

THE UK'S BEST SELLING MAGAZINE FOR AMATEUR RADIO ENTHUSIASTS

practical

AUGUST 1997 £2.20

Wireless

3 REVIEWS!



"An Absolute Cracker"
GOSKR Reviews The AT-600 Dual-Bander

"In A Class Of Its Own"
G3XFD Reviews The
Yaesu FT-920



**"How To
Improve On
Excellence"**

IC-706 Owner GORSN
Tries The New MkII





Waters & Stanton

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TOP HF Seller ICOM IC-706 MK II



W&S
£999

£1097 inc 5yr Wtty.

160-6m 100W 2m 25W + + +

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

TOP 2m/70cm Mobile Yaesu FT-8100R



W&S
£429

£467 inc 3yr Wtty.

Yaesu's new dual band mobile makes the competition look old and out-dated. Now you can buy a rig ready equipped with 12.5kHz and 25kHz filtering. You get a detachable head, 300 memories, true dual same band rx, CTCSS encode and the best display in the business.

TOP 2m/70cm Handy

W&S
£279

ADI AT-600

£314 inc 3yr Wtty.

**Reviewed
This Month!**

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

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



Mobile FM Rigs

Our best selling 2m Mobile



W&S
£249

AR-146 2m 50W

Both rigs feature:

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

With CTCSS AR-446 70cm 35W



W&S
£269

3W Novice version available

ADI AT-200 2m FM Handy

W&S
£129



Lowest UK Price!

- 2m FM Handy
- 2.5W output
- 5W on 13.8v
- 1750Hz tone
- Illuminated keypad
- Ultra sensitive Wideband Rx
- 20 memories
- Keypad entry
- DTMF
- Uses AA cells

This has proved to be our most reliable handheld. It has a very sensitive receiver and is built to professional standards.

ADI AT-400 70cm FM Handy

W&S
£169



The Novice Rig

- 70cm FM Handy
- 2W output
- 5W on 13.8v
- 1750Hz tone
- Illuminated keypad
- Ultra sensitive Wideband Rx
- 20 memories
- Keypad entry
- DTMF
- Uses AA cells

This has become the standard radio for Novice hams. Its sensitive, cost effective and was featured on Anglia.

WS-1000 Amazing Scanner

Aug. Special

£229.95



- World's smallest scanner
- FM, WFM, & AM
- 500kHz - 1300MHz
- Fast scanning speed
- Clear LCD readout
- 400 Memories
- Super sensitivity
- Good strong signal handling
- Runs from just 2 x AA cells
- Battery saving mode

Yaesu FT-50R 2m/70cms



OFFER

W&S
£249

Lowest UK Price!

- Wideband Rx (AM Airband)
- FM Broadcast receive
- CTCSS & 1750Hz
- 112 Alphanumeric Memories
- Dual Watch - Military rated
- 5W from 12v DC input
- Ni-cads and AC Charger
- One of our top 5 sellers!

CT-30 Mic Adaptor -----£9.00
CSC-69 Case (FNB-40 batt) --£15.00

Yaesu All-Mode Portables



W&S
£389!

FM - SSB - CW The most cost effective way onto the bands. Now with our new low prices you can enjoy 6m, 2m and 70cm DX. More Power? Add a linear!

FT-690R2 6m All mode £399
FT-290R2 2m All mode £389
FT-790R2 70cm All mode £499

GARMIN GPS

GPS-II

W&S
£189

Ideal for dashboard or handheld use. The display rotates to suit. Has flip-up detachable BNC antenna, 24 hours batt life (4xAAA), and stores up to 250 waypoints.



W&S
£229

GPS-I2XL

The best specified handheld that is an absolute bargain at our price. 500 waypoints an unlimited speed up to 999 knots makes it ideal for air and car use. It has ultra fast acquisition and a mini coax socket for external antenna connection.

GPS-150 Ant.

Active magnetic antenna, 5m of coax cable, BNC plug. Matches all GPS with BNC socket.



VHF & UHF Band Pass Filters

2m & 70cm Digital Communications

NO MORE PAGER PROBLEMS
We guarantee this will kill all QRM caused by strong out of band signals --- or your money back!

DCI-145 £89.95 Passband: 144 - 146MHz Loss: Less than 1 dB Selectivity: -68dB at 136MHz -55dB at 155MHz Power: 200 Watts	DCI-435 £119.95 Passband: 430 - 440MHz Loss: Less than 1 dB Selectivity: -47dB at 415MHz -50dB at 455MHz Power: 200 Watts
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ICOM IC-207H 2m/70cm Mobile



W&S
£389.95

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

NEW KENWOOD RIG



W&S
£585

TM-V7E

- * 144 & 430MHz 50/35W
- * Dual Rx on same band!
- * 280 Memories
- * Detachable front head
- * CTCSS & 1750Hz Tone
- * Large clear display

Kenwood 2m All Mode



Save £300

W&S
£699

TM-255E

Mirage Amplifier B-5016



W&S
£329

160W

- * 144 - 148MHz FM & SSB
- * 160W output for 40 - 50W input
- * GaAsFET switchable pre-amp
- * RF sensing with adjustable SSB delay
- * VSWR and temperature protected
- * 13.8v at 25 Amps peak

Mirage Amplifier B-2516



W&S
£329

160W

- * 144 - 148MHz FM & SSB
- * 160W output for 10 - 25W input
- * GaAsFET switchable pre-amp
- * RF sensing with adjustable SSB delay
- * VSWR and temperature protected
- * 13.8v at 25 Amps peak

Mirage Amplifier B-5030



W&S
£749

300W

- * 144 - 148MHz FM & SSB
- * 300W output for 40 - 50W input
- * GaAsFET switchable pre-amp
- * RF sensing with adjustable SSB delay
- * VSWR and temperature protected
- * 13.8v at 48 Amps peak

We are now ISO 9002 Registered



At Waters and Stanton we are always working towards improving our service to customers. This means running an efficient and well organised company with a professional service department. We are the first UK amateur radio retailer to achieve ISO 9002. So when our competitors refer to themselves as "UK's number one" or "Europe's leading dealer," ask yourself, who's kidding who?

W-MM1 Multimode Modem



W&S
£69.95

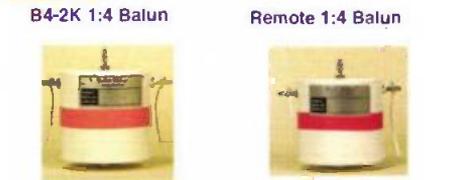
NEW

- * Packet, AMTOR, CW
- * SSTV, Fax, RTTY
- * NAVTEX, SYNOP
- * Transmit and receive
- * Needs PC 286 or better
- * Includes software
- * No external power required
- * Connects to RS-232

Radio Works Baluns

B1-2K 1:1 Balun
Rugged 1.5kW covering 3.5-30MHz at 50 Ohms. Fitted SO-239 and eye bolt fasteners. **£25.95**

Line Isolator
Isolates rf on the coax line, preventing it from travelling beyond isolator and into the shack. 3kW 3.5-30MHz **£25.95**



B4-2K 1:4 Balun
Ideal for Delta Loops, folded dipoles etc. Rated at 1.5kW 3.5-30MHz **£32.95**

Remote 1:4 Balun
Balun designed for outside use such as ladder line to coax applications. **£49.95**

Radio Works Carolina Windoms

WARNING
One of our competitors has been advertising these antennas suggesting that an ATU is not necessary. **THIS IS WRONG.** Had they read the data sheet issued by the manufacturers they would have known! The antennas do, however, give significant DX gain - trust us to get it right!

CW-160	160-10m 264ft long	£109.95
CW-80	80-10m 132ft long	£84.95
CW-40	40 - 10m 66ft long	£82.95

TONNA Antennas - Perform!

Balun matched excellent gain and VSWR. The favourite of the contest groups. Mount horizontal or vertical.

August Offer:
20505 5 EI 50MHz
£86.95 £79 carr. £4
Just a small selection!

2 Metres		20921	21 EI. 18dB	£69.95	
20804	4 EI. 8dB	£44.95	23 cms		
20809	9 EI. 13dB	£52.95	20623	23 EI. 18dB £51.95	
20811	11 EI. 14dB	£79.95	20635	35 EI. 20dB £61.95	
20817	17 EI. 15dB	£97.95	20655	55 EI. 21.5dB £65.95	
70cms		20696	4 x 23 EI. kit	£319.95	
20909	9 EI. 8dB	£45.95	20666	4 x 55 EI. kit	£419.95
20919	19 EI. 16dB	£53.95	Full range of splitters etc. Phone		

TOP HF Base Station

NEW Yaesu FT-920



Price Match

W&S
£1449

The new FT-920 has been released and offers some great features at a great price. 1.8MHz to 54MHz plus wideband receive, 33 MPS Digital signal processor, Digital IF shift, Auto notch filter, Dual VFOs, 100 Memories, Band Stacking VFO system, Break-in CW with electronic keyer, TNC interfacing, Digital voice recorder, 13.8v DC operation.

Yaesu FT-1000MP



Price Match

W&S
£1979

5 Year Warranty on FT-1000MPs £115

FT-1000MP	£2849	£2129
FT-1000MPDC	£2599	£1979

ICOM IC-756 HF Rig



Price Match

W&S
£1849

- * 100W of pure Magic
- * 160 - 6M
- * SSB - CW - AM - FM
- * Spectrum display
- * Auto ATU
- * Superb DSP built-in
- * CW Memory keyer
- * 100% duty cycle
- * Keypad entry option
- * DXers choice in the USA

KENWOOD HF RIGS



NEW TS-570

W&S
£1289

Filters SSB & CW **£57.95** each.
Kenwoods new transceiver that is earning a reputation for offering one of the best receivers in the business. If you are looking for a hot little number that is not too expensive (Radio we mean!), send for brochure.

TOP VHF Base Station

ICOM IC-821H 2m/70cm



Price Match

W&S
£1349

- * 2m/70cm All Mode
- * 45/40W adjustable
- * Full duplex
- * Satellite features
- * 160 Memories
- * 9600bps capability
- * Electronic keyer
- * IF shift, noise blanker

Yaesu FT-736DC 2m/70cm



NEW

W&S
£1199*

Offers even better value.

Requires 10 Amp supply. * Price subject to confirmation

MFJ

Ham Radio Accessories

ORDERS ONLY ON: FREEPHONE 0500 73 73 88

MFJ-784B Filter



- Works with any rx. or tcvr.
- DSP filter, fully programmable
- 16 Factory pre-sets
- Plugs directly into audio out
- Drives speaker or headset
- Requires 12v at approx 500mA

MFJ-948 HF ATU



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

MFJ-949 HF ATU



- 160 to 10m 300W PEP 150W CW
- Wire, coax or balanced feed
- Built-in Dummy Load
- 30 / 300W power meter - PEP / RMS
- Antenna selector, by-pass etc.

MFJ-9406 6M Trancvr.



- 50 - 50.3MHz 10W SSB
- RF speech processing
- 10MHz xtal filter
- Super performance
- Ideal way to 6M DXing

MFJ-259 HF Analyser



- 1.8MHz - 170MHz
 - Digital Readout
 - Resonance
 - VSWR
 - Impedance
 - AA batteries or 12v external
- Connect to aerial or coax and adjust it in seconds. Turns hours into minutes and ideas into antennas!

MFJ-1278DSPX Data Unit



- Multi-mode
- Packet
- Amtor
- Pactor
- Colour SSTV
- 10 Modes total
- DSP filtering
- Tuning scope
- Simple to us
- Software

Windows Software



Just arrived, the latest Windows Software for MFJ TNCs and Multimode modems. Now you can operate in a familiar environment with much improved software.

- MFJ-1286W TNC software £36.95
 - MFJ-1289W Multimode software £63.95
- All supplied on 3.5" size discs.

MFJ-781 DSP Filter



- Digital Audio Filter
- CW 50, 100, 200, 500Hz
- Amtor, fax, GTOR, PACTOR
- RTTY, SSTV, We-FAX

MFJ-914 Auto Match



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

MFJ-906 VSWR / ATU



- 50MHz - 54MHz
- ATU and VSWR power meter
- Matches all coax systems
- 100W CW/FM 200W SSB
- Tuner by-pass - SO-239 sockets
- Size 203 x 63 x 76cm

Ameritron 811 1kW

Price Down!



The only currently available HF linear to have passed a full lab. CE test

- 1 kW linear 9dB Gain
- Like a 5 element Monobander!
- Uses low cost 811A tubes
- Built-in rugged AC Supply
- Instant by-pass switch
- PA V/A meter + Grid meter
- Over rated variable capacitors
- Fan cooled for long life
- Very efficient - 600W output
- Easy to tune and connect
- Size 16" x 13.75" x 8"

160 to 10M of DX-Getting Power
Perfectly matches all 100W rigs

MFJ-441 Keyer



- 2 - 65 WPM - suits all transceivers
- Adjustable tone, volume and weight
- Semi-auto, auto and lmbic
- 37 character memory
- Use AA cells or external 12v
- 105 x 88 x 35mm approx

MFJ-941E Atu



- 160m to 10m ATU - 300W
- Wires, Coax and Balanced Feed
- Cross Needle VSWR & Power
- 3-Way antenna selector
- By-pass position - Dummy load socket
- Internal Balun - 30 or 300W position
- 260 x 180 x 70mm

MFJ-250X 1kW load



- 1kW Dummy Load
- Oil cooled design
- SO-239 socket
- Ideal for linears
- 1MHz to 400MHz
- Oil not supplied

MFJ-260C 300W



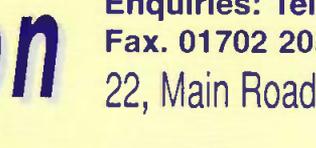
- Dummy Load
- 50 Ohm
- 300W
- OK to 450MHz
- Air cooled
- SO-239
- Totally enclosed
- Essential item

MFJ-702 LPF Filter



- Low pass filter 1.8MHz - 30MHz
- 200 W pep - 50dB down at 54MHz
- Loss less than 0.5dB
- SO-239 size 150 x 25 x 38cm approx

MFJ-840 Handy Meter



- 144 - 146MHz
- 0 - 5 Watts
- BNC Handheld fitting
- Reads power out

MFJ-418 CW Tutor

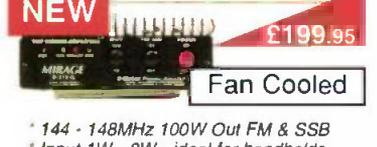


"It's an Amazing Idea!"

The Morse Tutor that has taken America by storm. Listen to carefully structured code practice or listen to actual QSOs - and they never seem to be the same - GREAT!!!

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

Mirage 100W 2m Amp



- 144 - 148MHz 100W Out FM & SSB
- Input 1W - 8W - ideal for handhelds
- GaAsFET switchable pre-amp
- RF sensing with 1 sec delay on SSB
- Supply - 13.8V at 15Amps approx

Mirage 160W 2m Amp



- 144 - 148MHz FM & SSB 160W out
- 40-50W input - ideal for modern FM rigs!
- GaAsFET switchable pre-amp + lo-high
- RF sensing - Adjustable SSB delay
- VSWR & temp. protected
- Supply - 13.8v at 25 Amps approx

MFJ-219 70cm Meter



- 420 - 450MHz Ant Analyser
- "N" or SO-239 version
- Measure VSWR & Resonance
- Uses AA cells
- Ext. socket for freq. counter
- Adjust ant. on site quickly
- 188 x 60 x 54mm

Waters & Stanton

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Fax. 01702 205843
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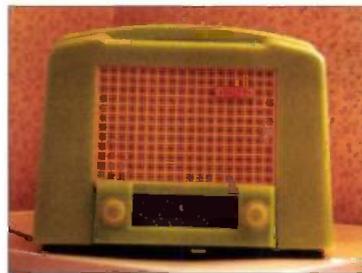
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ICOM

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YAESU

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★ Telex Hygain ★ And many more.

Call our sales teams now for advice and prices on any equipment from these manufacturers.

We will match any authorised dealers price.

DATA PRODUCTS

We now have the widest range of data products in the UK, and with our specialist knowledge of the products we must be by far the number one choice for packet equipment.

PacComm

Tiny 2	1200 baud TNC.....	£139
PicoPacket	12 baud portable TNC	£119
Spirit 2	9600 baud TNC	£219

Kantronics

KPC3	1200 baud TNC.....	£139
KPC9612	1200+9600 dual port TNC	£275
Kam+	Multimode data modem.....	£395

AEA

PK12	1200 baud TNC.....	£129
PK96	9600 baud TNC.....	£219
PK232/MBX	Multimode data modem.....	£319
*DSP232	Multimode data modem.....	£479
*PK900	Multimode data modem.....	£479

Symek

TNC2H	9600 baud TNC.....	£179
-------	--------------------	------

BayCom Modems

USCC 4 port plug in card W/O Modems	£107
-------------------------------------------	------

Modems

1200 baud Plug in for USCC.....	£39
---------------------------------	-----

COMET STATION ACCESSORIES

CF-706	1.3-56 MHz/75-320MHz duplexer for CA-HV or similar	£39.00
CF-30MR	HF Low Pass Filter 1kW PEP	£43.95
CF-50MR	6M Low Pass Filter 1kW PEP	£43.95
CF-30H	HF Low Pass Filter 2kW PEP	£69.00
CF-30S	HF Low Pass Filter 150W PEP	£25.00
CF-50S	6M Low Pass Filter 150W PEP	£25.00
CF-BPF2	2M Band Pass Filter 150W PEP	£49.95

CA-28HR	28MHz Mobile Whip	£46.00
HR-50	6M MOBILE Whip	£46.00
CA-50HR	50MHz Mobile Whip	£46.00
B-10	2M/70CM Mobile Whip	£21.50
B-22M	2m/70CM Mobile Whip	£44.95
CA-258	2m/6m Mobile Whip.....	£29.00
CA-350dB	6M/10M Base Collinear	£149.00
ABC23	3 x% Base Collinear	£55.00
GP9N	2M/70CM Base Collinear	£135.00
GP15N	6M/2M/70CM Base Collinear.....	£99.00
GP95	2M/70CM/23CM Base Collinear	£119.00

COMET ANTENNAS

CA-HV	HF/VHF Mobile Whip 7-14-21-28-50-144 * IDEAL FOR IC-706!!*	£89.00
HR-7	7MHZ Mobile Whip	£46.00
CA-14HR	14MHZ Mobile Whip	£46.00
HR-21	21MHZ Mobile Whip	£46.00

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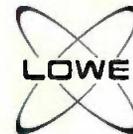
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EDITOR'S Keylines

Rob Mannion's viewpoint on the World of Amateur Radio

I'm starting off this month's 'Keylines' with a request to a Welsh reader to get in contact with me. I'm hoping that he or someone who recognises the following description will pass the message on so I can re-establish contact with him!

The reader involved lives in South Wales and we have met on many occasions at the major shows and rallies. Knowing of the technical problems involved with our (extremely unfortunate) published errors (not the author's) with the 'Locking The Robin To Droitwich' project (a further extension of facilities for the deservedly popular Robin Frequency Counter designed by Mike Rowe G8JVE) I've asked him to write on his own experiences for the benefit of readers.

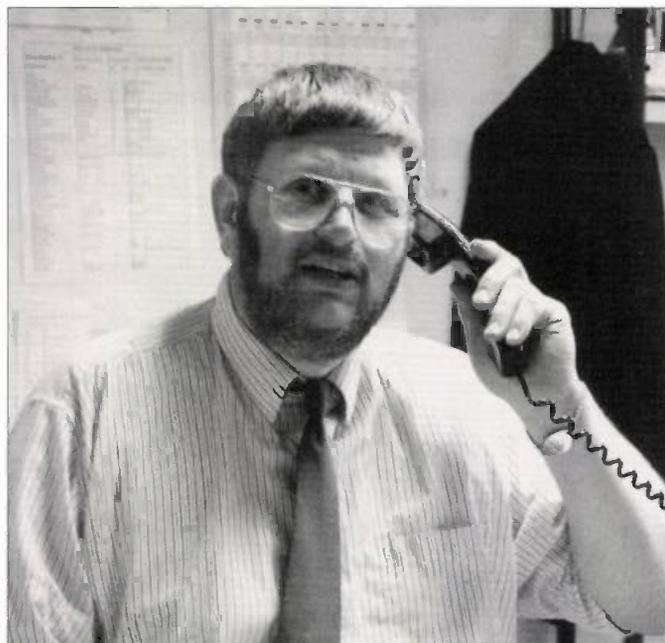
Unfortunately though....I have lost contact with the reader who is I believe a GW8. Can you help? Do you know the keen home constructor in the Carliff/Swansea area who may have chatted to you about sorting out the problems on the Robin? If you do know him I would be extremely grateful if you could ask the gentleman concerned to write or to telephone me at the PW office.

Home-Brewing Alive!

While on the subject of building your own radio equipment I'm very pleased to say that 'home-brewing' is apparently very much alive and well! I can say this with some authority because I've found out that my name is really 'Mudd' at a certain Engineering establishment in Lancashire!

I found out just how unpopular my name is at the R. A. Kent Engineering factory (the home of Kent Keys) when I met Bob Kent at the Dayton HamVention in May. There, much to my chagrin (and hidden delight at the response) I found out that the mentioning of the availability of large quantities of very cheap and reasonable components from Kent Keys had resulted in a deluge of orders.

Bob told me that following the mention of the 'bargain bags' of



resistors or capacitors in 'Radio....Discover The Basics' they were absolutely inundated with mail orders, telephone enquiries and readers making their way direct to the factory near Preston.

Keen home-brewers drove from East Yorkshire to the factory to collect bags of components, only to return a few days later with more friends to take advantage of the offer. Extra staff had to be taken on and they were working at weekends to cope with the demand. And one reader in Greece sent a money order and just said "I know the post and packing will be expensive, but just please send me as many bags as you can for the amount enclosed"!

In reality, along with being slightly embarrassed at the effect my mention has had on the Kent Keys team, I'm also feeling very pleased. I'm pleased because it's obvious there are very many keen constructors (and readers planning to have a go for themselves) waiting for opportunities such as the 'Kent Goody Bags'. I'm sure there's a very great future for our hobby and the episode has proved it!

Smaller & Smaller

Over the years, the number of specialist advertisers selling the necessary 'bits & pieces' required

for our hobby has become smaller and smaller. They have either closed down or concentrated on other items. Most of the names I remember from 25 to 30 years ago have gone, or only attend rallies and shows and long term regular 'bits & pieces' advertisers like John Birkett (trading from Lincoln) are now very rare!

And I'm afraid to say that I think that 'standard' sized components are going to become more difficult to find in the future. So, with that in mind the legion of home-brewers requires your help! Turn yourself into a 'spy' on behalf of the hobby and let me know when you find a good supply of components or odds and ends that other readers will find useful.

I ask for your support because I know I cannot possibly manage to build anything using surface mount components. It was bad enough using a magnifying lens to identify the markings on a 4.7µF tantalum bead capacitor when I was assembling an electronic keyer kit I bought at the Dayton HamVention recently! (I'm pleased to say the kit worked first time).

If we're to keep home-brewing alive everyone needs to work together. So keep your eyes open (even if like me you're at the bi-focal stage with the occasional use of a magnifying lens!). If you do find good sources, write and let us

know and we can publicise the news to the benefit of everyone.

I also encourage traders and surplus dealers selling components and electronic hardware to let us know what they've got on offer. We can always mention it on the news pages and I have no doubt that once they've been inundated with a response from our keen readers and the (no obligation news item) they will seriously consider advertising in PW to the benefit of all concerned!

One Valved Challenge

I enjoy QRP working with simple equipment and recently I've been playing around with a single valved regenerative receiver (EF91) working on 7MHz and I'd like to issue a challenge to readers. Would you like to join me in seeing just what you can do using a single valved receiver on the bands? If so, let me know and we'd be delighted to publish a letter and photograph in 'Receiving You'.

The tremendous interest shown by readers of our sister publication *Short Wave Magazine* with their recent one-valved design tells me a similar idea is likely to bring a response from PW readers too. So, if you (whether a listener or transmitting amateur) want to have a go, let me know. I can even let you have a copy of the EF91 circuit and ideas I'm using, re-discovering my early days in radio, if you send me an s.a.e.

I look forward to working you, or sharing the fun via your reports, both on 7MHz (my preferred 'one valve' band) or on 3.5MHz. Good DX!

Rob Mannion
G3XFD

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.

RECEIVING You

PW's Postbag. If your letter is published you'll win a prize.

Letters Received Via The 'Internet'
Many letters intended for 'Receiving You' now arrive via the 'Internet'. And although there's no problem in general with E-Mail, many correspondents are forgetting to provide their postal address. I have to remind readers that although we will not publish a full postal address (unless we are asked to do so), we require it if the letter is to be considered. So, please don't forget to include your full postal address and call sign along with your E-Mail hieroglyphics! Editor

This Month's Star Letter

HAC Receivers

Dear Sir

I recently advertised in your 'Bargain Basement' readers' free advertisement section for information on HAC short wave receivers and I wish to thank the many people who telephoned me from all around the country. And I hope I don't offend anyone if I mention a special thank you to Mr C. M. Lindars (Chief engineer of HAC) who telephoned me personally and sent me copies of the original circuits.

Thank you very much again and I will get in touch very soon with you all.

Aled Lewis
West Wales

Editor's reply: Our sister publication *Short Wave Magazine* has proved beyond all doubt there's still a tremendous interest in one valved receivers when the Editor, Dick Ganderton G8VFH, published a project. Remembering the success of the PW 'Millennium' 7MHz vintage valved style transceiver (to celebrate PW's 1000th issue) I'm considering offering a challenge to readers to build and use one-valved receivers in conjunction with simple transmitters. Please see 'Keylines' for further information if you want to join me and re-discover 'basic fun'.

Morse Magician?

Dear Sir

I have only just read the April issue of *PW* and enjoyed it very much. In particular, the comments about learning Morse rang a bell with me. I taught myself back in 1974 and then after only a brief period on the air went QRT until April 1995.

I had enjoyed c.w. and was determined to get the speed back up. So, I bought a cheap half inch thick scribble pad and started copying the c.w. on the bands again. I found it a struggle at first but the speed did improve.

Eventually, I got to the point where I could not write fast enough - maybe because I was using a pencil? Anyway, I had used up the scribble pad!

I met someone on Packet who advised abandoning the pencil altogether in favour of copy the c.w. in my head. This was a nightmare at first and I seemed to lose my speed. It soon came back though and quite soon I was building the speed past the point where I had been. Now I find that provided the code is nicely sent, I can

copy up to about 35w.p.m. but mostly I find about 18w.p.m. or so most comfortable.

For sending, I use a Bencher twin paddle which I have got quite used to. However, I do have an MFJ-451 as mentioned in your article. I have it connected to the rig at the same time as the Bencher.

The '451 is most useful when I need to send accurately under pressure! Most of the time I am fine with the Bencher but occasionally I get 'all thumbs' then I resort to the keyboard.

I also must confess to occasionally using the keyboard for a fast c.w. QSO. I have one in the log somewhere at 35w.p.m. and I agree, it could have been RTTY.

It is nice though to get your own back on the 'clever clogs' who increases the speed during the QSO. I can copy them on the computer and send back even faster!

Thanks also for the antenna article by Dick Pascoe. I suffer from a garden which is only 36ft long by 24ft wide and usually use a vertical although a delta loop is very good.

Many good antenna articles start off by saying... 'Many of us have small gardens these days, but provided we can erect a 40ft pole at the bottom of the garden, it is usually possible to squeeze in a G5RV...'

As regards wire, I have bought several clothes lines from the local supermarket. This stuff is multi-strand, brass plated steel wire. In addition, it is plastic covered. You can solder it and it does not stretch. I have made several very successful dipoles and

their views.

I hope that there will be good news for myself and others when the results are sent in June, but if not, then its back to more studying ready for December.

Phil Gormley
Gloucestershire

Editor's encouragement: Keep at it Phil, YOU WILL PASS. I ask you to keep trying because I've recently worked (June 3rd) Geoff M0AYK in Worcester on 3.5MHz.

Geoff was 88 years old when he passed the RAE and during the QSO he told us he was the oldest known candidate to pass. You can imagine the chorus of 'well done Geoff' that came from everyone in the QSO (these included E15HV, G4EOW, G4AUX and GW4CEP/P and myself). The news raised all our spirits - even Brian E15HV who works in the distillery at Middleton in County Cork!

Gets Up His Nose!

Dear Sir

Every time I open my *PW*, someone is writing about what Class B licensees should be doing about the Morse test. It really gets up my nose!

I am 61 years of age and I have been in the electronics industry since I was 15, an avid s.w.l. since the age of ten and a Class B licence holder for the last 18 years. My memory is bad, I have arthritis and I am not particularly interested in pounding a key for hours on end, although I can manage to use a keyboard to type this letter.

As you can imagine, when it comes to the practical side of Amateur Radio, I have built it all, thrown it away, come back and built it all again in 46 years. There are very likely quite a few people out there in my position and I feel that we are being persecuted by an elitist group of people who very likely acquired their skills during the Second World War in the forces when they had very little choice.

I strongly feel that anyone who has held a B licence for 15 years should be able to apply for an A licence automatically, without any restrictions. God willing, I hope I will be around to see that day, but I will not hold my breath!

W. H. Hilton GW6JXR

December 1997 RAE

Dear Sir

With reference to the article in the June 1997 issue about the December 1996 exam, I have to agree with your writer that I also found the exam papers difficult and I unfortunately did not pass. I, along with nine others from our class, have just sat the May exam and on discussing paper two amongst ourselves after the event, came to the conclusion that it was not for the faint hearted, in a nutshell, very hard.

Do the powers to be who set the papers really want to encourage new members from all walks of life or is it design for a few. I myself am a retired chef with no previous knowledge of electronics and even though I have attended three terms at college with an excellent tutor and sat through many hours of videos, still find it very hard to grasp.

There must be lots of others in the same boat as myself. I only hope they will also write to you with

verticals using the material.
Peter Halls G4CRY
Yorkshire

Morse Can't Be Bothered?

Dear Sir

With reference to R. G. Johnson GW7RDV in his letter Morse/No Morse in last month's issue, I think he may belong to the 'Can't be bothered, anything for nothing fraternity' who wants h.f. Amateur Radio but without the Morse test.

Using his thinking, why not scrap the RAE and put an extra £5 on the licence fee as well, this would cover the additional work the licence issuing contractors SSL would have to do to deal with the rush of other 'Can't be bothered brigade' numbers, awaiting licences.

Come on Mr Johnson, you knew that a fundamental requirement of a Class A licence meant a Morse test pass before you came into the hobby, so don't moan about it now. My advice to you is to get stuck in to some Morse practice and when you've learned, you never know, you might just enjoy the 'Magic Mode'.

Mick Fletcher G0NVS
Nottingham

Amateur Radio Expensive?

Dear Sir

I read the Star Letter in the May issue of *PW*, regarding the apparent expense of amateur radio. When I was first licensed as G8YJI back in 1980, I too felt radio was very expensive and then all I aspired to was a 12-channel, rock-bound Trio 2200GX!

The synthesised Trio 2300 was so far beyond my grasp it hurt! Nevertheless, I did manage to scrimp and save and acquire the giddy FT-290R (wow - s.s.b. on 144MHz!) Still, I had a few countries on that with the bare 2W or whatever it was then.

The basic point is this - radio gear has always been expensive because it is always 'high-tech'. As

basic technology becomes mundane the manufacturers provide newer, higher-tech 'gizmos' to keep the prices high (it's why they go to work every day so you can't blame them).

Always though, the more basic radios become cheaper to buy. An I think frankly, the cost of today's rigs is astonishingly low for what you get if what you want is radio. If you want to buy computerised gadgets be aware that it's they, not the wireless part, that will dictate the price.

Work out what you want, then separate that from what you need. You'll probably discover that what you need is affordable - what you want can come later.

David Perry G4YVM
Salisbury

Editor's comment:
Fascinating observation David. I only ever aspired to wanting a 'Liner 2' for 144MHz s.s.b. operation but never managed to get one (they seemed to be 'state of the art' then!).

Wind Damaged Antennas

Dear Sir

Some months ago, and not for the first time, my 8-element 144MHz Yagi was blown around by the high winds we experienced at 700ft a.s.l. and the cables to the rotator were damaged. I then decided that the time had come to make a more compact antenna and, after browsing through several books, made up the 144MHz 'ring beam' described in your excellent publication *Wires and Waves*.

The antenna proved to work remarkably well, but I thought I might squeeze a few more dB out of it with the addition of directors and so constructed a miniature version, tuned to about 500MHz for the television band. The idea being to try to improve reception from some of the distant TV stations available at 700ft.

However, evaluating performance proved difficult since measuring by eye the variation in grain on the picture was almost

Hot Under The Collar?

Dear Sir

For several years now I have watched the 'Abolish Morse' versus the 'Keep The Code' argument swing back and forth like a political pendulum. Never have I seen my fellow amateurs get so hot under the collar, so passionate, over a subject.

I am aware of all the arguments, the pros and cons, the fears of each side for what the future may hold. May I offer the perfect solution, the ideal answer, the 'coup de grace' on this emotive subject?

Reduce the test speed requirement to five or eight words per minute. Before anyone contemplates lambasting me on my idea, let me hasten to add I am comfortable up to 35w.p.m. here, so the suggestion is not for my own benefit.

Brian G0IER @ GB7SDN
Wiltshire

impossible. And delving into the works of the TV to access the a.g.c. line would have been too time consuming (and unpopular in certain quarters!).

It was then that I remembered seeing the article by Kevin James G6VNT in *PW* for September 1995 on the construction of a 'ring Quagi' and set about constructing my own version with wind resistant variations built-in.

The ring is made of 6mm copper pipe supported by 20mm plastic conduit in turn strengthened with wooden dowel. This dowel being impregnated with a mix of water repellent and wood preserver.

The boom is of 20mm square aluminium tube as is the support for the reflector elements, this support being strengthened by triangular aluminium plates. I have long been a gamma match fan and used this method achieving an excellent v.s.w.r. with virtually no movement of the meter from zero over the whole of the 144MHz band.

The performance of the antenna is very good indeed and shows a noticeable improvement over the original 8-element Yagi. Good old *PW* comes to the rescue again!

May I, whilst writing to you, add a brief comment on the letter from R. G. Johnson GW7RDV, in your June issue. The general idea in his letter is good and deserves further consideration by the 'powers that be', but I feel that he sees himself as a B licensee, to be inferior to those with an A licence.

May I remind him that, having passed exactly the same RA exam as an A licensee, with sections on

technical knowledge and operating procedures, he is of equal standard and is therefore equally qualified to operate on any band above and below 30MHz in any mode except Morse. Why then, does he suggest limitations on power and (except for those segments reserved for c.w.) band space? The present limitations preventing his use of h.f. have nothing to do with his technical knowledge and operating skill. Indeed, I have yet to understand the reason myself!

Keep up the good work Mr Editor, you and your team are doing a grand job in catering for the growing range of interests in amateur radio.

Roy C. Perry G7CQD
Herefordshire

Editor's reply: Delighted to hear from you Roy. And I feel sure other readers would like to see your 'Quagi' special modification project published. How about sending it in for 'Antennas In Action'?

Surprise At Dayton

Dear Sir

It was a pleasant surprise to see that *Practical Wireless* had a booth at the Dayton HamVention. I left the UK over 30 years ago and always enjoyed reading your magazine.

I was pleased to see the magazine is now devoted exclusively to Amateur Radio and will therefore keep my eyes open for a copy in the bookstores - not that easy here in Western Canada. I noticed many references to people that I knew back in the 1960s and whom I

have long since lost touch with. If you publish this letter I hope that some of them will see it and drop me a line.

I came away from your booth with a pile of magazines (who could resist the temptation!) one even signed by the Editor himself, which I will keep forever! Don't know if I can make it to Dayton next year, but I will keep my fingers crossed.

Please feel free to publish my address. I can also be reached on the Internet at:

frank.meredith@canada.cdev.com
Frank Meredith
(VE6CB, ex GW3NAM)
#8 Edgebrook Point
N.W.
Calgary AB T3A 5J5
Canada

Editor's comment: It was good to meet you Frank. And apart from meeting at Dayton I'd certainly 'Stampede' towards Calgary again if I was invited to come and provide a talk at your club! It's a long while since I passed through Calgary on the trans-Canadian train!

Reader's letters
Intended for publication in 'Receiving You' must be original and not be duplicated. Letters are accepted on the understanding that they have only been submitted to *Practical Wireless*. Please ensure that your letter is clearly marked 'for publication in Receiving You' and that it has not been submitted to other magazines. We reserve the right to edit or shorten any letter. The views expressed in letters are not necessarily those of *Practical Wireless*.

NEWS

1997

Compiled by Donna Vincent G7TZB

Can You Help?

Ken Evans is looking for operating information on the RadiVet Type 211 pictured here. Ken was given the radio by the XYL of a Silent Key and is now seeking information on how to get it up and running. If you can help please contact Ken direct at 5 Garswood Avenue, Rainford, Nr, St. Helens, Merseyside WA11 8JW.



Radio At The Touch Of A Button

Sir Clive Sinclair has recently returned to the world of radio with the launch of his Sinclair X1 Button Radio. The X1 is the size of ten-pence piece and is being billed as the 'world's smallest radio'.

