

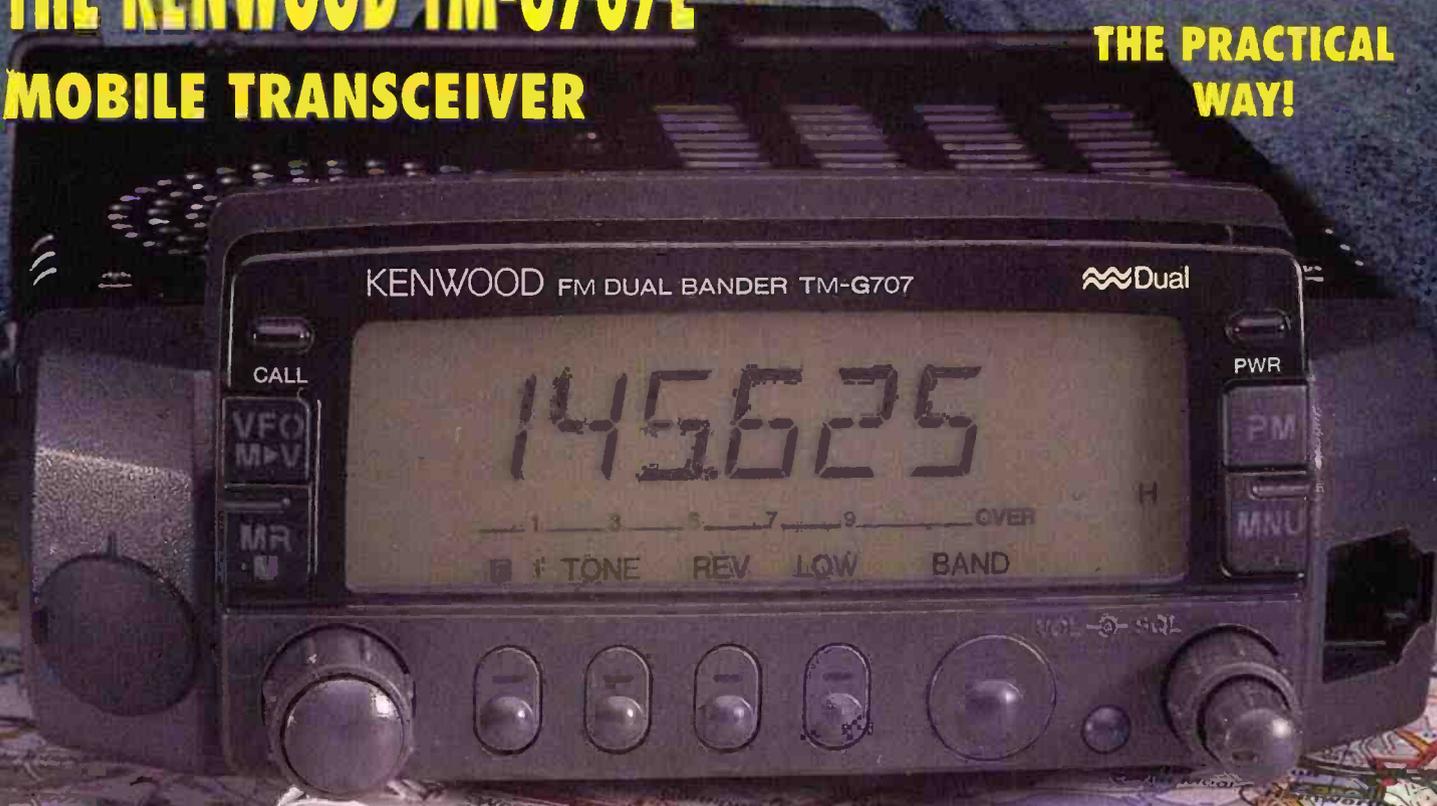
Practical Wireless

PW

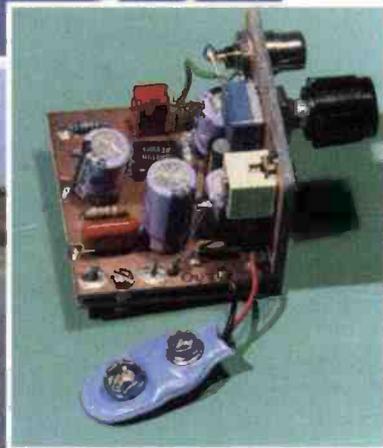
amateur radio & more!

REVIEWED!

THE KENWOOD TM-G707E MOBILE TRANSCEIVER



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AIR TATTOO
TICKETS**



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THE PRACTICAL
WAY!**

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LOOK**

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From HORA
70cms Handheld Full CTCSS

£89.95!

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SPECIAL OFFER PRICE

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

1998 Catalogue



- * Largest in Europe
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WATSON

Hunter Frequency Counter

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

£59.95

Add £2.50 Post & Ins.



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

UK's Top Dealer for YAESU, KENWOOD & ICOM

Kachina 505DSP HF Transceiver



A complete PC controlled remote HF rig - In stock

Main Features

£1995

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

SGC-2020 QRP HF Transceiver



Limited Stock

£599

1.8 - 30MHz

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

HORA C-150

2m FM Handheld

Can you believe your eyes?

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

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



Limited Stocks



New Low Price £249

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

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



£199

ADI AR-146 2m 50W

FULL CTCSS

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

KENWOOD

TM-451E 70cms Mobile

LAST FEW

£459



£249

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

VHF & UHF Band Pass Filters

2m & 70cm

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

DCI-145 Passband: 144 - 146MHz
Loss: Less than 1 dB
Selectivity: -68dB at 136MHz - 55dB at 155MHz
Power: 200 Watts

DCI-435 Passband: 430 - 440MHz
Loss: Less than 1 dB
Selectivity: -47dB at 415MHz - 50dB at 455MHz
Power: 200 Watts

WATSON

Great Value New Mini Case

For your handheld

Prices Down! Base Antennas

W-2000 6m-2m-70cm (2 1/2" 2 1/8" 4.0" 2.5m long)	£69.95
W-30 2m/70cm (3/6dB 1.15m long)	£39.95
W-50 2m/70cm (4.5/7.2dB 1.8m long)	£49.95
W-300 2m/70cm (6.5/9dB 3.1m long)	£59.95

All aerials have SO-239 sockets, mounting hardware for masts up to 62cm diameter and three radials. All tuned for UK bands.

Mobile Whips

Stainless Steel Mobile Whips with hinged bases. Pre-tuned.

W-285 2m whip	£15.95
W-770HB 2m/70cm	£24.95

New Super Gainer

Best value in high quality antenna design we have ever seen! A super antenna at a very special price! Why pay more?

- * 144 & 430MHz
- * 5dB 2m / 7.6dB 70cm
- * L 1.58m Power: 150W
- * PL-259 connector
- W-7900 -- £34.95

W-PL70 Patch Leads £6.95

A 66cm long PL-259 patch lead using semi-stiff cable that stays put. A smart ideal!

- * Dual band "Gainer" whip 2m / 70cm
- * 21cms long fitted BNC connector
- £19.95

VSWR / Power Meters

- Prices Down
- | | |
|----------------------------|---------|
| W-220 1.6-200MHz 5/20/200W | £59.95 |
| W-420 118-530MHz 5/20/200W | £59.95 |
| W-620 1.6-530MHz 5/20/200W | £129.95 |

W-25AM

£95.95

The Professional Power Source

- * 30 Amp Surge 25 Amp normal duty
- * Variable output 0 - 15V DC
- * Input 230V AC Front panel fused
- * 3 sets of front terminals
- * Cigar socket (10 Amps)
- * Dual Analogue meters
- * Click Stop adjustment for 13.8V
- * Internal heat sink for safety
- * Smart professional design

25 Amp Power Supply For 100W Transceivers

Fully conforms to the latest CE regulations and Low Voltage Directive. Phone for details of other models providing outputs from 3 Amps to 30 Amps, both variable and fixed.

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E-mail: sales@wsplc.demon.co.uk

Web Site: <http://www.waters-and-stanton.co.uk>

Cushcraft Antennas

R-7000 7 Band Vertical 40-10 Metres

80M Option Kit Available

£369

What the mags say!

Practical Wireless: "An excellent DX antenna - Extremely impressed with standard of workmanship and ease of erection"

RadCom: "Ideally suited to the small garden - an investment which lasts"

- * 7 Bands 40-10m
- * Power 1.5kW PEP
- * Height 7.3m (24ft)
- * 7 x 49 inch radials
- * Self-supporting.

Other Cushcraft Models

R-80 80m kit for R-7000	£129.95
AV-80 80m vertical 1.5kW 10.5m	£349.95
A-3S 10-15-20m beam 2kW	£389.95
A-4S 10-15-20m 4 el beam 2kW	£489.95
X-7 10-15-20m 7 el beam 2kW	£499.95
X-9 10-15-20m 9 el beam 2kW	£749.95
Ten-3 10m 3 el beam 2kW	£139.95
10-4CD 10m 4 el beam 2kW	£269.95
15-3CD 15m 3 el beam 2kW	£249.95
20-3CD 20m 3 el beam 2kW	£379.95

FC-130 Counter

£79.95

Now being shipped to UK Gov. departments.

- * 1MHz - 3GHz
- * LCD Display
- * BNC Whip Antenna
- * Very sensitive "off air"
- * Ni-cads and Charger

Super Hunter

£149.95

- * 10Hz - 3GHz
- * 16 segment field meter
- * 4 x gate speeds
- * Noise filter
- * 50 Ohm / 1M Ohm
- * Hold button / Beeper
- * Backlight / Battery Saver
- * Charger, Ni-cad & whip

24 Hour Digital WallClock

£34.95

+ Temperature

- * 265mm diameter
- * 24/12 hours LCD
- * 55mm digits
- * date - day - month
- * Celsius / Fahrenheit
- * 2 x AAA cells

Available End of March

WDB-30 Dual Band Amp

£139.95

Boost the power of your dual bander with this well-designed amplifier. Covering 144 / 430MHz it requires 0.3 - 5W FM drive for 6 - 30W output. The unit is RF sensed and fitted with SO-239 sockets. Requires 12V DC at approx 7A.

WSC-3 £12.95



Ideal for the modern mini dual bander. It holds the rig firmly in place. The Patented belt clip provides a quick release and has a curled end to prevent it from accidentally riding up, and off the belt.

Alloy Antenna Wire £12.95

Each reel contains 55ft of 3.5mm alloy wire (ideal for G5RVs etc.) Its ultra light - 55ft reel weighs 400 grams! This alloy wire will not tarnish like copper and its lighter weight means safer aerials.

New Triple Bander

6m - 2m - 70cms £34.95

WATSON W-627

Now you can have all three bands on one compact antenna!

- * 2.15dBi / 4.8dBi / 7.2dBi
 - * 100W maximum
 - * Length 1.62m
 - * Foldover PL-259 base
- Available End of March

DC Mobile Leads

£6.95

Standard "T" connector lead used by all modern rigs. 15A dual fused, 1.9m long.

WSM-270 Mag. Ant

Price Down

- * Dual: Band 2m/70cms
- * Mini Magnetic design
- * Super strong magnet
- * Base just 29mm diameter
- * Pre-tuned for 2m & 70cm UK
- * Low Profile whip
- * 2.75m of mini coax - BNC
- £19.95

Mini Dual Bander

Superb Design 2m & 70cms

W-77LS

£14.95

New

- * 2m & 70cms
- * 50 Watts
- * 42cm long
- * Match section
- * PL-259 base

Carriage is charged at cost - Phone, fax or e-mail for

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£1595

1.8MHz to 432MHz

Plus FREE PSU & Base Mic

Includes 70MHz Transceiver

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

ICOM Dual Bander **£215**

New IC-Q7E

2m & 70cms FM & AM Rx

In Stock about NOW

This pocket handheld provides 300mW of FM on 2m & 70cms plus wideband receive FM AM WFM from 30MHz - 1300MHz - no gaps. Runs from 2 x AA cells



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

Plus FREE DSP



PRICE MATCH

DSP Module for existing owners £59.95

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!

This Month Lowest Yaesu Prices Ever!

10 Day Approval 24 Month's Warranty

YAESU FT-920 1.8 - 54MHz **£1269**



PRICE MATCH

+ Free FM board & AM Filters

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

YAESU FT-1000MPDC (AC £1995) **£1895**



PRICE MATCH

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

Alinco Prices Down!

DX-70T



Limited Stock £599.95

* 1.8 - 54MHz

* SSB CW FM AM

* 100W HF 10W 50MHz

* CTCSS Tone unit

ICOM IC-746 1.8 - 144MHz **£Phone!**



PRICE MATCH

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

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



Save £100!

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

Special Price



* Dual Band 2m/70cm

* 200 memories

* Alphanumeric Display

* Full CTCSS

* DTMF

* Up to 6W out

* Wideband Receive

* Illuminated Keypad

* PC Compatible

* Windows Programming

Send For Brochure

ICOM New IC-2100 2M Mobile **£269**

With Switched 12.5kHz & 25kHz Filters.



New Model

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

YAESU FT-50R 2m/70cms Handy **£229**



* Wideband Rx (AM Airband)

* FM Broadcast receive

* CTCSS & 1750Hz

* 112 Alphanumeric Memories

* Dual Watch - Military rated

* 5W from 12v DC input

* Ni-cads and AC Charger

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

YAESU VX-1R Dual band **£219.95**

Save £50!



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

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

ICOM IC-207H 2m/70cm Mobile **£329**



PRICE MATCH

* 2m & 70cm

* 50W / 30W

* Detachable head

* Packet 9600 bps ready

* 180 Memory channels

* CTCSS & 1750Hz tone

PCR-1000 HF - UHF Receiver **£349**

+ FREE ACARS Software



new DSP Module Available £59.95

Computer controlled Receiver 10MHz - 1.3GHz

SSB CW AM HFV MFM Unlabelled Memories

FREE Software, AC Supply and whip antennas

PRICE MATCH

KENWOOD New TM-G707 **£299**



New Model

* 144 & 430MHz 50/35W

* AM / FM Rx

* RX 118-174/300-524/800-1000MHz

* 180 Memories

* Detachable front head

* CTCSS & 1750Hz Tone

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



* Rechargeable Alkaline

* 1.5V cells

* No memory effects

* Charge mid cycle is OK

* 5 year charge shelf life

* 3 x capacity of ni-cads

* Very low cost

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

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4 x AA cells (ready charged) £5.99 (£1.00 post)

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4 x AAA cells (uses standard charger) £6.25 (£1.00 post)

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

6m 2m 70cms

PRICE MATCH



All in one small package.

* 5W output (13V)

* 25 / 12.5kHz ready

* Wideband Rx

* Nickel Hydride batt

* Wide FM broadcast

* AM for airband

* Rapid scanning

* Alphanumeric

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DX-70TH

100W HF Transceiver plus 100W on 6 mtrs



£775.00
CB P&P

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

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



DX-77(E)

£675.00
CB P&P

- Covers all HF Amateur Bands
- General coverage receive (150kHz - 30MHz)
- 100 memories
- 100W, SSB, CW & FM, 40W AM
- Built in speech compressor
- Computer control with optional ERW-4
- Full QSK in CW modes

- QRM/QRN reduction with IF shift, RF attenuator and optional CW filter
 - Two VFOs + memory operation mode
 - Basic model upgradeable to (T) model with
 - EJ33U Electronic Keyer.....£29.95
 - EJ34U CTCSS.....£19.95
 - EJ35U CW filter.....£49.95
- Post and Packing £2.75

MICRO SIZED Handhelds

as reviewed in FEBRUARY RADCOM

NEW LOW PRICES

Water thin credit card size transceivers 300mW RF output - repeater offsets - CTCSS

£99.95
CB P&P

£99.95
CB P&P

- DJ-C1** 2mtr Handheld **£169.95**
- 144-146MHz TX • Extendable RX 118-174MHz Inc (AM) Air-band
- DJ-C4** 70cms Handheld **£169.95**
- 430 - 440MHz transmit • Extendable receive 420 - 470MHz



EMS-49 Speaker Mic
Miniature speaker mic with lapel clip for use with DJ-C1 and DJ-C4.
£22.95 CB P&P

DJ-G5EY

Dual Band Handheld



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

NEW LOWER PRICE
£269.00
CB P&P

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

DJ-191E

2 Metre 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

£169.95
CB P&P

DJ-190E

Low Cost 2mtr Handheld



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

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

£149.95
CB P&P

DR-610E

Twin Band Mobile



£499.95
CB P&P

The DR-610E dual band transceiver equipped with Alinco's Advanced Channel Scope utilises a 'Real Time Monitor' on 11 different frequencies simultaneously giving you quick visual scanning capability and the potential for making numerous contacts.

- 120 memories
- VHF 50W/UHF 35W max
- Channel Scope
- Full duplex
- CTCSS encoder
- AM Airband RX
- Optional extended receive inc airband
- VHF 108 - 174MHz
- UHF 420 - 470MHz

DR-150E

2 Metre Mobile



£279.95
CB P&P

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 receive to cover Airband, PMR, Marine, UHF, etc 135-950MHz (with gaps)
- 100 memories
- Channel Scope
- simultaneously displays 7 channels
- 9600 BPS Interface
- CTCSS encoder
- Time Out Timer
- On air cloning

DR-140E

2 Metre Mobile/Base

NEW LOWER PRICE



£219.95
CB P&P

Simple to operate, easy to program and dependable to use. It has optional extended receive coverage for airband, business and marine radio.

- Optional receive to cover Airband, PMR & Marine 118-135.995MHz (AM) 136-173.995MHz (FM)
- 51 memories
- Time out timer
- Alpha numeric display
- 50W FM output
- Electronic squelch
- c/w DTMF mic

DR-605E

Dual Band Mobile



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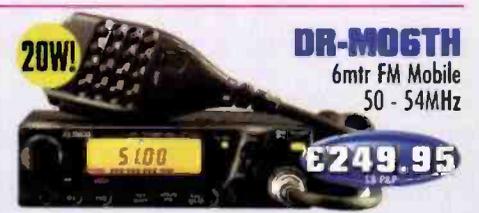
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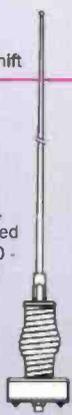
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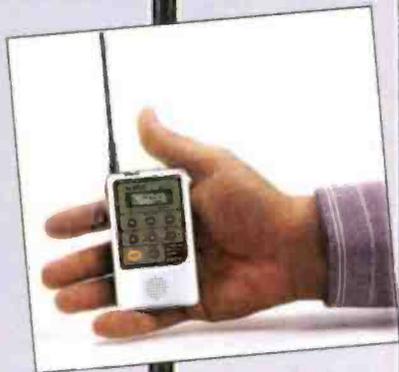


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Keylines

Everyone on the PW Editorial team is very approachable, whether it be during a show, rally or during office hours. Many of you take the opportunity to chat to us whenever possible and it's possible to telephone any of us at the office, including myself, at any time.

Anyone telephoning and asking for me is immediately put through, as we don't have 'layers' of staff to penetrate before you get through to anyone of us on the team. One of the benefits of being a member of a small team! We're always pleased to help, and of course E-mail is now playing an increasing part in daily communications.

Many readers now E-mail me and get a 'zippy' reply usually within the working day. That's fine - if you don't mind a hurried keyboard reply without the benefit of 'spell checking' for the inevitable 'typos' caused by my ill-educated artificial arm's typing appliance! (The National Health Service has promised me a new typing gadget that can spell - and I hope it arrives soon!).

However, although I enjoy talking to readers, and practice what I preach by avoiding the 'Particulars Withheld' entry in the RSGB's *Callbook*, I'm receiving an increasing number of telephone enquiries at home. And to date, the latest (or earliest?) I've received a call was 2am...from an Australian reader enquiring about an equipment review. He was easy to forgive because he'd totally forgotten the time difference between Queensland and Dorset times!

Out Of Hours

Over the years I've received many telephone calls 'out of hours' from readers - but I'm determined to keep the 'open approach' by remaining in the

Callbook and telephone directory. But in return I ask you to bear in mind several things before you do call.

Firstly, please think carefully about what you are to ask me! For example, if you're enquiring about an article, or review in the magazine bear in mind that - unlike the office - I won't have all my magazine reference copies to hand and that 'Archive Specialist' **Tex Swann G1TEX** won't be available!

So I would be pleased if you reserved any telephone calls you make to me at home to be for purely personal matters. Those I can deal with at home!

I also ask you to do the same for letters. If you're writing a purely personal letter - please feel free to address it to me at home. However, **if your letter has any connection with PW or with me as Editor** - please send it to the office where it will be much safer (logged in and recorded) than it would be in my rather disorganised office at home!

While on the subject of letters received at home, could the reader (from the Portsmouth area I believe) who sent me a cassette recording containing QSOs from the early hours on 3.5MHz, direct to my home please write to me again. This time addressing your letter to the offices - as I've mislaid the original.

Finally on my 'open approach' I should like to apologise to those callers who have got me out of my bath or bed - and who have not spoken to the 'usual tempered' G3FXD. However, on these occasions when I've dried myself off and thought perhaps I'd been a little unfriendly - I've tried to call them back via the '1471' telephone dial-back facility.

Unfortunately my recall efforts don't work very often because most of the late night callers are invariably 'numbers withheld'...and I can't call them back. So it appears that

Recently the Radiocommunications Agency (RA) wrote to PW regarding the illegal 'Amateur Radio' type activity which has been heard for very many years just below 7MHz. In the letter the RA official even suggests that otherwise legitimate Radio Amateurs are to be heard on these frequencies and that 'action will be taken'!

Although I don't normally make a habit of listening to the 'pirate' frequencies mentioned by the RA, I came across something that was both interesting and worrying recently when I was busy at my workbench preparing p.c.b.s for the 'Radio Basics' series. I'd been listening to **Radio Netherlands** up on their 31m band frequency, but then had to tune down to the 49m band around 6MHz.

As I've mentioned before in 'Keylines' - the 31m band in my part of Dorset is well populated with very strong transmissions from domestic 'cordless' telephones on narrow band frequency modulation (n.b.f.m.). But I was in for a greater surprise on the pirate frequencies!

Just below 7MHz I tuned across a strong signal which sounded as though it could be from a 'pirate' but turned out to be a cordless telephone transmission. It was an embarrassingly strong n.b.f.m. signal. Obviously, apart from confirming it was a telephone conversation - I did not linger on the frequency but tuning on down to 6MHz I came across at least three other similar transmissions.

So, just what is going on? Are these cordless telephones totally illegally imported models, or 'type approved' units working out of specification? If only the users realised how 'public' their conversations are I feel sure they wouldn't be happy (for obvious reasons I certainly don't intend to try to contact and warn them!).

So readers, knowing that the RA read PW very closely - please write and let me know what the 'cordless' problem is like in your area. Surely it must be widespread and not just in Dorset? In the meantime let's hope more people choose digital cordless telephones operating on the correct frequencies very soon!

the open approach is definitely only a 'one way' street in some cases!

Rob Mannion G3FXD



Letters

COMPILED BY
ROB MANNION G3XFD & ZOE CRABB

STAR LETTER

Lirpa Loof & Regulations

Dear Sir

I'm writing with regards to 'New Regulations' supplied by Lirpa Loof, April PW.

Following the report the new CEPT regulations will require Radio Amateurs to take the RAE and Morse tests in English, French and German, I am interested to know if PW have any plans to produce a tri-lingual edition of the magazine! Obviously as more languages are added, it would become impossible to produce one magazine, therefore I would suggest you print separate editions for each language, thus giving one the opportunity to choose which one we want!

It would be nice to think that for those of us who have a subscription we could be given the choice of having a different edition each month, this would make for very exciting reading, although the thought of reading Rob Mannlon's Editorial in Hungarian somehow makes the mind boggle!

I would like to thank all of you at PW for producing such an excellent magazine which I feel is the best one for radio amateurs. The new look is good and there is a good variety of articles. In the future I would be very interested in an article about filters and how to build them if this is at all possible. I look forward to future editions of PW.

Leslie Wright
Chester

News Editor Donna G7TZB replies: Thanks Leslie, your suggestion of producing a tri-lingual edition of PW has undergone serious discussion by the Editorial 'team' however, it was decided that if we produced PW in this way we may be in danger of alienating readers from countries other than England, France and Germany. So, until such time that we can produce a multi-lingual edition of *Practical Wireless* the decision has been taken to keep it in English and to fly the flag for the UK as the 'UK's Only Independent Amateur Radio Magazine'.

Thank you to everyone who wrote in with reference to the Lirpa Loof Spoof News story, I'm glad that so many of you took it in the way in which it was intended.

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 callsign along with your E-Mail hieroglyphics! Editor

Garmin GPS - Battery Life

Dear Sir

I read with interest David Butler's review of the Garmin GPS III (PW March 1998) as I purchased the same model some four months ago. Like your reviewer, I never cease to be impressed by its performance - but like David, I was also initially very disappointed by the fairly short battery life.

A set of new 700mAh NiCads provided a paltry 2.5 hours use before the 'low battery' warning indicator appeared, while the high cost of alkaline cells preclude their consideration as a serious long term option. The answer was to spend £10 at a rally on a set of AA size NiMH cells. These, when fully charged, will run the GPS for up to six hours continuously (less if the backlight is used).

They also have the advantage, that due to their lack of 'memory effect' their charge can be 'topped-up' as and when necessary. I hope that this information will be of interest to anyone considering the purchase of the Garmin GPSIII.

