz	£89.95

### Watson Off-Air Frequency Counters



High quality units supplied with antennas, ni-cad packs and AC chargers. They are very sensitive and may be used for near-field checking.

Hunter	10MHz - 3GHz	£59.95
FC-130	1MHz - 3GHz, switched gates, 16 segments	£79.95
Super Hunter	10Hz to 3GHz and with signal strength meter.	£149.95

### W50-RM Dual Band SWR & ATU

What a great idea! A combined VSWR meter and dual band atu matcher for 2m / 70cms. Can be left in circuit. The atu is adjusted with the trimmer tool supplied (controls for each band). Dual power levels of 0-15W or 0-60W can be selected.



## Antenna Rotators

### AR-300XL Lightweight



Ideal for VHF and UHF systems of small to medium size. Includes control box, motor and Brackets. Support mast sizes can be up to 50mm

### YS-130 Medium Weight VHF

Made in Japan, this rotator will support medium sized VHF arrays. The diecast motor housing will fit masts up to 40mm diameter. Includes motor, control box and brackets.



### New Create RC5-1 Rotator

We are pleased to be able to offer one of the most popular rotators from Japan. The RC5-1 will handle 3-4 element HF beams. It has a torque of 6kg (rotation) and 80kg braking. Uses 7-core cable.



### Yaesu Rotators for HF Systems

G-450C	Smaller Tri-band Yagis etc.	£379.00
G-650C	Larger Tri-banders etc.	£499.00
G-1000C	4 element HF Yagis (cw with 25m cable)	£559.00
G-2800SDX	Really large HF Yagis	£1229.00
G-550	Elevation Rotator	£499.00
G-5500	Az/EI Rotator	£309.00

We have extensive stocks of tower mounts, bearings and rotator cables. Phone if you need advice. Leaflets available.

## Audio Products

### W-184 HF DX Headset

Selected by us as a great value headset for HF base operation. Comprises 8 Ohm dual head unit with dynamic microphone. You just need to terminate the mic cable to a suitable connector. If you don't want to use MOX we can supply PTT box model complete for £42.95



### WEP-501 Earpiece with adjustable boom

Now extensively used in the professional market, the boom is fully adjustable with rotation hinge that permits left or right fitting. Fits neatly over the ear. Fittings available for popular handhelds. Models available for Yaesu, Kenwood, Motorola.



## HF Mobile Antenna

### Texas Bugcatcher

80m - 10m 1.5kW

6dB of Gain!

From USA



We measured over 6dB of gain on 80m and 40m compared to a standard helical whip. The secret is in the 3" diameter high "Q" air spaced loading coil. Measuring a little over 2m tall, it covers all 8 HF bands using coil tap positions. Standard 3/8" base fits all popular 3/8" mounts. Optional base matcher guarantees 1:1 VSWR whilst optional kit adds 6m coverage. Probably the most popular antenna in the USA "I was so impressed I installed one myself as illustrated - G3OJW/M"

## VHF/UHF Antennas

### Base Station Fibre Glass

WVA-100	2m/70cm 2/4.5dB 1.09m	£29.95
W-30	2m/70cm 3/6dB 1.15m	£39.95
W-50	2m/70cm 4.5/7.2dB 1.8m	£49.95
W-300	2m/70m 6.5/9dB 3.1m	£59.95
W-2000	6m/2m/70cm 2.5m	£69.95

### Mobile Antennas PL-259 bases

W-285	2m 5/8th foldover base	£14.95
W-77LS	2m/70cm 0.39m low profile	£18.95
W-770HB	2m/70cm 1.1m 3/5.5dB	£24.95
W-7900	2m/70cm 5/7.6dB 1.5m	£32.95
W-627	6m/2m/70cm 1.62m	£34.95

### Mounts

W-3HM	Hatch / Boot Mount	£14.95
W-3CK	5m low loss cable kit	£18.95
W-ECH	5m RG-58 standard cable	£12.95
WMM3	Magnetic mount	£10.95
WAM-2	BNC window mount	£12.95

## Duplex / Triplexers

WD-25	HF-2m / 70cms designed for masthead mounting. SO-239	£24.95
WD-24	As above but for indoor use and fitted with common SO-239 and dual PL-259	£22.95
WD-24N	As above but one "N"	£24.95
MX-62	1.8 - 54/140-470MHz 239/259	£49.95
MX-72	1.8-150/400-450MHz 239/259	£32.95
MX-72N	As above but with one "N" plug	£35.95
MX-2000	6m / 2m / 70cm Triplex	£52.95
MX-3000	2m/70cm/23cm Triplex	£54.95

## MQ-2 Mini Beam



£379



SEE REVIEW

If you have a small garden, this antenna could well be the answer. A 2-element beam that covers all bands from 6m to 20m and handles 1.2kW. Maximum element length is 3.35m and the boom measures just 1.37m. At last you can get on the bands and work the DX! MQ-1 covering 6,10,15 & 20m also available £299

## Back in Stock

### DIAMOND GSV-3000 PSU

30 Amps 1 - 15 Volts



£149

This fan cooled twin meter power supply is a high quality design that we normally sell to professional users. But at this special price, now ham operators can afford one!

## Motorola Talkabout 200

### Licence FREE PMR-446

446MHz 500mW Handy  
8 Channels  
38 CTCSS Tones  
3 Kilometres Range  
3 x AA Cells Req'd.

Now you can use a 446MHz handheld without a licence. Ideal for a wide range of uses. The package provides everything you need for personal communications. Just add 3 x AA cells and you are on the air!



£99.95

## Watson Super Searcher

10Hz - 3GHz

The Super Searcher is a frequency counter covering 10Hz - 3GHz with the ability to auto tune most AOR and loom handheld receivers. Supplied with internal ni-cad pack and AC charger.



£99.95

## WSC2 & WSC-3 Hip Handheld Cases

Keep your handheld safe but ready for use with these smart cases. They clip onto your belt and with the elasticated side panels, are able to fit any model. The WSC-2 is for the larger handhelds, the WSC-3 for the new generation of minis like VX-5 etc. Phone if in doubt.



£12.95

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Have you ever suffered from a severely aching wrist after sending Morse? Well, John Worthington GW3COI did, but he solved his problem ... take a look at his article to find out how.

## 36 ROB'S IRISH HOLIDAY

Rob Mannion G3XFD writes about his time spent in Ireland earlier in this year and describes just how the spirit of Amateur Radio reaches out across land and sea.

## 40 FAIR-WEATHER HILL-TOPPING

Colin Redwood G6MXL looks into v.h.f. operating on his local hill-tops and discovers that there are a lot of advantages. If you've ever fancied trying it then read this article to find out how.



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## SOLAR POWER

John Brown G4UBB says that recent articles on solar power panels on a spacecraft prompted him to try a system for himself - his experience wasn't gained in orbit though - but in sunny Pinner, Middlesex, in Greater London!



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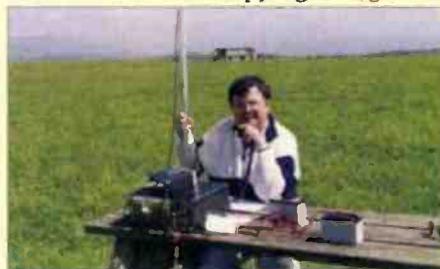
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# RadioScene

Seven Pages of band reports from all your favourite authors



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receiver.



**IC-T8E**  
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output.  
Military spec.  
£299



**IC-T22E**  
2m handie 5W.  
£185

**YAESU**



**FT-920AF**  
HF & 6m built-in tuner  
with FM & FREE AM/FM  
Filter. £1199



**FT-1000MP AC**  
Dual Receiver. Digital  
100W Competition radio.  
£2199



**FT-VX 1R**  
VHF/UHF  
Handie.  
Micro small.  
£199



**FT-847**  
The new mobile-  
base. DSP HF 2m-  
70cm 50MHz.  
£1499



**FT-100**  
HF 6m/2m/70cm extra  
small mobile.  
Information to follow.

**KENWOOD**



**TS-870**  
Still the only true DSP  
radio with TX, EQ N/R.  
£1699



**TS-570DG**  
Dedicated HF mobile-  
base DSP with built-in  
tuner. £899



**TH-G71E**  
Full 5 Watts  
power. Wide  
band receive.  
£239



**TM-G707**  
The new mobile package  
with features: High  
visibility display, 5-in-1  
programme memory,  
memory name function,  
multiscan facility & built-  
in CTCSS. £299

**ALINCO**



**DX-70TH**  
HF +6M £599



**DR-M06**  
6M MOBILE 20W  
£215



**DR-140**  
2M mobile 50W  
£220



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ALINCO	DR-M06 SX 6M FM	£159.00	KENWOOD	TS-811E TRANSCEIVER 70cm BASE / AC	£395.00
ALINCO	DX-70T 6M HF	£499.00	KENWOOD	TS-850 TRANSCEIVER 0-30MHz	£695.00
AOR	8200 SCANNER AS NEW	£295.00	KENWOOD	TS-850SAT TRANSCEIVER 0-30MHz	£895.00
ICOM	AT-150 AUTO ATU FOR THE IC-735	£175.00	KENWOOD	TS-870 SAT 0-30 DSP	£1,200.00
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ICOM	IC-271E MULTI-MODE 2M BASE	£395.00	WELZ	SD 400 SWR METER	£49.95
ICOM	IC-275E 25W MULTI/MODE	£550.00	YAESU	FC-20 ATU FOR FT-847	£175.00
ICOM	IC-275E AC 2M MULTI MODE	£495.00	YAESU	FT-757 AUTO ATU	£175.00
ICOM	IC-275H 100W 2M MULTI MODE	£650.00	YAESU	FP-707 POWER SUPPLY	£100.00
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ICOM	IC-737 BASE TRANS, INC TUNER 0-30MHz	£600.00	YAESU	FT-10 2M HANDIE	£125.00
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ICOM	PS-15 PSU 20 amp	£120.00	YAESU	FT-11 2M HANDIE	£140.00
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KENWOOD	MC 60A DESK MIC	£70.00	YAESU	FT-290R MK11 TRANSCEIVER INC AMP	£350.00
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KENWOOD	R-5000 PLUS CONVERTER	£600.00	YAESU	FT-757GXMK11 TRANSCEIVER	£450.00
KENWOOD	TH-78E DUAL BANDER	£195.00	YAESU	FT-790R 70CM TRANSCEIVER	£200.00
KENWOOD	TH-G71 LATEST DUAL BAND HANDIE	£200.00	YAESU	FT-790R MK11 70cm	£325.00
KENWOOD	TL-922 HF AMP	£850.00	YAESU	FT-8100 USED	£275.00
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KENWOOD	TR-751 2M MULTI MODE	£350.00	YAESU	FT-990AC	£895.00
KENWOOD	TS 570D DSP General Coverage	£695.00	YAESU	VX-1R HANDIE 2/70	£140.00
KENWOOD	TS 670 7-21-28-50MHz Base	£375.00	YAESU	FT-747 GX INCLUDES FM	£350.00
KENWOOD	TS-140S HF/0-30MHz TRANSCEIVER	£400.00	YAESU	FT-757GXMK1 TRANSCEIVER	£400.00
KENWOOD	TS-440 SAT TRANSCEIVER	£525.00			

Please find above our used equipment price list for the August Edition  
With regards Dave Hayward RADIOWORLD (West Midlands)

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**B**y now, most readers will have read the important 'Stop Press' news item entitled 'New Licence For The Millennium', on page 19 of the July issue of *PW*, or have heard the news from other sources. And although the RSGB stated very firmly to me that it was always intended that *PW* had the news before we went to press, in fact it was literally 'a stop press' item as the main body of the magazine was ready to 'go to press' the day we received it.

Incidentally, before I comment on the actual news item I must share with you the feeling of annoyance and much frustration that accompanied the publishing of the news item in question. And in fact, I consider that the Government Department involved - the Radiocommunications Agency (the body which regulates our hobby) - was shirking its responsibility by not directly handling the issuing of the news release which was done jointly via the Radio Society of Great Britain ... **despite the fact that the RA is the Agency responsible for 'regulating' our hobby.**

I object because, although the RSGB (I am a member myself) - represents its members and is there to work on behalf of its members and the hobby - **unless legislation has changed and the Society has become a Government Dept.** - I see no justifiable reason for it to issue 'joint' press statements in conjunction with a Government Department. In my opinion nothing, **but nothing** could 'raise more hackles' than for the RSGB to be seen to be acting in this way.

Although I fully understand that there was a great deal of negotiation done on behalf of Amateur Radio - including the original invitation for members and non-members to contribute ideas, suggestions and comments issued some while ago, I was taken unawares by the apparent 'secret agreement' by the RA and RSGB regarding the issuing of the subsequent press release. What was so secret anyway? What's been negotiated is a start - **even if there are very many points to be 'ironed out'** (more on this

later!).

## Telephone & E-Mails

Although, of course, we were expecting the negotiations between the RSGB and the RA to become 'public' eventually, the news of the pending release of the statement came when readers started to telephone the office and also send E-mails - asking what we knew about an impending news release from the RA on the future plans for our hobby.

My annoyance arises from the fact that when - doing what a professional journalist should do - I contacted the RA to find out what I could. However, on doing so, I was told to contact the RSGB as they were handling the matter!

Despite the fact I am a member of the RSGB I was most unimpressed at being told by the RA to speak to the Society on the matter and I refused to do so. Eventually though, things happened very quickly and the issue of the press releases was 'brought forward'.

I wrote to the RA, directly to the (relatively new) official involved, to state my objections. In reply I've received what I consider to be a **totally unsatisfactory reply** to my general objections. The official involved also, albeit politely, dismissed my suggestion that to satisfy non-RSGB members (to remove any suggestions of 'secrecy' whether they are justified or not) regarding the negotiations on our behalf, that 'independent' (Radio Amateurs not connected with the RSGB) people could be chosen by the RA to join the panel involved in the on-going discussions.

Before I venture on to the ideas contained in the press release, I beg that the officials in the Department of Trade & Industry's RA **please in future do the following:** By all means - if you so wish - issue press releases jointly with the RSGB, after all as the Government Department responsible it must be **YOUR** choice. But having said that, I ask at the very least **that the RA should be seen to retain control.** Joint 'Logos' yes - but devolving your responsibility? I say no!

Finally, I ask the RA to

remember that, with *PW* in particular, you are dealing with a magazine staffed by ethical journalists who believe in the Amateur Radio hobby and don't just 'write about' it. We're not from the 'tabloid' press. Issue us with a time and date 'embargoed' news item and we'll honour the embargo. At the same time we could then assure readers it's not possible 'secrecy' we're dealing with - but an effort to ensure everyone gets the correct, unambiguous, information at the same time.

So, how about it RA? What about working with **everyone** in the hobby in a truly 'open' fashion? You can trust us - that I can be sure of!

## The Heart Of The Matter!

Now to the heart of the matter - the release itself! And to be honest, I think it contains some interesting ideas. However, it also contains some problems - especially when you bear in mind (and being 'politically' correct I speak as an Englishman!) that English society is still one that's dominated by 'class' issues.

The use of Morse as a requirement for access to h.f. will go because the administrations around the world want it so. They want - in the ever competitive world of EMC - Radio Amateurs who will cause them the least bother! However, this will not mean we can't use c.w. on the bands - as I intend to do!

The suggested 'incentive'-based licensing system really does concern me though! Over the years the "I'm, an 'A' and you're only a 'B' licensee" debate has caused much resentment. To replace it with a (possibly) multi-layered 'graded' licence as they have in the USA (for example) would not work in our 'class status based culture'.

The 'incentive' based Amateur Radio licence might work in the USA where they supposedly don't have a cultural 'class' structure (there it seems to be based on money rather than 'class' divisions) but I think such a system would have to be very carefully planned if it to be used in the UK. It's taken centuries to develop our present 'class' structure - and at a time when many of us are trying to lessen its effect - I'll be concerned if it enters our hobby ... even in a technical grading sense.

However, to end

on a truly up-beat note I'm delighted to read that the h.f. and v.h.f. Novice operators are to be allowed more bands and frequencies. I hope this will mean many more! And in closing on this topic for now anyway - I think we can look forward more hopefully to the future although there's an awful lot of work and problems to be sorted out yet!

## Missing Paragraph

I have to apologise for somehow allowing a paragraph to 'drop off the page' in the FT-100 review published in the July issue. It occurred after (Having drawn reader's attention to the 'Active Antenna System' under the heading 'Menu Control') I managed to lose the paragraph (due to appear just above the heading 'In Rob's Shack') which basically stated I had "difficulty in understanding" the menu control instructions for the ATAS-100.

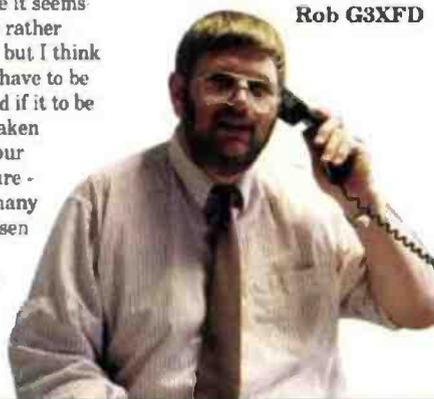
Well in fact, I have to admit it wasn't a fair comment in any case! On reflection - having read the instructions again, it was purely confusion on my part. Sorry if I caused confusion in you too!

## Club Visits

My final *PW* 'Club Visit' schedule for the second half of the year is now as follows:  
**Coventry ARS July 30, Barry (Wales) ARS August 10, Norfolk ARS September 8, Taunton & DARS October 1, East Yorkshire (formerly North Ferriby) Club October 21 and the (final trip of the year) Rochdale QRP Convention on Saturday October 23.**

If you can't make it to any of the above clubs - I'll be pleased to meet and have a chat with you at the **'Leicester' Show at Castle Donington** on either 24 or 25th of September. I hope to see you there! Cheerio for now.

Rob G3XFD



ROB HAS PLENTY TO SAY ABOUT THE NEW LICENCE!



COMPILED BY ROB MANNION



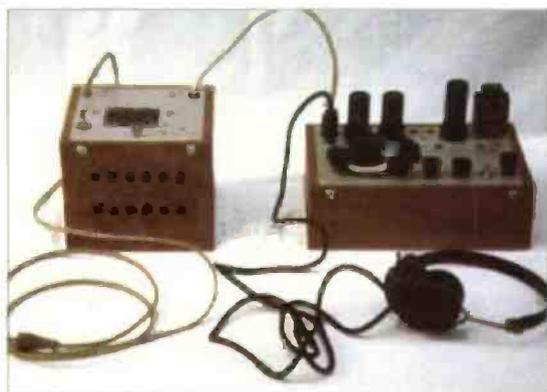
### Kind Offer From Belgium

Dear Sir

I built the replica of the Whaddon 'Paraset' (mentioned in 'Valve & Vintage' and shown in the photograph) for the 3.5MHz band and I had 132 QSOs with 21 European countries. Information and circuit schematic are available for all *Practical Wireless* readers. It is free!

Joe Lesuisse ON5LJ  
3 Rue de la Passerelle  
4031 Liege  
Belgium

Editor: Thank you Joe - an offer in the best tradition of the hobby. (I ask that anyone taking up Joe's offer please send a donation towards postage).



**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.**

### Nuts & Bolts

Dear Sir

In the May 1999 issue of *PW*, you refer to how to obtain various items and the fact that nuts are often missing and the older thread types are needed.

The problem is that the normal suppliers no longer stock threads other than metric even quite large nut and bolt suppliers now do not stock older threads.

Readers may not be aware that engineering supplies can be bought from Auto Jumbles which are similar to a radio rally. These Auto Jumbles have dealers who cater for those restoring old and historic motor vehicles.

In addition to motor spares, supplies of a wide range of plastics and metals and nuts and bolts of every known thread can be obtained together with taps and dies.

Radio frequency grade stainless steel screws are also available in all threads and the prices are low. I have just bought UNF and UNC stainless nuts for my radio rally 'bargain' high power diodes from my local Auto jumble.

Mirror-finish polished bolts are also available for custom vehicles. The metals available include copper, brass and aluminium in sizes suitable for radio constructors.

These are held at various venues around the country. Here in Yorkshire, I visit the Rufford Motorcycle Auto jumble which can be found on the B1224 York Wetherby Road.

Roy Oxley G0FYM  
Yorkshire

Editor's comment: Thanks for the tip Roy. Keen constructors can now add 'Auto Jumbles' to their rally dates!

### Keeping Logbooks

Dear Sir

In over 50 years of operating Amateur Radio I have, as required, kept a log of stations contacted, both as a fixed station and a portable or mobile station. Is it not time that compulsory log-keeping be abandoned?

When you consider the vast amount of radio signals emitted in the UK alone, how many users (except Radio amateurs) are legally required to keep a log? For instance, it seems anomalous that licensed amateurs must log everything, but our cousins on the Citizens Band (CB) are not so bound! All sorts of radio transmissions fill the ether these days without the need to be constantly logging. So, I say we should abandon compulsory logging for Radio Amateurs!

Mind you, if logging were not compulsory I would still keep a log for my own private purposes, but probably not with the detail now specified. It is the (to me) unnecessary compulsion to log that I am grumbling about.

Walter Farrar G3ESP  
Ackworth

Editor's comment: As most operators I talk to only seem to keep a

computer for log-keeping I wonder if they'd bother to keep it if they didn't need it for logging?

### Love Or Loath It

Dear Sir

Technology is a wonderful thing, you either love it or loathe it, depending upon your view. Whatever your opinion, it's a fact that more & more people are using computers at home & (It follows) in our shacks. We Radio Amateurs are as divided on this subject as we are with the c.w./s.s.b. debate.

I've read so much about the benefits of Morse code, yet myself and apparently lots of other amateurs prefer to use s.s.b. (Don't worry ... this is not a "for or against" letter on this topic, instead it's a novel suggestion to make use of both modes.

In this day and age, surely there must be someone out there capable of designing the right software (and matching interface) which will allow me to communicate with the outside world, using c.w. via my PC and keyboard. Maybe someone already has, I don't know. Regardless, here's where the fun creeps in. Why not take this one step further.

Using relatively inexpensive voice recognition software, I can talk to my PC and it will type my words for me. Combine this with the interface just mentioned (standard c.w. abbreviations would make things even easier) and you've cracked it! Rather ironic really, a hybrid mode of communication utilising all of the advantages of c.w. with the simplicity of microphone operation.

I wonder if this type (excuse the pun) of communication is realistic, I for one can see no reason why not. Amateurs who have never picked up a Morse key, can take advantage of c.w. without fear of making fools of themselves whilst reducing s.s.b. QRM at the same time. The best of both worlds? Worth thinking about, isn't it.

Keep up the good work & congratulations on an excellent magazine.

Paul Morrison G0VHT  
Northumberland

Editor's comment: Readers wishing to put part of Paul's approach into practice may like to see the review published in the June 1994 (Morse Special) issue of *PW* (back issues at the special price of £1 including postage from the Editorial offices). In the review John Goodall G0SKR tried the MFJ-451 dedicated c.w. keyboard (another model, the slightly more sophisticated 452 is now also available).

### The Not So Good Old Days?

Dear Sir

I read with interest John Worthington GW3COI's article - The Not So Good Old Days (July 1999) and must say that I find my own recollections of the "good old days" far different from John's experiences.

I was licensed in 1956 and spent the first few years happily working on 1.8MHz 'Top Band' using a variety of transmitters constructed from Second World War surplus equipment, which was readily available in

those days, living in Liverpool at the time in a house with no garden, my antenna farm was a 66ft long wire in about three 'doglegs'. This worked a.m. phone around the Lancashire / North Wales area with no real problems, the Loran navigation beacon on 1.9MHz was only a problem in the evenings and we never had very much mutual QRM as I recollect.

My first commercial rig was a Panda Cub transmitter which ran 25W a.m. and 50W c.w., with this rig I worked stations on a.m. 'phone' in the USA, Alaska, South America, Africa, Far East and Australia with nothing more complicated than a dipole antenna and of course my trusty 66ft long wire.

I remember that the bands were much quieter in those days of course there were not as many stations operating as there are these days although when 28MHz was open to the states it was something to be heard! I also used to operate 7MHz a.m. fairly regularly in those days too (the early 1960s) again without too much QRM.

I now use 100W s.s.b. and a full size G5RV but find it just as difficult to work DX as I did in those days: my point being that a.m. was not too bad! I enjoy PW every month and have just taken out a joint subscription with SWM as I also enjoy the listening. Keep up the good work PW team and Rob, I hope to work you on 3.5MHz one of these days! Regards.

**Ted Davies G3LIZ**  
Birmingham

**Editor's comment:** Thanks for your memories Ted - 'Forty' was my favourite band in a.m. days. I'm on 3.5 (c.w.) and 7MHz (c.w. and s.s.b.) most evenings and look forward to working you too! Any more comments on the 'Not So Good Old Days' readers?

## No Business Without The Internet?

Dear Sir

I see that **Roger Cooke G3LDI** in 'Data Scape' (PW June) thinks that in a few years there will be no business without Internet. As it happens I don't agree with him, but if he is right then I think that some of your advertisers might be rather short of business!

I need a new aerial to cover 50, 144MHz and 70cm. Normally I make my own aerials, but such an arrangement would need an awful lot of cut-and-try. So, with some shame, I decided to look at ready-to-go offerings. The obvious place to look was at the Web sites of Practical Wireless advertisers. The result is that I will wait until the next rally in my area - probably next year!

One company must be complimented on its site though: Waters and Stanton at <http://waters-and-stanton.co.uk> Navigation around the site is very easy. There's information on almost any product that you might want, and with current prices. Though, as it happens, they don't 'do' what I want.

The rest fall very far below. In several cases the site is no more than a cheap 'presence' to show that the company exists. Though in some cases there is a token attempt to provide skeleton product information for those determined enough to get to it.

One that I connected to faced me with a banner to say that they were shut for two weeks. I immediately moved on. But thinking about it since I have mixed feelings about this

one. Perhaps it was better to let me know - and thus avoid frustration when I tried to order. But I am not sure that the 'front page' was the best place to do it. They immediately lost me anyway.

One site might actually be very good. I never found out. That was because I hurriedly hit the 'back' button to kill the silly music that burst out of my speakers. Another site that immediately lost me greeted me with a repetitive 'CQ' in Morse code - here I operated the back 'button' again!

Most of your advertisers do not have a Web presence at all. Will that harm them? Based on the difficulty of getting anything useful from the ones that are there (W & S excepted) I doubt it. In fact, when I do buy my new aerial it will definitely not be from any of the companies that I tried to get information from.

**Tony Jaques G3PTD**  
Manchester

## Alinco DX-70 Special Offer - Thank You PW

Dear Sir

During 1998 I sent away for a couple of non-radio items and in both cases it was "Please allow 28 days for delivery" and in both cases, after about 40 days (and 40 nights) I had to ring up and ask what had happened to my order.

Noting that the Alinco DX-70TH special offer in the May PW could prove extremely popular, I posted off my application fairly promptly, at 11.30am on Sunday 11 April and then hoped for delivery within a fortnight or so.

To my complete astonishment, the rig arrived, beautifully packed, just 72 hours later on Wednesday 14 April!

Thank you PW Publishing for your amazingly prompt response. My thanks are also due to our Postal Service, the transport services and everyone involved!

My DX-70TH has not been heard on the air yet - it awaits construction of portable antennas with which I hope to experiment when on holiday. I am sure that the rig will give a good account of itself then!

Yours sincerely

**John GORVQ**  
Suffolk

**Editor's comment:** Thank you too, John - the popularity of the offer meant that some readers had to wait longer than you but (to quote their comments) they said "it was an offer worth waiting for".

## A Real Radio Shack

Dear Sir

How nice it was to see a real radio shack, that of **John Easterbrook's**, in the June issue (under the heading of 'Lisle Street Memories' on the 'Letters' section on page 9). I fondly recollect the days when radio magazines, including PW, often showed pictures of people's radio dens, illustrate the individual and sometimes novel ways in which commercial, modified surplus, but especially home brew gear was set-up.

In those days, individualism was the thing and gear had a character of its own, often shown surrounded by wires and accessories illustrating experimental interest of the owner

rather than show piece tidiness. There must be other real radio shacks remaining where the mysteries and convenience of modern appliances are kept at bay. Let's see more of them please!

On the subject of R-107 receivers, like **John Easterbrook** I too purchased an R107 in the government surplus paradise of the 50s and 60s and, after some 35 years languishing in the garden shed (or outdoor shack of youthful days) it too now has pride of place in my more comfortable indoor shack alongside a No. 19 Set, a TSC12, a Labgear LD300 and an Eddystone 888 receiver, plus other bits of kit, all making the floor boards groan under the weight!

I wonder how much modern gear could withstand the rigours of such protracted exposure to damp and temperature extremes of an unheated wooden garden shed and how much of it will still be functioning in anyway in 40 years time?

Yours sincerely  
**Howard Aspinall G3RXH**  
North Yorkshire

**Editor's comment:** Our sister publication *Short Wave Magazine* specialised in 'the other man's station' with shack photographs 30 or so years ago. We'd be pleased to continue the tradition.

## Articles For Sale

Dear Sir

When people use your excellent magazine for advertising in articles for sale why don't they put their town and the appropriate code so as to help readers interested in the article advertised to know whether it's easy to go and check the receiver or whatever is advertised?

Only recently I noticed a receiver which cost a lot of money which I could be interested in. But after telephoning the number given and not knowing where it was, I gave up when I was informed that he was well up the north of the country and I most certainly couldn't travel up there from Surrey. So you see, it was another wasted telephone call.

I hope this doesn't offend people but can, I feel, only help - not only the prospective buyers - but also the seller. Take care and keep up the good magazine.

**Jack GORWX**  
Dorking

**Editor's comment:** A good idea, Jack. Adverts intended for 'Bargain Basement' can cause us problems too! We're forced to put double (?) marks when we cannot decipher the adverts or cannot understand what's written. Another problem arises when the potential advertiser 'invents' an unusual abbreviation! Please help us to help you - It can prevent a lot of frustration for everyone involved!

ALLETTER PUBLISHED IN PW WINS YOU A VOUCHER TO SPEND ON ANY PW SERVICE



COMPILED BY JOANNA WILLIAMS

# Headline News

## Eddystone Saved At Last Minute...

*Practical Wireless* received news this month concerning the acquisition of **Eddystone Radio Ltd.** by **Megahertz Communications Ltd.** In a letter, which we received from the **Eddystone User Group**, we were told that the Megahertz group bought Eddystone Radio Ltd on the 14 May 1999, rescuing them from the threat of imminent closure at the last minute!

The press release from Megahertz Communications Ltd states that although Eddystone Radio Ltd will continue to be operated as a separate entity "... the addition to the Megahertz group of companies will enhance our position in the Broadcast market enabling us to offer a complete solution from acquisition to transmission", **Ashley Coles** (Megahertz Communications Group MD) says.

For further information on **Megahertz Communications Ltd** you can E-mail them at [sales@megahertz.co.uk](mailto:sales@megahertz.co.uk) Also,

if you would like to know more about the **Eddystone User Group**, then you can contact **Graeme Wormald G3GGL**, 15 Sabrina Drive, Bewdley, Worcestershire DY12 2RJ.

## West Wight's Weekend

You might remember a report in last week's *PW* on the 'Marconi fever' that seems to be sweeping the nation this year. Well, this is just a little reminder for you about a Special Event which will be taking place on **Saturday 10 and Sunday 11 July**. The **West Wight Radio Society** (with the help of many volunteers) will be re-enacting the world's first radio signals received by an Admiralty ship from "The world's first permanent wireless station" - the **Marconi Needles Wireless Telegraphy Station (Est. 1897) at Alum Bay, Isle of Wight, UK.**

**Ben Clegg G7RER** of the West Wight Radio Society told *PW* that their Guest of Honour on the day will be the Commander in Chief of the Fleet of the Royal Navy and that there will also be many other special guests on this

very special weekend for them, including people representing the Radiocommunications Agency (RA); Marconi Communications Ltd. and the RSGB.

Ben also goes on to tell *PW* that the West Wight Radio Society has applied to the RA via the RSGB for a unique special licence which includes the following aspects: The use of the Crown reserved call sign **GB100RN** to be allocated to them for mid-July; that p.e.p. allowances be increased where applicable from 26dBW to 33dBW; that they be allowed again the "Variation of Licence" to permit the transmission and reception on the Amateur Band radio spectrum allocations, all mode communications from Alum Bay to ships and shore stations of the Navies of countries other than Great Britain, which would include France, Holland, Germany, Italy and Sweden and finally, that 40 Cadets from all three armed forces be permitted to pass traffic whilst under supervision - all Cadets passing traffic hold Cadet Radio Users certificates and Classified Signallers certificates.

So, please go along to Alum Bay on the Isle of Wight and support the West Wight Radio Society. For further details on this Special Event, please contact **R B Clegg G7RER**, Operations Director of the **West Wight Radio Society**, **Monks Lane, Freshwater, Isle of Wight PO40 9ST**. Or you can E-mail him on: [castle@dial.pipex.com](mailto:castle@dial.pipex.com) To receive the automatic E-mail updates please request at station E-mail: [gb2gmm@dial.pipex.com](mailto:gb2gmm@dial.pipex.com)

## Bugcatching at W&S?

**Peter Waters G3OJV of Waters & Stanton PLC** (W&S) has been in contact with *Practical Wireless* to tell us all about the **WBP-1** - a ground mount system which "can turn any h.f. whip into a base station vertical".

Peter says that the **WBP-1** comprises of a standard 3/8in threaded socket mounted on a thick alloy plate with 152mm spokes which can be pressed down into soft ground. The tops of the spikes are fitted with nuts and washers to provide a means of attaching optional wire radials. A 5m length of coaxial cable is included which can be



extended as required.

**Waters & Stanton** state that either single-band or multi-band whips can be used and that tests have proved this to be a very easy and cost-effective way of radiating a signal from a small garden or when out portable (P).

**Waters & Stanton** also tell *PW* that they have been

appointed distributors for the **American Texas Bugcatcher mobile antenna** - watch out for the review coming up in *PW* soon - which, they tell us, covers eight bands from 3.5-28MHz and can handle up to 1.5kW input. The antenna has a 3 inch diameter open coil with adjustable taps for each band. The antenna has a total of length of 229cm and features a "quick disconnect top whip with



## Reader's Request

The *PW* news desk received a request from a reader who needs a circuit diagram and manual for the **Meccano crystal set RS1 or RS2** and/or any help with old red/green parts to make one. All replies answered! 31 **Eastwick Park Avenue, Bookham, Surrey KT23 3LZ**. Tel: (01372) 454381, anytime.

## Scarborough's Special Day

The **Scarborough Special Events Group** will be on the air as **GB6SW** on **Saturday 17 July 1999** to commemorate the 60th Anniversary of **RAF Staxton Wold Radar Base** which is located on the east coast of Yorkshire not far from Scarborough itself.

**Roy Clayton G4SSH**, Chairman of the group, tells *PW* that **RAF Staxton** was one of the first sites to be fitted with radar at the beginning of the Second World War in 1939 and is the world's oldest operational radar station. It's the only remaining station of the 'Chain Home' radar sites still in use today, **RAF Staxton** will be the site of a fly-past by the **Battle of Britain Memorial Flight** during a families day and a **QSL card** will issued for the occasion.

The main a.s.b. station will be operational around 3.725 or 7.055MHz as well as 144MHz and c.w.



an adjustable twin-vane capacity hat", W&S say. The antenna costs £129.95 and the order code for it is BG-1500. For further information on these or other W&S products please contact them on (01702) 206835/204965. FAX: (01702) 205843. Spa House, 22 Main Rd, Hockley, Essex SS5 4QS. E-mail: [info@wspc.demon.co.uk](mailto:info@wspc.demon.co.uk) Alternatively, you can visit their Web site: <http://www.waters-and-stanton.co.uk>



Peter Waters also wrote to tell us about their successful Open Day which took place on 30 May 1999. He tells *PW* that a queue had formed well before opening time at 10am (see top of column) and the total recorded attendance topped 400. Icom, Yaesu and Kenwood had their own stands and all donated products for the free raffle, Mark Francis conducted his notorious auction and everyone agreed that it was an enjoyable event!

## RAE Report

The News desk here at *Practical Wireless* received an E-mail from the Chief Examiner at the City & Guilds, David Pratt G4DMP, who tells us that the Examiner's Report for the May 1999 City & Guilds Radio Amateurs Examination is now available for

candidates, tutors and others interested on the Internet at: <http://www.kippax.demon.co.uk/c-and-g/index.htm>

David tells us that the report gives the overall performance of candidates in each section of the

examination syllabus and details of the number of candidates who entered and were successful. So, if you would like to see the report then why not take a look at the Web site?

## Additional Catalogues

If you missed out on your copy of the *MFJ Catalogue* which came free with the June issue of *Practical Wireless*, then you can get hold of a copy (with vouchers valid until the 31 August 1999), free of charge, if you telephone Waters & Stanton on (01702) 206835.

## Everything Must Go!

Terry Edwards G3STS of Megasys Ltd (formerly known as Radio Shack Ltd until 1995) contacted the *Practical Wireless* news desk to tell us that he was retiring after 35 years of importing radio equipment and that, as the shop has already been sold and must be vacated, he will be holding a big 'Closing Down Sale'.