The Sinclair X1 fits in the ear, weighs just half an ounce, has it's own built-in antenna and covers 88 - 108MHz. It uses the same type of autoscanning that is found on many car radios, you simply push a button and the X1 automatically re-tunes to next station.

Power for the X1 is derived from a small lithium cell which should give up to 12 months use. The X1 is made from a robust ABS plastic and features a special 'sure grip' ear fixing.

The Sinclair X1 Button Radio is available direct from Sinclair Research Limited, Vector Services Division, 13 Denington Road, Wellingborough, Northants NN8 2RL. Tel: (01252) 727313 at a cost of £10 including P&P.



Royal Tournament Station

An h.f. and v.h.f./u.h.f. Special Event station will be operational during this year's Royal Tournament, which is being held at Earls Court from 15 - 27 July. The station, operated by members of the Air Training Corps (ATC), will be on air each day between 1200 and 2100 hours local time with the call signs GB4ATC, G3ATC and G8RT.

During the 'on-air' sessions Air Cadets will be on-hand to pass

and receive greetings messages. They will also be operating a demonstration station and communicating with aircraft using their allocated Air Cadet frequencies. Novice call sign operators will have a chance to work the Tournament station each day between 1930 and 2030 hours using the 430MHz band.

For more information on the Royal Tournament Special Event Station or the ATC contact Malcom Wood on 0171-438 6053.

PLEASE SEND YOUR NEWS TO DONNA VINCENT G7TZB AT THE EDITORIAL ADDRESS

Quality Service

Waters & Stanton Electronics of Essex, having met with the terms of the Quality Administration System had have been accredited with the ISO 9002 certification for the supply and servicing of radio communication equipment and electronic products.

Jeff Stanton told the Newsdesk that the company feel this accreditation is a sign of their determination to provide high standards of service to the customers.

The latest new products on offer from W&S include two compact cross needle power and s.w.r. meters which are manufactured by the Diamond Corporation. The SX-20C covers 3.5 - 30, 50 - 54 and 130 - 150MHz with a power range of 30 or 300W and a retail price of £66.95. Whereas the SX-40C has a power range of 15 or 150W and covers 144 - 470MHz and retails for £59.95.

Both meters are of the large cross needle variety, require no calibration for s.w.r. measurement and feature S0239 connectors. For more information on the SX-20C and SX-40C contact Waters & Stanton on (01702) 206835.



Silent Key - 'Mr Manchester' G310A

The Manchester & District Amateur Radio Society (M&DARS) has recently lost one of its stalwarts when Barrie 'Mr Manchester' Langfield G310A died in May 1997 aged 68.

Born in Middlesborough, he moved on to Nottinghamshire and eventually Lancashire. Barrie joined the M&DARS in the 1950s. Working as an Electronics Engineer for Ferranti in Manchester, he soon became G310A.

Barry was one of the founder members of the Northern Amateur Radio Societies Association, helping with the promotion of the Bell Vue Kings Hall Exhibition in Manchester, the event now of course held in Blackpool.

Teaching was Barrie's main interest and during many years of instructing at Openshaw Technical College and later the M&DARS's headquarters some 500 students successfully passed through his classes. And in recognition of his devotion to the Society and the Amateur Radio hobby he was made Honorary Life President, a post he was exceedingly proud of, carrying out his duties with great enthusiasm.

Barrie passed away suddenly on the afternoon of 19th May 1997 and his many friends say that he will be greatly missed. Tex Swann G1TEX and I last met him when we provided a *Practical Wireless* 'club talk' at the Society in October 1996. He was a Gentleman and we join his friends at the M&DARS in extending our deepest sympathies to his family.

G3XFD



Always a friendly greeting, and always willing to help others during 45 years in the Amateur Radio hobby:
Barrie Langfield G310A
1929-1997.

Free Licences

The Radiocommunications Agency (RA) have recently announced that with effect from July 1 1997 Amateur Radio licences will be free to all licence holders under the age of 21. The move has been welcomed by Technology minister **John Battle** who is quoted as saying that:

"The Agency has taken this step to encourage more young people into amateur radio. Radio in its many forms, has made a massive impact this century on all aspects of our life - business, leisure and communications generally. We should do all we can to help young people develop an interest in one of the key technological areas for the next century."

All new licence applications which are registered on after July 1 will be issued free. Existing licence holders will not be charged, providing their expiry date is on or after the July 1 date. For more information on this or any of the RA's services telephone 0171-211 0158.

Vintage Fair

If you are an avid enthusiast of vintage communications make sure you visit the **National Vintage Communications Fair** which is taking place on **Sunday 26 October 1997** at the **National Exhibition Centre in Birmingham**. The fair will feature vintage radio and broadcasting, classic valve audio and hi-fi together with all kinds of electrical and mechanical antiques and collectables.

So, whether you're a seasoned collector or just fascinated by classic radios and all things vintage, this well established fair (now held twice a year in May and October) is well worth a look. The fair runs from 10.30am to 4pm and tickets cost £5 on the door.

More information can be obtained from **Sunrise Press, Spice House, 13 Belmont Road, Exeter, Devon EX1 2HF** (please enclose an s.a.e.) Tel: (01392) 411565.

New Hand-Held Brand

The **Palstar KH6** is the latest hand-held transceiver to be launched by Nevada. This 50MHz hand-held is the first of several radios to be launched under Nevada's very own Palstar brand name.

The Palstar KH6 has an operating range of 50 - 54MHz and features a dual frequency watch function, call frequency selector, key locking system, 1MHz frequency shift and a memory/recall function for up to five channels. Nevada state the KH-6 offers advanced performance in a practical multi-function and convenient slim size radio.

First deliveries of the KH6 should have arrived by the time you're reading this, so why not contact Nevada on (01705) 662145 for more information? The cost of the Palstar KH-6 is just £149 and at that price we think you'll agree it's bound to have wide appeal.



Hightailing It To Hockley!

All Amateur Radio routes seemed to point towards Hockley in Essex, home of **Waters & Stanton Electronics** on Sunday 1 June. The reason? - it was time once again for **Peter Waters G3OJV** and **Jeff Stanton G6XYU** and their large team of helpers to welcome visitors to their 7th annual 'Open Day'.

Visitors came from as far afield as Northamptonshire, Derbyshire and the East Midlands and were rewarded with a very hot but extremely windy day and the chance to find a bargain.

Supported by **Yaesu's Barry Cooper G4RKO**, **Icom's Dennis Goodwin G4SOT** and **Kenwood's Dave Wilkins G5HY** visitors could see the latest equipment on offer. Also present were the **RSGB**, promoting the Society and selling publications. *Practical Wireless* and *Short Wave Magazine* were represented by **Tex Swann G1TEX** and **Rob Mannion G3XFD** and both were kept busy chatting to readers!

The large covered marquee area was busy throughout the morning and into the afternoon and the numbers of visitors only seemed to drop after the plentiful supply of food was consumed! Four free raffles took place during the day and the event ended with an auction masterminded by **Mark Francis G0GBY**.

Next year's event - coinciding with Waters & Stanton's 25th anniversary year - is already being planned. And the W&S 'Crew' told *PW* that they are looking forward to seeing you there after recovering from this year's busy event!



Well I think it's a bargain and if you don't buy it I will!
Keen bargain hunters at work during the Waters & Stanton 'Open' Day No. 7 on 1st of June.



Organising refreshments, her Dad and keeping a happy face!
Tracy Stanton, the 14 year-old daughter of **Jeff Stanton G6XYU** busily adding a smile and youthful charm during the day - leaving onlookers to wonder where the energy comes from!

Exclusive Distributor

Nevada of Portsmouth have been appointed exclusive distributor for the range of **AEA** data products from the USA. This appointment follows the purchase of **AEA** by **Timewave Technology Inc.**

During the coming year **Timewave** intend to improve and develop the **AEA** range, as well as streamlining the production techniques. The first benefit of these changes is that customers buying from **Nevada** will be able to purchase the **PK12 TNC** for just £99.

For a full list of **AEA** products available from **Nevada** contact them at **189 London Road, North End, Portsmouth Hants PO2 9AE**. Tel: (01705) 662145.



Phil Jeffery Commercial Manager of Nevada (left) with **Randy Gavtry** President of **Timewave Technology** at this year's **Dayton HamVention**.

Licence Revocation Number Two

The Radiocommunications Agency have informed *PW* that the Amateur Radio Licence issued to **Mr D. Randles M0AUT** has been revoked. In her Press Release dated 28th May the RA's **Mrs Karen Scott**, Head of Amateur Radio & Citizens' Band Unit stated "I am not able to provide any further information on this case".

A previous licence revocation made against **Mr D. Randles**, then holding the callsign **G0WNG**, was made public in a RA Press Release dated 5th November 1996 and published in the January 1997 issue of *PW*.

Award Winning HF Radios?

If you are serious about HF + 6 metres these are the transceivers for you - they do not cover 2 metres - but instead offer optimised performance with narrow receive filters fitted as standard. In the words of Rob Mannion G3XFD, Editor of Practical Wireless "Alinco have got themselves an award winner in the DX70".

DX-70T 100W HF + 10W 6 mtr Transceiver

Alinco's 10W on 6mtrs version of the DX-70 TH above. Narrow receive filters and CTCSS fitted as standard.

Unbeatable value for money!



DX-70TH HF Transceiver with 6 mtrs

- All HF Bands 100W output
- 50MHz 100W output
- General coverage receiver
- Remotable front panel
- Receiver pre-amp
- Filters fitted as standard
- Superb TX audio and RX
- Good RX sensitivity
- Full break in on CW
- Speech compressor
- 100 memory channels
- All modes: USB, LSB, CW, AM, FM
- All mode squelch
- Noise blanker
- Scan facilities
- Quick offset for DX pile-ups
- IF shift control
- Separate antenna sockets for HF+ 6 Meters

£775.00

£695.00

Antenna Tuners

EDX-2 Automatic Random Wire Antenna Tuner

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



FREQUENCY RANGE 3.5MHz - 30MHz (with over 3m element)
1.6MHz - 30MHz (with over 12m element)

INPUT POWER (Max) 200W P.E.P.

£289.95

HFM-1 HF Stainless Steel Mobile

2.7 meters, covers 3.5 - 30-MHz (when used with the EDX-2 auto ATU.)



£59.95

EMS-14 Microphone

Speech compressor Base Mic for all Alinco models.



£79.95

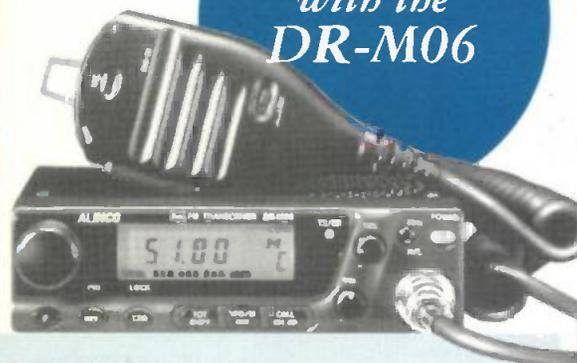
EDX-1 HF Antenna Tuner

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



£159.95

Work the new 6 mtr repeaters with the DR-M06



DR-M06 6 Meter Mobile

6M FM mobile - 50-54MHz. With the new 6 metre repeaters now up and running, this is the ideal radio for the Band. With an optimised receive front end, CTCSS and easy to use controls you will be amazed at the range achievable.

- 10W FM
- Repeater shifts
- 100 memories
- CTCSS encoder
- Time-out-timer
- Output 10W

£249.95

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DX-701 HF SSB Transceiver

A new channelised only HF Transceiver at an affordable price. Easy to use mobile on your favourite Net channels. With RIT control ± 1.5 kHz.

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- 101 memory channels
- 100W output
- SSB, AM and optional CW
- Noise blanker & squelch Inc.

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MODERN RADIO

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• Bolton
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• BL3 6HH

01204 526916

SUNRISE Electronics

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Court Road
• London
• W1P 9AE

0171 637 3728

The dealers listed in the advert have the full support and backup of the Alinco factory for spares and after sales service.

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DJ-C4 430MHz**

A wafer thin pair of transceivers that slip into a shirt or coat top pocket. DJ-C1 features Airband receive coverage.

- 300mW RF output
- Extended receive coverage
- Supplied c/w earphone
- Repeater offsets



£189.95

new

Micro sized handhelds

- 20 memories
- 340mW output option
- Repeater shift
- Scan function



**DJ-S41C
70cms UHF Handheld**

£99.95

**DJ-S11C
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£129.95

DJ-G5EY Dual Band Handheld

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

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- Optional extended receive including Airband 108-173.995MHz 400-511.995MHz 800-999.990MHz
- Full VHF/UHF Duplex
- Over air cloning
- Cross band repeat
- Up to 5W RF output
- 100 memories

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SUPPLIED WITH
FREE
NICAD & CHARGER

The dual bander that **PACKS A PUNCH!**



**DJ-190E
Low Cost Handheld**

A powerful super slim 2mtr handheld with a huge easy to read display.

- Up to 5W RF output (with optional EBP-36N battery pack)
- 40 memory channels
- CTCSS tone encoder fitted
- Battery save function
- Scan function
- Time out timer setting

£149.95

SUPPLIED WITH
FREE
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**DJ-191
2 Meter Handheld**

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

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

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144MHz mobiles

Features optional Wideband Rx to cover Airband, PMR, Marine etc



118 - 135.995MHz (AM)
136 - 173.995MHz (FM)

DR-140 2 Meter Mobile

A no nonsense rugged 50W 144MHz mobile transceiver that's easy to use on the move and comes with CTCSS as standard

- 51 memories
- 50W FM output
- CTCSS encoder

£249.95



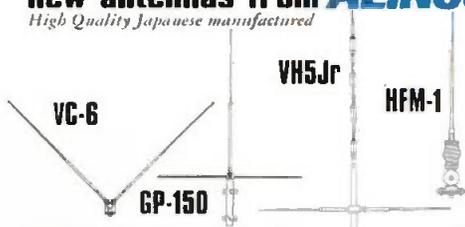
DR-150 2 Meter Mobile

A full featured 50W 144MHz FM mobile radio that's crammed full of extras. The DR-150 takes mobile radios into the 21st century!

- Optional extended receive AM/FM 135MHz-950MHz with gaps
- Channel Scope
- CTCSS encoder
- 100 memories
- On air cloning

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new antennas from ALINCO
High Quality Japanese manufactured



HFM-1 HF stainless steel mobile..... **£59.95**

2.7mtrs, covers 3.5 - 30MHz 150W (when used with EDX-2 auto ATU)

VK5Jr HF multi band vertical..... **£265**

Covers 80/40/20/15/10 mtrs, 500W

VC-6 6 metre V Dipole..... **£69.95**

Covers 50 - 5.1MHz, 300W

GP-150 144MHz Base Antenna..... **£59.95**

5/8 λ ground plane, covers 134 - 174MHz, 6.29dB, 100W

70cms mobile



DR-430 70cms Mobile

A 70cms version of the DR-140 above. 35W RF output.

- 20 memories (expandable to 100)
- 35W FM output
- CTCSS encoder
- Electronic squelch

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Dual Band mobiles



DR-610 Twin Band Mobile

- Range: 136 - 174/420 - 470MHz FM
- Channel Scope
- Full duplex
- CTCSS encoder standard
- AM Airband RX
- VHF 50W/UHF 35W max
- 120 memories

£525.00



DR-605 Dual Band Mobile

Easy to use twin band mobile transceiver that delivers both high power and performance with user friendly features.

- 50W (2m) - 35W (70cms)
- 100 memories
- Full Duplex
- CTCSS encoder fitted

£399.95

Accessories



**EMS-47
Speaker Mic**
£10.95



**EME-12
Headset and single
headphone for all
handhelds**
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Zoë says:
"keep the News and
those Club
magazines coming!"

CLUB Spotlight

Compiled by Zoë Crabb

These are your pages and I want to hear about your stories! Have you moved into a new club room, won a contest, got a funny story or news of a special event station? Then send it into me, I want to hear all about it. If you have pictures to accompany the story too, then even better! So, get writing and who knows, you might even recruit new members at the same time!

Samuel Morse's Birthday Party

Back on the 27 April, the Morse Enthusiasts Group Scotland (MEGS) celebrated Samuel Morse's birthday aboard RRS Discovery in Dundee. A total of 120 contacts were made with Japan, Canada, USA and all over Europe.

Lord Provost Mervyn Rolfe cut the cake and toasted Samuel F. B. Morse. Jack Nicholson GM0MFE, MEGS chairman, proposed the toast 'Dundee - City Of Discovery' and Stewart GM3YCG presented a MEGS plaque to RRS Discovery by way of thanks for hosting the party.

The Stirling & District Amateur Radio Society have kindly agreed to host the party on April 27th next year, in their shack at Menstrie, mid-Scotland. All c.w. operators are made welcome to the MEGS annual get-together.



Lord Provost Mervyn Rolfe and MEGS members celebrate the anniversary of Samuel Morse aboard RRS Discovery.

Demonstration & Exhibition

'Club Spotlight' has recently heard from Peter Brindley G0HEV, Secretary of the Bury St Edmunds Amateur Radio Society, who have news that they are repeating last year's successful event, an Amateur Radio Demonstration & Exhibition, and are once again being supported by the National Trust. The event is to be held on August 9/10th 1997 at Ickworth House, Bury St Edmunds.

The National Trust have offered them the use of their Lecture Theatre to set-

up a working demonstration of modern Amateur Radio and exhibit many items of radio history. Last year's event attracted a large number of visitors without specific advertising, so this year, the club are circulating their plans as widely as possible.

The public are, of course, welcome to visit, as well as any amateurs, both local and distant on the day. More information can be obtained from David Riches G0XEG, 92 Barons Road, Bury St Edmunds, Suffolk IP33 2LY, Tel: (01284) 701034.

Chichester's Election

The following were elected to the 1997-8 Executive Committee of the Chichester & District Amateur Radio Club, at the AGM held back on the 1st April 1997.

Chairman:

Mr John Robertson G0KJU

Deputy Chairperson:

Mrs Yvonne Robertson
2E1CHI

Treasurer:

Mr John Francis G8ZTD

Secretary:

Mr John Stratfull G3IJS

Members:

Mr Dave Burtenshaw
G0AYV

Mr John Chappell G4ZTQ

Mr Dave Clear G0KNU

Mr Hugh Duncombe
G3XJN

Mr Dave Gilbey G1ITL

Mr Henry Kaminski
G1NBX

Mr Ted Turner G1VMG

Mr Graham Swann
G0WSD continues in the post of President.

The club meet at 7.30pm on the 1st and 3rd Tuesday of each month at the St. Pancras Hall, St. Pancras, Chichester.

Summer Fair

The Ynys Mon Radio Users Group will be holding a Summer Fair on the August Bank Holiday at their venue at the Llangefni Scout Hall, Llangefni, from 9am onwards, both outside and inside the hall. There will be stalls, a Bring & Buy, refreshments and entertainment.

This venue is the continuation of the old Holyhead Eyeball of past years and is hoped to be held

every year from now on.

Any persons wishing to set-up any stalls for the day or want more information, please contact Bill on (01407) 760175 or Ken on (01407) 810006 or at PO Box 17, Bangor, N. Wales LL57 3ZB.

Loughborough & DARC

Members of the Loughborough & District Amateur Radio Club meet from 1930hrs on a Monday evening for construction,

computers, operating and general chat, etc. and on a Tuesday evening for different events. Just a few up and coming events are: July 15 - On the air evening, 22nd - 'Car Rally' - bring the family, 29th - Golf competition, 7.30pm start and on August 5 - On the air evening, 12th - 5th DF (band to be decided).

If you like the sound of the events and would like to join, meetings are held in the Science Lab, at the Hind Leys Community College, Forest Street, Shepshed,

Novice Results

The Mid-Glamorgan Amateur Radio Group have recently received the Novice results and have had a 100% pass rate! The age of the students are between 9 and 59. From the Mid-Glamorgan club, 11 people entered the exam.

The Radio Group was formed two and a half years ago to teach people of all ages about Amateur Radio and to help the students pass the Novice exam. In that time, a total of 32 students have passed the Novice exam, 10 people have passed the full RAE and 20 people have passed the Morse test, which is taught by Howard GW0BOJ and John GW0WHU.

Meetings take place at the Sports & Athletics Club, Aberkenfig, near Bridgend on a Thursday night at 7.30pm. For further information, contact Roger Luke on (01656) 733729.



The Novice Group and the Instructors. Roger Luke GW3XJC is on the left (the one with the tie on!) and on the right (also with a tie on!) is Tom Beadle GW0TOM.

The Spotlight's On Again! - Last Reminder!

Yes, it's true, this is the 2nd year of the Spotlight Trophy, awarded to the Radio Club magazine of the year by *Practical Wireless* and Kenwood (UK). Last year, the Hoddesdon Club won, but who will have their club name engraved on the cup this year?

How did it all start I hear you ask? Well, David Barlow G3PLE, a retired Marketing professional and former member of the Birmingham Press Club, who now lives in Cornwall, wrote to Rob Mannion G3XFD, Editor of *PW*, and myself, suggesting a special trophy for the best radio club magazine or newsletter.

Both Rob and I thought David's idea was an excellent way of encouraging the often (hard-pressed) magazine and newsletter editors. David Wilkins G5HY of Kenwood (UK) thought so too! So, a new competition was borne!

So, let's see your magazine, whether it be weekly, fortnightly or monthly, glossy, duplicated A4, PC produced or whatever. They're all of interest and yours could win!

To enter your club magazine for the award, all you have to do is to send in two of your most recent club magazines and details of how they're published to the *PW* Editorial Offices. Most importantly, remember to mark your envelope 'Spotlight Club Magazine Competition'.

The panel of judges (as last year) are: Dave Wilkins G5HY, myself, (Zoë Crabb), Jim Bacon G3YLA, David Barlow G3PLE and last, but certainly not least, Rob Mannion G3XFD. We're all looking forward to receiving and reading your club magazines, and as we want to receive more than last year's ten entries, you'd best get busy, the spotlight's now on!

The closing date for entries is Friday 25 July 1997 - SO SEND YOUR ENTRY IN TODAY!

Zoë

new members are always welcome!

More information about the club can be obtained from Ian G8SNF on (01509) 218259.

Annual Junk Night

The Cokenzie & Port Seton Amateur Radio Club are holding their 4th Annual Junk Night on Friday 15 August, between 1830 and 2130 in the Cokenzie & Port Seton Community Centre, South Seaton Park, Port Seton. Tables will be provided free of charge to be used on a first come, first served basis, to allow anyone attending to sell their 'radio junk'.

The real reason, however, for this night is to raise money for the radio club's adopted charity, the British Heart Foundation. The club's target this year is to raise £1000, bearing in mind that the club takes no annual or monthly subscriptions and thus all the money has to be raised by running various fund raising events!

Even if you have nothing to sell, why not go along and have a cup of tea, taste some home baking,

whilst supporting a worthwhile cause!

Another event in which the club are taking part in is the Northern Lighthouse's Event which runs over the weekend of 23/24th August from Barns Ness Lighthouse, Dunbar, E. Lothian. The club will be operating on 3.5, 7 and 14MHz using the callsign GB2LBN.

The whole event is being organised by the Ayr Amateur Radio Club, of which the Cokenzie club is one of the ten stations operating around the coast of Scotland, so, look out for all GB2Lxx stations!

Polling Day Talk At Colchester

The Editor Rob Mannion G3XFD and I work closely together organising the various *PW* club talks he undertakes. But we were overtaken by events when the planned talk for the Colchester Amateur Radio Club ended up coinciding with the General Election!

However, despite the 'other attractions' Rob tells me that there was a very good turn out and extremely friendly welcome waiting at

Donegal's Update

The Donegal (Tir Conaill) Amateur Radio Society (DTCARS), who hosted the Irish Radio Transmitter Society's 65th AGM (there was also an Amateur Radio Computer & CB Rally held at the same location) back in April, now have news of how well both the events went.

Gerry Dykes EI8HO, Secretary, has written in with news that both the events went very well in indeed. Gerry says it was the biggest trade show ever held in Donegal with a record turn out of traders from Ireland, N. Ireland and even some from England.

The AGM was successful too, with tributes being paid to the outgoing President Jim Ryan EI3DP who, after completing his three years, handed over the chain of office to Paul O'Kane EI5DI - good luck Paul in your new job!

The Donegal Society will hold their Annual Radio, CB & Computer Rally over the weekend of the 8/9th November 1997.



Pic 1: Jim Ryan EI3DP (Right), outgoing President of the IRTS, presenting the Arup Cup to Danny Bonner EI6GS for his outstanding work in promoting Amateur Radio through the Irish language.



Pic 2: (l to r) Ian Kyle G18AYZ President RSGB, Paul O'Kane EI5DI incoming President, IRTS Horst Ellgering DL9MH President DARC (the German National Society).

the Colchester Institute for his talk on the Dayton HamVention, which he was due to attend the following week.

It was Rob's second visit to Colchester and this very

active and friendly group have just added some new Novice callsigns to their membership. Two of these include Father and son team Jason Mageehan 2E1FRL and Dad David 2E1FRO.

Rob tells me he was delighted to receive the news and although David Mageehan has been interested in radio for many years...it was teamwork with his son that brought them both onto the air. David will now also have more time to get working on his ideas for producing simple valved receiver kits. So watch out in *PW* for more news on this interesting idea.

Incidentally, as I've mentioned Rob's Club visits it's perhaps a good time to mention that he's fully booked for *PW* 'Club Talks' right through until the end of 1998. So, although we'll be delighted to hear from you requesting a club visit...you'll have to wait until 1999 I'm afraid!

Special Event Station

The callsign GB2BWB was run on 11 May 1997 by members of the Bedford & District Amateur Radio Club as part of the National Mills Day 1997 celebrations organised by Denby Dale ARC. The station was located at one end of a barn next to the mill building where visitors to the mill passed by on their way from the car park.

Strong winds and heavy rain affected much of the country for most of the day. Several times during the day the wind rattled the roof tiles so much that the club feared for their safety!

During the period 0900 - 1700hrs, 138 contacts, including 15 mills, were made. Station equipment was a TS-130 with about 20dBW into a home-brew W3DZZ type dipole trapped at 7MHz and oriented east-west at about 40ft.



(L to R) Ray G0EYM, catering manager, Richard G0RNM, station manager and Glenn G0GBI.



Schottky Diode?

Ian Poole G3YWX sets out to answer the question What Is A ...
Schottky Diode?

The Schottky barrier diode is an important device which is widely used in radio frequency applications. Sometimes called the surface barrier or hot carrier diode it possesses many similarities to the point contact diode. In fact many of the early devices were made in the same way as a point contact diode, although today's devices are made in a totally different way.

Unlike conventional semiconductor diodes which consist of a *PN* junction, the Schottky diode is made from a metal semiconductor junction. This offers a number of advantages in some circumstances as the diode has a very low forward voltage drop, and secondly it has a very fast switching speed. Both of these properties make them ideal for many radio frequency applications as well as giving them uses in many other areas of electronics as we shall see.

Simple Construction

In comparison with many of today's semiconductor devices the Schottky diode is very simple in its construction. In its most basic form, a metal and is simply deposited onto the semiconductor as shown in Fig. 1.

On some diodes an oxide layer is deposited onto the silicon around the area for the metallisation as shown in Fig. 2. This 'guard ring' is often used to avoid problems with leakage and breakdown effects associated with high electric fields.

Characteristics

The Schottky diode is what is called a majority carrier device. This gives it tremendous advantages in terms of speed because it does not rely on holes or electrons recombining when they enter the opposite type of region as in the case of a conventional diode.

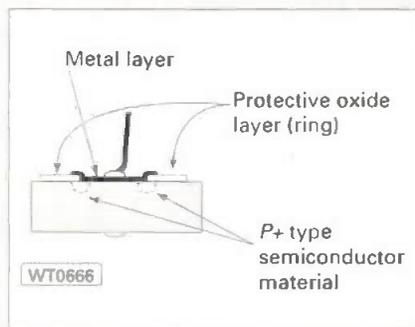
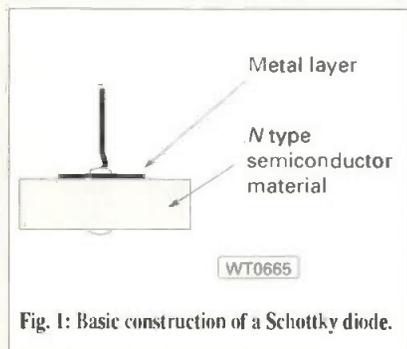


Fig. 2: Construction of a Schottky diode with an oxide guard ring.

By making the devices small, the normal RC (Resistance Capacitance) type time constants can be reduced, making the Schottky diodes an order of magnitude faster than the conventional *PN* diodes. This factor is the prime reason why they are so popular in radio frequency applications.

The Schottky diode also has a much higher current density than an ordinary *PN* junction. This means that forward voltage drops are lower making the diode ideal for use in power rectification applications.

The main drawback of the diode is found in the level of its reverse current which is relatively high. For many uses this may not be a problem, but it is a factor which is worth watching when using Schottky Diodes in more exacting applications.

Variety Of Applications

The Schottky diode is used in a wide variety of applications. It can naturally be used as a general purpose rectifier. However, in terms of radio frequency applications, it is particularly useful because of its high switching speed and high frequency capability.

As a result, high performance diode ring mixers almost exclusively use the Schottky diodes to enable their performance requirements to be met. They are similarly very good as r.f. detectors as their low capacitance and forward voltage drop enable them to detect signals which an ordinary *PN* junction would not see.

It has already been mentioned that it has

a high current density and low forward voltage drop. As a result, Schottky diodes are widely used in power supplies. By using these diodes less power is wasted, making the supply more efficient. Also this increase in efficiency means that less heat has to be dissipated, and smaller heat sinks may be able to be incorporated in the design.

The Schottky diode is used in logic circuits. Although not as common these days, the 74LS (low power Schottky) and 74S (Schottky) families of logic circuits use Schottky diodes as a core component.

The Schottky is inserted between the collector and base of the driver transistor to act as a clamp. To produce a low or logic '0' output the transistor is driven hard on, and in this situation the base collector junction in the diode is forward biased. When the Schottky diode is present this takes most of the current and allows the turn off time of the transistor to be greatly reduced, thereby improving the speed of the circuit.

The Schottky diode is also used as a fundamental building block in a number of other devices from photodiodes to MESFETs. Not only does it find widespread use in many applications in its own right, but it's an essential part of many other components as well. **PW**

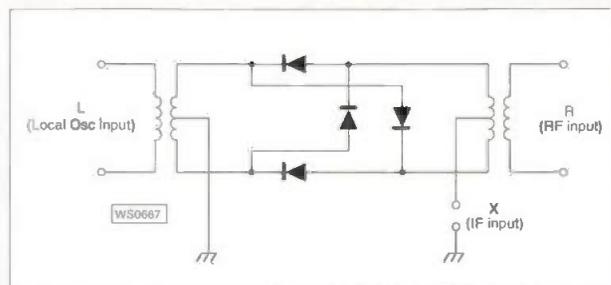


Fig. 3: A diode ring mixer.

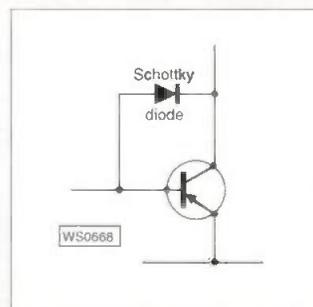


Fig. 4: Schottky clamp diode used for improved transistor switching speed.

Next Time

Next Time I'll be looking at voltage reference and the Zener diode.



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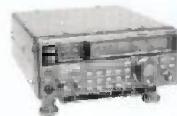


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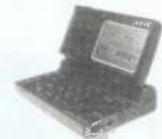


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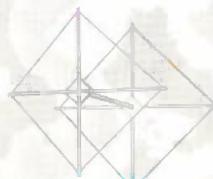
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Front to back rejection >20dB

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RADIO Diary

Compiled by Zoë Crabb

1997

*July 12: Cornish Radio Rally. More information from **Ken GOFIC** on (01209) 821073.

July 13: The Three Counties Radio & Computer Rally is to be held at a new venue, the **Perdiswell Leisure Centre**, Bilford Road, Worcester. Features include amateur radio, computer and electronic component traders, Bring & Buy stall along with **RSGB Morse tests** (please book on arrival and remember two passport photos will be required), refreshments and a licensed bar. Free car parking. Doors open 10.30am to 5pm and admission is £1.50. **Eddie G4POZ** on (01905) 773181.

July 13: The 17th Sussex Amateur Radio & Computer Fair will take place at the **Brighton Race Course** from 10.30am to 4pm. There will be free on site parking and admission to the event is £2. The rally is one of the largest in the south of England with well over 100 trade stands, covering amateur and CB radio, computers, electronics, etc., and also a large Bring & Buy display area. There will also be refreshments and bars at reasonable prices with a picnic area with views over the South Downs - certainly a rally not to be missed! **(01323) 485704**.

July 27: The Colchester Radio & Computer Rally with a hobbies and leisure fair is to be held at **St Helena School** at 10am. This is a family event. Further info. from **Frank Howe G3FIJ** on (01206) 851189.

July 27: The Rugby Amateur Transmitting Society are holding their 9th Amateur Radio Rally at the **BP Truckstop** on the A5, three miles east of Rugby, 24 miles NW from junction 18 on the M1 Motorway. Doors open from 10am and admission is £1 per car. Facilities include a cafe and toilets. Talk-in on S22 by **GB8RRR**. Pitches are £7 pre-booked before 14 July or £10 on the day. **Arthur M0ASD** on (01788) 550778.

*July 27: The Scarborough Amateur Radio Society is holding its annual Radio, Electronics and Computer Rally in **The Spa**, South Foreshore. Doors open at

11am. The rally features all the usual traders, radio, electronics, components, computer hardware and software. Morse tests are available on demand, but please remember the fee and two passport type photographs. Further details from the Rally Manager/Secretary **Ross Neilson** on (01377) 257074 after 6pm.

*August 3: The **RSGB Woburn Rally** is to be held at **Woburn Abbey**, Bedfordshire. **Norman Miller G3MVV** on (01227) 225563.

*August 10: Flight Refuelling **ARS Hamfest '97** will take place at the **Flight Refuelling Sports Ground**, Merley, Wimborne, Dorset. The event will run from 10am to 5pm and will include the usual mix of traders, Bring & Buy, craft exhibitors, car boot sale and field events. Talk-in will be on S22. **Richard Hogan G4VCQ** on (01202) 691021.

August 10: The **Derby & District Amateur Radio Society** are holding their 40th Derby Mobile Rally at the **Littleover Community School**, Derby. More information on (01332) 556875.

August 15: The **Cockenzie & Port Seton Amateur Radio Club** are holding their 4th Annual Radio Junk Night at the **Cockenzie & Port Seton Community Centre**, South Seton Park, Port Seton. Doors open 18.30 to 21.30. Bring along your own junk and sell it yourself. Tables will be provided on a first come first served basis (no charge for the table). Raffle at approx. 2100. Refreshments will be available. Disabled persons access. Entrance fee is £1 for all persons. All money raised is donated to the **British Heart Foundation**. Further details from **Bob Glasgow G4UYZ** on (01875) 811723.

August 17: The **Kings Lynn Amateur Radio Club** are holding their 8th Great Eastern Computer & Radio Rally at a new venue, this is at **Wallington Hall**, between **Kings Lynn and Downham Market**. Features include a spacious indoor area with major exhibitors, outdoor car boot area (unlimited

If you wish to have your Rally featured in *Radio Diary*, all you have to do is to put together as much information about the Rally as possible, i.e. date, location, time, who to contact, etc., and send it to **Zoë Crabb** at the *PW* Editorial Office.

space available), Bring & Buy, free parking, talk-in on S22, refreshments available and easy access for disabled persons. For booking or more information call **Ian G0BMS** on (01553) 765614 or @**GB70PC** Packet BBS or E-mail **Ian** on **ian@g0bms.demon.co.uk**

August 17: The 2nd Cardiff Amateur Radio & Computer Fair will be held at **The Star Sports Centre and Recreation Centre**, Splott, Cardiff. Open from 10.30 to 3pm. Further details from **Stuart Robinson G4W0WMT** on (01222) 613070.

August 24: The **Torbay ARS** are holding their rally at the **Torbay Leisure Centre**, Paignton. Doors open at 10am. Talk-in on S22 by **G8NJA/P**. Further details can be obtained from **Alan G7UEK** on (01803) 214445.

August 24: The **Galashiels & District Amateur Radio Society's Open Day & Rally** will take place at **The Volunteer Hall**, St John's Street, Galashiels from 11am to 4pm. There will be traders present along with a Bring & Buy stall, a raffle, refreshments and a bring & sell feature. Talk-in on S22. Tel: (01896) 850245 or (01896) 755943 (evenings only).

August 25: The **Huntingdonshire Amateur Radio Rally** (held Bank Holiday Monday) is to be held at **Ernuif Community School**, St Neots, Cambridgeshire (near **Tesco Superstore** on A428). Doors open at 10am and admission is £1. There will be hot and cold refreshments available. Also features a car boot sale on hardstanding. Talk-in on S22. **David Leech G7DIU** on (01480) 431333 (between 9am and 9pm).