Andrew Dermont G8BG
Berkshire

First Morse QSO

Dear Sir

Reading the letter from Dave Skye G3PLR in the April issue of PW caused me to recall a similar experience when I first ventured onto the h.f. bands using c.w. Having studied for the 'plain text and numbers' Morse test, I finally passed the exam in January 1988.

I was extremely lucky in so much as my Morse teacher offered to continue my tuition, after passing my exam, so that I could learn the art of 'on air' c.w. operation. I readily agreed to this additional tuition and noted how very different this style of Morse was to that which I had already learnt.

Armed with this new knowledge and the assurance that "good c.w. operators could, and usually would, adjust their speed to suit that of the station calling", I went on air. I put out a CQ call on 7MHz and received a reply from a G4 'machine gun Morse merchant' who, to my surprise, went immediately into his first over.

He was rattling along well over my speed and it took all my concentration just to get his complete callsign. In my innocence, I sent 'QRS' a few times followed by a 'K'. The station replied at exactly the same speed as the original over. This time I sent 'PSE QRS' and was astonished when, instead of a slow over, I was greeted with a chorus of 73 and then the station either shut down or moved to another frequency.

Is this what I had spent the last six months studying for? Undeterred I

called CQ again and had a very enjoyable QSO with a German station. Others followed and I came off air feeling reasonably satisfied that I could operate c.w. and work other stations.

This was the beginning of over 18 months of solid c.w. operation. Eventually, when finances permitted, I purchased a transceiver capable of s.s.b. and moved away from c.w. entirely.

In mid 1997 a friend asked me to help him cram for his forthcoming Morse test. This renewed my interest in the code and the evenings of sending and receiving helped me get my c.w. back up to scratch again.

My first c.w. QSO for more than seven years took place in August 1997 on 3.5MHz. As luck would have it, the QSO was with a member of the FISTS CW Club. He not only stuck with me through a very shaky QSO, but also instantly slowed down to my speed without having to be asked.

This, in itself, gave me the confidence boost I needed and I have now returned almost entirely to c.w. I have also joined the FISTS CW Club and worked many like minded operators who are more concerned with the quality of their Morse than the speed they can send it at.

They do their utmost to welcome and encourage new c.w. operators to the world of Morse Code. In my opinion, this organisation proves that a c.w. QSO need not be a battle of wits but can be a pleasurable way to enjoy another means of communications in this vast hobby of ours.

Chris Carrington G0IYZ
Derby

Morse & The 'A' Licence

Dear Sir

Views from one extreme to the other have been expressed in various publications, over the last couple of years in particular, on the subject of the 'A' licence requirement for a pass in the Morse test.

I think it's so obvious that the majority of those in favour of keeping the requirement, including the RSGB, only want to keep it as a tool for limiting the number of operators on the already overcrowded bands, in particular those coming from the 11m/CB avenue.

It's also just as obvious that those opposed to keeping the requirement just can't be bothered to learn a simple code that even children have managed to learn at very young ages.

I was very lucky in that I was taught Morse code (1987) at speeds of up to 50w.p.m. while in the Royal Signals, by a great character called Charlie Edgar. I wonder whether any older ex RS readers might recall him from earlier years? These speeds were attained over

a period of seven months, with many other subjects covered on the syllabus during this time. Surely 12w.p.m. is attainable to anyone interested enough in radio to want to get onto the bands?

The view of the RSGB and other advocates for the Morse Is, in my view, quite hypocritical. If a pass in the Morse test is so necessary to be allowed access to the h.f. bands, then surely an annual competency test should be introduced to monitor operators skills so that the level of Morse skills remains at a satisfactory standard.

I personally am in favour of this as I am sure that a lot of supporters of the requirement for a pass in the Morse test would suddenly become silent - at least the members of the 'I had to pass mine, so everyone else should, even though I've never used it since' brigade would.

Finally, I've got a 'whinge' about callsign allocation. Isn't it about time we dragged the RA/SSL into this century. After a pass in the RAE and Morse test, I reserved the callsign MW0BRO but I have to wait for the suffix sequence to reach BRO before being allowed to transmit!

I would gladly pay a fee to be able to get my licence and use my chosen callsign immediately! If the SSL's computer can't handle printing an out of sequence callsign onto a licence, I

wonder how it's going to handle the Millennium Bug. Here's hoping I'm licensed by the end of the century!
Martin Lewis MW0BRO
Wales

Lisle Street

Dear Sir
Remember Lisle Street? Memories of long ago, of constructing sets featured in *PW* were brought back on reading the letter 'It's a small world' by **John Taylor G3OHV** in the October 1997 issue. Also interesting were the Editor's comments about Lisle Street in the May 1998 issue, where we home constructors bought our components, valves and ex-government gear from the many radio shops, all interspersed with steep stairways leading to entirely different pleasures above!

One particular instance which sticks in my memory was when I had my nose pressed against the glass of a radio shop and a small very young sailor strolled by. A tall voluptuous lady standing at the bottom of a stairway put out an arm and grabbed the lad and he was whisked upstairs before you could bat an eyelid...!

Things have changed over the years, and when I looked up Lisle Street a short while ago, it was all Chinese

Oops!

Dear Sir

With regards your 'Back To Basics', page 22 of the April edition of *PW*. The mains are 50Hz as you say, but 50 positive and 50 negative pulses do not make 100Hz from the tip of a soldering iron because you need one +ve pulse and one -ve pulse for 1Hz, therefore at the tip of the iron is a 50Hz mains hum and not 100Hz.

Back To Basics? I think not!

Ross Bradshaw G4DTD
Milton Keynes

Editor's reply: Oops! Sorry readers - my mistake - of course the frequency is still 50Hz. My mistake Ross - but perhaps I wouldn't have made such a glaring error if we still referred to frequency in the more explanatory 'Cycles per second'?

shops and offices, not a radio emporium left from those 'good old days'.

Douglas Byrne G3KPO
Isle of Wight

Wynn's One Valver

Dear Sir

Ever responsive to the 'call' from the Editorial 'throne' of our favourite magazine, here a few lines and a photo of the little 0-V-0 that got built a few years ago, to show what one valve would do - safely - from the inspiration of Ron Pearce's 'One Valve Short Wave Receiver in *Short Wave Magazine*, Sept 1990.

Having a selection of three Acorn Valve type 957 (intended for a 144MHz transceiver, *PW* of many moons ago) with its 1.4V filament suggesting the use of a single NiCad cell (maintained charged via a 'fairy light' bulb and gating diode from the shack's 12V supply) a slot was incorporated below the 'breadboard' to house a 'domino-stacked' set of PP3 batteries. The half dozen giving adequate - but not cheap! - safe h.t. using conveniently available power sources and connectors.

Not having (as Denco had not re-started production) the specified plug-in coils, we used some miniature Eddystone ones, needing a Hivac style 4-pin base, fortunately also available from the shed-sized 'junk box'. This meant fitting an isolated reaction (positive feed back) capacitor with an insulated flexible shaft extension, wherein lies its 'Achilles heel', for the tuning/reacting hand has to stay put, else the finely adjusted gently oscillating condition changes enough to 'lose' a weak signal! Should I ever get round to a rebuild, it would be worthwhile changing to a Pentode Valve (the 954 being an Acorn type, but this of course has a higher current 'heater').

The circuit could then become the ECO type. This allows potentiometer control of feed-back, thorough decoupling of the screen grid to give isolation to the anode and audio circuitry and headphones wiring. The headphones being 50 year-old high resistance SG Brown types.

As I built the receiver as a demonstration model, provision for monitoring the grid waveform was made via a 200k Ω extension to the 1.8M Ω grid leak resistor. This reveals 'all about' the dreaded Miller effect of triodes at r.f. with the asymmetric

limiting by grid current of positive excursions of the tuned circuits magnified voltages, with 'damping' of the high Q circuit, but appreciably more negative peaking, giving greater voltages between grid and anode capacitance.

Also, the r.f.c. being a modern Ferrite cored variety, may have too great a capacitance in its solitary 'pie' to do its duty in the traditional manner. Perhaps future keen types may be dextrous enough to wind a 40s.w.g. radio frequency choke!

Antenna connection were by 'croc clip' onto various points via small capacitors, all adding to the fun and games attitude to 'play' with such 'one lung' devices. But having my Lowe HF-225 nearby, frequency checking was easily possible as the little receiver has definite ambitions for the 'big time' to become a transmitter with its oscillating detector!

Wyn Mainwaring GW8AWT
Tyle Bach, Manordello
Llandello, Dyfed SA19 7BA

Editor's comment: Photocopies of Wyn's version of the circuit are available from the *PW* offices by enclosing an s.a.e. He's also kindly suggested his address and telephone number, (01550) 777234, be published so he can offer further assistance to readers interested in the project. I think that there's a possibility the the Llandoverly College Amateur Radio Society (of which Wyn & Eileen Mainwaring are mainstays) may well attract more members too!



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

NEWS

COMPILED BY DONNA VINCENT G7TZB

head line news in harmony - Adur & Ten-Tec

In Harmony - Adur & Ten-Tec



If you're into kit building then Adur Communications is the place to go, as they are now stocking a comprehensive range of Ten-Tec Kits. The range includes everything from short wave receivers through dummy loads and s.w.r. bridges to complete transceivers!

Ten-Tec Inc., who reside at 1185 Dolly Parton Parkway, Sevierville, Tennessee, USA have been in business since 1968 when the company was founded by Al Kahn K4FW and Jack Burchfield K4JU. Both men, having worked together previously, decided to start their business with tool-and-die work and QRP Amateur Radio Kits, so they employed a workforce of seven and the doors opened for business in September 1968. So, kits have been part of Ten-Tec's business from the start and although manufacture stopped in the mid-1970s it resumed again in 1994 when a new line of kits was developed.

Ten-Tec have grown to be of four world-wide manufacturers of amateur radio equipment and virtually everything that goes into their products is manufactured on site. Their kit business has grown so much that Ten-Tec now have at least one kit dealer in every CE country and in a few have multiple dealers. In the UK, their only dealer for kits at present is Adur Communications.

Phil Godbold G4UDU of Adur has been involved with Ten-Tec for a number of years, mainly in the servicing of their equipment for the European market and so the progression to dealer would seem a natural one. For a full price list and catalogue of Ten Tec kits you are invited to contact Adur Communications at Belmont Buildings, The Street, Bramber, Steyning, West Sussex BN44 3WE. Tel: (01903) 879526. Full details can also be found on Adur's Web Site at <http://www.prestel.co.uk/adurcomms>

Practical Wireless will be reviewing two Ten-Tec kits in the shape of the RF Counterpoise and SWR Wattmeter in the very near future and you'll also have a chance to win the completed kits. Watch this space!



Hi-Tech Manuals

Mauratron Technical Services are a major supplier, in the UK, of Service Manuals for all types of equipment ranging from the earliest vintage valve sets to the latest video recorders, etc. They have been supplying manuals to the electronics repair trade since 1988 and have just launched a series of CD-ROMs containing their technical manuals as compilations.

Each CD-ROM contains 25 service manuals covering a wide range of equipment. The CD-ROMs which are currently available contain manuals for Television, Video Recorders, Computer Monitors and Vintage Valve Wireless sets. Future editions will cover

Test equipment, Amateur Radio equipment and Office equipment to name a few.

Mauratron say that once you've used the CD method of obtaining servicing information

you'll wonder how you managed before! Each CD costs £24.95 plus VAT and are available from Mauratron at 8 Cherry Tree Road, Chinnor, Oxfordshire OX9 4QY. Tel: (01844) 351694, FAX: (01844) 352554 or E-mail: enquiries@mauratron.co.uk If you've Internet access you can find details of the latest editions and current special offers on the Mauratron Web site at <http://www.mauratron.co.uk/mauratron/>

A full catalogue detailing all the makes and models covered by the CD-ROM series and the range of technical publications is available on a floppy disk. To receive yours, just send two first class stamps to Mauratron. If you want printed copies of the manuals they are still available.

More Minatures!

Do you remember the Alinco DJ-C1 (144MHz) and C4 (430MHz) hand-helds which were reviewed in the September 1997 issue of Practical Wireless? Well now there's a dual-band version available.

The latest 'super slim credit card' sized radio is the DJ-C5E and like its single band stable mates is small enough to hide in a shirt pocket! The DJ-C5E features 50 memory channels plus one call channel per band, CTCSS encode plus tone burst, 300mW of output power and a large capacity internal 500mAh lithium-ion battery.

Weighing in at only 80g and measuring just 56 x 94 x 10.6mm the DJ-C5E is light and slim, but, the manufacturer's state... it's powerful enough to deliver clear clean audio. And that's not all the recommended price is just £189.95!

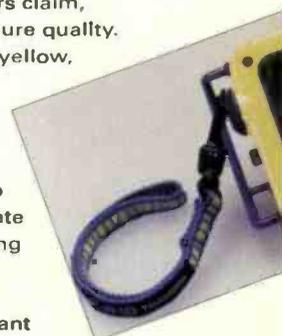
To find out more about the DJ-C5E contact Nevada at 189 London Road, North End, Portsmouth, Hants PO2 9AE. Tel: (01705) 662145, FAX: (01705) 690626.



Casio Catch

If you travel away from home a lot and tend to miss out on your favourite television programmes then the new Casio JY10 could be just what you've been looking for! The JY10 is a portable television with a 2.3in colour l.c.d. screen giving, the manufacturers claim, excellent picture quality.

Styled in yellow, the JY10 features an earphone jack, which allows you to listen in private while watching and an audio video/jack allowing instant playback of home-made videos - ideal for those



Radio Basics

If you've been following Rob Mannion G3XFD's 'Radio Basics' series over the last few months in PW don't forget to send in for your free Radio Basics Information Sheets. Editions 1 and 2 are currently available from the Editorial offices upon receipt of a large stamped addressed envelope. In addition to this, if you'd like reprints of Rob's original 'Getting Started the Practical Way', 5-part series first published in 1986 please enclose a cheque (payable to PW Publishing Ltd) or Postal Order for £2.50 with your request.

Decoding & Analysing

It's generally an accepted fact that many radio enthusiasts are also avid PC users. And by using the new Wavecom W41PC card you can now enjoy both radio and computing side-by-side.

The Wavecom W41PC boasts dual digital signal processors capable of handling more than 64 million instructions per second along with 4Mb of on-board memory and a well tested software package. To set-up your computer for use with the W41PC all you have to do is run a Windows based software program which has been developed by Wavecom Elektronik AG. The current software revision allows decoding of 70 modes across the h.f., v.h.f., u.h.f. and s.h.f. bands and when used in connection with the SHOC Radio Manager and the Klingenfuss Verlag database the user has access to an almost unlimited range of PC scanning options.

It's possible to fit a total of four W41PC cards into one PC, which ensures concurrent monitoring of up to four data transmissions at any one time. For more details and price information contact Slight Systems Ltd., Wavecom Sales & Marketing, Woods Way, Worthing, West Sussex BN12 4QY. Tel: (01903) 242001. Additionally for a full product portfolio point your web browser at: www.slightsystems.mcomail.com

holiday and DXpedition trips! Battery life is around four hours and optional extras which are available include a car adaptor and an a.c. adaptor.

The price of the Casio JY10 is around the **£99** mark, however there are five models in the range with prices ranging from **£89** to **£330**. If you're interested in getting

hold of your own portable television check out your local Argos, Dixons, Tandy and Tempo stores.



The 1998 Young Amateur Of The Year Award (YAOTYA) has recently been announced by the **Radiocommunications Agency** in conjunction with the **Radio Society of Great Britain**. The annual award, which is given for the most outstanding achievement by a young Amateur Radio enthusiast, is open to anyone under 18 with an interest in radio (candidates do not have to be licence holders).

The following areas of activity will be taken into account when applications are assessed:

- * d.i.y. radio construction
- * Operation of radio
- * Community service
- * Encouraging others
- * School projects

The idea behind the award is to generate interest in Amateur Radio and to encourage more people to become actively involved.

Applications for the YAOTY award should be sent to **Radio Society of Great Britain, Lambda House, Cranbourne Road, Potters Bar, Herts EN6 3JE** and must be received by **31 July 1998**. The award is open to any resident of the UK, Channel Islands or the Isle of Man and entrants must be nominated by an adult sponsor.

The winner of the award will be presented with their **£300** prize together with other radio 'goodies' at the RSGB's HF Convention in September 1998.



50 Years Of Computing

June 21 1948 saw the birth of the first stored-program electronic digital computer, at the University of Manchester. The machine had the ability to store and run any program put in by a user, which set it apart from all other special purpose computing machines and highlighting it as the first computer.

To commemorate the landmark of scientific research, a large number of activities will take place in Manchester during June of this year. Events will include the commissioning of an exact replica of the Manchester Mark 1 computer, public lectures, and 11 scientific conferences all of which will be held at the University of Manchester.

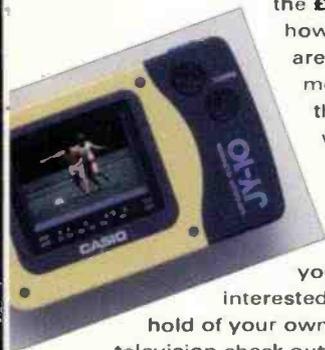
A Special Event Station will go on air on 7 June 1998 until the end of the month, using the callsign **GB50MK1** (50 years Mark 1) to mark the celebrations. The GB50MK1 station will transmit on all short wave bands

above 1.8MHz, using s.s.b., c.w. and f.m. but focusing in particular on data modes. Via a BBS operating on v.h.f., information about local events as well as technical information regarding the Manchester Mark 1 computer will be accessible 24 hours a day.

Special QSL cards will be issued for contacts with GB50MK1, and the transmission schedule of GB50MK1 will be published in advance on the World-Wide Web. Point your browser at: <http://www.gb50mki.org/>

For more information the GB50MK1 celebrations contact either **Simon Kahn GOSTU** via E-mail at: simon.kahn@ic.ac.uk or **Michael Lancaster G7VYZ** on Tel: **0161-275 6083**, FAX: **0161 275 6040** or E-mail: M.Lancaster@mcc.ac.uk Up-to-date information about all events can be found at <http://www.computer50.org/index.html> and more detailed information about the world's first stored-program computer can be found at <http://www.computer50.org/#mark1>

GB50MK1



club spotlight

COMPILED BY ZOË CRABB

Library Display Success

The **Cockenzie & Port Seton Amateur Radio Club's** local library has two display cabinets, displaying various activities and items of interest on a regular basis. These displays normally run from four to six weeks.

When one display was finished the club were undecided as to what to show next when **Liz Clark 2M1GLD** (one of the Radio Club's most recent Novice 'Passes'), who works in the library, came up with an idea. Why not put on a display telling the local people all about the Radio Club and Amateur Radio in general?

Secretary **Bob Glasgow GM4UYZ** then received a 'phone call from **Claire Johnston**, the Head Librarian. She was officially asking if the Radio Club was interested, of course, was the answer!

The display was duly set-up and was in the library for six weeks before receiving a request from the Librarian at Haddington Library asking if it could be moved there, which it now has.

According to Claire and Liz, the display, whilst in the library, definitely attracted a fair amount of interest. But whether it has induced people to take it further, well, time will no doubt tell.

So, how about approaching your own local library and ask if something similar could be done? It's definitely a cheap and effective way to promote Amateur Radio to the masses. Even if you only bring one person into the hobby, the exercise has done its job!

Finally, the Cockenzie & Port Seton Amateur Radio Club are holding their 144MHz d.f. hunt on Friday **May 15th 1998**. The meeting place will be in the car park near the old Pond Hall site in Port Seton at 1830 and the first transmission will be made at 1900.

All will be made welcome, so do go along for a bit of fun and friendly competition. An entry fee of £1 will be levied, with all proceeds going to the club's adopted charity, The British Heart Foundation.

For more information, contact **Bob Glasgow** on **(01875) 811723**.



Cockenzie's wonderful library display.

Special Event Station

The Special Event Station **GB5MU** (5 Maintenance Unit) will be on the air during the 2nd Kemble Air Show to be held on **31st May 1998**. This year sees the 60th Anniversary of No 5 Maintenance Unit, which was formed on June 22nd 1938. The station 5MU has had a fascinating history, from its early days as an aircraft storage facility, through to the departure of The Red Arrows in 1983.

The event will feature both static and airborne displays - from a Tiger Moth to a Tornado, representing RAF Kemble's involvement over the years. The Red Arrows will take part in the event as well as providing Red 11 on static display.

In conjunction with the Air Show organisers', members of the **Trowbridge & District Amateur Radio Club** will operate the station, which is located in the Bristol Aero Collection Museum. Planned operation will be primarily on 80/40 (3.5/7MHz) and 2m (144MHz) with a possibility of 6m (50MHz) as well.

For further information about the Air Show telephone the information line on **(0891) 122900** (calls 50p a min.) or E-mail <http://www.notar.force9.co.uk/kad98.htm> For GB5MU, telephone **Ian Carter G0GRI** on **(01225) 864698** evenings and weekends. QSL cards available and to be direct to G0GRI with an s.a.e. or via the Bureau.

Nunsfield House ARG

For more than 30 years, the **Nunsfield House Amateur Radio Group** has been a prominent organisation within the amateur radio community of Derby and its surrounding area. The Group is affiliated to the RSGB and is a section of the Nunsfield House Community Association. The HQ and shack are located in the Association's main building, which is just off Boulton Lane in the Alvaston area of Derby.

Having more than 60 members, the Group has an extremely active programme of events throughout the year, encouraging as much membership participation as possible. As well as having 'in-house' events such as talks,



video presentations, home-brew competitions, etc., the Group also has a programme of external events such as minibus trips to rallies, attending local lectures, quiz nights, etc.

As an approved City & Guilds Novice licence examination centre, the Group organises regular Novice Licence courses which are instructed by **Frank Whitehead G4MML** who is the Senior Instructor for the Derby area. The current course has 17 students attending regularly on a Saturday morning. The next course begins in September, and details can be obtained from Frank on **(01332) 512080**.

The Group is also responsible for organising the Elvaston Castle National Radio Rally, held this year on **Sunday 14th June**. Further details about the Rally from **Brian Reid**, Rally Secretary, on **(01332) 751412**.

The Group meet each Friday at 7.30pm for the programmed events and a less formal get together takes place on a Monday evening. Visitors and new members are always welcome on either evening. The Group is often also on the air, so keep a look out for **G3ZBI, G3EEO, G0NHR** or **G8KGC**.

For more information about the Group and activities, contact **Bill Smith G7PJJ**, Hon. Sec. on **(01332) 573174**, details are





also on the Group's Website at <http://dSPACE.dial.pipex.com/nharg>

Silent Key

Derek Purchase G3LXP died early on the morning of the 9th March 1998, only 36 hours after his round, happy smiling face had been seen wandering through the London Amateur Radio Show at Picketts Lock. Derek Purchase was a founding member of the **Verulam Amateur Radio Club** (VARC) and was probably its longest serving committee member. He was a great motivator, either organising or cajoling others to set up stations for NFD or VHF NFD and JOTA, as well as the myriad of tasks necessary in a club.

Derek never lost his enthusiasm for his hobby, VARC and his support of young people in Amateur Radio. He leaves a devoted wife Susan and his children Jennifer, Nigel and RobIn, to whom we extend our sincere sympathies.

Back on the 3rd March 1998, Rob G3XFD travelled to the **Plymouth Radio Club** for one of his 'famous' PW club talks. A good time was had by all. Next on the list for Rob is a visit to the **Cheshunt & DARC** on May 27th.



New & Improved Venue

The **Barry Amateur Radio Society Radio & Computer Fair** has changed its venue for February 21st 1999. The new and improved venue will be held at the **Holmview Leisure Centre, Skomer Road, Barry.**

There will be a lounge bar, catering and parking. Admission is £1.50 and doors open at 10am for disabled visitors and 10.30am for the general public. More information from **Brian GWOPUP** on (01222) 832253 (combined telephone and FAX number).

New Group

Club Spotlight have recently heard about a new group in town! The **Stockton-On-Tees Special Events Group G3YNB**. The Group run four to six events each year connected with Stockton, such as Captain Cook, the replica of the Barque HMS *Endeavour* (GB0CBB), Stockton & Darlington Railway, Stockton Riverside Festival GBOSRF and the Billingham Folklore Festival.

More information about the Group is available on their web site world.compuserve.com/homepages/mikeg0dod

Warrington's New Antenna

The Warrington Amateur Radio Club now have a new antenna, a Force 12 beam for 7, 14, 21 & 28MHz, installed on its wind-up mast controlled from within the shack. The trials and tribulations in getting planning approval for this replacement

to their previous beam and mast have taken some nine months!

So now the club have a first class facility for h.f. working available to club members at all times. In the past year, the club have also equipped themselves with further items of

test gear and can now offer their members the option of having their rigs checked and tested to professional standards!

The Warrington Amateur Radio Club meet at 8pm at the Grappenhall Community Centre, Grappenhall, Warrington. On June 9th, there is a talk by Peter Kirby, General Manager of the RSGB. If you would like further information about the club's activities, then contact John Riley, Club Secretary, on (01925) 762722.

New Committee

Back on the 25th March, the **Ynys Mon Radio Users Group** had their 2nd Annual General Meeting and the new Committee voted in are as follows:

Co-ordinator	Paul MW1CAN
Co Co-ordinator	Gwynfor MW1CGZ
Secretary	Tom GW0EGF
Treasurer	Bill MW0BLU

The Group wished the Committee all the best of luck in their new posts and thanked the old Committee for all their tireless efforts in putting the Group on such a solid basis, with so much achieved in such a short time. The new Committee has already stated that they have some ideas for the coming year, with many events, talks and outings.