All of his stock will be sold at clearance prices and items on sale will include PRO-2042

scanners @ £110, PRO-2032 @ £80, DX-394 @ £75, Drake RP-700 receiver protectors @ £35 (was £89.95), C and 7 line manuals, parts, crystals and accessories, Icom radios, Hi-gain antennas, Hustler antennas, masts, resonators, J-beam antennas and much, much more - Terry tells *PW* that it would be wise to bring a roof-rack!

The sale starts on **Saturday 17 July at Megasys Ltd, 188 Broadhurst Gardens, West Hampstead, London NW6 3AY. Tel: 0171-624 7174.**

The sale will last for as long as the goods last, callers only for large items or antennas, cash or credit cards (minimum £50, if we must) only - no cheques! You will find Megasys Ltd just around the corner to the left from West Hampstead tube on the Jubilee Line.

## Palstar's Star Products

Mike Devereux at Nevada has been in touch with *PW* to tell us all about two new products from their Palstar range. The Palstar AT300LCN antenna tuner is the latest addition to their antenna tuner range and Nevada tells *PW* that it uses a toroidal inductor with a silver plated tapping switch which, they say, "... provides fast and accurate matching for all popular antennas".

The AT300LCN has a dual needle meter which gives simultaneous s.w.r. and

Average, or Peak, power readings. It also has a built-in 4:1 balun and dummy load and will sell for £139.95, Nevada say.

Also new from Palstar are their voltage droppers. Nevada tells *PW* that Palstar have released three new 24V to 12V voltage droppers in the Palstar power supply range. These units have a wide variety of applications in vehicles and maritime vessels,



Nevada say, providing a 24V power source. Fully regulated and protected, these new voltage droppers are suitable for powering all types of communications and navigation equipment requiring 12V d.c.

The voltage dropper units are priced as follows: PDC10 10A is £19.95; the PDC25 25A is £42 and the PDC45 45A costs £59.95. Both the voltage droppers and the AT300LCN antenna tuner are available from Nevada, 189 London Rd, North End, Portsmouth PO2 9AE. Tel: (01705) 662145. FAX: (01705) 690626.



## Young & Talented?

Are you a young and talented Radio Amateur? Do you want to win cash and Industry prizes? Well, you need look no further ... the race is on to find the **Young Amateur of the Year**. Jointly sponsored by the Radiocommunications Agency and the RSGB, Young Amateur of the Year is an annual event giving the younger members of Amateur Radio the chance to win exciting prizes for both the winner and the runner up.

Both the winner and the runner up will be invited to visit the Agency's Monitoring station in Baldock, Herts and will also receive other prizes from the RA, RSGB and from industry.

So, if you're under the age of 18, keen on Amateur Radio and are helping to get other people interested in the hobby, then please, please, please send for an application form **NOW** from Marcia Brimson 2E1DAY, RSGB, Lambda House, Cranborne Rd, Potters Bar, Herts EN6 3JE. Or you can Tel: (01707) 659015 and E-mail: [sales@rsgb.org.uk](mailto:sales@rsgb.org.uk)

You must hurry though, as the closing date for applications is the end of July! (*Applicants must be: under the age of 18 on 31 July 1999; resident in the UK, Channel Islands or the Isle of Man; must be nominated by an adult sponsor; must have shown talent in any of the following areas - DIY radio construction, operation of radio, community service [eg. helping in emergency comms or helping disabled people], encouraging other radio amateurs into the hobby [eg. through the Novice licence scheme], school or club projects.*)



COMPILED BY JOANNA WILLIAMS

### Mobile ML&S

**Martin Lynch & Sons (ML&S)** have announced that, after almost ten years of selling Amateur Radio equipment in the UK, they will be "venturing" into an additional market - scooters!

Some of you might already be aware of Martin Lynch's interest in motorcycles and "ML&S BikeSmart" will be a new company selling scooters from the London showroom and Martin says he has space for fifty scooters and has dealerships from Suzuki, Aprilia and Peugeot. "Initially", Martin says, "both Amateur Radio and Scooters will be sold from the same location until the new showroom (literally across the road) is ready ... I warmly welcome my 'Ham' customers to join in the opening celebrations of ML&S BikeSmart on the weekend of 3 and 4 July".

ML&S BikeSmart can be contacted on 0208-566 0000. Amateur Radio sales on 0208-566 1120.

### Landmark Invention

Sinclair Research sent *PW* a press release telling us all about another landmark invention - **Sir Clive Sinclair** has launched the world's smallest a.m. radio - the **Sinclair Z1 Micro AM Radio**.

Constructed in a robust ABS plastic, this new a.m. radio is the size of an acorn and fits discreetly in the ear while delivering full performance across the medium wave band station (530-1600kHz) and it only costs £9.95 including P&P and VAT.

Sinclair Research tell us that the Sinclair Z1 Micro a.m. radio is the result of two year's



research and development and incorporates a unique Sinclair Research circuit which is ultra light-weight at just 14g (half an ounce).

The receiver comes supplied with a choice of antenna - integrated, rod or wire - and is powered by a tiny SR44 silver zinc button cell which are widely available on the high street and lasts approximately 40 hours. The Sinclair Z1 comes complete with a special key ring carry-case.

Sir Clive Sinclair says "Developed primarily with news and sports listeners in mind, its radical design means that you can walk, run, watch sport - even dance - without fear of it getting in the way".

The Sinclair Z1 micro a.m. radio is available direct by mail order only from Sinclair Research. Tel: (01933) 279300.

### Lighthouse Weekend

Mike Dalrymple GM4SUC has E-mailed *PW* telling us all about the **International Lighthouse/Lightship Weekend** which will be taking place from 0001UTC on Saturday 21 August until 2359UTC on Sunday 23 August 1999.

Mike says that, so far, 126 stations in 41 countries have confirmed their participation in this year's event and that Radio Amateurs of the world are invited to join in the fun by establishing a station at a lighthouse, lightship or



### Wireless Works Web

Rob Rusbridge from The Wireless Works - a well-known vintage radio shop in the middle of Cornwall - has been in contact with *PW* to tell us that they have just set-up their very own Web site. It's an on-line catalogue and information source, Rob tells us, and is growing all the time.

If you're interested in taking a look then you can find their Web site at:

<http://www.wirelessworks.freemove.co.uk> and is available now. The photo was taken from their Web site and shows how the old place looked in the 1930s when it was a Co-Op store.

### The Wireless Works



maritime light.

An updated list of participating stations and countries can be found at <http://www.waterw.com/~weidner/ld.htm> If you're going to join in the fun of the weekend and are not on the list could you please advise Mike of the callsign you will use, QTH and QSL information.

If you would like more information on the weekend or would like to register your station in the event then you can contact Mike Dalrymple GM4SUC at 11 Shawfield Ave, Ayr KA7 4RE, or you can E-mail him at: [GM4SUC@compuserve.com](mailto:GM4SUC@compuserve.com) Don't forget though, you can always visit the Web site for more information at: <http://www.waterw.com/~weidner/ld.htm>

The Scarborough Special Events Group will be taking part in the International Lighthouse/Lightship Weekend and will be active as GB0SCA from Scarborough Lighthouse on both s.s.b. and

c.w. and a full colour QSL card will be sent to all who make contact. The photo shows the operating position inside the lighthouse last year, with Peter G3JBR at the microphone.

### Tipperary Tribute

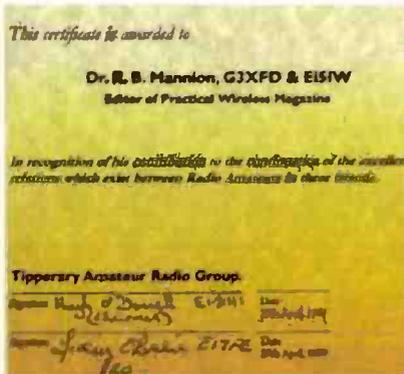
Rob Mannion G3XFD/EI5IW, Editor of *PW*, was - uncharacteristically - temporarily lost for words when the Tipperary Amateur Radio Group (TARG) paid tribute to his efforts to continue the excellent relations existing Radio Amateurs in our group of Islands.

Pictured standing alongside his great friend Hugh O'Donnell EI2HI, Chairman of



TARG (who had travelled from Bandon in Cork to attend the meeting), Rob was overcome with emotion when he accepted a mounted 'Certificate Of Appreciation' from Hugh at the first meeting Rob's been able to attend since being made an Honorary Member in November 1998. The certificate was countersigned by another special friend - **Liam O'Brien EI7FE** and was given to Rob in the presence of TARG members, friends and visitors from other clubs.

The presentation took place during Rob's holiday in EU/GI during late April and he says that: "I was totally overcome and felt truly honoured at the occasion and thoroughly enjoyed it". Continuing, Rob said with great feeling, "The wonderful friendship between Radio Amateurs in our Islands continues and grows ... and I hope and pray that the links between our separate nations will also grow into the friendship that we have already shown exists naturally. I'm very proud to have the honour to serve our hobby through PW and its wonderful 'family' of readers here and around the World".



### "The Last Run"

**Fit Lt Malcolm R O Wood G7VRT**, Air Cadet Radio v.h.f. Advisor, E-mailed PW to tell us all about the **1999 Royal Tournament**. This year will be a "Finale" celebrating 120 years of our Armed Forces and their Charities at Earls Court.

This year will see the largest massed bands for many years, the Commonwealth will combine with the Army to create a huge display of Massed Pipes

## Emergency Communications - AREN In Action

The Irish Amateur Radio community's emergency communications service - the Amateur Radio Emergency Network (AREN) stepped into action to provide communications cover on Sunday 11th of April for the annual Galtee Mountain Walking Festival in County Tipperary.

Liam O'Brien EI7FE writes: "The Tipperary AREN provided communication for the event, 125 walkers took part. A v.h.f. base station was set up - using a 'Slim Jim' antenna and with 10W fully reliable communication was maintained with all 'units' which included a mobile station.

"Fortunately there were no accidents but many messages were passed and in some cases brought relief from worry and physical stress when unanticipated circumstances arose during the event. Grateful appreciation was expressed by both walkers and the event organisers for the efficient way the communications were provided by and carried out by AREN".

Liam also reports that the mountain walking event provides an "ideal platform" to promote Amateur Radio and several walkers expressed an interest to finding out more about our hobby. Other Radio Amateurs working with EI7FE in the exercise included: **Hazel EI9ELB, Paul; EI3ENB, Seamus EI8EPB, John EI6FRB, Dave EI6FQB, Joe EI5GE, Ron EI6GO, Hugh EI2HI and Tommy EI2IT.**

Anyone interested in the AREN service in general, and particularly in County Tipperary, can contact **Liam EI7FE (QTHR)** or (Irish dialling code) on **052-22493**.



On duty for AREN: (Left to right, kneeling) John Burke EI6FRB, Dave Cody EI6FQB, Tommy Mallinan EI2IT. Standing (left to right) Hazel EI9ELB, Seamus EI8EPB, Ron EI6GO, (Rear centre) Hugh EI2HI, (centre) Liam EI7FE and Joe EI5GE.

and Drums and all the old favourites will be there including the RAF Dog Display Team and the last ever run of the Royal Navy's Field Gun Competition. For tickets please contact the **Box Office on 0171-244 0244**.

Malcolm Wood wrote mainly to tell PW of the Air Cadets part in this year's Tournament, who will have a radio station again this year and will be on air using the well known Amateur Radio Special Event call signs **GB4ATC and G8RT**. They will be mainly operating on h.f. and **Icom** have kindly agreed to loan them some equipment and Air Cadet Instructors, who are licensed amateurs will be operating assisted, at times, by Cadet Novice Licence holders.

Cadets will also be operating a station on Air Cadet frequencies and will be in contact with Air Cadet Units in the UK and Cyprus and there are also plans to make contact with Military aircraft using Air Cadet frequencies - using h.f. for the long range contacts and v.h.f. low band for local work. A PC will be used with software

which will plot Aircraft movements to give any visitors a feel for Aircraft communications. For further information about the Cadet's involvement in the Royal Tournament, please contact **Malcolm Wood G7VRT on 0171-438 6053**.

### Cambridge Goes Electronic

**Maplin Electronics** wrote to tell PW all about the opening of their new store in Cambridge which took place on Saturday 22 May. The store in St. Andrews Street is their 50th store in the UK

and has all the latest facilities and services available from Maplin.

The Essex based company tell PW that customers are invited to take advantage of the "state of the art computer centre" and that their enthusiastic and highly trained staff look forward to providing a quality service to the shoppers of Cambridge.

So, if you live in the vicinity of **46-48 St. Andrews Street, Cambridge CB2 3BH** then why not pop along and take a look at what Maplins Electronics have on offer. The store's telephone number is **(01223) 369758**.



SPECIAL PRIZE COMPETITION! WIN! A HIGHLANDER MULTI-FREQUENCY HF MOBILE ANTENNA - WORTH £175!

# SPECIAL PRIZE COMPETITION!

# WIN!

**A HIGHLANDER MULTI-FREQUENCY HF MOBILE ANTENNA**

**WORTH £175**



In the May 1999 issue of *Practical Wireless* we featured a review of the Highlander multi-frequency h.f. mobile antenna. The reviewer, Richard Newton GORSN had some very positive things to say about the Highlander and he said that he was very impressed with its aesthetics, design and performance! Since that review, Paul Beevers G1GCV/VK6UTE Hill Farm Granary, Lower Somersham, Ipswich, Suffolk, Tel: (01473) 658999, FAX: (01743) 658090 (who loaned us the Highlander for review) has very kindly donated that very antenna as a prize to one lucky reader!

All you have to do to win this Highlander multi-frequency h.f. mobile antenna is to dig out that May copy of *PW* (back copies of the May 1999 issue are available from the *PW* Post Sales Dept. for a special price of £2 per copy, to order call (01202) 659930) turn to pages 32 and 33 and re-read Richard's review and answer the questions on this page.

"Simple" you might think ... well then, what are you waiting for?

**Questions**

1. Paul Beevers G1GCV/VK6UTE kindly gave us the Highlander antenna used in the review and offered it as a competition prize, but what's the name of his company?
2. The Highlander Antenna covers which bands?
3. What is the Highlander's 'Wander Lead' used for?
4. One man builds the antennas by hand - what is his name?
5. A magnetic mount is the best way to mount the Highlander Antenna - True or False?
6. The Highlander Antenna is made in Suffolk - True or False?

**Answers:**

Q1: .....

Q2: .....

Q3: .....

Q4: .....

Q5: .....

Q6: .....

Name: .....

Callsign: .....

Address: .....

.....

Postcode: .....



Send your completed entry to Highlander Antenna Competition, *Practical Wireless*, PW Publishing Ltd, Arrowsmith Court, Broadstone, Dorset BH18 8PW. The Editor's decision on the winner is final and no correspondence will be entered into. Please do not include other correspondence in with your entry (photocopies of this form are acceptable). Entries to reach us by Friday 27 August 1999.

# ANTENNA RANGE from MOONRAKER

**HB9CV 2 Element Beam 3.5 dBd**  
 70cms (Boom 12").....£15.95  
 2 metre (Boom 20").....£19.95  
 4 metre (Boom 23").....£27.95  
 6 metre (Boom 33").....£34.95  
 10 metre (Boom 52").....£64.95

**Halo Loops**  
 2 metre (size 12" approx)£12.99  
 4 metre (size 20" approx)£18.99  
 6 metre (size 30" approx)£24.99

**1/2 Wave Vertical Fibre Glass (GRP) Base Antenna 3.5 dBd (without ground planes)**  
 70 cms (Length 26").....£19.95  
 2 metre (Length 52").....£22.95  
 4 metre (Length 92").....£34.95  
 6 metre (Length 126").....£44.95

**G5RV Wire Antenna (10-40/80 metre)**  
 All fittings Stainless Steel  
 Standard FULL HALF £22.95 £19.95  
 Hard Drawn £24.95 £21.95  
 Flex Weave £32.95 £27.95  
 PVC Coated Flex Weave £37.95 £32.95

**BEST QUALITY Antenna Wire**  
 The Following Supplied in 50 metre lengths  
 Enamelled 16 gauge copper wire £9.95  
 Hard Drawn 16 gauge copper wire £12.95  
 Multi Stranded Equipment wire £9.95  
 Flex Weave.....£27.95  
 Clear PVC Coated Flex Weave.....£37.95

**Mounting Hardware ALL GALVANISED**  
 6" Stand Off Bracket (complete with U Bolts).....£6.00  
 12" T & K Bracket (complete with U Bolts).....£10.95  
 18" T & K Bracket (complete with U Bolts).....£14.95  
 24" T & K Bracket (complete with U Bolts).....£16.95  
 1 1/4" x 5" Heavy Duty Aluminium Swaged Poles (set of 4).....£19.95  
 1 1/2" x 5" Heavy Duty Aluminium Swaged Poles (set of 4).....£29.95

**Vertical Fibre Glass (GRP) Base Antennas**  
 SQ & BM Range VX 6 Co-linear  
 Specially Designed Tubular Vertical Coils individually tuned to within 0.05pf (maximum power 100watts)  
 BM100 Dual-Bander.....£29.95  
 (2 mts 3dBd) (70cms 6dBd) (Length 39")  
 SQBM100\* Dual-Bander.....£39.95  
 (2 mts 3.5dBd) (70cms 6.2dBd) (Length 39")  
 SM200 Dual-Bander.....£29.95  
 (2 mts 4.5dBd) (70cms 7.5dBd) (Length 62")  
 BM200 Dual-Bander.....£39.95  
 (2 mts 4.5dBd) (70cms 7.5dBd) (Length 62")  
 SQBM200\* Dual-Bander.....£49.95  
 (2 mts 4.5dBd) (70cms 7.5dBd) (Length 62")  
 BM500 Dual - Bander Super Gainer.....£49.95  
 (2 mts 6.8dBd) (70cms 9.2dBd) (Length 100")  
 SQBM500 Dual - Bander Super Gainer.....£59.95  
 (2 mts 6.8dBd) (70cms 9.2dBd) (Length 100")  
 SM1000 Tri-Bander.....£49.95  
 (2 mts 5.2dBd) (6 mts 2.6dBd) (70cms 7dBd) (Length 62")  
 BM1000 Tri-Bander.....£59.95  
 (2 mts 6.2dBd) (6 mts 3.0dBd) (70cms 8.4dBd) (Length 100")  
 SQBM1000\* Tri-Bander.....£69.95  
 (2 mts 6.2dBd) (6 mts 3.0dBd) (70cms 8.4dBd) (Length 100")

\*SQBM1000/200/100/500 are Stainless Steel, Chromed and Poly Coated Full 2 year Warranty on these Antennas.

**Yagi Beams All fittings Stainless Steel**  
 2 metre 4 Element (Boom 48") (Gain 7dBd).....£19.95  
 2 metre 5 Element (Boom 63") (Gain 10dBd).....£34.95  
 2 metre 8 Element (Boom 125") (Gain 12dBd).....£44.95  
 2 metre 11 Element (Boom 156") (Gain 13dBd).....£65.95  
 4 metre 3 Element (Boom 45") (Gain 8dBd).....£39.95  
 4 metre 5 Element (Boom 128") (Gain 10dBd).....£54.95  
 6 metre 3 Element (Boom 72") (Gain 7.5dBd).....£49.95  
 6 metre 5 Element (Boom 142") (Gain 9.5dBd).....£69.95  
 70 cms 13 Element (Boom 76") (Gain 12.5dBd).....£54.95

**Crossed Yagi Beams All fittings Stainless Steel**  
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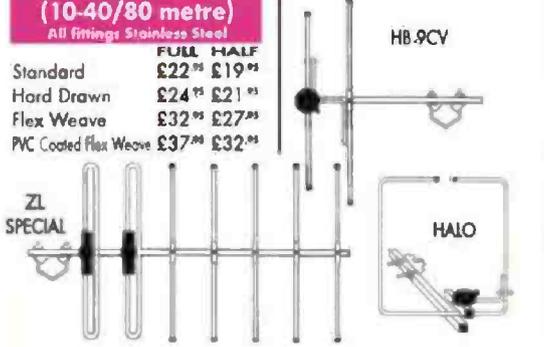
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**73 from Dave G4KQH, Technical Manager.**

# Part 2 Of Our Latest DHF Project

## The PW Panther 144MHz FM Transceiver

Mike Rowe  
G8JVE  
continues the description of his versatile 144MHz transceiver design which you can adapt to your own requirements, ranging from a 'mobile' rig to a hand-held portable transceiver.

Firstly, I'm sorry to say that, due to the printing process, there was an unfortunate 'blob' of ink that obscured part of the circuit shown in Fig. 1.1, in the first part of the PW Panther. A correction is produced here in Fig. 2.1, please amend the original circuit drawing to show the placing and value of capacitor C43.

Now it's time to continue. Other parts of the PW Panther are shown in the schematics of Fig. 2.2 (the receiver section), Fig. 2.3 (the microphone preamplifier and modulator), Fig. 2.4 (the toneburst circuit) and Fig. 2.5 (the transmit buffer amplifier and r.f. power amplifier stage).

Note: Copies of Mike Rowe's original drawings are available to allow you to make your own p.c.b. (see end of text for more detail). There's also a note providing important information on the synthesiser i.e. Editor.

### Starting Point

I would recommend the constructional starting point begin with fitting the regulators and building the voltage controlled oscillator (v.c.o.), buffer amplifier and components around IC3.

When completed, make up a temporary header with 2x10kΩ resistors connected between pins 6 & 7 and 6 & 4 of IC7.

Check for any short circuits and apply 12V to the input pin and to the TX supply pin near L6. Connect a frequency counter to the output of L6b and adjust for approximately 145MHz,

but don't worry if the frequency drifts at the moment.

Next, connect a diode probe to the junction of R47/C65 and peak L6 for maximum output. Then remove the TX connection and refit to the RX input, reconnect the counter to L7b, adjust C56 for approximately 134MHz and peak L7.

(As the two operations are slightly interactive repeat this a few times until you are satisfied with the v.c.o. coverage). Switch off the power and remove all

connections including the temporary header in place of IC7.

### Synthesiser Components

Now fit all the synthesiser components taking great care over the orientation of all the i.c.s and polarised capacitors. Mistakes at this point could prove very costly!

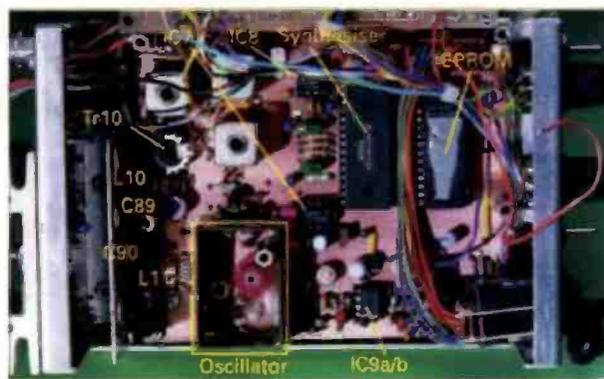
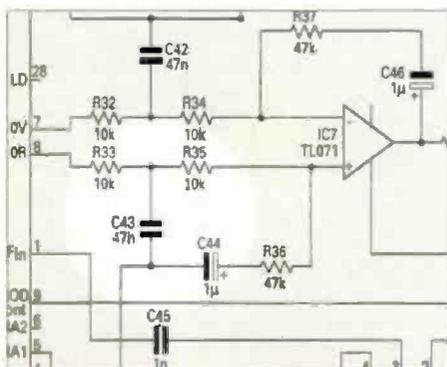
At this point there's no need to connect the channel switch because the synthesiser is programmed to 145MHz for transmit and 145.6MHz for receive.

Check the frequency of the reference oscillator on pin 29 of IC4. This must be 6.4MHz, adjust with C41. (If necessary alter the value of C40 to achieve this).

The synthesiser should now lock up. The v.c.o. 'steering voltage' measured on pin 6 should be about 4V.



Fig. 2.1: Details of the area (part of Fig. 1.1) which suffered a printing problem in many copies of Part 1 of the PW Panther.



An overview of the main synthesised phase lock loop and 'pre-PA' driver p.c.b. from the component side. This is the 'main' board and other photographs show more detail of component placing.

### What To Build Next?

It's now a matter of choice what to build next, if you select the modulator, you will be able to monitor the output on another receiver, setting the microphone gain with R49 and the deviation with R54.

The transmit driver is straightforward, when fitting Tr10, push the device down onto the p.c.b. and solder the can to the groundplane. (This not only

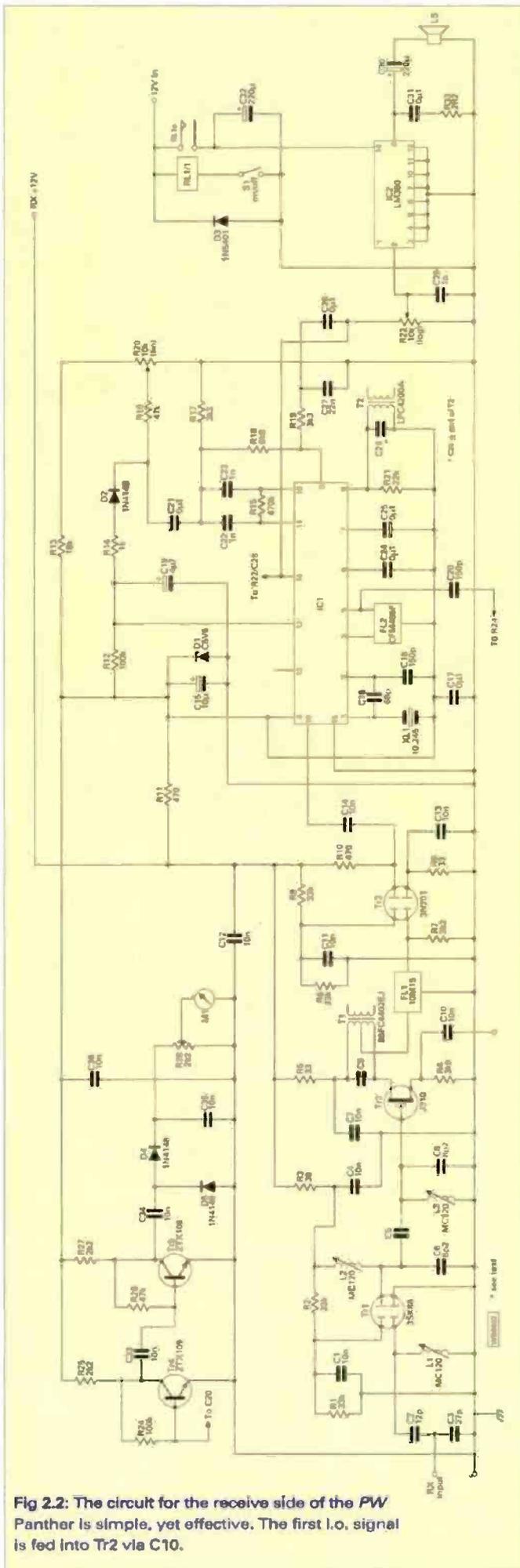
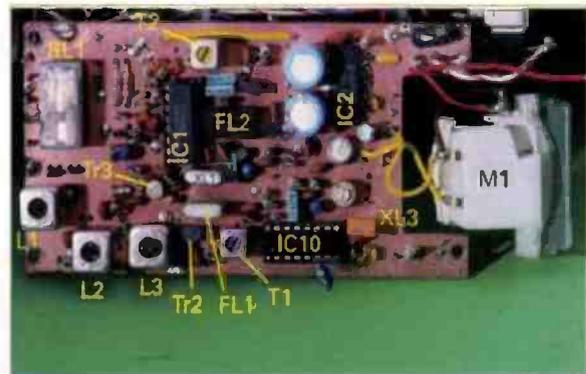


Fig 2.2: The circuit for the receive side of the PW Panther is simple, yet effective. The first i.o. signal is fed into Tr2 via C10.

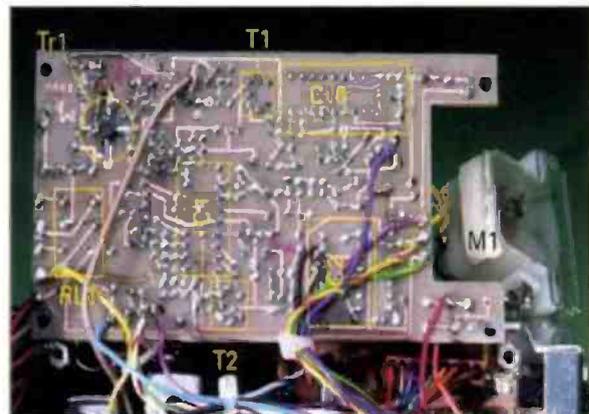


The Receiver p.c.b. (from the component side) showing the main component positions.

provides some heatsinking but also gives a low impedance earth path. Next, connect a power meter across the output terminal and peak L8 and L10/C89/90 for maximum output. This should be about 1.5W. The output from this stage may be taken from across C91 if only low power is needed. (The capacitors C92/93 form the input matching for the p.a. stage). If all is well with the synthesiser board this can now be put to one side. And you're ready to progress onwards!

### Receive Board

I would now suggest that you proceed with building the receive board. And if you're following my lay-out (see end of text advice) first of all you should fit



The underside of the receiver p.c.b. with the main locations outlined. Only Tr1 is mounted on this side of the board

the links where shown on the layout, followed by the rest of the components. The integrated circuit, IC2, has many of its pins soldered to the ground plane, as have many of the components. These connections provide ground connections to tracks on the underside of the board. When all the parts have been fitted, connect a miniature coaxial link between L7b output terminal on the synthesiser board to the input pin on the receiver board. At this point you should also make temporary connections for the volume, squelch and loudspeaker. Next, you should make a temporary connection to the antenna pin of the changeover relay and feed in a signal of 145MHz. This may have to be a fairly high level to start with, but tuning coils L1, L2, L3 and T1 should result in a performance of about 0.2µV for 12dB SINAD. Tune T2 for minimum distortion.

Continued on page 20...

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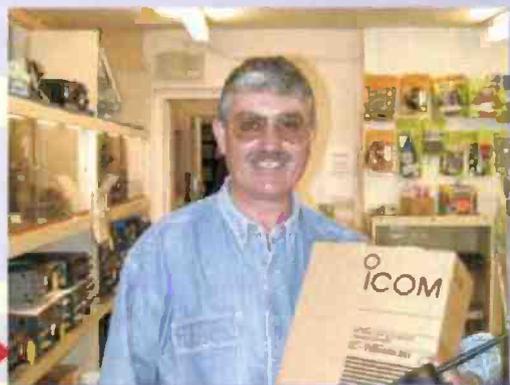
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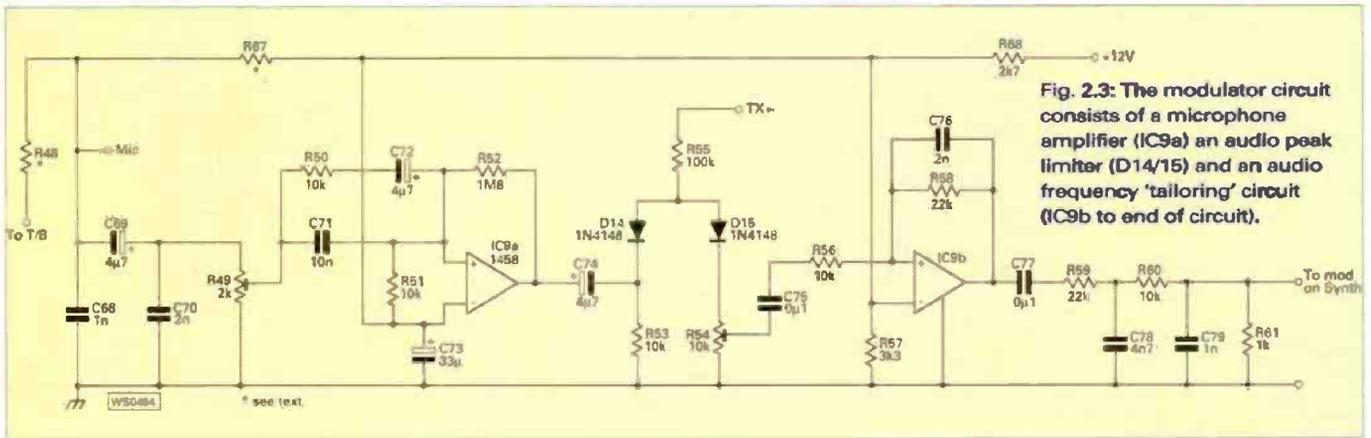


Fig. 2.3: The modulator circuit consists of a microphone amplifier (IC9a) an audio peak limiter (D14/15) and an audio frequency 'tailoring' circuit (IC9b to end of circuit).



Close-up of the oscillator and modulator area of the 'main' board.

(Make sure you have the wires in the correct order or else you will get some very strange channels!).

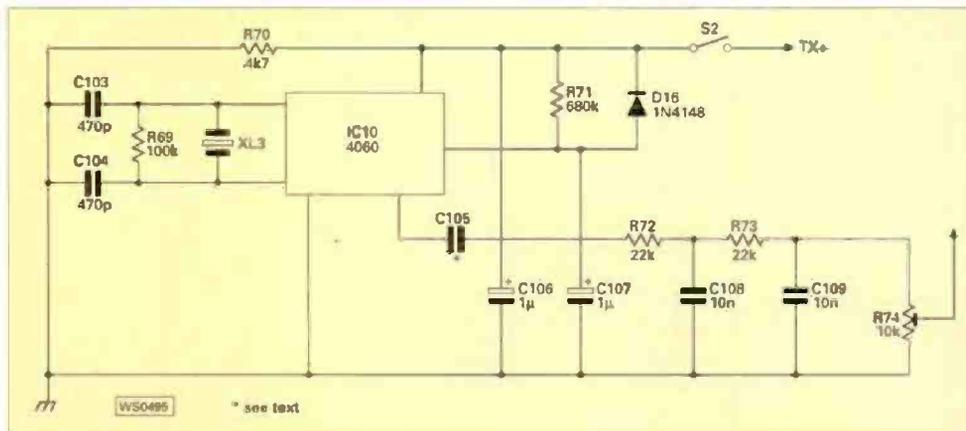
**Synthesiser chip:** Unfortunately, the synthesiser integrated circuit, the MC145152P, for this project has now been made obsolete by the manufacturers (Motorola). However, as many surplus p.m.r. boards contain the chip and it's still available as surplus, both the author G8JVE and the Editorial team consider the project is still viable. But please be aware that unless they still have 'remainders' in hand, most Motorola stockists will not be able to provide new i.c.s for customers.

**Editor.**

Fig. 2.4: This is a toneburst generator that could be fitted to any f.m. transmitter that doesn't have one fitted as standard. The duration of the tone signal is controlled by the time constant of R71/C107.

### Power Amplifier Stage

For a higher output recommended for mobile use, the p.a. stage should now be built. Fit all the components with the exception of the power transistor Tr11 on

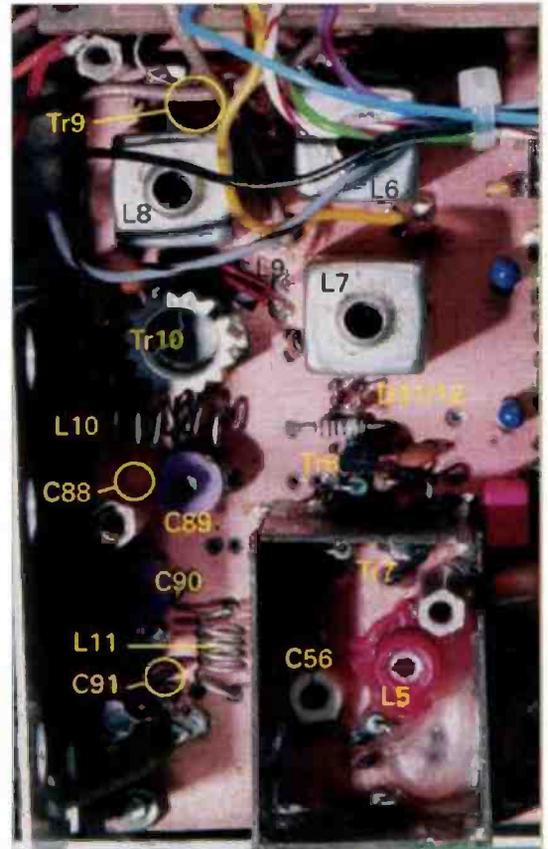


### The BCD Switch

Finally wire up the BCD switches to the connector, A0, A1, A2 and A3 make up the 1, 2, 4 and 8 weighted values on the least significant channel number.

The lines A4, A5, A6 and A7 make up the similar weighting lines on the most significant channel switch.

You should now have a fully working rig albeit with only 1.5W of r.f. output. Should you only want this level, the rig may be mounted in a box, the driver output being connected to the TX input of the changeover relay.



Close-up of the main oscillator and pre-PA r.f. stage area of the 'main' board.

the print side of the p.c.b. (Surface mount fashion) together with the screens around the l.p.f.