August 30: The Annual **Wight Wireless and Computer Rally** will be held at the **National Wireless Museum**, Arreton Manor, Nr. Newport, Isle of Wight. Open 10am to 5pm. Free entry and plenty of free parking. Free stalls for both private and business use. There will be refreshments, exhibitions and collections for **RAIBC** with Talk-in on S22. **Douglas Byrne G3KPO** on (01983) 567665.

*Practical Wireless & SWM in attendance

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

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



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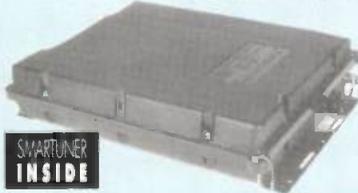
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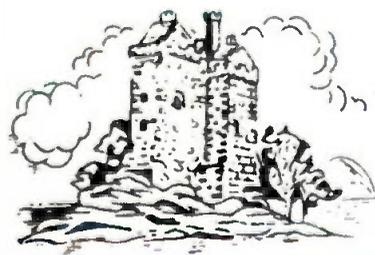


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"In A Class Of Its Own"

The Yaesu FT-920 HF & 50MHz Transceiver



By Rob Mannion G3XFD

Rob Mannion G3XFD has been busy on the air trying out Yaesu's recently introduced FT-920. The transceiver is considered by some to be the 'baby brother' of the FT-1000MP but Rob disagrees and considers it to be in a 'class of its own'.

I've often mentioned in *PW* that I have a long held liking for Yaesu h.f. equipment. And it's true that I have had the pleasure of owning Yaesu equipment since the late 1960s. Well, to this I recently added a brand new experience by having the opportunity to try out the FT-920 h.f. & 50MHz rig with Digital Signal Processing (DSP).

Although the FT-920 is considered by some Radio Amateurs to be the 'baby brother' to the FT-1000MP, I quickly found myself veering a long way from this opinion. This is because I found this excellent transceiver to be very individual and certainly "in a class of its own" in performance and presentation.

I'll start off with a description of the transceiver, its facilities and presentation. And I really do hope to convey the feeling of enjoyment I had in using this rig.

However, before I do start the review I must draw your attention to a new policy I'm adopting with reviews. Knowing that the majority of Radio Amateurs don't have access to sophisticated test equipment a different style is required.

Additionally many of us have difficulty in appreciating the implications of specification as noted by some reviewers. So, in future I'm going to provide comparisons (as a 'standard' to go by) with equipment that myself and many readers will be familiar with.

Also, now and in the future I shall have no hesitation in firmly stating

what my own preferences are when it comes to recommending equipment. I've no hesitation in doing this - **after all a review is a personal opinion!** But you can be assured that my reviews are the result of using the equipment on air and it's not just a case of running through the specifications. You can also be assured that I'm writing what I believe!

To set off in the way I'm to work in the future I'll stand up and tell you all that I think the **Kenwood TS-870** is my 'dream machine'. And although I cannot afford to buy one of these truly magnificent performers at the moment, I consider them to be a 'Classic' transceiver. So, that's my preferred choice if I win the lottery!

But to return to the 'real world' I have to tailor my equipment to what I can afford. I have to consider what will fit neatly on my operating desk (next to the computer I'm writing this review on) and provide me with the best performance in the price range. And in my case, this is most certainly an **Alinco DX-70**.

In its category (general purpose mobile/portable h.f. and 50MHz transceivers) I think the DX-70 is unbeatable in performance, especially bearing in mind the built-in narrow filters, uncluttered design and generally superior performance. All in a budget package.

So, now I've outlined my approach, it's time to get on with the review itself!

The FT-920

The FT-920, is an Amateur Bands 1.8 to 28MHz plus 50MHz transceiver with a maximum of 100W output and general coverage receiver. This is designed around a double conversion superhet with a first i.f. of 68.985MHz and a second i.f. of 8.215MHz (triple conversion with f.m. using an i.f. of 455kHz) with the DSP taking place at audio frequencies. And (as you would expect) it's the DSP which provides a remarkable difference in performance - especially on reception.

Yaesu have followed other manufacturers in one direction, but have (I'm pleased to say) gone their own way in another rather important aspect of design. They've followed other manufacturers by making narrow r.f. filtering an option (rather than working it in with the DSP) but they have provided an external variable control for r.f. and i.f. gain control.

And in my opinion the combined variable r.f. and i.f. gain control, was a very wise choice by the Yaesu design team. Careful 'balancing' of the combined r.f./i.f. gain control with incoming signal attenuation greatly aids reception. The only refinement I can suggest in this area would be to suggest that the r.f. and i.f. gain controls be made entirely separate. This is because in

Continued on page 24

"In A Class Of Its Own" - The Yaesu FT-920 HF & 50MHz Transceiver

Continued from page 23

conjunction with the extremely effective DSP, it would provide the FT-920 with an absolute winner in providing operator control to overcome combating general QRM, QRN and general static (more on this later).

On The Air

Most of the period when I had the FT-920 on review coincided with several weeks of heavy rain showers, thunderstorms and the dreaded summer static. However, (forgive the pun) "every black cloud does have a silver lining". Why? -

because it provided an excellent way of demonstrating just how effective the DSP noise reduction filtering is. And effective it certainly was!

It's extremely difficult to convey the effectiveness of DSP noise reduction

in writing, but suffice it to say that when I was on 3.5MHz working Max G3WMB in Ware, Hertfordshire during very bad QRN conditions. It made the difference in being able to hear him. (My Alinco DX-70's noise blander could not cope and listening to Max was virtually impossible).

Max G3WMB and I were joined by his good friend Roger G0KME in Bury St. Edmunds. Roger was finding it extremely difficult to copy me because of the high level of static at his end. I on the other

hand had the full benefit of the DSP noise reduction. And even though I have had much experience using DSP equipped-receivers. I was still surprised at just how effective it was.

In fact, I found that the DSP fitted FT-920 enabled me to work quite comfortably on the bands despite the QRN. As a result I spent much more time on 1.8 and 3.5MHz than I usually do when evaluating a rig for review purposes.

On 7MHz I found the usually extremely busy band to cause no



The left-hand side of the FT-920's front panel. The outer 'collar' control mounted directly behind the main tuning knob operates the 'Shuttle Jog' tuning control (see text).



The right-hand side of the FT-920's front panel. The main tuning knob is just visible to the left, with the VFO-B knob almost central. (This also provides auxiliary tuning - see text for comments). The DSP controls are on the far right with the 'hour and minute hand' type rotary controls providing adjustment for 'Low Cut' DSP filtering and 'High cut' filtering (see text).

Significant Specifications

The significant specifications listed below are drawn from the Yaesu FT-920 manual and only relate to the transceiver as fitted and supplied (i.e. no optional filters, etc.).

General Summary

Receiving coverage:	100kHz to 30MHz and 48 to 56MHz.
Transmitting frequency range:	1.8 to 28MHz and 50MHz
Modes:	s.s.b., a.m., c.w., f.m. (with optional module) f.s.k. & a.s.f.k.
Antenna impedance:	50Ω (built-in automatic a.t.u.).
Power supply:	13.5V d.c. negative earth max 22A
Dimensions:	410 x 135 x 316mm

Receiver

Type:	Double conversion superhet in a.m., c.w. and s.s.b. modes
Type:	triple conversion on f.m. (with optional module)
Intermediate frequencies:	First 68.985MHz. Second 8.215MHz. Third i.f. (f.m. mode only): 455kHz

Quoted sensitivity (Amateur Bands only)

1.8 to 24.5MHz 0.20μV (s.s.b., c.w.), 2μV (a.m.)
24.5 to 54MHz 0.13μV (s.s.b., c.w.), 1.3μV (a.m.)
(Above measurements quoted as with pre-amplifier on, for 10dB S+N/N)
Quoted i.f. selectivity (as supplied, no optional filters)
(-6/60dB) s.s.b., c.w. 2.4kHz/5kHz, 14kHz a.m.

Intermediate freq. rej:	>70dB (1.8 to 56MHz)
Image rejection:	>70dB (h.f.), >50dB (v.h.f.)
Int. freq. shift range:	±1.2kHz
DSP notch depth:	>35dB
Audio output:	1.5W

problems for the FT-920 and I worked many stations on both s.s.b. and c.w. On c.w. I found that the lack of the c.w. 'narrow' filter did not limit my QSOs because the DSP filtering virtually eliminated anything out of the audio passband. I say 'virtually' because (as the Yaesu handbook says) it's possible for the a.g.c. to be 'pumped' by the actions of strong adjacent signals and I found this to be possible, and although the interfering signal wasn't heard (because it was out of the DSP 'passband') I was aware it was there.

I often use conditions on '40' metres as a yardstick for my 'on air' reports. However, in future I also intend to mention conditions on '20' metres for comparison purposes, especially on the international beacon frequencies on 14.100MHz where QRM from upper adjacent frequency stations (they appear to be Packet radio transmissions) often make reception of the beacons very difficult.

The international network of c.w. beacons (transmitting in turn on an

agreed schedule) prove to be very helpful to me. And I'm often surprised to hear the DX beacons coming through whereas the band seems otherwise dead!

But unfortunately, the Packet transmissions just h.f. of 14.100MHz can spread sufficiently to make the copying of the relatively low power beacons very difficult indeed with any receiver. At times, despite the excellent 500Hz (-6dB) standard fitted filter and i.f. 'shift' on my Alinco, it often struggles with the powerful packet transmissions on the adjacent frequencies.

However, despite the fact the FT-920 I had on review did not have the extra filtering fitted as standard, I found the DSP helped overcome the QRM very effectively. The only problem I found was the very strong packet signals (adjacent to the 14.100MHz frequency) that did 'pump' the a.g.c. (as previously mentioned) but at no time did I lose the incoming signal I wished to copy.

So unless they were a keen c.w. operator like myself, I would imagine

that many FT-920 operators would not bother to fit the optional 'narrow' filter. However, in my opinion if they did it would make an excellent performer even better.

As is usual with 50MHz there was little activity and apart from hearing two stations working from the Southampton-Portsmouth area using the band for local 'nattering' I heard nothing using my 'quad loop' antenna. However, with the 50MHz repeaters coming the FT-920 will be ready for action and with the f.m. module fitted repeater operation will be possible.

On air with s.s.b. I received many favourable reports on the transmitted audio. Friends who know my voice from working me on the Alinco DX-70 often commented on the 'clean and crisp' audio from the FT-920.

I should point out at this stage that I did not vary any of the DSP audio input parameters. This was because I was satisfied with the audio reports I was receiving (most people I worked preferred the audio from the FT-920 to that from my Alinco, which usually gets good reports).

Using The DSP

Using the DSP facilities on air are simplicity itself. And as can be seen in the enlarged front panel photograph, they're all grouped on the right-hand side of the front panel.

In use, the DSP facilities are extremely easy to operate. I immediately found that the DSP noise reductions control produced dramatic results. During the QSO I had on (a very noisy band) 3.5MHz with Max G3WMB, the reduction in incoming noise (static crashes and bangs) was so good that I could carry on the QSO whereas without it communication would probably be impossible - and all I had to do was to rotate the control!

Operation of the **High Cut** and **Low Cut** controls are via a pair of knobs arranged (similar to hour and minute clock hands, as can be seen in the photograph) so the operator can avoid losing the incoming signal when attempting to reduce interference. The DSP is extremely effective and I (ignoring the warning

in the excellent instruction manual) inadvertently selected the auto-seeking notch filter. The c.w. station I was working promptly disappeared (as it should have done!).

In operation on the very noisy and busy bands I found the combination of the DSP, the DSP noise reduction and the intelligent use of the r.f./i.f. gain control provided me with a great deal of help in maintaining QSOs.

Other Innovations

There are some other innovations (apart from the DSP) on the FT-920 which I found to be helpful. And in my opinion the most spectacularly successful was the frequency '**Shuttle Jog**' control. It turned out to be a real boon for someone with only one arm and arthritic fingers!

I've no doubt many operators will find the many other innovations interesting, but the Shuttle Jog proved superbly effective and useful to me. It greatly eases the 'knob' spinning up and down the bands.

Rotating the 'collar' to the left provided a rapid decrease in the tuned frequency, and turning it to the right rapidly increased the frequency. The farther you turn the collar in either direction - the faster the transceiver tunes up and down the bands. It worked extremely well and I feel sure there'll be many contesters who'll also find it to be very useful indeed.

The automatic antenna tuning unit (a.a.t.u.) proved itself to be very quiet and quick. It also managed to match into long wire antennas and 'awkward' antennas and certainly exceeded the manufacturer's published specifications in speed and matching capabilities.

There's also the memory electronic keyer and the digital audio message recording facility. These will come into their own for contest use and for an FT-920 in personal use, especially for contesting. And of course, there are a great number of memories that be configured by the individual operator. In fact, there are so many I do not wish to take up valuable space by just providing a list. **Instead, I'm concentrating on what I consider to be the most important features and innovations.**

Final Question

The final question most people looking for a new DSP equipped transceiver would ask me - would you buy an FT-920? And my reply would be an enthusiastic yes!

Although my 'ultimate' purchase would be a Kenwood TS-870, the Yaesu FT-920 has so much to offer in its price range. With the splendid dual tuning control (with very useful 'shuttle jog' up/down control) and clear display, the ergonomics proved to be excellently thought out.

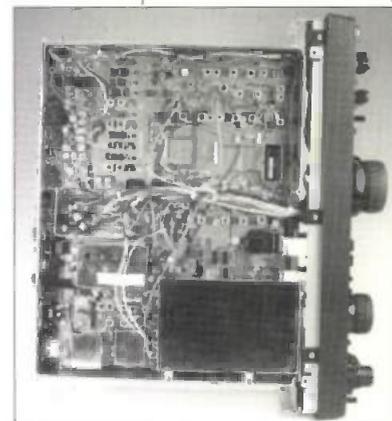
Additionally, Yaesu have provided an extremely effective and simple-to-operate DSP system. In operation it proved extremely effective and in my opinion it would be worth buying the FT-920 for the DSP noise reduction alone. **but I really do think the final finishing touch for the receiver should be narrow r.f. filtering fitted as standard. The benefits of really good r.f. filtering and DSP are unbeatable.**

Finally, although I had the review transceiver for a number of weeks, you should realise that there are a host of features I did not try out or have not mentioned. If I did my review would turn out to be an un-terminated list - and you can read those in the full manufacturer's specification and the excellent manual!

Just take it from me that this transceiver is certainly in a class of its own and should not be seen as a 'junior' version of the FT-1000MP.

My thanks go to Yaesu (UK) Ltd., Unit 2, Maple Grove Business Centre, Lawrence Road, Hounslow, Middlesex TW4 6DR. Tel: 0181-814 2001, FAX: 0181-814 2002 for the loan of the review model. The FT-920 costs £1699 inc. VAT and is available from Yaesu approved dealers.

PW



Under-chassis view of the FT-920.

The G3XFD Top Three Choices

In this and future h.f. transceiver reviews I intend to leave readers in no doubt as to what my own personal 'top three' tried and tested choices are. All will be from evaluation on the air and take into account the cost of the equipment and the information will be up-dated as I review equipment.

No. 1: (Top choice) The Kenwood TS-870 with DSP h.f. transceiver, offering absolutely superb performance and excellent operator facilities in the 'top of the range' price bracket. Would be G3XFD's ultimate choice.

No. 2: The Yaesu FT-920 h.f. & 50MHz transceiver (Second choice). A transceiver offering excellent facilities, excellent ergonomics and ease of use at 'top of mid-range' price. Especially effective DSP facilities, packed with innovations. Excellent value for the price range.

No. 3: (Third choice) The Alinco DX-70 (present main rig owned and in use by G3XFD). Superb value-for-money h.f. and 50MHz transceiver offering facilities, performance and selectivity of a transceiver much higher in price. Very (unfairly) under-rated in general because manufacturer's previous v.h.f. and u.h.f. speciality.

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The Probe

By Richard Q Marris G2BZQ

Richard Q Marris G2BZQ describes a neat helically wound antenna that's both small and effective and can be used anywhere.

The 'Probe' is a tiny inconspicuous h.f. antenna. It can be used in apartments and in Hotels while on holiday and anywhere else where the 'No transmitter antennas here' syndrome reigns. It can be used as a portable or boating antenna, taking up minimum space in the boot of a car and can be kept in a fishing rod bag.

In my apartment, there is a large aluminium framed window measuring four metres wide by one and a half metres high. The 'No TX antennas' rule applies, even though the area bristles with antennas for TV, Band II radio and the usual satellite dishes and public utility wiring. But the regulations and limitations have, in no way, stopped my transmitting activities.

But back to the window. The

For months after this, I speculatively peered at it and, suddenly, the penny dropped! Why not use the frame as a groundplane, albeit vertical, and 'poke' a whip out of the window in the dead of the night?

Why not make the whip sufficiently small so that it could be used in the favourite vacation hotel in a small fishing village on the south coast of England? And why not make it completely unidentifiable as an antenna, so that it can be used night or day?

Ideas Flowed

So, the ideas flowed, from the brainbox, leaving just one small (three-part) problem - design it! build it! make it work! The result

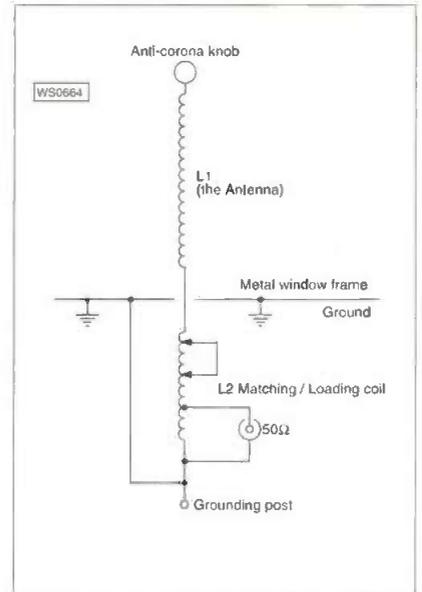


Fig. 1: The electrical diagram of 'The Probe'.

look like an antenna, and being well above ground, it might be anything!

Of course you cannot expect that The Probe could compete with larger antenna arrays, so the first QSO of nearly 500 miles (RST 559) I considered most satisfactory. This contact was on 3.568MHz using only 7W of 'Morse power'.

The electrical idea of The Probe is shown in Fig. 1. The coiled section L1, is a close wound helical style antenna with a brass anti-corona knob. The matching/loading coil is formed from L2.

The dowel should be thoroughly dried out and then given four coats of polyurethane varnish until a hard gloss coating has been achieved. A 25mm diameter anti-corona brass knob is screwed into one end (it also increases the bandwidth!). These knobs can be found in d.i.y. stores and are used as furniture knobs. Beware of gilt covered plastic knobs though!

The antenna is mounted horizontally through the metal frame window with L1 (the antenna) being outdoors and L2 being indoors. The bottom end of L2 'grounded' to the window frame. Impedance matching by means of L2's tapping point. The 3.5MHz band segment to be used, can be selected by means of an optional shorting link on L2.

The illustrations of Figs 2, 3 and 4 show the way of constructing The Probe. The element L1, is close wound with 43m of 7/0.2mm pvc covered hook-up wire having an overall

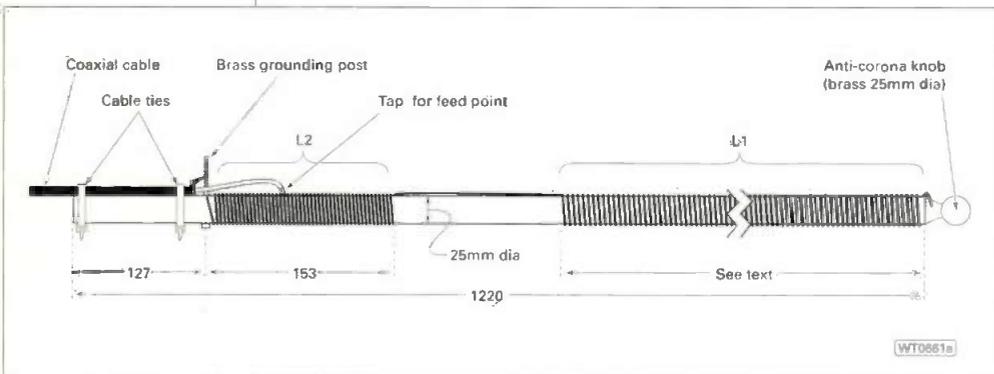


Fig. 2: The overall layout of the antenna.

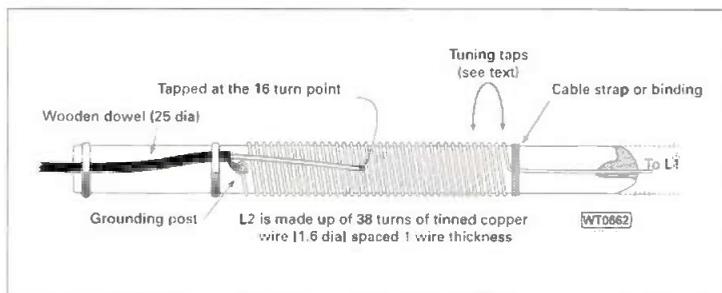
window sill is about six metres above ground level. It's well known that, with a suitable a.t.u., an h.f. transmitter can be loaded into almost any piece of metal. So, this window seemed to be a potential proverbial 'Window on the World' antenna except, that it resisted all attempts to load it up!

With the aid of a friend, a long length of wire and an ohm meter, I found that the window frame was very near ground potential.

is 'The Probe' at only 1.22m long and only 25mm diameter, fitted with a small brass anti-corona knob at the end.

Just less than one metre sticks out of the window and as it's coloured black, The Probe cannot be seen between dusk and dawn. Left out of the window, during daylight hours, it has attracted absolutely no comments. After all, such a small black rod with a brass knob at the end, just doesn't

Fig. 3: Details of The matching coil L2 and its tapping point.



diameter of 1.2mm (withstands 1kV and 1.4A). The wire end is soldered to the base of the brass knob and the wire close wound along the dowel, leaving a 300mm fly lead at the inside end.

The loading coil, L2, consists of 38 turns of 1.6mm (16s.w.g.) tinned copper wire. Start by soldering the end to the base of the grounding post and wind 38 turns, one wire diameter spaced to cover the 153mm. Tie the end to the dowel with a cable tie or binding thread, leaving a short length free.

Join this new end with the flylead from L1. Take a 525mm length of RG58 feedline and secure it to the end of the wood dowel as shown. Solder the screen of the coaxial cable to the grounding post and, leaving a little extra for adjustment, the centre conductor is connected onto L2 as shown.

On the prototype, the tap was at 16 turns from the bottom end of L2, which you could start with, but check for best matching on final test (see later). Note: After final test the whole of L1 and connecting tail should be wound with black insulating tape or encased in heat shrink sleeving.

The finished antenna is clipped to a suitable cradle, to hold the antenna securely in the opening of a horizontally sliding metal window. The cradle I used, suited my particular window. It consists of 355x60x25mm thick timber, fitted with two plastic pipe clips to hold the antenna.

The end of the cradle is cut away to snugly fit on the open sliding window channel with a strong steel strip screwed on the end and bent inwards slightly to hold the Probe in position. Note: Individual cradles will have to suit individual window frames.

I use a 6.5m length of RG58 feedline terminated with coaxial plugs at either end to connect to the short lead that's fitted to The Probe. I also carry a 'grounding' lead, which consists of 300mm of thick flexible cable fitted either end with robust battery clips. These clips with a strong spring and sharp teeth are used to connect the grounding post to the metal window frame, for grounding purposes.

I've also made a selection of similar longer grounding leads to connect the grounding post, to any other convenient ground, such as metal water pipe, radiator, wire fences or even a quarter wave counterpoise wire. **Do not use gas pipes or the electrical supply ground or conduit.**

In Use

The Probe is easy to put into use, just mount it in the plastic clips on the cradle, open the window and clip the cradle over the window channels, with the rear resting on the inner window ledge. Close the window up tight against the cradle leaving a small gap. Plug the 6.5m (or shorter) length of RG58 into the Probe coaxial flylead and the TX/a.t.u. Clip the connecting lead onto the grounding post and the metal window frame.

Initially, fix the matching tap (the coaxial inner) at 16 turns from the grounding post. Using a receiver, the frequency range should be checked by moving the shorting link (at top of L1) along the coil. 3500kHz should appear close to where the whole of L2 is in circuit. Bearing in mind that the usable bandwidth is approximately 35kHz, then moving the shorting link 2.5-3 turns, at the top of L2, will move the frequency about 100kHz.

Select a TX frequency and adjust the L2 shorting link to peak loading, next move the matching tap a turn either way to check the impedance matching. The matching tap selected should hold good over the band 3500-4000kHz. In operation, the shorting link on L2 is set at the centre of the (35kHz) band segment to be used.

The coil taps can be colour coded, with spots of paint, to enable quick antenna frequency changes. Most TXers usually hover around a favourite segment of the band - I tend to use it in the c.w. section

3.56MHz(±) using comparatively low power.

Though only very tiny, the Probe has been found to be a useful little antenna, especially in an apartment or on holiday. As mentioned before, it's invisible during the darkness or gloom and arouses no comment during

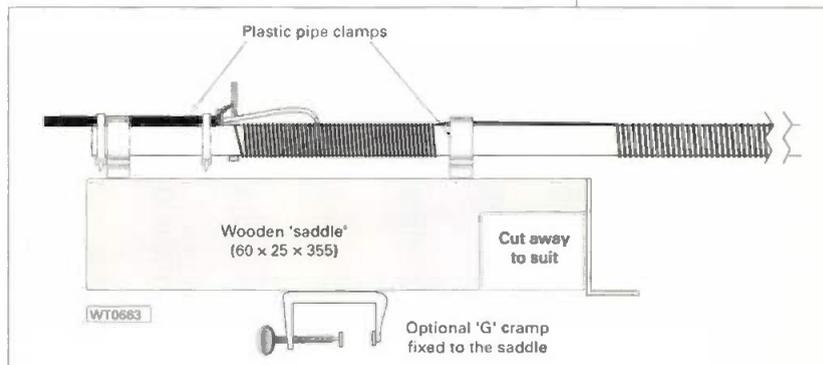


Fig. 4: The wooden saddle to support the antenna on. Don't forget some rubber pads if you are using the G cramp on furniture!

daylight hours. Using a 'T' type a.t.u. to The Probe, I've noted no TVI under any low power mode.

The Probe has always been used in a horizontal position, but there's no reason why it should not be mounted vertically, or at an

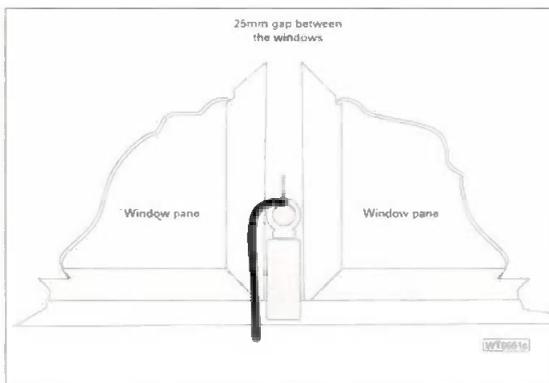
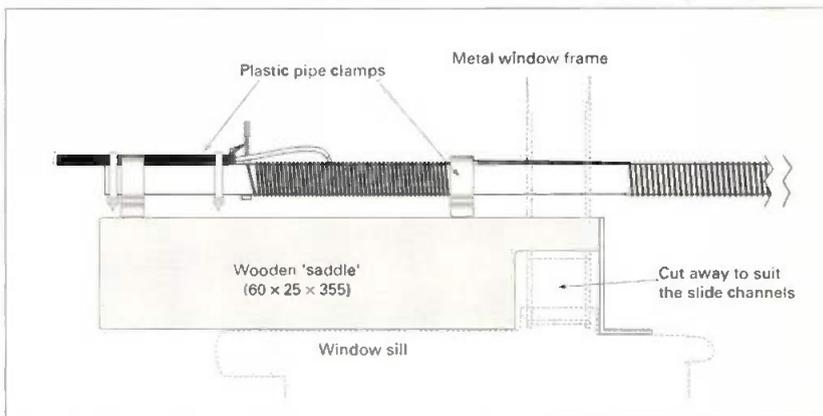


Fig. 5: Looking through the window along The Probe.

angle. A complete set of quick assembly Probe items, when travelling, is the Probe cradle(s) a length of RG58 with coaxial plugs at either end, battery clips 'grounding' leads - oh and don't forget to take the TX/RX!

PW

Fig. 6: Looking along the (vertical) 'ground-plane'.



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RF1

9999pf) and L (<0.04 to 300μH). It instantly reads out impedance and SWR at any frequency in its range. Antennas are easily trimmed with its miniature 'transmitter', minimizing trips to the antenna. Feeding loss and phasing, Q, tuned-circuit resonance can be accurately measured and adjusted. L and C are measured at the RF frequency of interest, not at 1kHz or 100 kHz as with other L/C meters. Basic accuracy is 2.5% to 5% over most of its range. The unit fits in the pocket, and runs on a standard 9V battery (or 7 - 15V).

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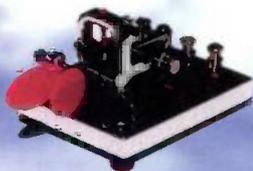
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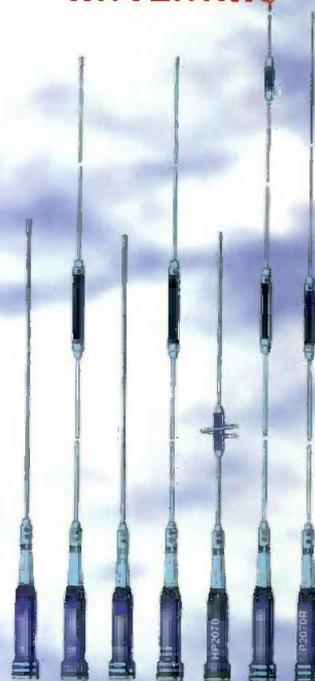


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Carrying on the Practical Way

By George Dobbs G3RJV



This month the Rev. George Dobbs G3RJV brings you more on 'ultra simple' radio stations in the form of the 'VU' transmitter and the 'PWixie' and as usual starts off with a quote!

Perhaps if Oscar Wilde had been a radio amateur, he might have said "Transmitters are rarely simple and never pure". In the June 1997 issue of *PWI* described the FOXX Transceiver. This is a small and very simple transceiver circuit conceived by George Burt GM3OXX.

The neat twist of the FOXX design was that the transmitter used a bipolar transistor as the power amplifier to a modest transmitter circuit. This also doubled as a mixer to form the basis of a receiver.

The power amplifier became a diode mixer at the front of a direct conversion receiver allowing the building of a minimalist transceiver. This circuit appeared in *Sprat* the journal of the G-QRP Club in the summer of 1983.

Caught Imagination

The FOXX idea must have caught the imagination of Oleg Borodin RV3GM, for in the *Sprat* of Summer 1992, Oleg offered the MICRO-80 Transceiver. This was a somewhat simpler design which once again used the bi-polar transmit power amplifier transistor as the mixer in a direct conversion receiver.

Although simpler, the circuit had the merit that it offered complete c.w. break-in operation. With the key down it transmitted and with the key up it received!

But all these simple circuits play 'swings and roundabouts' and it did not have any frequency off-set on transmit which can be a problem in practical operating. At the time it was even possible to get a simple kit from Russia to build the MICRO-80.

Improving A Design

Nothing pleases the avid radio constructor more than improving on a circuit design. And after the MICRO-80 appeared, it became 'open season' for the designing of little transceivers using a similar approach.

For example, David Joseph W6BOY, produced a variant in the December 1993 edition of *QRPP*, the

Journal of the Northern California QRP Club in the USA. David used the name 'Pixie' and that name seemed to stick with later versions including his own update in *QRPP* of June 1995.

The circuit returned to *Sprat* in Autumn 1996 with Derrick Webber G3LHJ, offering another version. This was followed by no less a person than Doug DeMaw W1FB, with his version of the Pixie in *Sprat* for winter 1996 and then came the f LVA, the Swedish Pixie, by Johnny Apell SM7UCZ, in the 1997 spring issue of *Sprat*.

Along the line others have come along with improvements and a variety of add-ons for the Pixie. I've mentioned most of the Pixie saga because it's a fine example of radio constructors at work.

Taking ideas and playing around

"Truth is rarely pure and never simple"
Oscar Wilde 1854-1919

with them until the builder is happy with the result is one of the things that keeps the practical side of this hobby alive and enjoyable. But there are limitations.

The Pixie and its clones were designed to be simple and adding extras to the circuit can be likened to "making a silk purse from a sow's ear". It is not possible to make a Rolls Royce by adding extras to a Ford. If you want a sophisticated transceiver, then you must start somewhere else!

Pixie Type Ideas

I thought it a good idea for *PW* readers to explore some of the Pixie-type ideas. So let's begin with a transmitter.

The version of the transmitter I like best is the one produced by the VU QRP Club (India). Here, K.P.S. Kang VU2OWF, of the recently formed VU QRP Club has designed several club projects based upon very small printed circuit boards.

The first of VU2OWF's designs which I saw and built was a transmitter based on the W6BOY Pixie. The finished transmitter is tiny and fits on a p.c.b. only 20 by 20mm. It is smaller than the famous ONER transmitter.

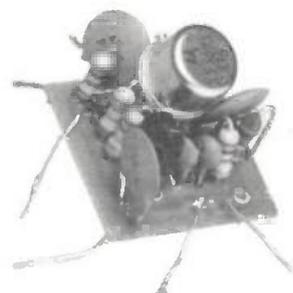


Fig. 1: Believe it or not but there's a VU transmitter in here! (see text!).

The photograph, Fig. 1, shows the VU transmitter size and perhaps where it cheats slightly. (The p.a. transistor has to be raised above some of the other components to fit on the board).

I like the VU circuit because it uses common parts and it is usable on any band from 1.8 to 10MHz. With the right values and good ('gainy') examples of both transistors, it can produce about 1W of r.f. output on 14MHz.

The circuit needs good samples of the two transistors...and perhaps a following wind! But it is easy to get at least 500mW output on 14MHz. Incidentally, this is an excellent band to use a small amount of power. Even a dipole at modest height will produce many useful contacts with low power and the version I give here was used on 'Twenty'.

The Circuit

The VU Transmitter is the left-hand portion of the circuit of Fig. 2. Transistor Tr1 is a 2N3904 *npn* transistor although many similar devices would do the job. (Take care with the lead-out of the 2N3904, as the collector and emitter leads are the opposite way round from most transistors).

The transistor oscillator is in a Colpitts oscillator configuration with C2 and C3 forming the feedback divider. The oscillator is crystal controlled but the trimmer capacitor C1 provides some useful frequency shift. (It can be a small variable capacitor or a trimmer).

Maximum capacitance should be in the 50 to 75pF range. Larger values



The prototype 'PWixie' as built by G3RJV.

offer more shift but attempting to move the frequency too much will produce instability and eventually the oscillation will cease.

The capacitor C4 couples the signal to the power amplifier, Tr2. The biasing resistor R5 controls the output of Tr2. Usually a value in the range 33 to 100kΩ is suitable. The higher the value, the higher the output of Tr2. (I suggest that Tr2 is not run higher than 1W of r.f. output power). It will get warm, so a small 'star' heatsink ought to be fitted. Have look at the internal photograph of Fig. 3.

The collector load for Tr2 is the choke RFC1 (a home-made r.f. choke). It's easy to make, you just need to carefully wind 12 turns of 0.16mm (38s. w.g.) enamelled copper wire (any small gauge wire will do) through a Ferrite Bead.

nominal 50Ω and the transmitter works well into a 14MHz dipole or other antennas through an a.t.u.

The PWixie Transceiver

The PWixie transmitter...well what other name could I give it? This is because it's a version of the PIXIE transceiver for the PW constructor!

Let's now follow what happens when the transmitter is keyed. The oscillator Tr1 is supplying Tr2 with an r.f. signal. When the key is down, Tr2 conducts and amplified signal appears at C4 and goes via the low-pass filter to the antenna. Result? - we have a transmitter.

When the key is up, Tr1 is still feeding Tr2 with a signal and Tr2 is still joined to the antenna via the low-pass filter. So two signals, from the

In practice it's very easy to overdrive the LM386 but the prototype I built suffered no such problems. If this does occur, in individual examples, the overall gain could be reduced by making R6 a lower value.

In the interests of stability, the filter (R11/C17) should be included on the output. Additionally, remember that the decoupling capacitor (C15) should be as close as possible to pin 6 on IC1.