The Group meet at the Scout Hall, Llangejni, opposite Kwik Save, every 2nd and 4th Wednesday of each month at 7.30 till 10pm, where events are run throughout the year. All are welcome, so why not go along. There are refreshments available on the premises and a 50p entrance fee.

For more information about the Group, contact **Tom Burley GW0EGF, 43 Maes Bleddyn, Llanllechid, Gwynedd LL57 3EG, Tel: (01248) 602887.**

Rally Cancelled

Please note that the Denby Dale Amateur Radio Society have had to cancel their Computer & Amateur Radio Fair, which was to be held on June 21st 1998 at Shelley High School, due to lack of response from traders. However, the Society would like to thank the traders who have faithfully given them support in the past.

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

This time I'm describing a very useful audio amplifier, based on the versatile LM386 integrated circuit (i.c.). I recommend you build the amplifier because it will form the audio stages in projects I'm aiming to describe in the future and it will also prove useful for your own ideas. It's simple, straightforward and provided you follow the circuit you shouldn't run into the instability problems often associated with high gain i.c. amplifiers.

Although I don't tend to use Veroboard matrix p.c.b. very much in my radio work - in this instance it's ideal as an introduction to p.c.b. type techniques. However, I'm going to use the board in an

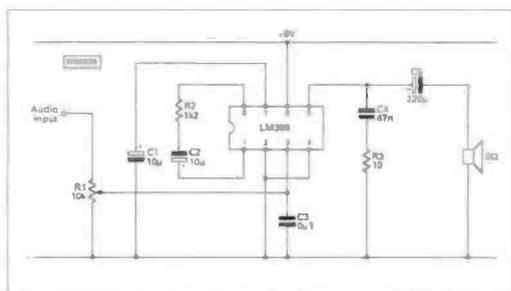


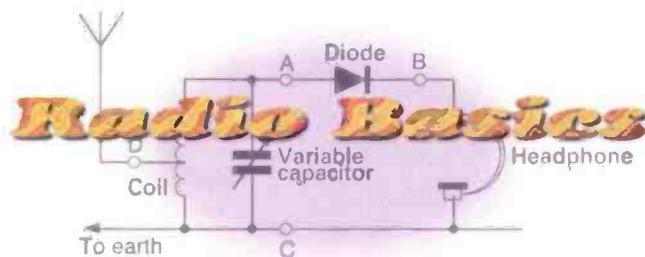
Fig. 1: Circuit of the integrated circuit audio

upside down fashion to prepare you for a method I've used successfully for many years.

The circuit for the amplifier is shown in Fig. 1, and apart from the capacitor, C3 (0.1µF) connected to pin 3 on the i.c., it's the same circuit as recommended in the manufacturer's application sheets. And although the circuit is very straightforward and very easy to use - this capacitor is essential as it by-passes or 'decouples' any incoming radio frequency (r.f.) energy to earth, removing any opportunity of instability in this high gain circuit.

The capacitor and resistor selected for C2 and R2 fix the gain of the amplifier at 50dB. This is perfectly adequate for most of the applications you'll need to use the amplifier for.

The photo, Fig. 2, provides the the lay-out of the amplifier project for you to build on Veroboard, around the 10k potentiometer. It can be built into a speaker enclosure, or left as a sub-assembly to use with future projects.



Wrong Way Up

You'll see that the project is built the 'wrong way up' with the i.c. and components on the copper track side of the Veroboard. This is a deliberate choice as the technique is much easier for the inexperienced constructor to use as everything is on the same side.

However, this method does not stop you from using wire links on the opposite sides of the board if you wish. It also provides an introduction to my long favoured method of designing p.c.b.s, using them undrilled and mounting

the components on the track side rather than on the opposite side. I shall be introducing you to this technique very soon!

I strongly recommend you use an i.c. socket for the LM386, it can be mounted very easily directly onto the matrix board copper tracks and soldered directly to them using the soldering lugs - after they've been bent out at right angles. Once you've soldered one, it's an easy job to solder the others and keep the socket correctly on the tracks.

Checking Connections

When you've finished building the project, check all the connections by comparing them with Figs. 1 & 2, and also checking polarity of the electrolytic capacitors. Finally, insert the LM386, making sure it's placed in the same way as indicated in the drawing.

With a 9V supply connected a loud mains 'hum' should be heard when you apply the tip of a

plugged-in soldering iron is applied to the audio input. The hum level should vary as you adjust R1. If it doesn't recheck your connections and try again!

The diagram, Fig. 3, shows the modification needed to connect the original receiver to the

With the modifications, the resultant audio output is impressive indeed and very loud once you have connected the amplifier and the receiver together. In fact while tuned into BBC Radio 4 on 198kHz I fed the audio into an 8Ω hi-fi speaker and the quality was so good I sat and enjoyed listening to 'Book At Bedtime'!

Have fun building this amplifier, it will come in useful for future projects. You can also use it as a 'Baby Alarm', and as a basis for intercoms, etc. (further ideas will be included in Information Sheet 2).

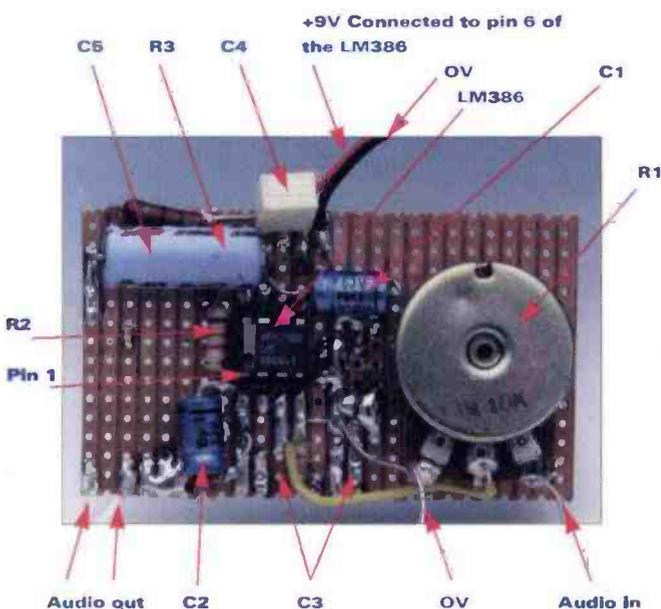


Fig. 2: Illustration showing preferred lay-out of the amplifier. Note the use of an i.c. socket and that the components are mounted on the copper side of the board (see text).

amplifier. The headphones are replaced by a 2.7kΩ resistor to act as a 'load'. I chose this value to provide the best output level, and the signal is fed to the amplifier input via the 6.8µF capacitor.

Next time I'm going to introduce you to the very enjoyable 'home-brew' p.c.b. designing and building process. But don't worry...it's easier than you think! PW

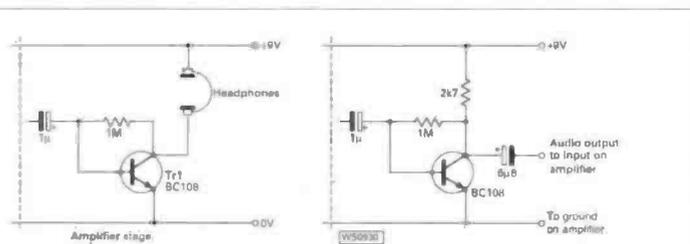


Fig. 3: Original audio circuit and modification to work with amplifier (see text).

This month Rob Mannion G3XFD describes a simple and useful integrated circuit audio amplifier which will form part of future projects in 'Radio Basics'.

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This time Ian Poole G3YWX sets out to answer the question What Is...A Gunn Diode?

Gunn diodes are used as an easy and relatively cheap method of producing low power microwave signals. Operating at frequencies between a few Gigahertz to over 100GHz they have been available for many years. These days they are well established and are used in a variety of applications and they are particularly popular for the 10GHz amateur band.

Construction

A Gunn diode is made from a single piece of *n*-type silicon. This consists of three main areas as shown in Fig. 1. The areas at the top and bottom of the device are heavily doped to give *n+* material, giving high conductivity for connection to the outside world.

The device is mounted on a conducting base to which a wire connection is made. It also acts as a heat-sink to dissipate the heat which is generated.

The connection to the other terminal of the diode is made via a gold connection deposited onto the top surface. Gold is required because of its relative stability and high conductivity.

The centre area is the active region of the device and this is less heavily doped giving it lower conductivity. Typically this is about 0.5Ω per cubic centimetre and it means that virtually all the voltage placed across the device appears across this layer in the diode.

Usually the active layer of the diode is about ten microns. As this largely determines the approximate frequency of operation its thickness will naturally vary from one device to another. This also means that part of the specification for a device is its operating frequency.

In view of the fact that the Gunn diode consists only of *n* type material there is no *p-n* junction in the device. In fact, it is not actually a true diode and it operates on totally different principles.

Operation

Although the operation of a Gunn diode can become complicated, it can be viewed from a basic level. When a voltage is placed across the device most of this appears across the active region. This is very thin and even a modest voltage means that the potential gradient, or voltage change over a given distance is very large.

When the voltage across the active region reaches a certain point a current pulse starts to travel across the active region as shown in Fig. 2. When this occurs the potential gradient across the rest of the active region falls, preventing any more current pulses from being generated. Only when the current pulse reaches the other side of the active region does the high potential gradient return, and another current pulse can be generated.

The unusual current pulse action can be viewed in a different way if the curve for the voltage and current is plotted

out. The diagram Fig. 3 shows the curves of a normal diode and a Gunn diode.

For a normal diode the current increases with voltage, although the relationship is not linear. On the other hand the current for a Gunn diode starts to increase, and once a certain voltage has been reached, it starts to fall before rising again. The region where it falls is known as a negative resistance region, and this is the reason why it oscillates.

Frequency Set

Although the approximate frequency of operation is set by the thickness of the active region, it's still possible to vary the frequency over a limited range. Being a microwave device the Gunn diode is normally fitted into a waveguide cavity which forms a tuned circuit, and it's the resonant frequency of the whole assembly which governs the frequency of operation.

Tuning can be carried out in a number of ways. Mechanical adjustments can be made by placing an adjusting screw into the waveguide cavity and these are used to give a crude measure of tuning. However, some form of electrical tuning is normally required as well.

The tuning can be achieved in two ways. The first is to use a varactor diode and this is coupled into the Gunn oscillator circuit.

By changing the voltage on the varactor diode its capacitance will change, and this will vary the frequency at which the whole circuit resonates. This method is cheap and easy to implement, but it has a number of limitations. In the first case it only operates over a limited range. Secondly, this method gives rise to a high level of phase noise and this may not be acceptable in many applications.

A more satisfactory method of tuning uses a device called a YIG. This contains a ferromagnetic material called Yttrium Iron Garnet.

The Gunn diode is placed into the cavity along with the YIG, which has the effect of reducing the effective size of the cavity. This is achieved by placing a coil outside the waveguide.

When a current is passed through the coil it has the effect of increasing the magnetic volume of the YIG and hence reducing the electrical size of the cavity. In turn this increases the frequency of operation. This method gives much lower levels of phase noise and it's found that the frequency can be varied over a much wider bandwidth.

PW

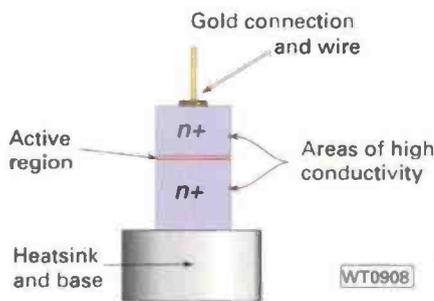


Fig. 1: The construction of a Gunn diode, you will note that the diode consists only of *n* type material (see text).

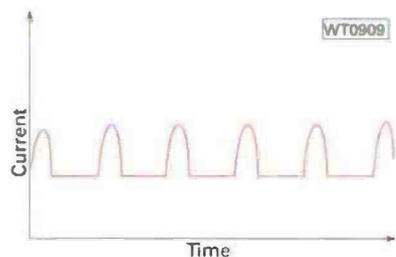


Fig. 2: The current consumption of a Gunn diode showing the current pulses.

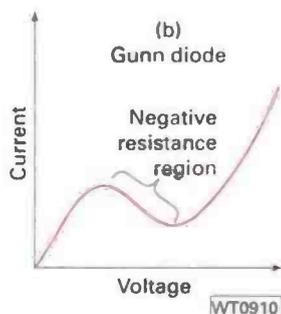
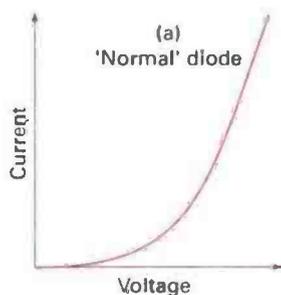


Fig. 3: Graphs showing the current and voltage curves for normal (a) and Gunn diodes (b).

In the August issue I'll be looking at the IMPATT Diode.



May 17: The Mid-Ulster Amateur Radio Club Rally. The rally will be open to the public from 12 noon, traders will have access from 9am. The venue is again the Silverwood Hotel, Lurgan, Co. Armagh. **Jim Lappin G1OOND** on (01762) 851178.

May 17: The Dunstable Downs Radio Club will be holding its Annual Amateur Radio Car Boot Sale at the Stockwood Country Park, Luton, Bedfordshire. The site opens at 9:00 until 1300. Leave M1 at Junction 10a, turn left and follow signs for 'Mossman Collection'. Talk-in on S22. Note new address for bookings! Please do not use any other address or 'phone number. **DDRC, PO Box 4053, Dunstable, Beds LU5 5ZJ.**

May 17: The Rippon & District Amateur Radio Society (RADARS) are holding their 41st Northern Mobile Rally at The Pavilion, Great Yorkshire Showground, Harrogate. There will be the usual traders, a Bring & Buy and quality catering (possibly a bar). Doors open at 10:30. Access behind Sansbury's, off A661 Wetherby Road. **Gerald Brady G0UFI** on (01765) 640229 (combined 'phone and FAX number), E-mail: woody@tanganon.demon.co.uk or packet at g1uap@gb7cym

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

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

May 24: The Three Counties Radio & Computer Rally is to be held at Pardswell Leisure Centre, Billford Road, Worcester. Easy access from junction 6 (Worcester North) M5. There will be the usual mix of trade stands with radio and computer dealers. Bring & Buy, refreshments and a licensed bar. Doors open from 1030 to 1700 and admission is £1.50. Free parking. **Eddie Cotton G4POZ** on (01905) 773181.

May 30/31: Peterborough Radio Festival '98 will be held in the Sacrewell Farm & Country Centre, Wansford, Nr. Peterborough. There will be activities for all the family, displays and exhibitions, caravan and camping facilities, disco and BBQ (Saturday) and a Radio Car Boot Sale (Sunday). More information from **Vince Edwards** on (01733) 331211 or G8NGZ@compuserve.com

June 7: The Royal Naval Amateur Radio Society are holding their annual mobile rally at The Playing Field, opposite HMS Collingwood, Fareham. Hants (off M27 at J11, follow A32 & B3385 towards Lee-on-the-Solent). All the usual RNARS Rally attractions, with trade stands. Bring & Buy, RAYNET, SUNPAC, Club stands and a talk-in via PC/PH. There is also a children's play area and various other stalls and attractions. A grand day out! Further details from the **Secretary, RNARS, 103 Torrington Road, North End, Portsmouth.**

June 7: The Spalding Radio Rally is to be held at Springfield Exhibition Centre, Springfields, Spalding, starting at 10am. Talk-in on S22. There is easy access for any disabled visitors, a licensed bar and catering, trade stands, a huge car boot area and acres of free parking. **Mick Pell G1APV** on (0976) 271796 or **David G7VQH** on (0966) 362828 or **Dennis Houth G4OO** on (01775) 750382.

June 14: The Nunsfield House Amateur Radio Group present the 29th Elvaston Castle National Radio Rally taking place at the Elvaston Castle Country Park on the

B5010, five miles south east of Derby. There will be all the usual traders plus Special Interest Groups, a grand Bring & Buy and a huge flea market. Over 48,000 square feet of marquees makes this the largest outdoor rally in Europe.

With crafts, bands, a museum farm, children's entertainment and woodland walks, there is something for all the family. The venue also has a Caravan Club approved site. Talk in is provided by G8ZECR on S22 and SU22. **Brian Reid G1CUH** on (01332) 751412 (combined telephone and FAX number).

June 14: The Bangor & District Amateur Radio Society are holding their major radio and computer rally at the Clondeboye Lodge Hotel (formerly The George), Estate Road, Bangor, County Down starting at 12 noon (11.30 for disabled visitors). This year's event will feature a full range of trade stands, including major cross St George's channel names a Bring & Buy and computer software, etc. Free parking, facilities for the disabled, full range of meals and bar services available throughout the day. Morse tests available on demand, operational stations and G13XKQP running all day. Admission is £2, under 16s go free. Talk-in on Ch22. **Roy G1WVN** on (01247) 460716 or **Stuart G4OCK** on (01247) 454049.

June 21: The Newbury & District Amateur Radio Society will be holding their 12th Annual Amateur Radio Car Boot Sale at Cold Ash playing field, near Newbury. Sellers/Traders should arrive at 0830, no earlier please. The sale will be open from 0900 to 1500. **Ian Trusson**, Secretary NADARS on Tel/FAX: (01635) 826019.

June 28: The Horncastle Rally is to be held at Horncastle Youth Centre. This Rally is held as a joint venture between the Youth Centre and the Fenland Repeater Group. The Rally is held on one level with very good access for disabled visitors. Food and drink is available, including the now legendary Horncastle Bacon Butties. Tables are only £2 for six foot table (bookable and payable in advance). Cheques should be made payable to the Horncastle Youth Club, sent to: **Area Youth Office, Cagthorpe, Horncastle, Lincs LN9 6HW.** Entry fee for customers is £1. Please call **Tony Nightingale G6CZV** on (01507) 522482 or E-mail tony.nightingale@virgin.net for further details.

July 5: The Harlow & District Amateur Radio Society are holding their Rally and Car Boot Sale (free entrance and parking) at a new and better venue, Mark Hall School, Harlow (A414), First Avenue. Tables inside £15, car boot pits, £7. For the best plots, book early! Talk-in on S22 & SU22. Morse tests on demand. **Len G7UUF** on (01279) 832700 or FAX on (01279) 864973 or E-mail: len.brackstone@virgin.net

July 5: The 9th York Radio Rally will be held in the Knavesmire Building, York Racecourse, York. Doors open at 1030 and admission is £1.50. Children accompanied with an adult go free. There is ample free car parking. There will be Amateur Radio, electronics and computers, Morse tests and repeater groups, refreshments and a licensed bar. Talk-in on S22. Further details from **Pat Trask G0DRF** on (01904) 628036.

July 12: The 18th 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 Radio and CB radio, computer and electronics, etc. There is also a large Bring & Buy display area. Refreshments and bars at reasonable prices and a picnic area with views over the South Downs makes this a rally not to be missed! Further details on (01323) 485704.

July 19: The McMichael Mobile Rally will be held at the Haymill Youth & Community Centre, 112 Burnham Lane, Slough. Doors open at 1000. There will be trade stands, car boot sale, food and licensed facilities. Talk-in on S22. There will be disabled facilities also. **Dave Chislett** on (01628) 625720 or for information on bookings, ring 0118-972 3504.

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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This year's RIAT will offer visitors the chance to see hundreds of aircraft from over 30 nations, many taking part in sensational aerobatic routines, together with vintage planes and modern jets all coming together to provide a blend of exciting entertainment. In commemoration of the RAF's 80th Anniversary, an 80 minute aviation spectacular finale will unfold the history of the RAF.

The gates to the event open at 6.30am and the flying programme runs from 10.00am and there will be plenty of attractions to fill the day. If you have even the slightest interest in aircraft the RIAT is not to be missed so, why not take part in our free-to-enter competition and who knows, you could be one of over thousands of spectators attending the world's biggest military event?

How To Enter

To be in with a chance of winning one of 15 pairs of tickets to this spectacular flying event All you have to do is find the words hidden in the wordsearch and then send your entry to *Practical Wireless*, **RIAT Competition, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW** by **26 June 1998**. Please remember do not include other correspondence with your entry form (photocopies are acceptable). The Editor's decision on the winner is final and no correspondence will be entered into.



Practical Wireless, June 1998

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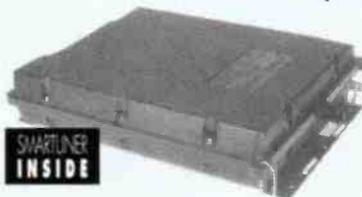
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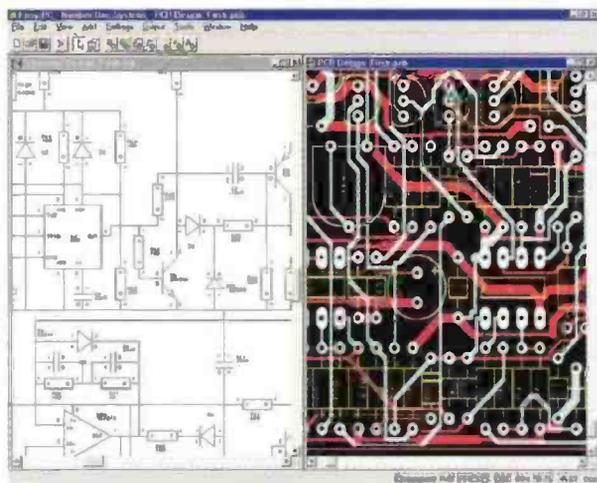
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ACTION

Welcome to Electronics-in-Action (E-i-A), a news and views column that you, as readers, decide the direction. Pose a question and I'll find an answer for you - or if I can't, I'll try and find a person that can. I also hope to publish your electronic tips and tricks and the authors of the ideas I use in any month will get a voucher to 'spend' at our *PW* Book Store. And in each issue I'll have a look at a few books to suit all levels of knowledge and skills.

Tex



THE ANSWERS TO CONUNDRUM-2 - REVIEWS - SOME BOOKS TO READ AND ANOTHER CONUNDRUM TO KEEP YOU BUSY

Conundrum Answers

The answers to the little problem I left you with last time has been well received and many of you sent in some answers that were very brief, others a full page long. It was very pleasing to note that there was only one wrong answer this time. Although I did manage to make the problem a little more difficult than I intended, by not stressing that the variable capacitor should be assumed to be 'perfect'. By 'perfect' I mean that it was 50pF at maximum value and 0pF at the minimum.

I'd intended that there should have been two simple possibilities for the combined minimum value of C2, the variable, and C3 a fixed 100pF component. The minimum combined

capacitance value was to have been 50pF (C2+C3=100pF) and, the maximum combined value should have been 60pF (C2+C3=150pF), which were easy to work out without a calculator.

The two intended values should have given a minimum tuned frequency of 20.547MHz and a maximum tuned frequency of 22.508MHz. If however, you assumed that C2 had a 3-50pF swing then the maximum tuned frequency became 22.343MHz. There is though, a lesson to be learned from these figures and, that is that even small amounts of 'stray' capacitance will seriously affect the tuning range of any circuit. Note the difference of 165kHz in the maximum frequency with just 3pF of 'stray' capacitance.

After throwing all the correct entries in the editorial hat, I pulled one out to be nominated as the 'winner'. A *PW* voucher is on its way to **Colin Hawkins G0CEV**. Of the postcard entries **M1AVL** sent in a rather nice stamp of the St John's Point lighthouse. I'm not quite sure where it is though.

Admitting to 'using a cheap calculator this time' former RSGB President, **Fred Ward G2CVV** provided a well laid out solution, **Walter Farrer G3ES** says that although he used a calculator, but that he sometimes works out the square roots by arithmetic. The ultimate in brevity though has to go to **J. Cawley G3NFQ** who put down the answers and 'QTHR'. From France came an E-mail from **Gordon Williams** which I found good as I could at least let him know that I'd received it!

There was only one person who supplied all three answers, and that was **John Louden** who also asked why I called it a 'Conundrum'. The answer to that of course lies in the dictionary. The latest 'Conundrum' (number 3) is at the end of the column.

Simple Interface

I needed a simple interface recently after I began 'playing' around with slow-scan TV and I experienced a small problem in connecting the adapter I'd made to the radio I was using. When I was listening with the headphones I couldn't see the picture. And when I looked at the picture, I could not hear the signal. So I got out my soldering iron and 'threw together' the 'Y' lead shown in skeletal form in **Fig. 1**.

I can now listen to an incoming signal and watch what sort of a picture develops. I decided to use a stereo socket for the headphones so that either a mono or stereo set of headphones could be plugged in (I have both with 3.5mm jack plugs). If you box the unit, try to use a plastic box rather than a metal one (this would cut out one side of the stereo 'phones).

Number One Systems have reworked their *Easy-PC* schematic and p.c.b. drafting package to run under either *Windows 95* or *Windows NT*. Now into the fourth generation, *Easy-PC* has been completely rewritten to take advantage of the 32-bit operating system. There are no limits on pin or net counts, no layer limits or track or pad limits. The amount of memory on your system is the controlling factor - add more memory, and you remove the limits you thought you had.

Contact Number One Systems at: **Harding Way, St Ives, Cambridgeshire PE17 4WR**, Tel: +44 (0)1480 461778 to see why 20,000 users in over 100 countries think that *Easy-PC* is Number One!

Vann Draper Electronics Ltd. suppliers of the Kenwood range of test equipment, have an oscilloscopes special offer for *PW* readers on page 27 of this magazine. Oscilloscopes are just a small part of the range of test equipment that can be supplied from their ranges, which includes: signal generators of all types, digital counters up to 2.5GHz, oscilloscopes (both analogue and digital), digital multimeters, power supplies and a range of programmers for EPROM and the latest PIC microcontroller chips.