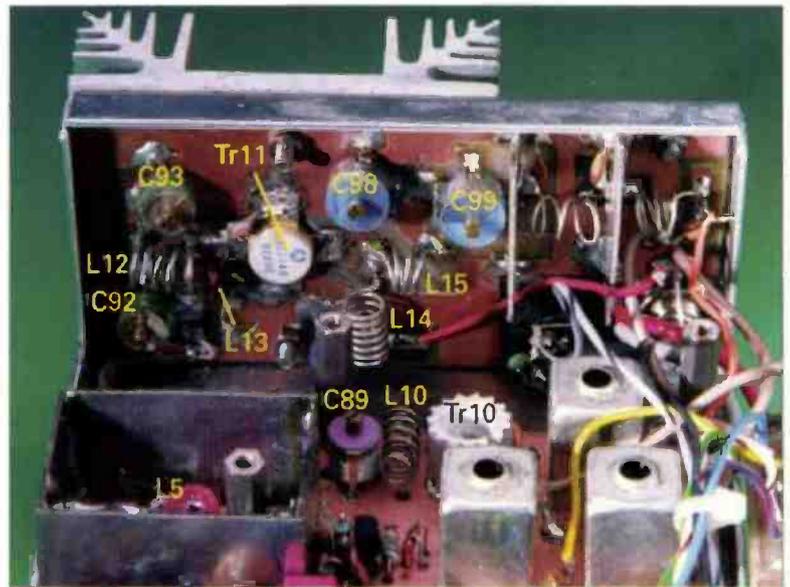
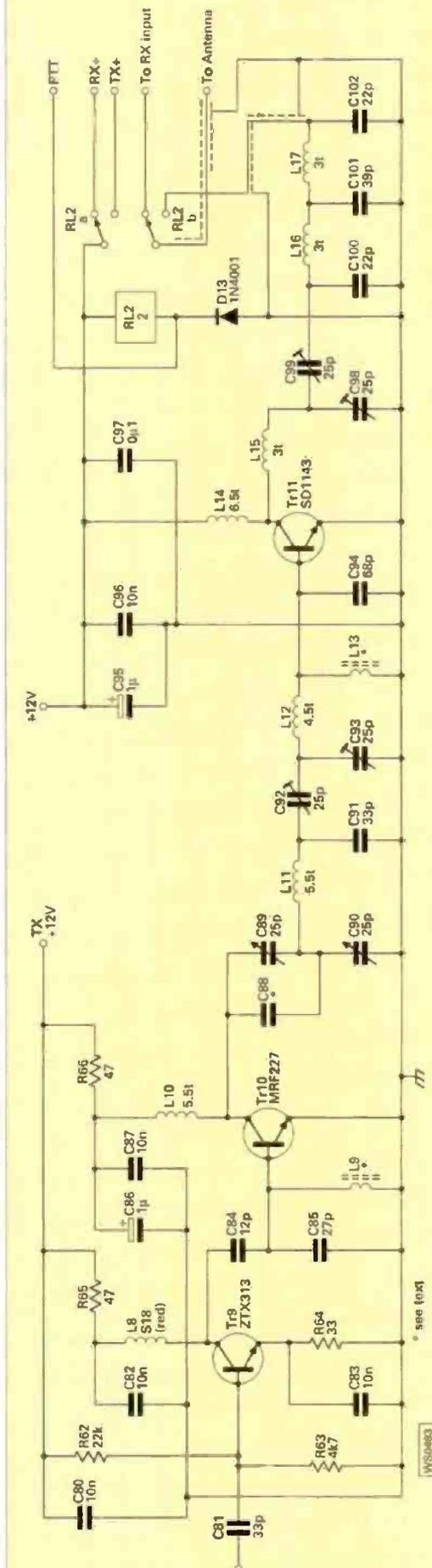
If not already done, drill a hole in the p.c.b. for the p.a. transistor so

### Circuits and p.c.b. layouts available

Copies of the author, Mike Rowe's, original circuits and p.c.b. overlays are available from the editorial offices. Send an s.a.e. A4 sized envelope marked 'PW Panther Drawings' to:

**Practical Wireless  
(Panther Drawings)  
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Fig. 2.5: The transmit pre-amplifier and power amplifier stages are fitted on the synthesiser board. See text for more detail.



that the device will sit flush with the p.c.b. Do not solder it in at this time!

Offer the p.c.b. into the case so that it is fitted at the left hand end of the back panel (viewed from the front) and mark and drill a hole for the p.a. device. This should clear the shoulder of the transistor.

Similarly, drill the heatsink, but this time drill a hole only large enough for the mounting stud.

I would also recommend that at this time you drill four mounting holes in all three layers (p.c.b., case and heatsink) positioned so that they miss the heatsink fins and p.c.b. components.

This will prevent the heatsink rotating and provide additional grounding. Screw the p.c.b. into the case and fit the p.a. device tightening the fixing nut, making sure that the collector tab is to the right.

Now solder all four leads to the p.c.b.

Fitting in this order should ensure that there is no undue pressure on the body or tabs of the p.a. transistor. Connect up the positive supply and input/output connections.

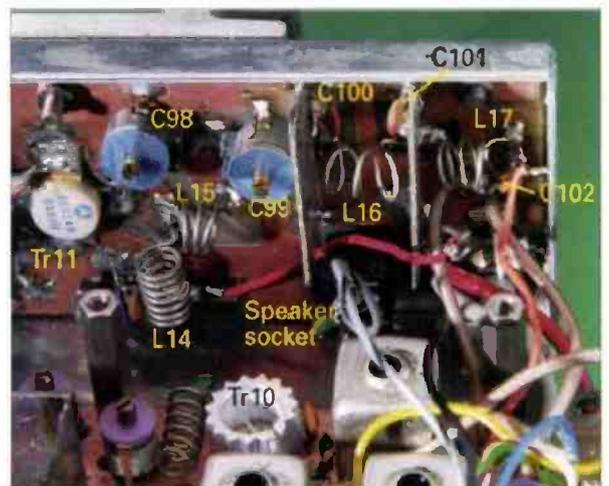
Apply r.f. then tune capacitors C92/93 and C98/99 for maximum out consistent with minimum current.

Tune L16 and L17 by altering the turns spacing for maximum output, checking with a wavemeter that this is consistent with minimum 2nd and 3rd harmonic output.

### Performs Very Well

You will now have a small reasonable powered mobile rig which performs very well. More to the point, if it does go wrong you know how it was made and it shouldn't present any problems! PW

Looking at the p.a. stage mounted on the rear wall of the unit. This stage may not be needed if an r.f. output of around 1.5W is adequate for your needs.



The low-pass filter area of the p.a. stages. This stage will be needed to minimise the spurious, even if you decide not to use the p.a. stage.

# MOSFET?

This month, Ian Poole G3WYX continues with the f.e.t. theme by answering the question: 'What Is A ... m.o.s.f.e.t.?'

**F**ield effect transistors (f.e.t.s) of all types are widely used today and last time I looked at the junction f.e.t. This month I'm going to investigate m.o.s.f.e.t.s to see what advantages they offer and how they work. The term m.o.s.f.e.t. stands for **metal oxide semiconductor field effect transistor**, m.o.s.f.e.t. for short! The name gives a clue to its construction, as we shall see later. The devices had been known about for several years, but only became important in the mid and late 1960s.

Initially, semiconductor research had focused on developing the bipolar transistor and problems had been experienced in fabricating m.o.s.f.e.t.s because of process problems - particularly with the insulating oxide layers.

The technology is now one of the most widely used semiconductor techniques, having become one of the principle elements in integrated circuit technology today. Their performance has enabled power consumptions in integrated circuits (I.C.s) to be reduced.

Reduced power, in turn, has reduced the amount of heat being dissipated and enabled the large i.c.s, which we take for granted today, to become a reality. As a result of this, the m.o.s.f.e.t. is the most widely used form of transistor in existence today.

## Two Categories

Like the junction f.e.t., there are two categories of m.o.s.f.e.t.,

namely *p*-channel and *n*-channel types. The principle of operation is similar as well, but there are some significant differences.

Whilst the channel area of a junction f.e.t. (and hence its conductivity) is controlled by the depletion layer of a reverse biased diode, for the m.o.s.f.e.t., the gate is placed on an insulating oxide layer. Voltages applied to the gate control the conductivity of the channel as a result of the electric field induced 'capacitively' across the insulating, dielectric layer.

There are also two further categories of m.o.s.f.e.t. These are the enhancement and depletion types. As the name suggests, the depletion mode m.o.s.f.e.t. acts by

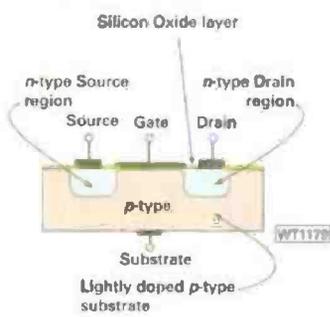


Fig. 1: Structure of typical *n*-channel enhancement mode m.o.s.f.e.t.

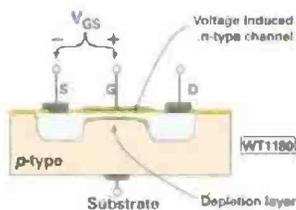


Fig. 2: Operation of an *n*-channel enhancement mode m.o.s.f.e.t.

depleting or removing the current carriers from the channel, whereas the enhancement type increases the number of carriers according to the gate voltage.

## Enhancement Mode FETs

In view of all the combinations of the m.o.s.f.e.t., it's easiest to look at the enhancement and depletion mode f.e.t.s in turn. However, I'll leave the depletion mode version

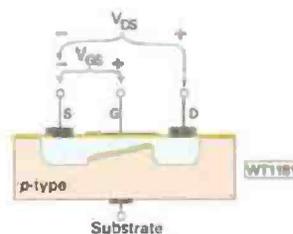


Fig. 3: The effect of a potential applied between the drain and source on the channel.

until next time and spend this month taking a look at the enhancement mode f.e.t.

The basic construction of an *n*-channel enhancement mode f.e.t. is shown in Fig. 1. The same basic principles apply for a *p*-channel m.o.s.f.e.t., except that electrons are exchanged for holes and the polarities are reversed. From the diagram, it can be seen that the device is fabricated using a section of lightly *p*-type semiconductor as the substrate. Silicon is the most common, but other semiconductor types can be used.

Two *n*-type regions are created at either end of the channel for the drain and source connections. An oxide layer is set down which overlaps the source and drain areas slightly. The oxide is very thin and may only be 0.1 microns thick. The gate contact is then laid down on top of this layer.

Materials for the gate contact vary. Metal would appear to be an obvious choice, but polysilicon, some specialised metal compounds and even silicides are often used. The source and drain connections are also made to provide connection to the channel.

When no voltage is applied to the gate, the device and the two *n*-type regions associated with the drain and source mean that the device effectively forms an *n-p-p-n* construction. When a potential is applied across the channel, one of the *p-n* junctions will be reverse biased and no current will flow.

If a positive voltage is applied to the gate then electrons from the *n*-type regions are attracted into the area immediately under the gate, creating a temporary

potential induced *n*-type area. As the current no longer has to pass through a reverse biased *p-n* junction, it means that current can flow between the source and the drain through this new *n* type area.

The greater the voltage applied to the gate, the larger the number of available current carriers. This means that the higher the gate voltage, the greater the current flowing through the channel.

When a voltage is applied between the drain and the source, the shape of the channel is modified in the same way that occurred for the junction f.e.t. This happens because a voltage gradient appears along the channel, altering the degree by which the gate potential can pull carriers in from the drain and source areas.

In other words, the potential difference between the gate and the end of the channel nearest the source is much greater than the potential difference between the gate and the channel nearest the drain. This results in more carriers being pulled into the channel region near the source than the channel region near the drain.

## In Operation

In operation, the m.o.s.f.e.t. presents an exceedingly high input

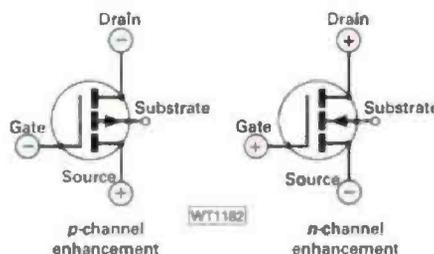


Fig. 4: Circuit symbols.

impedance. The fact that the gate is placed onto an insulating oxide layer means that it's virtually an open circuit, making the m.o.s.f.e.t. a truly voltage-controlled device. In reality, the input impedance is many hundreds of megohms and is often limited more by the leakage impedance of the circuit board, etc.

Although the enhancement type f.e.t. is not as widely used as the depletion mode f.e.t., it's still very important and widely used in many applications, making it an essential component in the electronics and radio designer's catalogue.

Next month I will take a look at the depletion mode m.o.s.f.e.t. For anyone wanting to take a look at some of the terms used in semiconductor fabrication there's more information on the Web at [http://website.lineone.net/~ian\\_poole](http://website.lineone.net/~ian_poole)

PW

THIS MONTH IT'S IAN POOLE G3WYX'S TURN TO ANSWERS THE QUESTION JUST 'WHAT IS A ... MOSFET'?

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RS-101	1.8-60MHz (3kW)	£79.95	.....£69.95 p&p £5
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Waterproof case for handheld .....£10.00 P&P £1

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Mobile holder for handhelds

**ONLY £9.99** + P&P £2

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**QS-300**

A fully adjustable desk top stand for use with all handhelds. Fitted coaxial fly (FAI) with BNC & SO239 connectors

**ONLY £14.99** P&P £3

**GARMIN GPS-III**

Latest UK version complete with moving map of UK & Europe. £449.00.

**SALE PRICE £279.95**

GPS-12	Navigator.....	£129.95
Cigar power lead	.....	£20.00
Active magnet antenna	.....	£39.95

**EP-300**

Deluxe over the ear earpiece.

**100 PIECES ONLY £9.99** + P&P £1

# An Adaptable Canadian Import...

# The MQ-2 Mini-Beam Antenna

Peter Dodd  
G3LDO, well  
known to *PW*  
readers for his  
work on  
antennas,  
reports on his  
experiences with  
an interesting  
'mini beam'  
imported from  
Canada.

**T**he MQ-2 is a compact two-element beam for the 14, 18, 21, 24, 28 and 50MHz bands. It uses end loading, comprising an inductance and capacity 'spokes' at the ends of each element. A separate set of inductors and spokes are used for each of the h.f. bands.

One of the spokes in each set is constructed so that its length can be varied. This is achieved using an adjuster, comprising a sleeve with small clamping screws and the arrangement allows the resonant frequency to be set at a specific part of the band.

The antenna element lengths are 3.6m (11ft 9in) and the boom length 1.37m (4ft 6in) so it's a very small antenna. Some idea of the size can be gauged from the heading photograph, where it can be compared with a standard u.h.f. broadcast TV antenna. (A diagram of the antenna is shown in Fig. 1).



The antenna is mounted on a short mast on a KR-600RC rotator, which is fixed to the chimney using a double clamp. Some idea of the small size of the MQ-2 gain can be seen by comparison with the u.h.f. broadcast TV antenna.

## The Antenna Kit

The kit appears to be made from materials of good quality. Additionally, the loading coil assemblies are coated in a thick layer of opaque silicone rubber material to ensure that they are weather proof.

The instructions for assembling and adjusting the antenna are clear and unambiguous. The front page gives a specification and a rather 'Over The Top' sales blurb that needs quoting to do it justice!

"Performance is almost beyond description - low s.w.r., low radiation angle, broad band, excellent gain and a front-to-back ratio far better than most two-element beams on the market today". (It's a shame that the manufacturer feels the need to include this sort of rubbish - it spoils what is otherwise a good manual and it makes me sceptical of the product).

The specification gives the forward gain as 6dBd on 28MHz, 5.8dBd on 24MHz, 5.5dBd on 21MHz, 5dBd on 18MHz and 4.4dBd on 14MHz. The front-to back ratio is quoted as between 12 to 17dB.

## Easy Assembly

Assembly of all the metal work parts was easy and accomplished in about an hour. The clamps that fit on the end of the horizontal sleeve were missing but a warning that these should not be tightened (because the quad reflector will distort with large variations in temperature due to the differing expansion coefficients of the insulating and metal sections) implies that they may have been omitted deliberately.

However, I installed the antenna without these clamps and the structure seemed quite stable, even in high winds. Most of the antenna assembly time and effort went

into fitting the capacitive spokes and the resonance adjusters. The complete antenna weighs 7.7kg (17lbs) and was fixed on rotator on the chimney of the house without difficulty. And I managed it without any additional help.

A note in the documentation says "for tower mounting this antenna, we recommend installing the boom and driven element on the tower first, then take the reflector assembly up the tower and push the cross arm bracket into the end of the boom .....

The reason for the suggestion became obvious when I tried to get up the roof with the complete antenna! All the spokes on the ends of the elements seemed to catch with anything within reach. It was far easier to install in two sections as described in the manual. (Fig. 2, shows the reflector assembly being fixed to the end of the boom).

From previous antenna tests, I knew that where I'd erected the antenna was not an ideal location, due to nearby telephone wires and the close proximity of electrical wiring and plumbing inside the house. On the other hand, in practice I thought it would probably be the sort of location a compromise antenna like this would be used.

## Antenna Adjustments

Now let's take a look at the antenna adjustments: The s.w.r. graphs in the documentation showed typical resonate frequencies (frequencies at which the s.w.r. is the lowest) and these are shown in the two left hand columns of Table 1.

The measured s.w.r.s (my measurements were done using an MFJ-249 s.w.r. Analyser) and frequencies are shown in the two right-hand columns.

From my measurements, shown in Table 1, it appeared

Fig 1: Electrical diagram of the MQ-2 Antenna. The dotted lines represent the boom support structure.

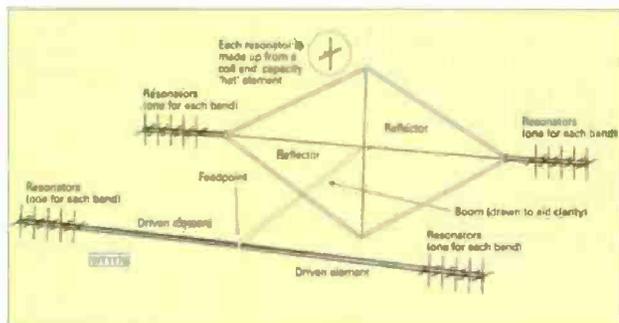


Table 1 Quoted SWR & Freqs.		Measured SWR & Freqs.	
Freq (MHz)	SWR	Freq (MHz)	SWR
14.2	1.2:1	14.12	1.6:1
18.1	1.2:1	17.9	1.1:1
21.28	1.3:1	21.05	1.8:1
24.95	1.5:1	24.63	1.25:1
28.4	1.2:1	28.8	1.6:1



Fig. 2: The reflector assembly being fixed to the end of the boom.

on one spoke from each coil for the band you wish to change). However, the position of the adjuster spoke on its respective ring is unimportant.

It's also important that some arrangement is made so that the resonance adjusters are accessible. A tilt-over mast would be the best option.

As I've already mentioned, the review antenna was mounted on the roof and the resonators were made



Fig. 3: The resonator adjusters: The resonator elements, showing construction of the resonators with their spokes and adjusters.

found a replacement in one of my junk boxes. The construction of the resonators can be seen in Fig. 4.

I decided to move the 14MHz resonance down to the c.w. end of the band by moving the adjusters out to their maximum length. When this was done the antenna was resonant on 14.04MHz.

The reason for moving the antenna resonance into the c.w. band is that the impedance bandwidth at an s.w.r. of 2:1 is only 50kHz on 14MHz (from experience I have found that c.w. is more effective with a modest performance station).

Table 2

Freq (MHz)	SWR
14.04	1.55:1
16.15	1.0:1
21.26	1.65:1
24.92	2.2:1
28.6	1.5:1

improved by shortening or lengthening the tuning spokes on the reflector coil. Although this was done, the s.w.r. results in Table 2 were the best I could achieve.

I removed the reflector assembly from the antenna and checked all the connections. I used my antenna element resonance measuring device (a grid dip oscillator with modified coil assembly and frequency counter (see *The Antenna Experimenter's Guide*\*) to check the resonators; all gave good dips about 500 to 700kHz below the band frequency but the dip on the 18MHz resonators was poor. If I increased the 18MHz resonator spoke lengths the dip was as deep as the other bands but the frequency was far too low and the s.w.r. was not improved whatever I did.

\**The Antenna Experimenter's Guide*, written by G3LDO, is available from the PW Book Service). Editor.

## Performance & Testing

Now it's time to look at performance and testing of the antenna and the strategy moving the 14MHz resonance to

that the WARC frequencies were outside the band, so I checked the length of the spokes with the diagram on page 6 of the manual; all seemed satisfactory.

I proceeded to adjust the antenna as described in the instructions. (It's important that the adjustment is made

accessible by slackening the mast/boom U-bolts and the mast clamp bolts on the upper section of the rotator. The antenna can then be rotated and tilted so that the resonance can be adjusted, as shown in Fig. 3.

The small spoke adjuster clamp screws can easily be unscrewed out too far and lost forever, as happened once in my case. Fortunately I

the low end of the band was rewarded on the first QSO with the antenna. I received a 589 report from VK7VR on 14.025MHz, although on this band I was unable to measure any front to back directivity.

On 28MHz the front-to-back ratio was around one to one and a half S-points, which tallies with the value given in the specification. The front-to-side (F/S) was very good on all bands from 14 to 28MHz; measuring on the S-meter better than 20dB.

As regards gain measurement I compared it with my skeleton slot antenna, which is an elongated loop 3m (10ft) wide and 9.1m (30ft) long, with the bottom element 4.6m (15ft) from the ground. This antenna has a calculated gain of 11dBi on 28MHz. On 28MHz the MQ-2 was down about one to one and a half S points on the skeleton slot.

Just after the antenna was installed the weather became very wet. I noticed that resonant point on all bands moved down about 100kHz on all bands during heavy rain but reverted to the original frequency when the rain ceased.

## My Conclusions?

My conclusions about the MQ-2 Antenna? Well, considering how small this antenna is, it works quite well. During the test period the DX worked included CX, LU, W, PU, CE, 9J2 on 28MHz, PP5, P49, S79, JL on 24MHz, VU2, 9V1, 9K2F, W on 21MHz, CO8, W4 and PY on 18MHz and VK7 and YV5 on 14MHz. Since the frequency I've been even more successful.

The antenna was not tested on 50MHz as I don't have any equipment for the band. However, because of its small size the antenna would meet the needs of many amateurs who have very small gardens - or even no garden at all. I was impressed enough with the MQ-2 to buy the review unit!

My thanks go to Waters & Stanton PLC of 22 Main Road, Hockley, Essex SS5 4QS, Tel: (01702) 206835, FAX: (01702) 205843 for supplying the reviewed antenna.

Normal price for the MQ-2 is £379 plus £7 P&P, but W&S state that PW readers can buy it for £350 plus £7 P&P by mentioning this review. PW

## Waters & Stanton Replies

Jeff Stanton of Waters & Stanton had the following to say about some of Peter Dodd's comments in his review:

"I agree with Peter Dodd that the 'sales blurb' for the mini-beam is a little 'over the top' and I know that Tom McKay at the manufacturers is planning to tone it down in the future. As Peter says, it's not necessary on what is a quality product.

"I understand that the two clamps which were missing should have been in the box and are sending me spares. I'm pleased that this did not affect the tests.

"Of course, another important consideration is that a low cost lightweight rotator will turn this antenna avoiding several hundred pounds further expense on beefy rotators".

## Tom McKay Replies

Tom McKay from the Manufacturers of the MQ-2 Antenna had this to say about some of Peter Dodd's comments:

"The clamps that fit on the horizontal sleeve are included. I wonder if they were lost in the paper wrap? It also sounds like he tested an older version with the black nylon vertical and horizontal insulators. The latest version produced this year have clear lexan insulators and do not suffer from moisture and temperature expansion.

"I read where he lost one of the small adjuster screws, I figured that this may happen now and then, so there is a small packet of extra screws and nuts as well as 12 extra long spokes in the parts package for such problems".



Fig. 4: Peter G3LDO says: "Note the crawling ladders used for mounting the antenna ... don't even think about going on to a roof without these!"

# Indoor Antennas...

## Are They Really Feasible?

Gordon King  
G4VFFV takes  
you through his  
experimentation  
with various  
indoor antennas  
and proves that  
they can be  
feasible.

Fig. 1: The 5-element XY ZL Special, located at the gable end of the roof space and pointing north-east. It's fed by two lengths of low-loss coaxial cable with polarisation switching in the shack. A part of the trapped dipole h.f. antenna can be seen in the apex of the roof.

An indoor antenna can never be a substitute for an efficient outdoor antenna, but when there's no alternative, an indoor configuration is certainly worth trying. You may be pleasantly surprised! However, it's impossible to forecast how well (or how badly) any type of indoor antenna will behave - there are so many incalculable varieties.

Much is governed by the complex environment within the building, such as the 'space' available to site the antenna, the height of the building above ground and sea level, the nature and absorption factor of the building materials and the local field strength of the TV and radio transmitters serving the area.

Indoor transmitting antennas significantly increase the risk of TV and radio interference and the smaller the signal fields from these transmitters the greater the risk of interference. Then of course, there are the questions of safety and health hazards that must be considered.

Nevertheless, it is feasible (given reasonable conditions) to operate a satisfactory and satisfying amateur transmitting station merely with indoor antennas, as I have been doing now for more than a decade. Most of the h.f. bands can be accommodated, as can v.h.f. and, if you have the space, a v.h.f. beam is not out of the question - but excessive signal loss due to increased absorption through the building is likely at u.h.f. and above.

### Signal Absorption

With indoor antennas, of course, the radio wave needs to get out of the building into free space and for this to happen, the wave needs to pass through the walls and roof and, unless the wavelength is

extremely short, at least, a proportion of the energy of the wave will pass through and propagate through space in the normal way.

It is inevitable, however, that some of the energy is going to be lost owing to it being absorbed by the building materials. The outgoing wave will thus be attenuated and the energy not being propagated will be dissipated or converted to heat.

In general, as the wavelength is decreased (frequency raised) so the absorption attenuation increases, but in the h.f. bands, especially the lower frequency bands, normal building absorption attenuation can be remarkably small, unless of course, the building is made of metal or metal framed. The main impairment to radiation efficiency is generally the need for antenna compression and compromise, unless you are blessed with a cathedral-sized attic space!

During my somewhat protracted spell with indoor antennas I have calculated that the 144MHz absorption attenuation relative to my ZL Special seven-element beam (which is sited at one end of the roof space and looking 'out' through the gable-end wall of my house) is not all that much more than 2dB under dry conditions. The antenna itself has a gain of around 9dB (relative to a dipole) so, in effect, being in the roof-space from this aspect alone means that I'm running with a beam of about 7dB gain instead of one of 9dB gain!

My gable wall is constructed out of quarried stone on the outside and thermal insulation blocks on the inside and the internal dimensions of the roof space are around ten metres in length and 9.5m width. The roof is designed in Swiss-cottage style, steeply sloping and tiled and lined with 500 gauge plasticised pvc underlay. Roof headroom approximates 2.5m, but reduces rapidly from the centre to either side.

### Roof Space Hardware

I've got all the usual roof space hardware including the water storage tank, the central heating header tank, water overflow and plumbing pipes and several lighting and power electricity circuits. Also located in my roof space is a 10-element TV antenna.

Happily, the strength of the signals from the local f.m. radio and TV transmitter are sufficiently strong as to produce an average signal of around 10mV p.d. at the antenna sockets of the receivers. This, as already intimated, goes a long way towards taming some of the problems of transmitting with indoor antennas.

### Topography Factor

Topography is another factor which favours the use of indoor antennas at my



QTH. As some readers will already know, my house is located on sloping ground about 100m a.s.l. and is 1.6km from the sea. The ground rises to some 150m in a southerly direction, which gives me an open aspect across Lyme Bay in a north-easterly direction, with the rising ground behind.

My location is really super for a north-easterly take-off and is the direction my 144MHz beam (looking through the gable end of the house) is mostly pointing. The house is a little above 10m in elevation, so the antenna itself is about 9m from the ground.

I have experimented with a wide range of indoor antennas over the years for both the v.h.f. and h.f. bands. With all of them I've had varying degrees of success - and none have been an utter disaster on any band.

A significant advantage of indoor antennas, of course, is that you can experiment with them at any time of the day or night and under any weather and signal conditions without the need for tall ladders! Moreover, they are not affected by strong wind, which is a bonus at my QTH during the winter gales. Neither are they affected by the hostile outdoor environment.

I've constructed a variety of 144MHz antennas for roof space siting, including vertical dipoles, five and seven-eighth verticals, end-fed J antennas, loops, phased verticals, helicals, slots and beams.

Apart from the usual 144MHz F3E mode, my favourite mode on this band is A1A. On this mode I use horizontal polarisation - also F3E with horizontal polarisation. (I wonder what happened to the experimental horizontal f.m. group, which undoubtedly proved over the years that, even under 'flat' conditions, horizontal polarisation had a two to three decibel advantage over vertical). This meant a 144MHz antenna was required to provide both vertical and horizontal polarisation.

## Experimenting With Helical

After experimenting with a 144MHz helical to yield circular polarisation (and thus serve both my requirements) I found that, for adequate gain, a lot of my roof space was being used up (such an antenna for 430MHz wouldn't have been so bulky). I thus decided on a crossed or XY beam and, after several attempts based on long-boom designs, I eventually settled on a short-boom XY ZL Special. This antenna is based on two driven elements and takes a bit of playing with to optimise. (See Fig. 1).

The antenna is fed through two lengths of ultra low-loss coaxial cable, one length for the horizontal section and the other for the vertical section. A coaxial switch in the radio room allows selection of the required polarisation.

My radio room is on the first floor of the house and each cable is about 10m long. Signal loss isn't all that high (it's desirable to keep losses as low as possible with indoor antennas). There's direct access from the roof space to the radio room via a shaft which runs behind the wall and emerges from a small door within a built-in cupboard, which is handy and the feeders from all my roof space antennas follow this route.

## Circular Polarisation

Before I opted for separate X and Y feeders I experimented with circular polarisation. This, of course, would have catered for both vertically and horizontally polarised signals on the one cable without the need for switching. (Except, perhaps, for a change between left and right-hand circular). But because of the extra 3dB (half-power) loss, which results when communication is with a station of 'linear' polarisation, I considered it more

desirable to reduce this loss by running two feeders and a changeover switch, since the higher the signal (both transmit and receive) that can be achieved with indoor antennas the better.

Anyway, having now used this 144MHz antenna set up for several years I'm very happy with the results. For 'local' working, the TX power is 1W or less, though I do tend to become more power mad (!) for DXing and utilise the full 10W of my Yaesu FT-480R, especially under tropo lift conditions.

## No Interference!

Even running at the full 10W of the TX, I've never had trouble with television or radio interference, despite the fact that the 144MHz antenna is barely one metre distance from the television antenna in the same roof space!

Most broadcast radios in my house use their own ferrite rod antennas, while the hi-fi f.m. tuner operates from an indoor antenna running along the skirting board. This, of course, is one of the advantages of being blessed with high signal fields from the local broadcast stations!

My radio room is situated below the roof space and is about six metres clear from the rear of the beam at an angle of around 30°. At the operating position the measured signal field at 10W is little more than 1V per metre. This corresponds to a power flux density of around 2.6mW per square metre, which is some 34dB below the **National Radiological Protection Board's** (NRPB's) investigation levels at two metres, so I have no qualms concerning health hazards in operating my station under these conditions. There's a further 10dB margin at 1W, of course.

## Communication Distance

Operating under 'flat' conditions, the communication distance covers around 100km (somewhat more over a sea path). This distance, of course, is a function of the overall heights of the two stations (just over 100m a.s.l. at the antenna in my case). However, when there's tropo enhancement (especially when the pressure just starts to fall after an anticyclonic spell) things really begin to buck up because the distance is far less influenced by height or power.

From my 1080 locator square, under normal tropospheric conditions, I can achieve reasonable communication up to square I082 (about 100km), while with a trace of lift the path increases to squares I083 and I093. When the lift is more dramatic, I've worked into square I085 (GM-land) and into Europe, both achieved with F3E mode.

However, for more esoteric 144MHz DXing I'm particularly keen on A1A mode, especially for the advantage provided by the smaller noise power bandwidth.

Morse, of course, is particularly useful for making DX contacts where voice would have little chance of succeeding (a pity Morse seems to be losing favour in the amateur world!). I've also had my fair share of Sporadic-E (Sp-e) contacts with the indoor

Fig. 2: An L-type dipole located at the opposite gable end cut for the 29MHz band. This has a very low v.s.w.r. and is useful for 28MHz f.m. activities, especially during Es propagation.





Fig. 3: Photo showing the centre feeder connection of the h.f. antenna. The conductor is supported to the timbers by a cord, while the helixes are wound on roof timbers insulated by a plastic membrane (but large diameter plastic piping could be used as an alternative).

beam and no more than 10W of TX r.f.

There's little doubt that an indoor antenna is perfectly feasible on the 144MHz band given fair conditions, but can the same be said for the h.f. bands? Well, let's see.

### A Tricky Problem

A tricky problem with indoor h.f. antennas can be a direct coupling of the signal into adjacent electric wiring and plumbing, which not only reduces the effective e.r.p., but also conducts the r.f. to other electrical appliances in the house and sometimes neighbouring houses as well. This increases the possibility of radio and television interference. The wiring and pipe work can also re-radiate the signal, making life even more difficult.

I've compared so-called magnetic loops with various types of dipoles and open loops and, although a well designed magnetic loop is capable of a performance which belies its diminutive dimensions, it suffers from the inherent disadvantage of compressed bandwidth. (This is a result of its necessarily high Q-value, which calls for continuous operational tuning). Electronic synchronisation of the loop tuning with the transceiver tuning has been attempted, but so far without adequate accuracy.

Various designs have been published, including 'flexible' arrangements (made from good quality coaxial cable) which can be squashed through the smallest of roof space apertures. I've found that when correctly tuned, a high Q-magnetic loop can perform almost equally to a correctly dimensioned open dipole on most of the h.f. bands, especially in a roof space environment.

There are fewer problems with r.f. couplings too, but on balance - in my particular roof space - I've come out in favour of the open dipole. Despite that, compression is necessary to get it to fit into the available space on the lower frequency bands.

The two main problems in fact, appear to be the need for compression and the elimination of r.f. coupling to pipes and wires. Most recently built houses have essentially plastic piping, but there's still the electric and other wiring to avoid coupling into. (In this respect it's absolutely essential to avoid running the antenna along a line parallel to any other conductors in the roof space).

The maximum distance possible must also be

maintained between the antenna and other conductors. Endeavour to run the antenna along the inner apex of the roof space, as high up as possible and keep the feed point (of a dipole) midway along the apex.

### Twin Feeder

It's a good idea to use a twin feeder rather than coaxial cable to couple the antenna to the transceiver - this will help to avoid feeder radiation. Also try to get a direct route for the feeder. If it's necessary to cross other cables with the antenna, try to arrange for a distant right-angle crossing.

The amount of coupled r.f. can be judged by using an r.f. detecting device, with its pickup antenna or sensor held close to hidden wiring runs or pipe work in the house. I've tried various arrangements of series-tunes traps connected or coupled to the wiring or plumbing in an endeavour to 'notch out' the offending r.f. when the pickup has been excessive.

Although I've had some success with these, they often need to be tuned each time the transmit frequency tuning is changed and this is not always practical! The best plan is to site the antennas so as to eliminate, or at least minimise, any such coupling.

### What Antenna?

I must admit to having the most encouraging results with the simplest of antennas. The basic dipole cut for the particular band of operation is fine. I have also had good results with an L-shaped dipole (see Fig. 2), especially for the higher h.f. bands.

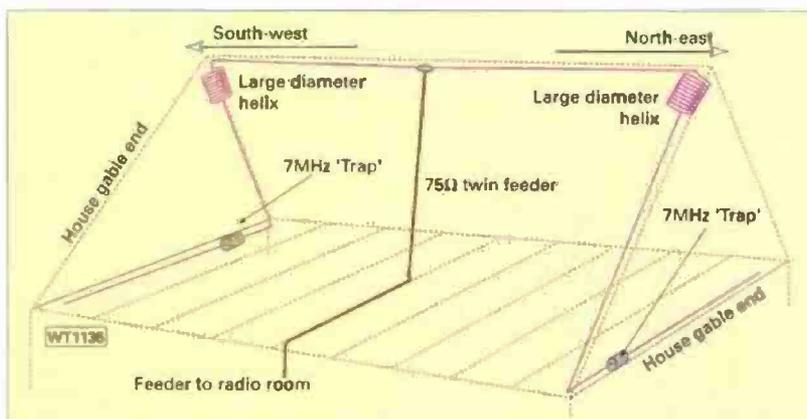
My current arrangement for 3.5, 7, and 14MHz is a simple trapped dipole, where the untrapped middle part is cut for 7MHz, and 7MHz traps inserted in each leg with conductor extension to embrace the 3.5MHz band. Dedicated dipoles are used for the higher bands.