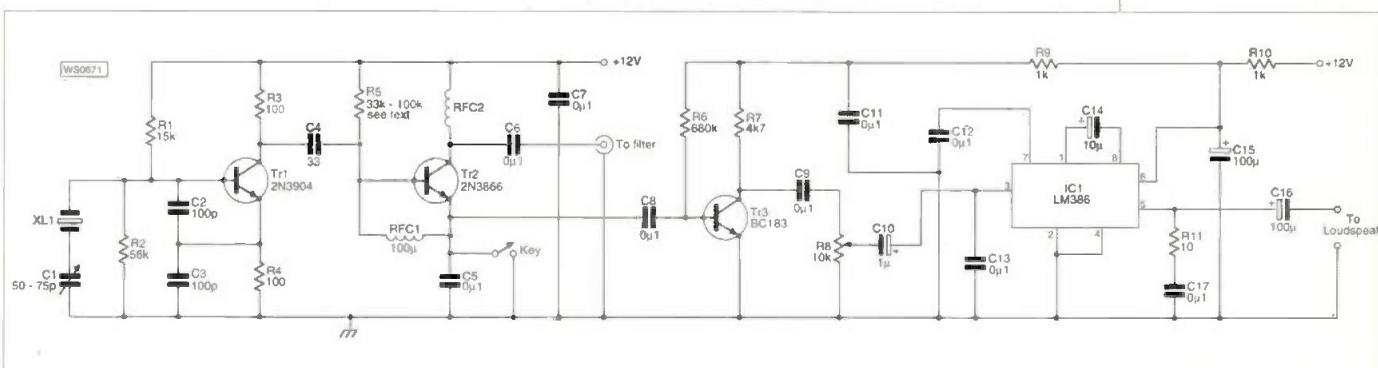
I built my version of the PWixie in one evening in a 50g tobacco tin using 'ugly' construction. All the grounded leads were soldered to the base and the rest of the parts were joined point to point.

I use a miniature 70pF trimmer for C1. The low-pass filter is external to the transmitter which means I can use



Fig. 3: Inside the 'container' used for the 'PWixie' built using the 'ugly' technique. Non-smokers will have to source an alternative housing!

Fig. 2: Circuit of the 'PWixie' transceiver as built by G3RJV.



The other choke, RFC1, is a small 100μH axial choke which is essential when using Tr2 as the receiver mixer. It also provides a useful r.f. load on the input of Tr2 and increases the drive to Tr2.

Transmitter output is coupled from the collector of Tr2 via C6 to a low pass filter. (Note: A low-pass filter is essential, even with the lower power transmitters). This is because Tr2 runs in Class C and has high harmonic output which requires filtering before the signal reaches the outside world. To, help I've included the circuit of a low-pass filter, Fig. 4, with suggested values for various bands laid out in Table 1.

Also the low-pass filter is the only tuned circuit on the input of the receiver. This filter is a seven element low-pass filter following the design tables of Ed Wetherhold, W3NQN.

The transmitter is very easy to build and get to work. Output is a

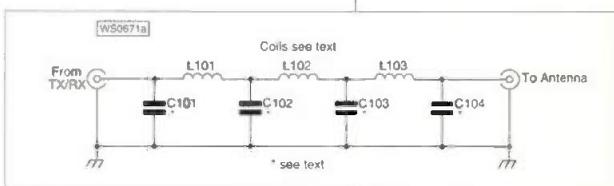
antenna and from the oscillator, are reaching Tr2.

With the emitter above ground, Tr2 is rather like a couple of diodes which can mix the signals from the oscillator and the antenna. The sum and difference of the mixed signals will produce audio signals of both upper and lower sidebands of stations received by the antenna.

Result this time? -we have a direct conversion receiver. When the key is down Tr2 transmits, when the key is up Tr2 receives. Full QSK keying!

The required audio signal appears on the emitter of Tr2 but is of a very low level. A pre-amplifier, Tr3, and a CM386 audio chip (IC1) bring it up to a useful level for listening to signals.

The path from C8 to C16 represents a lot of audio gain and like many direct conversion receivers, the PWixie is very prone to audio hum. It requires either a battery supply or a very well smoothed 12V d.c. supply.



it on more than one band.

To change band all that is required is changing the crystal and the low-pass filter. The filter is one of the little plug-in low-pass filters described in my article 'Roll Your Own Low-pass Filters' featured in 'Carrying on the Practical Way' published in PW March 1997.

So have a go at the PWixie, it might not be 'high' technology but it's quick and cheap to build and can be a lot of fun but remember, there is no transmit off-set frequency. Try to call stations which are nearly zero beat and hope they will listen around for replies. Good building and good (QRP) DX!

PW

Fig. 4: Low-pass filter circuit.

Band (MHz)	C101/104 (pF)	C102/103 (pF)	L101/103 (turns)	L102 (turns)	Core (size/type)	Wire (dia mm)
3.5	470	1200	25	27	T37-2	0.38
7.0	270	680	19	21	T37-6	0.45
10.1	270	560	19	20	T37-6	0.45
14.0	180	390	16	17	T37-6	0.56

WT0673

Table 1: For a more comprehensive filter to use, look at the circuit of Fig. 4.

Crystals for the Amateur bands can be obtained from:

The QRP Component Company, PO Box 88, Haslemere, Surrey GU27 2RF

Kanga Products, Seaview House, Crete Road East, Folkestone, Kent CT18 7EG

QuantSLab Marketing Ltd., PO Box 19, Erith Kent DA8 1LH.

The QRP Calling Frequencies on c.w. are 3560, 7030 and 14060kHz

Wagons

Dayton '97 - Final Report

By Rob Mannion G3XFD

The 1997 Dayton HamVention was blessed with good weather this year, along with many bargains, and many British visitors. Rob Mannion G3XFD was one of them and shares some of the news and views gathered during the hugely popular event.

Fig. 1: (below) The giant flea market is always very popular - especially when the weather's good as it was this year.

Fig. 2: (far right) He told G3XFD it was for 1kW mobile working on 28MHz!

This year we did not run an official PW 'party' trip to Dayton for readers, although several groups came with us on the flight from the UK. In 1996 we flew to New York and stayed for a few days before flying in Dayton. This year it was a case of flying to Cincinnati and driving down to our Hotel at Englewood very close to the Hara Arena.

The final drive to Dayton always seems very long and tiring, but of course most of us were still working with 'body clocks' set to UK time! You soon get into the swing of it and what seems to be a very long and tiring few days passes by at breakneck speed.

Last year's weather at Dayton was rather variable, although warm at times. This year, however the weather for the outside events and exhibits (particularly the flea market) was superb. It was cool, sunny and very comfortable indeed. In fact I met several friends who did not even bother to come in and see 'inside' Hara Arena - they 'did' the flea market instead.

Family Event

The Dayton HamVention seems to be far more of a family event than the large indoor shows are here in the UK.

Roll!



Wagons Roll! It must be Dayton HamVention time again but at least there's room in here for my bed, refreshments, Teddy and me!

I certainly seem to see more 'families' of radio enthusiasts, with everyone from the eight year old to Grandad sporting a call sign and with around 40,000 people attending that's a lot of families!

The little girl I saw in her own miniature version of a 'pioneer' wagon summed it up very well. Mum and Dad kept in contact on 144MHz and shopped, while bigger brothers and sisters looked elsewhere. When the 'little one' got too tired she only had to get back in the wagon and sleep it off!

There seemed to be a tremendous turnover of flea market stall holders. Very often I'd find that a space occupied in the early morning by someone selling vintage receivers was taken by a Morse key collector later in the day. So, in theory you could possibly spend your whole trip to the HamVention just searching the flea market. And some people do just that!

Inside Hara

Inside the Hara Arena this year was far more comfortable than usual. Our stand is now in what appears to be a fast growing 'UK Village'. I say this because this year the G-QRP Club stand (with George G3RJV and friends) were joined by Marcia Brinson 2E1DAY who was running the RSGB's stand 'next door' to the PW stand. The combined presence,

although clearly independent, clearly demonstrates to everyone that Amateur Radio is alive and well in Europe!

And although Marcia, who has attended the show before, was officially alone, she didn't lack support. It was obvious to everyone that the RSGB had made the right decision to join the 'UK away team' in the spot in the roller-skating rink where they expect to find us nowadays and as a result Marcia and her various helpers were very busy.



Fig. 1.



Fig. 2.

New On Show

New items on show this year included the Icom IC-706 Mark II, the number you see fitted permanently for h.f. mobile use in American cars is amazing! Also making itself known was the Alinco DX-701 (recently reviewed in *PW*).

The Drake Company's 'booth' (they're based in the Dayton area) was attracting a great deal of attention. Two of their new products which are



Fig. 3.

of special interest to transmitting Amateurs and s.w.l.s and one - the Drake SW2 Receiver - features in the a review in the July issue of our sister publication *Short Wave Magazine*.

With the dramatic change of their main market (satellite TV reception equipment) the Drake Company is now re-organising itself and is stepping up its interests in the Amateur communications market. I saw the company's new Amateur band main station transceiver the TR270 on display in pre-production form. It looked very interesting indeed.

The TR270 transmits on 144MHz and has receive capabilities on 430MHz and I understand (information to be confirmed) that there will be many different options



Fig. 4.

available. These will include packet radio units, and further u.h.f. 'add on' modules. And as soon as the transceiver is in production and available *PW* will carry a review.

I was also able to see the new SGC Inc's recently introduced SG2000 'power talk' h.f. transceiver with digital signal processing (DSP). This is a transceiver which is very likely to prove very popular with marine mobile operators, vehicle mobile and disabled operators (because of the radical 'remote operating' concept, which is a major feature rather than an add-on option). More news on the latest range of SGC products as soon as we can get hold of them!

The MFJ company had their big new loop antenna on display along with a roller coaster tuner that covers up to 50MHz. These and the new products from Cushcraft (including new h.f. beam antennas) will feature in *PW* soon.

Friends Old & New

Of course, my main job was to be on the *PW* & *SWM* stand for most of the time - meeting friends old and new. Many of our American based readers (these include quite a number of British people who now live in the USA or Canada) take the opportunity to renew subscriptions, friendships and pass on comments to the team on the stand. Personally, I think this is the single most important aspect and although it's incredibly hard work we all enjoy the experience.

We've been attending the Dayton HamVention for so long now that we are all very known and everyone does their best to help in any way they can. The goodwill and co-operation extended to **Kathy Moore**, myself and our more recent member of the team **Dick Ganderton G8VFN** Editor of *SWM*, has to be experienced

to be fully appreciated.

The help and friendship includes the HamVention managerial team who loaned me a special high revolving chair so I could sit comfortably whilst appearing to be standing up talking to



Fig. 5.

visitors. So my thanks go to **Mel Berman** and **Judy Hudson KB8UZZ** for their help which will also be appreciated next year (Thanks for coming to my rescue Batman and Robina!). They're all a great crowd and everyone greets us by name nowadays and it all makes Dayton feel a little less distant from Dorset!

In closing off this year's report on Dayton I think it's easy to sum up the HamVention atmosphere by the actions of people like Mel & Judy and **Rich Kennedy AD4RB**. I say this because when he saw how amused and interested I was in his miniature speaker microphone (in the form of a tiny Yaesu transceiver) Rich promptly went and bought me one as a gift.

I was both delighted and very grateful for Rich's gesture. For me it sums up the International friendship generated by our hobby and I'm looking forward to the exhausting, but rewarding trip in 1998. And I hope to see you there too! **PW**



Fig. 6.

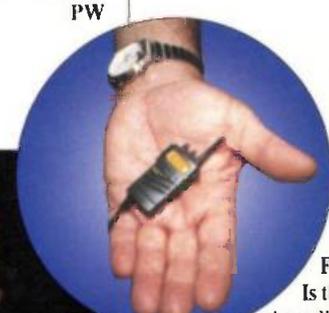


Fig. 6: Is that an incredibly small transceiver on **Rich Kennedy AD4RB's** shirt front? No, in fact it's a natty little remote microphone speaker 'disguised' as a miniature transceiver (close up view inset). As **G3XFD** showed much interest Rich kindly bought him one to bring home! (Thanks Rich).



Fig. 3: (far left) On parade and at your service Sir! This gentleman attends Dayton every year. He specialises in collecting Second World War Military radio and field telephone equipment. Last year he was in full Royal Australian Army Signals uniform of the period, this year he decided to be patriotic and wear an American Army Signals outfit!

Fig. 4: (bottom far left) A popular (and effective) way of advertising often used at Dayton. Judging by the number of Collins for sale/wanted signs in evidence - it's obviously still an extremely popular range.

Fig. 5: (above) At your Dayton HamVention service! The 1997 *PW* & *SWM* team consisting of economy size *SWM* Editor **Dick Ganderton G8VFN**, overgrown **G3XFD** and attractively packaged Subscriptions Manager - **Kathy Moore**.

Restoring Valved & Vintage Memories

By Ian Liston-Smith G4JGT

Ian Liston-Smith G4JGT explains his approach when restoring valved and vintage radio equipment in a safe and economical fashion - resulting in enjoyable 'vintage listening'.

All aspects of vintage radio, particularly the collecting and renovating of domestic sets, have become very popular. Those sets eagerly thrown out 20 or 30 years ago are now often keenly sought after, with high prices paid for some. But a newcomer to this aspect of the hobby need not be put off by the costly image that vintage radio is starting to acquire.

The obvious places to search are car boot sales and bric-a-brac shops. Placing a small ad in the 'wanted' pages of a local paper can also be productive, but be prepared to be called to see radios which turn out to be much younger than their owners' claim!



A fully restored Bush DAC10 receiver.

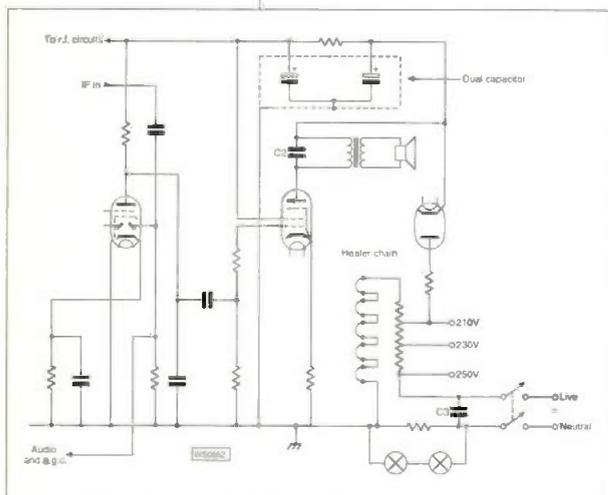


Fig. 1: Circuit showing typical live chassis 'a.c. d.c.' circuitry receiver showing i.f./a.f. supply and audio output stages. Note that the neutral side of the mains is connected to the chassis side of the circuit. Capacitor C3 is the mains r.f. by-pass (see text).

New To Vintage?

If you are new to the vintage aspect of radio, then don't be tempted to pay too much for something which turns out to be too complicated or expensive to complete. For example, if you keep your eyes peeled, a typical 1950s set can be obtained for less than £20.

If the receiver is from the 1950s it's also likely to need less work than something from earlier decades. But if you see something older which is worth the asking price - my advice is buy it!

But I advise that you think twice about buying a set containing v.h.f. circuitry. Not only will it be probably relatively modern (ie. post 1956) and more complicated, but it will also require a fairly well equipped workshop if the v.h.f. section needs realigning.

A rough estimate of a set's age, without looking inside, can be gauged by reading the station names on the dial. The 'Light Programme' was introduced in 1945 and the 'Third Programme' in 1946. However, bear in mind that pre-war dials were used by a few manufacturers for some time afterwards.

Much of the following will be familiar to the more experienced 'restorers' amongst *PW* readers. But I hope that this article will give the less experienced reader a general grounding to obtain their first working set, and provide a few useful tips along the way.

Reasonable Price

Once you have spotted a likely looking radio at a reasonable price, closely check the dial for damage. Any significant deterioration is not usually repairable, and detracts from the finished appearance. Keep an eye out too for a cunningly replaced knob which doesn't quite match the rest.

Don't forget to look at the back or base. In most older sets it will be made from a compressed fibre material. Check that it's attached and not too badly scorched, as happens with some models.

Providing the case has no serious defects, it's usually possible to bring it up like new. This is relatively easy with a Bakelite cabinet, but wood often demands much more attention to restore to its original condition. Books on furniture restoration should then be referred to for more detailed information.

Dismantling & Cleaning

Now it's on to dismantling and cleaning your find. First, remove the

knobs. This sounds simple (and usually is) but some of those which just appear to pull off, contain hidden grub screws. These are often only accessible through the bottom of the case or from the back with a long bladed screwdriver.

Next, take the chassis and speaker from the case. Locate the mounting screws for the glass dial, and carefully remove it. Note that the rubber grips often used in the mounting can pull off the dial markings if they are disturbed.

Cleaning the dial can be a very tricky business. Most are marked with transfers that will slide off on contact with water. A solvent can occasionally be selected which is harmless to the lettering, but unless it is very grubby just gently rub the dial glass with a dry cloth. The outside surface can of course be cleaned with any glass cleaner.

Re-painting the pointer and washing the surface behind it will also enhance the radio's finished appearance.

Bakelite Easy

A Bakelite case is generally quite easy to clean. Following removal of the chassis and electrical parts, using a mild soap solution and a session in the shower with a brush will remove dirt very effectively. After this treatment however, the case will be quite dull once it's dry.

The shine can be restored by applying a few thin coats of appropriately coloured shoe polish, allowed to dry, and then polished between applications. If properly buffed it will not come off on your hands. The secret to a really good shine seems to be to leave it for a couple more hours before giving it a final rubbing with a soft dry cloth.



Knobs are best cleaned with soap and a toothbrush, and any embossed white markings can be restored by using a sharp cocktail stick or pin to remove any loose paint still in the grooves. Then clean it again with the toothbrush and soap before finally drying.

Next, you can roughly paint a light coat of Tipp-Ex type correcting fluid over the lettering. Once the Tipp-Ex is dry, polish it with normal furniture polish. This will dissolve the excess, and leave the embossed lettering looking like new.

The success of the method depends on the depth of the moulding, and a few attempts may be required to get the best results. Please note that the solvents used in typewriting correction fluid can attack some forms of thermo-plastics and varnished surfaces. My best advice is to use very carefully and sparingly and protect surfaces you don't plan to coat with Tipp-Ex!

Circuit Helpful

Before starting work on the chassis, a copy of the circuit will be extremely helpful. To this end, many reference libraries have copies of *The Radio & TV Servicing* manuals published by Newnes, which contain most British models from the early 1950s onwards. The circuit diagram, voltages, i.f. frequencies and modifications are all included and are invaluable.

The books also describe general fault finding and alignment techniques. For models which are not contained in these volumes, suppliers of service sheets can be found in the back of *PW* and similar magazines.

Live Chassis

Before you start check whether the model you're going to work on is a 'live chassis' type or not. A live chassis will not usually contain a mains transformer, although some contain an auto-transformer instead of a mains dropping resistor, so beware!

Check the condition of the mains wire and replace if damaged. The neutral lead of a live chassis set should be connected to the chassis side of the circuit, though not necessarily directly to it, as shown in Fig. 1. Nevertheless this cannot be taken for granted and must be checked before work starts.

On some sets the on-off switch only breaks the neutral side, thus turning the chassis **LIVE** when the set is switched **OFF** when correctly wired to the mains. **This will also happen with a single pole mains switch designed to break the live side if the live/neutral wires are reversed.**

All the problems with potential 'Live' chassis equipment can be overcome by using a mains isolating transformer on the work bench. They are expensive if bought new, but well

worth the expense if you intend to do much work on this type of equipment.

Using an isolating transformer also allows signal generators and oscilloscopes to be connected directly to the receiver's chassis. However, a mains isolating transformer **DOES NOT ELIMINATE THE RISK OF ELECTROCUTION**. It's still capable of supplying sufficient current to stop the heart, and h.t. voltages are of course still present with respect to the chassis so the best approach is to always take care.

A receiver containing a conventional mains transformer to provide both h.t. and low tension (l.t.) supplies would not usually have either side of the mains connected to the chassis, so test equipment may be connected to it in the normal way. However, the h.t. voltages contained in the circuit can be significantly higher than those found in live chassis designs.

Remember also that once the earth connection from test equipment is connected to any chassis which is isolated by a transformer from the mains, the h.t. voltages then become live with respect to all earthed objects.

A half inch paint brush used in conjunction with a vacuum cleaner hose is the easiest way of removing the dust so that the condition of the chassis can be seen. This is best done outside because the dust can be extremely irritating and can trigger asthmatic attacks.

Pay particular attention to removing dust from the tuning capacitor and switches. These can be made less noisy by a hefty squirt of switch cleaner, but again be careful to ensure that the solvent from the cleaner cannot come into contact with varnished finishes and thermo-plastics (read the directions carefully!).



Valve Faults

In my experience valve faults are not as common as might be supposed. Providing the heaters are intact (and they usually are) valves with quite

poor emission can provide better than expected results. The exception to this is in the oscillator section where a poor valve here may not oscillate across every band.

Any valves with a white deposit inside the glass no longer contains a vacuum and must be changed. This is because the white deposit is actually the oxidised remains of the silvery 'gettering' material (this is 'fired' by a high power r.f. source during manufacture and as it burns in the envelope the reaction removes the last vestiges of oxygen) which has reacted with the air that's leaked in through a cracked envelope or leaky base seal.

A more common valve fault is one of 'microphony' where any vibration of the chassis is amplified and heard from the speaker. Unless it can be traced to a dirty valve holder or bad connection, the valve responsible should be replaced.

Before switching on for the first time, check for any obvious visible faults and put a 1A mains fuse in the mains plug. This is an ample current and will give more protection than a higher rating, should a mains short develop. Locate the h.t. line and check that its resistance to chassis is 10kΩ or greater once the measurement has settled. Also ensure that the valves are all in their correct sockets!

Don't put it back into the cabinet yet, but replace the knobs. **And don't touch the chassis - just in case!**

Limit The Current

To help limit the current, should anything be seriously wrong during the initial switch-on, you should connect two 60W bulbs in series with the mains (via appropriate light bulb sockets of course - don't be tempted to solder wires directly to the bulbs!). Take care not to touch any exposed mains wiring. They should glow very dimly if all is well, and a working radio should produce some signals.

My advice may appear to be over cautious, but the set may have been stored in the damp for some years. This can cause problems in the mains transformer and/or various capacitors. In combination with a possible

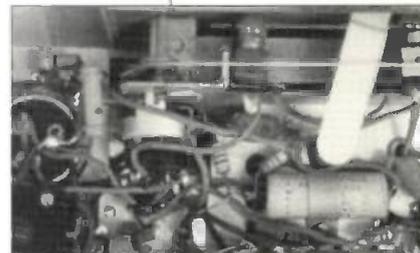


Fig. 2: The underside of a (in surprisingly good condition) Ecco U122 receiver showing waxed paper capacitors before replacement (see text).



Fig. 3: Typical samples of removed waxed paper and metal can type electrolytic capacitors removed from receiver's during renovation.

Fig. 4 (Left): Restored 'memories' from the 1940s and 1950s.

Restoring Valved & Vintage Memories

Continued from page 37



Fig. 5: The fully restored (green Bakelite cabinet) Ecko U122 receiver. One of the rarest 'vintage' sets is the famous 'Green Onyx' Ecko Bakelite cabinet type 'Saucepan' shaped receivers of which only two or three were ever made.

original fault, any sudden application of inappropriately fused full mains voltage could result in additional damage.

Leave the receiver connected like this for a few minutes. Providing no unpleasant noises or smells appear, the full mains voltage can then be applied. But be ready to

disconnect at the slightest signs of trouble!

You may be lucky and consider the performance to be satisfactory at this point, but few radios this old will be working at their best. This is where the real work starts!

Component Replacement

Please be aware of the dangers of working with equipment containing h.t. voltage. You may think I'm stressing the danger too much, but a safe approach is especially important when working on live chassis equipment without completely isolating it from the mains. It sounds melodramatic, but simply changing a dial bulb could be lethal!

Undoubtedly, the first parts to replace are the waxed paper capacitors. They are easily identified as the round soft sticky components! (See Figs. 2 and 3).

Waxed capacitors are used in most 'vintage' domestic radio sets, and often go leaky, i.e. act as if shunted by a resistor. If they have h.t. across them, this will upset the circuit's d.c. conditions, causing distortion and shortening the life of associated valves and resistors.

The waxed capacitors are often marked as being 350V or 500V d.c. Those with h.t. across them must be replaced with modern ones of similar voltage rating, i.e. at least 50% greater than the voltage expected across them.

Leaky capacitors across low value cathode resistors won't usually have much effect. But I think they might as well still be replaced.

Any square or rectangular flattened shaped waxed capacitors with values not exceeding about 1000pF in the r.f. stages are mica types. They are usually quite reliable.

Electrolytic Capacitors

Electrolytic capacitors are also worth changing as they often either dry out and fall in value, go open or occasionally short circuit. Again, replace with the correct voltage rating.

Substituting electrolytic capacitors with up to double their original

capacity will not generally cause any problems (but try to stick to the original values if possible). However, the possible exceptions are the h.t. smoothing capacitors. Higher values here will give better smoothing, but the rectifier valve may not be rated for the increased initial charging current.

If the h.t. smoothing capacitor(s) require changing, make sure that any dual electrolytic capacitor replacement has its red terminal connected to rectifier cathode side of the power supply and the yellow terminal to the receiver h.t. side. The black terminal or case is usually connected directly to the chassis. (If in doubt check the information on the side of the electrolytic 'can' which is often obscured by the fixing clamp).

It's a good idea to 're-form' the h.t. smoothing capacitors before use. This involves connecting them through a 22kΩ resistor to their full rated voltage for an hour or two.

The capacitors are unlikely to have been recently manufactured and the sudden application of full h.t. may occasionally cause them to explode! A final leakage current of about 500μA per μF at the working voltage is normal when fully re-formed.

Capacitors found connected directly across the mains (C3 in fig. 3) are an attempt to reduce mains borne r.f. interference and are often problematic. Substitutions should be modern types designed to withstand a.c. mains voltages, although some vintage radio restorers recommend their complete removal.

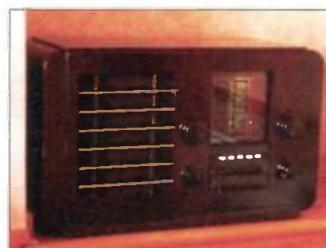


Fig. 6 (Right): A restored Ecko A23.

Any perished rubber coated wiring should be replaced. This tends to be worse where the wire has got hot, most commonly near the mains dropping resistor.

Switch On

Now switch on again and see how the receiver behaves on all bands. Hopefully it should be working reasonably well, since the removal of the above capacitors is already likely to have cured a number of faults.

The next stage is to check the d.c. voltages against those given with the circuit information. Differences of up to about ±15% can be tolerated, but anything greater than that should be investigated.

Bear in mind that the voltages provided were probably taken with a voltmeter less sensitive than those used today. So some voltages may be

higher than expected when measured with a modern meter.

Resistors in screen and anode circuits can go high in value, especially if they normally run hot. So check these first if voltage readings are significantly different from those expected.

Tone Correcting

Many of the older domestic sets had quite crude methods of 'tone correcting'. The most common way was to put a capacitor across the primary of the audio output transformer as in Fig. 1. This also went some way to remove the 'shrillness' of third harmonic distortion introduced by the output pentode.

But you must remember that the audio output stages of the older receivers were designed when the audio processing at the transmitter was significantly different from that used today. Broadcasters have introduced these changes over the years for a number of reasons, making some of these sets now sound dull and 'woolly'.

If you wish, the 'woolliness' may be alleviated by reducing the values of the capacitors C2 (fixed tone corrector) and C1 (i.f. by-pass) shown in Fig. 1. **Ensure that the working voltage for replacements used for C2 is at least 700V d.c.**

The effectiveness of the changes I've suggested will depend on their original values (which may have been chosen so as not to have a significant influence on the audio response) and also the receiver's i.f. bandwidth. However, they are worth experimentation, but instability may result if the capacitors' values are reduced too much.

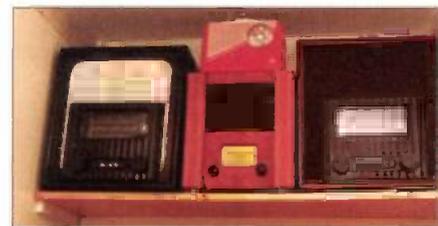
Fully Functioning

Once the set has been re-assembled, you should now have a fully functioning radio. It has probably not been working so well or looked so good for many years!

There are many areas which I have not covered, but I hope that sufficient information has been given to enable you to make a start in this particular aspect of our hobby. Breathing new life into old equipment is most rewarding...and I hope you enjoy your 'vintage' listening!

PW

Fig. 7: (From left to right) A restored Murphy A28, a 'Wartime Civilian Receiver', Murphy A90 and a KB 'Scarlet Rhapsody' (centre, standing on top of WCR).





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An Absolute Cra

By Goodall GOSKR



John Goodall GOSKR takes a look at the latest dual-bander to come from ADI Communications.

In today's modern world of Amateur Radio, technology advances at such a pace that it is sometimes difficult to keep up. Everything new you look at in the local emporium, appears to have shrunk in size. Everything, that is, except the price tag!

So it's rewarding to find a manufacturer that appears to move from this trend. The ADI Communications company have been around for some time now, and it was a pleasure for me to put their AT-600 dual-band hand-held through its paces.

The AT-600's appearance is unique because including the supplied standard battery pack, the size of the little beast is only 160(H) x 55(W) x 34mm (D). The upper protrusion of the hand-held takes the width to approximately 70mm. This upper protrusion makes the equipment very comfortable to hold, for either right or left hand operation. The protrusion also houses the push to talk (p.t.t.) and Function button.

Uncluttered Layout

The front panel layout of the AT-600 is uncluttered and easy to operate. It has the usual 16, dual function, numbered and lettered button keypad. The functions of the keypad, I shall mention later.

Above the keypad is situated the backlit dot matrix l.e.d. This is a comfortable 35 x 15mm. Below and slightly to one side of the keypad is located the internal electret microphone, being easily identified by four tiny holes in the outer casing.

Above the display can be found the internal speaker. This has four horizontal slots in the casing, to allow the audio to be comfortably heard. To the left of the display and speaker slots are situated three individual buttons.

Starting with the uppermost, which

for ease of identification is coloured Orange, is the On/Off button. Pressure on this and holding in for one second, toggles the radio between On and Off.

Below this is the Squelch Off or Monitor button. This is used to open the squelch of the band in use, to monitor if the frequency is being used with a signal below the set squelch level.

The last of the three buttons is the internal illumination button. This toggles between On and Off the backlight for the display and for the keypad. Together with the Function button the light can be switched on and allowed to remain on.

On the left of the protrusion, comfortably placed and easily operated, is the p.t.t. Above the p.t.t. the Function button is located. This is used in conjunction with the dual functions of the keypad buttons. Holding this button, and then pressing one of the keypad buttons, gives the dual function of that button.

The top panel of the hand-held sports the usual BNC antenna mount, three sets of rotary controls, sockets for the insertion of an external speaker or microphone, and a dual colour l.e.d. The two front rotary controls, are two tier.

The lower controls operating the squelch level, whilst the upper controls the volume. The left hand pair operate the v.h.f. band whilst the right hand pair operate the u.h.f. band. I found this very convenient when monitoring both the v.h.f. and u.h.f. bands.

The last control on the upper panel is the encoder for the v.f.o./Memory channel. In v.f.o. mode this rotary control varies the frequency, up or down to the selected step size. In Memory mode this control changes up or down the memory channel number. The dual colour l.e.d. shows green when a signal is received and red when the unit is transmitting.

Default Settings

The factory default frequency settings for the AT-600, allows the unit to receive over the following ranges. 130.00 - 172.00; 350.00 - 399.995; 400.00 - 470.00 and 900.00 - 985.00MHz.

Included with the radio, is a simple software modification, which enables the user to expand the above frequencies, using only the keypad.

Once expanded the AT-600 gives

wide-band receive capabilities over the following frequencies: 100.00 - 199.995; 350.00 - 399.995; 400.00 - 499.995 and 850.00 - 999.995MHz. This is quite an impressive range of frequencies, and together with the radio's ability to switch between a.m. and f.m. is very useful indeed.

The AT-600 comes from the factory complete with a flexible dual-band antenna, belt clip, carrying strap, 7.2V 700mAh NiCad battery pack, 240V a.c. standard battery charger, and comprehensive owner's handbook.

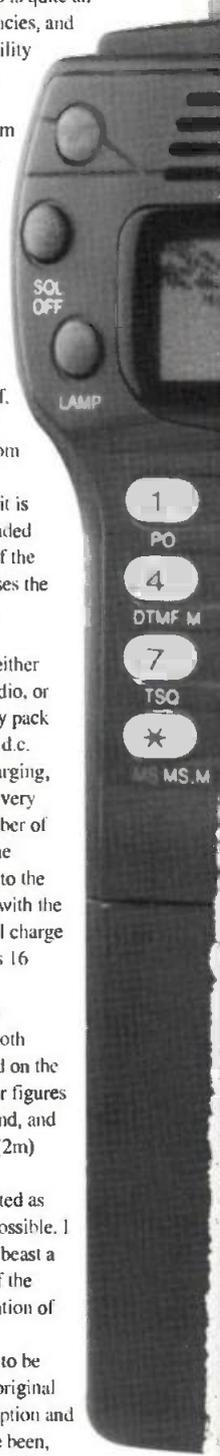
The installation of the battery is simplicity in itself. Simply slide the battery on easily accessed grooves, from left hand side of the radio, pushing it to the right until it is firmly 'home'. A spring loaded catch at the left hand side of the radio, below the p.t.t. releases the battery pack to facilitate its removal.

The battery pack can either be charged in situ on the radio, or whilst removed. The battery pack has the useful addition of a d.c. input for the purpose of charging, near its base. I found this a very useful facility. A large number of hand-held radios, require the battery pack to be attached to the radio to facilitate charging with the standard charger. The initial charge for the supplied battery was 16 hours.

Once switched on, the operating information for both bands was clearly displayed on the Dot Matrix l.e.d.. The upper figures for the 430MHz (70cm) band, and the lower for the 144MHz (2m) band.

Having read and digested as much of the handbook as possible, I was eager to give this little beast a try. Whilst on the subject of the handbook, just a quick mention of its ease of reading.

Some handbooks tend to be poor interpretations of the original language, this was the exception and easy to follow. It must have been, because I managed to follow it!

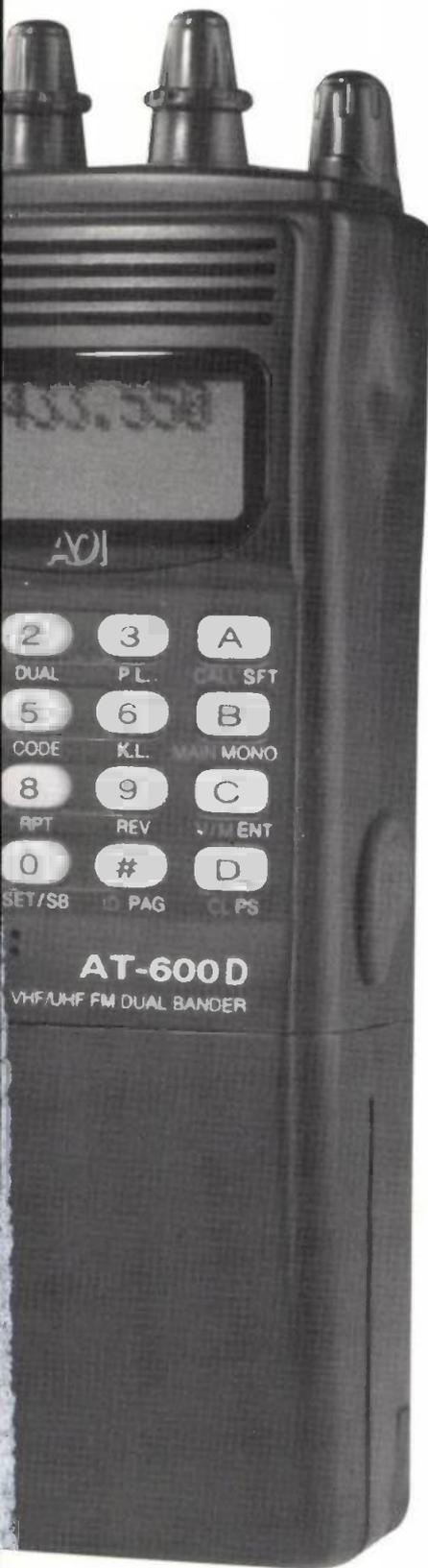


Manufacturer's Specifications

Transmission Frequency Range	v.h.f. 144.00 - 146.00MHz u.h.f. 430.00 - 440.00MHz
Modulation Type	F3
Microphone Impedance	600Ω
Speaker Impedance	8Ω
Operating Voltage	6 - 16.0V d.c.
Receiver Type	Dual Conversion Superheterodyne

The ADI AT-600 Dual-Band H

Cracker!



Hand-Held

Practical Wireless, August 1997

Built-in Guide

Like many modern transceivers, the AT-600 has an inbuilt Menu guide, this makes life so easy when you don't happen to have the handbook with you. To access this facility simply depress the Function button situated above the p.t.t., and follow this with the key for 0 (zero). You then have at your fingertips, (and the keypad is well prepared for those of us with large digits) 30 very useful menu items.