All Vann Draper prices include VAT and free carriage. For more information and data sheets for the things you're interested in, contact Vann Draper at: **Unit 5 Premier Works, Canal Street, South Wigston, Leicester LE18 2PL**. Tel: 0116-277 1400 or FAX: 0116-277 3945.

Harry Leeming G3LLL has decided the time has come to retire. And due to his retirement it's very likely that **Holding Amateur Electronics** will have to close. In an open letter to customers, Harry sent out a plea for 'A younger person with plenty of drive (a Martin Lynch clone?)' to take over the shop, so that Blackburn doesn't lose a radio dealer.

The shop has quite a cheap rental and the startup cash needs wouldn't be too prohibitive, says Harry. But he says that if the worst comes to the worst, and the shop has to close and has stocks left, then he might 'pop up' from time-to-time at rallies. He also thanks his many customers over the years and looks forwards to meeting them again, but only on a purely social basis, as he will not be able to carry out any repair work at home.

If you fancy going into the Amateur Radio business, just six miles from junction 31 of the M6 motorway and would like a 'ready-made' business, then contact Harry at **Holdings Amateur Electronics** at: **45 Johnstone St, Blackburn, BB2 1EF**. Tel: (01254) 59595 on Thursdays to Saturdays only.

As many of you know I use computers a great deal in everyday life, I think they are superb tools for anyone interested in electronics. As a teaching tool they can be without doubt unbeatable. With a well designed program computers can become instructors with unparalleled patience as either total or top-up teaching.

Electronics Principles

One rather good program that I've found for you is *Electronics Principles 5.0*. As it has now reached version 5 what is *Electronics Principles 5.0*? That question has rather more than one answer, as it's a 'principles' demonstrator, an aide-memoire, an electronic problem specific calculator and it manages this without a linear structure as you can jump from topic to topic at will.

Needing only a minimalist mid-range IBM PC (486DX2/66 running *Windows 3.1*) to run, the program installs quickly and easily from the supplied three 1.4Mb floppy disks. The program runs extremely slickly when on a Pentium powered 'brute' with more memory and

Windows 95, as you would expect. On running the program, you are then presented with a simplistic textual 'sign-on' screen that doesn't prepare you for the range of principles covered.

The range of electronics covered is very wide, from simple atomic structure to the workings of the latest microcontrollers. You may choose your subject by scrolling down a complete list, or by choosing from a comprehensive series of 10 drop-down menus. The main menus are: DC, AC, Power, Semiconductors, Op-Amps, Maths, Logic, Measurements, Micros and, the latest addition, the PIC 16CXX series of microprocessors.

By 'printing' the text, in an active box or

screen, to the clipboard, you can quickly make up your own notes to refer to later. For colleges and schools (or training organisations) a simple site licence agreement is available to allow an unlimited number of users at one location. This site licence also allows the unlimited distribution of screens from within *Electronics Principles* as either student handouts or to make up 'multi-media' presentations.

I was very impressed with *Electronics Principles 5.0* as it ran smoothly and without problems on several IBM PCs machines that I tried it out on for ease of use. The only problem I came across was when running it on an *Windows Emulator* on the *Macintosh PowerPC 'clone'* that I am writing this column on.

This problem I will have to talk over with the supplier of the emulator software as I encountered no problems at all on the IBM PC clones.

The many 'grabbed' screens of just a few of the many topics available should give you an insight into the capabilities of *Electronics Principles 5.0* supplied by EPT Educational Software. An additional stand-alone program called *Electronics Toolbox 3.0* is also available from EPT. This less costly program would be suitable for more advanced users looking for a computer based 'calculator' specifically for electronics problems.

The full *Electronics Principles 5.0* costs £99.95 and *Electronics Toolbox 3.0* costs only £19.95 and both are available from EPT Educational Software at Pump House, Lockram Road, Witham, Essex CM8 2BJ. Tel: +44 (0)1376 514008. If you have Internet access then you can request more details from EPT by E-mailing sales@eptsoft.demon.co.uk or point your web-browser at <http://www.eptsoft.demon.co.uk> and following the screens.

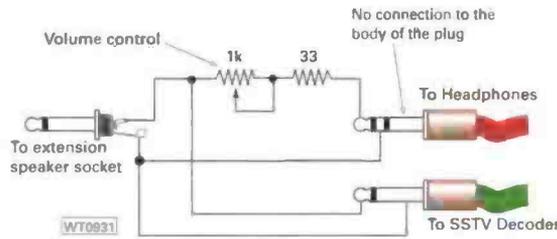
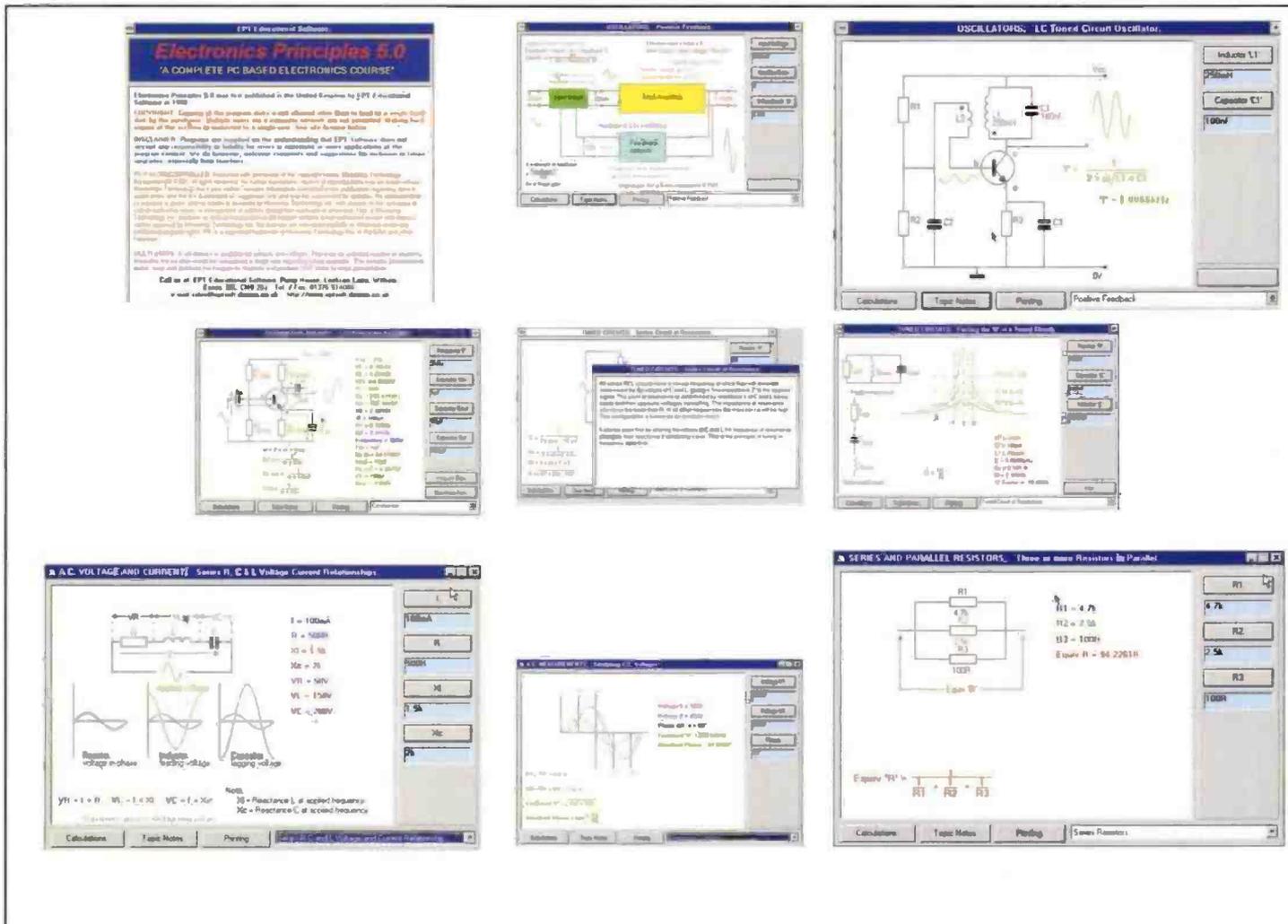


Fig 1: a simple interface that allows the monitoring of a signal whilst a data interface is being used.



Dealers in Your Area

JAB Electronic Components has sent me a copy of their 1998 catalogue, and it makes interesting reading. The 60-page A4-sized catalogue is packed with components, kits and bits for all levels of electronics. Laid out in alphabetical order by type of component it wends its way from 'Audible Devices', through 'Batteries & Accessories' and 'Capacitors' through to 'Semiconductors' and 'Transformer & Inductors', before two pages of a full alphabetical index.

Peter G7JAB, has put together two pages of special offers on transistors and components to supplement (or to start off) your 'junk-box'. Find all these in the 1998 JAB catalogue, send £1 to receive your catalogue from JAB Electronic Components, PO Box 5774, Birmingham B44 8PJ. Tel: 0121-682 7045 or FAX: 0121-681 1329.

Diverse Devices, of Southampton, can supply their 'CAT on a DISK' catalogue on a low density IBM PC formatted disk. All you have to do is contact them with your name and address. The 18 plain formatted text files are in PC format and may be imported directly into your word-processor of choice, running under Windows or DOS. They may be imported into any computer that can understand the plain text format for viewing, so they are readable on Apple Macintosh, Acorn Archimedes, Atari ST and STFM, and Amiga computers.

For the Diverse Devices 'CAT on a DISK' write to: 75 Priory Road, St. Denys, Southampton. Tel: (01703) 584680. For those of you with internet access, point your browser at <http://homepages.tcp.co.uk/~diverse> for more information.

If you live in the Mansfield area **Sherwood Electronics** can supply many of the bits that you need, their speciality is the £1 pack. A pound coin will bring you a pack of 100x1N4148 diode, or 20xBC182 transistors, or 30x1N4002 diodes or 15xred l.e.d.s.....the list goes on. For details of the

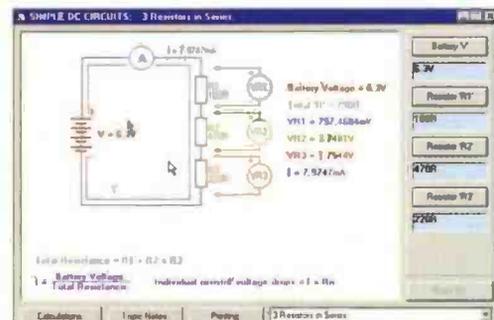
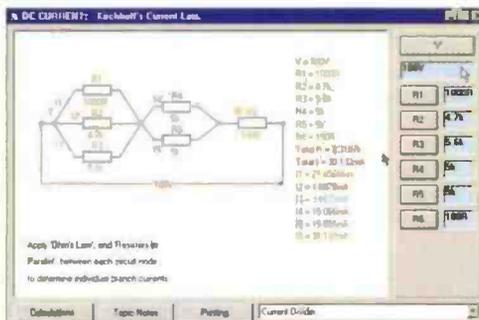
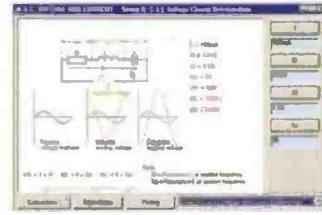
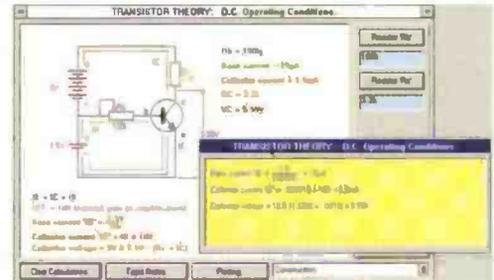
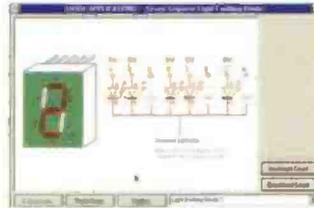
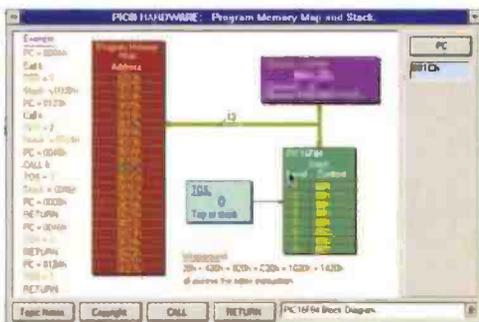
£1 packs (buy 10 and you get one of your choice free) and other lines that Sherwood can supply send £1 to cover the catalogue and postage to Sherwood at: 7 Williamson Street, Mansfield, Notts NG19 6TD.

Dick Pascoe G0BPS is a well known member of the G-QRP club for his gentle(?) sense of humour, but did you know that he has been supplying kits and components for some 11 years now? Better known as **Kanga Products** in his disguise of kit supplier, he's sent me his 24-page 'Spring 1998' catalogue. The catalogue is filled with descriptions of kits, such as 'The Sudden', the 'Spectrum Wavemeter' (both projects that have been featured in PW), receivers, transmitter, Novice course kits and converters as well as three Morse keyer projects.

To get your copy of the latest Kanga catalogue, contact Dick at Kanga Products at **Seaview House, Crete Road East, Folkestone CT18 7EC**. Tel/FAX: +44 (0)1303 891106. For those with internet access E-mail to: sales@kanga.demon.co.uk or point your browser at <http://www.kanga.demon.co.uk> for the latest information.

The above names are just a few of the many dealers that can supply bits and pieces for the practical side of the hobby. It isn't, at present, a definitive list. Can you help others in your area, by letting me know of dealers that you use? How about sending me the name, address and telephone number of the suppliers you use?

Are you a supplier of components? and would like to let the readers know where you are? Details to me at the office (or via E-mail to tex@pwpub.demon.co.uk) marked 'Electronics-in-Action', so I can add them to the list? Tex



Let me now turn to a few books that I've been looking at since the last column. The only specific 'radio' book is *Build Your Own Intelligent Amateur Radio Transceiver* by **Randy L. Henderson**. A book with over three hundred pages does more than just describe how to make an h.f. rig with digital readout, Randy also deals with test equipment that you can build to evaluate how the set is working.

In the 19 chapters, circuits for audio, modulation (s.s.b. d.s.b. and c.w.) i.f. (both high and low frequency) frequency generation and control of synthesisers, problems with synthesisers and transceiver design choices. There are chapters about how you create the 'operating system' for your transceiver using an 8031/51 micro-controller.

The final three chapters are: 'A spectrum analyser projects and test equipment issues', 'A swept-frequency generator for crystal-filter evaluation' and 'Power distribution and operating techniques'. This really is a brilliant book - even if you don't intend building the transceiver - as the information gives a good insight into all the principles and techniques.

On the computer side *The BIOS Companion* from **Phil Croucher** should be in the library of anyone who 'messes about' with computers. Recently brought up-to-date this book really is full of information about the settings that you may have found in the BIOS of your IBM PC Clone.

Billed as "The book that should come with your motherboard!" it filled in my knowledge of the 'goings-on' inside the many computers I've been asked to help with by members of my radio or computer club. For more information contact **Electrocution Technical Support Services**, at Unit 7c, Stonefield Park, Chilbolton SO20 6BL. Tel: (0410) 080666. If you have internet access, point the web-browser at <http://www.electrocution.com> and follow the pages.

Many students of electronics start off by building audio amplifiers, as the circuit may be evaluated quite quickly - the only 'real' test equipment needed is a pair of good ears. A new book I've come across is *Valve & Transistor Audio Amplifiers* by **John Linsley Hood**. (I

wonder if it's the same JLH whose circuits I used to follow way back in the distant ages of my early electronic training in the late 1960s and '70s? *Tex*)

Looking through this book I found circuits for audio amplifiers that were very much modern high quality, and a circuit that used a pair of KT66 valves with +450V finger-tingling h.t. that I remember from my youth. But this book of circuits isn't just for incurable nostalgia sufferers, it's a well thought out and presented work on the many aspects of making the ultimate audio amplifier.

There are 11 chapters dealing with active and passive components, voltage amplification with valves, the layout of valved amplifiers, negative feedback, and valved power output stages. The chapter on the early solid-state audio amplifier leads into contemporary

power amplifier circuits that are very modern, before dealing with preamplifiers and their requirements. The final chapter deals with the part of an audio power amplifier most often forgotten - and that is the power supply. You can build the best amplifier in the world, but it's no better than the p.s.u. feeding it.

Electronics is a very wide subject, and I suppose throughout my career I've been down many of the 'branches' of it. So, imagine my surprise when I found one aspect of the hobby I'd not even considered. *The Complete Book Of Model Railway Electronics* by **Roger Amos** was a brand-new path for me.

On reading Roger Amos's book I found that things have moved on somewhat from my recollection of the electrics of model railways. My first - and only electric train set had an 'all-off' or 'all-on' controller, and the train would generally throw itself off the track on the second curve, but at least it would be within reach on the table top.

The ten chapters of this hard-backed book cover such topics as simple and complex controllers, accessories for the

Books Mentioned in This Month's EIA

The following books may be obtained from the *PW* Book Store featured elsewhere in the magazine.

Build Your Own Intelligent Amateur Radio Transceiver £24.95

Valve & Transistor Audio Amplifiers £19.95

The Complete Book Of Model Railway Electronics £16.99

The Radio Control Model Manual £14.99

controllers, detection of trains in parts of a large layout, automatic signalling and points control and block control in a layout. There are chapters on enhancements to an individual train on a layout, such as lights and sound effects. The last two chapters are more theoretical, dealing with Tools, construction practices, fault finding and electronics. A different and yet very interesting book for the shelf.

Another book I found very interesting was *The Radio Control Model Manual* by **David Boddington**. I've toyed with controlled models both flying (perhaps crashing would be a better term here) and electric boat or racing car types and have built many controllers for the various models I've had over the years.

So, here was a topic that I was aware of. David Boddington's book is less about the electronics involved and more about general radio controlled modelling.

There is a wealth of information (much of which I was reading for the first time) within this book for anyone new to the controlled model hobby. The book describes controllers and how they work, how a 'servo' works and what you can expect from it. There's information about how to choose the most suitable controller for your model and what frequency band you should use. A source of basic knowledge about the hobby, and well illustrated with pictures of large flying models, this 160-page hard-back book is well worth the shelf space.

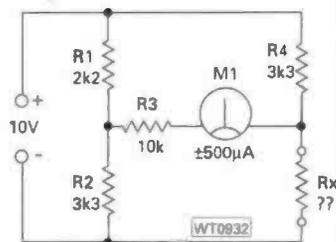
Conundrum Question

This month's conundrum is a fairly simple one and it concerns the Wheatstone bridge circuit shown in Fig. 2. The problem is: given the values of R1, R2, R3 and R4 what value of Rx is required to give a zero reading on the meter (which is a centre zero movement with a full scale deflection of 500µA in either direction)?

Answers to me, please at the editorial address, marked 'Tex's Conundrum 3' by Monday June 15.

The first correct answer drawn out of the editorial hat wins a voucher to spend in the *PW* Bookstore.

Fig. 2: Tex's conundrum.



Tex

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Model shown: CS4125

For a limited period Vann Draper is offering readers of *Practical Wireless* special discount on the Kenwood range of high quality oscilloscopes.

The CS4125 20MHz 2 channel oscilloscope normally sells for £351.33 excluding delivery but is available to *PW* readers for just **£319.00** including both VAT and delivery.

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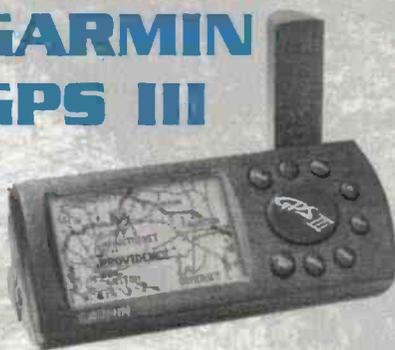
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Top Band Tourer Revisited

John Hoban G3EGC has 'revisited' a popular little 1.8MHz a.m. transmitter-receiver first published by PW in 1994, and has come up with some interesting modifications.

"In recent years there's been a revival of 1.8MHz 'Top Band' a.m. activity"

USING HIS 'TOURER' JOHN HOBAN G3EGC LOOKS FORWARD TO WORKING YOU ON 'TOP BAND'

In recent years, there has been a revival of 1.8MHz 'Top Band' a.m. activity in the Greater Manchester area where I live. Every Sunday morning at 11am on 1.963MHz the '1963 Net' can be heard in full swing.

I'm one of a group of regular Net members who have bought about the Top Band revival. So, it's in this scenario, that my interest was caught by the article 'The PW Top Band Tourer Transmitter Receiver' by Clive Hardy G4SLU in the July 1994 issue of PW. Its simplicity appealed to me and I decided to construct it.

A local print shop made a transparency of the p.c.b. mask (July 1994, page 28, Fig. 4,) and I borrowed a UV light box from Bury Radio Society. By following the instructions in Maplin's catalogue on the



use of their Pre-Sensitised Copper Clad Boards (Order No JP56L), I produced an excellent p.c.b. which was accurate in every detail.

John Hoban G3EGC's modified 'Top Band Tourer'.

Easily Obtained

Components not already in the junk box were easily obtained from Cirkut and Mainline. The whole thing went together with no

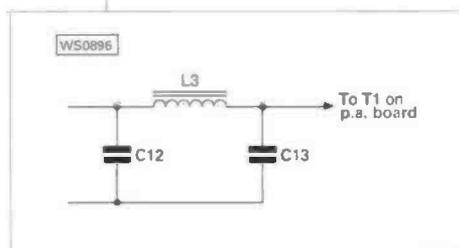
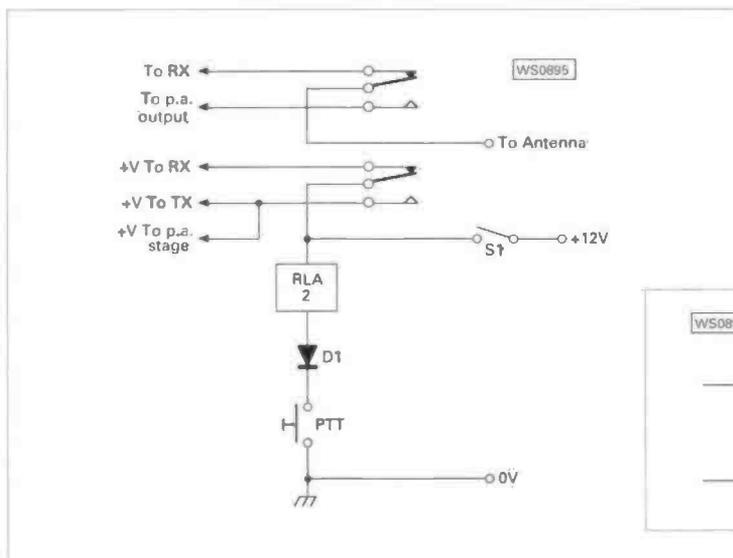
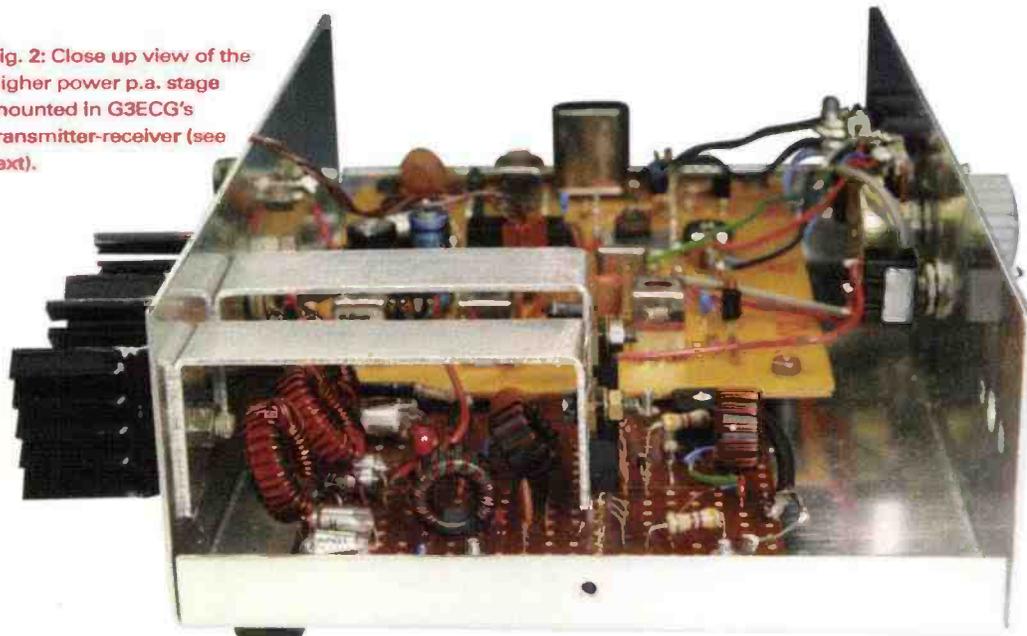


Fig. 1a/b: Circuits for the modifications required for using the higher power p.a. stage (see text).

Fig. 2: Close up view of the higher power p.a. stage mounted in G3ECG's transmitter-receiver (see text).