It will not be possible, in a normal roof space, to erect the dipole kind of antenna in a straight line, as its overall length is about 33m. The half-wave 7MHz section works out to around 19.5m, while an extra 6.7m of conductor is required after each trap. Clearly, then, the antenna needs to be 'bent' and compressed for roof space accommodation.

The diagram, Fig. 3, shows the arrangement in my case (also see Fig. 4 for diagram). Two large diameter helixes reduce the physical length. They are formed on suitable parts of the roof timber (but large diameter plastic pipe could be used). The number of turns are tailored to provide maximum spread with the least bending (both important points).

I found it best to trim the length of the 7MHz section first for the lowest v.s.w.r. at the centre of the 40m band and then follow suit on the 80m band by trimming the conductors on the far side of the traps equally (tuning is fairly flat on both bands). For optimum impedance matching on the higher frequency bands I use a Yaesu FT-102 so-called Antenna Tuner.

Fig. 4: Diagram of the h.f. antenna configuration as described in the text.



### Final Word

I rarely use more than 5W r.f. input with indoor antennas and yet have worked stations world-wide on A1A mode. The measured electric field (that's the near field on most h.f. bands) is little more than 2V/m maximum in the radio room - some 30 to 38dB below the NRPB investigation levels over 3.5 to 29MHz so, again, no qualms in this respect.

Certainly in my case, I've had lots of fun and success with indoor antennas, so I can vouch for their feasibility. My final comment would be that it's best to start with low power, while bearing in mind the inevitable engineering shortcomings. Good luck with your 'Indoor DXing too!

PW



# Over The Arctic Seas From Siberia to St. Petersburg

Vadim Banandin UA9MCM was nominated to be the radio operator on *Siberia* during its expedition from 'Siberia to St. Petersburg via the Arctic Seas' and in this article (submitted by Stan Gould G0VJJ on behalf of Vadim), he describes the ensuing journey.

Vadim Banandin UA9MCM operating the radio on board the yacht *Siberia* and a map of the journey which the yacht, *Siberia*, took.

The yacht we used on the expedition, *Siberia* was built by a group of enthusiasts, over a nine-year period, under the leadership of the captain, **Serge Sherbakov**. It was a centre-boarder - ten metres long by 3.3m at its widest point, with a 14m mast and its crew consisted of seven men. I was lucky enough to be nominated by the Omsk Regional Radio Club to be the expedition's radio operator and I was to do all the cooking and also keep a video record of the expedition. The radio we used on the expedition was an **Alinco DX-70** with automatic antenna tuner (a.a.t.u.), loaned to us by **Gennady RU9MC**. Electric power was from a 25 horse power diesel engine and generator, charging two 180 a/h batteries.

The antenna system we used was a sloper consisting of three insulated, ten metre length steel guy ropes connected at the mast top to the inner conductor of a coaxial feeder - the braid being earthed to the mast. A home-made electronic keyer was found to cause strong r.f. feedback when used on board, so a straight key had to be used for all c.w. contacts.

In addition, we used a **Magellan GPS system**, which enabled us to transmit our exact co-ordinates. **Folke Anderson SM2AYE** plotted our course almost daily, using the *Microsoft World Atlas*. We were allocated the special call sign **R9MCM/MM** - the first letter of the suffix designates Omsk.

## As The Crow Flies

Omsk is some 1400km from the sea, as the crow flies, but much further by river. So, in fact, the yacht was transported by freighter along the River Ob to Salekhard near the Gulf of Ob. Therefore, the actual expedition started on the 10th August and heading for the Gulf of Ob.

Close to Salekhard are the Senokosnye Islands, designated IOTA AS-109, and leaving the yacht, we carried one of its batteries and the Alinco to one of the islands and I managed to make 245 QSOs using inverted 'V' antennas on 7 and 14MHz! (See Fig. 1).

During the next day, we moved into the Ob Gulf which was really more like a vast sea and as we progressed northwards, the nights became much lighter and I found that propagation to North America improved noticeably. At this point, for a period of several hours during the day, stations acquired a curious



Fig. 1: Yacht *Siberia* berthed at Senokosnye Islands, AS-109.

vibrating sound - an effect which is a peculiarity of the polar regions (possibly an auroral effect. Ed).

By now, we had passed the Khalavengo Islands, sailed through the Malygin Strait by Belyj Island and on into the Kara sea. (See Fig. 2). We tried to contact Radio Amateurs back in Omsk twice daily, but we were not always successful.

However, we did get some help from the **Russian Amateur Radio Emergency Service**. This service has members throughout the former Soviet Union and they relayed traffic between ourselves and Omsk on some occasions.

On the 18th August, near cape Kharasovey, we met a dense ice field. By Channel 16 v.h.f. marine radio, we contacted Kharasovey and were informed that the icebreaker *Captain Kosolapov* would soon depart for Arkhangelsk. (See Fig. 3).

Their Captain kindly offered to guide us around the ice on our way to Vaygach Island - but not before entertaining us all on board in the traditional Russian manner!

On the 22nd August, we came to Vaygach Island. Yugorsky Shar Strait is narrow and we could see land on both sides and it was here that we parted with the captain and the crew of the icebreaker. I wonder what we would have done without their help.

While some repairs were carried out to the yacht, I was



Fig. 2: Vadim on board the yacht *Siberia* in the Kara Sea at sunset.





Fig. 3: The icebreaker *Captain Kosolapov* guides *Siberia* through a dense ice field.

landed on Matveev Island. The lighthouse there is now automatic, but the wooden tower of the old lighthouse still stands. I used it to hook up a long-wire antenna and one of my first QSOs from the lighthouse was with an old friend, Heinz DF4BV, whom we were later to meet in Hamburg. Altogether, I managed 147 QSOs, including 5H1, KL7 and KC6 before being picked up by our yacht again. (See Fig. 4 and Fig. 5).

## High Winds

In the Barents sea we encountered high winds and five metre waves and, although we were getting used to storms by now, they didn't exactly make us feel joyous. The transceiver got damp and wouldn't work so I had to put it into the dryer, along with our clothing!

There was a storm on the night of the 25th August and the rope on the steering wheel broke - and not for the first time either! Half an hour later the rudder broke and while we were repairing the rudder, the yacht was running almost out of control!

The next morning we stopped near the village of Bugrino on Kolguev Island for a well earned rest and to complete our repairs. It would have been nice to set up the radio on the island, but I didn't feel that I could leave the rest of the crew toiling while I operated the radio.

## The Last Leg

The last leg of our journey round the Russian Arctic coast took us past Kildin Island and on into Kolskiy bay. In Murmansk we had to deal with an unbelievable amount of bureaucracy but we were finally allowed to leave for Norwegian waters. For every one of us, it was the first experience of being abroad.

In Norwegian waters we were impressed by the small, clean cities of Honingsvåg, Northcape and Hammerfest. We were surprised, after our Murmansk experience, that no one tried to stop us. Neither the army nor the Customs took the slightest interest in us and nobody wanted to check if we had such things as safety-belts and other emergency equipment.

The climate of the Arctic in Norway is much warmer than in Russia, especially the Asian part of Russia. We were surprised to see apple trees and roses in blossom in a Norwegian town situated just south of the Arctic Circle.

All along the coast we saw islands and mountains with glaciers and waterfalls. Here, conditions on the 14MHz band were very unpredictable, however, conditions on the 3.5MHz band were good, but only at night and then only with Europe. Fortunately Folke SM2AYE, and Stan G0VJJ helped us maintain contact with Omsk.

## Outside Russian Waters

Outside Russian waters, about 1000 QSOs were

recorded, mostly on the 7 and 3.5MHz bands. These included 9X0A, EP2MMK, ZS2BBG and stations from USA, PY, VE, CO, VK, DU, FH, etc. There were many QSOs with British stations, with G3LCS, G3HQH, G4JIO and GW4XAU showing special interest.

On the 20th September, we parted from Norway and began to sail in the direction of Denmark in the Skagerrak strait. That night, in a storm, we were almost run down by a ship coming from the Baltic sea, but luckily we escaped serious damage, even though we did lose our stern rail.

When we reached the Dutch coast we were surprised to see so many yachts and

sailing ships. The ancient towns of the West Frisian islands seemed very beautiful to us. We anchored at Amsterdam but it seemed that the Dutch Amateur Radio community was unaware of our visit. It was a great pity we were unable to visit the UK, but time and the lack of visas precluded such a visit.

Hamburg was the only foreign city where people were waiting for our arrival. We met Peter Lefler a well-known marathon runner who sponsors annual events back in Omsk. Peter had made the formal arrangements with authorities for our crew to visit Germany. We also met Werner DK5BA, who helped me to get the license DL/UA9MCM and of course Heinz DF4BV, who communicated with the yacht all the time.

We are most grateful to them. It was the first time that we stayed in a foreign city for more than 24 hours. So we had the opportunity to receive visitors on our boat and I was able to visit the homes of DK5BA and DF4BV.

From Germany to the Baltic Sea we went via the Kiel Canal. We made a brief stop in Kaliningrad to pick up Eugene Federov, who had flown in from Omsk to join us for the last leg of our journey.

The weather in the Baltic was stormy, but on the evening of the 14th October we finally arrived at St. Petersburg. (See Fig. 6). In just over two months station R9MCM/MM had logged more than 2000 QSOs and met the conditions of the WAC award. Shortly after the yacht's arrival in St Petersburg the entire crew flew back to Omsk. By the way, you may be wondering what happened to the yacht - well, it was to be transported back to Siberia by road!

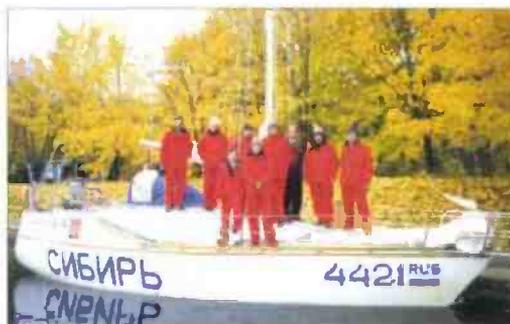
Fig. 4: Vadim Banandin UA9MCM was landed on Matveev island while repairs were carried out to the yacht.



Fig. 5: Vadim UA9MCM made 147 QSOs from Matveev Island.



Fig. 6: *Siberia* and its crew finally arrive in St. Petersburg.



By the way, you may be wondering what happened to the yacht - well, it was to be transported back to Siberia by road!

PW

# For All Suffering Morse Operators... A Wrist-Resting Recipe

Have you ever suffered from a severely aching wrist after sending Morse? Well, John Worthington GW3COI did but he solved his problem ... read on to find out how!

A 'Wrist-Resting Recipe?

**H**ow many c.w. users have a machine that sends CQ for them? As far as I can tell in many QSOs over my 50+ years as a Radio Amateur, very few. It seems that it isn't a chore to many and some people enjoy it. I, on the other hand find it increasingly tiring. In one of the places I "stayed" in whilst in the RAF, they had a beacon keyed by a revolving wheel which had the callsign and a long dash cut into its perimeter operating a simple keying switch. I thought that this was a good idea and it lurked in my mind until the second year of activity as a Radio Amateur when I built by own replica to take the backache out of my CQing.

Unfortunately, mine didn't work very well and it sent lousy Morse so replies were sparse. After all, who wants to work someone who, apparently, can't even send his own callsign correctly?

## Another Idea

It wasn't long before I had another idea which was to use a tape recorder playing into the microphone of an a.m. transmitter. This worked a bit better, however the tape had to be constantly rewound and the machine I was using was an early model which was so big that it hardly left room for my logbook.

In addition, I used to get stations complaining about the strong carrier when the calls were being made. So I soon gave up on this idea.

My third idea was to lay a tape loop into an audio operated relay, but the main snag with this was that the loop wore out rapidly because of the many laps it had to do. This idea, too, was abandoned and a long 'self-calling' period ensued with me having to send Morse in the traditional way until there appeared a small advertisement offering a kit of very few solid state bits, powered by a PP3 battery that would do all I wanted and more. It was as if the designer had been reading my mind.

The 'brain' it had was a chip - I can't tell you its number because it has been obscured by a very strong label. Available with this piece of equipment were four options which I elected to use:

- 1). As an ordinary CQ;
- 2). The same but saying 'DX K' at the end;
- 3). A short run down on my name, QTRH and power;
- 4). A longer ramble with more detail about my outfit. (This number message is very handy when working a very slow Morse learner because I can use the three or four minutes to make tea, etc.).

## Silent Key?

The inventor of this gadget may read this article and decide to offer his goods once more as I'm sure that it would have a good market for something which is quite small and very light on battery consumption. The odd thing is, he advertised only once (some ten years ago) and perhaps he is now a 'Silent Key'. On the other hand, he could have perfected the complete, tiny, self-operating QSO machine!

PW



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# Mannion's Marathon!

## An Irish Holiday To Remember

Rob Mannion  
G3XFD/EI5IW  
describes his  
'marathon' 1750  
mile (2800km)  
holiday and the  
natural  
friendship that  
awaits Radio  
Amateurs  
visiting the Irish  
Republic and  
Northern  
Ireland. But he  
says "Take a  
good appetite  
and be prepared  
to be  
overwhelmed by  
the hospitality!"

**M**y holiday to EI and GI began with two differences this year - it started on a Friday (23rd of April) and, instead of heading for Cork and the south west, I stayed overnight in Rosslare before my 'marathon' drive to County Donegal VIA County Mayo (not exactly a direct route!). As I was determined to give my newly-issued Irish callsign EI5IW (Irish Whiskey) a good 'airing' Jeff Stanton G6XYU of Waters & Stanton had kindly loaned me an ADI 146 - 50W 144MHz f.m. mobile transceiver to go with the h.f. equipment I carry. This budget-priced rig was to prove itself thoroughly reliable and very useful indeed over the holiday!

Travelling up through Carlow I stopped off briefly in Athlone to meet Ron Hall EI4AR, a great friend and marvellous organiser on behalf of others (thanks Ron!) to drop off some solar panels that I'd brought for him. We'd been working each other on 144MHz simplex for a while but before that I'd been active on the Limerick Repeater EI4LRC which has an enormously wide coverage. In fact I was still working through EI4LRC when I was up in Sligo thanks to the marvellous (and often not fully appreciated) work by the Repeater Groups.

### Mayo Meeting

There was a real surprise awaiting for me in County Mayo. John Corless EI7IQ and the wonderful crowd that make up the Mayo Amateur Radio community arranged for me to see a pub which has had a diesel railway locomotive installed inside the pub. You can enjoy a drink - and admire the railway memorabilia at the same time. Incidentally, anyone going on holiday to EI and GI can get a free leaflet - jointly issued by the Irish and Northern Ireland Tourist Boards - showing everything of railway interest.

Running behind schedule, I was then taken to another pub where - to my great surprise and pleasure - many of the Mayo Radio Experimenter's Network (MREN) had turned out to enjoy a full sit-down meal and 'get together' with me. It was an ideal way to meet so many PW readers and (swollen head here!) I was even asked to autograph copies of my 'Keylines' pages!

At the end of the meal I was presented with a copy of *Ironing The Land* - the book which accompanies the Irish TV (RTE) series broadcast recently on the history of Irish Railways - not seen in the UK yet and a treat to come I hope. However, it was time to move on and the only problem was that, although I could have spent several days with them, I had to hurry with them all on to the 'Wishing Well' Hotel in Ballyvary in County Mayo.

Once at the Hotel I had the pleasure of officially 'opening' the QTH of the MREN's 'visitor' Amateur Radio station. This marvellous idea is bound to grow and at the moment there's a power supply available, a half-sized G5RV, somewhere to park the car and a great welcome.

All you need to do is bring your rig with you on holiday! The next stage I hope to see with this venture is an outbuilding provided for the visiting Radio Amateur so that operating can be done outside throughout the year. Perhaps we can persuade a generous



Rob EI5IW receives a copy of the Irish Railway book *Ironing The Land* from members of the County Mayo Amateur Radio community - after a splendid meal in good company!

donation of a sturdy wooden shack or portable building to further encourage the splendid initiative of the MREN? I for one intend going back to Mayo soon - because, apart from the fishing, delightful countryside and marvellous people, this part of Ireland seems very special and is matched by its Amateur Radio community.

### Sligo & Donegal

Bidding farewell to my Co. Mayo friends I was then escorted part of the way towards Sligo before driving onwards to Donegal by some of the members heading home. It clearly indicated to me the long distances Amateurs in this part of Ireland have to travel to enjoy club meetings.

Driving through Sligo I was able to see Ben Bulbin, Ireland's own 'Table Mountain' clear of cloud for the first time (it's normally covered by cloud when I pass by). I then had a memorable drive up into Donegal and through the 'Barnesmore Gap' and could clearly see the sad remains of the famous old County Donegal narrow gauge railway high up on the mountainside alongside the modern - but twisty - main road. The railway was still visible by its engineering works and telephone poles - 40 years after it had closed. I almost expected to see a train!

The 'Wishing Well' pub at Ballyvary in County Mayo. Bring your rig on holiday and you can use the power supply and antenna provided by the Mayo Radio Experimenter's Network.



I'd been on the road for 13 hours by the time I arrived at the home of my good friend **John Doherty EI9GB** in Buncrana. This pleasant little seaside resort (full of excellent restaurants) is often called 'Londonderry By The Sea' because it's so close to Derry City in Northern Ireland and many people travel the short distance to enjoy the food and other (liquid!) delights.

John and my other good friend **Willy McCauley EI4EK** had arranged a truly superb 'B&B' for my stay in the town. It turned out to be as good as it looked!

On the Sunday, John and I met up with **Willy** to travel up to Malin Head Radio station to meet **Finbar O'Connor EI0CF**, one of Ireland's very well known Amateurs. The historic Malin Head station - still very much operational is where Finbar works and we enjoyed the visit very much despite it being the only day on my holiday where it rained.

Finbar turned out to be a railway enthusiast too - he's built miniature live steam locomotives that run on a large track in the roof of his barn/workshop. No room downstairs as it's already filled with boats he's built!

## Donegal Club Visit

On Monday 26th during the day, John, Willy and I met up for lunch before travelling to Londonderry to the Foyle Railway, right in the centre of Londonderry itself. This was a 'treat' arranged by Willy on my behalf and the Museum and Railway was opened especially for me - what a privilege!

I thoroughly recommend, if you're in Northern Ireland on holiday, that you visit the Foyle Railway. Willy EI4EK is a true 'Master Craftsman' and he rebuilt (from an almost total wreck) No. 12 County Donegal Diesel Railcar. I had a ride and was then given the opportunity to drive it on the narrow gauge track.

Incidentally, the County Donegal narrow gauge system was one of the World's pioneers in diesel traction and the use of these remarkable vehicles kept the railway going until 1959. Willy is now rebuilding an original County Donegal coach (yes, a full size narrow gauge carriage) in his workshop. When I saw it - the coach was almost ready, but how it was to be removed from the workshop I don't know (demolish the large workshop perhaps!).



Rob's hosts in Donegal, **John EI9GB** (second left) and **Willy EI4EK** (on G3XFD's right) at the Foyle Railway in Londonderry, Northern Ireland with one of the volunteer staff and organisers (far left). Willy EI4EK rebuilt the 1930s railcar which Rob was able to drive on the visit

In the evening, Willy, John and I drove down to Ballybofey in Donegal to visit the Tir Conaill ARS (the Donegal Amateur Radio Club). The venue was at the same Hotel where they hold their rally in late June - Jackson's Hotel (a superb venue). Unknown to me it wasn't to be just a 'social' visit - it turned into a 'PW Club Visit' and talk. We came away very late indeed after a marvellous evening and drove back to Buncrana via Willy's home complete with a large bottle of Irish Whiskey for EI5 'Irish Whiskey' (thanks folks!).

## Bangor Club

On the Tuesday (27th April) I said farewell - and thank you - to John and Willy and headed for Bangor in County Down

Practical Wireless, August 1999

to meet up with another special friend - **Terry Barnes GI3USS**, former President of the RSGB and stalwart of the **Bangor & District Amateur Radio Society**.

After lunch - where we were joined briefly by another good friend (and supposedly 'retired') - journalist **Stewart Mackay GI4OCK** - who writes the only weekly Amateur Radio column that's published in a newspaper in the British Isles.

In the afternoon, Terry Barnes and I visited the Transport Museum at the Ulster Folk Museum, Cultra, near Holywood, Belfast. This museum demonstrates a marvellous spirit of unity as it holds the Irish national collection of vintage railway items, historic bus and trolleybus collection, tram, car, motorcycles and you name it! A wonderful (you need at least a day) day out. We were joined by another friend (and yet another former RSGB President) - **Ian Kyle GI8AYZ/MI0AYZ** - for the afternoon. I enjoyed the company and recommend a visit.

In the evening we had a marvellous meal in the Crawfordsburn Inn - hosted by the B&DARS and I was very proud to be made an Honorary Member of the Society. Another late night - but to experience and taste Irish hospitality is something to remember!

## South To Tipperary

On the Wednesday (28th) I headed south to Dublin and onwards to Clonmel in Tipperary. The drive from Dublin to Clonmel went through some particularly beautiful countryside and I arrived in the late afternoon. The Tipperary Amateur Radio Group (TARG) has arranged accommodation for myself and **Kevin O'Herlihy EI7IM** (Editor of the *IRTS Newsletter*) and we enjoyed each other's company very much!

Kevin and I enjoyed our time hosted by TARG, and in particular the hospitality provided by **Liam O'Brien EI7FE** and **Ron McGrath EI6GO**. And I even managed a home bread baking session and demonstration at **Jim Gaffney EI8W's QTH!** (The loaves I baked were my way of saying 'thank you').

On the Thursday, the TARG meeting held at a local pub proved to be yet another wonderful occasion. Here I was presented with a 'Certificate Of Appreciation' by **Hugh O'Donnell EI2HI** and the occasion left me (unusually) lost for words and with a lump in my throat!

## Heading For Home

The Friday (30th April) saw me heading for home, via an overnight stop in Rosslare before the ferry trip back to Fishguard and Dorset via Wales. It was too short a holiday with a great deal packed into it. However, if you're thinking of a holiday where you can enjoy your Amateur Radio, the hospitality and marvellous countryside north and south - I recommend the Island of Ireland.

Thanks to all my EI/GI friends - the 144MHz repeater network organisers and the weather for a marvellous time. I'll be back soon ... of that you can be sure.

PW



On his visit to the Bangor & DARS, GI3XFD - after receiving honorary membership of the Society - was then privileged to operate on 430MHz from the shack of Stewart Mackay GI4OCK, a fellow journalist who writes the only regular column on Amateur Radio to appear in a newspaper (*The Belfast Telegraph*) in the British Isles.



End of a marvellous meeting - Rob and friends at the Tipperary Amateur Radio Group in Clonmel, County Tipperary.



Rob EI5IW and Kevin EI7IM (Editor of the *IRTS Newsletter*) enjoy pints of the 'black stuff' after taking extra insulin as both journalists also belong to the international 'Diabetics' club! Kevin, a keen member of the Irish cricketing fraternity has a son who could soon be playing for an English team. Well bowled Sir!

ROB MANNION G3XFD/EI5IW TAKES HIS PRODIGIOUS APPETITE OVER THE SEA TO IRELAND AND IS NOT DISAPPOINTED!

# out of this world!

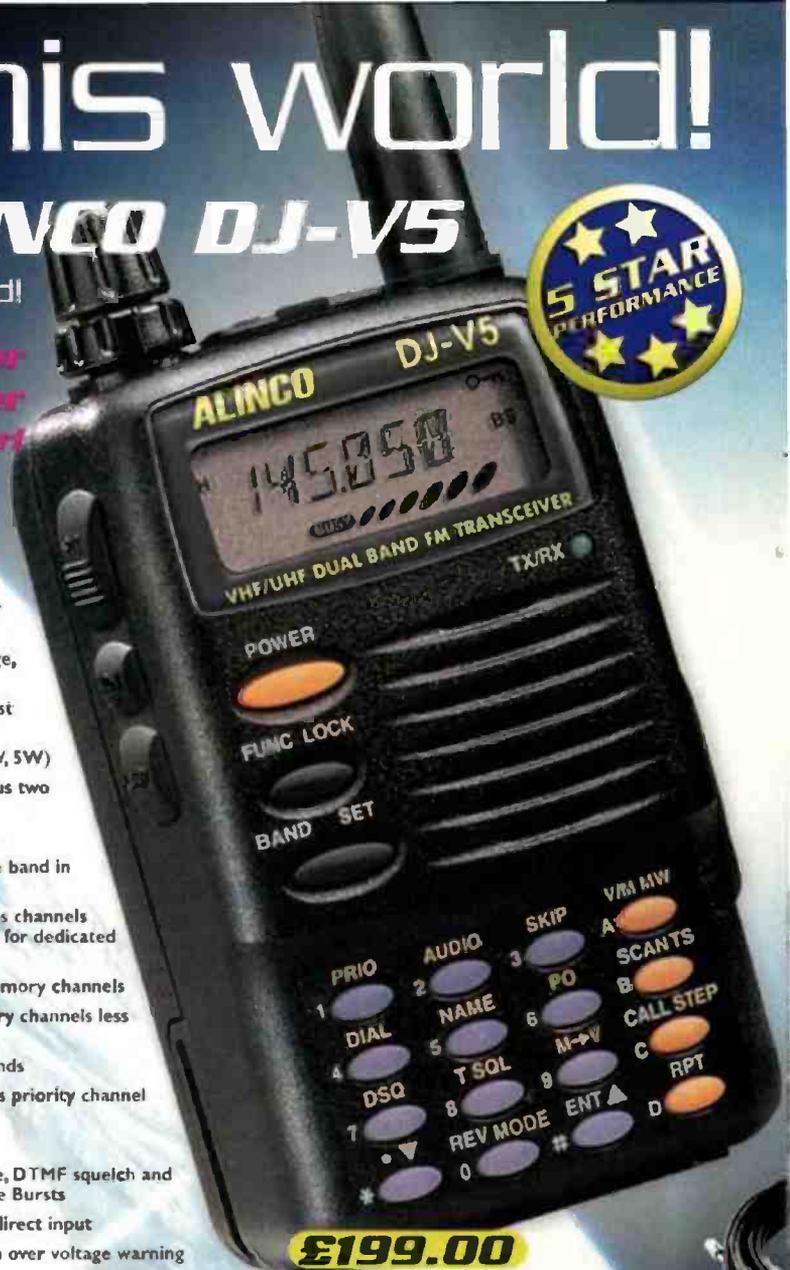
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# On The VHF Bands

## Fair-Weather Hill-Topping

Colin Redwood G6MXL looks into v.h.f. operating on his local hill-tops and discovers that there are a lot of advantages. If you've ever fancied trying it then read on and find out how.

There are many advantages, I feel, to operating from the local hilltops on the v.h.f. bands - not the least of which is the distances that can be worked. With a bit of advanced planning, it's possible to make the very most of the opportunity. In the past, I've found that there have been plenty of articles written in magazines by the large contest groups and DXpeditions and whilst these all make interesting reading, the average fair-weather operator, running up to only a few tens of watts into a single antenna and going out portable for the first time will find these of little help with the planning - this article is intended to cater for those individuals.

### First Outing

For your first outing I would suggest that you stick to the nearest readily accessible hill because it's not until you've done this a couple of times that you discover what you really need. The tops of hills are almost always colder than lower down and, once outside, there's no shelter from even the slightest breeze and of course any clouds, mist, fog, etc., always seem to congregate on your chosen hill.

It's important you remember that you will be sat around whilst operating, so you will not be doing anything to keep you warm, consequently you must consider what you wear on each and every visit, even in the height of the hottest summer.

I always make a point of taking at least two additional layers of clothing above what I would wear outside at my starting altitude. I frequently find that I need them both and sometimes more.

I, myself, am what might be termed a 'fair weather' operator. I pack up as soon as I start to feel cold or wet but if you intend to operate through all weathers then you will need to consider a lot more than what I've discussed here.

Even fair-weather operators like me must consider what to take with them in the way of food and drink. A hot drink in a flask should be considered an **absolute minimum** even if your only going to be operating for a couple of hours on a

operate in colder conditions then it is essential that you take enough food and drink to sustain yourself.

### Power Supply Requirements

In order to make 'Fair-Weather Hill-topping On The VHF Bands' a success, you will need to consider your power supply requirements **before** you leave for the hills. Whilst a small generator is worth considering, the difficulties of starting it and the need for refuelling on top of an exposed hill top tends not to make it a first choice for the average operator.

I've found the 12V, 6 or 7A hour sealed lead-acid batteries to be ideal for this kind of /P operating. These are available for under £5 each at rallies and worth every penny! Another good thing about them is that they'll even fit into a large coat pocket but there is a downside - they are capable of delivering very high currents if shorted out, so you should consider some protection to save melted leads or connectors in the event of short circuit. I aim to take at least twice as many batteries as I expect to need. Remember that f.m. will eat batteries much faster than s.s.b.

To connect equipment to these batteries, I terminate all my portable equipment in Red and Black 4mm plugs. Maplin supply some useful insulated red and black crocodile clips with 4m sockets. (If you use the Yaesu FT-690, FT-290 or FT-790 then please remember that the external power plug is not wired in the conventional manner!)

### Type Of Rig

Where the type of rig you use is concerned, you have a wide variety to choose from - provided that you can provide a suitable power supply just about any rig can be used.

Remember that on the top of a hill you will be exposed to a lot of signals that perhaps you don't normally hear from lower down, so when choosing a rig, selectivity is one of the most important things that you'll need to consider.

Some rigs may need some assistance in the presence of strong, out of band signals. My 70MHz transverter doesn't reject some strong local Band II f.m. signals very well and I found that a band-pass filter removed from an old ex-p.m.r. radio helped and was very effective.

Another important thing to remember is that if you find yourself operating during a major v.h.f. contest, then you may be surprised at the strength of some of the signals on the band. If so, you may also need to choose your operating frequency in order to continue operating.

Some hand-helds are notorious for their inability to cope with strong out-of-band signals. Fortunately, band-pass filters have recently appeared on the market place which claim to help, but I have not yet tried one, so cannot comment but it might be something worth considering. In



Colin Redwood G6MXL and his set-up at one of his favourite hill-top sites.

warm summers day.

A hot cup of tea/coffee will warm you up even if you just got a bit cold whilst packing up. If you plan to

the end, you may even need to consider changing site if your rig cannot cope with out-of-band signals.

## The Antenna

As usual with any aspect of Amateur Radio, the antenna is an important consideration. For portable (P) operation some different considerations will come into play. First and foremost is the ease with which the antenna can be assembled and erected on site.

You might find that you're able to do a partial assembly at home before transporting to site. For example, I leave the elements of my 9-element Tonna permanently attached to the two halves of the boom and transport it on a roof-rack to the chosen site. Once on site, I just have to connect the feeder and clamp the two halves of the boom together to the mast. I have tried larger antennas, but they generally seem to need more than one person to help erect them.

Where I have to remove the elements of antennas for transportation, I use colour coded insulation tape - each element has a different number of strips of tape on it, as does the multi section boom. This helps to ensure that the boom is assembled in the correct manner and that the correct elements go into their respective hole. Each antenna has a different colour of insulation tape. This way I can then quickly spot if I am trying to put the 70MHz elements on to the 50MHz boom.

Where masts are concerned, I've been using the 30mm  $\mu$ m lengths of swaged aluminium tubing for some time. These seem to work well and I normally use either three or four lengths and try to get the antenna bracket bolted on to the mast before I leave home. It's one less thing to do on a cold hill-top and one less set of nuts to drop in the grass or mud!

As regards to erecting the mast, I always adopt what may seem a rather novel approach. I try to avoid locations where I need to guy the mast - instead, I look for venues where I can clamp the mast to an existing fence post or seat. I also use re-usable cable ties to fix the mast to the fence posts, picnic tables, railings, etc. (See Fig. 1). These seem to be very effective and have never let me down. They have the advantage of not having guys to trip over or stakes to get in and out at the end when it starts to rain!

A favourite site of mine boasts four picnic tables with concrete legs set into the ground. There's no way that these are going to move! Further more, they are nine metres or so from the nearest car so that, in the unlikely event of catastrophic failure, the antenna will not come tumbling down on a visitors car.

Getting the antenna up can be made easier by applying a little physics. I usually fix the bottom section to the picnic table, then I fix the top mast section to the antenna whilst it's still flat on the ground. When I'm ready to put it all up, I insert the remaining one or two sections into the top section and then turn over the antenna, gripping the mast with my hands well apart (over 1.5m apart) - this maximises the amount of control I have on the antenna. I then walk it over to the single lower section and insert it.

For a small antenna, this approach seems to make much more sense than the use of gin-poles, etc., which you may have seen described elsewhere. As a final test, I use my full (ample) weight to try to pull the antenna system over.

By using the picnic seat/table for supporting my antenna system, I've also saved the need to bring tables and chairs with me! I usually position the rig at the end of the table by the antenna pole - this way the antenna can be rotated (by hand) and the rig operated single-handed. (See Fig. 2). Even if you have a second operator with you

there will inevitably be occasions when they won't be able to assist (when pouring the tea!). Also, I always keep a spare battery immediately to hand, so that I can switch over at a moment's notice.

If I use the same site more than once, I always try to sit facing the same direction (preferably where I expect to get most of my calls from) - that way I get to know where the major towns and locator squares, etc., are ("Scotland is over that clump of trees on the horizon, the Channel Islands in IN89 are immediately behind, London is over that town in the distance and Wales up that valley") and can point the beam roughly in the right direction as soon as I have a clue where a station might be.

As regards to log sheets, etc., I always clip these to a clip board. I'm sure that someone has some bright ideas to keep them under control when the wind starts to blow - I currently use spare batteries to try to keep mine under some control!

## Storing & Transportation

I have found that the covers designed for rotary clothes lines are quite effective for storing and transporting antenna poles, boom and elements. One cover will easily store four or five poles and the elements and boom for at least one antenna.

Once the opening is tied up, the cover will strap to a car roof-rack quite easily with small bungee straps. I've also tried re-usable cable ties, but I don't think they're as effective as the bungee straps. I try to keep a separate bag per band, so that I can grab the mast bag and the correct antenna bag at a moments notice.

I have a couple of boxes in which I put the rest of the gear apart from the rig - one box is used just for the batteries and I never put anything metallic in it just in case it should short the batteries during transportation. The other box has coaxial leads, connectors, pens, tools, etc. Both boxes have clip down lids, so that they can be closed when not in use. These boxes are reasonably smart, so can be taken into a guest house or hotel overnight for battery charging, etc.

## Dress Rehearsal

If I'm thinking of travelling a significant journey away then I always have a 'dress rehearsal' to check that I have everything. For this I assemble the complete station in the back garden or even the local park. I find that this is a very effective way of checking that I have everything I need and that it all works and connects together.

A 'dress rehearsal' is also useful for checking which tools I need to assemble the antenna and clamp it to the pole, etc., and can also be an effective way of eliminating things that aren't needed if short of space.

I hope that this article will encourage some of you to try 'Fair-Weather Hill-Topping On The VHF Bands'. I truly feel that you will enjoy it immensely.

PW



Fig. 1: Colin Redwood G6MXL uses re-usable cable ties to fix the mast to the fence posts, picnic tables, railings, etc. An idea that you might like to try.



Fig. 2: Colin positions the rig at the end of the table by the antenna pole - this way the antenna can be rotated (by hand) and the rig operated single-handed.

COLIN REDWOOD G6MXL EXPLAINS HOW YOU CAN MAKE FAIR-WEATHER HILL-TOPPING ON THE VHF BANDS A SUCCESS.

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By now, some of you will have heard rumours regarding my involvement in a new business to run in addition to the Ham Radio Company. Well, it's true! London traffic is getting worse by the day so to meet the demand of city travellers I have opened a new Scooter Outlet. 'ML&S BikeSmart' starts trading on the 3rd of July this year. With Suzuki, Aprilia and Peugeot, you won't be short of choice. (Bit like Yaesu, Icom & Kenwood really!) If you fancy joining the opening celebrations, pop in that weekend. Until the additional new premises are fully refurbished, both companies will operate from one location, but don't worry - the new store is in the same road so you won't have to search West London looking for us! How will it effect our No. 1 position Ham Radio? It won't - the same faces, Chris, Graeme, Jez, Andy, Brian and the rest of the gang are all here together with a larger warehouse to cope with the growth in mail order. We are in fact recruiting for further staff to assist in the Scooter division. Any budding mechanics out there? Give me a call! BikeSmart can be reached on 0208 566 0000. The usual Ham Sales is on 0208 566 1120.

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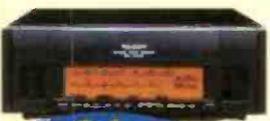
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John Brown G4UBB says that recent articles on solar power panels on a spacecraft prompted him to try a system for himself. His experience wasn't gained in orbit though - but in sunny Pinner, Middlesex, in Greater London!

## Installing...

# Solar Power

**N**ews of damage to solar panels on the *MIR* space station prompted me to buy my own solar panel generator to charge a 20Ah car battery used to feed my 12V v.h.f. radio transceiver. This is an elderly Icom 290E, whose memories continuously consume 30mA and also a Davis weather station taking 4mA. The car battery also serves as emergency lighting in the event of mains power loss.

After considering different offers I bought the Uni-Solar Flexible Solar Panel MBC-131. This seemed to have the most comprehensive specification, rugged marine construction and a three year warranty.