By simply turning the Channel encoder on the top of the unit, each menu item appears in the display. Certain items of the Menu are briefly mentioned as follows:

AM Mode On/Off	This toggles between a.m. reception and f.m. reception.
Attenuation On/Off	This toggles between attenuation On or Off.
Automatic a.m. function On/Off	When switched on, this automatically selects a.m. in the segments of the receive band likely to receive a.m. signals, e.g. Air Band, 118.00 - 136.00MHz.
Duplex Mode On/Off	This toggles between normal and full duplex operation.
Memory Set 120/200	Toggles between 120 and 200 memory capability - when using Alpha-Numeric display 120 must be selected.
Offset VHF 0.6 - UHF 7.6	Allows changes to be made to the offset (repeater) frequency. As can be seen, the default for the u.h.f. 430MHz band is 7.6MHz - this MUST be immediately changed to the local 1.6MHz offset. If you fail to do this you will talk to nobody!
Time Out Timer off - 1 - 15 mins	This is a very useful addition for those of us who tend to be a little long winded, as it terminates your transmissions at the pre-set time. (But - you can leave it switched OFF)
Voltage display	Displays the current voltage of the battery pack in use.
Cross Band Repeater On/Off	The default of this mode is OFF and as operation of the unit in the ON position is NOT allowed under the terms of our licence. I think it should left OFF. Holding the function button whilst turning the encoder, toggles each of the items through its facilities.

The keypad of the AT-600 is easily laid out in four rows across, with four rows down. Numbers 1 through 0, with a star to the left and hash to the right of the 0, occupying the first three rows down. The fourth row of buttons are lettered A, B, C, and D from the top down.

Programming of the radio is simplicity itself. Just set the required frequency on the desired band by direct entry on the keypad. By simply pressing B on the keypad enables you to move between bands. The band in operation, being indicated by MAIN being displayed on the screen.

Memory Frequencies

Entering frequencies into the memories I found much easier than on my own hand-held from one of the larger stables. With the AT-600 you simply select the frequency using the v.f.o, press Function and C, choose a channel number and - hey presto - that is it.

To then modify each memory with the correct Alpha-Numeric identification was almost as simple. In the space of 45 minutes I had all 144.00, 430MHz, Marine Band, Air Band and other useful frequencies, complete with identifications, entered into memories.

The radio has three power level settings, giving 2W on high, 7.2V (1.8W on u.h.f.) or 5W with 13.8V; 2W on Medium (1.8W on u.h.f.) 7.2V or 13.8V; 350mW on Low for both v.h.f. and u.h.f., 7.2V or 13.8V.

Incredibly Priced

I think that the AT-600 is an incredibly well priced radio. It's an absolutely little cracker of a transceiver and I had a job to stop my friends from stealing it!

The transceiver is amazingly sensitive, with truly excellent audio on transmit and receive and I've proved it's also very selective with no sign of the 'wide area paging' problems associated with hand-helds on 144MHz. And although not officially 'filtered' for 12.5kHz channel spacing I set it up for this and it worked very well, even with strong adjacent channel signals.

The only problem I found was with the 1750kHz toneburst. This was facilitated by pressing p.t.t. then D on the keypad, followed by A. I found this somewhat awkward with one hand and certainly not to be advised when operating mobile. However, the radio is fitted with full CTCSS and DTMF as standard.

However, altogether I found that the AT-600 is a smashing hand-held transceiver providing excellent value for the price of **£279**. My thanks go to **Waters and Stanton Electronics** (who are the official importers of ADI equipment to the UK) of **22 Main Road, Hockley, Essex SS5 4QS. Tel: (01702) 206835** for the loan of the review model. In addition to Waters & Stanton the AT-600 can be purchased from all ADI approved dealers and Maplin Electronics shops. **PW**

The top panel showing BNC socket, the two foremost rotary controls which are two tier and the encoder control (see text).



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- Size of each unit: 410Wx135Hx410D

PRICE: £TBA

Ham Radio Ticket - USA Style

By John Teale N7FKV

John Teale N7FKV looks back on his early days in radio, his transition from RAF style training and Army service to getting his American Amateur Licence.



I have been involved with electronics most of my life, first in England where I was born and afterwards in the USA. I learned the Morse code early in life, probably when I was about 14 years old.

I was an Air Cadet in the Bailey (West Yorkshire) 185 Squadron, Air Training Corps. Remembering that squadron number reminds me of when I joined the Army when I was 18 years old.

Being in the Air Training Corps (ATC) and joining the Army doesn't exactly 'jive' and don't think it didn't 'irk' me especially after putting in all those dedicated years looking forward to the great day when I would be joining the 'real' Air Force, only to be turned down because their ranks were full.

I had to report to Colchester Barracks in 1944. There I met Sergeant Moon (his real name) and will I ever forget him? (Never!) He told us that he was issuing us with our official Army numbers and that it was a number which we would never forget.

I'm not sure whether Sergeant Moon's words were an order or a friendly suggestion. Regardless, I never did forget 14828445, the number I was assigned. I even use it today to make out my Washington State Lottery entries. I've never won a prize yet, but I'm still hoping!

It was the same with Morse code. I never forgot that either, although I won't say that I was ever what you might call 'a whizz' at it. But at least I did learn the Code and what is more, I never forgot.

There is a chap, an American, who lives not too far from where I live now and he is the USA (if not the World) Champion Morse Code expert. He can take down Morse code faster than I can write. Don't quote me, but I believe it is something like 76 words per minute (w.p.m.)!

Essential Requirement

The ability to read Morse code was, (note I say was) an essential requirement of getting any Amateur Radio licence here in America. However, now they have changed things a bit.

Perhaps it is because of what they call 'lobbying' in Washington DC. Perhaps the Japanese manufacturers Yaesu, Kenwood and Icom 'lobbied' the American Government and persuaded them to bring out their 'No Code Licence'. Sell more equipment if a whole lot more people have licences, even 'No Code Licensees'. (No, the \$ sign in 'persuaded' isn't a typo!).

Back in the 1960s if you got a Novice licence, it was good for just one year. If you didn't advance to a higher grade, (Technician at least), it was a case of 'pull the plug' and shut down completely. You could actually be put in jail if you got caught transmitting without a licence. In this year of our Lord, 1995 the US Government has become a bit more lenient.

Awesome Examination

When I first obtained my Technician licence and later my General licence, I had to attend an awesome examination at the Federal Communication Commission (FCC) Licence Office in San Francisco, near to where I lived at the time. That was for my Tech' licence. For my 'upgrade' to General, I had relocated to Washington State so I attended the Seattle FCC office.

Nowadays, it's different. You simply attend an examination session at any one of perhaps a dozen Amateur Radio club meeting halls. They do have to be accredited by their Amateur Radio Relay League (ARRL), but it has saved the Government countless dollars in not having to assign personnel to take care of giving licence examinations.

Item Of Leniency

There is another item of leniency. In 'my day' if you flunked your exam you only waited a month until the next examination!

However, now there are exams going on every weekend, somewhere within easy driving distance of where anyone lives. You can make a career nowadays out of taking exams and flunking them, on a weekly basis!

I will never forget the Saturday morning when I attended the FCC office in the Federal Building in Seattle, Washington. It was in the early 1980s and I had already passed my 'written' examination comprising questions on electronics, FCC Rules and Regulations, etc. It was now time to take my 13w.p.m. Morse code examination.

From where I live, you have to take a ferry the 12 miles (20km) across the Puget Sound to get to Seattle, or drive about 75 miles (121km) round the bottom of the bay and up the Interstate Highway-5 (a motorway) to Seattle. With the traffic, you tend to be exhausted by the time you get there, so I took the ferry. A relatively pleasant one hour sail across the normally placid waters from Bremerton to Seattle.

Overflowing Room

I got to the appointed room in the

Federal Building on time, but I was a little dismayed to find it packed almost to overflowing with applicants. Regardless, I managed to elbow my way to the corner of a table and find just enough space to set my writing pad down and perhaps a little awkwardly, write.

There were fellow entrants almost rubbing elbows with me on both sides. I looked at my competition. They were both men in their 40s. They seemed to ooze confidence. I thought this is just a formality as far as they are concerned. They will just breeze through this little lot!

Listening & Understanding

The test began. A short 'warm-up' to start. Not to be taken seriously. Then the test began in earnest.

You think five w.p.m. is fast? Try listening and understanding 13w.p.m. Unless you are thoroughly familiar with copying the code you might consider it impossible for anyone to make any sense out of it - not true. It just takes practice. Like some of these concert hall musicians, pianists, etc., they must practice, practice, practice, every day in their life.

It's the same with Morse code. You just can't take it easy and expect to be able to take down fast code after months or even weeks of not doing it. The test seems to take an eternity. In actuality, it is only ten minutes, but it feels to be a lot longer at the time.

Five minutes into the test, the participant at my right elbow suddenly threw his pen down on the table and very unceremoniously, to say nothing of disgustedly, stomped out of the room. He had had it. He called it quits right there and then.

Such a display of emotions, is enough to make even the most confident applicant want to join in the exodus. I think it is called a 'sympathetic reaction'. I know it almost precipitated me into doing just what he had done, although I'm glad I didn't.

The chap on my left continued, seemingly unaffected by this minor, unexpected display of tantrums. Then the examination tape came to an end. Thank God!

Test Results

We were permitted to bring our answer sheets up to the front of the room, where a somewhat stern looking (but actually pleasant when you got to know her), old gal who was running the show, took them from us. We were not rushed into surrendering our test results.

The fellow on my left performed

exactly as I imagined he would. He was a 'shoo in'. No doubt about it. No problem with him whatsoever. He was among the first to surrender his answer sheet. I held onto mine while I studied what I had written down and decided to make sure that the answers I put on the exam sheet was exactly according to what I had heard.

Every now and then, the old gal would call out the names of those who had already bought in their answers. As they came up to the front, she would greet them with either 'Congratulations' or alternatively 'Sorry, try again next month'.

She called out the name of my 'friend' on my left. To my utter amazement, she gave him the 'sorry' routine. I could hardly believe what I was hearing. If he had failed, then God help me! I almost walked out myself, not out of sympathy, but out of sheer cowardice, wanting to eliminate myself from the disgrace of hearing those dread words applied to me. 'Sorry...', etc.

But I didn't walk out. Gritting my teeth, British bulldogged courage to the forefront, I walked up and handed in my results. Then I retreated back to my seat and cowered, waiting. I felt like some hapless victim at the Roman

Coliseum, waiting to be thrown to the lions.

New Privileges

Suddenly she called out my name. This was it. 'Sorry, come back next month'. But wait, that wasn't what she said. Instead she came forth with 'Congratulations! Have fun with your new privileges'. Unbelievable! Incredible! Eureka! I had done it. I was a General! At last! I felt almost like I had won the \$6 million Lottery. Well, not quite!

However, success does tend to give you a bit of a 'chip on your shoulder' sort of thing. (For a while anyway).

Last month I got this nice letter from a fellow 'Ham' who is a regular participant in one of the daily Nets that I join. Her name is Jerry. She lives in Fullerton, California. She is 72 years old.

To be quite accurate, Jerry passed her 'extra class exam on her 72nd birthday'! That requires Morse code at 21 w.p.m. plus a lot tougher written questions. I give up! Now, there is a lady who deserves a chip on her shoulder!

PW

There are four classes of Amateur Radio Licenses in the US. They are: 1) Novice, 2) Technician, 3) Advanced and 4) Extra. Radio spectrum privileges are allocated according to the grade of licence.

Novice class operators were originally not permitted to operate voice transmission at all, they were restricted exclusively to Morse code operation only. They are now permitted voice transmission on a fractional part of specific amateur frequencies, in addition to their Code privileges.

Technicians are permitted slightly more concessions than Novices. General Class Operators can operate on all the allocated amateur radio frequencies, except for small, almost insignificant sections of the various frequencies, which are the official 'domain' of the two advanced license grade operators.

A minor portion of this exclusive allocation is again restricted to an even smaller part of the spectrum, which is dedicated to the exclusive use of the Extra Class licensee operators.



'... seemed to ooze confidence.



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How To Improve On

By Richard Newton GORSN

Richard Newton GORSN takes a look at the IC-706 MkII alongside his own faithful IC-706 MkI. Read on to find out what's new and improved.

As an ardent Icom IC-706 MkI owner and user I was thrilled when the team at *PW* asked me to do a comparison review on the newly introduced IC-706 MkII.

I compared the two sets, side-by-side, switching between them with a coaxial switch. I tested the sets 'On Air' and in the 'shack' using equipment that the average Amateur would have to hand. None of my results were obtained in a Lab environment.

The Icom IC-706 MkI is a radio that took the market by storm about two years ago, and it has become the most talked about and probably best selling radio in recent years. So, I hear you ask, 'Why have Icom brought out a MkII?'

The MkI did attract some criticisms. The output power on the 144MHz band was 10W thought by some as being too low. And the receive sensitivity on 145MHz was not very good unless you used the built in pre-amplifier.

The receive sensitivity above 147MHz was particularly bad. Having said all this I think the Icom IC-706 MkI is an excellent radio, so how do you improve on excellence? Read on....

Significant Changes

Here is an overview of what the more significant changes are in the MkII. Later I will enlarge on some of them, others will be self explanatory.

- * Improved receive sensitivity on v.h.f.
- * 144MHz power output now 2 - 20W instead of 1 - 10W.
- * Heat Sink fan now temperature controlled instead of on all the time.
- * Space now made available for two optional filters instead of one.
- * Easier and quicker ways to step through available bands.
- * Optional CTCSS. decode capability, MkI encodes only with no option to decode.
- * Band 'scope feature now includes 100kHz step and works on Band II f.m. broadcast band.
- * A larger Loudspeaker.
- * Improved audio Tx and Rx with new s.s.b. filter.
- * Sub-dial for r.i.t., memories or click step frequency changes.

Start My Tests

The receive sensitivity on v.h.f. seemed to be the obvious place for me to start my tests. Icom quote the attenuator gives 20dB attenuation for both radios when activated, but do not give details of what the pre-amplifier specifications are.

I tuned in on 145.525MHz one Sunday and listened to G8LVC operating GB2RS from Chandlers Ford. A distance from me of approximately 32km. Below are details of how the IC-706 MkI and II fared.

G8LVC operating GB2RS	Icom IC-706 MkI	Icom IC-706 MkII
20dB Attention Normal	Signal not detected	Signal not detected
Pre-amplifier	Signal strength 1	Signal strength 3
	20dB over S9	Signal strength 7/9

I was surprised that although I had got a far better result on the normal setting, the pre-amplifier setting on the MkI seemed to be better, so I continued to listen and at the end of his broadcast I heard G3EMF call in and speak to G8LVC. Here are the figures I got when listening to G3EMF.

Distant 144MHz signal - G3EMF	Icom IC-706 MkI	Icom IC-706 MkII
Attenuation Normal detectable	Signal not detected	Signal not detected
Pre-amplifier	Detectable under squelch	Signal just
	Signal Strength 3	Signal Strength 1

There was no doubt that the MkII was performing far better on the normal setting, however the pre-amplifier seemed to be more effective on the MkI. I then listened to GB3WR, a distant repeater from me, near to Wells in Somerset.

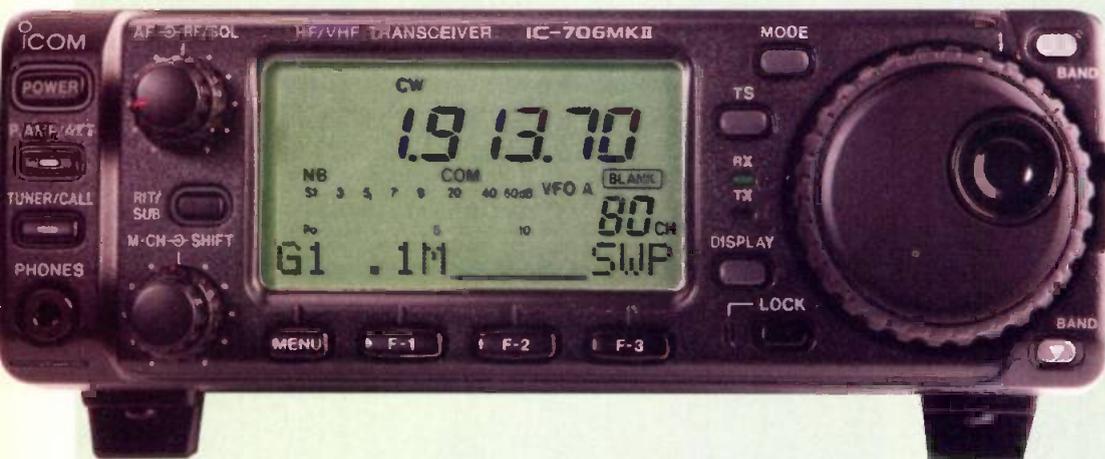
I achieved the same results. On the normal setting the MkII was a vast improvement however, the received signals using the pre-amplifier were definitely in favour of the MkI.

Next I decided to talk to someone, to get a report on the transmitted audio. I caught a local station, Derek G4BRQ from Northbourne in Boumemouth on 145MHz, I spoke to Derek with both radios, not telling him which was which and asked him to report on the audio. Derek said both were excellent, but reported the audio on the MkI had slightly more 'punch'.

Marine & Air Band Performance

Living on the outskirts of Poole and a short distance away from Boumemouth International Airport, I do enjoy listening to Marine and Air band radio. I had been very disappointed with the performance of the MkI on both bands.

So, I decided to see how the MkII fared. I tuned Poole Harbour control on 156.700MHz. And I think the results speak for themselves!



The Icom IC-706 MkII HF

Excellence

Marine Band	Icom IC-706 MkI	Icom IC-706 MkII
Attenuation	Signal not detected	Signal not detected
Normal	Signal not detected	Signal Strength 1
Preamp	Signal not detected	Signal Strength 5

The test for most Air band receivers in my part of the world is to listen for the low power airport information service. This is a continuous loop transmission from the airport giving weather, approach and runway information. Boumemouth International Airport transmits this information on 121.950MHz.

Air Band low power TX

	Icom IC-706 MkI	Icom IC-706 MkII
Attenuation	Signal not detected	Signal not detected
Normal	Signal not detected	Detectable under squelch
Pre-amplifier	Signal not detected	Signal Strength 1/2

Although there is an improvement on 144/145MHz. I found the real and undoubted improvement in receive sensitivity is on frequencies outside of the 144MHz Amateur band.

Channel Spacing

With the imminent use of 12.5kHz channel spacing on 145MHz I paid particular attention to this. Both radios have a front panel switched filter that reduces the transmitted deviation.

The MkII was far better at rejecting strong signals on adjacent channels. I tuned to 145.4625MHz, the MkI with the Narrow filter could detect, albeit slightly, the very strong signal present on 145.475MHz. The MkII however, was unaffected.

There seemed to be little difference in reception on the broadcast band between the two radios. The only difference being that the MkII has the S-Meter enabled on the broadcast band, whereas the MkI does not.

On the h.f. and 50MHz bands there seemed little to choose between the two models.

On the MkI the Up/Down buttons on the radio controlled memories, to go up and down the bands was a two or three button operation. The Up/Down buttons on the MkII are configured to move up and down the bands, making operating a lot easier.

There is also a new front panel menu that configures the F1, F2 and F3 keys into band select keys. These can be set-up to correspond to the three Amateur bands of your choice.

New Function

In particular, one new function on the MkII grabbed my interest. This was the ability to use VFO A and VFO B to 'split' the transmit and receive frequencies. The MkI will do this, but only on the same band. The MkII will do this across bands.

To illustrate this I was helped by my father, John G8EAM in Minehead. For years we have been trying to find a band we can both use to communicate with each other.

The 144MHz band struggles with the terrain, I can hear

Dad as he has more power than I, but he alas cannot hear me. However, he can hear me on 7MHz on his h.f. receiver, but since he has an alleged medical condition called 'Morsecodeitis' this has never helped us much! Until now!

Dad tuned his h.f. receiver to 7.075MHz and transmitted on 144.370MHz, using his 144MHz multi-mode. I on the other hand, with just the one radio, the MkII, tuned VFO A to transmit on 7.075MHz and VFO B to receive on 144.370MHz. We had a direct, cross band QSO which was great fun!

Set-Up Sked

The IC-706 will receive 70MHz but not transmit. I set up a sked with Bob G6DZM, who is a keen 70MHz user. We arranged a talk-back frequency on 145MHz.

Bob parked his mobile station about 16km or so away from me and running 3W into a 4m centre loaded mobile whip gave me a call. In the end I got two Bobs for the price of one! Bob G8NSV from Christchurch called in, he was just a few km away from me as the crow flies.

The results were very interesting. The MkI could only hear G8NSV and that was with the pre-amplifier on. However, the MkII heard both stations in the normal setting.

With the pre-amplifier in, G8NSV was S7 and Bob a steady S3. These results would have been even better had I been using an antenna that was resonant on 70MHz!

An Excellent Job

Icom have done an excellent job of 'fine tuning' an already justly acclaimed radio. The changes that I feel of particular note are the much improved receive sensitivity especially above 147MHz. The excellent performance on 12.5kHz spacing and the ability to use the split facility across bands.

I think both the IC-706 MkI and MkII are superb, no matter if they are used mobile, portable or as a base station. My thanks go to Icom (UK) Ltd for the loan of the IC-706 MkII which retails for £1195 and is available from all Icom approved dealers.

PW

Manufacturer's Specifications

As PW has already run a comprehensive review of the IC-706 MkI in the February 1996 issue (back issues available for £2.30 inc. P&P from the PW Book Store) with a full list of manufacturer's specifications. Those listed here are only those that differ from the original.

Receiver

Sensitivity (pre-amp ON):

SSB/CW (for 10dB S/N)	1.8 - 28MHz	< 0.15µV
	50 - 54MHz	< 0.12µV
	144 - 148MHz	< 0.11µV

AM (for 10dB S/N)	50 - 54MHz	< 1.0µV
	144 - 148MHz	< 1.0µV

FM (for 12dB S/N)	50 - 54MHz	< 0.25µV
	144 - 148MHz	< 0.18µV

Selectivity*

SSB, CW, RTTY	> 3.0kHz/-6dB
	< 4.8kHz/60dB

AM/FM-N	> 8.0kHz/-6dB
	< 30.0kHz/-40dB

FM	> 12.0kHz/-6dB
	< 30.0kHz/-60dB

* Without optional filter and with mid-band selected.



VHF Transceiver Review

Antenna Workshop

It's What a Good Idea Time!

By C. Harlow, R. Putnam, P. Brent & K. Burrows

In the 'Antenna Workshop' this time we turn the pages over to Colen Harlow G8BTK, Richard Putnam G0ILN, Peter Brent G4LEG and Keith Burrows G00ZK. Read how they've overcome problems with their antenna systems. And don't forget that I also need your answers for antenna related problems for the 'Antennas-in-Action' pages every other month. G1TEX

Balanced Feeding

I like using open wire feeders out to my antennas. But how do you get the signal out of the shack as a balanced feed?

I've worked on this problem for some time, and I've finally came up with using unbalanced coaxial cables to do it. Look at the electrical layout of Fig. 1.

From the output of the balanced output a.t.u. you'll see I have taken the two individual output lines through their own coaxial cables. The common screens are joined together at the each end of the run, and to the chassis of the a.t.u. and ultimately to the station (real) earth.

I've found that this method is very effective and does not need expensive high quality coaxial cable. On the run along the bench to the wall both the coaxial cables are bound together and kept in place with suitable flat cable clips (Fig. 2).

On the outside of the shack I've fixed a wooden block (Fig. 3) made out of marine plywood, to the wall with several long corrosion resistant screws. Then I use screw eye fasteners to act as strain relief and anchor points for the

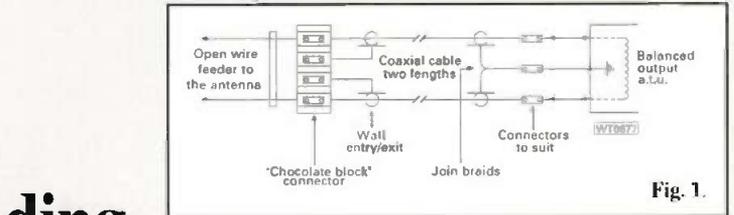


Fig. 1.

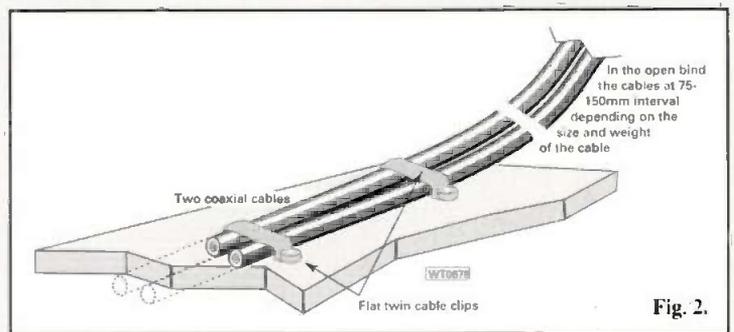


Fig. 2.

open wire feeders.

So, now you can have open wire balanced feeders without worrying about uncovered lines carrying potentially dangerous voltages within the shack. You know it makes sense as well as looking neater.

Peter Brent G4LEG
Crawley

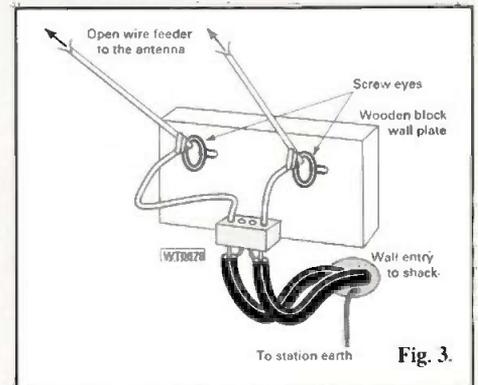


Fig. 3.

Bottling Up!

I live in a house with a garden too small for a full sized antenna for the 3.5MHz band. In fact at only 13 or so metres long it's only big enough for a 7MHz antenna. I wondered how I could lengthen the garden, or shrink the antenna to fit!

I decided that loading coils were the way to go. To keep costs to the absolute minimum I pressed a couple of the square one litre soft drink bottles into service as coil formers.

The coils take up the excess length of wire needed to be a quarter-wave on the band of interest. The diagram Fig. 1 shows how I wound the excess wire onto the bottle. Even on the smaller

bottles four or five turns will take up about a metre of wire.

I found that these small bottles would take about four metres of wire with a reasonable turn spacing. The larger bottles will take quite a lot more wire if you need to 'get rid of' more wire.

The general format is shown in Fig. 2. When you are satisfied with the various bottle coils then a clear glue may be used to hold the coils in place.

I used a hot soldering iron to make the holes in the top and bottom of the bottle. This leaves a nice rounded hole that doesn't chafe the support twine too much. Each end of the coil has a small 'choc-block' connector fitted so I can change bands quickly. As a strain relief 'trick' make a loop in the 'inboard' wire as shown in Fig. 3.

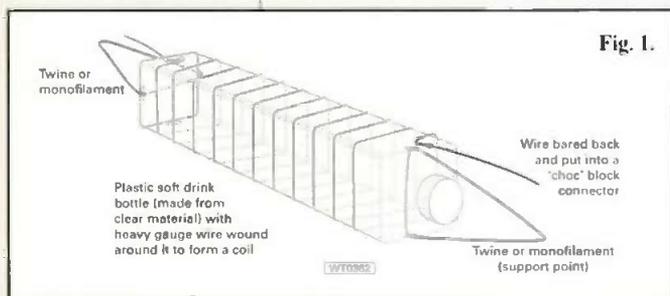


Fig. 1.

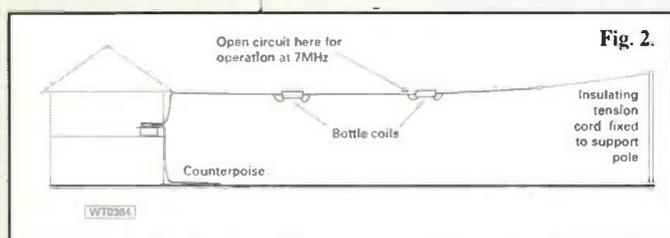


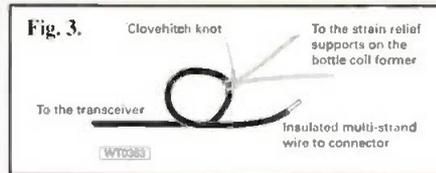
Fig. 2.

With a reasonable a.t.u. you now have a dual-band antenna for 3.5 and 7MHz. You may also find that the antenna may be used on other h.f. bands, but that will depend on the exact layout at your location.

The system I've described lasted

about two years before the first failure. The support twine snapped. But after a quick repair I was back on air again.

Keith Burrows G00ZK
Cheshire



Flat-Dweller's Delight 'Magnetic' Loops For VHF/UHF

Tuned or 'magnetic' loop antennas are physically small for the band that they are tuned on. For many flat dwelling radio amateurs they are the only real option. Tuned loop antennas, as published in previous issues of *PW*, are really the only alternative. The designs shown here are my variants for the 50, 144 and 430MHz bands.

Look at the drawing Fig. 1, I think that all the basic information is on there. Strips cut from large coffee tins are suitable for the two smaller loop antennas. **Take extreme care as sharp edges are created when cutting the tins.** But for the 50MHz loop antenna you will have to find a suitable section of copper strip. Your local model making shop is a good starting point, although suitable metal strip might be expensive there.

You could use narrower strip or even heavy gauge wire, although the dimensions and parameters will probably change. The wide strip gives better efficiency and a wider bandwidth for the antenna.

The 'Butterfly' capacitor has two sets of fixed vanes and one double set of moving vanes. The moving vanes don't need to be connected, they are at virtual earth potential. An added advantage is that there is minimum

detuning due to hand-capacity effect.

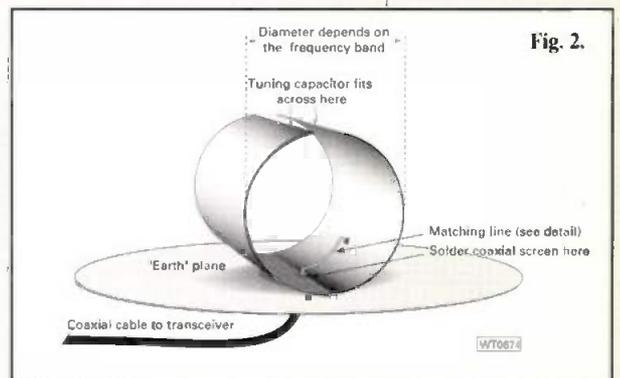
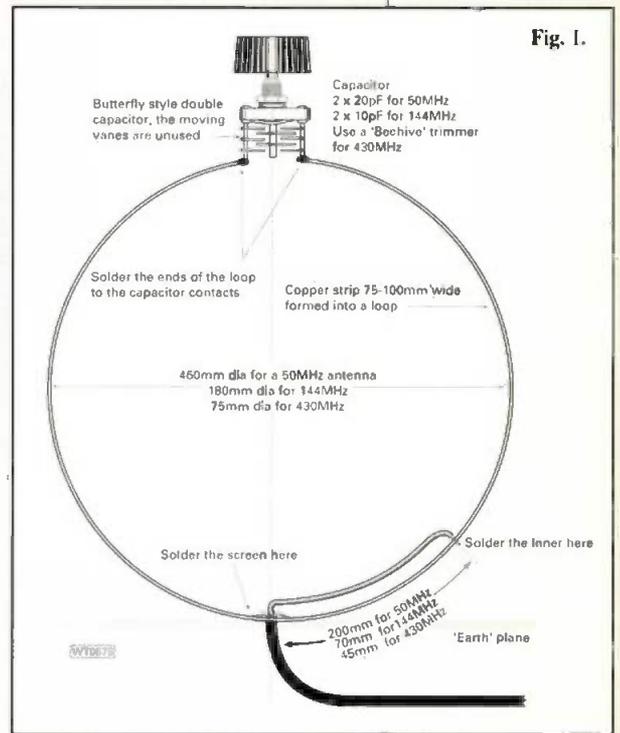
To adjust the antenna, tune the capacitor to minimum v.s.w.r. Then by moving the feedline - loop spacing, and retuning you should be able to get the v.s.w.r. below 1.5 over a band of frequencies.

The 'ground-plane' should be at least 50-75% larger than the diameter of the loop antenna, but the larger it is the more effective it is. It may also be spaced a little way below the loop, but should still be connected to it electrically.

For the 50MHz loop, I ended up using a 900mm square sheet of hardboard covered in aluminium foil. For the 430MHz antenna, I have it perched on a wide metal reflector of a reading lamp purchased at a car boot sale. The drawing, Fig. 2, gives the dimensions for the various bands.

As shown, the antenna has horizontal polarisation, and may be twisted through 90° for vertical polarisation if required. In the time I've been using these antennas, I've worked more than a dozen countries on 50MHz, and had much success on both 144 and 430MHz.

Colen Harlow G8BTK
Worthing



Plugging Away - Rapid Changeover Of Antennas

When using a Z-Match antenna tuner, or other balanced antenna tuner, it's of little use putting an unbalanced plug on the output. It negates the whole idea of a balanced output.

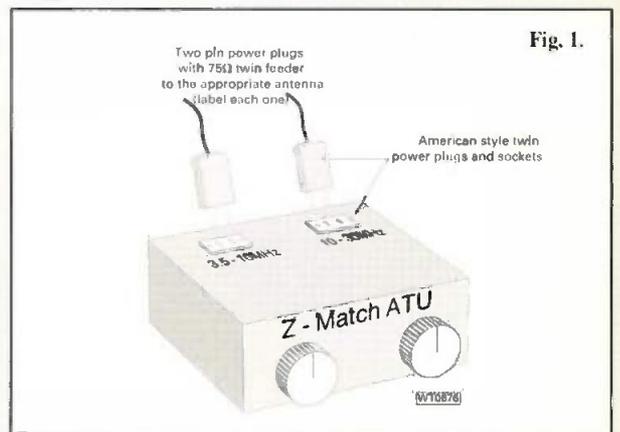
So, if you have several antennas needing a balanced feed, how do you do a rapid switch over without an expensive switching arrangement? My answer to this question is to use the American two-pole power plug and socket arrangement as shown in Fig. 1.

You should be able to obtain the plug and sockets from most electrical component suppliers. (If you are having

difficulty finding them, the Maplin codes are *HL17T* for the plug, and *HL18U* for the socket. The cost is just over £1 a pair. Ed.) Mount the socket on the casing of the a.t.u. The drawing shows a simplified sketch of how it is done.

On each plug, mark the antenna to which it is connected and then you can easily swap bands or antenna very quickly. I've used up to 100W on h.f. with no apparent problems in the two or more years that I've used this method.

Richard Putnam G0ILN
Bexhill-On-Sea



PROFILES

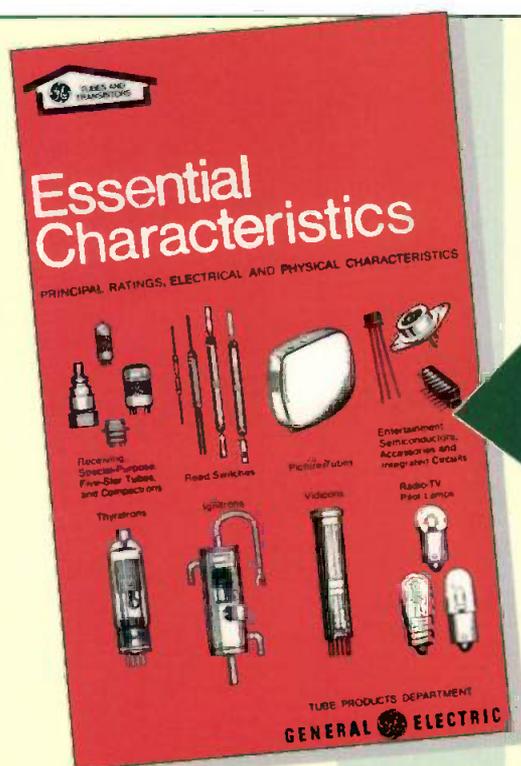
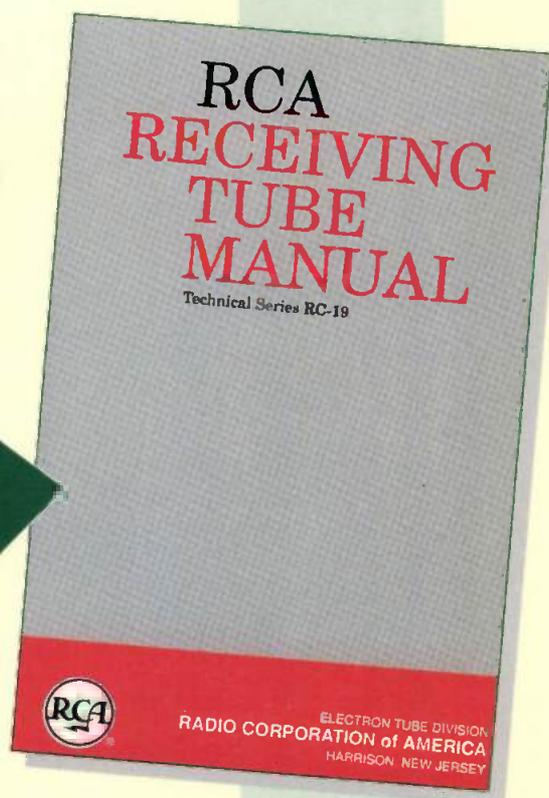
Pactical Wireless readers continue to show a great deal of interest in valves, valved equipment and history. With that in mind the Editorial team have provided an information up-date on the various titles available from the *PW* 'Book Store'. All the books featured this month are American in origin.