Footnote:

RSGB Radio Communications Handbook

There are two errors in the *RSGB Handbook* (6th edition) circuit I used. Please refer to your copy and if you see in the layout drawing (Fig. 5.65), that a connection is shown from T1 to the drain of TR1, it is incorrect as this should go to the gate of TR1. The circuit diagram (Fig. 5.64) is correct. Also in the details under Fig. 5.64, T2 and T3 have two, not three 11t loops. Please note that later editions of the *Radio Communications Handbook* carry a corrected version of the circuit.

G3ECG

difficulty and it worked first time. With R4 set at the earthy end it produced about 1W into a 50Ω dummy load.

First 'on the air' reports were very encouraging and with the help of the Net members I was able to find the right position of R4 to give the best speech quality. However, this resulted in a reduction of r.f. output to about 50mW (output measurements were made with one of Alan Lake's PM20 power meters).

Different microphones were tried but as Clive G4SLU suggested, a cheap dynamic, low impedance, hand-held microphone produced the best results. First reports of too much bass were corrected by reducing C2 to 0.47μF. (No doubt, different microphones would require individual attention).

On applying my frequency counter to the transmit oscillator, I was surprised to find the frequency was quite a bit below 1.963MHz even though the crystal was ordered for that frequency. This puzzled me at first until the penny dropped. **I had not given much thought to the crystal order and so it was produced for the normal 30pF loading.**

Examination of the oscillator circuit soon revealed that the capacitive loading created by C4 and C5 is well in excess of 30pF, thus lowering the crystal's effective frequency. This problem was solved by connecting in series with the crystal to earth a 10pF capacitor paralleled with a tiny 20pF variable. Careful adjustment of the variable set the oscillator exactly on 1.963MHz.

Receiver Loudspeaker

I fitted the receiver with an 8Ω 3.5in diameter loudspeaker from an old transistor radio and I have been most impressed by the audio quality. Also impressive is the receiver's

sensitivity and it pulls in all that I would hear on the normal receiver - a rebuilt Marconi CR100.

However, the receiver does fall down badly on selectivity and I have found it to be very broad. Sometimes when listening on 1.963MHz I get breakthrough from a Net on 1.940MHz. Given the simplicity of the design however, I do not consider this a serious problem and it has not detracted from my enjoyment of this little rig.

With only 500mW output, signal reports were well down on my usual 10W input, valve transmitter. Nearby

stations got R5 copy but more distant stations struggled or did not copy me at all. So, I then began to give some thought about how to increase the output power.

Handbook Answer

A browse through my copy (6th edition) of the *RSGB Communications Handbook* provided the answer to increasing the power output. On page 5.23 in the chapter 'Building Blocks' I found an excellent power amplifier using a pair of IRF510 Mosfets in a push-pull circuit* (see footnote). I built it on Veroboard following roughly the layout in Fig. 5.65 in the *Handbook*.

With 14V supply, the circuit gave 5 to 6W first time into the power meter. On the air

"I've had much fun & satisfaction in working on this little rig."

reports were immediately back to those I receive using my valved transmitter with all stations getting good copy. The new p.a. is most certainly a vast improvement.

My 'Tourer' is housed in a Maplin Vinyl-Effect box, type WR3 with the loudspeaker mounted on the suitably cut-out top. The p.a. Veroboard had to be made into two halves in order to create space for the loudspeaker magnet. Circuit modifications required for use with the new p.a. stage are shown in Fig. 1., while Fig. 2 shows a close-up photograph of the new p.a. stage installed in my 'Tourer'.

I have had much fun and satisfaction in working on this little rig. I have even carried out tests in the car with a view to using it mobile, but a recent change of car has halted this work. But this doesn't stop me using it from home - so I look forward to working you on Top Band!

PW

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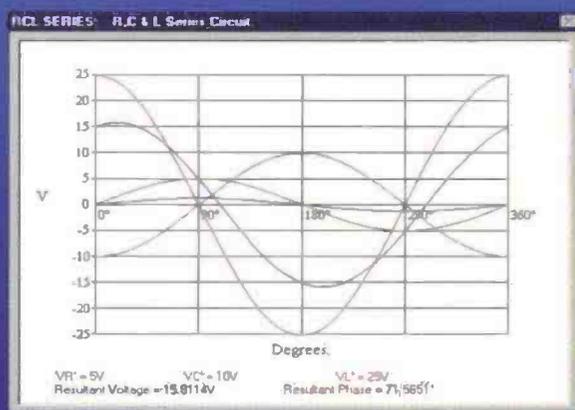
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seem to be doing more and more operating in the car lately. Even most of my h.f. operating is now mobile. So, I always enjoy the opportunity of looking at new mobile equipment and therefore readily agreed to look at the new offering from Kenwood, the TM-G707E.

The TM-G707E is a 144/433MHz dual-band (one band operation at a time) transceiver. It can be converted to cover Airband and the Marine band, but is supplied with the Amateur Bands only.

This latest Kenwood offering is supplied with mobile mounting bracket, a Kenwood MC-45 Microphone with Up/Down keys along with four function keys, a d.c. cable with in-line fuses and a comprehensive handbook are also included.

The TM-G707E has a good quality 'N' type antenna connector on the rear of the unit as well as the normal 3.5mm jack socket for an external speaker. On the front of the radio are the modular microphone socket and a Data connector socket for dedicated Packet and RTTY operation.

The TM-G707E has a small detachable head, which was one of the first things that impressed me. It's very easy just to take off and put in a pocket or handbag and provides a good security feature.

An optional extra connection cable allows the radio to be mounted in the boot or under a seat and the just the head mounted in the car. This way of mounting helps those of us with modern cars that seem to have nowhere to put a radio!

*Richard Newton
GORSN, PW's very
keen mobile
operator has been
putting the new
Kenwood TM-G707E
dual-band mobile
transceiver to the
test, here's how he
got on.....*

Mobile Working!



Smart Looking

The TM-G707E is a very smart looking radio with the detachable head containing the display and all the transceiver's controls. The controls are well set out and are labelled both on the case and on the i.c.d. display.

The controls are well thought out, with the tuning knob used to go 'up and down' memories, v.f.o. ranges and menu options. The tuning control also has a button set inside it which when depressed allows you to tune in 1MHz steps (I liked the fact this could easily be done with one hand).

The **squelch** and **volume** rotary controls are easily accessible. Band change and call frequency recall along with power-out selection are all simple operations to carry out. I got the distinct impression that the designer of the TM-G707E is a mobile radio operator!

And what a display! In my opinion the display on the TM-G707E is wonderful. It's huge in comparison with others I have seen.

There's absolutely no doubt what frequency you are operating on and even the smaller items on the i.c.d. can be seen easily. The display can be backlit with varying levels of yellow light, which is very effective. And it's just another example of a small but extremely useful function.

The transceiver can be set to have a dim back light but on the use of a button or control the display becomes brighter for a couple of seconds. This I found very useful at night as it meant I didn't have to drive with a bright light glaring at me from the dash but when I needed to see the radio's display, there it was in all its glory.

The TM-G707E comes with all the features I would expect to see on a radio of its calibre. It has 180 memory channels that can contain separate transmit and receive frequencies as well as simplex frequencies. These memory channels can also hold other information such as tone squelch. Each memory channel can be given an alphanumeric name up to 7 characters long, for example repeater or packet BBS call signs.

The radio is also very versatile, it can be switched on and used giving the operator excellent service without the need to do very much at all. On the other hand, through the easy-to-use menu, the transceiver can be set-up with many advanced features.

Optional Extras

I was interested to see that the TM-G707E radio is also supported by a veritable army of optional accessories. One of the many optional extras is the voice module (the review model had this included) and I think this would be an 'absolute must' for those whose sight is impaired.

Among its many uses the voice synthesiser announces if the transceiver is on v.f.o. or memory mode, and will announce when you have selected menu options and announce memory number and frequencies. I programmed one of the microphone buttons to the voice feature, so

Practical Wireless, June 1998



that while I was driving along I could make sure I was monitoring the correct frequency by pressing the button and allowing the radio to announce what the current working frequency was.

Other optional extras include a detachable front mounting kit with a choice between 3, 4 or 7m cable lengths. There's also a multi-function DTMF Microphone, a data cable, a modular to old style microphone connector adapter cable and a modular plug microphone switch also available.



Sensible Way

The sensible way to get the most out of a new rig is to make a pot of tea and sit down with the manual. How many of us actually do this? Precisely ... not very many! And that's the reason why when I get a rig to review I unpack it, turn it on and try using it.

By 'using' the rig I don't mean just speaking to someone. I mean being able to programme a memory, assign memory names, tune the v.f.o. ranges, change bands, and select shift and reverse frequencies. If I can do most of these without reading the manual, I consider the achievement to be an indication the radio has been thoughtfully designed.

I'm pleased to say I was able to do all of these on the TM-G707E without referring to the manual. So, the next job was to see how it worked 'on air'.

Mobile Operations

I was delighted to find out the case dimensions of the TM-G707E were the same as my existing mobile rig, another dual-bander from Kenwood, the TM-732E. I have a slide-in/slide-out mount for my '732 so all I had to do was to put the sliders on the new

The upper side of the transceiver is dominated by an impressive aluminium alloy die-cast heat-sink provided with a purpose-made 'sit in' recess for the loudspeaker. The effect of which adds to the neat and very professionally engineered design.

Don't be misled by the apparent lack of 'active ingredients! In fact there's a large component count on this impressive p.c.b. due to the intensive use of the extremely versatile 'surface mount' devices.

JOIN RICHARD GORSN AS HE GOES MOBILE WITH THE LATEST OFFERING FROM THE KENWOOD STABLE

radio and slip it into the dashboard.

The TM-G707E fitted like a glove, with the head was just proud of the dash and tilted at just the right angle. I connected it up to the power and turned it on. Being the vain man I am, I programmed the alphanumeric display to show, 'G0RSN' on power on!

On the whole the 144MHz band is quiet in my area. So, on my way to work one evening, driving to Poole, I decided to put a call through the local repeater, **GB3SC**.

I got an instant reply from **Peter G1IDZ**, who was situated somewhere in South Shropshire while sitting in his car. Peter was doing very well to get into the Bournemouth



The small detachable head is very easy to take off, which also makes it a good security feature.

"I got the distinct impression that the designer of the TM-G707E is a mobile radio operator"

Manufacturer's Specifications

General

Frequency range	144 to 146MHz	430 to 440MHz
Mode	F3E (f.m.)	
Antenna Impedance	50Ω	
Usable temperature range	-20°C to +60°C	
Power Supply	13.8 V DC ±15%	
Grounding method	Negative Ground	
Current	VHF	UHF
Transmit Max.	11A or less	10.0A or less
Receive 2W out		1.0A or less
Frequency stability	10° to +50°C Within ±3ppm	
Dimensions (projections not included)	140 x 40 x 189mm	
Weight	1.2kg	

Transmitter

Power Output	High	50W (144MHz) 35W (430MHz)
	Medium	Approx. 10W
	Low	Approx. 5W
Modulation	Reactance	
Spurious emissions	-60dB or less	
Maximum frequency deviation	±5kHz	
Audio distortion (at 60% modulation)	3% or less	
Microphone impedance	600Ω	

Receiver

Circuitry	Double conversion superheterodyne
Intermediate frequency	1st 38.85MHz 2nd 450kHz
Sensitivity (12 dB SINAD)	0.16μV
Selectivity (-6dB)	12kHz or more
Selectivity (60dB)	28kHz or less
Squelch sensitivity	0.1μV or less
Audio output (8W, 5% distortion)	2W or higher
Audio output impedance	8Ω

repeater, conditions were 'up' so I checked for Peter on the input (easy to do on the TM-G707E I'm glad to say).

I was extremely impressed to hear Peter on the input. And although I didn't get an exact location but suffice to say it was a long way, which certainly shows that the receiver on the TM-G707E works well.

I then went onto make some more local contacts. One of these was with **Keith G3WSN** who reported the transmitted audio from the TM-G707E as being, "excellent, crisp and punchy, just what you want". During another QSO **Peter G4TBI** said, "very good in the audio department".

The received audio was also very good. Repeater access using CTCSS tones was very simple indeed.

However, 1750Hz was not quite so straightforward as this needs to be assigned to a microphone button. This means you can't use 'hands free', this in turn does mean 1750Hz tone burst repeater access is cumbersome, which meant I had to practice my 1750Hz whistle!

The performance of the TM-G707E was outstanding on both 144 and 433MHz and seemed very sensitive on both bands. It also offers an impressive 50W high power on 144MHz and 35W high power on 433MHz, so you can be sure of talking to stations that you can hear.

I used a middle of the range, dual-band mobile whip when operating and got very favourable reports and results. The versatility of the radio continues with the output power, a medium setting of 10W for each band and a low power of 5W are also options. The radio cools itself by a very quiet, unobtrusive fan assisted by very impressive heat-sinking.

Base Station Contacts

I then decided to take the radio indoors to see if I could get a few more contacts using it a base station. For this I have a WX1 dual-band antenna on a pole at the rear of my

bungalow and as this antenna has not been used in a while I had to crawl around my loft to find the coaxial cable, ... the things I do for PW!

With the coaxial cable found and the dust blown from my 30A power supply I was ready to set up. I balanced the TM-G707E on its box and turned it on. A call on 145.500MHz went unanswered, several calls on 433.500MHz also went unanswered.

However, a plaintive cry on the local repeater, GB3SC, did not go unanswered.

Lou G1ULZ and **John GOVPJ** both came back to my pitiful plea for help.

Both Lou and John are relatively local to

cries on 145MHz but had not been able to call me back. I am delighted to say that he then seized his opportunity when we moved bands. Graham was situated in an area of Poole

"The TM-G707E is very versatile and therefore shows great potential"

called Alderney, which is only a matter of a few km away from me. Graham added his comments on the signal and audio quality from the TM-G70E. These included: "Very nice, smashing audio, smashing signal on both bands".

We then continued experimenting. Lou called me using his hand-held again, this time I did not hear him, although he did say his batteries may be low. Graham also called me using his IC-Z1E hand-held on low power and we made contact easily, Graham dropped from being a 59+ received signal to about 5 and 7.

The review model had the Airband receive dealer mod activated. I could not resist listening to the local Airport. I have to say that the quality of the a.m. reception was excellent. I did this both in the car and while I had it set up in the house on the WX1 antenna.

So, all in all the TM-G707E did very well on the air. As a base station it's just as impressive as it is for mobile operation.

The TM-G707E also offers something that I have not seen on any other transceiver. This is what Kenwood call Programmable Memory (PM).

The PM function means that individual settings such as v.f.o. frequencies, memory recall mode (either frequency or channel numbers) Offset direction and Frequency step sizes can be saved as a template. There are four operator templates available on the radio, which means that if you share the transceiver, at a club or within a family of amateurs, up to four people can individually tailor the transceiver to their own requirements.

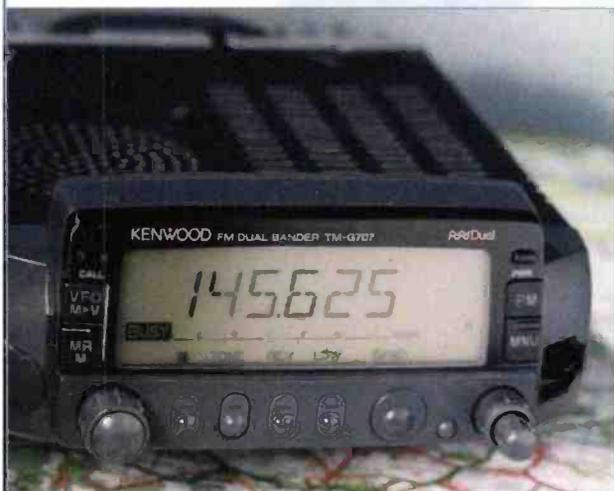
Joy To Use

Well designed, well built, and a joy to use. That is my conclusion on the TM-G707E. Reverse repeater monitoring, power output adjustment, band selection and menu access are all single button functions. Yes, this radio was designed for mobile operators and unless I am very much mistaken, mobile radio operators also did the design work.

All in all I think this very smart, well-made little unit is very good value for money. The TM-G707E is very versatile and therefore shows great potential.

For those operators who want to have dual-band capability but are happy to operate only one band at a time then the TM-G707E is worth a good look. The real plus points for me were that as a mobile operator the TM-G707E gave me what I would want, an easy to use, simple to operate transceiver that has the power of advanced features should they be required. The bottom line is - I liked it!

PW



my QTH. We all moved to a 145MHz simplex frequency and made contact. Lou was situated in West Moors, a village some 8km away from me, John was a little further away in Verwood, about 16km distant from me.

Lou first used a Trio 4000A dual-band rig putting about 2.5W into a 518 ground plane for 145MHz on his bungalow, using this set up he was an end stop signal with me. He gave me a 59+ report and after getting me to move my mouth away from my microphone (Thanks Lou!) he reported the transmitted audio from the TM-G707E as, "Very good indeed".

John also gave me an excellent signal report, even when I was on 5W I was still 59+. He was using a Standard C5800, 4W and a WX2 antenna. His comments were all very positive, his comments included "Cracking signal" ... and ... "nice audio".

We all had a very pleasant chat trying the different power settings. No matter how hard we tried we could still talk to each other despite the low power.

John bowed out for a prior engagement and Lou and I continued to experiment. Lou then called me using his Kenwood TH-79E hand-held on the Extra Low setting, Lou described this to be "A few milliwatts". The TM-G707E still received him 55 and he still heard me with no problem at all.

Lou then kindly agreed to help me try the radio out on 433MHz. We chose an obscure frequency and moved to u.h.f. We established contact and gave each other excellent reports.

Then I heard 'Break' and to my utter amazement there was another station on 433MHz. This was **Graham 2E1BVG**.

Graham had first monitored my plaintive

The Kenwood TM-G707E is available from all Kenwood approved dealers for the recommended price of £349.95. All accessories for the G707E are the same as those for use with the TM-V7E.

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The 16th Annual Practical Wireless 144MHz

Once again Adjudicator Neill Taylor G4HLX reminds us that it's time to find the insect repellent, stock up the picnic basket, prepare the portable mast, find that site and get ready for the PW 144MHz QRP Contest.

An Alinco DJ-190 will be awarded to the overall winners.

When summer arrives, it's time to take to the hills with portable v.h.f. equipment and antennas, for a day of on-air activity which promises to bring some good contacts for everyone. With stations sited in the best locations all over the UK, there should be some good DX to work wherever you are.

You can join in the fun with just a simple 144MHz station, and the 3W output power limit means that you don't need extravagant equipment to compete effectively. For the 16th year, the PW QRP Contest provides the opportunity for newcomers and seasoned contest groups alike to engage in friendly competition for the top positions in the results.

For some, the goal is to become the leading station in their locator square. Others have personal aims such as achieving a higher position than last year, or working some DX that is usually out of reach.

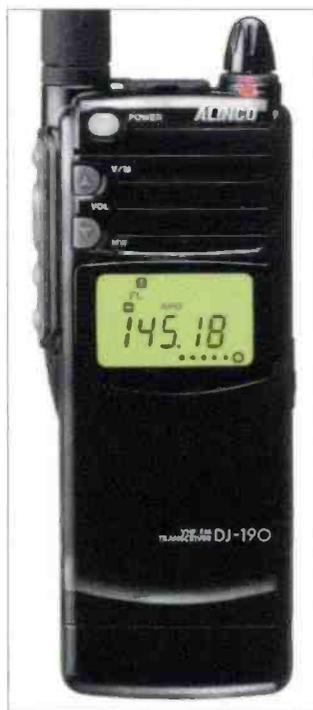
And for the really high performers, there are rich rewards for the overall winners, who will receive the coveted **PW QRP Contest Winner's Cup** and a special prize of an **Alinco**

DJ-190 144MHz hand-held transceiver, kindly donated by **Mike Devereux G3SED** of **Nevada Communications**.

The runners-up will be awarded a special prize of either a **portable battery pack** or a **portable mast**, kindly donated by **Bob Keyes GW4IED** of **Key Solar Products**.

The Tennamast Trophy in Memoriam to Frank Hall GM8BZX, donated and sponsored by **Tennamast (Scotland) Ltd.**, will be awarded to the leading Scottish station.

Entries from Ireland aren't forgotten either, as for the second year the **PW EI/GI Trophy Clock** will be presented to the leading station in Eire or Northern Ireland.



Certificates Awarded

Certificates will also be awarded to the leading stations in a number of categories, including leading single operator, and the leading station in each locator square. So why not have a go and try to win one of these? Contests results, along with a review of the contest and results, will be published in *Practical Wireless* later in the year.

Even if you are a regular entrant to the PW QRP Contest, please take the time to read the rules thoroughly. When submitting your entry, please be particularly careful to supply all the information required by **Rule No. 6**.

Every year some entrants lose valuable points through being penalised for incomplete details here. Be sure to provide the list of all the locator squares you have contacted, and check that in your log you have

highlighted in some way the first contact in each new square.

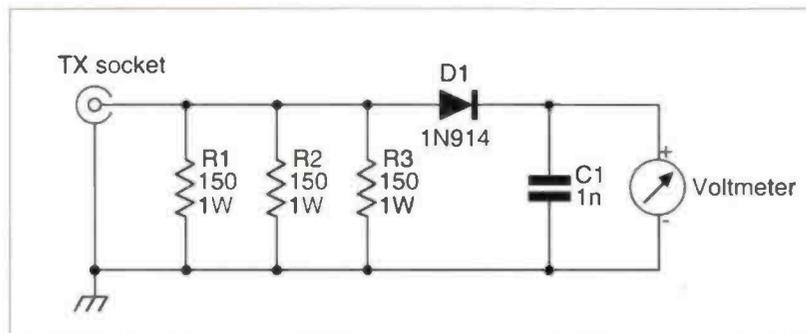
You'll probably find it easier, and it's certainly better for the adjudicator, if you use the blank log sheet and covering information sheet available for downloading from the PW QRP Contest pages on the Internet, at <http://www.rmplc.co.uk/eduweb/sites/ntaylor/pwqrp.html> (you'll also find complete results from many previous contests here).

New To VHF Contests?

If you're new to v.h.f. contests, then please don't be afraid! You couldn't have chosen a better event to get started - you'll find everyone you contact friendly and welcoming.

All you need is a 3W 144MHz transceiver, preferably s.s.b. as this is where most of the

Fig. 1: Simple power reduction circuit (see text).



QRP Contest

0900-1600UTC, Sunday 21 June 1998

activity is. A good antenna is highly valuable, as is a good site to operate from.

You may find it easier to get together with a group of friends, as it takes a lot of concentration to operate continuously for seven hours. The key to success is to prepare well, try out all the equipment together beforehand, and keep well-organised during the contest.

Also remember that the mark of a good contest operator is to be brief and precise in the exchanges. Avoid needless repetition, but at the same time be sure that both sides of the QSO

have logged all the information correctly. Being in too much of a hurry can be as ineffective as being long-winded.

Finally, a good measure of luck is helpful, in reaching those DX locations and working the remote squares. So, let's hope that we get some good propagation conditions to really set the band alive! Above all, I hope everyone taking part really enjoys the day. **Good luck in the 16th contest!**

Neill Taylor G4HLX

Contest Rules

1. General: The contest is open to all licensed radio amateurs, fixed stations or portable, using s.s.b., c.w. or f.m. in the 144MHz (two metre) band. Entries may be from individuals or from groups, clubs, etc. The duration will be from 0900 to 1600UTC on 21st June 1998.

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

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

2. Contacts: Contacts will consist of the exchange of the following minimum information:

- (i) callsigns of both stations
- (ii) signal report, standard RS(T) system
- (iii) serial number: a 3-digit number incremented by one for each contact, starting at 001 for the first
- (iv) locator (i.e. full 6-character IARU Universal Locator for the location of the station)

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

If a non-competing station is worked and is unable to send his full universal locator, his location may be logged instead. However, for a square to count as a multiplier (see rule 4), a full 6-character IARU universal locator must have been received in at least one contact with a station in the square.

Contacts via repeaters or satellites are not permitted.

3. Power: The output power of the transmitter final stage shall not exceed 3W p.e.p. If the equipment in use is usually capable of a higher power, the power shall be reduced and measured by satisfactory means. The simplest way is often to apply a (variable) negative voltage to the transmitter a.i.c. line, reached via the accessory socket. The output power can be accurately measured using the simple circuit of Fig. 1. Connect this to the 50Ω output of the transmitter and adjust the power so that the voltmeter does not exceed 16.7V on a good whistle into the microphone.

4. Scoring: Each contact will score one point. The total number of points gained in the eight-hour period will then be multiplied by the number of different locator squares in which contacts were made (a 'square' here is the area defined by the first four characters of a universal locator).

Example: 52 stations worked in IO81, IO90, IO91, IO92 and JO01 squares; final score = 5 x 52 = 260.

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



The leading station in Eire or Northern Ireland will be awarded the PW E1/G1 Trophy Clock.

NEILL G4HLX SAYS IT'S TIME TO JOIN IN THE PW 'FUN' 144MHZ CONTEST!

5. Log: The log submitted as an entry must be clearly written on one side only of A4 sized paper (210 width x 297mm height), ruled into columns showing:

- (i) time GMT
- (ii) callsign of station worked
- (iii) report and serial number sent
- (iv) report and serial number received
- (v) locator received (or location).

Underline or highlight the first contact in each of the locator squares worked.

At the top of each sheet, write:

- (a) callsign of your station
- (b) your locator as sent
- (c) sheet number and total number of sheets (e.g. 'sheet no. 3 of 5').

The sample shown in Fig. 2 illustrates how each sheet should be headed.