I'll briefly mention some of the brochure details: System voltage, 12V d.c. Rated peak power, 5.5W. Rated peak current, 0.35A. Rated charging (UK), 7Ah/week. Size, 710mm wide x 200mm high. Weight, 700g.

### Blocking Diode

The panel output cable incorporates a blocking

diode to prevent 'back leakage' from the battery to the panel at night. Also supplied with the panel is the battery connector lead with an in-line fuse.

I extended the wiring using 1.5mm<sup>2</sup> pvc insulated red and black wires to reach my battery terminal board. I took good care to avoid a short circuit when making the connections.

Next, I made a wooden frame to mount the solar panel and installed it with an elevation of 45° facing south to get the best sun from my home in Greater London. (See Fig. 1). However, the elevation and direction the panel faces is not particularly critical.

Straightforward installation instructions come with the panel so I shall not repeat them here.

I mounted the panel with the cable rising from below to minimise the chance of water percolating into the connections. To avoid short circuits later, I ensured that the plug and of the panel cable was also mounted out of the rain.

### Solar Panel Performance

In July afternoon sunshine, the solar panel performance (open circuit) voltage was 20V d.c.

My car battery measured 12V before connection to the panel. But when connected, the panel produced a charging current of 200mA.

In mid-day sunshine, the panel produced 400mA, considerably exceeding specification, so I introduced a 3.5V 300mA miniature Edison screw (MES) torch bulb in series with the charging circuit.

The sleeved bulb

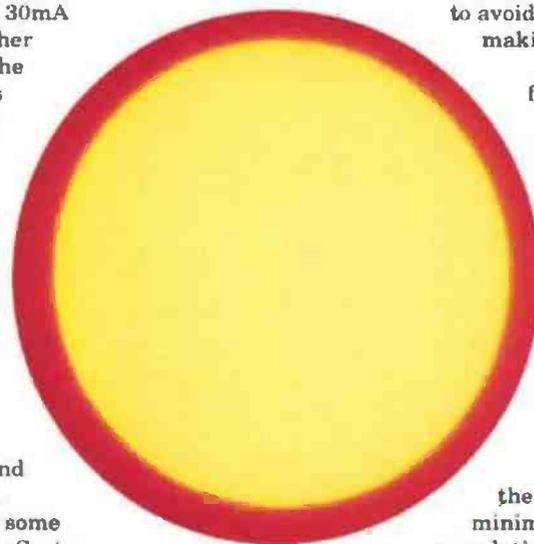
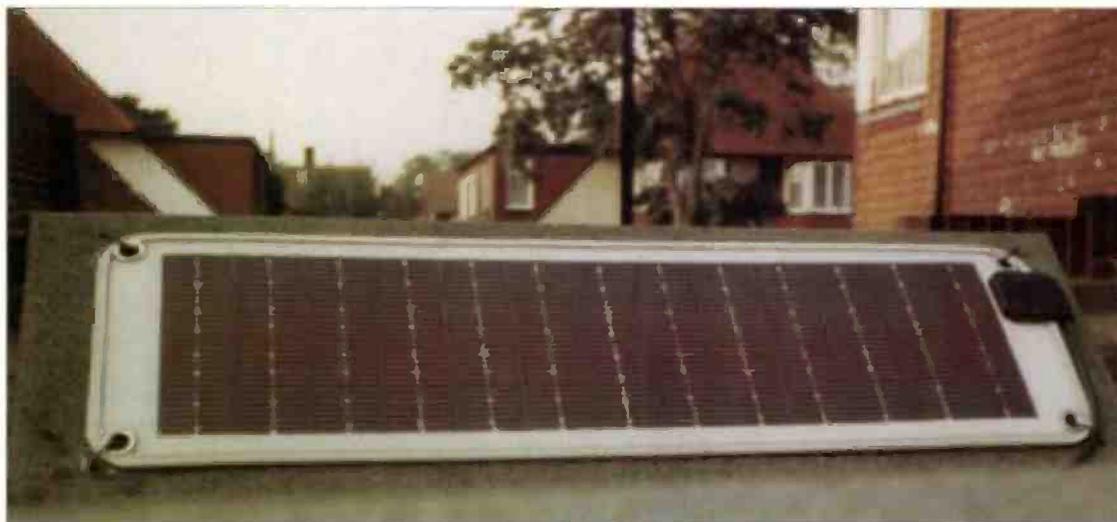


Fig 1: The solar panel installed at G4UBB's home in Greater London. (See Editorial footnote at the end of the article regarding and up-date on purchasing this form of solar panel).



has a very low resistance at 100mA or less but in bright sun conditions it reduced the charging current to around the brochure value of 350mA. (When the weather was overcast the current was about 100mA).

Incidentally, the 3.5V 300mA bulb gives a useful indication of battery charging current as follows:

<b>Bulb dark</b>	Current 100mA or less;
<b>Bulb just alight</b>	Current just over 100mA;
<b>Bulb dim</b>	Current 200mA;
<b>Bulb normal brightness</b>	Current 300mA.

Although not really necessary, I added an ammeter to the charging circuit. This meter was obtained second hand at a radio rally and is a moving coil milliammeter which I rescaled and added a home-made shunt to, see Fig. 2.

### Brochure & Details

A brochure and details on Uni-Solar Flexible Solar Panels was obtained from **Ampair, PO Box 416, Poole, Dorset, UK, BH12 3LZ, Tel: (01202) 749994**. The solar panels may be obtained from Ampair or a convenient yacht chandlerly (the yachting world's equivalent of a hardware or ironmonger's shop).

To conclude, I must say that I found this



project interesting to install and satisfying in use. Although I am not sure I would recommend it to absolute beginners in Amateur Radio ... although setting up such a project will provide interesting experience.

### Editorial note:

Since John G4UBB prepared this article the designation of the solar panel he purchased has changed to USF-5. It now costs **£88 plus VAT plus £4.50 P&P**. Additionally, for readers equipped with Internet access, Ampair inform us they now have a Web site with full information on the products at: [www.ampair.com](http://www.ampair.com)

PW

Fig. 2: Although not strictly necessary, being a Radio Amateur G4UBB fitted an ammeter so he could monitor the efficiency of the solar panel (see text).

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This month the Rev. George Dobbs G3RJV is taking a 'quick look' at light emitting diodes (l.e.d.s) and zener diodes after, of course, the usual quotation....

"As if his whole vocation were endless limitation"  
Wordsworth

# Carrying on the Practical Way

In 1907 Henry J. Round, an experimenter with electricity, touched a crystal of silicon carbide with two wires connected to a battery and noticed that the crystal emitted a yellowish light. This was the humble beginning of the light emitting diode (l.e.d.) which is now the definitive indicating device in electrical and electronic equipment.

If Mr. Round had kept his battery connected to the crystal it would have still been giving out light (with many years to go) before its intensity noticeably decreased. The l.e.d. is a source of cold light with a life expectancy of over 100 years.

The basic l.e.d. is a single colour, on-off, device although there are many variants, types and applications for the device. The common colours are red, green, yellow and orange.

In practice, the simplest l.e.d. is used as an on-off indicator, as a segment or dot matrix indicator for alphanumeric displays and for optical coupling. The voltage drop across an l.e.d. is a nominal 1.6V for the red and 2V for the green types with a current flow in the order of 20 to 30mA.

The diagram, Fig. 1, shows the usual arrangement to illuminate a single l.e.d. The device is connected to the supply via a current limiting resistor,  $R_s$ .

Table 1 shows how to calculate the series resistor ( $R_s$ ). It's a simple application of Ohms Law assuming a current flow of 20mA through the l.e.d. There is enough latitude in  $R_s$  requirements to use the nearest preferred value of resistor.

The table also includes

worked out values for three common supply voltages. The l.e.d. is a rugged device and decreasing the value of  $R_s$  will allow a greater light output.

However, if the constructor wants a bright light 'super bright' l.e.d.s are available. (I've even seen miniature 'shack lights' sold using the bright l.e.d.s.

## Polarity Identified

The polarity of single l.e.d.s is identified in two ways. Many l.e.d.s have a long and a short lead. In such cases the longer lead goes to the anode (positive) side of the circuit.

Some l.e.d.s have a flat side to the plastic base. In such l.e.d.s the flat side indicates the cathode (negative) lead.

An l.e.d. can also be used as an a.c. voltage indicator. For this it must be provided with reverse voltage break-down protection.

The reverse voltage break-down is in the 3 to 10V range. The protection is a diode (or even another l.e.d.), in reverse polarity, connected in parallel with the l.e.d.

Most signal diodes can withstand 50 - 100 peak inverse voltage but the average l.e.d. can only handle about 3V. (This arrangement still requires the appropriate series resistor shown in Fig.1).

Before leaving the basics of l.e.d. operation, I offer a simple but useful little circuit in Fig. 2. This is an l.e.d. 'Flasher' based on the LM3909 chip.

The LM3909 is a dedicated l.e.d. 'flasher' chip, which only requires the l.e.d. and a capacitor to produce flashes of light. The frequency of the flashing depends upon the value of the capacitor.

A value of 330µF produces about one flash per second. In the past I have built such

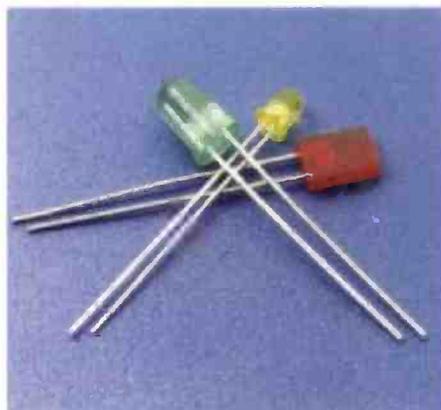
flashers into small boxes as mock alarms for cars and garden sheds.

Just to see a flashing l.e.d. might just deter the would-be thief. Such has become the power of this remarkable little diode device. (Completed project is shown in Fig.6).

## The Zener Diode

The Zener Diode differs from a conventional diode in that the primary characteristic for its intended purpose is the reverse break-down point. In use the positive voltage is applied to the cathode rather than the anode. As this reverse voltage goes higher, the leakage current in the diode remains fairly constant until a critical point, known as the break-down voltage, is reached.

In conventional diodes it's essential to operate the diode well below the break-down point to avoid damage. When the break-down point is reached large amounts of current flow through the diode junction. For zener diodes this is known as the zener current. At break-down the normally high reverse-



This month's column discusses the use of two forms of diode - the l.e.d. and the zener.

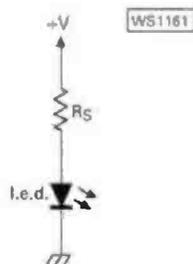


Fig. 1: Basic light emitting diode (l.e.d.) circuit (see text).

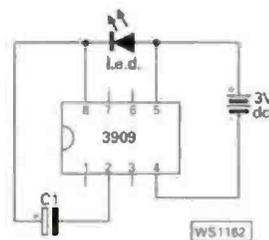


Fig. 2: A 'flasher' unit based on a dedicated integrated circuit, the LM3909. The rate of flashing is set by the value of C1. In the text G3RJV suggests various uses, including Amateur Radio shack alarms.

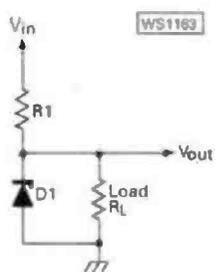


Fig. 3: Basic circuit using a zener diode (see text).

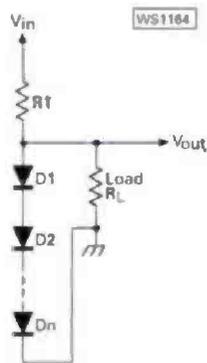


Fig. 4: A 'customised' zener diode 'stack' to achieve the stabilised level required (see text).

resistance of the diode drops to a very low level and, therefore, the current increases rapidly.

In zener diode circuits a series resistor between the zener diode and the voltage source limits the amount of current. Zener diodes are designed for a specifically high break-down value, from about 3.9 up to 200V.

The diodes are supplied in types according to the designed break-down voltage. The zener diode type specification will also designate a safe zener current level which can be in the range from 150mW to tens of watts

There are many uses for the zener diode but the most common is that of a shunt voltage regulator. It's a simple way to add a regulated voltage to a circuit or part of a circuit.

Although this usage has been largely replaced by the advent of three lead voltage regulator chips, zener diodes are a cheap and easy way to add simple voltage

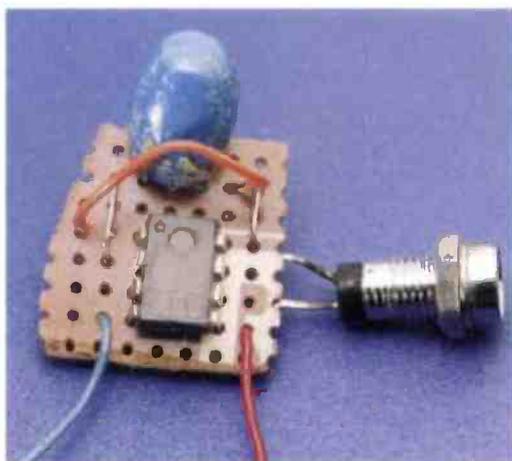
regulation in many circuit applications.

## Shunt Voltage Regulator

The diagram, Fig. 3, shows the method for using a zener diode as a shunt voltage regulator. The zener diode is D1 and Vin is the supply voltage and Vout is the required regulated voltage while R1 is the current limiting resistor with Ri representing the load resistance offered by the circuit using the regulated voltage.

Table 2 gives all the information required to work out the value of R1 for a given zener diode and a known supply voltage. (The zener diode must have an adequate power rating for the application).

Fig. 6: A completed project using the LM3909 i.c.



Practical Wireless, August 1999

Information on how to calculate the power rating is also given in Table 2. All these calculations are variants of Ohms Law, so remember the basic units of calculation are volts, ohms and amps.

## No Zener?

Not got a zener diode or can't find one for a required voltage? Don't panic! - it's possible to make a voltage regulator from conventional diodes.

The voltage regulator shown in Fig. 4, is based on the fact that a forward biased diode will not conduct until about 0.6V d.c. is supplied. By adding a suitable number of diodes in series, as shown in Fig. 4, a 'custom' voltage regulator can be made. (Dn represents the total number of diodes in series and the regulation voltage is Dn x 0.6V).

The diagram, Fig. 5, shows a very useful circuit that has 'done the rounds' for many years. It's a Ni-Cad battery charger based on Fig. 4.

A mains transformer supplies an a.c. voltage of (let's say) 30V which is rectified by the diode bridge with a little smoothing added by the electrolytic capacitor.

The bulb acts as a current limiter and for most Ni-Cad batteries a bulb rated at 100 to 150 mA, with a voltage rating around the voltage of the Ni-Cad battery, will serve the purpose. The series diode chain is then made up for the maximum battery voltage.

## Setting Up

The setting up of the circuit requires the use of the 'rule of thumb'. First you should switch on the charger without the battery connected and the lamp should glow.

You should then find that the voltage across the regulator should be about 5% above the rated voltage of the battery. (Diodes can be added or removed to obtain this value).

When charging batteries the current should be approximately 100mA for a partly discharged battery. It should then drop to around 5mA for a fully charged battery.

So, there you have a few ideas for using those useful diodes: the l.e.d. and the Zener diode. 'Flashing' and regulation circuits will always prove useful.

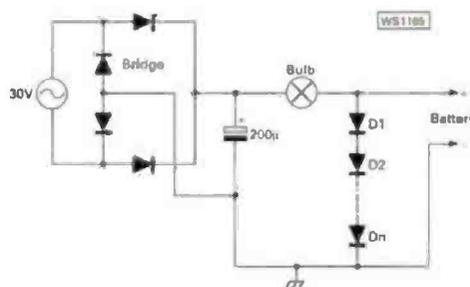


Fig. 5: A simple NiCad battery charger based on Fig. 4. (see text).

TABLE 1

A series resistor, R<sub>s</sub>, is required to limit the current through the l.e.d. Most common l.e.d.s operate at about 1.8V @ 20-30mA.

The simplest formula to work out the value of R<sub>s</sub> (for supply voltages above 3V) is:

$$R_s = \frac{\text{Supply Voltage}}{20\text{mA}}$$

(and use the nearest preferred value above the figure obtained).

Common supply voltages work out as:

6V:330Ω	9V:470Ω	12V:680Ω
---------	---------	----------

Table 1: LED series resistors.

TABLE 2

The limiting resistor [R1] is worked out from:

$$R_1 = \frac{V_{in} - V_z}{I}$$

V<sub>z</sub> = Zener Diode Voltage, I = Current through R1 (this should be the maximum planned current)

The current is shared between D1 and R1 according to the load applied. e.g. A 12V supply to give 9V at a maximum current of 50mA requires a 9V zener diode and R1 of 60Ω.

## Zener Diode Power

The zener diode must have an appropriate power rating which can be calculated from:

$$P_z = V_z \times I_L$$

V<sub>z</sub> = Zener Diode Voltage, I<sub>L</sub> = Max. load current

(Be conservative! Use the maximum projected load current to calculate R1 and the safest power rating for the zener diode).

Table 2: Zener diode limiting restrictions.

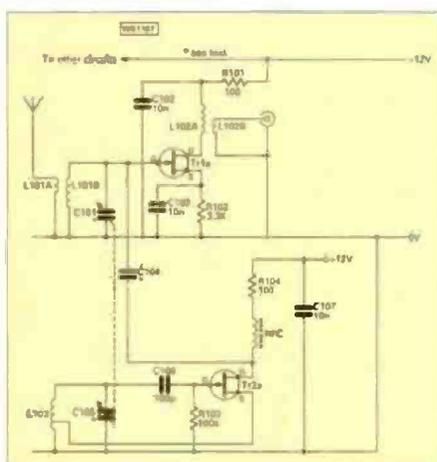
# RADIO BASICS

Now that he's back from holiday - Rob Mannion G3XFD is 'champing at the bit' and ready to guide you through (what often seems) the tricky setting up of a superhet 'front end'.

One of the most off-putting aspects of the superhet 'front end' receiver design for many radio enthusiasts - both beginner and experienced alike - can often be the 'setting up' of the local oscillator and input tuning and tracking. It can be infuriatingly 'fiddley' and frustrating when it's not successful but in this somewhat delayed edition of 'Radio Basics', I'm aiming to help you over some hurdles by lowering them somewhat!

The problems which occur with tuneable local oscillators and mixers are due to a number of factors - some

Fig. 1: Simple 'no frills' front-end circuit (see text for further comments).



of them under our control and some we have to 'put up' with and make a working compromise. However, because most of the Amateur Radio bands are relatively narrow frequency wise, particularly on h.f., constructors are actually assisted

because the tuning range to be covered is relatively small. Broadly speaking (forgive the deliberate pun!) **the narrower the tuning range - the easier it is to get the 'tracking' to stay in track** as the combined input tuning and local oscillator circuitry is tuned over the band.

## What's Tracking?

As this series is aimed at the less experienced constructor I can imagine that quite a few readers are asking the questions: "What's tracking - what does it mean and what's going on in the circuitry?" Well, to answer these questions let's now look at the circuit, Fig.2 on page 31 of the June issue, reproduced this time for discussion purposes as Fig.1.

I've chosen the simpler circuit because it will be easier to follow. So, let's follow the r.f. inwards from the antenna to start the reception process and to see what's involved in a very simplistic explanation. No science degrees needed!

The incoming r.f. signals are tuned by the combination of L101a and L101b and C101. The dotted line connecting C101 and C105 indicates that the two variable capacitors are actually 'ganged' together. In fact they're usually combined on one 'chassis' (see Fig.3, page 14 May issue) with the moving vanes (the 'variable' part of the capacitor actually mounted on the same rotating spindle).

In practice, it is possible (though not recommended until you're quite confident) to use totally separate variable capacitors. With this method - often favoured by keen constructors

and a method dating back to the late 1920s and early 1930s - constant 'tweaking' and 'twiddling' is required to get the best results from the mixer and oscillator. Perversely, the constant 'tweaking' for best results is why some enthusiasts use two separate capacitors rather than one 'ganged' type.

A degree of amplification of the incoming tuned signal, fed into the device by the Gate (G) is provided by the MPF102 f.e.t., Tr1a and this amplified signal appears at the f.e.t.'s 'Drain' (D on

diagram). However, a second signal - locally produced (hence 'local oscillator') is generated by the second f.e.t. - Tr2a in conjunction with C105 and the inductor (coil) L103. This is also fed into the Gate via C104.

The resultant 'mixing' process provides (amongst other signals\*) a 'difference' signal which we will then 'select' by the use of a suitable tuned circuit (L102a) to pass on out to our fixed tuned intermediate frequency (the car radio - this time being set on to one frequency on the medium wave) via L102a and L102b. But that's when it can become 'difficult differences'!

*\*Note: For the purposes of the simplified explanation I'm ignoring the other products of the mixing process. You can read up on them later!*

To produce the 'difference' signal the local oscillator must always 'track' ('follow') the incoming signal by an unchanging amount over the tuning range. Something that's very difficult to do in practice!

One method to produce the 'difference' signal is to make the local oscillator (l.o.) run above the incoming signal. And for this discussion I'll suggest we're to produce a 1MHz (1000kHz, right in the centre of the medium wave band) on a 7MHz 'front end'. So, to achieve this our local oscillator will be a 8MHz when the input (antenna input) is tuned at 7MHz (at the bottom end of the 7MHz (40 metre Amateur Band) and at 9MHz when the 'front end' input is tuned to 8MHz.

## Easier Said Than Done!

Getting an oscillator and the 'front end' input to 'track' (tune in step) over even a narrow band is often 'easier said than done' but it is possible. For you - the home constructor - one of the easiest ways to achieve reasonable tracking is to wind L103 with fewer turns than L101b so that it will tune to a higher frequency and adjust the value of the actual variable capacitor in circuit by the use of a 'trimmer'.

Sometime you'll be helped by the inclusion of small value 'trimming' capacitors mounted on the same chassis as the main variable capacitor, as shown in Fig. 2, which, in this instance, is of course a miniature solid dielectric type. Fig. 3, shows other capacitors which can also often include 'trimmers' (particularly the 'open' air spaced variable).

If you're using a variable capacitor fitted with trimmers, it's best to adjust the value of the antenna input circuit to be as high as possible (trimmer screwed down hard or set with its mini-vanes fully meshed) and in the case of the l.o. tuning circuit the trimmer is set at minimum value so to help ensure the local oscillator is continually on the higher frequency as it will naturally be tuning to a higher frequency.

Don't forget though - it's up to



Fig. 2: Example of a miniature solid dielectric capacitor with fitted 'trimmers' (see text).

you to ensure your l.o. is higher than the input frequency to start with. Incidentally, for those of you 'already in the know'... I am aware of course that you can have the l.o. below the incoming frequency - but I should also point out that keep things as straightforward as possible at this stage of most of this column's readers.

For those of you who opt for the 'permeability' (slug tuned - as discussed in May 'Radio Basics' with a sample of the coil formers used shown in Fig. 2 on page 14) the necessary tracking can be arranged



Fig. 3: Variable capacitors - particularly the 'open' air-spaced type are often available with trimmer capacitors (see text). If not, you can always incorporate low value type in parallel (see text).

mechanically by off-setting the cores on their tuning 'yoke'. Anyone interested in this - relatively more complicated but very successful - tuning method can get a photocopied sheet showing my ideas and suggestions for this under-used technique by sending a stamped addressed A5 sized envelope (with a 26p stamp) and endorsed with 'Permeability Tuning Details' to me at the PW office.

## Perseverance Pays!

Please do try your hand and build a tuneable 'front end' - perseverance pays! It can be time consuming but the effort is worth it.

You'll also learn a lot on the way and enjoy the process. And what's more you will have achieved it by your own efforts!

Next month I'm planning to introduce several smaller projects which will end up with you providing yourself with some useful little test equipment aids that can be put to use immediately.

Cheerio for now. And keep that soldering iron hot!

PW

Whether you are brand new to the hobby of radio monitoring or a seasoned DXer, there is something in *Short Wave Magazine* for you every month!

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**MONSTER FREQUENCY WALL CHART - PULL-OUT & KEEP**

Robert Connolly G171VX has been a radio addict for many years. Here he tells us about 'Amateur Radio In A Virtual War Zone'.

Andrew Howlett G1HBE checks out the Yaesu FRG-9600 and Icom IC-R7000 base station scanning receivers. Read his round-up and you could find yourself buying second-hand too.

Joe Carr K4IPV, our resident antenna specialist, explains how to build a very usable and cheap beam for listening use in Part 1 of Building A VHF/UHF Yagi Antenna.

Lawrence Harris reviews PROsat For Windows LC - the latest offering from the Newmarket based satellite specialists - Timestep.

JW investigates what was a quantum leap at the time of its launch - the R-1000.

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# Counting Up From The Millennium!

Most of us are somewhat tired of the various 'count downs' to the coming 'Millennium'. However, for the remaining part of 1999, Rob Mannion G3XFD is doing something quite different by 'counting up' from the Millennium! Rob is letting his imagination run wild with 'cuttings' of imaginary Amateur Radio 'news' items which (might) appear in the magazine in future years. They're intended to be thought provoking, sometimes controversial and interesting but above all ... totally imaginary!

(Report originally broadcast on Welsh TV in September 2014, published in PW in the October 2014 issue)

## Welsh Candidates Take RAE In England

Since the enforcement - by the all-powerful Welsh Language Agency - of compulsory 'Welsh-Language only' Radio Amateur's Examinations in the Devolved Principality - a growing number of candidates in South Wales are taking their internal passports to drive the short distance across the border to sit the examination in England.

However, despite the opportunity of taking the 'walk in

and on demand' RAE in England, many Welsh candidates are finding reasons - and apparent advantages - in learning Welsh and taking the examination at a local centre. And to prove the advantage, Mike Arfon, who sat his Welsh language format RAE in Cardiff recently said: "It does have its advantages. I had to learn Welsh to sit the RAE in my own country, it was hard work but I now have the ability to read the road signs and road work

instructions now that English has disappeared from road signs here in Wales and can also read official letters sent to me".

Looking proudly and directly at the camera, successful candidate Mike (now awaiting his call sign) said "I felt so good when I was able to speak directly in Welsh to the exam invigilator - and what's more I don't feel like a second class citizen anymore because I can speak the language now!" PW

(Extract from the PW Editorial, March 2020)

## Frequencies Unlimited - Spectrum Sale

Since 'Frequencies Unlimited - the UK's former Radiocommunications Agency - was 'privatised' when the English Federated States decided the control of the Radio Spectrum in England and Wales had to go into private hands - everyone involved in Amateur Radio has been concerned as to whether the hobby could be 'priced out' by the increasingly competitive communications market.

Recently, as more European Union nations have followed suit and also 'privatised' their formerly Government-controlled agencies, the International Amateur Radio Union (IARU) has rallied round to ensure a 'group strategy' approach to the forthcoming 'frequency auctions'. In an odd way the EU's own support for the funding of each member state's National Amateur Radio Society has helped too - as there have been adequate funds available to challenge individual Governments in

the new EU Central Court in the Hague, in Holland with enough money left over to 'lease' the frequencies for our use over the next five years. Once the time is up though - the whole process starts again!

In the meantime, the average 'cost' applied to each Amateur in the Confederated English States and Wales is approximately 50 Euros per head. Most of the costs involved are for v.h.f. and u.h.f., but it reflects increased costs of the h.f. allocations. The new - Middle East based - owners of 'Frequencies Unlimited' state that "Amateur Radio won't be treated differently to any other customer" and that "only the highest and most suitable bids for frequencies will be accepted".

An Editor, I'm pleased indeed that the IARU and the EU are supporting our national societies. Without them we'd be lost!

PW

(Court report reproduced in PW with permission from the Southern Times newssdisk, 2010).

## Amateur Radio Protected - First Prosecution

Now that Amateur Radio has at long last become a partially 'protected' service within the European Union, progress is being made to remove some of the totally unnecessary EMC problems affecting innocent Radio Amateurs in these Islands. The first prosecutions of alleged offenders are taking place as this issue PW 'goes on line' to the Web.

The first prosecutions involve 'North & South Power', the largest 'tidal power hydroelectric' generation company in Europe. This huge PLC -

generating 100 000 megawatts from its English Channel tidal barrage is accused of causing widespread interference on the various Amateur Bands below 500kHz and right up to 30MHz from its overhead power lines due to lack of maintenance to insulators and switchgear. The company is also accused of causing widespread interference from its h.f. mains-distributed data systems. The case is being brought by the IARU with help from the EU.

The case continues at the Isle of Wight Central Legislature.

PW

## Rare Paper PW Found!

all over Europe and watching via the video link, we all noted that the issue of PW was dated 2006. It appears to be in good condition although it seems hard work to turn the pages rather than pressing the 'scroll' button on a portable disk display unit!

The PW team wonder just how anyone managed to store five magazines compared to the 50 or so volumes now available on the new 'postage' stamp sized plasti-disk. Perhaps it was from the not so good old days?

PW

Michael Henry, daughter of the late Michael Furd (for many years a well known PW author earlier this century) reports that she's found a paper copy of the magazine in her late father's former shack! I found it quite by accident, behind a map which was itself protected by a glass cover. It's a miracle it survived and it's so quaint! she told PW's newssdisk by videophone. Holding it up to the micro-camera lens for the PW Editorial team to see, although spread out

(News report from PW dated 2070)

Please direct any correspondence or comments to the PW office in the correct year - remembering to add the relevant space-time-warp code.

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## SPECIAL OFFER!

Take a sneaky peak at the **PW Tenna-Tourer antenna base** - ideal for portable working!

## REVIEWED!

**Rob Mannion G3XFD** reviews the **MFJ-9402X 144MHz s.s.b. transceiver** courtesy of Waters & Stanton PLC and the **Maspro 144WH8 antenna** courtesy of the **Short Wave Shop** which he used to take part in the 1999 PW QRP Contest - just for fun, of course!

**Richard Newton G0RSN** puts the **Icom IC-706MkIIIG** through its paces whilst taking part in the 1999 PW QRP Contest and reviews its performance for you in the September PW.

## ANTENNAS IN ACTION

**Tex Swann G1TEX** gives you more goodies on antennas and other antenna related hints, tips, news and mini reviews.

## FEATURES

Build your very own 'Modulation & Ripple Level Meter' courtesy of **Jim Brett G0TFP**; play 'I Spy With My Little Set' with **Ben Nock G4BXD** as he puts the Spy Set under the Radio Amateur's microscope; join **Phil Whitchurch G3SWH** as takes you through his DXpedition to Les Iles Glénan, in the Bay of Biscay; collect old QSL cards with the help of **John Heys G3BDQ** and discover the secrets of v.h.f. propagation with **Patrick Allely GW3KJW**'s article on 'Red Sprites And Blue Jets'.

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# PW

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Stand to attention! - it's Ben Nock G4BXD 'on duty' in the 'wireless shop' and his Second World War uniform reminds us that we've got a mainly 'Military' theme this month - and a mystery has also been solved.

**H**ello once again and I hope that summer is well on the way by the time you're reading this, hopefully sitting in the garden with a very dry Martini. I'm often asked where I find all my old gear from and in fact, the story of how I obtained the first set in this issue, Fig. 1, shows just what a complicated business it can be. The set in question was French made in the 1938/39 era, stolen by the invading Germans and used in Norway during its occupation.

The set was originally sent to me here in the UK from Norway. Another French friend supplied information on it and an American contact supplied some missing valves.

The Saram 3-10 transmitter was used in larger aircraft, indeed, it's very similar to the better known T1154 of RAF fame, but I'll let my friend, **Dominique Loustau**, describe it for you. (*We've published Dominique's letter with as few corrections as possible so as to maintain clarity. Ed.*)

Dominique wrote: "The Saram Transmitter covers wavelengths (as used in its initial version) from 41 to 1560 metres, with six continuous sub ranges. This is a French Transmitter designed in the 1938/39 era as a transmitter for large military planes. It was associated to a receiver Saram 3-10, successor to the Saram 0-12, covering a wider wavelength range with six continuous sub ranges from 19 to 2170 metres. The Transmitter was a modern, v.f.o. type with mechanical memories (like 'flick' system as on 19 Set, Ben), buffer stage and PA-2 valves in parallel. The receiver was a superhet using two i.f.s (with variable selectivity) with i.f. frequency

Fig. 2: The Experimental X32D set as it arrived, only barely evident as a military radio.

according to the received range. (The i.f. frequency changes depending upon range selected. Ben).

"Construction is basically with aluminium sheets and the units are relatively light. The Saram 3-10 system could be operated with c.w., m.c.w. and 'phone and used additional items (modulator, control box, etc.) and was powered from onboard 24V d.c. with two rotary converters (1200V for transmit and 300V for Receive) or for ground stations from a.c. mains (p.s.u. rack of 122kg, only). According to my info, the sets entered in mass production in late 1939-beginning 1940 and a part of them were seized/rebuilt by the Germans who replaced wavelengths by frequencies markings and added other German markings.

"After the war, in the 1950s, the French Air Force made use of these Saram 3-10 sets after complete rebuilt and modifications, like addition of six switched xtals to the transmitter for operation on stabilised frequencies, replacement of the sockets for headset and throat microphone by standardised jack types. The name was changed to 3-11 and 3-10 DM, apparently painted in black colour although the initial 3-10 sets have been painted in light grey (French issues).

"The Saram 3-10 sets are difficult to find and the transmitter seems very scarce today although several hundreds of these sets have been available for surplus sales in the beginning of the 1960s, but at high prices at that time and amateurs were fond of more renowned or exotic US sets than these national units".

Thank you for that most interesting information  
Dominique.



Fig. 1: The Saram 3-10 transmitter. The two doors either side of the large central tuning dial open to reveal the valves for the set.

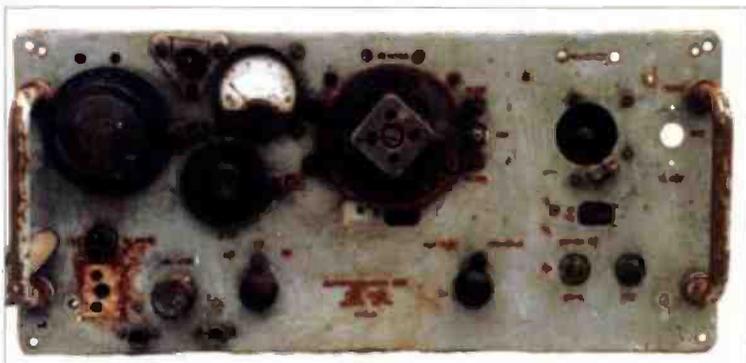
### Strange Rusty Chassis

A strange 'bashed up', partly rusty chassis, Fig. 2, was offered to me recently and at first glance I thought it was a 22 Set.

However, there seemed to be too many i.f. transformer 'cans' on it, too many valve sockets and the tuning dial did not look right. The grab handles seemed different and real doubt spread through my mind.

Having got the set home and given it a wash (hot water with 'Fairy Liquid' works wonders), the light began to dawn. In fact the set is an experimental set called the X32D. This 19/22 Set hybrid was apparently designed and produced in limited numbers to test out the new, as then, frequency modulation mode against amplitude modulation.

The X32D set can run c.w., a.m. or f.m., with an output of about 10W on c.w. or f.m., and about 3W on a.m. The tuning range is the same as the 19 Set, 2 to 8MHz and is covered in two bands.



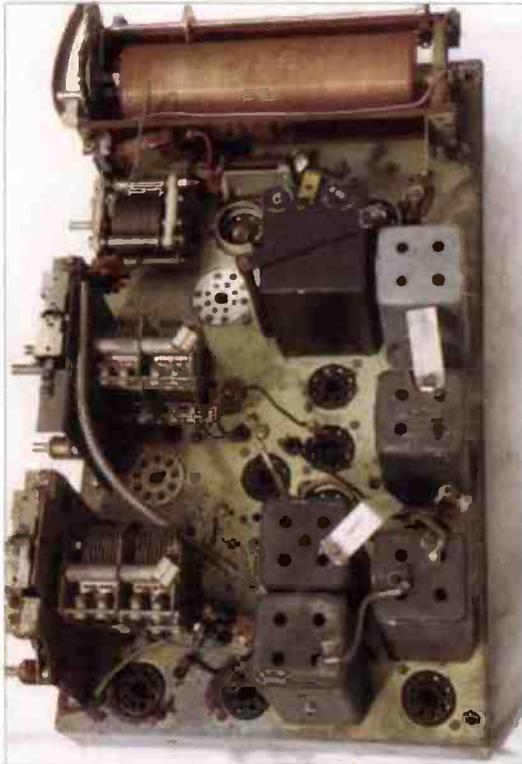


Fig. 3: The inside of the X32D before any restoration work (although a new tuning mechanism has been fitted) showing how the layout differs from either the 19 or 22 Set.

Although the one dial remaining on the set was slightly different to the standard 19 Set dial, when I removed it for cleaning it was revealed that it was indeed a 19 Set dial simply reversed and re-numbered. The antenna tuning 'roller coaster' is from a 22 Set and the knobs are similar to the 62 Set knobs and exactly the same as those on the BE-201.