RCA Receiving Tube Manual

Reprinted by Antique Electronic Supply

Essentially this popular re-print (in a well presented paperback form) is a designer's handbook. It's not just a valve listing, it comes complete with 'thumbnail' design data for Radio Corporation of America (RCA) receiving 'tubes' (USA 'speak' for valves), application notes, theory, practical circuits, base pin-outs, internal circuitry and lots more. And as it covers in its 384 pages valve theory and applications it's also a very comprehensive manual in an extremely convenient 'package'.

Very highly recommended at just £10.50.



Tubes & Transistors Essential Characteristics

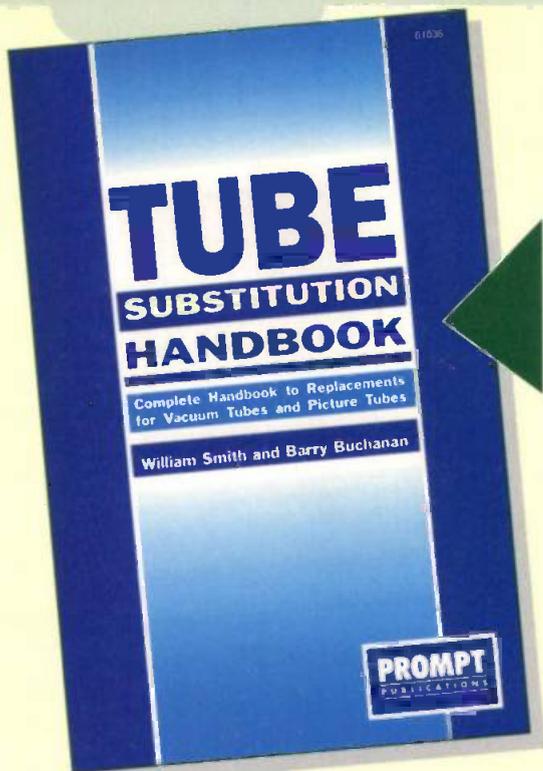
(Principal Ratings, Electrical & Physical Characteristics)

Re-printed by Antique Electronic Supply

This is an excellent companion book to support the *RCA Receiving Tube Manual*. It's a compact 474-page soft-backed book which is packed throughout with essential information on valves, cathode ray tubes, thyratrons, ignitrons (rectifiers), vidicons, special bulbs, reed switches and semiconductors.

It also contains a comprehensive physical characteristics section and valve-base pin-out indexed pin-out section. **Highly recommended.** *Tubes & Transistors Essential Characteristics* costs £10.50.

TO ORDER ANY OF THE TITLES MENTIONED HERE PLEASE USE THE OR



Tube Substitution Handbook

Published by Prompt Publications

Struggling to find a valve equivalent? This book could prove extremely useful as it provides a comprehensive list of equivalents and the publishers state "it lists all known receiving tubes".

The book also provides equivalents lists for cathode ray tubes (c.r.t.s). Valve base diagrams and references are also provided.

A Useful reference source costing £15.50.

RCA Transmitting Tubes

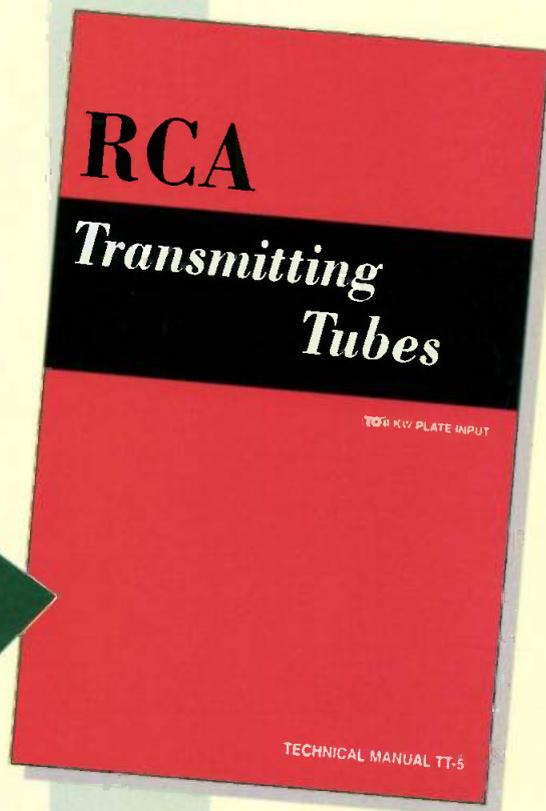
(To 4kW Plate Input)

Re-printed By Antique Electronics Supply

Building a valved linear? This 316 page book could help you do just that!

Covering valves from the 955 'acorn' type (yes it was a transmitting valve!) to well known favourites such as the 833 and 5763, this book is - apart from anything else - a very interesting read.

Packed with information, pin-outs, design data and circuit ideas (including Amateur Band transmitters) this book will prove very useful for collectors and constructors alike *RCA Transmitting Tubes* comes highly recommended at just £10.50.



ELECTRON TUBE LOCATOR



by George H. Fathauer

Electron Tube Locator

Published by Antique Electronic Supply

Ideal for the vintage collector, military radio historian, and anyone interested in valves, this book will prove to be good reference source. Of particular interest to British and European based valve enthusiasts is the British Military Common Valve (CV types) equivalents listing.

A basic description of valve type and function is provided, with good-sized valve based pin-out connections. Presented in a wired-spiral bound format this book is clearly laid out and easy to read and use.

Useful reference source. The *Electron Tube Locator* costs £21.95.

ORDER FORM IN THIS ISSUE OR CALL MICHAEL HURST ON (01202) 659930.

The PW A5

Linking The Rugby Transmitter & Daventry Receiver

By Dave Howes G4KQH

Dave Howes G4KQH describes how you can link the popular Daventry & Rugby 7MHz units together.

The PW Rugby and Daventry projects have certainly stirred up a good deal of interest among readers. However, to enable the Rugby s.s.b. transmitter to transceive with its companion Daventry receiver, you need to add some additional interfacing.

The PW 'A5' linking module (so named because the main A5 trunk road is located between both sites!) is the answer to these requirements. And in my prototype receiver it's mounted on pillars above the rear of the main p.c.b. Construction and installation was very straightforward.

By combining the Daventry receiver, Rugby transmitter and A5 linking module, you too can build yourself an excellent 7MHz s.s.b. transceiver either as 'separates' like the prototype, or combined in one unit. Surprisingly, it's not too difficult either!

Separate Receiver

If you wish to use the Rugby with another separate receiver, then combining the circuit of the Daventry v.f.o. (see Fig. 1, October 1995 *PW*) with just the buffer stages and voltage regulator of the A5 will give you a suitable v.f.o. unit to drive the transmitter on its own.

There are several functions on the A5 board, the circuit of which is shown in Fig. 1. For example Tr101 and Tr102 buffer and amplify the v.f.o. signal taken from terminal 'B' on the Daventry board. Transistors Tr104 and Tr105 interface the push-to-talk (p.t.t.) connection to the receiver muting relays.

A short time delay is provided by C115 charging up when the p.t.t. is released. This holds the mute relays in long enough for the transmission to have

completely ceased to prevent any momentary howl-round on returning to receive.

Transistor Tr107 drives the incremental receiver tuning (IRT) relay to turn off this function on transmit and Tr108 turns off the receiver's b.f.o. oscillator. If this is not done, any crosstalk from the b.f.o. into the v.f.o. output will manifest itself as reinserted carrier on the transmission. (Some interfacing requirements are more obscure than others!).

Cable Connectors

On my prototype I have used five way (audio type) DIN cabling connectors for the cabling between the two units. These carry the v.f.o. signal from the receiver, the IRT control voltage in the reverse direction, along with the p.t.t. line.

The v.f.o. signal connection is made via RG174 miniature coaxial and the others via screened multicore cable. I found the two cables would just squeeze together into the back of a DIN plug.

The Construction

If you have built the Daventry and Rugby, then the construction of this unit shouldn't defeat you! The board, shown in Fig. 3, is assembled in the same manner as the other units, there are no special 'features' to look out for!

After assembly I mounted the module on 20mm brass pillars fitted to the two rear fixing bolts of the Daventry board. But before it was finally fitted in position, L101 was soldered to the base of the Daventry's b.f.o. transistor, and suitable 'tails' were soldered onto the 'LS' and '+Ve' terminals ready for connection to the A5.

Inductor L101's other lead was positioned to poke up through the trim tool clearance hole in the A5 p.c.b. for soldering to its b.f.o. terminal. The A5 module was then wired up as per the wiring diagram, Fig. 2.

Testing & Checking

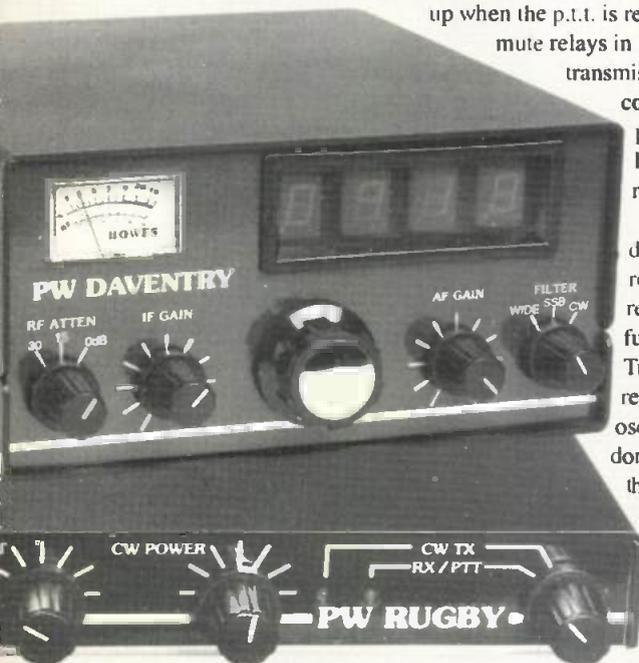
Before I started the testing and checking the A5's operation, the Daventry and Rugby's b.f.o. and carrier oscillators were set to the same frequency so that there would be no unwanted frequency shift between transmit and receive.

After this was done, I connected a dummy load to the transmitter. Then, with the c.w. power control set to minimum the p.t.t. and c.w./transmit switching was checked for correct operation.

To set the v.f.o. signal level at the 'OP' terminal, I adjusted R113 to give the required nominal 0dBm (when measured with 50Ω input test gear). But you can just as effectively 'tune for maximum smoke' from the transmitter in the standard way!

I set the IRT knob's pointer to be exactly vertical at the frequency corresponding to 'IRT off'. I haven't actually fitted an IRT off switch on my prototype, but provision is made for this on the A5 p.c.b.

You can check the IRT knob setting by ear, by simply switching the IRT on and off while listening to a steady carrier. And that's in essence the sum



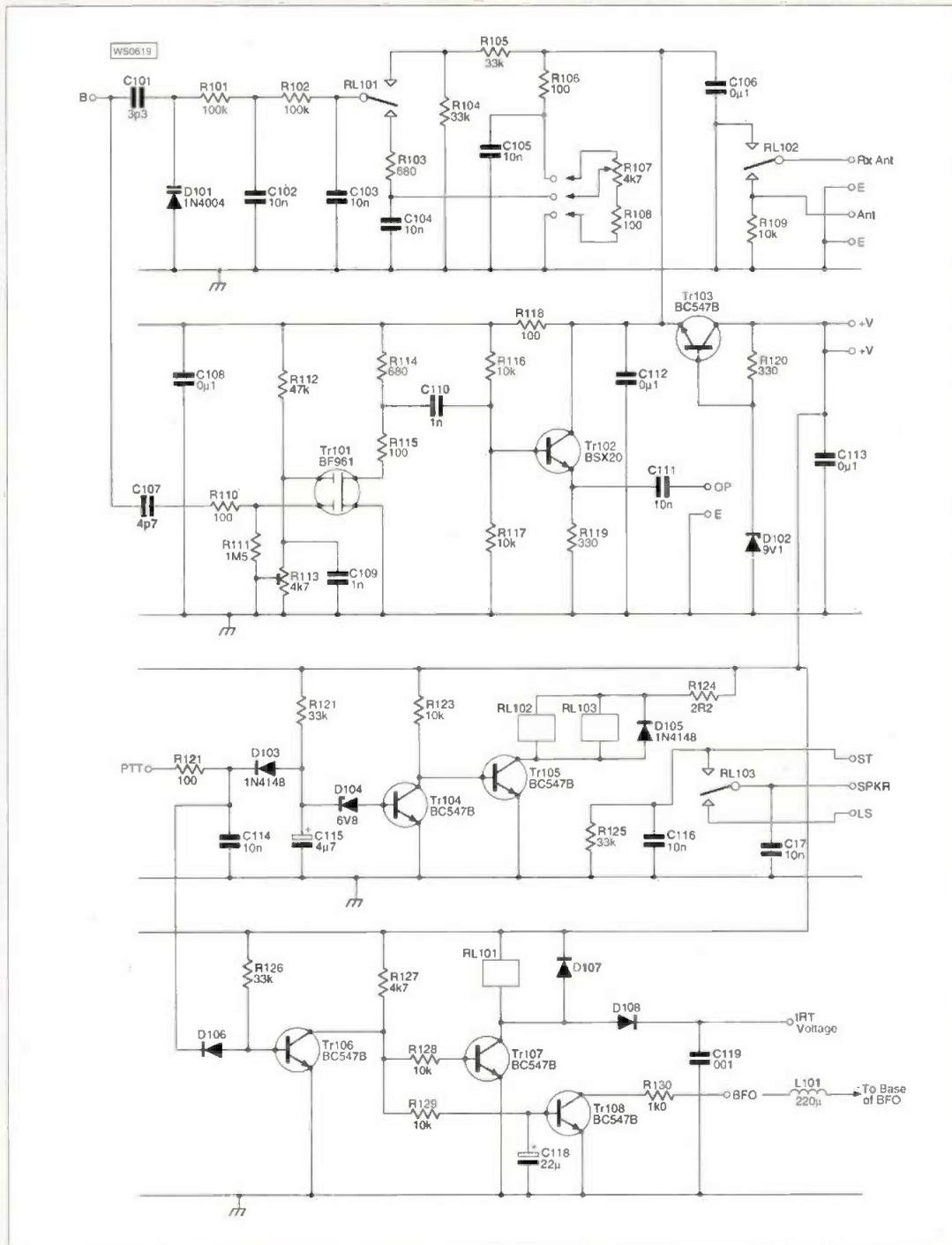


Fig. 1: Circuit of the PW A5 linking module (see text). Readers requiring information and circuitry for the Daventry v.f.o. should refer to page 26 of the October 1995 issue of PW (photocopies or back issues available from the Book Service).

PCB diagram is on the following page.

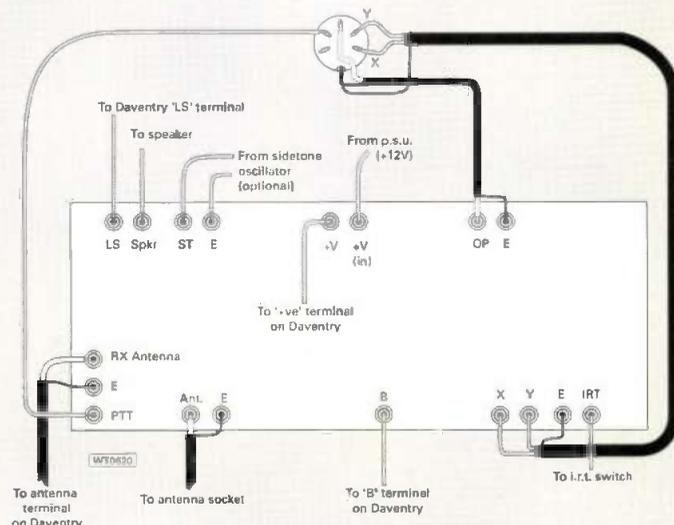
Fig. 2: Interconnection details (see text).

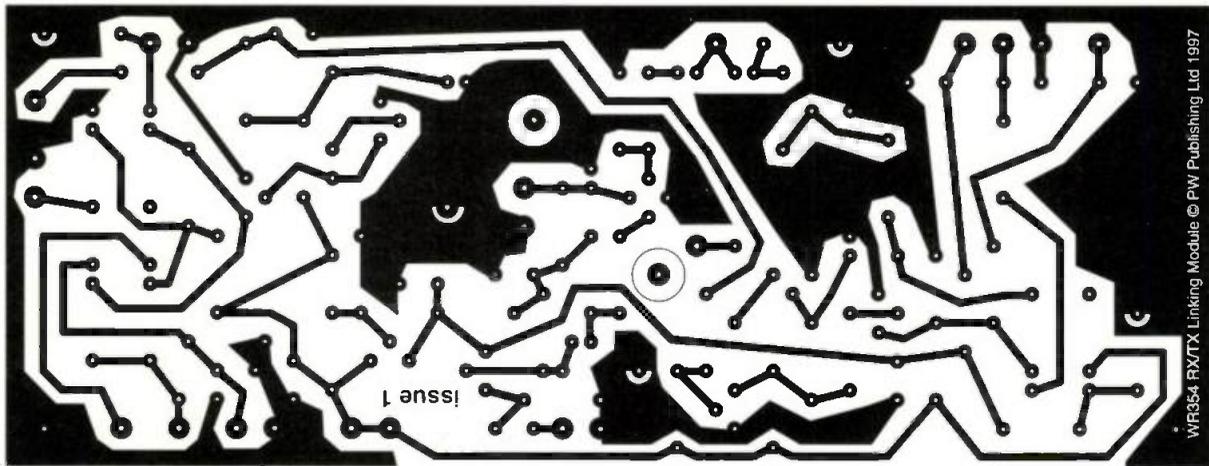
total of the A5's alignment – nothing too complicated!

If you are building this project, this is the moment to admire your handiwork! If everything is constructed and working correctly, you should be in possession of a very desirable 7MHz meter QRP rig!

As a generalisation, I think it's safe to say that there are relatively few people with decent home built s.s.b. transceivers on the bands. So when you join this exclusive club, I think you are definitely entitled to consider yourself a fully fledged Radio Amateur! And with the help of these PW projects, its not nearly as difficult as you might imagine!

Editorial note: For further details on the PW Daventry and Rugby projects, the associated kits and other details, please write directly to Dave Howes G4KQH at: C.M. Howes Communications, Eydon, Daventry, Northamptonshire NN11 3PT. Tel: (01327) 260178.





WR354 RX/TX Linking Module © PW Publishing Ltd 1997

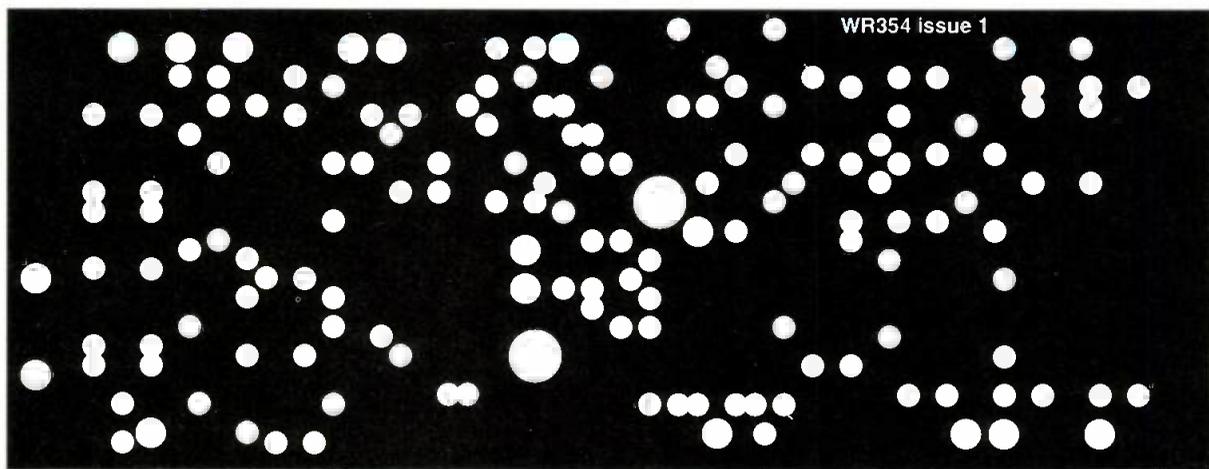
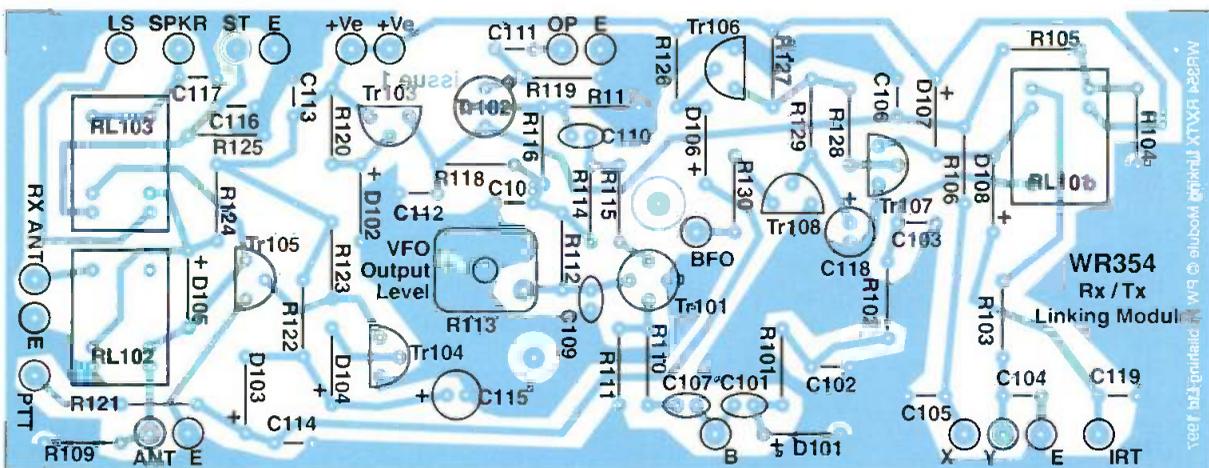


Fig. 3: The printed circuit board track design, associated component overlay and ground-plane details for the A5 interface module's p.c.b.

A5 Shopping List

Resistors

Carbon Film resistors 0.25W

2.2Ω	1	R124
100Ω	6	R106, 108, 110, 115, 118, 121
330Ω	2	R119, 120
680Ω	2	R103, 114
1kΩ	1	R130
4.7kΩ	1	R127
10kΩ	7	R109, 116, 117, 123, 128, 129
33kΩ	5	R104, 105, 122, 125, 126
47kΩ	1	R112
100kΩ	2	R101, 102
1.5MΩ	1	R111

Variable Resistors

4.7kΩ Preset 1 R113 (horizontal mounting type)

4.7kΩ Linear 1 R107

Capacitors

Miniature plate ceramic

3.3pF	1	C101
4.7pF	1	C107
Miniature disc ceramic		
1nF	2	C109, 110
10nF	9	C102, 103, 104, 105, 111, 114, 116, 117, 119
100nF	4	C106, 108, 112, 113
Miniature Electrolytic (radial)		
4.7μF	1	C115
22μF	1	C118

Semiconductors

1N4004	1	D101
1N4148	5	D103, 105, 106, 107, 108
BC547B	6	Tr103, 104, 105, 106, 107, 108
BF961	1	Tr101
B5X20	1	Tr102
BZX55C6V8	1	D104
BZX55C9V1	1	D102
Inductors		
220μH axial	1	L101

Relays

Omron GE2-182P-M 3
RL101, 102, 103 (all 12V types)

Miscellaneous

Interconnecting wire, p.c.b. and pins, plugs and sockets, coaxial cable (miniature) stand-off pillars, screws and nuts as necessary.



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LM2000 Linking Module

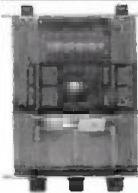
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73 from Dave G4KQH, Technical Manager.

FM DX Down Under

By Graham Rogers VK6RO



Graham Rogers VK6RO describes how he discovered the delights of 28MHz f.m. DXing.

Sitting in the waiting room of the International arrivals section opposite the customs exit door at 1230UTC on 6 April 1993 was an exciting time for me as I was about to welcome **Bill G4TQV** and his **XYL Jean** to Australia. Bill and Jean had flown 12 000 miles to see me and this meeting was the culmination of many contacts with **G4TQV** on f.m. mode on 29MHz between 1988 and 1993.

I thought I would be in for a long wait while Bill went through customs, but the aircraft landed at exactly 1230UTC and at 1246UTC Bill and Jean were in the car, about to have a look at Australia. And 16 minutes from aircraft seat to my car seat must be a record! If it had not been for my keen interest in h.f. f.m. DX, I would never have met young **Bill G4TQV**.

I have worked many UK stations over the years, many of them mobile using just a few Watts from modified UK CB f.m. rigs. And I would like to thank all the UK stations for the fun we have had on f.m. and it will continue when conditions improve.

Early Days

Back in the early 1980s, I could hear all these 'wobbly' signals just above 29MHz on my s.s.b./c.w. only rig. I was intrigued as to what they were, then I realised they were JA (Japanese) stations working locally. Not many rigs in those days were fitted with f.m. on h.f.

On 20 January 1982 I plugged my three hour old Kenwood TS-660 into my 2-element cubical-quad and called CQ DX at 1121UTC on 29.600MHz. To my great surprise

JE6QJV came back to me and we exchanged 5 and 9 reports. I was hooked!

We all know f.m. is used on 144MHz for local work and here I was talking to Japan on f.m., the 'local' mode. The technical aspects of f.m. on h.f. make for rather interesting propagation and signal reception.

Phase distortion or the capture effect by receivers can make signals hard to copy or stronger signals can completely swamp the wanted signal. If you want to be a true f.m. DXer you must be able to accept these limiting factors.

Some f.m. DX signals can give full scale readings on 'S' meters. However, be aware that some rigs give full scale on very few microvolts!

Powers Low

I have used powers as low as 1W to have contacts with friends in the UK on f.m. on 29MHz. Many tests with overseas stations at various power levels resulted very little difference.

An output of 50W seems sufficient for most DX working. I have worked many mobile stations around the world who were using 10W or so from modified CB rigs or similar.

Friendly Group

I've found f.m. DXers around the world to be a friendly group. I have formed many friendships in some countries, especially the UK and Japan. Rag chews are not uncommon over great distances.

I even worked my mate **G4TQV/M** through several countries in a two hour period as he travelled close to several borders in Europe. His callsign changed instantly as he drove over the borders. Even in the UK, **Bill G4TQV** surprised me by becoming **GM4TQV/M** as he entered Scotland on several occasions.

Some other friendships formed were with **Bill G0HUB** and **Jan PA3FAO**, who would give me a signal report every day as the band opened to Europe. Then there was **Roomy VU3RMS** who would sometimes scare me with very strong signals out of the blue on a 'dead' band. Many long contacts were conducted with Roomy.

I've got a JA friend **Aki JF6UMR**, who operated portable

from his office as well as at home. In the UK there was a 28MHz f.m. group and I was a member for many years, receiving regular newsletters. Some VK friends were **Ian VK3DSI** and **VK3ADR** (now a Silent Key).

Serious DXer

Many repeaters exist around the world, in the Phillipines, USA, JA, VK and various European countries. A 100kHz split is used with output above 29.6MHz. Some repeaters need 88.5Hz or 1250Hz tone burst in Europe.

Also, some repeaters are linked to local 144MHz input. But it seems unusual to work a station in his house watching TV in Hungary using a 144MHz hand-held!

Being a serious f.m. DXer involves many hours of waiting for openings and looking for new countries. I must admit, being a 50MHz DXer has helped me to get new DXCC countries as I would work all the 50MHz DXpeditions around the world on the 28MHz world-wide liaison frequency and ask them to QSY to f.m.

Some stations who obliged were **VK3OT** on Lord Howe, **N6AMG** on KH8 and **VK9YJ** (VK3AMZ) and **W6IKV** on Wallis (FW). My thanks to all stations who helped me.

Some rare countries worked on 28MHz f.m. have been A2, A9 (VK expatriate) BV, BY, CN, CU (Azores) EA6, EA9, FT8X, FT8Z, H44, HK (rare from VK6) HZ, JE, KX6, SV5, TA, TI, TL8, VQ9, XE, XX9, T30, 5X, Y0, Z21, V51, 3B8, 3B9, 3D6, C21, 1S, 4S, 5H, 5W, 7Q, 7X, 8Q, 9J, 9M2, KH7, KH8, 9M8, 9Q5, 9V plus many more not-so-rare countries. On 28 April 1990 I worked **1S0XV** on the Spratley Islands for my magic 100th country. My total now stands at about 132 countries on h.f. f.m.

Follow Rules

Most f.m. DXers follow some rules concerning f.m. h.f. DXing and the most important is to QSY from 29.600MHz immediately upon establishing contact. The international frequency for calling DX is 29.600MHz. Local rag chews should not be carried out then if at all possible as you may not think the band is open, but it could be and your local rag chew could prevent DX contacts.

Of course, stations have every right to stay on 29.600MHz. But it would help if the frequency was left clear for DX calls.

Please keep an ear out for me on 29.600MHz f.m. mode. I usually QSY to 29.510MHz and I hope to meet you on the band. PW

Look out for me on 28MHz f.m.



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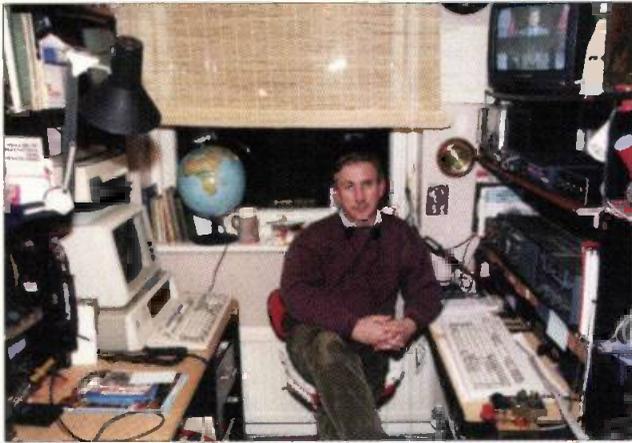
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Amateur Radio - A Hobby For Life



By Steve Appleyard G3PND

Above: Steve Appleyard G3PND in the shack he shares with his son Will G7VGE.

Below: Pete Linsley G3PDL operating his home-brew transmitter in the First Class Operators' Club (FOC) 'Marathon'.



In April 1963, *PW* published an article written by Steve Appleyard G3PND. The article described an amateur transmitter which he had designed and built after gaining his licence in 1961 - at the age of 16. We recently contacted Steve, now a C.Eng. and MIEE, to see if his early interest in amateur radio had endured today, and also whether it had influenced his choice of career. As an encouragement to today's novices, Steve agreed to recount his experience, and also to contact five of his amateur radio friends from the past - to discover what role amateur radio had played in their lives.

My simple answer to the question of whether my interest has endured is yes. But after a 30 year absence I had a bewildering return to the hobby only three years ago. Had my early enthusiasm for amateur radio influenced my choice of career? Most definitely - in choosing a career as a Radio Officer in the merchant navy, I saw this as an extension to the hobby - with the added dimension of world travel.

Old Friends

I was enthusiastic about the idea of looking up my old friends, some of whom I had not seen since my schooldays, more than 33 years ago. The task of locating old amateur friends

is of course simplified by the availability of *The RSGB Call Book*. Fortunately, G3PDL, G3PDH and G3RXP had not chosen to be "ex-directory", and G3RZP and G3YQF, whose call signs I had forgotten, were soon located in the new alphabetic listing.

Being two years older than me, Pete Linsley G3PDL, had already discovered the world of amateur radio when we first met at our school electronics society. He was a short wave listener, and a junior member of the Grimsby Amateur Radio Club.

Pete was an avid constructor of both receivers and transmitters, and I was always impressed with his many on-going projects - without doubt he was my early mentor. Remembering that there was no Novice (or even Class B) licence at this time, we became largely self taught through our own experimentation.

By the age of 16, I had become expert in the design and construction of super-regenerative receivers, and transmitters incorporating Colpitts oscillators and Class C driven power amplifiers. I had also become the proud (and surprised) possessor of an RAE certificate and the call sign G3PND.

Influence On Career

Our hobby certainly had an influence on Pete's early choice of career, he left school after 'A' levels, to work in the electronics lab of a local chemical company.

A second friend who also obtained his licence in 1961 was Malcolm Prestwood G3PDH. For Malcolm, this was the culmination of an interest in radio which started at the age of 12, when he was given an old broadcast receiver.

Through experimentation, the young Malcolm found that he could retune the radio so that it could receive transmissions from ships in the nearby River Humber. He became a true s.w.l. after buying an R107 receiver from one of the many ex-military equipment advertisements appearing in the editions of *PW* at that time.

Malcolm's introduction to amateur radio came through making the acquaintance of G5GS and Gordon Brown G3MZV. Gordon gave a lot of help and guidance, particularly with the

building of Malcolm's first rig - a three valved 'Top Band' transmitter using two EF91s and an 807.

It was Malcolm's school's career adviser who suggested training to become a Radio Officer in the Merchant Navy - which he embarked upon in 1961.

Starting the Radio Officer course at the same time was Dave Mason, later to become G3RXP. Even now, Dave remembers that his fascination for 'wireless' began when he was only six years old. The fascination for radio never left him and it became channelled into Amateur Radio through his uncle (G3NNN), whose R107 receiver opened up a whole new world. He also had much help and guidance from his older friend and mentor, Jim Sleight G30JI.

So at the age of 18, with several years of construction and operating experience behind us, we embarked upon our careers. G3PDL in his electronics lab, G3PDH, G3RXP and myself, set sail as merchant marine Radio Officers.

Job Met Expectation

The job certainly met my expectation, with eight hours of watch-keeping/operating each day. There was also the maintenance responsibility, which extended beyond the radio equipment to the radars and other navigation systems. Neither was I disappointed with the travel, visiting many parts of the world.

However after two years, I had decided that my long term interest was in the theory and design of radio equipment - and for this I would need to study further. I therefore embarked upon the next phase of my career which was a four year course sponsored by Marconi Marine in Chelmsford.

Within my first few days in Chelmsford, I had discovered the Marconi Apprentices Amateur Radio Club. And one of the enthusiastic members at this time was a young technician apprentice called Peter Chadwick G3RZP.

The youngest member of the club was a 14 year-old school boy, Richard Linford. Dick had entered the world of radio through building crystal sets and experimenting with long wire antennas. He was invited along to a local field

day and met Peter. Dick remembers that Peter had been very helpful during this time and with his encouragement obtained his licence and became G3YQF. Dick became a Radio Officer after qualifying at the North East London Polytechnic.

My own career now developed along an engineering rather than operating path. By this time, my interest in amateur radio had waned. By 1980, I had finally moved away from engineering, first into sales and marketing, then into general management, ultimately to become the Chief Executive of my present company.

My Re-introduction

My re-introduction to Amateur Radio came rather unexpectedly three years ago through my 15 year old son Will. Unprompted by me, Will attended the Novice class at the Colchester Institute, becoming 2E1DJB.

In the next year, he took the RAE, and obtained his class B licence and G7VGF callsign. Perhaps an interest in amateur radio is passed through the genes!

Together, we established a new shack and Will acquired 144 and 430MHz rigs. I procured a second-hand h.f. transceiver and erected a G5RV antenna and on 4 December 1994, I had my first QSO for 28 years (with G3GGL). My Morse was a bit rusty and I was certainly nervous - my apologies to G3GGL!



So what had become of Pete, Malcolm and my other young friends from the early 1960s? Had their interest in amateur radio endured the intervening years? Had it impacted on the development of their careers?

Peter G3PDL and Dave G3RXP still live near to Grimsby. Pete worked in the electronics lab of the chemical company for four years, alongside G3RGC and G3RJV - the now famous Rev. George Dobbs. Both Pete and George decided on a complete change of career, returning to college to become school teachers. Pete's subject is physics, and he's now the Head of Science at a secondary school.

The Rev. George Dobbs of course, made a further career change, into the

church and is now Vicar of the Parish of Sudden in Rochdale, Lancashire.

An interest, shared by both Peter and George, was in QRP operation. George is well known for his many articles on low power transmitters and Pete is co-author of the *QRP Antenna Handbook*, treasurer of the QRP Club and a winner of the RSGB QRP contest. I was even more impressed by his rig, a fully home brewed (designed and built) h.f. transceiver, with outstanding receiver performance. Well done Pete!

Dave G3RXP lives only a few miles from Pete, his QTH is a superbly elevated position on top of the Lincolnshire Wolds. His interest is still for h.f. c.w., and like Pete, Dave is also a gifted operator. One manifestation of this is the certificate in his shack, recording the fact that he was the winner of the 1995 CW World-Wide contest (single operator, low power section).

Like my own, Dave's Radio Officer career lasted for two years, before pursuing a career ashore. Eventually Dave moved into the expanding world of computers. He joined ICL as a service engineer, and now holds the position of Technical Support Manager.