6. Entries: Accompanying each entry must be a separate sheet of A4 sized paper bearing the following information:

- (a) name of entrant (or of club etc. in a group entry) as it is to appear in the results table
- (b) callsign used during contest (including any suffix)
- (c) name and address for correspondence
- (d) details of location of station during contest; for portable stations, a national grid reference is preferred
- (e) locator as sent
- (f) whether single- or multi-operator (a single-operator is an individual who received no assistance from any person in operating the station, which is either his/her permanent home station or a portable station established solely by him/her); if multi-operator, include a list of operators' names and callsigns
- (g) total number of contacts and locator squares worked
- (h) list of the locator squares worked
- (i) a full description of the equipment used including TX p.e.p. output power
- (j) if the transmitting equipment is capable of more than 3W p.e.p. output, a description of the methods used (i) to reduce and (ii) to measure the output power
- (k) antenna used and approximate station height a.s.l.

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

This declaration concludes the entry, which should be sent, with the log sheets, to: **Practical Wireless Contest, c/o Dr. N. P. Taylor G4HLX, 46 Hunters Field, Stanford in the Vale, Faringdon, Oxfordshire SN7 8LX.** A large s.a.e. should be enclosed if a full set of contest results is required.

Entries must be postmarked no later than 6 July 1998. Late entries will incur a heavy points penalty or may be disallowed.

Any other general comments about the station, the contest and conditions during it are welcome, but should be written on a separate sheet of paper. Photographs of the station are also invited (but please note that these cannot be returned); if these are not available by the time the entry is submitted they may be sent later, to arrive by 10th August 1998.

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

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

Make sure your transmitter is properly adjusted and is not radiating a broad or poor-quality signal, e.g. by over-driving or excessive speech compression. On the other hand, be aware that your receiver may experience problems due to the numerous very strong signals it will have to handle, and that this may lead you to believe that another station is radiating a poor signal. Before reaching this conclusion, try heavy attenuation at the receiver input. The use of a high-gain r.f. pre-amplifier is likely to worsen strong-signal problems, so if you do use one, it is best to be able to switch it off when necessary.

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

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

The 16th Annual Practical Wireless 144MHz QRP Contest

0900-1600UTC, Sunday 21 June 1998

Fig. 2: Sample log sheet for PW 144MHz QRP Contest (see text).

Practical Wireless 144MHz QRP Contest 1998				
Date	Callsign	Locator		Sheet No Of
Time UTC	Callsign	Report & Serial No		Locator
		Sent	Received	

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73 from Dave G4KQH, Technical Manager.

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MML70-100-10	4 Metres	1/3 Watts	100 Watts	£199.95
MML70-100-25	4 Metres	25 Watts	100 Watts	£199.95
MML50-30-3	6 Metres	3 Watts	30 Watts	£99.95
MML50-100-25	6 Metres	25 Watts	100 Watts	£199.95
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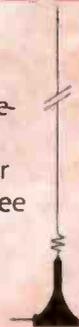
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The GDP-430 Hand-Held UHF Transceiver

Part 3

This month Geoff Pike G10GDP describes the final constructional stages of his low power hand-held transceiver project.

THE THIRD AND FINAL PART OF GEOFF'S LOW POWER HAND-HELD TRANSCEIVER PROJECT

In this, the third and final part of the GDP-430 project, I'm going to describe the final stages of construction. And I hope - for those of you who are underway by using the previously published circuit - that it's a case of 'Okay so far?'

I advise that you build the transmitter section carefully using good v.h.f. and u.h.f. techniques. No long leads, and if you make the p.c.b.s. yourself make sure they are good quality fibreglass.

Once you've completed the transmitter board, check all the tracks and ensure there are no solder blobs and other short-circuits. And if all is well, it's onto the transmitter alignment.

Personally, I've no doubt that once having seen the photographs of my prototype you'll agree that alignment is **best done initially outside the case and then fitted afterwards**. It may then be necessary to go over some of the adjustments and adjust slightly for best performance.

Alignment Process

To start the alignment process, you should select the appropriate 3rd overtone crystal and preset L1 to about 3mm into its former. The variable capacitor C9 should be set 35% meshed, C12 80%, C16 55%, C19 20% and C24 30%.

When you've inserted the crystal, there should be a rise in current drawn to approximately 35mA. As with the receiver local oscillator, C7 may need to be padded with 2.7pF until reliable starting occurs.

Ensure that the varicap diode is temporarily 'tied' to mid supply voltage level with R18/17. Now peak C12, 16, 19 and 24 for maximum output, and adjust HF1 (but this will only need 1-2 turns on each slug).

Next, check that the voltage drop across R16/17 is about 0.55V (i.e. 55mA). The BFR96S is rated at 100mA/12V, so caution is needed not to exceed its rating. To that end, do not remove R18, R19 and or 20 in the quest for more power.

When everything is adjusted and tuned up, approximately 350mW will be available at the antenna socket. This is because losses in RLA are unfortunately unavoidable for such a low cost switching relay used at this frequency.

Total current drawn in between 160-200mA depending on final output power. Temporarily connect a variable supply to R8, so as to swing the voltage mid-point $\pm 2V$. Check that a deviation of $\pm 3.5kHz$ is available, i.e. a total of 7kHz.

Adjust C9 to achieve the required deviation,

and then check that the centre frequency is the crystal frequency $\times 6$. The adjustment of C9 and L1 will obviously interact to some degree, but it is possible to achieve a good compromise between centre frequency and deviation.

Tone Burst

The tone burst on my prototype is on the same p.c.b. as the audio amplifier. It's straightforward and there's nothing special required except to check that the crystal frequency of XL2 is 3.579MHz.

You should also verify that the output of the IC4020 (pin 15) is 1748Hz. This should have a duration of about two seconds when power is applied. (This can be adjusted with R40 to suit individual repeaters).

A small piece of 1.5mm diameter wire is used to connect the negative side of the board to ground plane of the receiver board, providing extra mechanical rigidity as well as a ground return. Tone burst level can be preset with R42 to about 20% away from ground potential.

Microphone Board

The microphone board is fitted as close as possible to the transmitter board. Additionally all connections must be made as small as can be achieved mechanically.

Fig. 1: The microphone amplifier and modulator board component side.

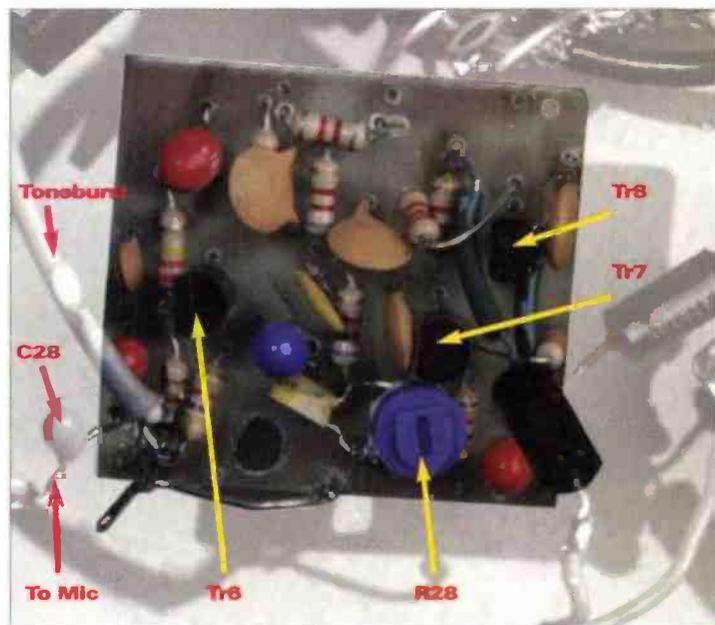




Fig. 2: The underside of the microphone amplifier board.

Ensure that the board has a good earth with a mounting bolt into the case side with a single countersunk bolt. Ensure that L2, a 1.5μH moulded choke has a short run between the microphone amplifier and the varicap diode. The deviation control R28 can initially be set about 30% from ground potential.

Relay Control Board

Now it's on to the relay control board, and in my prototype the antenna change-over relay is controlled by a small p.c.b. mounted on the case side opposite the transmitter board. It should be mounted as close to the microphone socket(s) as is possible.

Operation is simple and only requires a swamp resistor across the electret microphone of approximately 1kΩ (if not already fitted). This will ensure sufficient current flow to activate the c/o relay via the switching transistors Tr9, 10 and 11.

However, if you decide to use an ordinary 4 pin CB type of microphone, the board is not needed. In this case R35 will allow control of the amplifier's sensitivity.



Fig. 3: The transmitter board overlay.



Fig. 4: As space is tight a few components must be mounted on the track side of the transmitter p.c.b.

Final adjustments when in a suitable case will include checking with another station for modulation quality and also adjustment of the tone burst duration. Additionally, you may notice that when the unit is 'up and running' that the squelch control can be backed off after a few minutes to advantage. (This is because in practice the threshold seems quite temperature dependent).

Choosing The Antenna

When it comes to choosing the antenna there are several options. It could be a commercial helical or a 1/4 wave whip as needed.

However, for my prototype I used a 5/8 wavelength antenna which was easily made from welding rod and a BNC plug. The plug was shrouded with an 'in-line' fuse holder outer to support the base matching coil. I then slipped the fuse holder over the assembly and filled it with epoxy resin.

Be aware that if you use a 1/2 or 5/8 wavelength antenna that some experimentation will be needed to find the best reception, especially if you are moving about the house. And don't forget to incorporate some form of protection at the tip of the antenna - it's all too easy for a whip antenna to be used as a rapier!

Your Hand-Held

When it comes to building your version of the GDP-430 I'll be pleased to hear from you. Obviously there will be differing requirements for each constructor but if you do wish to contact me directly to discuss the project please do so.

The p.c.b.s for this project **will not be available from the PW PCB Service**. Instead, I can provide you with the prototype p.c.b. designs I used and up-dates on the project if you enclose a large s.a.e. (50p stamp).

You can write to me at **2 Windslow Drive, Carrickefergus, County Antrim, Northern Ireland BT38 9BB**. However, please remember that I'm not available on the telephone.

So, whatever form your GDP-430 takes - good luck and I hope you enjoy building the project. Home-brewing a u.h.f. transceiver is a challenge but it's also very enjoyable!

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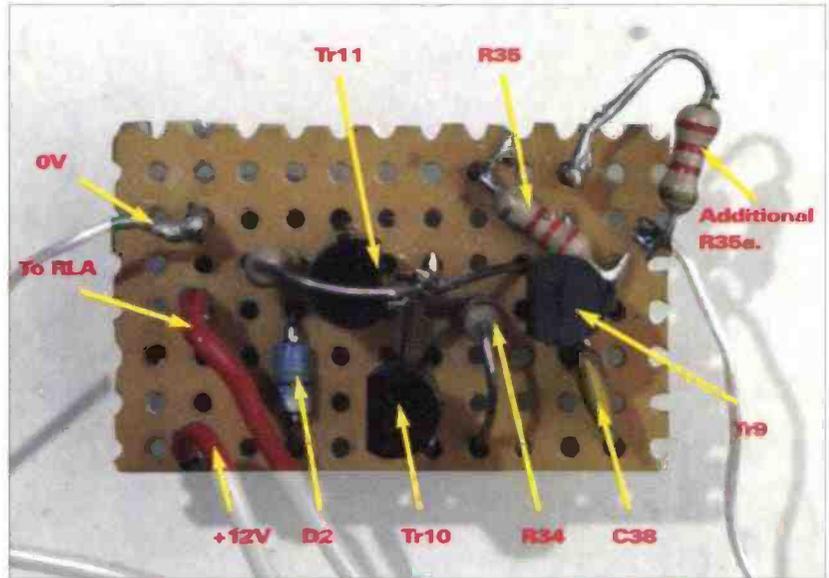


Fig. 5: A small section of Veroboard was used to make up the transmit/receive changeover circuit.

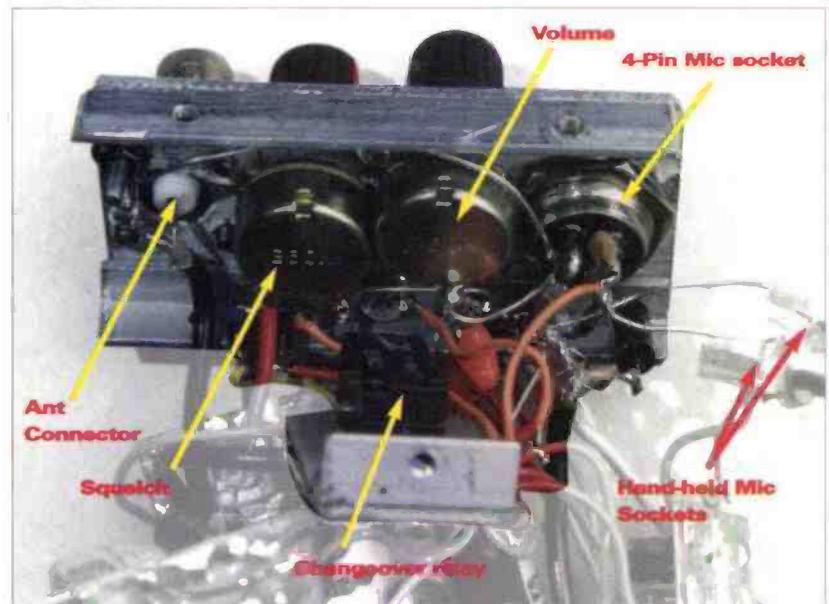


Fig. 6: Looking behind the front panel shows a tightly mounted group of components.

Errors & Updates

In Fig. 1b on page 68 of the November 1997 issue of *PW* the resistor R118 may be modified to 1.5kΩ rather than the 2.2kΩ as shown.

In Fig. 1c (p 68) the connection shown from the top of R123 to the top of R120 should not be there. The top of R120 should be connected to the junction of C137/R123/L104.

Also in Fig. 1c the connection shown between R129 and the +12V (Rx) line should go to the junction of R131/C146/L106.

On Fig. 1d (p 68) R6 should connect direct to the +8V supply from IC1 rather than to L2/C5 junction as shown.

Shown as single capacitors in Fig. 1d (p 68) C11 and C18 should be a combination of 10nF and 1nF for decoupling purposes. This comment also applies to C25 on Fig. 1f (p 69)

The resistor on the base of Tr2, shown as R12 should be labelled R11.

For maximum stability the r.f. filter, C27/L10 (Fig. 1g) should be mounted on the microphone socket direct.

In Fig. 4 on page 50 of the May 1998 issue of *PW* the lower component marked C102 on the left hand side of the photograph should have been labelled Tr102.

The coils L102 is wound in one lead of R102, and L103 is wound in one lead of R104. Both should be two turns and 3mm internal diameter.

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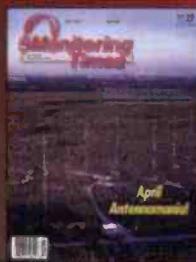
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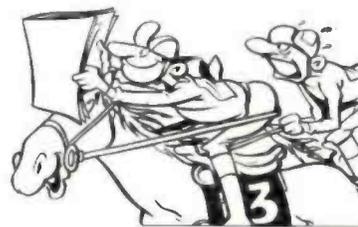
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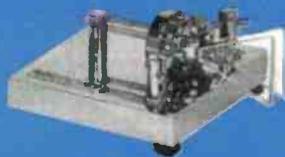
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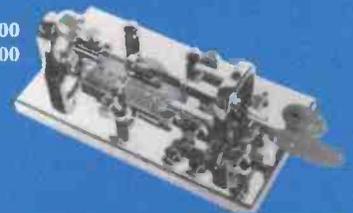
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is any use.

I've covered the theoretical side of coaxial cable in a previous article 5. So, now I'd like to expand that and deal with coaxial cable from a practical viewpoint. Many amateurs who've found or acquired a length of coaxial cable of unknown

characteristics, must often wonder if it's of any use. In this article I'll describe some simple tests to determine whether it is usable or should be used as a source of braid for 'earthing' straps.

Radio waves travel more slowly in a coaxial cable than they do in free space (where the speed of transmission is the speed of light at 300 000 000 m/s), and the ratio of these two transmission velocities is called the 'velocity factor of the cable' (it's always less than 1). The difference in transmission velocities has the effect of physically shortening any signal's wavelengths within the cable.

Let me illustrate it by example. Let's assume you wish to make an open-ended $\lambda/4$ stub for 7MHz using a length of coaxial cable, with a velocity factor of 0.66. The length of coaxial cable is calculated by first finding the quarter-wavelength in free space -

$$\lambda/4 = 0.25 * (300/7) = 10.7m$$

To then find the wavelength in the coaxial cable you multiply the free space wavelength by the velocity factor. So, $10.71 \times 0.66 = 7.07m$ and this is the length of the cable stub.

Now you know what velocity factor is, how can you measure it? The first method is to take a convenient length of the coaxial cable and measure it's $\lambda/4$ resonant frequency with a (grid) dip oscillator (g.d.o.). Having found this frequency, work the above calculation backwards to find the electrical length of the cable.

Then measure the cable's physical length

A radio wave travels slower in a cable than in 'free-space' so, wavelengths within the cable are always shorter than in free-space.

with a tape-measure. The ratio of the length of the coaxial cable to the free space $\lambda/4$ is the velocity factor.

Word Of Warning

I must just mention a word of warning to those of you who are using a g.d.o. with a simple dial read-out. To obtain a good result some care is needed. You must lightly couple the g.d.o. to the cable through a single turn coil which joins the braid of the coaxial cable to its inner.

Having found the initial 'dip', further reduce the coupling to the minimum and either use a frequency meter or a receiver to find the exact frequency of the g.d.o. The act of coupling the g.d.o. to the coaxial may have 'pulled' the frequency and possibly changed its calibration. **Note: Always start from the lowest frequency range setting when looking for the 'dip'.**

There is however a better method. Instead of using a g.d.o. you can use a noise bridge and a receiver to find the $\lambda/4$ resonant frequency of the cable, see Fig. 1. Estimate the approximate frequency by calculation as described above. Set both dials on the bridge to zero.

At the resonant frequency of the coaxial cable under test there will be a marked fall in the level of the noise which is heard in the receiver. This is because the length of cable under test behaves as an open circuit $\lambda/4$ stub, putting a short circuit across the receiver and the bridge.

Characteristic Impedance

Do have a look at my earlier article dealing (5) with characteristic impedance of a coaxial cable, for which we usually use the symbol Z_0 . The Z_0 value is solely determined by the physical characteristics of the cable and is quite easy to evaluate. But please note when taking measurements as my old physics master used to say, "Note a micrometer must not be used as a vice"!

Don't worry if your answer is not exactly 50 Ω or whatever. Many cables which we call 50 Ω are not in fact that value. For example, the impedance of RG-58/U is actually 53.5 Ω . However, most cables you are likely to meet fall into one of two major groups, those whose impedances are about 50 Ω and those whose impedances are about 70 Ω .

Beware; you may encounter RG-62A/U coaxial whose impedance is 92 Ω . This cable is semi-airspaced and is widely used in v.d.u. installations and can often be found in skips when a building is being gutted.

Line Loss

Now I'll look at line loss, which is specified loss (in dB) per unit length. The unit length usually is 10m or 100 feet (30m). Make sure you are comparing like with like when you are considering which

Practical Wireless, June 1998

coaxial to buy from a manufacturer.

Line loss is very frequency dependent and gets worse as the frequency increases so be certain that you use a loss figure that is comparable with the use to which you are putting the cable. A cable that is excellent for 3.5MHz could be a dead loss (excuse the pun) for the '2m man'.

The usual method of measuring cable loss simply measures the power flowing at each end of a matched length of coaxial as shown in **Fig. 2**. The loss is $10 \times \log(P_a/P_b)$ dB. If you don't have an accurate power meter, measure the r.f. voltage at the same points, the loss figure is then $20 \times \log(V_a/V_b)$ dB.

To compare the loss of your length of coaxial with that of known cables you may have to allow for a difference in lengths between your test piece and the standard length used by the manufacturer. For example, your 20m of cable gave a loss of 1dB, then 30m would give a loss of 30/20 greater or 1.67dB per 30m.

Another way of measuring the loss is as shown in **Fig. 3**. Here r.f. is fed via a directional power meter - many s.w.r. meters are suitable for this purpose - into a length of un-terminated coaxial cable. You will remember that in these circumstances all the power which has been fed into the line will be reflected by the open circuit at the far end.

So, if we measure the forward (P_f) and reverse (P_r) powers at the input of the line we can calculate the loss by applying the following formula: $\text{loss} = 5 \log(P_f/P_r)$. The loss is incurred on both the outward and return journey, so 5 is used in this formula and not 10.

The method must be used with care as many rigs do not like running in an unmatched condition. I have found that running about one watt output and using a sensitive directional power meter gives good results. I use the Stockton Power meter which can detect very low power levels with ease. This meter, should have a normal meter, not digitally driven i.e.d. indicators.

I suspect many amateurs have sometimes wondered whether the coaxial cable feeding their antenna is suffering old age or ingress of water. The last method I'd like to describe can be adapted to check the loss of your dipole feeder without leaving the shack.

If you disconnect the antenna from the feeder you can determine the feeder loss using the above two power method. But, with many installations this may not be too convenient. You could attach a shorting link across the feeder at the antenna feedpoint. (A short circuit reflects power in exactly the same way as an open circuit). This too, may not be convenient, but if we operate the dipole at twice its design frequency the cable is now terminated at the centre of a full wave length.

The feed-point impedance is about $5k\Omega$ and the coaxial cable will be operating with an s.w.r. of 100:1. so, it is effectively terminated in an open circuit which, like the short circuit, will reflect all the power. So, at twice the dipole's design frequency, measure the forward and reflected powers and calculate the loss as described above.

The measured loss will be a little higher
Practical Wireless, June 1998

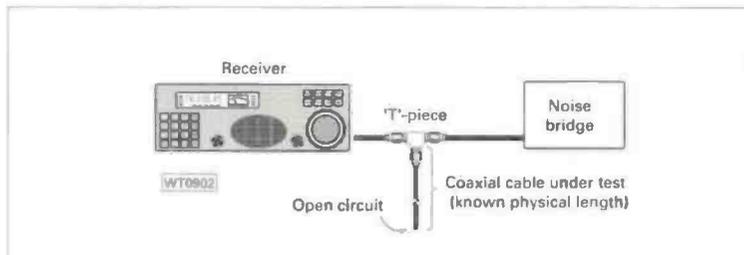


Fig. 1: This is all you need to find the resonant $\lambda/4$ frequency of a length of coaxial cable and, from the physical length you can work out its velocity factor.

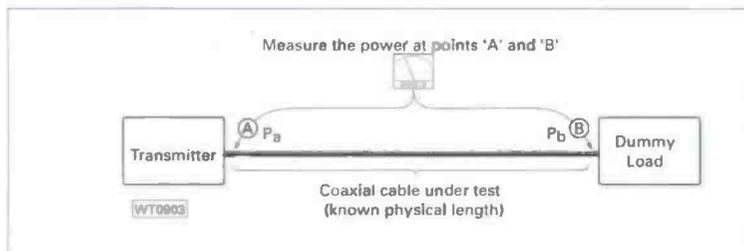


Fig. 2: To find the loss figure, measure the available power at each end of the length of cable, and divide the loss (in dB) by the length of the cable.

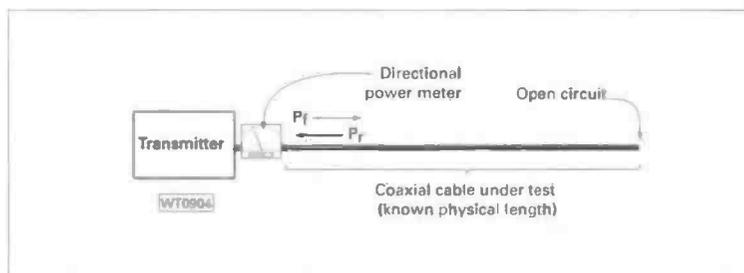


Fig. 3: By using an unterminated length of coaxial cable and a directional power meter two power readings can be obtained for the loss figure. See text.

The ratio, of a signal's $\lambda/4$ length in a coaxial cable, to its free space $\lambda/4$ is the velocity factor of that cable.

than the actual loss due to the test frequency being higher than the operating frequency but this should not normally be of any consequence. This method will not work with trap dipoles and G5RV's. I have only used it with directly fed dipoles and if you are using a balun the results may not be reliable.

Simple Methods

These simple methods will enable you to test to see if a coil of coaxial cable is any use. If you are interested in other parameters, such as power handling, it may be necessary to apply intelligent guess-work or go and buy some coaxial cable of a known type. If you need to have more accurate figures then you will have to use more sophisticated measurement techniques.

PW

5 'Antenna Workshop - Transmission Lines' by Gerald Stancey G3MCK - PW October 1995 (pages 48/49)

COAXIAL CABLES FROM A PRACTICAL VIEWPOINT - THEY ARE EASIER THAN YOU THINK!

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This month Rob Mannion G3XFD looks at a selection of books written by Ian Poole G3YWX, a prolific author who also writes PW's popular 'What is A....?' series. And quite honestly - this brief look at just a few of his titles is really like 'dipping the toes' into Ian Poole's work!

Book PROFILES

Author Of The Month - Ian Poole G3YWX

Basic Radio - Principles & Technology

£14.99

This book is Ian Poole's latest, and I'm pleased to see it in print because we discussed the idea together a few years ago and the result is an excellent, very readable 'first' technical book. The format adopted is just right to encourage the interest of anyone in the first stages of interest.