I have so far restored the front to something approaching a decent appearance, Figs. 3 and 4, although I'm not totally happy with it...so there is still more to do. I also fitted a 19 set dial in place of the missing one (not correct but near enough for the time being) and a new antenna tuning knob was found, again a close match.

The set should have had two drop leads, as on 19 set control boxes, but these had been replaced with standard jack sockets. I will refit drop leads along with a new antenna terminal which had been changed to a Pye socket.

The next stage will be to re-valve the set and start work on the electronics. I have limited information on this set and am looking for copies of the following military publications to assist in the restoration. EMERs Tels F370/1 WS No32D, Dec 1944. SRDE 445, Nov 1943. SRDE 574B, May 1945. SRDE 575A, June 1945. All expenses will be covered of course and I'll bring you further news of this interesting set as it develops.

## Mystery Set Revealed

The mystery TR11HS set mentioned in my last column (May, 1999) has been revealed to have been manufactured by Ernest Turner Ltd. It made for and used by the Oil Exploration industry in the 1950s and 60s.

Ted Martin G0WYU, wrote to tell me he used an earlier version of the set while exploring in the Libyan desert for British Petroleum. Apparently, the FIRE and SSD function relate to the set sending out

a tone or pulse when the detonation of an underground charge went off which, using seismic refraction techniques, was used to locate underground oil, etc. The pulse from the TR11 was transmitted to the base camp, basically to synchronise the recording equipment.

As well as the principal function of sending the timing pulse back to the base, the set could also used in a more conventional role to provide communications between base and the field stations. This role of operation was once used by Ted to 'check' on his position during one particular off road experience, not that he was lost of course, it was just a check.

Thank you very much for the information Ted!

## The Light's Out

The beacon put forth by Eddystone's famous Lighthouse logo has gone out for the last time (perhaps). With the demise of the Eddystone name a great tradition in receiver (and latterly, high quality broadcast equipment) building has ended.

Along with the demise of the company the Eddystone User Group (EUG) Newsletter has been forced to go it alone and hopes to continue publishing its very informative material. It welcomes new members and offers its newsletter and various other attractions for a yearly subscription of £12.

If you wish to join and help keep the name in the public domain then contact: Graeme Wormald G3GGL at 15 Sabrina Drive, Bewdley, Worcestershire DY12 2RJ, Tel. (01299) 403372.



Fig. 4: The front panel of the X32D after a week's restoration work. Not quite finished but at least it's now starting to look like a military set.

**STOP PRESS:** Just as this text was being finished off I heard that a company in Cambridge might well be buying Eddystone. So, watch this space and I'll let you know. (See News pages. Ed).

## Frequency For Testing

And a final point: A new frequency, 3.605MHz, for testing a.m. equipment is being proposed. So, I hope to hear you there!

So that's it for now. Hopefully I will meet some of you at the rallies throughout the summer and I can, as always, be contacted at: 62 Cobden St, Kidderminster, Worcestershire DY11 6RP, via the PW offices or E-mailed on G4BXD@compuserve.com A correction to my Web site address, which I got wrong last time, (naughty me!): <http://ourworld.compuserve.com/homepages/G4BXD/>

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As we are half way through 1999 and the year 2000 is looming on the horizon, take a step back in time with this month's Book Profiles.

Take a look at the development of wireless over the past century.

The Practical Wireless Editorial team bring you a selection of books which will take you back to valve regenerative receivers, the story of John Logie Baird, old handbook receivers amongst other fascinating Amateur Radio topics.

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# Book PROFILES

## *Secrets Of Homebuilt Regenerative Receivers* C. F. "Rock" Rocky

**Secrets Of Homebuilt Regenerative Receivers**  
This American book claims to give you the "secrets" of how to build a simple regenerative receiver with vacuum tubes and to "relive the earliest days of radio" - and this "old pro", C. F. "Rock" Rocky, does just that.

With its chapters on 'Early Detectors', 'Regenerative Detection', 'Challenges of Regenerative receiver Design', 'Building a Practical Regenerative Receiver' and 'Sample Regenerative Receiver Circuits', this book will help you to understand the regenerative receiver and help you build one.

"All you need are a couple of vacuum tubes or transistors and not much more than a handful of parts to build a simple but hot performing regenerative receiver. With it you can cover the short wave bands listening in on foreign broadcasts, amateur communications, ships at sea, secret spy transmitters and much more".

If you've always wanted to learn more about such receivers then this book is a definite must. It's circuits and diagrams are clear and uncluttered and C. F. Rocky's writing style is clear and, as

you might expect from a past teacher of electronics and science courses, concise. **Recommended.**

## *How To Build Your First Vacuum Tube Regenerative Receiver* T. J. Lindsay

In his book, *How To Build Your First Vacuum Regenerative Receiver*, T. J. Lindsay says that he intends to show you "the practical stuff", where vacuum tube regenerative receivers are concerned and he admits that if you also want some of the theory then you will need to look at other books and he suggests C. F. Rocky's (as discussed above).

As you open this American book, the reader is confronted with a disclaimer from the publishers and it is important that you take note of this disclaimer: "The author of this book is not a professional engineer nor has he had formal training in the design and operation of regenerative receivers. The author is an amateur but has been successful in building and operating the device discussed herein.

"The methods that he describes are presented merely as guidelines for others" in developing such

receivers. These devices can be dangerous, possibly even lethal, and dangers have been pointed out wherever possible. Since the author is not a professional in this field, there are probably other dangers involved in construction and operation as well".

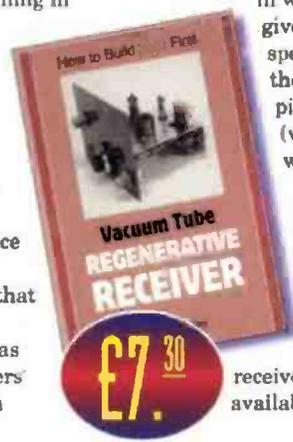
Despite the fact that the author is **not a professional**, there is still some very interesting information in this book and it is worth reading - just be cautious! (Remember, America is the home of compensation litigation). The author encourages you to have a go at these receivers because they are "incredibly simple sculptures of metal, plastic and glass that come to life and perform far better than most people would ever expect". **Recommended.**

## *Communication Receivers - The Vacuum Tube Era: 1932-1981* Raymond S. Moore

This soft-backed book, in reality is more of a catalogue of receivers - with brief details and some history - than a true book. The copy of *Communications Receivers - The Vacuum Tube Era: 1932-1981* that we are profiling here is the new Fourth Edition - straight from the USA.

In the book **Raymond S. Moore** discusses the 'History Of The Communications Receiver' and also contains 'Tables' of valve receivers from the vacuum tube era, in which the author gives the specifications on these receivers with pictures of each one (where pictures were available).

A fascinating read for anyone who would like to learn more about the valve era and the many, varying types of receivers which were available over that era -





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from Hallicrafter, Collins and Hammarlunds to Lafayette's and military receivers (very useful for the collector).

It's well worth reading for the section on Hallicrafters equipment alone, but the associated text is somewhat disjointed at times with a jerky 'notebook' style. Another problem is that the reader can be misled by thinking that the illustration above or below the text is actually the equipment under discussion ... which sometimes it isn't!  
**Recommended.**

### 1934 Official Short wave Radio Manual

Lindsay Publications

The *1934 Official Short Wave Radio Manual* is a reprint from Lindsay Publications of the original manual and will probably bring back a lot of memories for a lot of you. In the introduction, Hugo Gernsback (the editor) states that in this book, they have tried to "incorporate" ... all the various branches of short wave equipment, in such a manner as to cover the best that has appeared during the past few years".

The book also features a complete directory of all 1934 short wave receivers, has many projects and circuit diagrams and also has a special

new chapter on building transistor receivers. The *1934 Official Short Wave Radio Manual* is a fascinating collection of old articles ranging from 'Can We Radio The Planets?' to 'Human Beings As Antennas'.

So, if you wanted to take a step back in time and see what Amateur Radio articles were all about back in 1934 - or perhaps you remember but would like to read them all over again, the this book comes **Recommended.**

### Those Great Old Handbook Receivers

Lindsay  
Publications

*Those Great Old Handbook Receivers* is another offering from Lindsay Publications and carries the sub-title 'Techniques of Early

Vacuum Tube Short Wave Receiver Construction' and contains chapters from the 1929 and 1934 ARRL *Radio Amateur's Handbook*.

The book states that "If you enjoy electronics,

amateur radio, collecting or just the history of technology,

you'll get interesting insight into the beginnings of a technology so common today that we almost take it for granted". With various chapters dealing with receiver design and construction, detailed receiver theory, construction techniques and power supply secrets from the 1929 and 1934 editions of the *ARRL Radio Amateur's Handbook*, there is anything you need to "... rediscover radio in the days when it was just beginning to emerge as a new technology".

*Those Great Old Handbook Receivers* is a good read, if tightly packed in, with circuit diagrams and pictures in abundance, so if you fancy a vintage read, then why not put your hands

on a copy of *Those Great Old Handbook Receivers*. **Recommended.**

### Seeing By Wireless Ray Herbert

*Seeing By Wireless - The Story of Baird Television* is a Second Edition by Ray Herbert G2KU/G2TV is a book which you are probably very familiar with by now. This book (now published by PW Publishing Ltd.) has been fully revised by the author, who is of course, well known to PW readers.

*Seeing by Wireless* is the story of John Logie Baird and

Baird Television. It's hard to imagine that television is, in fact, conceptually older than radio, even though it was 1926 before J. L. Baird, often referred to as the 'Father of Television', demonstrated the first true television pictures. This and many other interesting facts are detailed within the pages of Ray's book.

The publication traces the Baird story from the early demonstrations, which became historical events to International Operations through to Stereoscopic Television. *Seeing by Wireless* gives a fascinating insight, complete with quality photographs, into something that has become an accepted part of everyday life - television.

*Seeing by Wireless* costs just £4.95 and comes **Recommended** to those of you who would like to be more familiar with the story of John Logie Baird and the birth of TV.



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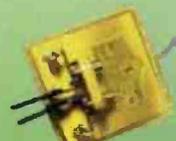
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**ICOM IC-751**  
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Icom IC-725	As new	Yaesu FT-787GX	With 6/270/CTCSS	Kenwood TM-231E	2 meter mobile, boxed
Icom IC-726	HF + 6, as new	Yaesu FT-ONE	Great condition	Kenwood TM-2550A	2 meter 70W mobile
Icom IC-728	Boxed			Kenwood TM-733	As new
Icom IC-729	HF + 6 as new, boxed	Alan CTE-145	2 meter hand-held	Kenwood TR-7730	2 meter mobile
Icom IC-735	As new, boxed	Alinco DJ-150	As new	Kenwood TS-480	Great 2/70 base rig
Icom IC-735	Boxed, as new	Alinco DJ-180	2 meter hand-held	Kenwood TS-711	Boxed, mint
Icom IC-746	Ex-display, new	Alinco DJ-560	Dual band hand-held	Multi 800-D	25W 2 meter FM
Icom IC-751	Great performer	Alinco DJ-S41	70cm hand-held as new	Palstar KH-6	6 meter hand-held, ex-display
Icom IC-B1050	29MHz FM rig	Icom IC-2350H	Dual band, ex-display	Standard C-500	Dual band, large battery
JRC JST-135DX	Boxed, as new	Icom IC-255E	25W FM	Standard C-5200	Dual band, boxed, mint
JRC JST-135DX	Boxed, CW filter	Icom IC-260E	2 meter multimode	Trio TR-7200G	Mint, boxed, 1 owner from new
JRC JST-245	Ex-demo	Icom IC-2AT	Boxed, as new	Trio TS-700G	2 meter base multimode as new
Kenwood TS-440S	Boxed, immaculate	Icom IC-505	6 meter base multimode	Yaesu FT-203	2 meter hand-held
Kenwood TS-450SAT	Mint	Icom IC-W21E	Dual band	Yaesu FT-208R	Boxed, hand-held
Kenwood TS-450SAT	Mint	Icom IC-W2E	Dual band hand-held	Yaesu FT-230	Boxed, mint
Kenwood TS-570DGE	Ex-demo	Icom IC-W32E	Dual band h/h + access.	Yaesu FT-290	+ linear
Kenwood TS-870SD	Ex-display	Kenwood TH-26AT	2 meter hand-held	Yaesu FT-290R	Boxed, mint
Yaesu FT-1000MP AC	Ex-demo, new	Kenwood TH-26E	Boxed, as new	Yaesu FT-411E	2 meter h/held + accessories
Yaesu FT-747GX	Boxed, mint	Kenwood TH-78E	Dual band, A-1 cond.	Yaesu FT-480	2 meter multimode
				Yaesu FT-530	D/band, mint + £215 worth of acc

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# ELECTRONICS IN ACTION

**H**ello and welcome to the August 1999 issue of Electronics-in-Action (E-I-A) a bi-monthly look at news, views, electronic projects and ideas.



**Downey G3WDK.** With almost 300 pages, the Techni-Tool catalogue is packed with items to ease all stages and levels of production. There are simple hand tools and toolkit boxes right up to the production stages using surface mounted components. A catalogue of useful and indispensable tools and items for any level of



production. The contact details I have are: **Doug Dilley, T.I.G Marketing, 3 Bedwell Park, Stevenage, Herts SG1 1NB. Tel: 0800-026 8609.**

**Maplin Electronics** are presently saying "See How We Measure Up" with savings of up to £170 (before VAT) on selected oscilloscopes and other savings on test equipment through their many stores. On offer is the Goldstar OS-502 oscilloscope for only £299.99 (inc VAT) instead of £499.99 (in VAT). But you don't have to spend that sort of money to save, there's a free £10 gift voucher with many Fluke Digital Multimeters and saving of up to 50% on other multimeters in the very affordable range of prices starting from only £12.49 (in VAT). Maplin have 50 store nationwide so, there should be one near you, or you can phone then on (01702) 554000 to order by credit card over the 'phone.

## Your Letters

Turning now to your letters and I'll return to a plea that I mentioned back in this column on page 53 of the June 1999 PW. In that issue I asked on behalf of **Michael Troy EI6HA** about an infra-red trigger to make photography of animals easier. Since then I've found a supply of very cheap (costing nothing) electronic flash guns. The source of the flash-guns costing 'nowt' is the simple 'throw-away' cameras that abound these days.

I have to deal with a commercial photographic developing house and in the course of seeing 'how the processing was done' I found a box full of throw-away cameras awaiting the local refuse operative's arrival. On

**L**et me start by looking at some catalogues, the first of which I received after a visit by **Roland G7VRN** (who is a member of **Sheffield and District Amateur Radio Club**), to **Graham G7TCS** here in Poole. Graham brought Roland along to one of Poole Radio Society's meetings and we fell to discussing good shops for components. Roland mentioned that 'back home in Sheffield' there was an excellent shop in the form of **N. R. Bardswell**, who seemed to be able to supply almost any component at very good (for this read 'low') prices.

Several days after Roland's visit I received a simple, but comprehensive 26 paged A4 catalogue (same size as PW) that featured tools, components, batteries, accessories, cable, boards, connector and computer bits and pieces. It's worth getting this catalogue from them, at **288 Abbeydale Road, Sheffield S7 1FL (Tel: 0114-2500689)** just to see what is available. For those of you with Internet access try <http://www.bardswell.co.uk> or send an E-mail to [sales@bardswell.co.uk](mailto:sales@bardswell.co.uk) to ask for a catalogue.

Another catalogue that I received 'by recommendation' from a fellow amateur was the **Techni-Tool** catalogue that dropped onto my desk here at PW after talking to **Pete**



**Fig. 1:** Throw-away cameras can be a source of small electronic flash guns and high voltage capacitors. See text for more details.



**Fig. 2:** Front and back on one of the 'larger' electronic flash guns. Readers should be aware that the capacitors, rated at 120µF may carry a dangerous voltage of up to 330V.



**Fig. 3:** All shapes and sizes, but still as dangerous with 300+V available from this little 'nipper'. See text for more detail.



**Fig. 4:** The AOP-1 output transformer from Isoplethics matches almost perfectly to battery valved audio amplifiers.

asking, I was told to take as many as I wanted just to get rid of them. The photograph of Fig. 1 shows a typical camera (this one is from Kodak) and the flash-gun units stripped out of three others.

The cameras have a low light output electronic flash, suitable for the film that's inside. The cameras are a source of fairly good quality, high voltage capacitors. Power to charge up the capacitor usually comes from a single 'penlight' 1.5V cell. Fig. 2 shows the front and back of these units. When you have gained access to the battery I suggest that you take it out and leave the camera for several days before proceeding. Why? You may ask - well I'll tell you!

The reason I suggest putting the camera aside is because of safety. Although you may not be able to see the lettering on the storage capacitor in the photograph, it's 120µF with a rated voltage of 330V. After struggling to try and get the inner case sections apart for around two minutes my fingers found the two 'lands' on the p.c.b. with this level of voltage on them.

The 300+ volt jolt (across my fingers luckily) caused my arm to immediately straighten out and fling the whole camera away. Sailing serenely across the room it was brought up sharply by the wall, when the camera simply fell apart.



Fig. 5: Two colours of 20mm diameter coil former, fitting a B9A base, available from Isoplethics. You may have your own choice of colour if you order enough of them.



Fig. 6: My first attempt at a 'reproduction' coil for a valved radio - not very pretty, but the next one will be better!



Fig. 7: Winding a 15µH choke on an Isoplethics IDCW5/16 powdered iron choke core is very easy and the results look good.

revealing the p.c.b. in its glory. Whilst the flash itself didn't go off, I noted lights flashing in my eyes and a general wish to sit down for several minutes!

My technique of disassembling the camera is not recommended for those 'of a nervous disposition' or with heart problems! But it did open the camera up easily - if a little suddenly. The photo of Fig. 3 shows another type of electronic flash unit that I've encountered (albeit not shockingly this time). The two small contact are the trigger contacts and these too carry the full voltage although with a limiting resistor. But still not recommended to touch!

### Tracking The LO

I've had a letter from George Fisk congratulating me on my attempt (in E-i-A June 1999) to tackle the mystery of how to get perfect tracking (of r.f. and l.o. circuits in superhet receivers) "a subject usually avoided", as George says, "by writers of articles on radios". George did however, rightly take me to task for not mentioning the value of the variable tuning capacitor I had designed the circuit around - it was, as he says 350pF.

Another problem George pointed out was that the annotations of Table 1 on page 56 of the June 1999 issue of PW had the two legends reversed. The two tuning ranges legends (top and bottom parts) should be reversed within the table. George also mentions that my choice of having the l.o. on the low side of the r.f. makes tracking more difficult. I shall look deeper into and discuss more this in a future column George, as I think it deserves a little more space. But for those readers who would like to investigate for themselves he suggests that an article in *Short Wave Magazine* October 1947 (Simplified Formula For Oscillator Tracking) might be a useful starting point.

While I'm on the subject of radio and making coils and general valved circuits. I have recently had, from Isoplethics, an audio output transformer, the 'AOP-1' shown in Fig. 4. This is to replace the 'jury-rigged' output transformer (a 6V-1A mains transformer) that I'd used in the battery valved, amplifier, presented in E-i-A, (p58) April 1999 issue of PW. The sound is now much smoother and less distorted and is much louder than before.

Also from Isoplethics (a wonderful name), I've had samples of other products, such as the 20mm diameter) coil formers shown in Fig. 5 and Fig. 6 and the powdered iron core choke formers of Fig. 7. For more details of the growing range of products that Isoplethics can supply, contact them at 13 Greenway Close, North Walsham, Norfolk NR28 0DE. Tel: (01692) 403230 for more details.

### A FEW BOOKS

Let me now look quickly at a few books that I think may be useful in your library. I've specifically looked out books which, although cheap, are excellent value for money. So, I'll start with a book from the pen of Robert Penfold. The 92 page book *Projects For Radio Amateurs And SVLs (BP304)* by Robert Penfold is the slimmest of the four books I have and this little Babani volume will prove helpful to anyone coming into the hobby, as it offers interesting (and instructive) working projects ranging from 'add on' beat frequency oscillators, crystal calibrators, various filters and an 'active antenna' circuit.

Well known for his straightforward approach, this book by R. A. Penfold will provide hours of home-brewing ideas, construction and instruction all at the same time. **Helpful, practical** and affordable at only £3.95.

Also well known to PW readers, Ian Poole who writes the 'What is a...' column has tackled the basic explanation of how a superhet receiver works. In *The Superhet Radio Handbook*, Ian Poole describes in seven chapters all the main areas of superhet receivers, from the history to implementation of features to be found in most good-quality sets. For instance, chapter two deals with the basic principles of mixing, tuning, a.g.c. and even d.s.p., while chapter three looks at sensitivity and overload.

Selectivity has a chapter all to itself as has the local oscillator. Chapter six deals with demodulation of both a.m. (standard as well as synchronous decoding) and f.m. signals as well as single and double sideband signals. For decoding f.m. signals, the two methods of a ratio and a Foster-Seeley detectors are looked at in greater detail all before the final chapter seven deals with the more 'day-to-day' information of antennas, controls and how to make the most effective use of your superhet receiver. **All in all very informative** and good value at £4.95.

Easily the thickest of the Babani books I'm looking at this month, Owen Bishop's *Practical Electronic Design data*, with over 320 pages is the one of the most comprehensive and wide-ranging data books I've seen at such a low price. Broken down into six chapters, covering Units of measurements, components, analogue circuits, digital circuits, radio circuits and power supply circuits, there's something in this book for almost everyone.

The analogue and digital sections cover almost two thirds of the whole book, but much data will be found in there as well as many circuits to try out, leaving r.f. and p.s.u. circuits for the final third. In spite of appearing to have less information for a Radio Amateur, this is still an extremely good book at the price of only £5.99 and certainly is one that should be considered for your library.

The final book that I have this month is a reprint of compilation articles from the 1929 and 1934 ARRL *Radio Amateur's Handbook*. Titled *Those great old HANDBOOK RECEIVERS* and sub-titled 'Techniques Of Early Vacuum Tube Shortwave Receiver Construction - Chapters From The 1929 And 1934 Arnl Handbook', this is a fascinating book of historical circuits.

I was also impressed with the general quality of the printing of this book, it's of excellent quality - but what about the content? Throughout the book, chapters have the same number as when originally printed so, the first chapter, about 'How Radio Signals Are Sent And Received' is 'Chapter IV' followed by 'Chapter V' - 'Building A Station - The Receiver', Then follows another chapter five, but this time from the later issue of the handbook, about 'High Frequency Receivers'. A small gap leads into 'Chapter Nine' about 'Ultra High Frequencies' and the final chapter in the book is 'Chapter Ten' about power supplies.

This book *Those great old HANDBOOK RECEIVERS* is well illustrated through out and makes fascinating reading. There are many tables of valve and transformer data to make this a worthwhile reference book too. **Excellent reading as well as being very readable** and at a price that is within range of everyone's pocket money at £6.95.

### URL Watch

Links to World-Wide-Web sites related to items on these pages.

Maplin Electronics  
N. R. Bardswell  
Poole Radio Society

[www.maplin.co.uk](http://www.maplin.co.uk)  
[www.bardswell.co.uk](http://www.bardswell.co.uk)  
[www.pawms.co.uk/PRAS/prs-start.html](http://www.pawms.co.uk/PRAS/prs-start.html)

Well that's all I have space to squeeze in this month. I'll see you in the next issue of E-i-A.

*TEX*

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The FT-736R is a frequency-synthesised amateur transceiver incorporating up to four bands and modules covering the 30, 144, 220, 430, 440 and 1200MHz amateur bands. The standard model provides 25 watts RF power output on the 144 and 430/440MHz amateur bands in SSB, CW, and FM modes, with any two of the remaining three bands installable as options.

### ICOM IC-2000

144MHz FM mobile transceiver.

Compact sized mobile constructed of die-cast aluminium with a large beat sine making stable operation even at high duty cycles. The IC-2000 has 1 call channel and 50 regular memory channels plus 8 scan edge memory channels. It has a large easy-to-read function display and a set mode to customize operation.

### USED EQUIPMENT

All secondhand equipment is checked out thoroughly before going on our shelves for sale and we try to give an honest description of equipment to mail order customers.

Yaesu FT-990	£379
Yaesu FT-787GX 2m boxed	£580
Kenwood TS-530SP	£399
Yaesu FT-126R + 2x2 HF	£625
Kenwood TS-770	£499
Yaesu FT-990	£600
Icom IC-730	£525
Icom AT-180 (IC-706 matching ATU)	£250
Kenwood TS-630	£350
Yaesu FT-101ZD MHz + FC-902/FTV-901R	£790
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Kenwood TW-4100	£225
Icom IC-207 dualbander	£TEL
AKC-6001 4m FM	£TEL
Icom V-2007 + 1500A/box	£TEL
ARR200 boxed	£275
ADI-18 2m hand held	£99
Icom IC-X21ET + CTCSS fitted	£225
Yaesu FT-50R + FT-12/CAX software	£TEL
Capoc SPC-900	£99
Icom FL 52A filter	£TEL
MCCL 1000/100 easy reader + monitor	£90
Yaesu FL 2100Z HF linear	£TEL

### YAESU FT-650

24.5, 28 & 50MHz all mode transceiver.

Power output is adjustable from 10 to 100 watts in CW, SSB and FM modes and up to 25 watts carrier in AM mode. Operates from 13.8V DC. Options include the DVS-2 Digital Voice Synthesiser for continuous recording and instant playback of received signals.

### YAESU FT-790R II

70cms multimode mobile.

Although discontinued by Yaesu, this is still a sought after radio. Completes with FBA-6 battery case and nine C-size dry cells or NiCads, the FT-790R which provides extra high performance and 2.5W output for many hours after hand-held have eaten up their batteries.

### ICOM IC-281H

2m FM mobile transceiver.

High power 50W mobile with 70cm receiver and packet connector. Smaller than the average mobile radio but built to Icom's usual high standards.

### KENWOOD TM-251

144MHz mobile transceiver.

High performance mobile transceiver that combines a sophisticated, stylish design with advanced technology. Top flight features include a digital recording system, a 6-pin mini DIN connector for packet communications, built-in OTSS with pager, and a multi-function LCD with three different display modes. Each features a dual-band receive capability, allowing full-duplex cross-band communications.

### ICOM IC-728

IIF all band transceiver.

Compact enough for mobile and portable operations as well as fixed operation, and easy operation appealing to both beginners and experts alike. It is equipped with basic features plus additional functions required for HF operation such as passband tuning and speech compressor.

### KENWOOD TS-450S

IIF transceiver.

Kenwood's formidable TS-450S can star in virtually any role with its 100W transmission capabilities on all nine amateur bands - in SSB, CW, AM, FM and PSK modes. Compact lightweight construction makes this HF transceiver particularly suited for DX-peditions. Rugged reliability is matched with leading-edge electronics. Optional antenna tuner unit is available.

### YAESU FT-990

All mode IIF transceiver.

Based on the high performance and easy operation of the FT-1000, the FT-990 combines the basic technical features of that model with several enhanced features resulting in a spectacular performer. Its multiple direct digital synthesizers, effective interferences rejection, with digital filtering, AFB VFOs & 90 memories, etc.

### YAESU FT-1000

The best of the best HF all mode transceiver.

It took Yaesu's top design engineers and many man hours to produce this remarkable 200W, dual-receive HF radio. There are too many features to list, so phone now for a colour brochure and discover yourselves the many advantages to owning this impressive radio.

### ICOM IC-2340

Dual band FM mobile transceiver.

Separate tuning controls for operating convenience, 100 memories, optional remote control capability. This radio is built to the highest quality and was one of the best mobiles on the market at the time.



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# RADIO DIARY

**July 11:** The 19th Sussex Amateur Radio and Computer Fair will take place at the Brighton Race Course from 1030-1600. There is free on-site parking and admission is £2. The rally is one of the largest in the South of England with well over 100 trade stands covering Amateur Radio, Computers, Electronics, etc. There will also be a large Bring & Buy display area, refreshments and bars at reasonable prices, a picnic area with views over the South Downs. Further details on (01323) 485704.

**July 18:** The Leeds & District Amateur Radio Society are holding a large Amateur Radio, computer and car boot sale at The Radio Shack, Yarnbury Rugby Club, Brownberrie Lane, Horsforth, Leeds, W. Yorkshire. There will be a large car park, full bar and meals service, toilets, etc. Talk-in on S22. Prices are as follows: Cars £5, Vans £10. The site will be open from 0800, there will be full marshalling on site, supply your own tables. **John M1CAI** on (01843) 874650 after 1800.

**July 18:** The 16th McMichael Amateur Radio Rally and Car Boot Sale is being held at The Haymill Youth & Community Centre, 112 Burnham Lane, Slough. Doors open at 1000 and admission is £1.50, car boot pitches are £10 on the day. There is free parking on-site, food, tea and coffee served and a licensed bar. The Thames Valley Packet BBS Group and the Berkshire Downs Repeater Group will also be in attendance. Talk-in on S22 GB6MMR. **Dave Chislett G4XDU** on (01628) 625720 or E-mail [g4xdu@amsat.org](mailto:g4xdu@amsat.org) Trade enquiries and bookings should be made to **Min Standen G0JMS** on 0118-972 3504. E-mail: [mins@mstanden.freemove.co.uk](mailto:mins@mstanden.freemove.co.uk)

**July 25:** The Rugby Amateur Transmitting Society are holding their Radio & Computer Rally at the BP Truckstop, A5 Watling Street. Details from **MOASD** on (01788) 550778.

**July 25:** The Colchester Amateur Radio & Computer Rally is to be held at St. Helena School, Sheepen Road, Colchester, adjacent to the Colchester bypass, Avenue of Remembrance. Doors open from 1000-1600. Talk-in on S22. Admission is £1.50. There will be a wide range of Amateur Radio and Computer traders, Bring & Buy and specialist stands inside, a car boot sale and trade sale area outside. **RSGB Morse tests on demand** (two passport sized photos required). Catering and licensed bar. There will be ample free parking and reserved disabled parking adjacent to the main entrance, with full access for wheelchair users. Details from **Jeff G7BKU** on (01206) 728710.

**\*August 8:** The Flight Refuelling ARS Hamfest 1999 will take place at Flight Refuelling Sports Ground, Merley, Wimborne, Dorset. The event will run from 1000-1700 and will include the usual mix of traders, craft exhibitors, car boot sale and field events. Overnight camping facilities available for Saturday 7 August. Talk-in will be on S22. **Note - No Bring & Buy.** Further details from **Richard Hogan G4VCQ** on (01202) 691021.

**August 8:** The annual Derby Radio Rally will take place from 1000 at the Littleover Community School, Pastures Hill, Littleover, Derby. This is on the A5250, just north of its junction with the A38. For further details contact **Martin Shardlow G3SZJ (QTHR)** on (01332) 556875 or E-mail: [martin@martinshardlow.demon.co.uk](mailto:martin@martinshardlow.demon.co.uk)

**August 13:** The Cockenzie & Port Seton Amateur Radio Club are holding their 6th Annual Radio Junk Night at the Cockenzie & Port Seton Community Centre, South Seton Park, Port Seton, East Lothians, Scotland, from 1830 to 2130. Bring along your own junk and sell it yourself. Tables will be provided on a first come first served basis - with no charge for the table. There will be a raffle at approximately 2100 and refreshments will be available.

Disabled access. Entry fee is just £1 all persons, with all money donated to the British Heart Foundation. **Bob Glasgow GM4UYZ @ GB7EDN** on (01875) 811723, E-mail: [r.glasgow@x400.wins.icl.co.uk](mailto:r.glasgow@x400.wins.icl.co.uk) or [bob.gm4uyz@btinternet.com](mailto:bob.gm4uyz@btinternet.com)

**August 29:** The Milton Keynes ARS Annual Rally & Car Boot Sale is to be held at the Bletchley Park Museum, Wilton Ave, Bletchley, Milton Keynes. Open from 0800 for traders, 0900 for buyers. Museum open with tours. Morse test on demand (bring two passport size photos). Talk-in on S22. Contact **Dave G3ZPA** on (01908) 501310.

**August 29:** The Torbay ARS annual rally at Churston Grammar School near Brixham. A wide variety of traders will be present and food and refreshments will be available. Doors open at 1000. Further details from **Peter G4VTO** Tel: (01803) 864528.

**August 29:** Coleraine and District ARS will hold its annual Radio Rally in the Bohill Hotel, Cloyfin Rd, Coleraine, Northern Ireland. Full catering facilities available in Hotel. Why not stay overnight and visit the Causeway Coast? Doors open midday. All enquiries to **G18LTB** Tel: (01265) 52393 or **G17TMQ** on Tel: (01265) 822502.

**August 30:** The Huntingdonshire Amateur Radio Rally are holding their rally at the Ernulf Community School, St. Neots, Cambridgeshire (near Tesco Superstore on the A428). Doors open 1000 till 1400 and admission is just £1. Hot and cold refreshments will be available. Features hall and car boot sale on hardstanding. Talk-in on S22. **David Leech G7DIU** on (01480) 431333 (between 0900 and 2100).

**September 5:** The Bristol Radio & Computer Rally is to be held at the Brunel Centre, Temple Meads Station, Bristol. Doors open 1030 till 1600 (disabled entry from 1015). Admission is just £1, accompanied children under 12 free. Features

include 15+ tables, large Bring & Buy, under £30 Bring & Buy, refreshments, on-site parking £3.50, also NCP £1 opposite, ATV demonstration and a raffle. Details from **Muriel Baker G4YZR**, Rally Manager, on (01275) 834282 (24hr answerphone).

**September 11:** The Reddish Rally is to be held at 1000 at St Mary's Parish Hall, Reddish, Stockport. More information from **G4ILA** on 0161-477 6702.

**September 12:** The Lincoln Hamfest will take place at the Lincolnshire Showground on the A15, five miles north of Lincoln. There will be extensive free parking and overnight facilities for tents and caravans by previous arrangement. There will also be a licensed bar, catering on the day, trade stands, flea market, Bring & Buy, car boot sale and Morse tests. Talk-in on 2m. Other 'non radio' attractions. Admission is £2 per person (under 14s free). **Bob G3VRD** on (01522) 533325.

**\*September 25/26:** The Leicester Amateur Radio Show will be held at the Castle Donington International Exhibition Centre at Donington Park, Castle Donington, Leicestershire. The hall itself is purpose built and features a floor area approximately one third larger than the two Granby Halls combined, and the car parking is unlimited and free.

**October 3:** The Great Lumley Amateur Radio & Electronics Society are holding their rally at the Great Lumley Community Centre, Front Street, Great Lumley, near Chester Street. Doors open 1100 (1030 for disabled visitors). There is free parking and easy access, with good, inexpensive food and drink. There will be radio, electronics, computer, satellite and component stalls, plus a Bring & Buy in two sections - junk and good buys. Admission is just £1, free of charge for under 14s if accompanied by an adult. Talk-in. More information on 0191-384 2803 or (01228) 401201 or from the Rally Organiser, **Nancy Bone**, 49 South Street, Durham City DH1 4QP.

**October 24:** The Galashiels & DARS is to be held at The Volunteer Hall, St John Street, Galashiels, Scottish Borders. Doors open at 1100 (disabled access from 1045). There will be all the usual attractions. **Jim Keddie GM7LUN** on (01896) 850245.

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

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

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# RadioScene

## VHF REPORT

REPORTS & INFORMATION BY  
THE LAST SATURDAY OF EACH  
MONTH.

DAVID BUTLER G4ASR  
YEW TREE COTTAGE  
LOWER MAESCOED  
HEREFORDSHIRE HR2 0HP

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THIS MONTH DAVID BUTLER  
G4ASR HAS NEWS OF  
ACTIVITY ON BOTH THE 50  
AND 70MHz BANDS.

After a period of many months and for some operators, many years, the 50MHz band finally kicked started itself into life again.

Propagation during the month of May saw not only the start of the regular summer Sporadic-E (Sp-E) season, but also the start of some real DX activity via the F2-layer.

Contacts made with Sp-E propagation are via the E-layer (an altitude of around 100km) and normally allow QSOs to be

made with stations up to 2500km or so away. For stations in the UK this effectively means the possibility to contact every country in Europe and some further afield.

Propagation via the F2 layer (at an altitude around 400km), however, enables world-wide contacts to be made with stations 5000, 10 000 or even 15 000km away. During May, many UK operators reported making QSOs around 10 000km into South America with stations in CE (Chile), CX (Uruguay), LU (Argentina) and PY (Brazil).

Contacts were also reported with African stations such as TZ (Mali), V5 (Namibia), Z2 (Zimbabwe), 5H (Tanzania), 6W (Senegal) and 7Q (Malawi). The distance for most of these countries is around 7500km from the UK. This is the beginning of a number of years of excellent propagation on the 50MHz band - so, get on the band now!

## YOUR REPORTS

Now I'll take a look at your Sp-E reports. The first reasonable opening via this mode occurred on May 4 between 2100-2200UTC with stations as far north as IO83 reporting propagation into Italy and

neighbouring countries. Another event followed two days later on May 6 with stations in central England and Wales working into the Mediterranean area.