The third of my Grimsby friends, Malcolm G3PDH's seafaring career had similarly lasted for two years, after which he became involved with Decca Hi-Fix, an highly accurate hyperbolic navigation system. Malcolm then joined the company's overseas operations and was involved with setting up Hi-Fix systems for oil exploration in Australia and New Zealand, and for crop spraying in Indonesia. Returning to the UK in the position of Technical Director, and to a life as G3PDH once again he's now the Morse examiner for Norfolk.

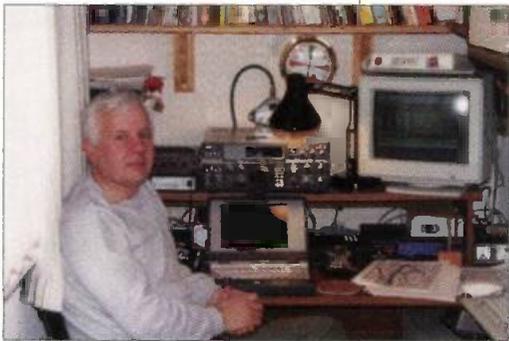
The Essex Duo?

Well, so much for the Grimsby trio, but what of the Essex duo? I had already become aware that Peter G3RZP, was still active in amateur radio when I renewed my own interest in 1993, and received my first *Radcom* from the RSGB. There was Peter - President of the RSGB.

Peter's career development kept him very much in the mainstream of radio and electronics and for the past 16 years, Peter has held the position of Senior Principal Engineer with GEC-Plessey Semiconductors. After more than 30 years, Peter's enthusiasm for amateur radio appears to be unabated!

Finally, we come to Dick G3YQF, whose career path took him from an enjoyable and much travelled period in the Merchant Navy, to life again as a student. Dick studied for a BSc in Communication Engineering at Plymouth Polytechnic. A requirement of the course that the students spent a period each year working in industry and I was delighted that Dick chose to join me at Marconi Marine!

After graduating, Dick joined me full time, taking over as Head of Navigation Systems when I moved on.



Dick's next career move was to take him back into education and to Plymouth Polytechnic, but this time, as a lecturer in Communication Engineering.

Dick is now Head of RF and Microwaves at the University (as it has now become), with the department being one of the leaders in this field. He has introduced Amateur Radio into the teaching of communication and propagation studies.

Link With Past

Dick was able to make one final link with the past, in that he had kept his original home-brew transmitter. Designed and built when he was 16, it incorporates choke modulation to provide a.m. as well as c.w. operation.

As we examined it together in the modern communications laboratory, it symbolically transcended three decades. From the schoolboy Amateur Radio enthusiast of the 1960s, to the University Lecturer of the 1990s, responsible for educating the professional radio engineers of the future.

In conclusion, I would suggest that Amateur radio is unique. What other hobby taken up by six schoolboys 35 years ago, would still play a part in their lives today having also shaped and influenced their careers?

PW

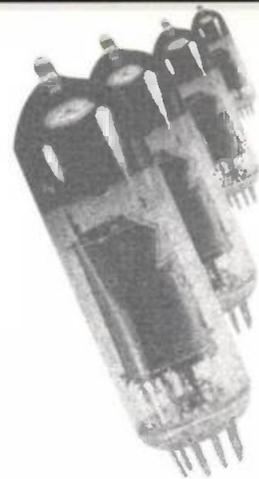


Top: Dave Mason G3RXP at his QTH high in the Lincolnshire Wolds.

Middle: Malcolm Prestwood G3PDH with the compact station he operated from A9XBC and other exotic DX locations.

Left: Three decades on! Dick Linford G3YQF shows Steve G3PND the transmitter he built when aged 16. In the background is the Plymouth University Amateur Radio station G0UOP.

Valve & Vintage



By Ben Nock G4BXD

It's Ben Nock G4BXD's turn to look after the vintage 'wireless shop' this month. This time Ben takes a look at the Codar AT5 and an interesting 'Spy' set. So...read on to find out more!

Once again it's my turn to open the vintage shop, with, as is usual in my case, a military flavour (green that is!). But this time there's a small 'slice' of 'ham' (radio) included.

And this time around it's a real case of 'little and large'. Little in the way of 'spy' radio equipment and large in the way of Navy sets.

The AT5 Transmitter

It will probably be hard to find any licensee before the G4C or G4D series of calls that hasn't heard of the AT5 Transmitter. Made by Codar way back in the mists of time (well, the 1960s at least) the AT5 must have been the most popular rig for 1.8 and 3.5MHz use for years. Lets face it, it was the only rig around for years that most could afford!

The AT5 runs to about 10 to 12W of a.m. and c.w. It uses valves (five in all) with an EF80 as a v.f.o., another EF80 as a 'buffer' on 1.8MHz and as doubler on 3.5MHz, a 6BW6 as p.a., with a 12AX7 and 6BW6 as modulator.

Modulation is provided by a 'choke modulated' p.a. stage. This is achieved by using a centre tapped choke, with the h.t. applied to the centre, feeding to the power amplifier and modulator anodes from each end of the choke.

The AT5 has a matching mains power supply. Also available was an inverter mobile supply and the companion Codar T28 receiver.

Unfortunately though, the AT5 receiver (which used Mullard modules) is 'as wide as the proverbial barn door'.

Whilst it worked fine as a

mobile set-up, used on the main station long wire antenna, it sadly lacks selectivity.

On Air

Digging out one of my AT5s the other day I tried it out on the air on 1.8 and 3.5MHz using a Drake 2B as the receiver. On the MWARS Net on Saturday morning, good reports of its a.m. transmission were obtained from



Fig. 1: The Codar AT5 transmitter and Drake 2B receiver, with a G4BXD a.t.u. and Type D RAF Morse key.

many stations. Likewise, on c.w. the little transmitter really gave a good account of itself, a good note and stability.

It will be interesting to see how many of the modern day rigs still work as well 30 years on. As many use special dedicated processors and chips...what's going to happen when those processors and chips are no longer available? Indeed, I have been told that certain chips for my six year-old Icom hand-held are already no longer available!

Blue 'Brick'

Now for something just as old but just a little more sophisticated than the AT5...the Mk 123 set, sometimes called the 'blue brick'. This is an example of 'spy' sets at their best. Covering 2.5 to 20MHz in three bands, this valved set can deliver over 20W of r.f. into various makeshift antennas.

The receiver uses miniature wire-ended valves-seven in all) while the transmitter has three. The 5B/254M in the p.a. to really give the set a powerful punch. The receiver is tuneable while the transmitter is crystal controlled.

Equipped with a b.f.o. the receiver can resolve a.m. or c.w. but the transmitter is c.w. only. A built in Morse key sits in the corner of the case but there's provision for an external key to be plugged in.

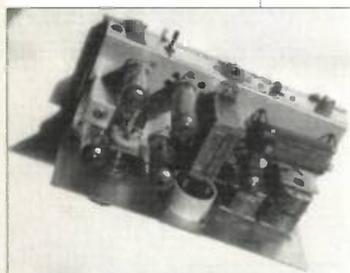


Fig. 2: Inside view of the AT5, the p.a. stage is to the left, v.f.o. and buffer top right and the modulator on the bottom right-hand side.

The built in power supply can run of anything between 90 and 230V a.c. or d.c. A separate power unit being supplied in the kit to power the set from a 12V d.c. supply.

In the kit of spares there are objects like the tape ruler style aerial. A wire aerial in a tape measure like box, which after use can be rewound for stowage.

Also included is a device to reform the capacitors in the power supply if the set has been unused for a time. This comes along with various plugs and bits that allow the set to be attached to whatever type of power receptacle is in use in whatever country you happen to be spying from!

The PRC-316

The PRC-316 military set (similar in size to the 'blue brick') is a fixed frequency semiconductor unit providing a.m. or c.w. communication for troops in the field. It's claimed that the SAS were the main users of these sets, but as with all military facts and figures concerning the British SAS Regiment (Special Air Service), it is very difficult to get the exact picture.

Running about 4W on h.f., the RC-316 has nine crystal channels, each channel then having a further five preset Variable Crystal Oscillator (VXO) like shifts of a kHz or so up and down.

The receiver has a decent 300Hz i.f. filter on c.w. and once again, the set has a built-in Morse key. There's one strange thing on the set though and this is a plate

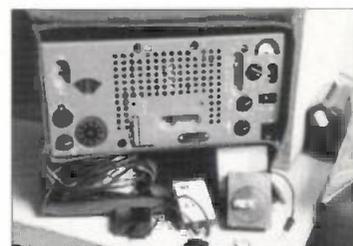


Fig. 3: The Mark 123 'Spy' set. The unit comprises the receiver on the left, transmitter on the right with the p.s.u. in the centre. The box on the lower right is the 'tape measure' housing for the wire antenna.



Fig. 4: The Mark 123 spares box showing wire antenna, spare valves and antenna insulators. Below is the 12V p.s.u. with leads. The device (top right) is the capacitor reforming tool (see text).

an adapter for connecting the set to an external power source.

VHF Transceiver

Another PRC set now, and this time it's the PRC-638 v.h.f. transceiver. According to *Jane's Military Communications*, 90/91, this set is manufactured by IRET in Trieste, Italy.

Covering the frequency range 30 to 76MHz the PRC-638 set provides 1840 channels spaced at 25kHz. It has F2B and F3E modes, at a selectable 4W or 100mW r.f. output.

The transceiver uses an internal battery pack (held in the base) consisting of 10 D sized cells (hence

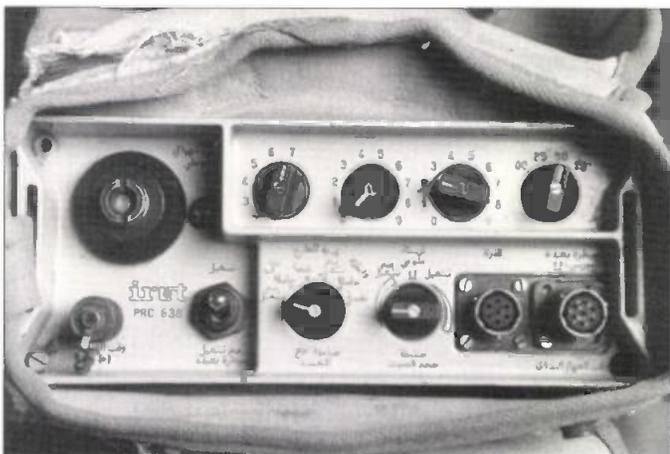


Fig. 5: The PRC-638 v.h.f. 'Manpack' transceiver.

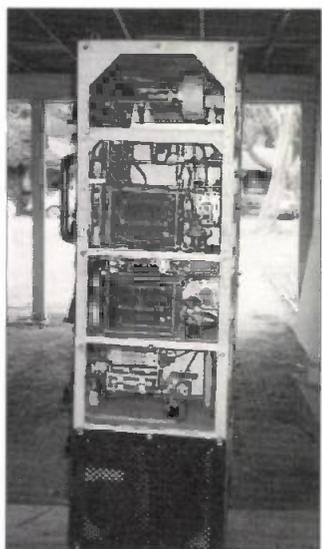
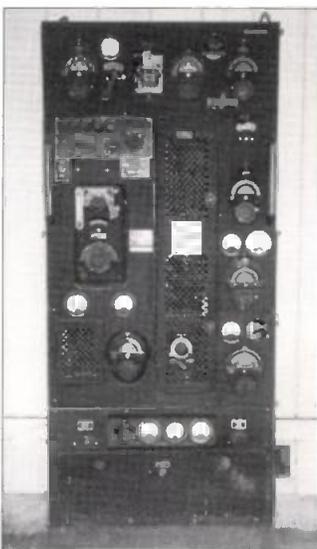


Fig. 7: The mighty TBM-10 Navy transmitter inside and outside views. A veritable (and impressive) 'battleship' in itself!

giving the Morse code characters in dots and dashes. Makes you wonder if the signallers were taught Morse before being sent on a mission!

There are two versions of the 316, designated A and B. The difference is in the channel frequencies fitted. In addition to the internal battery, there's

11V) using rechargeable cells. It draws 1.5A on high power and 40mA on low. Weighing 3.5Kg with batteries, the set uses one of those tape measure type aerials and a telephone type handset. The actual set in the photo has Arabic markings and is believed to have been used in Iraq.

Around The World

Now its time for some picture postcards from around the world. Further examples from the stable of my good friend in the USA, Paul Thekan, in sunny California.

The TBM-10 is a real 'battleship' of a transmitter, probably apt as the set was used on battleships. And as we all know, the USA had some mighty big ones.

Running 350W on phone (that's USA speak for a.m.) and 500W on c.w., the TBM-10 tunes 2 to 18MHz and uses an 861 valve in the p.a. stage.

The rack housing the set is some 6ft tall and 2ft across (no, I don't know what that is in centimetres!). Paul does not state the weight, but I think we can assume its heavy!

The next set is the TCM transmitter along with the RAS-5 receiver. With the same frequency coverage of the TBM this transmitter runs a mere 35W 'phone, but at least a 100W in c.w. mode.

The receiver bears obvious resemblance to the HRO set we all know (the same plug-in coil units, etc.). But you can see from the photo that there are a few less controls on this set to that of the HRO M or 5T.

The complete housing, power supply on the left, transmitter in the middle and receiver, along with spare coil holder, power supply and mounted speaker, on the right does make for a very impressive station indeed. I wish I had this in my shack!

Information Please!

Frank Vanden Eynde from Belgium would like information, and I guess a circuit, for the Sarbe Transistor Beacon with Speech units. Made by Burndep, I think these are the little yellow sets for 'downed aircrew' that operate on the 243MHz band.

Information to me please and I'll pass it on. And don't pull the pin on the Sarbe Frank else you'll have Air Sea Rescue knocking at your door!

Frank also had a question regarding low gain on one of his 18 Sets. When he uses an active antenna, one that has a pre-amplifier built in, the 18 works well fine. But when working on the rods antennas, it's 'dead'. (The antenna feed to the receiver comes directly from the anode of the p.a. in the transmitter).

Assuming there is a peak when the transmitter p.a. is tuned then it would seem that the problem might be either in the lead from the TX to the RX, or in the coupling capacitor, C6A. This capacitor connects from the incoming cable to the grid of the first valve in the receiver. There is



Fig. 6: The PRC-316 h.f. portable sets. The Model A is on the left, B on the right. The meter reads battery voltage or r.f. output. Note the handy 'Morse Memo'!

also a resistor (R1C), which feeds a g.c. to the receiver r.f. stage. It may well be that this is either high or open circuit.

Finally, I would also like to ask for assistance with a Mk 122 set. I would like any information, circuits, pictures, etc., for help in restoration of one. Please contact me on the address below if you can help.

Locating Older Sets

Further to the question of locating older sets have I did mentioned rallies of course. Having attended several so far this year many have been interesting, the Drayton Manor Rally and the Luton Boot Sale (both in May) were again very good despite the bad weather at Drayton..

However, some of the big specialist shows have been most disappointing. Possibly the rather silly prices being asked by many dealers has forced many to keep their hands in their pockets.

Thanks go out to James Farquhar for information on the Sound Ranging set, and to Bob Warner for the circuit diagram and official working instructions. Thanks also to Jim Packer for information on the Navy set AP100335. The information has been passed on. Finally, thanks to Paul Thekan for the TBM and TCM pictures.

As always, I can be contacted by mail at: 'The Radio Room', 62 Cobden St. Kidderminster, Worcestershire DY11 6RP, or via the PW office. (s.a.e. please if you need a reply) or E-mail on the web at:

106312.1035@compuserve.com

Cheerio from Ben, see you in November.

BITS & BYTES

This time Mike Richards G4WNC looks at spectrum analysis software, a new decoding package and offers advice on file finding.

After my recent mention of the sbfft analysis software, I received lots of enquiries from listeners with an interest in this area of signal analysis. So great was the interest that I decided to spend some time searching through the Internet software archives to see if there were any other audio programs that could be used to help with the analysis of radio signals.

I was pleasantly surprised and came up with a number of very impressive programs. I will concentrate for this month on the excellent *Spectrogram* program by R. S. Horne. This is currently available on the Internet in two versions, one that supports Windows 3.1 whilst the later version only works with Windows '95, but features real time analysis and so is highly recommended.

Before I go into the details of how you can use the *Spectrogram* program for signal analysis. I thought it would be useful to give some

the whistles and whines of a radio signal into a meaningful set of numbers? It's easy really, but I will run through the process step-by-step. You might be interested to know that this very same process is used to store your favourite music on to a CD.

The most important point to note about the process of converting an analogue signal into a digital form is that the result is only an approximation of the original signal. It might be a very good approximation, but it is nevertheless an approximation.

Sampling & Quantisation

The technique used for converting signals into numbers is called sampling and quantisation. Sounds dreadful doesn't it? but it's really quite simple. Sampling means that the audio signal is examined at regular intervals and the instantaneous voltage measured and

recorded. It's rather like taking a snap-shot of the different parts of the signal.

You're probably wondering how on earth you can capture all the detail of an audio signal just by measuring the voltage now and again! Well of course you can't as you need to measure the voltage very frequently.

In fact the 'rule-of-thumb' says that the sampling and

measurement needs to take place at a rate equal to twice the highest frequency that you want to record. If you apply that principle to a normal communications signal, you find that the highest frequency is around 3000Hz. That would mean sampling the audio signal at least 6000 times every second - you'd need a pretty

good AVO meter to do that!

The only way of course to sample the audio is to use an electronic voltmeter with a very fast response time and electronic switching. This may sound mind bogglingly complicated, but suitable measuring systems are readily available from semiconductor manufacturers.

Having sorted out the basic sampling, what do you do with the result? The next step is to turn the measurements from the sampling system into numbers that the computer can handle. In order to do this you first have to decide on just how accurately you want to record the measurements taken at the sampling stage.

In theory the measurements could be stored to a huge number of decimal places. Whilst this would help to create a very accurate record of the signal, the numbers could get unmanageable.

What has to be done is to decide on a compromise for the resolution of the samples. There are countless choices available, but if you remember that you want to send the information to a computer it would be as well to work in multiples of eight bits (**B**inary **d**igits).

If you were to use the 8 bit sampling our voltage measurements would have to be rounded up or down to align with one of the 256 values available. This process is called quantisation and, as you can see, adds a certain amount of distortion to the original signal. I've illustrated this effect in Fig. 1.

So let's review just how far we've got. Our original audio signal is being sampled at 6000 times per second and each sample is stored as an eight bit value.

If you were to store this directly in the computer's memory you would fill it up at a rate of 6kb per second or 360kb per minute. What I have just described is called an analogue to digital converter or A-D converter.

In order to ensure a degree of commonality between different computers there are a number of standards around that you need to understand. The most common standard is that used for CD digital audio systems.

Each channel uses a sample rate of 44100 times per second or 44.1kHz and stores each measurement using a 16 bit number. This means that there are 65536 steps available which is significantly better than our original 256 steps using an 8-bit number.

It's this very fast sampling rate combined with fine resolution that provides the high quality associated with CDs. The penalty is a huge hunger for memory which equates to around 10.5Mb per minute!

A more modest standard that's more suitable for dealing with the audio from communications equipment, is mono recording using 11.025kHz sampling and eight bit resolution. This reduces the memory consumption to a more manageable 661kb per minute.

So far we've succeeded in converting our audio signal into a series of numbers that manage to eat-up your computer's memory! While this may not appear very significant it actually opens-up a whole new world of signal processing.

In this particular case I'm looking at how you can transform this series of numbers into something much more meaningful. The secret is to use an analysis technique known as Fast Fourier Transform (FFT).

The FFT technique enables a computer to replicate the function of the Cochlea in the human ear. If you think about it, this part of the ear responds to a varying pressure on the ear drum and transforms this into frequency information using thousands of minute hairs that resonate at different frequencies.

The FFT, on the other hand, takes the varying electrical signal as

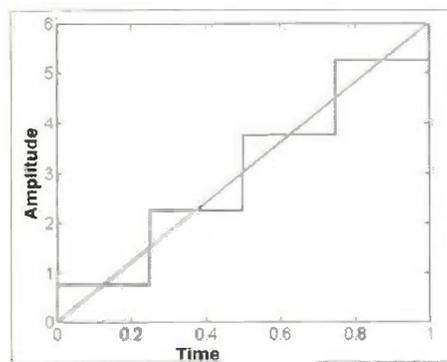


Fig. 1: An example of quantisation error.

background into the way in which computers process audio signals.

As with all things to do with linking analogue signals with computers, the first requirement is to convert the signal into numbers. This is because computers can only 'think' in numbers!

So how on earth do you change

represented by our digital sample and turns it into frequency information. Once you have details of all the frequencies present in the signal you can start to work wonders.

For example, a DSP based audio filter uses the principle I've described here to first analyse the incoming frequencies and reject those that fall outside the specified pass-band. It's this clinical analysis that enables DSP filters to produce such stunning results.

However, the *Spectrogram* program that started me off on this



track uses FFT analysis to identify the frequency components of the signal and then displays the result in graphical format. You can then apply your brain power to further analyse the results.

Now you may well be struggling to understand what good this can be so let's look at an example or two. If you're interested in any of the digital modes then the *Spectrogram* display could make a very effective tuning indicator.

You are presented with a pair of horizontal lines representing the mark and space frequencies of the incoming transmission, see Fig. 2. All you then have to do is adjust your rig's tuning so that the two lines straddle the centre frequency of your decoder.

You can also make use of *Spectrogram* to take a detailed look at just what's being transmitted. If you adjust the horizontal definition to around 1ms you will find that you can very clearly see the structure of the data signal.

I've shown an example of an SSTV signal in Fig. 3. This can be useful for tracking down transmitter problems or even to help identify unknown transmission modes. If you

would like to try a copy of R. S. Horne's excellent freeware program check-out the links on my Web page.

New Decoding Software

If you've been keeping an eye on the Radio sites on the Internet you may well have heard news of the new *RadioRaft* decoding package. This excellent new utility decoding program has recently hit the streets and is causing quite a stir.

RadioRaft is a very effective multi-mode decoding system with fully automatic mode selection and a price tag of just £18! The program has been written by Francois Guillet F6FLT and demo versions are freely available via the Internet (see the links on my Web Page).

Francois reports that the program has taken around five years development to get it to its current stage. Although the decoding routines were fairly straightforward, it was making the program user-friendly that really took the time.

I managed to get my hands on a full version of *RadioRaft* and have

been very impressed with the results. Despite its extensive range of features, it operates very successfully using just a standard HAMCOMM type comparator interface.

On the computing front *RadioRaft* works at its best under DOS with any version from 3.3 to 6.2 being acceptable provided you have a 386 or better processor. While it's possible to run the program under Windows, it's unlikely to work properly unless you have a very fast Pentium based machine.

One of the points that's really quite impressive with *RadioRaft* is its

speed of operation. This is further borne-out by its comparatively small file size at just 400kb.

Installing *RadioRaft* is really easy as it has a built-in installation program that not only decompresses the files, but also guides you through the essential set-up options. In operation *RadioRaft* impressed me with the effectiveness of its automatic mode and speed detection.

There were a few fairly obvious limitations to this mode, as it could only handle one signal at a time and it didn't like heavy fading! If you're tempted to have a go, you can download a demo version via my Web page or write directly to Francois sending £18 for a full registered version. The address to write to is: Francois Guillet, 17 rue Michel Delalande, F-44800, St-Herblain, France.

File Finding

I often get letters from readers asking for help in finding files on the Internet. Whilst the various search engines on the Web can be very effective, I still find that the old Archie client is by far the quickest

and most reliable way to find a specific file.

If you want to give this a try, one of the best clients around is WSARCHIE this can be found at ftp.demon.co.uk/pub/ibmpc/win3/wisock/apps/wsarchie/wsarch11.zip.

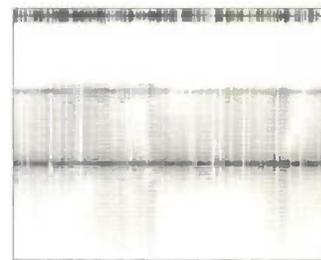


Fig. 2: An RTTY signal.

Fig. 3: An example of an SSTV signal received using the *Spectrogram* program.



Fig. 4: The *RadioRaft* decoding package.

Special Offers

If you'd like a copy of Hamcomm/JVFX, etc. I've arranged a very special offer with the **Public Domain and Shareware Library (PDSL)**. They have put together a library set of all five disks for just £12, all inclusive.

Using PDSL also makes ordering simpler as they accept all the usual credit cards so you can order by phone, and you don't even have to write a letter. Please direct all orders and enquiries about this disk set to **PDSL, Winscombe House, Beacon Road, Crowborough, Sussex TN6 1UL. Tel: (01892) 663298** and request library volume: **H008739abcde**.

The software is only available as a set of five disks as follows:

IBM PC Software (1.44Mb disks): **Disk A** - JVFX 7.1, HAMCOMM 3.1 and WXFX 3.2, **Disk B** - DSP Starter plus Texas device selection software; **Disk C** - NuMorse 1.3; **Disk D** - UltraPak 4.0 and **Disk E** - Mscan 1.3 and 2.0.

Space and time have caught up with me again, so until next time 'happy computing' and as usual I look forward to receiving your news and views. All correspondence to me Mike Richards G4WNC at PO Box 1863, Ringwood, Hants BH24 2ZD or via E-mail to mike.richards@dial.pipex.com Don't forget you can also visit my Web site at: <http://dialspace.dial.pipex.com/mike.richards/>

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VHF REPORT

David Butler G4ASR has reports of Sporadic-E contacts on the 50 and 144MHz bands, details of the new 50MHz Band Plan and information about v.h.f. contests.

The onset of the summer Sporadic-E (Sp-E) season on the 50MHz band was akin to a light switch being turned on! To all intents and purposes the band was dead for much of the month of April.

However, from May 1 Sp-E propagation was reported every day from some part of the UK. Contacts could be made with stations located within Europe and briefly to stations in Africa and Asia.

The ionisation was also sufficiently intense on two occasions during May to enable long-distance Sp-E contacts to be made on the 144MHz band. On this latter band there were also auroral openings, tropospheric enhancements and meteor scatter propagation.

On the 50MHz band there was an Auroral-E opening and way up in the microwave spectrum there were rain scatter and tropo duct openings into the nearer parts of western Europe. Enough to keep a v.h.f. DXer very happy.

Band Reports

As I've just mentioned the 50MHz band was open via Sp-E propagation for a few hours every day during May. Activity was quite high and according to reports extracted from the DX Cluster system there were a total of 54 countries worked from the UK during the month.

Among the usual European countries (e.g. EH6, OH0, OJ0, SV, S5, T7, ZB, 9A) were many of the ex-Russian republics and other eastern European countries. These included Estonia (ES), Belarus (EU), Lithuania (LY), Bulgaria (LZ), Russia (UA1), Latvia (YL) and Romania (YO).

Many beacon stations were reported but it is interesting to note the reception of JW7SIX (Svalbard) on May 14, 5B4CY (Cyprus) on May 22 and Z08VHF (Ascension Island) on May 24. The stations of CT3FT, EH8BPX and EH9IB located in Africa provided many stations with a new continent on the band.

In my opinion the best long distance openings occurred between May 21-23. In this period the stations of JY9QJ (Jordan), OD5SB (Lebanon), SU1ER (Egypt), 4X1IF and 4Z4TT (Israel) were all worked from the UK.

In June I mentioned that it was

hoped to get the station of **Ezzat Ramadan SU1ER** (KM50) active on the 50MHz band. I am pleased to record that following a two day visit by **Chris Gare G3WOS** and **Nick Waite G3KOX** the Egyptian station is indeed now fully QRV.

One of the objectives of the visit was to present Ezzat with a 100W amplifier and p.s.u. unit donated by the **United Kingdom Six Metre Group** (UKSMG). A further objective of the trip was to meet the management of the Arab Republic of Egypt National Telecommunications Office (ARENTO) to support the general release of the 50MHz band to all SU operators later this year.

A number of successful meetings were held and SU1ER is confident of achieving this goal. By the way if you were one of the lucky stations to contact SU1ER you can QSL him direct via Ezzat Ramadan, **P.O. Box 78 Heliopolis, Cairo 11341, Egypt**.

One station that can't send Ezzat a QSL card yet is **Bo Nilsson SM7FJE** (JO65). He reports that he heard SU1ER for nearly two hours during the evening of May 22 but unfortunately couldn't attract his attention! Bo also copied JY9QJ, SV9ANK, 4X1IF, 4Z4TT and 4Z5JA.

In a Packet radio message **Andy Napier GM1TBW** (IO97) mentions that the 50MHz band has been fairly quiet at his QTH in northern Scotland. So much so that he thought his transverter wasn't working!

However, on May 16 Andy found the band open to Poland and managed to work **SP2SGZ** (JO82) and **SP6OUL** (JO90). As he says "it wasn't much of an opening but these things can be rare up here!"

And now a big welcome to **John Yarnall M1AUN** (IO82) who has provided news of his station activity for the first time. John has been interested in the 50MHz band ever since obtaining his licence in August 1996.

Having read all about the potential of Sp-E propagation (in previous issues of *PW*) John was very pleased to catch his first opening via this mode on May 27. Using a Yaesu FT-736R running 10W into a vertical collinear antenna on the chimney he made s.s.b. contacts with **EH7AH** (IM67), **F1FMU** (JN04)

and **F5MMF** (JN04). John mentions that although these results may not seem much he was really amazed what can be done with low power and a small vertical antenna.

Sporadic Ionisation

What may have been the first European Sp-E opening this year on the 144MHz band occurred on May 23. It commenced around 1515UTC and lasted for over an hour allowing stations located in Germany to contact stations in Bulgaria and Romania.

At the QTH of **Ulrich DH0GHU** contacts were made with **LZ2CC**, **LZ2HV**, **YO3DMU** and **YO7VS**. Ulrich was using a TS-850S transceiver into an s.s.b. Electronics LT2S transverter running 20W into an 11-element Yagi.

The station of **DK9TF** (JO31) reported working 10 x LZ stations, four of them on f.m. The stations of **SV7APS** (KN21) and **SV7BVZ** (KN12) were worked on s.s.b. and a very rare **TA2HO** (Turkey) was contacted on f.m.

Unfortunately the opening did not spread to the UK although the maximum usable frequency (m.u.f.) was noted as being over 100MHz at the QTH of **G6YIN** (IO93) and **PE1PZS** (JO21) briefly heard an Italian station on the s.s.b. calling frequency. Although the m.u.f. exceeded 100MHz on a number of occasions in the following days it was not until May 28 that it reached the 144MHz band again.

The Sp-E activity on May 28 had not been particularly intense but during the early evening a surge in activity was noticed on the 50MHz band. In the past it has been observed that if the 50MHz band suddenly becomes very active (as opposed to gradually over a few hours) then sometimes the m.u.f. shoots up to a very high frequency almost immediately.

At my QTH (IO81) the 50MHz band became active with Italian stations around 1740UTC. Within 20 minutes the activity and strength of the Italian stations had increased dramatically.

I then moved up to the 144MHz band and set the receiver to the s.s.b. calling frequency. At 1804UTC I heard a high speed c.w. station

calling **CQ DX**. It was **IC8FAX** (JN60) on the Isle d'Ischia over 1800km away.

Fortunately, as many v.h.f. operators can't read c.w. (!) the pile-up was non-existent and, switching to s.s.b., I was able to complete the QSO with ease. He was audible at my QTH (IO81) for about 10 minutes, signals ranging from 55 to 59. Incidentally, I suspect that the main Sp-E path was actually to northern France (JN18 area) with a tropo extension to my location.

Aurora

Two auroral openings, affecting both the 50 and 144MHz bands were reported on May 1 & 15th. The event on May 1 was fairly small lasting from 2130-2400UTC with only the **GB3LER** and **GB3RMK** beacons being reported on the 50MHz band.

It was a similar situation on the 144MHz band with beacons **GB3LER** and **SK4MPI** being heard in eastern England. The station of **GM4ILS** (IO87) was heard however making a number of c.w. contacts into southern England.

An auroral-E opening (where signals are T9) was spotted at the QTH of **Clive Davies G4FVP** (IO94). He heard the **SK3SIX** beacon (JP71) at 2150UTC, peaking 529. On May 2 he also heard the **OH9SIX** beacon (KP36) at 2208UTC via the same mode.

Following the auroral events at the beginning of the month the solar geomagnetic activity settled to a low level but on May 12 a major flare took place. Associated with this flare was a coronal mass ejection (c.m.e.). By May 15 the geomagnetic activity had increased to major storm levels giving rise to an auroral opening which started around 1315UTC.

Stations in Denmark, including **OZ1ELF** (JO45), **OZ8ABE** (JO55) and **OZ9NT** (JO57) could be worked on the 50MHz band while on the 144MHz band the station of **SM5BSZ** (JO89) was putting in a tremendous signal into southern England. As the solar activity increases over the next few years we can expect to enjoy more

Continued on page 68

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of these type of events. Openings will become more prevalent and DX stations up to 2000km away on the 144MHz band will be easily worked.

Band Enhancements

Conditions on the v.h.f., u.h.f. and microwave bands via tropospheric propagation (or tropo as it is more commonly known as) were generally quite good during May. Contests on May 3-4 and 17-18 provided a welcome increase in activity and some excellent enhancements occurred towards the end of the month.

For example, on May 28 s.s.b. contacts on the 144MHz band were being made from central England with LA2PHA (JO38) and OZ9IT (JO46) in Scandinavia, DG6PY/P (JO30) and HB9RDE (JN37) to the east and with F6FZS/P (IN92) way up in the Pyrennees, by the Spanish border. On much higher frequencies the station of PA0WWM (JO22) heard the 10GHz beacon GB3SEE (IO91) over a 400km path and Sam Jewell G4DDK (JO02) made s.s.b. contacts with PA0BAT (JO31) and PA/OZ1DQ, the latter station peaking 59 on the 10GHz band. On May 29 at 2243UTC the 10GHz station of G3JMY (IO81) was heard peaking 529 by PA0WWM over a distance of 531km.

At the station of GW7RDV (IO83) an Icom IC-290 running 25W is fed to an indoor 4-element Yagi. Despite these limitations he found conditions quite good during the 144MHz contest held over the weekend May 17-18.

Contacts were made around the UK and GW7RDV remarked that he found this all very strange but fascinating. Well, I reckon that although conditions were favourable the biggest boost to making contacts that weekend was that they were with portable contest stations.

Many portable stations opt for the high ground with a clear take-off. They also generally run high power into large antenna systems. And that's why low power stations with small antennas can work some reasonable distances. It all relies on the large antenna groups and sensitive receive capabilities of the portable-mega station.

Large Array Trouble

After 'suffering' for two years with a large 4 x 17-element Yagi array for the 144MHz band I have come to the conclusion that it's more trouble than it's worth. It's true that I could exploit more esoteric modes like troposcatter, ionoscatter and moonbounce but there was also a down-side to having a large antenna system.

One of the major problems of having a QTH some 233m a.s.l. on the foot-hills of the Black Mountains (Welsh/English Borders) is that the antenna tower was more often than not wound down and tilted over to escape the ravages of the high winds. What's the point of having a

large antenna if you cannot get it up!

The other problem associated with having a large antenna array is something called the common volume mismatch. In simple terms it means that your large antenna can only 'see' a very small area of the troposphere/ionosphere from which signals are reflected.

A large antenna array will normally have a very narrow horizontal and vertical beamwidth. Unless you are pointing the array in the optimum direction (which may not necessarily be the direct beam heading) the chances of hearing the real DX is greatly reduced. This is especially true of weak-signals modes like meteor scatter and aurora where it's useful to illuminate a reasonable amount of 'sky'.

It's also the same for Sp-E propagation and to some extent with tropo enhancements. Anyway to cut a long story short I've now mounted my 4 x 17-element array on a fixed tube (150mm diameter) at 4m above ground. In theory it's only going to be used for moonbounce operation and will be firmly guyed when not in use.

So, it's now back to a single 17-element Yagi on a 20m tower for general DXing. Within a week of using I had caught my first Sp-E opening (May 28) on the 144MHz band. In my opinion I would have been very lucky to have detected the brief geographically selective opening with my previous large array.

The 50MHz Band Plan

At the Region 1 International Amateur Radio Union (IARU) conference held in October 1996 a number of important changes were made to the 50MHz band plan. As you can see in Fig. 1, the band is 2MHz wide, from 50-52MHz.

Amateur Radio has a Primary allocation from 50-51MHz and you can use up to 400W (26dBW) output in this section. From 51-52MHz the band is allocated on a Secondary, non-interference basis and consequently only 100W (20dBW) output is allowed.

The c.w. only section is from 50.000 to 50.100MHz and this is shared with beacon stations (50.020-50.080MHz). The c.w. calling frequency is on 50.090MHz.

Between 50.100 to 50.500MHz the band is allocated to all narrow-band modes. That includes not only s.s.b. and c.w. but also a.m. (does anyone still use this mode?), slow scan television (SSTV) and radio-teletype (RTTY). This narrow-band area is where most DX operation takes place.

The section 50.100 to 50.130MHz is the DX 'Window' and should only be used for contacts with stations in different continents. Similarly the International DX calling frequency, 50.110MHz, should only be used for calling purposes and not for QSO's. Regrettably though many operators continue to use this area of the band for local and inter-continental

contacts. Result? Chaos!