Starting off with a look back at radio history Ian travels right through radio and ends up in orbit with satellite communications! Chapters include radio today, yesterday and tomorrow, radio waves and propagation, capacitors, inductors and filters, modulation, receivers, transmitter, antenna systems, broadcasting, satellites and personal communications.

There's a useful index and information on basic calculations. If you enjoy reading PW's 'What is A....?' - you'll certainly enjoy this latest book from Ian Poole. **Excellent first technical book. Highly Recommended.**

Short Wave Listener's Guide

£14.99

Having first discovered an interest in radio communications, most enthusiasts to either specialise in one aspect of the hobby or 'dabble' in both the 'hobby construction' and 'on air' aspects of the pastime. In years past the 'traditional' method of serving your radio 'apprenticeship' was to become a dedicated short wave listener.

However, some enthusiasts specialise even further by concentrating on the aspect of the hobby and after reading Ian's *Short Wave Listener's Guide* I realise there's some areas of the listening speciality I've missed out on! In his typical style the author has comprehensively, but concisely, covered What is short wave listening?, aspects of the hobby, technology today, looking into the future, how it began.

There's much additional information regarding callsigns, prefixes and call areas. All this information is presented in Ian's informative but informal and interesting style. A superbly researched and

prepared read, and a very useful reference book. **Highly recommended.**

An Introduction To Scanners & Scanning

£4.99

This little paperback will probably be the first book that scanner owners will see listed once they've bought their scanners. Scanning has received much poor publicity over the years but many radio enthusiasts have entered the radio hobby because of their interest. Ian introduces the reader to how the scanner works, how to use it, radio waves and propagation and also provides plenty of information to launch any first timer off on the listening hobby in an ethical fashion. **A useful 'starter' book.**

An Introduction To Amateur Radio

£4.99

This little will be an ideal 'follow-on' book for any scanner enthusiast who having had the appetite 'whetted' by what's received on the scanner would like to 'have a go' for themselves.

Ian starts by answering the question What is Amateur Radio? and follows it up with enough information to help any reader get going in the Amateur Radio hobby. **Useful 'starter' book.**

The Novice Radio Amateurs Examination Handbook

£4.95

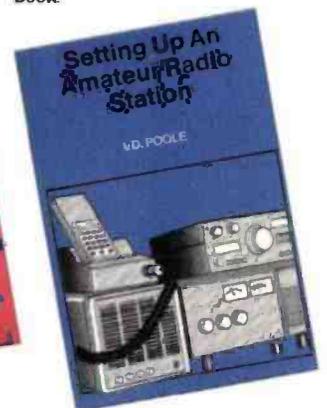
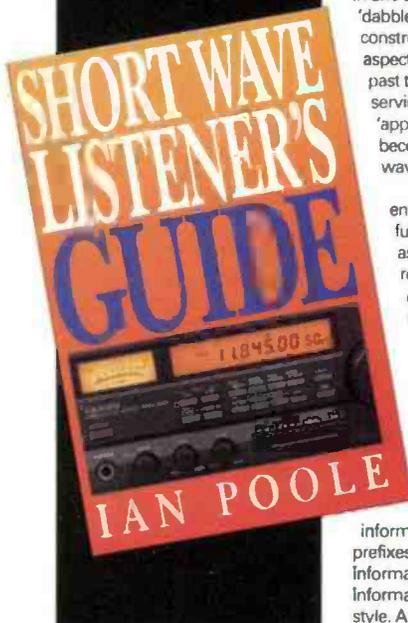
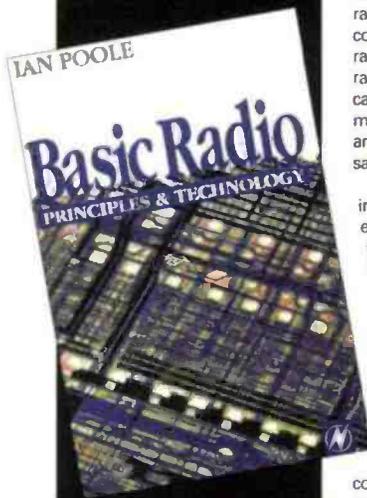
Several of Babani's little publications stand out from the rest - and this little paperback certainly does! Not only does it provide in a very modestly priced publication an overview of the Novice Radio Amateurs Examination (NRAE) but also an introduction to the hobby itself, with the necessary syllabus for the NRAE, the theory, circuits, projects, and techniques.

Altogether this little book provides a great deal of information for the potential NRAE candidate, it could also be used as a course book. **Useful, readable and well researched little textbook.**

Setting Up An Amateur Radio Station

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The Radio Amateur's Examination (RAE) has been rightly criticised for its non-structured approach to preparing the candidate for going 'on the air', particular since the advent of the excellent Novice Licence scheme and the associated well structured preparatory approach of the NRAE. But this little publication goes a long way towards making up for the RAE's shortfalls (I've passed the RAE - what next?) by helping any successful recent RAE candidate to do what the title says: "Setting Up An Amateur Radio Station" - in an orderly and efficient fashion, benefiting from the author's experience. A very useful little book - with many useful hints and tips. **Useful Reference Book.**



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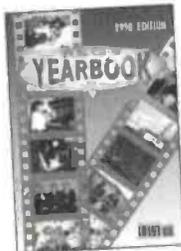
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This month the Rev. George Dobbs G3RJV says "an audio brick will do the trick" when you're looking for a suitable amplifier for your receiver project - together with an appropriate quote of course!

Carrying on the Practical Way

I'm grateful to PW reader Dr. Simon Newstead G7UEQ for sending me the full text of the "what are the wild waves saying" quotation used by Igranic for their plug-in receiver coils. He sent it to me on a photocopied page from the book *Those Radio Times*.

Beneath the quotation is a photograph of a 'wireless stall' at a church fete in 1922. A placard above the stall says "What are the wild wireless

waves saying? Listen in for 3d" I do not know the book but the page I have seen will encourage me to find a copy.

Listening to the Marconi Company station 2LO on headphones in the middle of a church garden fete must have been difficult. Good reception was a rarity. Not so these days, with even the weakest DX stations being enhanced by signal processing and advanced receiving techniques.

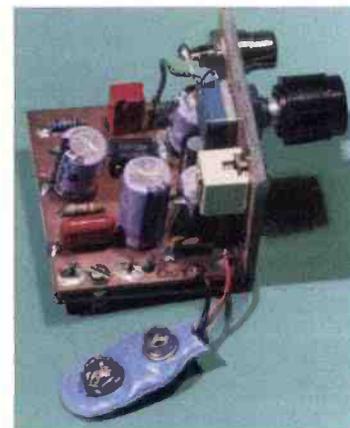


Fig. 2: An amplifier project using the TBA820M (see text).

and yet yield a useful output. Quite often the equipment may be used in a noisy environment so at least 1W of audio output is required.

The SGS TBA820M is an audio amplifier chip that I've used with some success for radio equipment where small size and modest current are required. It's a monolithic audio amplifier in an 8 pin dual-in-line package with several useful

characteristics. The final nail in the coffin lid of the receiver is a 2-inch diameter loudspeaker. It's simply amazing how much better the most modest of receivers will perform with a decent loudspeaker fed by an adequate audio amplifier.

There are many suitable circuits and audio chips about to give the 'wild waves' a better chance. In this article I want to offer a couple of suggestions for better audio stages for a receiver.

spoil their efforts by adding a poor audio section and an inadequate loudspeaker on the end of a receiver. Frequently this design failure is faithfully repeated by constructors of home-made receivers.

So often, after spending hours designing a receiver, the conclusion is - stick an LM386 on the end. Although the LM386 audio chip is cheap and uses few external components, its output is low (about 300mW) and it is prone to overload and distortion.

Portable Equipment

Portable equipment has rather a different design criteria from fixed station equipment. By its very nature, portable equipment needs greater power supply economy - the operator has to carry the power.

Ideally an audio amplifier chip for portable equipment ought to have low standby current

The i.c. is capable of operation over a wide range of voltages, from 3 to 16V. It will yield 1.2W of output at 9V to an 8Ω load and 2W of output to an 8Ω load at 12V. The quiescent drain current is low, in the order of 4 to 12mA and it requires few external components.

characteristics.

The circuit diagram in Fig. 1 shows an audio power amplifier using the TBA820M. This circuit is based on the manufacturer's data and I have found these values to work very well. The component count is somewhat more than the more common LM386 but the output and the quality are both better.

The input pin (3) requires a direct resistance to the 0V rail, which could be the volume control but if the amplifier is capacitively coupled the fixed resistance must be included. Pin 2 controls the gain.

A resistance in the range 220 to 820Ω seems to work well in R4's position. The capacitor on pin 8 could be omitted if space is at a premium. However this capacitor is for ripple rejection and certainly improves the amplifier. The 220pF between pins 1 and 5 is for frequency compensation.

However, it always amazes me how often the designers of sophisticated radio equipment

"What are the wild waves saying
Sister, the whole day long,
That ever amid our playing,
I hear but their low lone song?"

Joseph Edwards Carpenter

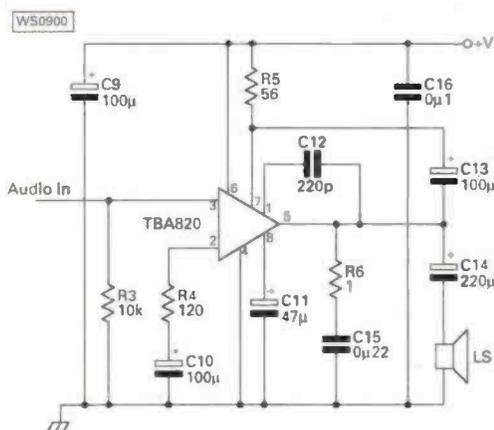


Fig. 1: Circuit diagram using the TBA820M i.e. (see text).

The Prototype

The prototype shown in the photograph, **Fig. 2**, is a TBA820 amplifier built on a p.c.b. It was once part of a home-built transceiver and was removed when the project was pulled apart.

In the photograph, the amplifier is shown mounted on a p.c.b. material base and front panel. The volume control (10kΩ log potentiometer) also forms the load on pin 3.

It would be quite easy to duplicate this circuit on 'perfboard' material or in ugly construction on a piece of scrap p.c.b. material. The layout is not critical but long leads are best avoided as are an unshielded input and output leads.

The amplifier requires a decent sized loudspeaker to use it to advantage. In portable operation I tend to use an external speaker. I hope the *PW* staff sends the prototype board back to me quickly, as I feel sure it will find its way into other projects!

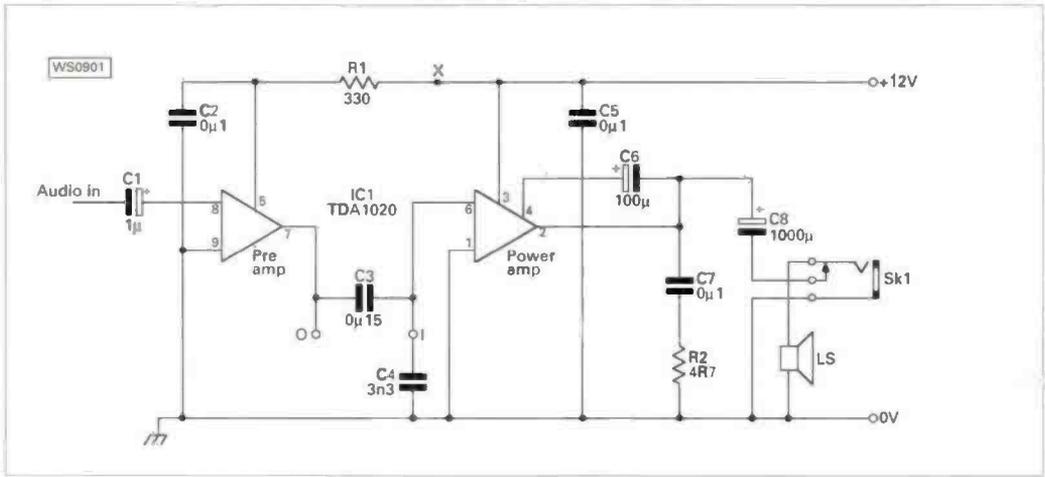


Fig. 3: Circuit diagram of an amplifier using the recently introduced TDA1020 i.c.

The greatest advantage for our sort of application is that the pre-amplifier and the power amplifier are separate. The output from the pre-amplifier and the input to the power amplifier both come out on pins.

The input impedance to the preamplifier and the power amplifier are both in the order of 40kΩ and the output impedance of the pre-amplifier is somewhat over 2kΩ. This means that the gain control could be placed between the pre-amplifier and power amplifier. What's more important is that audio tailoring or filtering circuits could also be added between the two sections.

Fixed Station Use

Building an audio amplifier for fixed station use is a somewhat different undertaking. A bench power supply unit will be available with greater power capacity and the amplifier can be run into a much larger loudspeaker.

There's also an advantage to be gained in using an amplifier that's capable of more power output than will ever be required. An under-run audio amplifier will produce much less distortion and better ripple rejection.

I've found that the TDA2003V/H audio amplifier chip is a good contender and I have used it in several applications. Although it has a cooling tab, a heatsink is not required at the sort of power required in our applications.

The in-car entertainment industry provides several other options. More recently my choice has been the Philips TDA1020 chip. A relatively new device.

The TDA1020 is a monolithic 12W audio amplifier in a 9 pin single-in-line package designed for car radio amplifiers. At a supply of 14V the amplifier can deliver 6W into a 4Ω load at 1% distortion.

Frequency limiting to avoid interference from car ignition systems is built in and the TDA1020 has short circuit and thermal overload protection. The output can be shorted to ground and the chip will not fail. It will work down to 6V and includes a 'load dump' facility which protects the device should the voltage rise about 18V.

Using The TDA1020

The circuit diagram in **Fig. 3**, shows a typical audio power amplifier using the TDA1020. The circuit shows that very few external parts are required. Pins 7 and 6 are the connections between the pre-amplifier output and the power amplifier input.

The amplifier can also be run in stand-by mode by making a break at point **X** in the circuit. With this point open the amplifier only draws about 1mA.

The prototype amplifier shown in the



photograph, **Fig. 4**, is built on Veroboard. It lays out very well in this medium. The only slight quirk is that the decoupling capacitor is mounted under the board.

I connected the prototype board to a heatsink - the front of the 'L' shaped enclosure, but it never got warm in all applications I tested it in! I included p.c.b.

Fig. 4: The G3RJV prototype amplifier using the TDA1020 i.c. (note the heatsink 'tab' is bolted to the 'chassis', which is formed from a section of aluminium angle extrusion).

pins alongside pins 6 and 7 to facilitate additions between the stages.

So far my tests show the TDA 1020 to be an excellent audio amplifier chip for fixed station work. The voltage gain is plenty: 30dB in the preamplifier and 47dB in the power amplifier.

The TDA1020 produces lovely sound into a large loudspeaker. The quiescent current is around 30mA and I think you may see this chip in further 'RJV projects! And perhaps some of yours too?

PW

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Valve Vintage

Judging by the huge pile of old PWs on the counter - it's Phil Cadman G4JCP's turn to look after the vintage wireless 'shop'. And this month Phil takes a look at the work of F. G. Rayer G3OGR - one of PW's most prolific authors from the past.

Hello again! I hope you all had a good Easter. But now, it's straight down to business. Obviously thinking along the same lines as last time, the Editor came along with the suggestion, "what about devoting June's column to re-publishing a receiver design...there's a lot of reader interest in the idea". Well, I'm game I replied!

After rummaging through a pile of old PWs the Editor and I chose a design by the late F. G. Rayer G3OGR, a really prolific author. Entitled '5-Band TRF', the circuit was originally featured on the blueprint included with the December 1966 issue of *Practical Wireless*.

When the design, the circuit is shown in Fig. 1, was first published there were still many Radio Amateurs using amplitude modulation (a.m.). But a.m. has given way to s.s.b. for voice communication in the amateur bands below 28MHz. The only place where you might still find the odd

amateur a.m. transmission is in the 1.8 and 3.5MHz bands (the latter where the specialist vintage military collectors operate).

Whilst it's possible to receive c.w. transmissions by allowing V1 to oscillate in Fig. 1, you should avoid this! Without an r.f. stage to isolate the antenna from the detector the set will radiate - very well indeed if connected to a good antenna.

The Circuit

The diagram, Fig. 1, shows the circuit diagram as it appeared on the 1966 blueprint. It's a fairly standard regenerative detector followed by a simple two-stage audio amplifier.

The detector stage uses the then popular Denco 'Green' range of miniature coils. These were (and still are - see below) available in five frequency ranges.

The three coils most appropriate for this design are: Range 2, 515 - 1545kHz; Range 3, 1.67 - 5.3MHz and Range 4, 5.0 - 15MHz. The coils are very easy to use being wound on formers that plug into a B9A valve holder.

It is, of course, perfectly possible to wind your own coils but be prepared for a bit of trial and error. The inductance of the tuning winding (between pins 2 and 5) should be around 270 μ H for range 2, 27 μ H for range 3 and 3 μ H for range 4. Out of these, range 4 (5.0 - 15MHz) is the most appropriate for s.w. broadcast listening. That one coil will cover the 49, 41, 31, 25, 22 and 19 metre broadcast bands.

The antenna coupling coil (between pins 8 and 9) needs to have around half the number of turns of the tuning winding and it should be wound over the 'earthy' end of the tuning winding.

The reaction winding (between pins 3 and 4) only needs about 30% of the number of turns of the tuning winding. But this time it should be wound to one side of the other two windings.

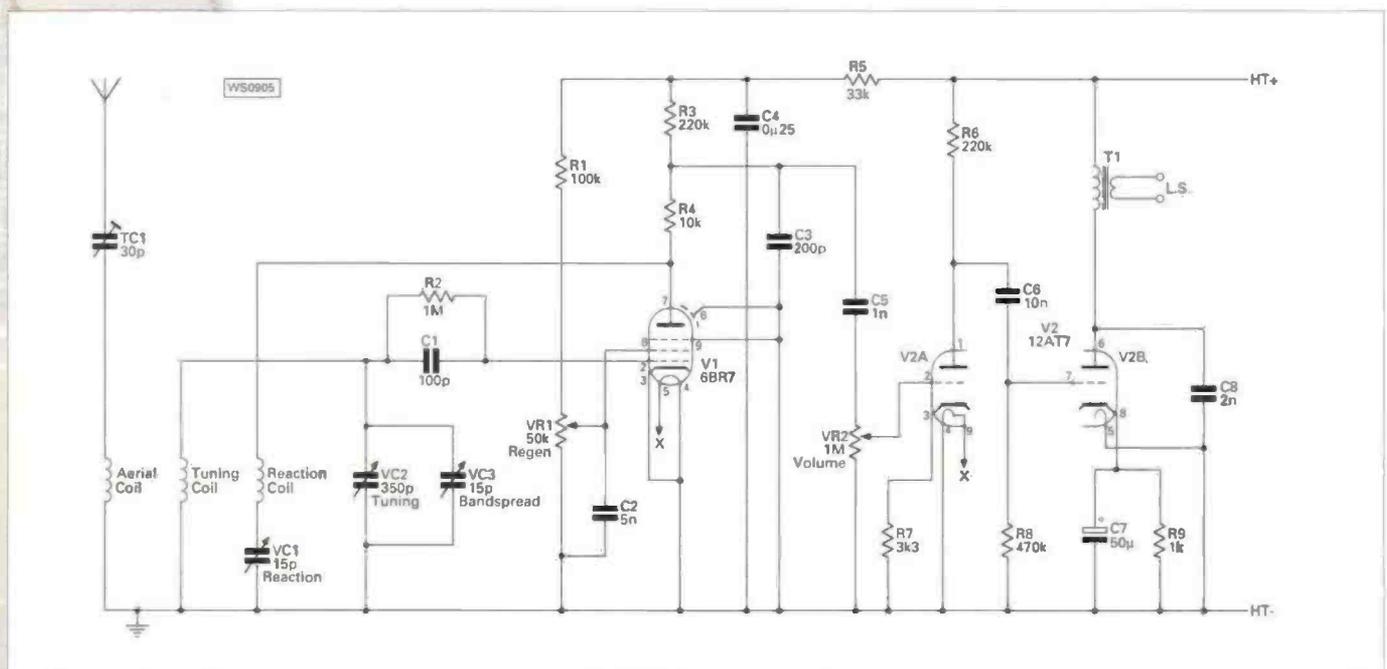
When the receiver is operating try reversing the connections to the reaction winding. Leave the connections whichever way gives the smoothest reaction.

The trimmer, TC1, acts as an r.f. attenuator for when signals are very strong. The bandspread capacitor, VC3, can be omitted if either a slow-motion drive is fitted to VC2 or the receiver is only used on the m.w. band (range 2).

Components & Valves

You should have no problem in obtaining components or a 12AT7 valve. The European equivalent of this valve - the ECC81 - was used in valved television sets so try asking

Fig. 1: The G3OGR two valve receiver project from a 'blueprint' design originally published in 1966 (see text).



anyone who has a junk box before buying new.

In contrast, the 6BR7 is not particularly common but it is available from regular *PW* advertiser **Langrex Supplies**. It's actually a low-noise pentode intended for use in the early stages of high-gain audio amplifiers.

There's only one direct equivalent for the 6BR7 as far as I know, and this is the 8D5. The EF80 r.f. pentode, another favourite of TV set designers, is pin-compatible with the 6BR7 although its characteristics are significantly different. But, if you have one, by all means try it. The same applies to the EF184.

The output transformer, T1, might well be one of your biggest problems. It ought to have a ratio of 40:1 or more for best results, that's assuming an 8Ω loudspeaker.

New valve output transformers are available but can be a little expensive. One source is **Savoy Hill Publications** - see the classified advertisements at the back of *PW*.

The audio output transformers that were fitted in valved TV sets would work well in this receiver. You could also try a scrap television field (frame) output transformer. The turns ratio might not be correct but at least it would be free.

Another alternative would be to use a small mains transformer as the output transformer. Try one with a 240V primary and a 3 or 6V secondary rated at 6VA or more.

Unfortunately, there is a risk that any d.c. flowing in the primary will lower the primary inductance and cause distortion. However, the current passing through V2B is too low for this to be much of a problem.

Power Supply

The original power supply is shown in Fig. 2. However, any p.s.u. capable of delivering 200-300V at 10mA, plus 6.3V at 0.5A, will work fine.

The near-unobtainable choke, Ch, can be replaced by a 2W resistor. Begin with a value of 10kΩ and adjust for an h.t. of 250-300V. If you just happen to be knee-deep in surplus television type transformers, you can use the primary winding of either an audio output or field output transformer instead. (Remember to leave the secondary open circuit). Only use real metal rectifiers for MR1 and MR2 if you want authenticity. In all other cases they should be replaced by 1N4007 silicon rectifiers.

The mains transformer, T2, would ideally be a surplus type salvaged from some old valve equipment. Failing that, **Maplin** stock a rather generously rated h.t. (with heater winding) transformer, stock code XP27E.

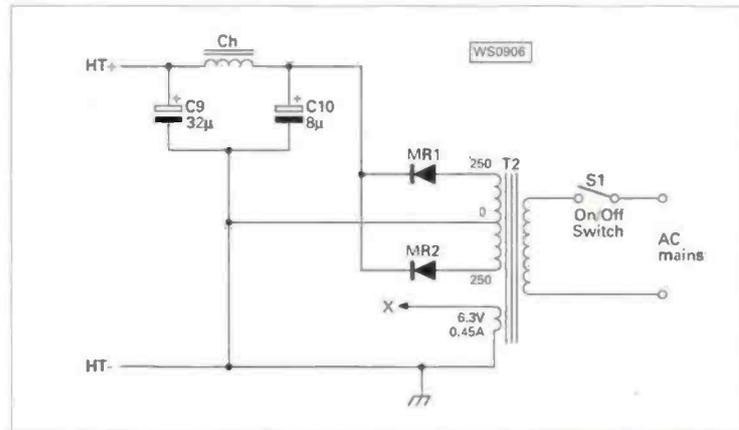
But if you already have a 6V transformer for the valve heaters - even a 3VA type will do - then Maplin's 12VA mains isolation transformer, stock code LW33L, would be a cheaper alternative.

Any transformer that has a single h.t. winding - like the two Maplin types I've mentioned - will need four 1N4007 rectifiers wired in a bridge configuration to give full-wave rectification. However, the h.t. current requirement is so low you can easily get away with half-wave rectification using just one 1N4007. But remember, this will double the ripple voltage across C10 and might lead to more hum on the audio.

Now, this is most important; please put a 1A fuse in series with the on/off switch S1, and put a 100mA time delay type fuse in series with the h.t. secondary. If you use a centre-tapped transformer, as shown in Fig. 2, you can put the fuse in series with the 0V tap. But ideally you should use two 100mA fuses, one in series with each rectifier.

Whatever h.t. transformer you use, you are likely to end up with more than the required 250V h.t. This is due to a combination of the poor regulation of small transformers, the low h.t. current required and the incredible efficiency - compared to high vacuum valve and metal rectifiers - of silicon rectifiers.

If you do find the h.t. is higher than 300V, put a resistor in series with the choke, Ch. Be prepared to try various values and don't use less than 2W types because of the Practical Wireless, June 1998



high working voltage that's required in this part of the circuit.

Fortunately, the other resistors are no problem; 5% tolerance, half-watt metal-film or carbon-film types will be perfectly adequate. For example, Maplin's 'Metal Film 0.6W' range. And you can also happily use a standard carbon potentiometer for variable resistor VR1.