The first sign of Sp-E signals at the QTH of **John Hilton GM1ZV** (IO86) was at 1100UTC on May 14 when he worked the Spanish station of EH1DAV. John uses an Alinco DX-70TH transceiver running 100W into a 5-element F9FT Yagi and in the period May 16-19 he made further s.s.b. contacts on the band with the stations of EH1EBJ, IK3ITO, S53EO, S54G and 9A7W. A contact with GU6AJE gave John his 37th country and brought his squares total up to 192.

"Wow-wee"! Exclaimed **Simon Purdy M1DEF** (IO84). Six months of listening to white noise and then an s.s.b. contact with S57UUD in Slovenia on May 17. All with 20W and a poorly located dipole inside the house!

**Mike GU6AJE** (IN89) made similar comments about a Sp-E opening on May 24. He contacted stations in DL, EH, I, IS0, IT9, OE, OK, OZ, SM, SP and 9H. Mike reports that he usually calls CQ around 50.175MHz if you're looking for a contact with Guernsey.

**Steve Bunting M0BPQ** (ex-G7ACQ) (IO91) reports that he's

now active on the 50MHz band having recently erected a G3FDW design log periodic beam. The only problem is that the beam's located on a first floor balcony and fixed on a beam-heading of 100°. However, the log periodic covers the 50, 70 and 144MHz bands, making it ideal for those with limited space unable to erect antennas for individual bands.

Steve uses an Alinco DX-70T transceiver running 9W and prefers to use c.w. for most of his contacts. This is probably a very wise move as use of c.w. is very effective and can go a long way to combating the use of low power and a small antenna. On May 17, whilst testing the antenna, he made contacts with the stations of IC8XCU and 9A5I.

The antenna, by the way, was balanced on a clothesline a few feet off the ground and beaming completely in the wrong direction! Having fixed the beam on the balcony, Steve was then in a position to start working some more DX on the 50MHz band.

On May 18, between 1159-1215UTC, three c.w. contacts were made with Romanian stations YO2BEH, YO7BSN and YO2VS. On the following day, May 19, even better results were achieved. Between 1710-2206UTC he contacted two German (DL) stations, three Austrian (OE), three Czech (OK), ten Polish (SP) and one Croatian (9A) station. Best DX of the day was SP6GYU/8 (KN19) at 1640km.

On May 20 he worked EH7GTF (IM87) in Spain and two Portuguese (CT) stations and a few days later on May 23 he contacted three Polish stations, IW5BMC and OK1MP. Steve reports that an opening on May 24 was very good and provided him with his best DX so far, 9H1AZ (Malta) at 2046km. He also contacted six Italian (I) stations and two Sicilian (IT9) stations, although the latter can't be counted as an additional country for DXCC award purposes.

Steve mentions that he heard the Bulgarian beacon station LZ1JH/b peaking 329, although his unit only runs 1W into a vertical antenna. Around the same time the Scottish beacon CB3RMK (IO77) was heard peaking 599, via short-skip Sp-E. **Ivan S51DI** (JN76) also reports hearing the CB3RMK beacon, but this one was on the 70MHz band. He heard it on May 16 between 1530-1700UTC.

## FURTHER AFIELD

Now it's time to take a look at some of the DX from much further afield on the 50MHz band. A good opening to Africa,



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Fig. 1: Andy Adams G0KZG has been transferred to this ship - Royal Research Ship Challenger (published with the kind permission of Southampton Oceanography Centre).

and South America occurred on May 8 with several stations in southern England working CX8BE, V51, Z23JE, Z23JQR and 7Q7RM between 1630-1900UTC.

A week later, on May 16 at 1900UTC, **Kerry Rochester G0LCS** (IO91) reported hearing the station of 5H3US (K193) in Tanzania. Interestingly **Chris Gare G3WOS** observed that it was 10-years to the day that he worked the other active Tanzanian station, 5H1HK, at 1812UTC on May 16 1989.

Between May 16 to 23 Argentinean stations were given permission to change their call signs from the LU prefix to L2 and from LW to L3. Whether this administrative move caused the band to open up can only be conjecture but, on the very first day of airing his new call sign, **Alberto L22EG (LU2EG)** had a tremendous opening to the UK. Between 1700-1730UTC on May 16 he contacted the stations of G0LCS, G1IOV, G1RNM, G1YLI, G3COI, G3FPQ, G3IMV, G3NSM, G3NVO, G3WOS, G3WZT, G4BWP, G4DEZ, G4HBA, G4IGO, G4PCI, G6ION, G7BXS, G8BCG/P, M1CYQ, GW4EAI and GW7SMV.

Another excellent opening to Africa and South America occurred during the evening of May 26. Stations known to have been worked or heard from the UK included TZ6VV, PY5CC, 6W4RK, 7Q7RM and the V51VHF beacon. **Darrell Moody G0HVQ** (IO81) heard the station of TZ6VV around 2040UTC but was unable to crack the pile-up. He reckons that 50W is not enough as there seem to be so many more stations active running high power with large antenna systems.

Darrell also reported an amazing opening on May 30 with many LU stations and a handful of CX stations, active between 1800-1900UTC. This time he did manage to crack the pile-up working four LU stations. His secret? He simply used c.w. - It works every time! Among the DX noted in the UK were the stations of CX1DDO, CX7BBR, LU2EG, LW4DIR, LU7DZ, LU8DIO, LU8MB and LU9AEA.

One real gem during this opening was the Chilean station **CE3BFZ (FF46)** who was worked by **Keith G4FUF (JO01)** at 1838UTC on 50.112MHz. The distance for this contact was around 11 700km. The station of LU2EG (GF05) reported making contacts with G0JHC, G1YLE, G3IBI, G3FPQ, G3VOF, G4DEZ, G4HBA, G4IGO, G4NOO, G4PCI, G4RKG, G6JJ, G6ION, G7BXS, G7ULL, M0RCT and GW7SMV.

**Neil Carr G0JHC (IO83)**

mentions that this opening to CX and LU was the first to reach his QTH since 1991. He worked six LU and two CX stations, leaving to the pack a number of South American stations he'd previously worked eight years ago.

### FLEETING OPENINGS

One method of catching those fleeting openings on the v.h.f. bands is to log into your local Packet radio DX Cluster. However, some anti-social people have been putting 'spoof' spots on the system, causing some confusion amongst the inexperienced operators.

**Neil G0JHC** commented about these 'hoax' DX spots on the UK Six Metre Group Web site. He thought that some of it was unintentional as there are now a number of operators new to the band who have little experience of international call signs. For example, he recently heard a local working a 9A (Croatia) station. Unfortunately, he logged him as 5A and then went on to tell his mates that he had worked Libya!

Another instance of incorrect logging occurred during a recent 'Sp-E' opening to Italy. A Dutch station was called by a very weak c.w. station signing ZS2CO before disappearing into the noise. After some investigation (on the DX Cluster) it turned out to be S52CO. Working Slovenia is certainly very different from contacting the tip of South Africa!

### STATION ACTIVITY

Now some news of station activity and DXpeditions to look out for on the 50MHz band this summer. First up is **Gary Hyde G7LXK** who reports that, if his permit arrives in time, he will be active between July 10-14 from the west coast of Ireland (IO53). He will be using an Icom IC-706 running 100W into a 2-element Yagi.

**Richard PE1OUC** passes on the news that the third yearly meeting for 50MHz enthusiasts will be held at **Fort the Gagel, Utrecht, Netherlands on July 10-11**. The Six Metre group plan to erect a 12m long Yagi on top of a large tower and participate in the IARU 50MHz contest which is running during the weekend. On the Saturday evening, there will be a barbecue and on the Sunday the team will run a flea market. Contact Richard by telephone **0031 346 578 024** for more details. If you're unable to attend you can always listen out for the contest group who are expected to be active around 50.135 and 50.098MHz.

In North America, a group of Canadian operators will be active as **CY9CWI** between **July 21-28**

and **N5JQQ** will be using the call sign **C6AFP** whilst on holiday in the Bahamas during July. Two German operators, **DL9UDS** and **DL9USA**, will be using the special call sign **J45K** (Greece) during the period July 28 to August 11.

The station **HZ1AB** (LK27) in Saudi Arabia has a transceiver and amplifier for the 50MHz band and expects to have a beam antenna erected for the summer Sp-E season. Keep a look out for **N3FNE** who will be active from Jordan as **JY9NE** from now until the summer of 2000. He'll be active on the h.f. and 50MHz band.

**Erol TA7V**, one of the Turkish hosts of the Dutch expedition **YM7PA** in 1977, will be active on the 50MHz band this summer. Using the callsign **YM7KA** he will be active until September 1 from his home QTH in Trabzon on the Black Sea coast in eastern Turkey.

### THE 70MHz BAND

On to activity on the 70MHz band now. It was recently reported (not in this column!) that Polish amateurs will have access to the 70MHz band commencing January 1 2000. The request was for an assignment between 70.000-70.300MHz, using c.w. and s.s.b. at a power level of 10W. However, it's my understanding that, although a request has been forwarded to the **Polish Ministry of Telecommunications (Panstwowa Agencja Radiokomunikacyjna)**, nothing has yet been confirmed.

Indeed, a letter from the v.h.f. manager of the **Polish Amateur Radio Society (PZK)** mentions that they're watching the situation, but just when they can obtain authorisation for 70MHz access is unclear. This is because of many changes in regulations relating to new European Union requirements. This news is very encouraging and follows the introduction of the 70MHz band to Slovenian (S5) Radio Amateurs in June 1998.

Another country that has requested permission for spectrum space at 70MHz is South Africa. **Chris Turner ZS6GM**, President of the **South African Radio League (SARL)** previously reported (in 1996) that the band 70.000-70.300MHz has been allocated to the amateur service on a secondary basis.

The allocation is part of a re-farming of the radio frequency spectrum in South Africa which involves some migration of existing users to new frequency bands before the amateur service can be accommodated. The migration plan expected this to come into effect three years after the initial notification dated December 27 1996, sometime later this year or early in 2000.

However, I've recently heard that, although the full allocation will not become available until the end of 1999, a small allocation has been granted and that several contacts within South Africa (mainly in the ZS6 call area) have already been completed.

Following an investigation of commercial users in the 70MHz band, it was found that a number of 12.5kHz channels were unassigned. Requests were then made to the South African Frequency Planning Department asking for four discrete frequency assignments between 70.000-70.100MHz slotted in-between existing commercial users.

The purpose behind the above is to establish beacon stations in Johannesburg, Durban, Port Elizabeth and Cape Town. These represent the four major areas of South Africa and are also coincident with the major centres of v.h.f. activity. I'm pleased to report that permission has recently been obtained for these beacons, ahead of the migration plan and that the two are already operational.

On April 29 the beacon **ZS1FOR**, operating on 70.002MHz, was switched on. Operating from the Cape Town area, the message transmitted is as follows "ZS1FOR/B (three times) Western Cape JF96FB Vertical dipole 15W". According to a message recently seen on the Packet radio BBS system, another unit is also operational.

The beacon **ZS5MTL** (KG50IG) is running 50W into an omni-directional antenna on 70.005MHz. I've also heard that there are plans for a beacon station to be located on a site (KG44CE) some 1900m a.s.l. on a ridge overlooking Pretoria and Johannesburg. A Pye p.m.r. (private mobile radio) transmitter has been obtained and is being crystallised to operate on 70.015MHz.

All of this is very good news indeed, especially as there's a high possibility of contacting South African stations on the 70MHz band in the next few years. This is because we are very close to the peak of Solar Cycle-23 when the maximum usable frequency (m.u.f.) may reach 70MHz or higher for this path. The optimum months to listen for ZS stations will be from October 1999 through to March 2000.

If you can't wait that long, then why not try your hand at some cross-band working. Listen on 28.885 or 50.185MHz for non-UK stations who have the capability to listen on the 70MHz band. A number of stations including **CY9AA**, **UR4LL** (KO70), **FM5ZX** (JO00), **IK0BAL** and **PA2TAB** (JO32) have such facilities.

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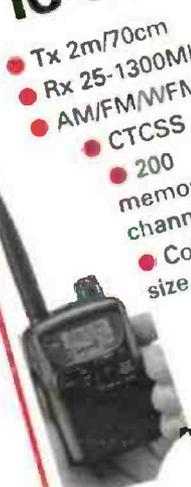
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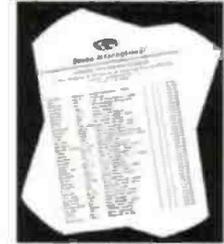
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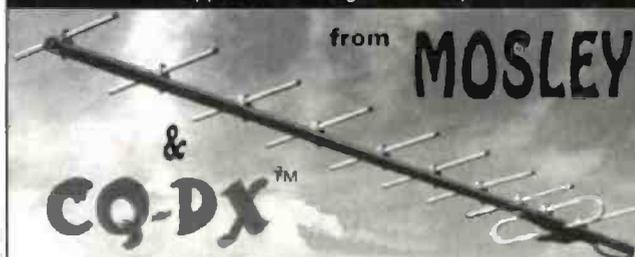
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# RadioScene

Although the cross-band working frequency is 70.185MHz, a good frequency for non-UK stations to monitor is the national s.s.b. and c.w. calling frequency on 70.200MHz. If you want to look for UK stations then don't forget that Tuesday night is the 70MHz activity night. You'll also find a fair bit of activity on Sunday mornings and during contest periods.

## MARITIME MOBILE

Andy Adams G0KZG, famous for his maritime mobile exploits, informs me that he has been inactive for six months but now the ship is back in service and he's now active again on the 144MHz band.

Since his last radio operations, he's moved house from Wales to Cornwall and has therefore changed his callsign from GW0KZG to G0KZG. He's also been transferred to the Royal Research Ship RRS *Challenger* (shown in the photograph, Fig. 1), where Andy first started his /MM operation over ten years ago.

The equipment in use will be the same as last year, a Trio TR-9130 transceiver, a 3CX800A7 amplifier running 1kW, an 11-element F9FT Yagi and a Landwehr GaAs f.e.t. low noise amplifier. His operating times, subject to work requirements, are 0400-0700, 1800-2100UTC and weekend afternoons.

As he only has a temporary feeder cable installation, he has to close down operations during bad weather to prevent flooding of his cabin. Operating frequencies are 144.240MHz for s.s.b. and c.w. contacts, 144.125MHz for random (unscheduled) meteor scatter contacts and 144.120MHz for meteor scatter (m.s.) schedules.

When operating via m.s. Andy transmits during the first 2.5 minute period (that is 00-2.5 minutes, 05-07.5 minutes, 10-12.5 minutes past the hour and so on) at a speed of 360 words per minute (wpm) on high speed c.w. The call sign GTKZGMM will be used, the letter T indicating an abbreviated 'zero' and omitting the 'forward slash'.

At the start of the operating period he'll send for one period the old two letter QRA locator, for example VQ for IO56. (I wonder

how many newcomers will understand this?). His first cruise is already over, having left Southampton on April 17 to his working areas in IO40, IO31 and IN18 and arriving in Glasgow on May 19.

Herv F5HRV reports that he had one contact with G0KZG/MM on May 2. He heard Andy calling CQSI, meaning he was locator square IN28. His next cruise will start from Southampton on July 21 for working areas in IN68, IN69, IN78 and IN79, returning to Southampton on August 14. The follow-on cruise departs Southampton on August 17 with a working area of the English channel and southern North Sea, returning to port on August 30.

Andy mentions that there will be a few more cruises later in the year and that he will forward the details when he receives them. His QSL address is 15 Tregenna Court, Port Pendennis, Falmouth, Cornwall, TR11 3XC.

## DEADLINES

That's it again for another month. Please forward any news, views, comments or photographs to the address and by the date given at the top of the column.

THANKS FOR YOUR LETTERS AND GOOD LUCK WITH THE DX. SEE YOU AGAIN NEXT MONTH.

73 David GAASR.

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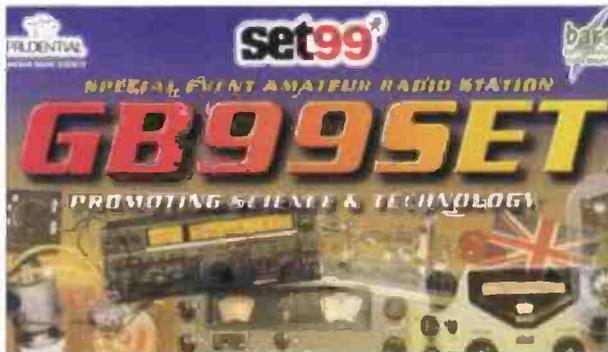
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THIS MONTH LEIGHTON SMART GW0LBI BRINGS YOU NEWS ON MAY'S PROPAGATION CONDITIONS, SPECIAL EVENTS AND THE USUAL BAND REPORTS FROM VARIOUS REPORTERS AROUND THE UK.

Well it seems that it wasn't a very 'merry month of May' this time around, with conditions on the higher bands ranging from 'patchy' to 'poor' judging by our reporters' comments. In mid-April, there was a large solar flare which, it seems, had quite a detrimental effect on h.f. propagation conditions, although May itself did not see much of an improvement on this either.

As far as the sunspot maximum is concerned, John Heys G3BDQ in Hastings tells me that the "experts" first announced that it would take place in the spring of 2000, but have now decided that the maximum won't occur until late 2000.

John says: "I've a horrid suspicion that this cycle will be a great disappointment, especially to the new entrants to our hobby". Well let's hope that you're wrong, John!



by the Prudential ARS and Barry ARS) celebrated 150 years of the Prudential Building Society and these QSL cards will have been sent out by the end of June. Anyone who has not received their QSL card should apply again and another will be sent out.

## NEW LICENCE

One event this month will certainly have the UK Amateur Radio world talking! (As if we don't do enough of that already, that is!). The introduction of a new class of licence, the A/B licence, is of course a 'middle ground' approach to what exists now and should satisfy those who have campaigned, whether you think rightly or wrongly, for a better deal for B licences.

On the other hand, although the Novice licence improvements are, I think, a step in the right direction, I still believe that

Indeed, John has been spending most of his time exploring the very experimental 136kHz band, where his exploits have bagged him contacts with 12 G stations and a couple of GWs, as well as crossing the English Channel to work the Netherlands and Belgium. Pretty good going on such a long wavelength!

John operates mainly at weekends and during daylight hours, and would appreciate listener reports. His address is: 'Whitefriars', Friars Hill, Guestling, Nr Hastings TN35 4EP.

## SPECIAL EVENTS

News has come in of special event stations GB99SET and GB150PRU from Dennis Egan GW4XKE. Dennis says that both operations were a huge success, bringing contacts from all over the world and would like to thank all those who made them successful.

The GB99SET (promoting Science and Technology) QSLs have been despatched via the relevant bureau, with s.w.l. reports being the first to be sent. (See Fig. 1).

The GB150PRU (run jointly

Fig. 1: QSL card sent out to all those who contacted the GB99SET Special Event.

Novices should have access to all bands depending on class of licence and all modes at 10W output and not merely small narrow segments of them.

I have no doubt that the RSCG and the RA are thinking more positively regarding the future of our hobby. But more work needs to be done, particularly regarding the Novice allocation. What do you think?

## YOUR REPORTS

I'll start with the 14MHz band this month, as space is limited. First comes Sean Gilbert G4UCJ of Milton Keynes who says that things have been so quiet this month that he's taken to other pursuits, such as broadcast band DXing.

Nevertheless, he hasn't given up, and lists his 14MHz 30W c.w. contacts this month as YVSDTJ (Venezuela) at 2314UTC, HL1CG (South Korea) at 1133, YN6HM (Nicaragua) at 2202, 5N0MSV (Nigeria) at 2236, PZ1DV (Suriname) at 2246 and

DL1GKG/H13 (Dominican Republic) at 2206UTC. His QRP contacts at 2W include HS0JA6GJ (Thailand) at 2316, HV5PUL (Vatican State) at 1133, and LU5FF (Argentina) at 2216UTC.

More grass means less time on the air for **Ted Trowell G2HKU** on the Isle of Sheppey in Kent, proving that gardening and Amateur Radio are two hobbies that get in the way of each other! Ted lists a 5W c.w. QRP contact with JH4UYB, while increasing power to 70W brought him contacts with S79GT (Seychelles Islands), at 1500, as well as JA5PL (Japan), 5A1A (Libya) and TF1MMP (Iceland), all at around 1800UTC.

### THE 18 & 21MHz BANDS

On to your 18 and 21MHz band news now and **Carl Mason 2C0VSW** of Skewen in West Glamorgan says that long shifts as a BBC outside broadcast engineer covering the opening of the National Assembly of Wales meant that radio was much curtailed this month. Looks like matters of State come first Carl! He lists just one 2W c.w. contact on the 18MHz band in the form of T77C (Republic of San Marino) at 1619 and a single 3W 21MHz contact with 7X2DG (Algeria) at 1708UTC.

Meanwhile, the ever-intrepid Yeovilian s.s.b. DXer **Don McLean G3NOF** had a bit more time to spare on 18MHz, hooking up with BV4QC (Taiwan), CO8LY (Cuba), ER1M (Moldova), TR8CA (Gabon), FG/JA1WPX/P (Guadeloupe), a string of Japanese stations and 9M6CT (Sabah).

On the 21MHz band he adds A71EM (Qatar), ET3AA (Ethiopia), DU7MHA (Philippines), TI4CF (Costa Rica), YB2LAB (Indonesia), as well as 6W1RB (Senegal), 7J6CC (Japan), 9V1JA (Singapore) and 5H3US (Tanzania).

### THE 24 & 28MHz BANDS

Change was certainly in the air this month for **Ted G2HKU**. Normally a c.w. - only man, he switched to s.s.b. for a few contacts on the 24MHz band, which included 5V7FA (Lome, Togo), P49M (Aruba Island), 5A1A (Libya) and S79YL (Seychelles Islands), all at around 1500, while his 28MHz c.w. list includes LW6DJQ (Argentina) and 5H3RK (Tanzania), again at 1500UTC.

A man who specialises in 28MHz operation is **John Wheeler G0LUE** of Melksham in Wiltshire. He's also an all - s.s.b. operator who, despite the recent drop in conditions on the band, managed to come up with a

pretty impressive list of 28MHz DX, including PU1MMP (Brazil) and VU2SMN (India) both at around 1520, LU9AY (Argentina) at 1200, 8R1Z (Guyana) at 2017, 9J2AM (Kuwait) at 0824 and 4K54GF (Azerbaijan) at 1300UTC.

While operating mobile passing Stonehenge, John also hooked up with CX6DAF (Uruguay) at 1222 and also made a 29MHz n.b.f.m. contact with OD5JY in Lebanon at 1613UTC.

To tie up the ribbons this month, **Carl 2C0VSW** offers 24MHz c.w. contacts with 3B8CF (Mauritius) at 1200 and FG/DL1WPX/P (Guadeloupe) at 1700, while **Sean G4UCJ** mentions 9K2MU (Kuwait) at 1106 and VU3VLH (India) at 0900UTC on the same band. Finally, last but certainly not least, on the 28MHz band **Don G3NOF** hooked up with AP2JZB (Pakistan) and S07UN (Western Sahara) both during mid-afternoon.

### SIGNING OFF

So, despite relatively poor conditions our reporters have been able to dig out some of the good stuff on the bands. Let's hope that by the time you read this, the 'lull' in propagation will be long forgotten!

**THANKS AGAIN TO ALL REPORTERS FOR THEIR HELP AND ASSISTANCE. AS USUAL REPORTS, INFORMATION AND PHOTOGRAPHS BY THE 15TH OF THE MONTH. DETAILS AT THE TOP OF THE COLUMN.**

### FOCAL POINT

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**THIS TIME ROUND, GRAHAM HANKINS G8EMX REMINDS YOU ABOUT "SHUTTLEWORTH '99" AND ALSO BRINGS YOU NEWS ABOUT HOW SOMEONE WENT /P WITH AN ATV SET-UP.**

Perhaps this part should be printed in red ink, because it's a 'Final Notice' to remind you of the **British Amateur TV Club (BATC)** convention and general meeting



on Sunday 8 August at Shuttleworth College, near Bedford.

The BATC organises its convention every two years and this biennial occasion, called "Shuttleworth '99" is far more specialised than a 'normal' rally would be. There will only be a small number of traders - instead, the emphasis will be on practical Amateur Television, so a live ATV relay link through GB3P, the Cambridge 1270MHz repeater, is planned plus ATV to and from Holland.

The provisional plan for the day's lecture stream includes a talk on Programmable Integrated Circuit (PIC) programming by **Brian Kelly GW6BWX** and representatives from the Radio Society of Great Britain (RSCGB) and the Department of Trade and Industry may come along to speak.

The convention will be opened with a 'Keynote Speech' from **BATC Chairman Trevor Brown G8CJS** and will close with an Awards Ceremony to recognise outstanding or long-service contributions to ATV by BATC members.

The Awards Ceremony will be immediately followed by the BATC's Biennial General Meeting (BGM). A small entrance charge may be made to attend the convention, but this will be removed by - or before - the start of the BGM, which has to be available for all BATC members to attend, without charge.

Within the formal business of the BGM will be the election of a committee that will take the BATC into the next millennium - at least one member of the present committee does not wish for re-election, others have to stand down on rotation (but may be willing to be re-elected). But, of course, all committee positions may be contested.

Elections to the committee are only a part of what the Biennial General Meeting is all about. The BATC represents and supports Amateur Television within the broader Amateur Radio hobby and, at present, there are many ATV-related issues

**Fig. 1: An ident page from Coventry 1270MHz ATV Repeater GB3RT, which may soon be moving to a new and better site in Leamington Spa.**

that could be aired at the BGM: the retention of the 430MHz band for ATV; repeater site costs; ways of encouraging more activity; the promotion of ATV contests; the digital prospects for amateurs and 'Any Other Business' can open a 'Pandora's Box' of discussion! "Shuttleworth '99" opens at 10am on Sunday August 8. See the BATC Web site at <http://www.batc.org.uk> for latest details.

### FIXED STATION ATV

Fixed station ATV is reasonably commonplace and so too is ATV/P from various hilltops, but what about ATV/M? The **Kent Television Group (KTG)** runs GB3KT, the 1270MHz ATV repeater and their latest newsletter shows KTG member, **Andrew White G6OLV**, fully walkabout mobile using a camcorder and Solent 1W 1270MHz transmitter attached to the camcorder's tripod socket. Andrew used a home-brew quarter-wave antenna, with a ground plane of unetched p.c.b. and his antenna was weather-protected with a radome made from an inverted ice-cream tub!

A quick reminder now about protocol when using the 144MHz band for ATV talkback. The v.h.f. frequency of 144.750MHz is an **ATV CALLING** channel. When a QSO has been established, stations should find a clear frequency and move off the calling channel. I experienced this problem in Birmingham recently, 144.750MHz was in continuous one-way use by an ATV station working cross-band to 1270MHz. His speech path was 144MHz, the other station was able to use the 6MHz audio sub-carrier on 1270MHz.

### COMPUTER LITERATE?

Have you heard of the phrase

GRAHAM G8EMX IS BRGH WITH HIS ROUND-UP OF ATV NEWS - AND A REMINDER ABOUT "SHUTTLEWORTH '99"

# RadioScene

used to describe people as 'being computer-literate'? I have never been quite certain what it means but I do remember, with some horror, hearing a conversation near the hobby magazines in a newsagent shop. A customer observed: "Well, if folks aren't up with computers soon, they're going to be quite out of the scene".

So, how 'computer-literate' does today's ATV operator need to be? The early home computers, e.g. the Spectrum or BBC, became extensively used for ATV as they were fairly easily programmed in BASIC (Beginner's All-Purpose Symbolic Instruction Code) via the keyboard to produce test cards, text or other graphics. But, vitally, they could be fed into a domestic TV as a monitor, so the computer's direct video output became a vision source for ATV.

Can the PC be used as a vision source for ATV? The screen of a computer monitor uses many more lines than a domestic TV and although QBASIC and 'C' languages are available, the PC is not usually programmed from the keyboard. So, it was with some curiosity that I downloaded a programme called PCATV from the BATIC's software pages on their Web site.

The PCATV generates test cards on the PC monitor, but is as a 'zip' or compressed file when received so it has to be 'unzipped'! Onto the internet (yes, again), find WinZip (trial version) and download. I try to do all these downloads on a weekend, because they take a long time. Click to start the process then walk away and have a cup of tea, to give your eyes a break if not yourself.

'Winzip Download complete' is the eventual message. After auto configuring in Windows 95 I go to 'Unzip' and click on PCWIN which is expanded and installed in my 'ATV' folder. Running PCWIN and selecting a style of test card produces that card, with my callsign and locator, on the monitor screen. All very pretty, but what could I actually do with it? Not a lot - I needed another plug-in card for the computer.

There are cards now available which let you watch broadcast TV on your PC (and yes, you do still need a TV licence). But these same cards

also have a 'TV out' socket, which lets you watch your PC on the TV! And, presumably, transmit that PCWIN testcard on ATV too. When I've bought one of these video cards and tried it, I'll let you know! I'm still not sure if I can be considered as 'computer-literate' or not!

ANYWAY, THAT'S ALL THIS TIME AROUND. HOPE TO SEE YOU ALL AT "SHUTTLEWORTH '99"!

73 Graham

## DATA SCAPE

ROGER COOKE G3LDI

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THIS MONTH ROGER COOKE G3LDI BRINGS YOU SOME MORE INFORMATION ON APRS AND BEACON SITES ON THE INTERNET AND ALSO LOOKS AT THE W9GR DSP-III UNIT.

It's all my fault and I apologise! I changed from Freenet to Freeserve a few months ago and forgot to change it on my template footer, hence the wrong E-mail address was printed on last month's 'Data Scape' column. I did this last month, only to get it wrong!

But worry not, the correct version is now in place, so those of you that sent reams of information, numerous photographs and so on, please could you re-send to the above address.

## AUTOMATIC POSITIONING

In last month's 'Data Scape' column, you might remember that I told you a little bit about Automatic Positioning Reporting System (APRS). It's an excellent application for using orbiting Packet digipeaters such as on the shuttle, MIR space station, AO-16, WO-18, LU-19, IO-26 and AO-27. APRS only requires one Packet for everyone to see each station, compared with the

typical 'Connected' SAREX mode which requires five successful Packets.

Not only does APRS reduce channel loading, but it also capitalises on the most fascinating aspect of the Amateur Radio hobby - and that is the display on a map of the location of those stations.

If everyone simply inserted their 'Lat/Long' or 'Grid Square' as the first characters of their beacon text, everyone within the satellite footprint would see the location of every successful uplink. Similarly, any 144MHz f.m. rig and any TAPR-2 compatible TNC can be used to digipeat APRS Packets via any of the PACSATS.

## EXCELLENT TOOL

I have found that APRS is an excellent tool for plotting the location of a hidden transmitter, balloon, or interfering signal as it has several powerful d.f. tools such as:

- 1). APRS plots the positions and bearing lines of all participating stations, whether mobile or fixed;
- 2). It plots the overlapping signal strength contours for omni-d.f. reports. This technique even plots big black circles for null reports so that you see all the areas where the fox is NOT. This omni technique is very powerful and can locate a jammer to a neighbourhood with no beams or special equipment;
- 3). APRS has a Fade-Circle Search and Rescue technique for single station signal strength location using only an omni antenna;
- 4). Finally, it has optional automatic d.f. interface to Doppler d.f. units for automatic plotting of d.f. bearings.

For tracking known objects that move at known speeds over a known course, such as the runners in a marathon, APRS will 'dead-reckon' objects along the course. This makes it possible to follow the progress of the event without having to strap a tracker to the runners. All Global Positioning Systems (GPS) mobiles are also tracked. This is a tremendous visual aid for net control.

## OTHER FEATURES

Other features which APRS has to offer include the following:

- 1). **Weather Station Reporting** - Automatic display of remote weather station information on the screen;
- 2). **DX Cluster Reporting** - APRS is an ideal tool for the DX Cluster user. Not only is it possible to see all DX spots on the map but, by operating in the monitor only

mode, the overall Packet load on the DX Cluster is reduced. This is a benefit to everyone on the channel;

3). **Internet Access** - With a modified version of APRS, it's possible to telnet into the Internet APRS servers and see hundreds of stations from all over the country, live. Everyone connected can feed their locally heard Packets into the APRServe system and everyone everywhere can see them.

## SEVERAL SITES

You can get your hands on APRS Software from several sites on the Internet. A good starting point is <http://www.aprs.org> (See Fig. 1). APRS is extremely popular in the USA and Canada and is catching on fast in the UK.

Unfortunately, the system gained some bad publicity in the first instance - due mainly to the fact that, in conducting experiments with the system, the input channel to my BBS was used.

This caused problems for my users with the constant beacons being generated and a few tempers were frayed!

However, the problem has now been sorted and the following paragraph regarding a change to the 144MHz bandplan will show that a dedicated channel is now available. This will enable the APRS enthusiasts to set up their own network.

Ian Wade G3NRW has produced a white paper on APRS briefly describing how APRS works and discussing how APRS can go forward in the UK. The white paper can be found on the Internet at: [www.harlington.demon.co.uk/aprs](http://www.harlington.demon.co.uk/aprs)

## BANDPLAN AMENDMENTS

As part of its ongoing review of utilisation of spectrum allocated to digital modes, the RSGB's Data Communications Committee has recognised that the recommended plan for the 144.800-144.990MHz segment should be amended in order to better serve the needs of data users within that band. Due to pressure from various sources, the following has been agreed:

144.800MHz now confirmed as "unconnected nets" UIVIEW APRS, etc.;  
144.825MHz no change (25kHz/9600 bps);  
145.790MHz now confirmed as "special linking" as previously discussed;  
433.800-434.250MHz now data. VERTICAL ONLY in this mini-band. LINKING ONLY



**Fig. 1:** You can get your hands on APRS Software from several sites on the Internet. A good starting point is <http://www.aprs.org>



**Fig. 2:** The title page of a beacons Web site which can be found at: [http://www.taborsoft.com/softstuff/ABW\\_Page.html](http://www.taborsoft.com/softstuff/ABW_Page.html)



**Fig. 3:** The free software which can be found at [http://www.taborsoft.com/softstuff/ABW\\_Page.html](http://www.taborsoft.com/softstuff/ABW_Page.html)



**Fig. 4:** A Web site connected with propagation is <http://www.taborsoft.com/wwizard>

above 434.0MHz. Also, it must be appreciated that the new frequencies are currently only available as site-cleared.

The DCC does not currently plan to reassign 144.975MHz, although by doing so a single additional 12.5kHz channel at 144.9625MHz would become available. Users are, however, asked to recognise that pressures on spectrum within the 144MHz may inevitably result in changes to the use of that channel and it is suggested that no further use of 25kHz channels within the band be planned.

For further information, please either telephone the DCC Chairman on (01494) 432144. FAX: (01494) 728094 or send an E-Mail to: [bandplan@rsgb.org.uk](mailto:bandplan@rsgb.org.uk)

**THE W9GR DSP-III**

Following on from Rob Mannion G3XFD's review of the W9GR DSP-III unit (courtesy of Hands Electronics) in the June Issue of PW, Rob kindly offered me the chance to ascertain how well it would perform in conjunction with my Yaesu FT-1000MP.

I must admit that I thought it was 'gilding the lily' somewhat to expect it to improve the FT-1000 too much, but all the same, I readily agreed. I had considered buying such a unit some years earlier to use on the satellite, Oscar 13 because I had heard that the improvements that such a unit made were astounding, the noise reduction superb, etc. However, I never even tried one, so was very pleased to have the opportunity to do so.

Looking at the unit, it seems rather a large amount of cash for rather a small box but I wired it into the audio line, not expecting too much. I had used audio type filtering in the past with moderate success, but I found that the W9GR DSP-III is a drastic improvement over such a system.

Filtering is a complex subject and obviously cannot be covered here, but it is well worth a read - for example in the ARRL Handbook - where it's extensively

covered and, in fact, this unit is described there too. The use of f.l.r. filters in modern DSP units is commonplace now, they have a constant delay at all frequencies, or a linear phase response, which means that the filter will not introduce phase distortion of the signal - in the field of DSP, this is a crucial requirement. Ringing is also reduced, something that was evident in older filtering systems which detracts from the readability of the signal.

I first used the DSP-III on c.w. and I was pleasantly surprised because it really isn't needed on the FT-1000MP, which has its own internal filtering. However, I could take the bandwidth down to 50Hz and winkle out the weakest stations quite well, after adjusting the filter itself.

Tuning the filters takes a little more practice but is obviously an essential procedure - it's simple to do and should not present anybody with a problem. Tuning is not possible with such a limited bandwidth so the filter has to be switched in after tuning the station in, but this applies to narrow filtering anyway.

I then tried the DSP-III on s.s.b., again, with the Yaesu FT-1000's superb internal filtering it really isn't necessary, but even here it's possible to reduce QRM from the side. The noise reduction is quite impressive too, although the way that this is effected produces a weird effect on the final audio. Once accustomed, the final audio is very acceptable and it becomes almost desirable to use it all the time!

On to Packet now and the same thing as with s.s.b. applies here. The FT-1000MP has a Packet position which offsets the centre of the i.f. passband according to the Packet tone pair that is being used in the TNC.

This is selectable and, once set, the selectivity can be narrowed down to 500Hz. Having set this as normal and then switched in the DSP-III to the Packet position, the received audio certainly seemed sharper.