One change made to the old 50MHz band plan was to replace the national s.s.b. calling frequency on 50.200MHz with a centre of activity based on 50.150MHz. So, if you want to call for inter-UK contacts use this frequency.

The cross-band activity centre on 50.185MHz has been retained. It is used when making cross-band contacts between 50 and 70, 144MHz or whatever band you choose.

Moving up the band you'll see that the old meteor scatter calling frequencies of 50.300 (c.w.) and 50.350 (s.s.b.) have been changed to one solitary reference frequency on 50.200MHz. How well this will work out in practice only time will tell. Personally I think this is a poor decision.

The area from 50.500 to 51.000MHz is designated All Modes (in the IARU Region 1 band plan) but in the UK there is a proposal that the section 50.500 to 50.700MHz should be allocated for digital modes. The suggestion from the RSGB Data Communications Committee is that it will include not only Packet radio but facsimile (FAX) and SSTV as well. Full details of this digital sub-band proposal were given last month.

IARU	UK Usage
50.000	Band edge
020	Beacons
080	
090	CW calling
100	International DX windows
110	International calling
130	
All narrow modes	150 National calling
	185 Crossband activity centre
	200 Meteor scatter calling
	500 Digital comms (see PW July 1997 for details)
All modes	710 FM repeater output (UK only)
910	
51.000	
FM Repeaters	210 FM repeater inputs
390	
410	FM simplex channels (10off)
FM Simplex	510 FM calling (20kHz spacing)
590	
800	
FM Repeaters	810 FM repeater outputs (not used in the UK)
990	
52.000	Band edge

Fig. 1: The 50MHz Band Plan.

In the UK the sub-band 50.710 to 50.910MHz is being used for f.m. repeater outputs. This is different from the IARU band plan but was necessary as the Primary user would not allow repeater outputs above 51MHz.

The area 51.210 to 51.390MHz is the input channel for f.m. repeaters and matches that in IARU Region 1. So to clarify the situation, all repeater input channels are the same throughout Europe but in the UK the outputs are 500kHz lower whereas in the rest of Region 1 they are 600kHz higher.

Next you'll find the 10 f.m. simplex channels. These lie between 51.410 to 51.590MHz, each spaced 20kHz apart. The centre frequency 51.510MHz is the f.m. calling frequency.

Finally the 200kHz of spectrum from 51.800 to 52.000MHz (nominated as repeater outputs in IARU Region 1) is unused in the UK. An ideal area therefore for experimental usage. Anyone got any ideas what to use it for?

Contests

Now I'll turn to news of some contests coming up soon. The CQ World-Wide v.h.f. contest is being held over the weekend July 12-13. It is organised by CQ magazine and attracts entrants from all over the world. Look out for activity on all bands from 50MHz and up.

On Sunday July 13 the Worked All Britain (WAB) group are holding a 432MHz telephony contest between 0900-1500UTC. Further details can be obtained from the WAB contest manager G8UYD.

Also on Sunday July 13 the RSGB are holding the second 50MHz Backpackers contest. It runs between 1100-1500UTC and has single-operator and multi-operator sections.

On the following weekend the RSGB are holding two low power contests. On Saturday July 19 between 1400-2200UTC the 144MHz contest is being held and on Sunday July 20 between 0800-1400UTC it's the 432MHz event. In both contests the maximum transmitter power allowable is 25W. County and QTH locator details need to be exchanged.

The fourth 144MHz Backpacker contest of the year is being held on Sunday August 3 between 1100-1500UTC. On the following Sunday, August 10, between 0900-1500UTC the RSGB are holding their 70MHz Trophy contest. You'll normally find that the larger contest stations head for the extremities of the UK. So look out for increased activity from Scotland and the Channel Islands.

One week later, on Sunday August 17, a 432MHz Fixed station is being held between 1700-2100UTC. Although it's a home station contest both single-operator and multi-operator entries are allowed.

Finally Monday August 18 sees the first of five 144MHz c.w. cumulatives being run over the following 3-month period. Each session is held between 2030-2300 local time.

Deadlines

That's it again for another month. Don't forget to send any news, views, comments or photographs to reach me no later than Saturday 2 August. Send them to me at Yew Tree Cottage, Lower Maescoed, Herefordshire HR2 0HP. You can also contact me via Packet radio @ GB7MAD, the UK DX Cluster @ GB7DXC or E-mail via davebu@md1hr1.agw.bt.co.uk Alternatively you can telephone me on (01873) 860679.

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HF FAR & WIDE

Leighton Smart GWOLBI provides his monthly column on your activities on the h.f. bands, compiled from your activity reports.

As the merry month of May passed by, it appears that the 1997 Sporadic-E season has well and truly started. I've already heard quite a few European (and some south American countries via 'F' layer propagation) coming in at varying signal strengths on 28MHz. It's bringing life back again to dear old 'Ten Metres'!

However, there are far greater 'fish to fry' on the bands below 28MHz, as our readers show in their reports. Some of them are real 'early birds', up at the crack of dawn to get that far-off DX on the lower h.f. bands, most notably 7MHz.

Although it's only 100kHz wide, the 7MHz band is surely one of h.f. amateur radio's most fascinating allocations. It's open all day and all night, albeit to varying locations and distances, and most amateurs can manage to set-up a reasonable dipole for the band even in a small garden, and if space is even tighter, most can manage a vertical antenna.

With 100W or so of r.f., it's not too difficult to work all parts of the globe in an evening. But watch out, once you've got the '40 metre bug', you may find yourself awake at all hours!

Logs & Reports

Space is limited this time around, so I'll stop the 'chat' and go straight into your logs and report, starting with 1.8 and 3.5MHz. First comes **Ted Trowell G2HKU** on the Isle of Sheppey in Kent.

Ted reports that he's worked **K2FU** and **AD4Z** (USA) plus **DA0IMD** (Marconi Special Event on Borkum Island) on 1.8MHz at 0500UTC with 70W of c.w. Ted says that he's been given a good report by the hospital from his last check, so it looks as if he's fully tuned and radiating r.f.! Great news Ted!

Next it's over to **John Constance GOVGD** of Aylesford in Kent, whose 3.5MHz report shows 3W QRP c.w. contacts with **S57AJC** (Slovenia) at 0104, **F6ACD** (France) at 2000, while 100W of s.s.b. gave him a contact with **DJ9IN** (Germany) at 2100UTC.

The 7MHz Band

It's up to the 7MHz band now, where

we give a warm welcome to new reporter **Don Robertson GM3JDR** of Wick in Scotland. Don says that he uses a half-Rhombic antenna erected up at 20 metres, with 400W output on the band.

Don's log includes contacts with **CX1AC** (Uruguay), **4Z5AF** (Israel), **JA7AGO** (Japan), **VK3CWB** (Australia), **PY7COU** (Brazil), **FR5JI/J28** (Djibouti), **HL1DH** (South Korea), **JS6CDB** (Okinawa), **ZS6AKF** (South Africa), **LU6XQI** (Cape Horn, Argentina), as well as **ZD7BG** (St. Helena Island), and **VU2TS** (India), all worked between 1800 and 2100UTC.

Another regular 7MHz buff is **Sean Gilbert G4UCJ** of Milton Keynes, who reckons that '40' didn't come up to much this month. But despite his comment he still managed to work **ZD8DEZ** (Ascension Island) at 2030, **6W2/F6BUM** (Senegal) at 2132, **AA3B** (USA) at 2147, **CE2LZV/MM** in the Black Sea, at 0633, **CO8OH** (Cuba) at 2230, and **HB0/DL1RWB/P** (Lichtenstein) at 2050UTC, all with c.w.

Staying with 7MHz, but on the s.w.l. side this time, we come to **Charlie Blake MOAIJ**, also in Milton Keynes. Charlie offers reception reports of **VK3AQN** (Australia) working **F5VBY** at 0700, **HP1DAV** (Panama) in contact with **IK4GRO** at 0511, **PY8GC** (Brazil) working **DJ8QP** at 0518, **OA4AWN** (Peru) working **HB9IQA** at 0646, and **ZL2HJR** (New Zealand) in contact with **IK20FW** at 0515UTC.

Meanwhile, Charlie had a couple of on air contacts himself, in the shape of **K2QBV** (USA), and **4U1ITU** in Geneva, both at 100W s.s.b.

The 14MHz Band

The 14MHz band reports start with a long list indeed from **Don McLean G3NOF** of Yeovil, along with his monthly propagation report. (Welcome back Don!). He says that the long path to Australia was often open from 0700 on 14MHz, with conditions on the short path to Asia



Fig. 1: Tony CT1FFB, formerly ZS1AGJ and a South African based PW reader is now a regular subscriber in Portugal!

being 'very good' on most days. Africans came in after 1700UTC, and in the late evenings north and south America were very strong.

Don's list contains s.s.b. contacts with **A41LZ** (Oman) at 1917, **BV4FH** (Taiwan) at 1637 (QSL via **KA6SPQ**), **DU1BBY** (Philippines) at 1527, **FY5YE** (French Guyana) at 1942 QSL to **W5SVZ**, **HS2CRU** (Thailand) at 1544, **JW7QIA** (Svalbard Island) at 1700 (QSL to **LA7QIA**). Also logged were **S21/PA3BTQ** (Bangladesh) at 1559, **TN/F5OZS** (Congo) at 1741 QSL via **F6FNU**, **TR8XX** (Gabon) at 1856 (QSL via Box 4069, Libreville, Gabon), and **VQ9LQ** (Chagos Islands) at 1644UTC (QSL to **KY3V**).

Now over to another new reporter **Antonio Gomes CT1FFB**, Fig. 1, a regular reader of *PW* when he was in South Africa, and after moving to Portugal three years ago has become a regular Portuguese *PW* reader! Antonio is the former **ZS1AGJ**, and his 14MHz report shows s.s.b. contacts with **ZC4EE** (Cyprus) at 1015, **ZS6BPA**, **ZS6BDD** (South Africa) at 1600, and **JY5IN** (Jordan) at 1410UTC.

Back to Carl **GW0VSW** again, who has been 'mixing the modes' so to speak, on 14MHz. Carl lists c.w. contacts here with **5N3/SP5ZAR** (Nigeria) at 0631 (QSL via **SP5CPR**, **K9EEE** (USA) at 1925, and **9M2TO** (Malaysia) at 1826UTC. His s.s.b. operation on the band resulted in contacts with **9X/RW3AH** (Rwanda) at 1820, **9K2RA** (Kuwait) at 1948, and **BV5GO** (Taiwan) at 1810UTC.

The 18MHz Band

Just enough room left for a brief peep at the 18MHz band. The first report from **Chris Knowles M0ABO** in Bolton, shows s.s.b. contacts with **HK3AO** (Colombia) at 1320, **KN4UG/VP5** (Turks & Caicos Islands) at 1354, **XE3VD** (Mexico) at 1444, and **9K2HN** (Kuwait) at 1606UTC.

Meanwhile **Ted G2HKU** wielded some mean c.w. to hook up with **VQ9VK** (Chagos Islands), **VE1TRH** (Canada), **W4XJ** (USA), **6W6/K3IP** (Senegal) and **A71CW** (Qatar), all between 1700 and 1800UTC.

Signing-Off

Well that's just about all I can squeeze in for this month folks! Keep those reports, photos, and letters coming in, as I am continually informed by *PW* readers that your reports and information is well read and appreciated by them. Keep up the good work!

As usual, reports to me by the 15th of the month to: **Leighton Smart GWOLBI**, 33 Nant Gwyn, Trelewis, Mid-Glamorgan, Wales CF46 6DB. Tel: (01443) 710749, FAX: (01443) 710789 (9am - 6pm).

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BROADCAST

ROUND-UP

Peter Shore has been trying out a new travel portable short wave receiver, the Sony ICF-SW40, read on to see what he thought of it.

If you are packing your bags for a summer holiday, space is likely to be at a premium, particularly if you are lucky enough to be flying off to a sun-drenched destination. Even on holiday you'll probably want to keep in touch with news and sport from home but you may not have a receiver that's compact and light enough to pass the holiday baggage weight test.

One solution may be to acquire a new travel portable short wave receiver. I've just been trying out an offering from Sony, the **ICF-SW40**. It's very small, just 170 wide x 106 high x 35mm deep, and won't take up too much of your airline baggage allowance since it weighs in at just over 400g, including its three AA size batteries.

The SW40 is a digital set, with full coverage of the f.m. broadcast band, plus long wave from 150 to 285kHz and medium wave 530 to 1620kHz, and all of short wave between 3.85 and 26.10MHz without any breaks. There is stereo on f.m. via optional earphones (a standard 3.5mm stereo jack is fitted), and a reasonably-sized loudspeaker offers good audio quality for general listening.

A 24 hour clock is displayed on a digital liquid crystal display while the set is switched off, but this changes to give frequency read-out when you switch the receiver on (usefully you can switch back to the clock when the set is on). To give novice listeners a helping hand, there is an analogue style dial with a traditional pointer immediately below the frequency display that shows roughly the frequency that the set is tuned to. But that pointer is not very traditional since it's l.c.d., too!

The set tunes in either 1 or 5kHz steps on the short wave bands, and in 1 or 9kHz steps on long and medium wave (you can change to 10kHz steps in North America). On f.m., standard tuning steps are 0.1MHz, but this can be reduced to 0.05MHz.

A large switch on the front panel alongside the tuning knob controls the tuning step rate. If you want to move quickly across the bands, you simply turn the tuning knob more

rapidly, and the tuning steps speed up. The tuning knob feels solid and is reasonably well damped.

There are 20 memory presets which can be used across all bands - there is no predetermined number for, say, f.m. and another number for short wave. This adds to the flexibility of the set.

Two timers are included, and these can be used to wake you up with either a radio station (a different one on each timer, if you wish) or via a buzzer. The l.c.d. can be illuminated for use at night.

The set seems to work well for general broadcast listening, although the filter seems a little too wide for parts of the overcrowded short wave bands in Europe. However, I pulled in all the usual stations (**BBC World Service, Deutsche Welle, Voice of Russia**) as well as a couple of more distant ones. And since the set can tune in 1kHz steps, stations not on standard frequencies can be received without problem.

Overall I was impressed by this quasi-analogue and digital receiver. It performs well and is just the right size to fit in luggage. Short wave performance seems to be fine for everyday listening, although this is not a specialist DX set.

The SW40 retails at around £90 in the UK - you might find it a little cheaper at airport Duty Free stores, but remember that you may have to pay duty on your purchase when you return home!

Now on to what you might hear using a new Sony ICF-SW40, or indeed any other short wave receiver! There's a new weekends only station from Europe that anyone who was a keen short wave listener during the 1970s and 80s might remember.

World Music Radio (WMR) is back on the air from Denmark - although its transmitters are in South Africa at the Meyerton transmitting station that beams Channel Africa across the continent. Tune in to this 'blast from the past' between 1800 and 2200UTC on 6.29MHz. The station reports that tests at the beginning of May were well received in many parts of the

world on this frequency, including Europe.

The station WMR also uses 3.345MHz to cover Africa, and this frequency and the 6MHz channel use a 250kW transmitter at Meyerton's high-tech transmitting station. If you want to contact WRM, the address is **PO Box 112, DK-8900 Randers, Denmark**.

Station News

Voice of Nigeria is reported back on the air on 7.225MHz for most of the day. English has been noted at 0500, 1600 and 1900UTC.

Radio Vlaanderen Internationaal (RVI) from Brussels will not lose its German language service later this year as I reported some time ago. The Flemish government has agreed with BRTN, the public service broadcaster in the Flemish-speaking part of Belgium, that German should remain on the air. However, Spanish and Arabic are still likely to cease at the end of October this year. BRTN, Belgische Radio en Televisie, will be renamed Vlaamse Radio en Televisie later this summer.

The station RVI is on the air with half-hour English programmes at 0630UTC on 6.035, 9.925 and 9.94MHz; at 0900UTC on 6.035 and 7.19MHz, 1800UTC on 5.91 and 2100UTC also on 5.91MHz.

Investment Channel

Do you remember the new Investment Channel set up to promote the trading of stocks and shares via short wave transmissions beamed to Africa and the Middle East? The station came on the air via the short wave facilities of Meyerton in South Africa in mid-March, but ceased operations at the beginning of May, without any prior notice.

The Investment Channel was based in the USA, but gave an on-air address in the European principality of Liechtenstein. This is famed for the number of banks located in the tiny capital of Vaduz.

The short wave transmitting station run by **Monitor Radio International, WSHB** in Cypress Creek, South Carolina, may be off the air by the time this edition of *PW* reaches you. Monitor Radio will probably close on 30th June, and the WSHB site is on the market for a

cool US\$13million. The WSHB service has two 500kW transmitters and a range of antennas which cover most of the world.

Keep entering the National Lottery!

Maybe **HCJB**, based in Quito, Ecuador, ought to buy the WSHB facility. It is being forced to close its transmitting station because of the construction of a new airport for the Ecuadorian capital.

The HCJB station is in the flight path of the airport which will be built next year. The HCJB organisation is examining the possibility of overseas relays of its programmes to improve reception, and may contract with existing short wave broadcast facilities in Europe and Asia.

You can hear HCJB in English to Europe at 0730-0930 on 5.865MHz and again at 1900-2200 on 12.015 and 21.455MHz.

International Broadcaster

A new Tamil-language international broadcaster based in London has been operating on satellite for Europe, since the beginning of June. **International Broadcasting Corporation (IBC)** has been launched by a group of Tamil-broadcasters including some former BBC World Service staff.

The 24 hour-a-day station is carried on Astra transponder 18 (Movie Channel TV) and the audio is at 7.56MHz. And in addition to satellite, the service is carried on short wave from Tajikistan on 12.07MHz at 1300-1400UTC daily, beaming to South Asia.

The International Broadcasting Corporation can be contacted at: **Wyvil Court, Wyvil Road, London SW8 2TG, UK**.

Until next time, keep your ears to the dial!



The ICF-SW40 is ideal for taking on holiday

END

Advertisements from traders or for equipment that is illegal to possess, use or which cannot be licensed in the UK, will not be accepted. No responsibility will be taken for errors.

You should state clearly in your advert whether the equipment is professionally built, home-brewed or modified.

The Publishers of *Practical Wireless* also wish to point out that it is the responsibility of the buyer to ascertain the suitability of goods offered for purchase.

BARGAIN

b a s e m e n t

Compiled by Zoë Crabb

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Antique test meter, v.g.c., like pocket watch in original box, £20. no offers. John, Wirral. Tel: 0151-632 2638.

AOR scanner AR2002, 25-550. 800-1300MHz, w.f.m., n.f.m., a.m., 20 memory channel base model with indoor (discone type) antenna with instructions, £115. David on 0181-341 5617.

Argonaut QRP h.f. transceiver, full c.w./s.s.b. 80-10m (3.5-28MHz). Trio mic., manual, boxed, first class, £325. Trio R600 general coverage receiver, v.g.c., £150. Clive G4NVX, QTHR.

BARTG multiterm terminal unit high tones, c/w computer lead, £30. Simpson frequency counter, 10Hz to 60MHz, £50. Audio generator, 15Hz to 200kHz, square/sine wave, £30. All items plus postage. Tel: NW London 0181-455 8831.

Beam, 70cm (430MHz), as new, £25. Also 2m (144MHz) collinear, as new, £20. Buyer collects. Tel: 0121-552 7560.

Casio CT655 keyboard, 5 octave 110 voice, little used, w.h.y.? Sell or exchange. GW3COI, Penrhyn Bach, Abersoch LL53 7BU. Tel: (01758) 712675.

Collins 75S-1 communications receiver, classic valve receiver of the 1960s, in excellent condition with manual and p.s.u., £300 or swap for other radio gear, please ring with details. Tel: 0151-625 5501.

Complete station: h.f. Kenwood TS-890S, £995. ATU KW, £100. PSU 20A, £75. VHF - FT5100 dual-band mobile, 2m/70cm (144/430MHz), £350. Yaesu FT-51 handy, 2m/70cm (144/430MHz) with car kit, spare batt., £250. Keith G4FCR, Huntingdon. Tel: (01480) 455800 or (0802) 437023 mobile.

Datong set top filter, just serviced by Datong, £50. Grundig Satellit all-mode receiver. 1024 memories, room for another

1024! Superb reception and audio, boxed, with books, etc., £240. Exchanges possible. Bill, Bournemouth. Tel: (01202) 430043.

EA150P amplifier with built-in pre-amp, mint condition, still boxed, six months old, £40 including postage. Tel: Cardiff (01222) 488723.

Eddystone 940 re-valved spares, manual, £130 o.n.o. Racal RA17 MkII spares, manual, £120 o.n.o. Chelcom h.f. vertical, £60. Tel: 0161-775 7066.

ERA Microreader-Super, £50. Tel: (01260) 252287.

FRG-8800 RX, fitted with FRV-8800 internal v.h.f. converter, 118-173.999MHz and wide band f.m. option plus FRT-7700 antenna tuner, both g.w.o. with manuals, £380 pair, no split. Buyer collects. G4MNB, QTHR. Tel: Swindon (01793) 826325.

FT-101, as new and Holdings Chipper MFJ-948 deluxe a.t.u. cross needle, s.w.r. meter, new Jaybeam antenna Vr 3 10-15-20 balun 1:1 2K boxed, as new, £275 the lot. G4HMW, Derbyshire. Tel: (01246) 236496.

FT-200 with p.s.u. and spare p.a.s. v.g.c., buyer collects, £180. G3ARU, QTHR. Tel: 0181-989 3196.

FT-23R 144MHz hand-held, speaker mic., dry cell case, NiCads, charger, mobile mount on glass mobile antenna, £160 (or offers). Swap plus cash for 144MHz all-mode (FT-290R, etc.) or FTV107R. Steve G7ACQ, London. Tel: 0171-635 8386 after 6pm.

FT-840 h.f. transceiver with 500Hz c.w. filter, box, mic. and manual in as new condition, £525 o.n.o. Adrian G0RXC, Bristol. Tel: 0117-956 8380.

FT-980 (CAT) h.f. all-mode, immaculate order with all handbooks and cat cable, inspect and collect, £575 o.v.n.o. Chris G0KMX, Kent. Tel: (01474) 329324 after 7pm.

FT-980 with all optional filters, keyer, works manual, etc., £550. Kenwood TR-9130 2m (144MHz) multimode, 25/12.5kHz channel spacing, £250. W9GR d.s.p. unit, £100. Griffin professional weather satellite receiver, unused, £100. Tel: Ringwood (01425) 479226 after 6pm or E-mail on g3fys@markt.com

FTDX401, £175. Seavoice RT550, £50. Mizuho 20m QRP, £100. 2m valve amp, £65. Clansman testbox, £100. Larkspur A13 sets, various prices, also spares, army kit always wanted, buy or exchange, for further details contact 0181-858 1448.

Hanmarlund HQ180A, g.c. receiver, recently re-valved, immaculate condition inside and out, c/w manual, £420 o.n.o. Tel: 0161-283 1689.

Hewlett Packard u.h.f. signal generator, model no 616B, 0-15.5GHz, offers. Systron Donner counter timer, model 6153 (2 off), offers. Tel: Dundee (01382) 817835.

Home-brew 2kW h.f. amplifier M3 size, it's heavy! Pair good 4-400A bottles, working but too QRO for my Smartuner hence, £150. B2 spyset receiver, complete plus circuit diagram, £70. Tel: 0181-858 1448.

IC-P2E, £110. 2m (144MHz) hand-held, TR7730 2m (144MHz) mobile, £120. FT-780 70cm (430MHz) all-mode mobile, £250. All v.g.c., all o.v.n.o. John G6UVU, Wolverhampton. Tel: (01902) 681961.

Icom 706 Mk1, one month old, immaculate condition with handbook and box, £695 o.n.o. Possible exchange for a Yaesu FT-840 with f.m. plus cash. Daiwa PS30411 30A, immaculate condition with box, £95 o.n.o. Andrew, Middlesbrough. Tel: (01642) 814503.

Icom 735, mint condition, hardly used with Kenwood low pass filter, £650. VCI ant. tuner VC300DLP, £60. Manson EP925 power supply, £50. Reason for sale, giving up radio. Peter, Lancs. Tel: (01204) 385466.

Icom R71E h.f. receiver, 100kHz to 30MHz with remote control, excellent condition, £500 plus postage or collect. Jim, Tyne & Wear. Tel: 0191-416 8211.

Kenwood R5000, v.h.f., as new, boxed with manual, excellent condition, two years old, £750 or exchange an 8in reflector. Tel: Truro (01872) 278002.

Kenwood SM-220 station monitor BS-8 pan display fitted, £375. Tel: Northants (01604) 762083.

Kenwood SM-230 monitor, £400. Datong F1.3 filter, £80.

Psion organiser LZ64, offers. Icom IC-240 + IC3PA, £100. Kenwood BC10 charger, £10. Kenwood PB8 battery, £20. G2DYM trapped dipole, £60. Dewsbury memory keyer, £40. Tony G4KHT, QTHR. Tel: Nr Hull (01482) 843457.

Kenwood TS-440SAT, manual, mic., boxed, mint condition, not used for three years, £650, no offers. Roy G4WHQ on (01472) 840862 or E-mail: roy@g4whq.demon.co.uk

Kenwood TS-690S h.f. + 6m (50MHz) (50W), 1.8kHz filter fitted, boxed, as new, £795. MFJ 784B tunable d.s.p. filter, as new, £145. Tel: Cornwall (01736) 362809.

Kenwood v.h.f. f.m. transceiver with mic for tinkering/constructing, quick sale, only, £95 (mobile TK715). Tel: Cheshire (01625) 522189.

KW2000B transceiver, p.s.u. and external v.f.o., £185. Racal RA17 receiver with i.f. adapter, v.h.f. adaptors, cabinet, £245. Eddystone 504 receiver, 580kHz-30.5MHz, £135. Marconi, early marine receiver, model RG+2C, 1.5-15MHz, £140. Tel: E. Yorkshire (01482) 896682.

KW2000B with p.s.u., £170. CR100, £35. H/kit 1018 'scope, £30. H/kit GDO, £15. AVO8 MkIII, £30. Maplin Gold multimeter M5050E, £12. KW E-ZEE Match, £30. Two 6146, new, boxed, £20. Ted G2HKU, Kent. Tel: (01795) 873100.

Lowe HF-225 receiver, all modes, key pad entry, internal NiCads, carry case, whip antenna, boxed, as new, £375. PK232 MBX data terminal, boxed as new, £225. Tel: Swansea (01792) 891458.

Marconi CR100 receiver, working with manual, £30. Buyer collects. John Mullen on (01767) 627241.

MMT 432-28 transverter, £75. 144-146 receiver, £15. Digital s.w.r. 160-1500MHz, £55. IC-2E 2m (144MHz) handie, loads of accessories, mint, £75. Realistic scanner, £40. AKD 4m (70MHz), boxed, as new, £120. P&P extra. Tel: Watton (01953) 884305 or (0468) 756762 (daytime).

Multireader MFJ-462B, modes c.w., RTTY, ASCII, AMTOR, FEC, with power supply, cable, manual, works also with built-in screen and printer, only, £65.

Frank, Warwick. Tel: (01295) 670749.

NB50R 2m (144MHz) linear amp, 10W input, 50W output, boxed, £50 o.n.o. Two Pye Westminster, boot mount, offers, 24 pin dot matrix panasonic printer, hardly used, £90 o.n.o. Tom M IACS, QTHR. Tel: (01509) 214058 evenings/weekends.

Practical Wireless magazines 1988-95, eight years of mags, complete. *Short Wave Magazine* 1989-95, seven years, complete, offers + carriage. Penny, London. Tel: 0181-675 4622.

Pre-war HMV radiograms, model 521 (1931), £150. Model 581 (1936), £200. Both in good working condition. Tel: Derby (01332) 700658.

PRO-50 scanner, mint condition, £40 boxed. Pye Europa + crystals for R0 TX. OK RX, needs work, £20. Heathkit clock - 25 years in storage, manual, little used, £25 + postage. Exchange lot for h.f. rig. David, Fife. Tel: (01383) 839616.

Pye Westminster 4m (70MHz) transceiver, £20 with crystals, ideal mobile. Icom 1050 10m (28MHz) f.m. channelised TX/RX, £25. Matching linear 45W, £35. 12-14V CB radio 'Icom', good condition, £20. Brian GW0GHF, QTHR. Tel: Cardiff (01222) 703429.

R1155, excellent working order, including power supply, £110. R107, excellent working order, £70. CR1007, excellent working order, £70, no offers. Tel: (01535) 630361.

R210 receiver, £85. Redifon R551N comms receiver, 0.1-30MHz, synthesised, manual, £175. Racal 9081 synthesised sig. gen. 5-520MHz, manuals, £240. Taylor 62 sweeper, £75. Marconi TF263A, £10. Many others, list available. Alan on (01344) 27869.

Realistic DX-302 h.f. receiver, 10kHz to 30MHz, g.w.o., digital read-out, manual, £100. Taxan 12in display monitor, monochrome, KX 117B, manual, £35, carriage extra. Tel: Staffs (01543) 481202.

Spectrum 2m (144MHz) to 6m (50MHz) transverter, excellent condition, £125 o.n.o. MML 100LS 2m (144MHz) linear, excellent condition, £100 o.n.o. John G0NAJ, QTHR. Tel: 0161-304 9327.

FOCAL POINT

This time Graham Hankins G8EMX has news of a new repeater in Kent, pioneering news from Canada, some practical hints and lots more!

Yet another new 24cm (1270MHz) Amateur TV repeater has opened in the UK. The repeater, **GB3KT** (East Kent), was given the 'go ahead' to begin service from 17 May 1997, a substantial achievement for members of the **Kent Television Group** in the Medway region of the UK.

The ATV Repeater **GB3KT** is located on the Isle of Sheppey and radiates an omni-directional 25W e.r.p. on 24cm. The allocated output is at 1310MHz from a Solent transmitter and SC1040 modular power amplifier.

A test card and news pages are transmitted in beacon mode, when accessed by an ATV station, the Z80-based logic puts a 'received signal-strength' bar graph into vision. The repeater can be accessed on the input frequency of 1249MHz.

Andy Parnell G8SUY (Faversham) is Keeper of **GB3KT** and Chairman of the Kent Television Group (KTG, no connection with the Kent Repeater Group). Further repeater and KTG news can be downloaded from the internet at <http://ourworld.compuserve.com/homepages/BJenkins-2>

Repeater Pioneers

Jim Hatch G300L (Somerset) sends news of a new Canadian ATV repeater. After four years of planning, **VE3TVA** was built by the Seniors' Video Repeater Committee of the **Pioneer Amateur Radio Club (PARC)** and is now operating in Ottawa.

"Here in the frozen north", writes **Bill Westbrook VE3EKA**, "we only have one ATV frequency in the 70cm band. The 439MHz frequency was chosen as the a.m. input, with an f.m. output on 914MHz. We plan to add an f.m. input in the 1.2GHz band later on".

The specification of Ottawa ATV repeater **VE3TVA** quotes an output power of 1.5kW (yes, 1500W!) e.r.p., with plans to increase this to 200W into the antenna. Remote control and monitoring via packet radio will also be incorporated.

Having built **VE3TVA**, the Pioneer ARC has many uses for the repeater. Organisers of public events can be provided with live video coverage; the local Emergency Measures

Organisation (like **RAYNET** in the UK?) recognised how useful pictures could be; kids in the local Childrens' Hospital will 'see' Father Christmas at the North Pole. Pioneer ARC may even provide a camera at other Amateur Radio Club meetings.

Other News

Oyther news now and **Mike Sanders G8LES** says "Long-established ATV repeater **GB3HV** (High Wycombe) has undergone an almost entire re-installation". Mike continues "GB3HV shares a mobile 'phone site and the company wanted to replace the mast with a stronger structure".

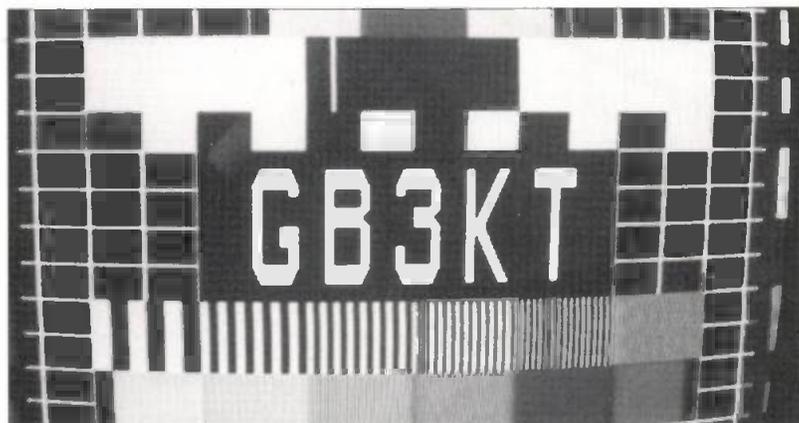
The electronics of **GB3HV** had developed numerous faults which needed to be fixed. An overload trip (monitoring antenna s.w.r.) was not firing, r.f. output power was low, a 70cm receiver had drifted and a power unit was intermittent.

Mike adds: "GB3HV had suffered hardware problems too. A faulty power splitter, a loop-antenna needed attention and a 2m/70cm (144/430MHz) dual-band antenna was measured to have a high s.w.r. on 430MHz". The repeater group's 'antenna expert' **G8CKN** attended to these little jobs, so **GB3HV** is now back in service.

Later this month there will be an attempt to achieve a new ATV distance record. **Peter Johnson G4LXC** intends to be in Peterhead, Scotland on Saturday and Sunday August 16/17 to send pictures over to **PE1ECO/P** in Holland - a distance of more than 750km. Peter will be using 435MHz, 1.3GHz and 10GHz. All are welcome to join in.

There will be an International ATV Contest during the weekend 13/14 September 1997. There should be fixed and portable UK and European ATV stations on all fast scan bands, from 1800UTC Saturday 13 until 1200UTC on Sunday 14.

So, look for pictures around 436MHz, 1255MHz (24cm simplex) and 10GHz. Test cards are used by stations 'lining-up' or radiating a 'CQ



The 1.3GHz repeater GB3KT is now up and running and ready to link ATV stations in East Kent.

ATV Contest' call, but the vision used for the contest exchange itself may simply be four non-consecutive, non-repeating white numbers on a dark background (or black numerals on white). The receiving station does not recite these but adds them together and states their sum. If correct, that is a confirmed contest contact. For example; a contest station sends, in video, 6475.

The audio reply (on 2m or via inter-carrier sound) will be: "Do your numbers add to 22?" Thus the contact is verified and, together with a picture clarity (P0 to P5) report and distance calculation, constitute a score.

For any ATV station wanting to flex their ATV operating skills, latest contest rules can be obtained from **Richard Gutteridge G4YTV (QTHR)** or by E-mail to **101700.1000@compuserve.com**

Would your local Amateur Radio Club like a talk and demonstration of Amateur Television? Members of the **British Amateur TV Club (BATC)** have been known to visit ARC meetings, to show the results than can be achieved with vision on the amateur frequency bands and demonstrate working 70cm and 24cm ATV equipment. If your club would like a speaker, or maybe several clubs combined for one evening, please get in touch with me.

Building A Kit

How about building an ATV project kit? You can generally obtain a p.c.b. and several packs of components.

My advice when building is to start with the resistors, these are the most easily identifiable and the least heat-sensitive. Select a resistor, note the value then find its component number

and position on the p.c.b. I find this quicker than starting with R1 and then trying to find that particular resistor value in the kit.

In the component pack, resistors of the same value will probably be physically joined by tape anyway. I aim to solder in place all those of an equal ohmic value, this sequence considerably speeds up assembly.

More practical hints next time. Cheerio and P5 for now, send those reports, as always, to me, **Graham Hankins G8EMX, 11 Cottesbrook Road, Acocks Green, Birmingham B27 6LE.**

Amateur Television A to Z

Here's the next instalment of my ATV alphabet. Please note letters are not included if they have no Amateur TV meaning.

Losses: Main causes are quality or length of feeder cables, too many or poor quality connectors, poor weatherproofing.

Microwaves: Amateur bands from 1.2GHz upwards

News pages: A useful feature incorporated in many ATV repeaters.

P0 to P5: ATV picture quality assessment scale. P5 is ideal.

Quad-loop antenna: Good 24cm antenna for gain and bandwidth.

END

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TRANSVERTERS 25W out. low noise. 15dB RX gain. 2m 3W drive. Types TRC4-2iL built only, TRC6-2iL	£159.30	£225.00
10m 5W drive. TRC2-10iL, TRC4-10iL, TRC6-10iL	£159.30	£225.00
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- Simplified Tuning with Shuttle Jog Control
- Omni-Glow™ Dual Display with Twin VFO Knobs
- Separate FET RF Amplifier for High & Low Bands
- Digital Voice Memory System
- Quick Memory Bank (QMB) Instant Frequency Memory System

*Million Instructions Per Second

The real difference is the signals you hear-- not the ones you see.



State-of-the-Art DSP Bandwidth Controls



<http://www.yaesu.co.uk>

Specifications subject to change without notice. Specifications guaranteed only within amateur bands. Some accessories and/or options are standard in certain areas. Check with your local Yaesu dealer for specific details. Collins is a trademark of Rockwell International Corporation.



FT-1000MP

This HF standout features a high-intercept front end design, EDSP, and built-in Collins SSB Mechanical Filter