The h.f. Packet filter uses a 100th order linear phase bandpass filter, if the passband is 1550-1850Hz then 1350Hz and 2050Hz will be attenuated at 65dB - this is very difficult to quantify with h.f. Packet. The same filtering will be used for h.f. SSTV, but I do not use this mode.

However, the same principle applies as we're dealing with an audio bandwidth, this time the passband would be 1075-2350Hz. In this case, 875Hz will be attenuated 70dB and 2550Hz will be attenuated 60dB. If you intend using both modes then you will have to get used to adjusting between them with the BIO switch on the back panel - it's simple to use, however, so it should not present a problem.

The DSP-III also covered RTTY and it does improve the receive capability and again, it depends which tone pair is being used but once set up, using the BIO switch on the DSP-III, it will remain set. Used in conjunction with the RTTY bandpass position AND the 500Hz filter on the FT-1000MP, there was not much other than the required signal!

I would think that, used in conjunction with a transceiver that does not possess too much in the way of filtering, either i.f. or audio, the DSP-III would transform it. Used with my FT-1000MP, I was impressed with its performance and must admit will myself consider buying one!

(A full review of the W9GR DSP-III unit appeared in the June issue of PW, back Issues are

available from the Subscriptions department FOR £2.50 on Tel: (01202) 659930, FAX: (01202) 659950).

**BEACONS**

As you are probably aware, 14.100MHz is an international beacon frequency and should be kept CLEAR at all times for the benefit of everybody. There's also a beacon frequency on 21.150MHz and, of course, numerous beacons on 28MHz.

Beacons can provide an invaluable aid to the DXer and h.f. amateur interested in International communications because checking them can provide useful information before trying to maintain skeds and so on. The title page of a beacons Web site can be seen in Fig. 2. The address of this Web site is: [http://www.taborsoft.com/softstuff/ABW\\_Page.html](http://www.taborsoft.com/softstuff/ABW_Page.html)

Software is available that can be run on the standard PC which can assist in this checking and it is free from the NCDXF site. A visit to this site will provide you with all sorts of information and software. Some of it is free and some of it is for sale, so take your choice. The free software displays a world map on the screen and highlights the beacon heard (as in Fig. 3). It's possible to connect the PC to the transceiver to produce an automatic system.

There's also a list of programs on the Internet which are connected with propagation, some are free and some are for sale. Another page from this site - <http://www.taborsoft.com/wwizard> - is shown in Fig. 4. shows the Northern California DX Foundation's (NCDXF's) logo as seen at <http://www.ncdxf.org/beacon.htm> It's well worth a visit and is a must for the serious h.f. operator. The URL is [www.ncdxf.org](http://www.ncdxf.org)

**THAT'S ALL FROM ME THIS MONTH. UNTIL THE NEXT TIME ...**

*73 Roger*



**Fig. 5:** Northern California DX Foundation's (NCDXF's) logo as seen at <http://www.ncdxf.org/beacon.htm>

# RadioScene

## BROADCAST

REPORTS AND INFORMATION TO ME PLEASE:

PETER SHORE  
C/O PW EDITORIAL OFFICES  
ARROWSMITH COURT  
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THIS MONTH PETER SHORE CONTINUES HIS REPORTS FROM THE BALKANS AND FINISHES UP WITH SOME FREQUENCY NEWS AND AN ESSENTIAL BOOK FOR THE BRITISH BROADCAST STATION ENTHUSIAST.

For the third month, my 'Broadcast' column starts with news from the Balkans. As I write, NATO's campaign against the Milosevic regime continues as does the exodus of refugees from Kosovo.

The NATO alliance has targeted broadcasting installations across Serbia, including Radio Yugoslavia's short wave sites. However, at the end of May, as this column went to press, it was still possible to hear Radio Yugoslavia in Europe.

Some of the transmissions have become less than regular and the signal strength is often poor due perhaps to a combination of attacks on the transmitter sites and on Serbian power supplies. Here's the latest schedule that I have (all times are in UTC):

1800-1830 on 6.10MHz in Russian  
1830-1900 on 7.23MHz in Serbian  
1900-1930 on 7.22MHz in Spanish  
1930-2000 on 6.10MHz in Serbian  
2000-2030 on 6.10MHz in German  
2030-2100 on 6.185MHz in French  
2100-2130 on 6.185MHz in English  
2130-2200 on 6.185MHz in Serbian

Radio Yugoslavia still has a presence on the Internet, but the URL has changed from [www.beograd.com/radioyu/](http://www.beograd.com/radioyu/) to <http://62.229.99.175> There's RealAudio in English and the other languages which the station broadcasts.

The Serbian television service, RTS, has been removed from the Eutelsat satellite across Europe and at the meeting of Eutelsat's owners - principally Europe's state telephone companies in Cardiff in May - it was decided that it's inappropriate for Eutelsat to continue to relay what NATO believes is propaganda from Belgrade. The Belgrade administration has protested, but this is unlikely to cause a reversal of the decision.

### INCREASED OUTPUT

As I reported in last month's column, broadcasters across Europe and further afield have increased their output directed towards the former Yugoslavia and the latest additions come from the Voice of Russia and Radio France Internationale.

Voice of Russia has expanded its Serbian programmes from one and a half hours a day to four hours and 50 minutes. Radio France Internationale has introduced

new Albanian language programming at 0530UTC on 7.28 and 9.805MHz and increased its 'lifeline' broadcasts to Albanian-speaking Kosovo refugees. There's a weekdays-only broadcast at 1010UTC on 11.67 and 15.155MHz. Serbo-Croat has an extra 30 minutes at 0500 on 9.805 and 11.975MHz.

In other parts of the world, the broadcasting bands continue to be as interesting as ever. In the Caribbean, Radio Marti is using more short wave to reach Cuba. This seems to be in response to increased jamming of the American-run station.

According to the Radio Marti Web site, Radio Marti programmes offer listeners an uncensored, comprehensive and balanced perspective on current events. In sharp contrast to the Cuban media.

Channel Africa has increased its output this season although its coverage is still limited to Africa, officially, you can receive some broadcasts in Europe, so here's the current schedule (all times are in UTC):

0300-0325 on 5.955MHz in English  
0300-0325 on 6.15MHz in Swahili  
0330-0355 on 5.955MHz in French  
0400-0430 on 9.525MHz in English  
0430-0455 on 9.525MHz in French  
0430-0455 on 3.345 and 5.955MHz in Portuguese  
0500-0530 on 11.72MHz in English  
0530-0555 on 11.72MHz in Portuguese  
0600-0630 on 15.215MHz in English  
0630-0655 on 15.215MHz in Portuguese

1300-1455 on 11.90, 17.86, 21.53MHz in English

1500-1525 on 15.545MHz in Swahili  
1500-1530 on 17.87MHz in English  
1530-1555 on 17.87MHz in French  
1600-1630 on 6.15MHz in English  
1600-1630 on 11.90MHz in Swahili  
1630-1655 on 3.345 and 6.15MHz in Portuguese

1700-1730 on 17.86MHz in English  
1730-1755 on 17.86MHz in Portuguese

1800-1830 on 17.87MHz in English  
1830-1855 on 17.87MHz in French

### CLOSER TO HOME

Closer to home, Merlin Network One (MNO) is on the air 24 hours a day in English from London, mainly broadcasting pop music. Merlin Communications International, the company that provides BBC World Service transmission, runs MNO and the service can be heard (all times are in UTC):

0000-0200 on 9.60MHz  
0200-0400 on 9.795MHz  
0400-0500 on 3.985MHz  
0500-0600 on 6.045MHz  
0600-0700 on 6.11MHz  
0700-1600 on 9.915MHz

1600-2000 on 6.175MHz  
2000-2200 on 17.695MHz  
2200-0000 on 11.985MHz

All transmissions come from Merlin's transmitting stations in the UK, except the two hour block at 2000UTC which comes from Radio Canada International's Sackville transmitters and is beamed to Europe. The MNO service is also on Astra.

### MEDITERRANEAN VOICE

The Voice of the Mediterranean has Arabic, English, German, Italian, Japanese and Maltese language programmes made in Malta but relayed from transmitters in Italy and Russia, plus medium wave in Libya on 711kHz. The station has a Web site under construction at <http://www.vom-malta.org.mt> with RealAudio.

English is on the air at: 0500-0600UTC Sunday on 711kHz; 0530-0600UTC Monday-Saturday on 7.155MHz; 0800-0900UTC Sunday on 11.77MHz; 1900-2000UTC Sunday-Thursday on 12.06MHz.

Radio Republik Indonesia is an unusual catch, at least for me. Here's the English-language schedule; let me know if you hear the station: 0100-0200UTC on 9.525MHz; 0800-0900UTC on 9.525MHz; 2000-2100UTC on 15.15MHz.

Radio Bulgaria has English for Europe: 1100-1200UTC on 15.70 and 17.50MHz; 1900-2000UTC on 9.40 and 11.72MHz; 2100-2200UTC on 9.40 and 11.72MHz; 2300-0000UTC on 9.40 and 11.70MHz.

If you have an interest in catching broadcast stations from across Britain, the British DX Club's *Radio Stations in the United Kingdom* is a must. The 16th edition is now available and it details all the stations on the air, listing by frequency and their station name. Frequencies are cross-referenced to show parallel channels and comprehensive data on transmitter sites and powers, postal and E-mail addresses plus telephone and FAX numbers are included.

There's also a special supplementary guide to radio stations in the Irish Republic, including complete details of the new RTE classical music service, 'Lyric FM'. This useful book is available for £3.00 (DM10, US\$5) from the British DX Club, 126 Bargery Road, London SE6 2LR.

THAT'S ALL FOR THIS MONTH, UNTIL NEXT MONTH HERE IN PW, GOOD LISTENING!

73 Peter

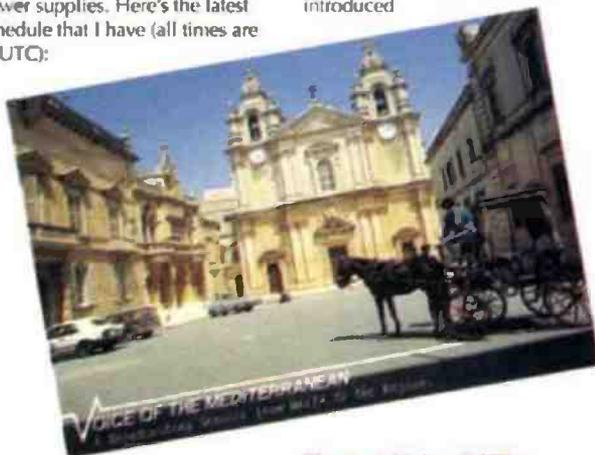


Fig. 1: A Voice Of The Mediterranean QSL Card.

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**18m lattice tower**, £150. 3-element Tn-band J-beam, £100. Tel: Jim MW0ATP (01495) 248899.

**Abandoned project:** Alpha transceiver/receiver, single band, 20m (14MHz) 50V. All info and parts to complete, offers around £150, ring for further details. Tel: Mike GD3JMJ (01494) 01624 832037.

**AKD Target receiver**, £95. Datong FL2 filter, £65. MCL 1100 easy reader decoder with monitor, £175. Tel: John Redfern GW4RZU (01437) 710544.

**Alinco DJ-511**, £50. DJ-C1, £50. DJ-C5, £120. Hora C408, £50. Microset 40W 144MHz linear amplifier, £30. All new, boxed, MFJ-411 code tutor, £40. MFJ-212 Matchmaker, £40. MFJ-1116 distribution board, £25. Tel: Stockport 0161-427 6094.

**Alinco DJ-560 hand-held**, 2m/70cm (144/430MHz) charger, spare battery case, speaker/microphone, car lead, £150 o.n.o. Mono notebook, 2Mb RAM, 60Mb hard drive, charger (battery door catch broken) thermal printer (portable) sheet feeder spare carriage, £95 o.n.o.?? Tel: Maurice GOFUE (01494) 013621 896993. GOFUE@GB7ILH.

**Alinco DX-70**, boxed, manual, mint condition, £400 buyer inspect/collect or pay P&P. Tel: Wiltshire (01672) 564151.

**Altron 9m**, two section mast with base, needs cable, £100. Collins TC-S10 receiver plus p.s.u., good condition, needs restoration, £40. DX-40U transceiver, needs restoration work, £20. HF-225 extras, manual, boxed, £350. Tel: Malcolm (01703) 433749.

**Ameritron AL-811X linear** hardly used, going ORP, boxed, £450, carriage extra. Tel: Dave (01443) 683912.

**AOR 2000 hand-held scanner**, 0-1300MHz c.v., charger NiCads, stand, discone, coaxial cable frequency book, £150 o.v.n.o.; Midland 78-900 CB base station, fully featured, v.g.c., c/w base microphone, rare classic ng, £160 o.v.n.o. Tel: Kevin on Essex (01268) 779191.

**AOR AR-1500 hand-held scanner**, covers 500kHz-1300MHz, no gaps, all modes immaculate, boxed with case, charger, instructions, etc., £140. Timewave DSP-9+ noise filter, boxed, instructions, immaculate, £100. Tel: 0181-391 1145.

**AOR AR-800 plus Mini-Scout**, NiCads chargers, only three months old, under guarantee, £330. Yupiteru 7000, NiCads charger, case, £130. Tel: Ipswich area (01449) 721225, after 5pm.

**Base scanner Pro-2039** s.m.f.m. 68-960MHz with gaps, excellent condition, boxed, manual, antenna, £75, P&P extra at cost. Tel: John G3OAZ (01256) 485128.

**Brand new Epson GT5500** colour image scanner plus manuals, etc., £150 plus P&P or exchange for base scanner or 2m (144MHz) base receiver r/o?? hand-helds. Tel: John (01634) 233058.

**Butternut HF2V vertical antenna** with coils for 30, 40, 80 and 160m (1.8, 3.5, 7 and 10MHz). £35 o.n.o. Tel: (01825) 876133 (near Stockport).

**Collins TC-S10 receiver 46159**, g.w.o., £75. AR77 receiver, £60. Also collection of domestic radios for restoration, £65. Philips super induction receiver 677A, Pilot U357, Pye Cambridge International, etc.. Tel: High Wycombe (01494) 521839.

**Complete disposal of workshop** Test equipment and spare parts, transistors; diodes; resistors; capacitors; valves including storage trays, etc. Some test equipment perfect, some need repair, first reasonable offer secures. Tel: C. Jeffrey on Cornwall (01872) 573373.

**Decoder:** Universal M7000 version 7.2 boxed with manual and guide, 18 modes, excellent performer with Novex 11 inch monitor, may exchange or part exchange for good receiver or sell for £550. Tel: Bournemouth (01202) 430043.

**Diamond SX-600 s.w.r. meter**, 1.8-180 and 140-525MHz, unused, bargain, £75, no offers, with 13.6V meter lamp. Tel: Alan G7CDK on Royston, Herts (01763) 262443.

**Diamond X500 dual-band** collinear, 2m/70cm (144/430MHz), £50. Nollon Nova 4m a.m.f.m., six channels, crystallised??, £35. Tel: Neil G1HSG (01204) 594235 or (0467) 824843.

**Eddystone 1837/2** digital five filters, excellent receiver, £250. Tel: Kent (01797) 361438.

**Fairhaven RD-500VX**, boxed with remote, book, etc., £500. Yupiteru 9000 top quality scanner, boxed, £225. Tandy 2042 with voice box record internally fitted, boxed, £150. DX-392 h.f. receiver, cassette, boxed, £70. Tel: Vic on Stoke-on-Trent (09735) 38502.

**FC-20 a.t.u. for FT-847**, unused, boxed, £150. Icom IC-T42E, 70cm (430MHz) hand-held, speaker, microphone, charger and manual for TS-450/690, £5 plus postage. Tel: Terry on Hitchin (01462) 435248, after 6pm.

**FT-101 h.f. transceiver** fully working, £155. FT-101B h.f. transceiver, working on 80m (3.5MHz), £80. Military sets for

exchange Mk119 German Torn B BC-1000 with p.s.u. Wanted, similar military sets WWII, etc. Tel: Ben (01562) 743253 or E-mail: 106312.1035@compuserve.com

**FT-290 multi-mode**, 2m (144MHz) transceiver with FL-2025 linear mobile mount bracket, gutter mount antenna, p.s.u. and s.w.r. meter, £300 o.n.o. Tel: G7KGM on Swindon (01793) 740786.

**Grundig YB-400 portable radio**, f.m. plus all short wave bands 1.6-30MHz, digital, s.s.b., as new, in box, very little use, £95 o.n.o. or WHY? Tel: Chester (01244) 310267.

**Icom IC-240 2m (144MHz)** mobile transceiver with 12-element, home-brew beam, Slim-Jim and magnetic mount whip antenna. Old radio but works very well. Also power supply 35A, £225. Tel: G4ZTW on New Romney, Kent (01797) 366272.

**Icom IC-4SRE u.h.f. transceiver** wide band receiver, boxed, v.g.c., £80. B40 receiver, £50. Autek research u.h.f. analyst RF5, as new, £150. Tel: Richard G7MJJ (0181) 690 9913, office hours.

**Icom IC-701** six band transceiver, s.s.b./c.w./RTTY, microphone, RM3 remote c.u., wired for linear, matching p.s.u. and speaker, 100W, all manuals and circuits, v.g.c., original boxes, £265. Tel: G3PXV (01783) 844321.

**Icom IC-706 MkII** h.f./v.h.f. (1.8-146MHz) transceiver, mint condition, £650 o.n.o. Watson 25A p.s.u., £70. Welz 0.5-150MHz a.w.r./power meter, £30. Heavy duty coaxial switch, £12. Tel: Jon on Eastbourne (01323) 769649.

**Icom IC-725 h.f. transceiver** with f.m. board, 100W, ideal for new A/B licence, as new condition, boxed, £400. Tel: 0141-885 2022.

**Icom IC-735 h.f. transceiver/receiver**, all filters fitted plus iambic keyer, £550. AH2 a.s.t.u., £350. Trio CS-2070 oscilloscope, 70MHz, £350. Packrat PK232MBX Packet modem, £175. Might consider exchange WHY? Amateur equipment or computers. Tel: G4XPP (01783) 844321.

**Icom IC-735** good condition, g.w.o., with manual, buyer collects, an absolute bargain at £300, no offers please! Tel: East Lincs (01754) 890628.

**Icom R-71E** all mode classic receiver with f.m. board, 0-30MHz, 32 memory channel switch, proper S-meter, good condition, £295 includes carriage. Tel: GWDGHF on Cardiff (01222) 703428.

**JRC NRD-545 DSP receiver**, mint condition, £90. Lake Electronics NRF2 noise reduction filter, £10. Joy Match a.t.u., £10. May exchange

NRD-545 for back lit Rascal 1792 or Plessey PRS-2280. Tel: (01772) 704009, after 6pm.

**Kenwood 570D transceiver**, boxed, unused, £550. Motorola SRBR u.h.f., 460MHz hand-helds, four available, boxed, unused, £95 each. PSU, 25A with meters, fan, boxed, unused. Tel: Graham (01634) 717365, after 6pm.

**Kenwood SP-23 speaker**, 8Ω, cost £70 will sell for £40. Icom IC-202, portable 2m (144MHz) s.s.b./c.w. transceiver, 3W output, 13.6V input, manual, £90. Panasonic multi-band compact radio RF-8650 u.s.b./a.s.b., p.s.u., manual, £60. Tel: Alan near Bury St. Edmunds (01284) 827379.

**Kenwood TH-D79E dual-band hand-held** f.m. transceiver plus accessories, boxed, £220. Datong D-70 Morse Tutor, £25. Tel: Paul M0BCL on Somerset (01823) 661405.

**Kenwood THG-71E** hand-held, dual-band includes speaker, microphone, power-supply, DB770H telescopic antenna, 1999 Calbook, mobile magmount, mint and boxed, ideal for beginner or professional. Tel: Mike Dudley on West Midlands (01384) 233723, after 6pm.

**Kenwood TS-50 transceiver** with Kenwood AT-60 a.t.u., boxed, all manuals, new October 1998, possible part exchange for FRG-8800 or similar, or sell, £800 v.n.o. Tel: Plymouth (01752) 669758.

**Kenwood TS-711A/E** transceiver, 144MHz, all modes, never used, still boxed, voice synthesiser, £400 o.n.o. Tel: Cheltenham (01242) 241499.

**Kenwood TS-790F** 144/430MHz, £900, no offers. Tel: Tony GOCZV (01430) 422657.

**Kenwood TS-940, SP-930, £700**. Kantronics Kamplus, Pactar, RTTY, GTOR, Packet, £120, two 13.6V p.s.u.s, 6/8A, 5/7A, £10 each. AKD h.f. wavemeter, £30. Leader LAC895 h.f. tuner, 80-10m (3.5-28MHz), £15. Tel: Yeovil (01935) 422973.

**KW Viceroy transceiver**, g.w.o., new 6146s fitted, manual, £50, buyer collects. Yeasu UD-844 base microphone matches FST-101ZD, etc., £20. XLP-150 low pass filter, £8 - all plus postage. Tel: (01745) 890646.

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**Lake DTR7**, 40m (7MHz) transceiver/receiver with TU2 MkII a.t.u., £80. Datong FL3 audio filter, £80. Stephen James MkII multi-

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**Marconi TF-2015 signal generator** 10-520MHz, a.m./f.m., £65. Telequipment oscilloscope D83, £75. Kingshill p.s.u. 0-50V twice at 5A, nice but big, £35. All plus carriage or buyer collect. Tel: Ray (01989) 769209, day or (0374) 173333.

**MFJ-784B tunable DSP unit**, absolutely superb, very effective unit, five months old, as new, boxed with manual, bargain at £100 including P&P, no offers. Tel: Mike G4MJA (0191-389) 2822.

**MFJ-901B versa tuner**, new, cost £59, will accept £35. Duplexer model CF-706 for 1.3-56MHz??, 144-3020MHz??, £20. Tel: John (01283) 221870, after 6pm.

**Microwave Modules**, 144MHz BNC converter, 28-30MHz, Lt. m.o.s.f.e.t., 9-15V, £20. Hansen r.m.s. peak reading watt meter, F560m, £25. Spectrum 10m (28MHz) pre-amplifier, r.f. switched, 10-18V, £20. S G Brown 2000G headphones, £15. Tel: Alan near Bury St. Edmunds (01284) 827379.

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**Oscilloscope - model 1707B** dual beam, £60. Multimeter Keithley 179 TRMS digital, v.g.c., £20. Tel: Mr Ken Wood (01827) 895170. Dordon Rd, Dordon, Tamworth B78 10W.

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**Reel-to-reel tape recorders:** Teac A1030, needs slight attention, Brenell Hi-fi tape deck, minor fault. Collaro Studio three motor - deck only, offers. Tel: Huntingdon (01480) 860401.

**Saje SC-40 frequency counter**, £60. MFJ-921 144MHz a.t.u., £30. Comet CD-120 1.8-200MHz, £30. CD-270D 144-525MHz, £30. Diamond SX-40C X-needle p.w.r./s.w.r., £30. AKD WA1/2/3. £15 each SEM Easytune, £15. Tel: Stockport 0161-427 6094.

**Several Betamax video recorders** and tapes including pre-recorded tapes (one stereo machine, rest mono), offers please. Consider swaps for WW2 radio, etc. WHY? Tel: Anthony on Bucks (01908) 373114.

**Shack clearance bargains:** 2m (144MHz) all mode base, nice, £135. Quality 6m (50MHz) transceiver (144MHz drive - 25W output), £115.



# Readers & Their Local Dealers

## We Need Your Help!

Yes...you can help PW to complete a project for the forthcoming Millennium and it could help us to help you get the most from your radio hobby, says the Editor, Rob Mannion G3XFD. Rob says he's hoping to recruit readers to help locate all those 'difficult to get' components and the local dealers who provide them.

**P**roject 2000 is an idea I've been thinking of for some while - and believe it or not the ideas comes directly from readers who have met me on the many 'club visits' I undertake through the year. It's on these occasions that readers - in the general 'chat' sessions that often take place (as we're being locked out of the building by the Caretaker!) tell me about their favourite local shop. Many of these truly local dealers have stocks of components, rare items and other help and advice that - if we don't support them - will soon disappear from the towns they serve, to be replaced by yet another 'take away' or 'Building Society' (for 'Building Society; please read 'bank' or 'financial institution!').

When Project 2000 - with your help - comes to fruition we hope to publish a special directory listing all our regular dealers (and the not-so-well-known services they provide) and every other radio component, service, equipment and otherwise hobby-related dealer we can learn about. In this way our readers will continue to be able to enjoy their hobby and the dealers involved will be provided with the necessary customers to keep them in business. Because without each other - our hobby could be in trouble!

### As Time Goes By

To use the famous cliché: 'As time goes by', radio hobbyists are finding local stockists of components and specialists more difficult to find. Added to this, more and more specialised dealers (many of whom advertise in *PW*) don't have room in their standard advertising to mention the complete range of services they offer. So, what the *PW* team are planning is this - a complete 'Directory' of who the dealers are, where they are, what they do, supply or make, how to contact them and everything you need to help you - the reader and the supplier - at the same time.

We're planning to publish a comprehensive directory to cover England, Ireland Scotland and Wales, Isle of Man, Channel Islands and of course we would be delighted to hear from readers abroad too! So, if you're in Paisley or Plymouth, Birmingham or Belfast, Tralee or Truro we'd like to hear from you. By working together we can 'communicate' our interests and help readers find the dealers they need and assist the trader to find customers.

All you need to do is fill out all the information on the local radio shops you use, on the form laid out below (clean photocopies welcome). Provide all the details you know, and we'll do the rest. You can be sure that we'll produce a directory to help the hobby forge its way into the Millenium. Project 2000 is already on its way - with your help!

Name & Address of Dealer:

Town:

County:

Country:

Telephone & FAX number:

Do they have a Web site?

What specialities do they offer?

(e.g. components, new/used equipment/surplus, 'sale on commission' etc.):

Is a mail order service offered?

Do they publish a list or catalogue of components?

Do they publish a list of second-hand equipment?

What service which they offer do YOU think is their speciality?

(e.g. Servicing, part exchange, antennas, accessories, etc.).

Your comments on what's on offer and anything of special interest you've discovered: (e.g. large stocks of resistors, 'goodybags' of components, variable capacitors, etc. We will then contact the dealer concerned to provide us with a full up-date so, in turn, we can provide the most accurate information as possible. But please bear in mind that some dealers have 'limited stocks' of 'quick turn round' surplus).

Your full name and address:

(Please note that any details provided in the name and address section, along with any special interests) is for the use of Rob Mannion G3XFD and the Editorial team only in preparing the directory. You have G3XFD's personal assurance that none of the information (your address, etc., will be passed to a third party for any purposes other than that stated).

Interests:

Suggestions for information to be included in directory:

Thank you for your help. Please ensure that any help you can provide is sent (by Wednesday September 1) to: Rob Mannion G3XFD, Editor *Practical Wireless*, Project 2000 'Freepost', Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW, United Kingdom. (Unfortunately, the 'Freepost' facility is not available from addresses outside the UK, but we'll still be pleased to hear from you and would appreciate to receive your information).

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Alinco DR-M06T 6m FM Mobile 10W CTCSS £159  
Kenwood TM-251E 2m FM Mobile 50W £269  
Kenwood TM-451E 70cm FM Mobile 35W 2m RX, Full Duplex £299  
Kenwood TS-711E 2m All Mode Base Transceiver 25W mains £549  
MFJ MFJ-9406 6m SSB Transceiver 10W 12V with CW Option £199  
Yaesu FT-225RD 2m All Mode Base 25W with Mute/Mains/12V £549  
Yaesu FT-290R II 2m All Mode Portable 2.5W £299  
Yaesu FT-790R II 70cm All Mode Portable 2.5W £269  
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ADI AT-600 2m,70cm FM H/Hand, Wide RX, Full Duplex £175  
Alinco DJ-180 2m FM H/Hand with sp.mic, DC lead, Batt box £135  
Alinco DJ-580 x2 2m/70cm FM H/Hand £175  
Alinco DJ-F1E x2 2m FM Mini H/Hand £99  
Alinco DJ-S11 2m FM Palm Transceiver with 136-174MHz RX £69  
Hera C-408 70cm FM Micro Transceiver (2 x AA batteries) £65  
Icom IC-2E 2m FM H/Hand £95  
Icom IC-2SE 2m FM Mini H/Hand with Battery box, Case £109  
Icom IC-24ET 2m/70cm FM H/Hand £179  
Icom IC-W2E 2m/70cm FM H/Hand (with sp. mic) £199  
Icom IC-W32E 2m/70cm FM H/Hand with Full Duplex £229  
Kenwood TH-28E 2m FM H/Hand £199  
Kenwood TH-42E 70cm FM H/Hand £189  
Kenwood TH-46E 70cm FM H/Hand £199  
Standard C-520 2m,70cm FM with Full Duplex, Batt. box £185  
Standard C-558 2m/70cm FM Handheld £299  
Yaesu FT-50R 2m/70cm FM Dual Display Wide RX £179  
Yaesu FT-51R x3 2m/70cm FM Dual Display Wide RX 80Ch £249  
Yaesu FT-209R 2m FM H/Hand £95  
Yaesu FT-470R x3 2m/70cm FM H/Hand with Dual Display £189  
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Realistic Pro-2006 25-520,760-1300MHz AM,FM,WFM 400Ch. £175  
Realistic Pro-2014 68-512MHz (with gaps) FM Receiver 50Ch. 12V £85  
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AOR AR-8000 500MHz-1300MHz All Mode 1000Ch. with PC unit £279  
Icom IC-R1A3 0.1-1300MHz AM,FM,WFM £199  
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Yupiter MVT-7100 Handheld scanner £150  
MVT-7000 Handheld scanner £125  
Drake RSE HF Receiver £495  
Lowe HF-150 HF Receiver £195  
HF-225 HF Rx + FM, sync ANT £295 \*  
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# Book Store



**BOOK OF THE MONTH**

## Basic Radio - Principles & Technology

This month's 'Book Of The Month' comes from the stores of Newnes and is written by *Practical Wireless*' very own 'What Is A?' author, **Ian Poole G3WYX**.

In this book, *Basic Radio*, Ian G3WYX says that he has assumed that the reader already has a basic knowledge of electronics and "... aims then to provide an introduction for future radio engineers and should be useful to those on BTEC and similar courses as well as Radio Amateurs wanting to deepen their knowledge of the topic".

With chapters such as: 'Capacitors, inductors and filters'; 'Modulation'; 'Receivers'; 'Transmitters'; 'Antenna systems'; 'Broadcasting'; 'Satellites' and 'Personal communications', *Basic Radio* covers a wide range of necessities.

For this month only, you can order *Basic Radio - Principles & Technology* from the PW Book Store for a special price of **£12.74 including P&P** (UK only, £2 P&P for overseas orders). This is 15% off the usual price of £14.99. But hurry, offer closes **31 August 1999**.

To order please either use the form on page 82 or call the Credit Card Hotline on (01202) 659930 and quote PWB.

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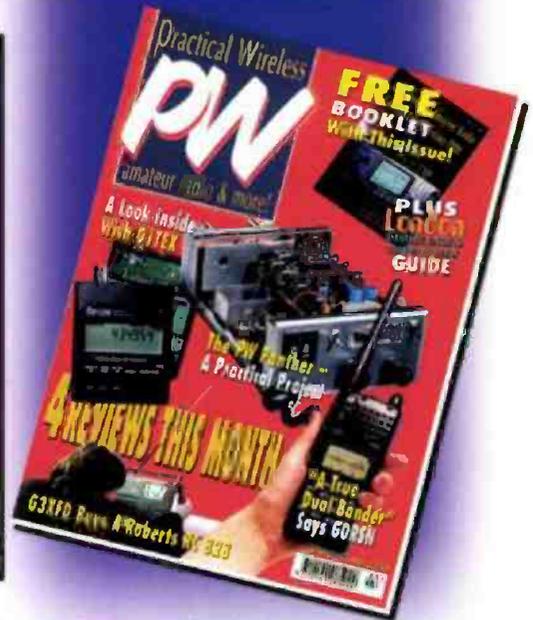
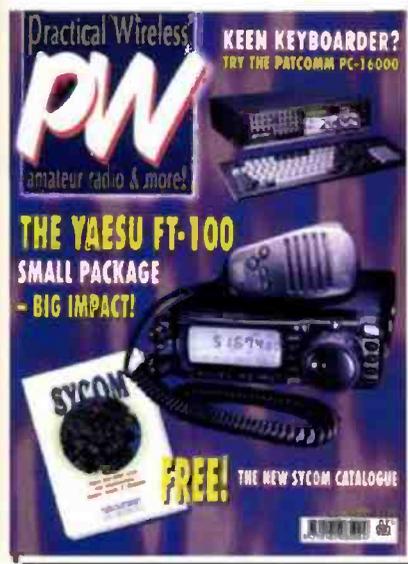
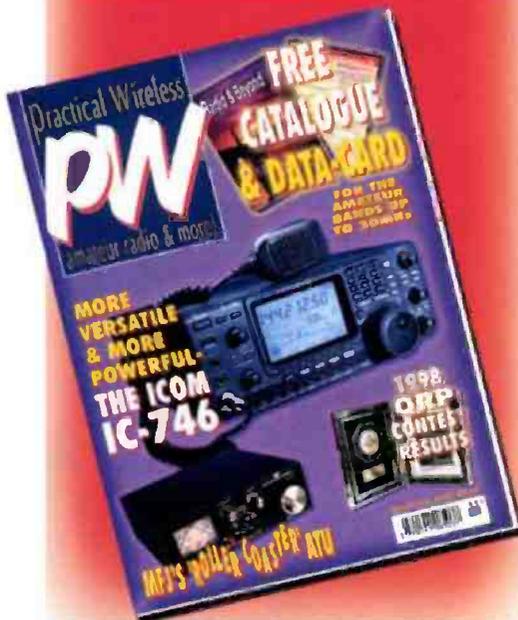
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# All Mode HF Transceiver FT-1000MP



The year was 1956. Electronic communication throughout the world was on the threshold of significant and remarkable change. Intrigued by the development of single-sideband radio theory, a young engineer and amateur radio experimenter painstakingly assembled an SSB transmitter. Word of his successful efforts spread quickly among his friends, and soon radio amateurs from all over the country were requesting transmitters just like it. Thus was born the first invention of JA1MP, founder of Yaesu. Though his key is now silent, in tribute to his leadership and exceptional contributions to the radio art, the FT-1000MP carries the memory of his call sign.

## An HF Masterpiece, Combining the Best of Digital and RF design technology. The FT-1000MP.



### Specifications

- EDSP (Enhanced Digital Signal Processing)
- Shuttle-jog Rapid Tuning Enhancement
- Directional Tuning Scale for CW/Digital mode and clarifier offset display
- Dual In-Band Receive w/ Separate S-Meters
- Selectable Antenna Jacks
- Collins SSB Mechanical Filter built-in, 500 Hz CW Collins filter plug-in, optional
- Selectable Cascaded Crystal and Mechanical IF Filtering (2nd and 3rd IF Filters)
- User-Programmable Tuning Steps w/0.625 Hz High Resolution Low-Noise DDS Circuit
- Custom Feature Set-up via New Menu System
- Adjustable TX Output Power: 5-100W(5-25W AM)
- True Base Station: Both 100-117 or 200-234 ± VAC 10% 50/60 Hz and 13.5 VDC Power Inputs

Blending digital and RF technology, the FT-1000MP features a Yaesu exclusive: Enhanced Digital Signal Processing (EDSP). Beginning on the receive side with Yaesu's industry-standard high-intercept front end design, the RF signal is then fed to the IF stages, where an impressive array of 8.2 MHz and 455 kHz IF filters (including a built-in Collins SSB Mechanical Filter) establish the tight shape factor so important in obtaining high dynamic range and low noise figure. Finally, the EDSP system provides specially-designed filter selections and response contours for maximum intelligence recovery.

Only with this combination of EDSP, independently selectable 8.2 MHz and 455 kHz IF filters, and a low-noise DDS local oscillator system can receiver performance without compromise be obtained. You can customize your FT-1000MP by choosing from 20 kHz, 500 Hz, and 250 Hz optional, cascaded IF filters, then zero in on weak signals using Yaesu's exclusive Shuttle-jog Rapid Tuning Enhancement and high-resolution (0.625 Hz) DDS VFO. Without question, the FT-1000MP is the most technologically advanced HF rig today.

**EDSP** operates in both transmit and receive modes. On receive, the EDSP produces enhanced signal-to-noise ratio and significantly improved intelligence recovery during difficult situations involving noise and/or interference. The result of hundreds of hours of laboratory and real-world experimentation, EDSP's 4 preset random noise reduction protocols and 4 digital filtering selections are controlled by easy-to-use concentric controls on the front panel of the transceiver. High, low, and mid-range cuts for voice work are teamed with razor-sharp CW bandwidth filters and an automatic notch filter which identifies and attenuates undesired carriers or heterodynes. Also operational in the transmit mode, EDSP provides 4 performance-enhancement pattern selections for different operating circumstances, ensuring best readability of your signal on the other end of the path.

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