Choice Of Capacitors

Turning to the choice of capacitors now, both C1 and C3 need to be mica. Again, try Maplin's 'High Stability Silvered Mica' range. Maplin don't stock a 200pF component so use 220pF for C3.

Suitable high-voltage electrolytic capacitors are readily available but you'll probably have to use a 10µF capacitor for C10 and a 47µF capacitor for C9. Neither 8µF nor 32µF are preferred values these days and for safety, keep to 450V types.

The value of the cathode bypass capacitor, C7, isn't critical; anything from 47µF upwards will do. And the 6V working voltage isn't a misprint - it only has a few volts across it.

All the remaining capacitors can either be polyester or polypropylene, even paper. And none of the values are critical. The only thing to watch for is their voltage rating; only use capacitors with a working voltage of 400V or more.

And be sure to thoroughly test junk-box capacitors for capacitance and leakage before using them. Very low leakage is particularly important with regard to C5 and C6, the audio coupling capacitors.

Best Results

To get best results both VC1 and VR1 need careful adjustment. Initially, set TC1 at maximum capacity and VC1 at half to two-thirds closed. Then increase VR1 from zero until oscillation is heard whilst tuning through a transmission. Now back off VC1 until oscillation stops.

I've found that the best way to adjust this type of regenerative detector is to set VR1 for best demodulated audio quality and use VC1 as the reaction control. With strong stations reduce the capacitance of TC1. This will attenuate the input signal and so still allow sufficient regeneration to produce adequate selectivity.

In addition, reducing the capacitance of TC1 will decrease the loading effect of the antenna on the tuned circuit and also help increase selectivity.

Once correctly adjusted VR1 need not be moved unless stations of wildly varying strength are received. Conversely, VC1 needs to be adjusted in sympathy with VC2 so as to maintain the required level of regeneration. Tuning this sort of set is definitely a two-handed job!

Oh dear, no more space. So, cheerio until it's my turn 'in the shop' again. Let me know if you decide to have a go with the 1996 project, and as usual, please send your comments and letters to me either via the *PW* offices, via E-mail to phil@oldpark.demon.co.uk or direct to: 21 Scotts Green Close, Scotts Green, Dudley, West Midlands DY1 2DX.

PW

Fig. 2: The original power supply - using metal rectifiers. See text for comments and the advised use of modern silicon rectifiers.

Denco Coils

Denco coils are once again available. For current pricing and availability contact them at: Denco (Clacton) Limited, 259/265 Old Road, Clacton-on-Sea, Essex CO15 3LU. Tel: (01255) 422213. Please remember to enclose an s.a.s.e. when writing.

PHIL G4JCP TAKES A LOOK AT THE WORK OF A PROLIFIC *PW* AUTHOR FROM DAYS GONE BY

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Icom IC-R7000 Wideband HF/VHF/UHF receiver ALL MODE, built-in PSU	£499.00
Yaesu FRG-100 General coverage receiver (MINT COND) with PSU	£349.00
Lowie HF-150 General coverage receiver (AS NEW) c/w interface & software	£299.00
Trio R600 General coverage receiver (ideal starter rig)	£199.00
NRD-535 General coverage receiver (AS NEW)	£699.00
Top of the range receiver	£699.00
Icom IC-R710E General coverage receiver, built-in PSU (SUPERB UNIT)	£479.00
Kenwood R5000 General coverage receiver fitted with VHF unit (ALL MODE), CW hat & manuals	£649.00
AOR-3000 Wideband receiver, ALL MODE, computer controllable	£429.00
AOR-3000A Wideband receiver, ALL MODE, computer controllable	£529.00
Realistic DX-394 General coverage receiver, ALL MODE	£99.00
Yaesu FRG-7 General coverage receiver c/w Digital Display	£99.00
Yupiter VT-1251 Airband handheld receiver (EXCELLENT RECEIVER)	£109.00
Alinco DJ-X1 Wideband handheld scanning receiver	£139.00
WIN-108 Civil Airband handheld	£89.00
Nevada MS-1000 Wideband receiver AM/FM/WFM (Mobile/Desk)	£179.00
AOR-1500 Wideband handheld receiver (ALL MODE)	£149.00

VHF/UHF TRANSCEIVERS	
Yaesu FT-290RII 2M Multimode c/w matching 25W linear carry case box & manual	£430.00
Yaesu FT-290RII 2M Multimode	£375.00
Yaesu FT-290RII 2M Multimode	£239.00
Yaesu FT-4700 2M/70cms mobile	£279.00
Kenwood TM-431E 70cms mobile	£239.00
Kenwood TM-701E 2M/70cms mobile	£299.00
Kenwood TM-411E 70cms mobile	£189.00
Alinco DJ-500E 2m/70cms handheld, wideband receive	£199.00
Alinco DJ-F1E 2M handheld	£149.00
Alinco DJ-180E 2M handheld (AS NEW)	£139.00
Kenwood TH-215E 2M Handheld c/w speaker mic	£129.00
Kenwood TH-28E 2M handheld c/w speaker mic, case	£129.00
Trio TR-9000 2M Multimode 10W	£199.00

ACCESSORIES	
20W Dummy Load	£49.00
TM-1000 1kW antenna tuner	£85.00
LAR VHF ATU	£39.00
Datong FL-3 Filter	£85.00
Starmaster Automatic Keyer	£39.00
Ditna CNW-419 500W ATU with SWR meter	£85.00

MULTICOMM 2000 01480 406770

HF TRANSCEIVERS	
DRAKE TR-7A + PSU	£575.00
ICOM IC-706 MK I AS NEW	£599.00
ICOM IC-706 MK I AS NEW	£599.00
ICOM IC-725 AS NEW	£479.00
ICOM IC-725 AS NEW + CW FILTER	£599.00
ICOM IC-735 (BOXED)	£499.00
JRC JST-135-ATU AS NEW	£999.00
KENWOOD TS-180S GOOD CONDITION	£325.00
KENWOOD TS-450SAT GREAT COND.	£495.00
KENWOOD TS-570D + CW + TAXCO (EX-DEMO)	£995.00
KENWOOD TS-850SAT MINT COND	£869.00
KENWOOD TS-850SAT GREAT COND	£799.00
SWAN LINE UP INCLUDING 3-TX/RX	£375.00
TRIO TS-520 HF TRANSCEIVER	£189.00
YAESU FT-1000MP AC NEW ON SHOW	£1,850.00
YAESU FT-747GX AS NEW	£359.00
YAESU FT-890 WITH ALL OPTIONS	£799.00
YAESU FT-900 1-WEEK OLD	£659.00
YAESU FT-930 ALL OPTIONS (EX-DEMO) NEW	£1,100.00

VHF/UHF TRANSCEIVERS	
ALINCO DJ-191 2-MTR. HAND HELD	£110.00
ICOM IC-290E 2-METRE MULTI-MODE 25W	£249.00
ICOM IC-290E 2-METRE MULTI-MODE 25W	£199.00
ICOM IC-2E 2MTR HANDHELD	£90.00
ICOM IC-2UE 2-MTR HAND HELD	£100.00
ICOM IC-475 70CMS MULTIMODE	£359.00
ICOM KC-16T 70CMS HANDHELD AS NEW	£110.00
ICOM ICW-21-ET DUAL BAND HANDIE	£199.00
KENPRO KT-22 2-METER HAND HELD	£70.00
KENWOOD TH-26 + ACCESSORIES DUAL BAND	£169.00
KENWOOD TH-28E DUAL BAND	£175.00
KENWOOD TH-48E 70CMS HANDHELD	£140.00
KENWOOD TH-79E HAND HELD	£245.00
KENWOOD TM-201A 30WATT 2-METER FM	£129.00
KENWOOD TM-2550A MOBILE	£175.00
KENWOOD TR-751 2-MTR MULTIMODE	£325.00
KENWOOD TS-730 VHF/UHF BASE	£399.00
STANDARD C-508 (EX-DEMO)	£199.00
YAESU FT-109 2-METER HAND HELD	£129.00
YAESU FT-211 2-MTR. MOBILE	£115.00
YAESU FT-230 30WATT 2-METER FM	£89.00
YAESU FT-230 2-MTR. HANDHELD	£110.00
YAESU FT-290K MK-1 MULTIMODE	£199.00
YAESU FT-300M (3-WEEKS OLD)	£335.00
YAESU FT-408 (MINT CONDITION)	£269.00
YAESU FT-408 (BOXED)	£259.00
YAESU FT-726 2700HF	£269.00
YAESU FT-726 2700HF/SAT	£550.00
YAESU FT-727B DUALBAND WITH ALL ACCESSORIES	£199.00

ACCESSORIES	
BOHSEI 6-METER 70WATT LINEAR	£79.00
DAVIS WEATHER STATION	£110.00
DEWSBURY ELECTRONIC'S MORSE TUTOR	£15.00
ICOM AT-100 AUTO ATU MINT	£145.00
ICOM IC SP-3 SPEAKER	£60.00
ICOM PS-15 20-AMP PSU	£70.00
KENWOOD PS-30 PSU	£70.00
KENWOOD PS-31 PSU	£109.00
KENWOOD SP-31 SPEAKER	£51.00
KENWOOD TL-922 LINEAR	£999.00
LAFAYETTE GDO	£25.00
MICROWAVE MODULES 30V/144 LINEAR	£89.00
REVEX-WS-70 1.6 to 1300MHz SWR/PWR METER	£90.00
SHURE 444 MICROPHONE AS NEW	£55.00
TIMEWAVE DSP4	£125.00
TOKYO HF LINEAR (COST £1779.00 6-MONTHS AGO)	£749.00
MARION'S FILTERS	from £20.00
WATSON DUAL BAND LINEAR 270 3W IN/PUT	£95.00
WELZ SP-122 HF SWR POWER METER	£50.00
WELZ SP-15 SWR/PWR + AC 38M ATU	£55.00
YAESU FC-901 300W ATU	£99.00

PLEASE MENTION TRADERS' TABLE WHEN ENQUIRING ABOUT ANY ITEMS ON THESE PAGES!

Radio Scene

AUSSIE ORACLE

LETTERS AND REQUESTS FOR TOPICS YOU'D LIKE COVERED TO ME PLEASE.

CHRIS EDMONDSON VK3CE,
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AUSTRALIA

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WE WELCOME A NEW COLUMNIST TO 'RADIO SCENE' THIS MONTH IN THE SHAPE OF CHRIS EDMONDSON VK3CE. CHRIS WILL BE WRITING FOR PW ON A QUARTERLY BASIS AND WILL BRING US NEWS AND VIEWS FROM THE AUSTRALIAN AMATEUR'S POINT OF VIEW.

G'Day from Downunder! I'm writing to you from sunny Australia, an antipodean land where the bands are quiet and the parties are rowdy. I understand it works the other way around 'up there', which may explain why, from my perspective, you all appear to be standing on your heads!

My ancestors showed remarkable good sense and migrated here many years ago. However, although she was born here, my grandmother always called England 'home', and instilled in me a great and as yet unsatisfied curiosity about your land. One day I hope to visit you to find out where my people came from, but the main idea of this column is to tell you a bit about my home, and of the radio exploits we get up to here.

I guess I'm Rob Mannion's opposite number in Australia, as I am fortunate to be the Editor of the largest circulating hobby radio magazine in this part of the world. I took over as Editor of *Amateur Radio Action*, as it was then known, back in 1986. These days we call it *Radio and Communications*, and one cannot help but marvel at and worry about the pace and amount of change in those 10 or so years.

AUSTRALIAN SCENE

The radio scene in Australia is quite interesting to observe. In most ways, of course, Amateur Radio here is very similar to your own, but in other ways Australia has quite unique communications obstacles and needs, and this tends to colour its general perception.

For instance, I can attach a very

large h.f. antenna to my car, a thick and heavy 3m or so long black antenna with a spiral-wound tuning 'wander lead' running half its length and, once out of town, nobody gives it as much as a second look. Try that in Europe!

The bands are relatively quiet here, because there's nothing like the level of industrial noise and QRM, but there is also far less activity due to the far lower number of amateur operators in this part of the world. Being about as far as you can get from Europe, your signals are pretty well attenuated by the time they get here, all of which means the background noise is very low.

Also Australia has some of the world's toughest regulations for clean emissions and r.f.i. suppression, which also pays handsome dividends for the radio hobbyist. Every item of electronic equipment sold here these days must comply with savage r.f.i. constraints, too.

The world's largest island is really quite huge in European terms, but while its people are well dispersed in terms of density per square kilometre and in stark contrast to the figures, most people tend to live in cities on the fertile coast. This means the arid outback is notable for having very, very few permanent residents.

Australia's total population is just over 18 million, and its total amateur licence database extends to just over 18,000 and many of those are repeaters or beacons, or individuals like me who have more than one callsign. An educated guess would estimate there's about 16,000 individual licensees and no more than about 13,000 VK calls in active use (even that is a number which really hasn't grown for many years).

About 5% of our calls are relinquished each year, mainly through death. Happily, almost exactly the same number of new licensees hit the air each year, but the fact remains that there has been no real growth in our numbers for several years. The average age of amateur licensees in this country is now 52 years.

REPRESENTATIVE BODY

Our representative body, our equivalent of the RSGB, is the **Wireless Institute of Australia** (WIA), which has been around since 1910. I always try to support the WIA and encourage all VK amateurs to maintain their membership in it, but at a sliding fee scale of up to about Australian \$70 per year (around £30 or so), its membership

has been in steady decline for many years. Today, the total member base has dropped to below 5000, roughly 26% of licensees, and it continues to drop alarmingly.

In fairness, I should point out that our society's falling membership is a far from unique situation. The RSGB has seen a

NEW COLUMN

similar pro rata decline in membership and I sometimes wonder if the decline in our representative societies might be an indicator to the general health of Amateur Radio in global terms.

It's actually a quite simple equation here as the 5% per annum loss is very probably the 'silent key'. It would seem that 'new chums' are yet to be convinced of the value of supporting a national federation.

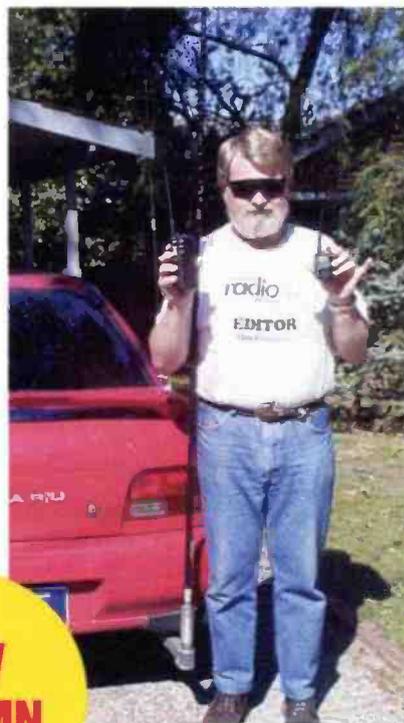
Okay, so what's the story with Amateur Radio in Australia? Perhaps we should go back to a quick look at the troubled WIA first...

I think the WIA has a somewhat clumsy structure which, sadly, appears to be working against its own best interests. All government and international representation is handled by a federal office currently located in Melbourne, Victoria. (Mind you, the federal seat of government is in Canberra, about 700km away!)

The federal office is responsible for liaison and publishing activities, and comes under the control of a board of directors made up from one representative from each 'division'. The divisions have simple geographical boundaries, the state and territory borders. Each director has one vote to cast.

New South Wales (NSW) and Victoria are the states with the highest populations and they also have the greatest number of amateur operators. In fact, between them, these two states have more than half of Australia's total amateur population, yet they get only two-sevenths of the say.

This means that the members living in the Australian Capital Territory, home of the nation's capital city Canberra (and about the size of a decent outback farm!),



Practical Wireless welcomes Chris VK3CE as a regular columnist to 'Radio Scene'.

collectively have precisely the same voting power as all the WIA members in NSW. Of course, that would be completely fair were there not a small discrepancy in the arithmetic. Neither VK1, nor VK7 (Tasmania) can boast even as many as 200 WIA members, whereas the VK2 and VK3 divisions are many times that size.

Now, I don't know about you, but I believe that amateur operators around the world need effective and regular lobbying at the highest government levels if we are not to lose our hard-won privileges. It's so easy for our politicians to be swayed by the slick and professional presentations employed by corporate spectrum-hunters, we must keep our guard up at all times.

I don't really believe that we can forever sit back on our exalted status as amateurs. One day all that will change. Look at the recent loss of privileges for amateurs in Guatemala, where the entire 70cm (430MHz) band has gone forever.

LUCKY OPERATORS

I have to admit that Australia's Amateur Radio operators are among the luckiest on Earth. Our licence conditions are generous, and our bands more so. In future columns I should be able to make you good and jealous about some aspects of amateur radio in Australia... so why not whip out and join us!

To start with, anyone can listen to anything they like. Any frequency, any mode, anytime. The sole limitation from a reception point of view is that the country's telecommunications regulations forbid listening to telephone traffic, so cordless and analogue cellular

Australian law is such that Chris has a very large h.f. antenna attached to his car and nobody sees it a second look!



calls are off limits. Anything else, though, go for it! This means the commercial equipment manufacturers give our amateur gear some very wide frequency coverage indeed.

Most of the v.h.f. and u.h.f. transceivers sold here cover literally hundreds of MegaHertz on receive. This I find particularly useful for those times when I take advantage of our balmy weather and head off for a walk at two or three in the morning, clutching a hand-held radio!

The quoted specifications rarely reflect what our radios will do and while the sensitivity may drop off as you wander around the spectrum at will, at least we can legally do these things! While we don't have your 4m band (70MHz), our 2m (144MHz) primary allocation is 4MHz wide (144-148MHz) and 70cm 430MHz is a full 30MHz wide (420-450MHz).

LICENCE GRADES

Australia has several grades of amateur licence and those in the know can usually tell the various grades based on the callsign allocated. The top level is generally known as the 'full call', which means its holder has passed three examinations, one in each of theory, regulations and Morse Code. The regulations test is common to all grades of 'ticket', while both theory and Morse are tested at two levels of skill.

The full call (Amateur Operator's Certificate of Proficiency) gives access to all bands and modes at a maximum power level of 400W (120W on carrier modes). The Intermediate class of licence has full theory combined with the slower Morse and gives h.f. access to 80 (3.5), 15 (21) and 10m (28MHz) only, at a power level of 100W.

These amateurs can also operate on all v.h.f. and above bands at the maximum 400W allowed in this country.

Next come the two grades of Novice licence. These have a more basic theory test and only one has a Morse test, held at 5p.m. The Morse-qualified Novice can operate on the same three h.f. bands as the Intermediate licence-holder, but cannot use f.m. on 28MHz.

Morse-qualified Novices also have access to restricted parts of 144 and 430MHz for f.m. voice operation. The non-Morse Novice operator has access only to 144 and 430MHz.

Are you with me so far? There's one more class of licence and it showed that Australia was prepared to lead the way when, back in 1955, it introduced the world's first code-free amateur licence.

The code-free licence is called the Amateur Operator's Limited Certificate of Proficiency (AOLCP). It allows suitably-qualified operators who have passed the full theory and regulations tests exactly the same privileges as a full call operator, but only on frequencies above 29MHz.

So, to summarise, theory is tested at two proficiency levels. There's a Novice-level test or the full call test.

The one-level regulations test must be passed by all licence applicants. Morse is examined at two speeds, either 5 or 10w.p.m. and sending in the test is restricted to a basic hand key only.

When I sat for my licence quite a few years ago, the test was conducted by officials of the Postmaster-General's Department. However, all licence testing these days is conducted by private individuals and organisations on behalf of the WIA Exam Service, which conducts all amateur licence testing on behalf of the government.

If anything, testing is more thorough and more carefully observed than ever before, but the service has certainly come in for its fair share of criticism over the few years since its formation. It has managed to survive this well and continues its work to a high standard. It's just that there's not enough people coming along to take the tests!

Perhaps it's high time the amateurs of Australia took collective stock of their situation. We have an extraordinarily generous access to precious spectrum, yet the amateur service is not the flourishing, vibrant and jubilant collection of people it once was.

Should we blame the Internet? Perhaps, to a degree. It's very difficult to give or form of 'wireless' communication the sort of significance that today's computer

equipment has in schools.

There were no computers in schools when I was a student, but my school had an active Amateur Radio club. What about approaching your local secondary college and introducing the school to the wonders of wireless? It's precisely the program I'm about to start pushing in this country.

I believe that amateurs right around the world need to find new ways to promote this fabulous hobby, to share with the young the very real sense of excitement and accomplishment that Amateur Radio can and should bring!

I'M AFRAID THAT'S ALL I'VE GOT FOR YOU THIS TIME, SO UNTIL SEPTEMBER ALL THE VERY BEST TO YOU AND YOURS.

73 Chris VK3CE

VHF REPORT

REPORTS & INFORMATION BY THE LAST SATURDAY OF EACH MONTH.

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THIS MONTH DAVID BUTLER G4ASR HAS NEWS OF VHF SIGNALS BEING HEARD OVER A 5300KM TROPO PATH AND DISTANCE RECORDS ON THE 2.3 AND 47GHZ BANDS PLUS ALL YOUR USUAL PROPAGATION REPORTS.

Anyone thinking of attempting the Transatlantic Challenge (the first stations to complete a two-way terrestrial contact on the 144MHz band between Europe and North America) should note the following news sent to me by **Emil Pocock W3EP**.

The Pacific Ocean between the west coast of the USA and Hawaii has for years provided a surface duct (at certain times of the year) which supports contacts on the 144MHz through to 5.6GHz bands at distances of between 3700 to 4330km. There has always been good reason to think that these distances could be extended, perhaps considerably. This speculation has recently been given a huge boost by a report from **Shel Remington N16E** on Hawaii.

Shel has been monitoring the band 11 f.m. broadcast band for several years for signs of stations from the mainland. On February 13, around 0420UTC, he began hearing a Spanish language station on

89.5MHz which he later concluded must be XHME from Jalisco, Mexico.

Within an hour, Shel found XHPVA (90.3MHz) also from Jalisco and XHMZO (92.9MHz) from Manzanillo. These are Pacific coast cities between 5200 to 5300km from Hawaii! These are surely among the longest reports of tropospheric ducting anywhere in the world and the implications of this report are obvious. The next step is to encourage some dedicated v.h.f. operators along the Mexican coast to take advantage of future occurrences of such ducting as this probably is not a one-time event.

I'm not certain if similar climatic conditions exist across the Atlantic Ocean between the UK and Canada/USA but I think it is entirely feasible. After all many UK operators, including myself, have made tropo contacts on the v.h.f. bands to stations in the Canary Islands some 3000km away. (The existing European tropo record on the 144MHz band is held by **GM0KAE** and **E8BML** at 3264km. On the 430MHz band it's with **GW8VHI** and **E8BXS** for a 2786km contact and on the 1296MHz band the record is held by **G6LEU** and **E8BXS** for a contact over a path length of 2617km.)

TRANSATLANTIC BEACONS

To facilitate the reception of signals across the Atlantic Ocean a number of transatlantic beacon stations have or are in the process of being set up. Those on the European side include **E8BVHF (IL28)** on 144.402MHz, **OY6VHF (IP62)** planned for 144.402MHz, **E12WRB (IO62)** on 144.403MHz, **EA1VHF (IN53)** on 144.404MHz, **FSXAR** on 144.405MHz and a planned UK beacon (possibly **M1A**) on 144.407MHz. All of these are located on the coast with a clear take-off to North America.

It's not all one-way traffic however. **Serge Szpilfogel VE1KG** passes on the news that Saint Mary's University, Nova Scotia (FN84) are now running a 250W beacon on 144.300MHz.

The antenna system consists of 4 x 10-element Yagis, horizontally polarised and vertically stacked on a 20m tower a few hundred metres from the Atlantic Ocean. The use of 144.300MHz will be re-evaluated later in the year.

EARTH-MOON-EARTH

Ivo Chladek ZS6AXT has sent me details of recent earth-moon-earth (e.m.e.) contacts he has made on the 2.3GHz band. In the Dubus/REF contest on March 7 he worked **F1ANH**, **HB9SV**, **IK2RTI**, **JA4BLC**, **OK1KJR**, **OZ4MM** and **W5LUA**.

On March 8 Ivo worked **W8WZG** and **GW3XYW** for the first **GW-ZS** contact. This QSO with **Stewart Jones GW3XYX** needed to be arranged as the 2.3GHz band is not harmonised throughout the world.

In the UK the 2.3GHz band

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starts at 2310MHz, with e.m.e. activity taking place between 2320-2320.025MHz. In South Africa (and other parts of the world) the e.m.e. activity is conducted just above 2304MHz. (The bottom 20MHz of the 2.3GHz band were removed from amateur usage in the UK a few years ago.)

On March 14 Ivo had an e.m.e. schedule with the station of **Charlie Justinak W7G8I** which resulted in a new world record distance of 16080km. Charlie's signals were 579 at the QTH of ZS6AXT despite local screening caused by an antenna tower.

Ivo runs about 100W output in the shack and after cable losses measures about 65W at the feedhorn. The antenna is a 5m dish (shown in Fig. 1 but fitted on this occasion with a feed system for the 430 and 1296MHz bands).

Two contacts with OE9ERC and OZ4MM have been made with only 8W at the feed-point and the station of L8BLF, who only runs 16W, has been worked on a number of occasions. Although Ivo has only been on 2.3GHz e.m.e. for one year he has managed to work 25 stations in 19 countries! Finally Ivo mentions that this is his fourth band on which he has been active on e.m.e. (144, 430MHz, 1.3, 2.3GHz) and that very soon he will be fully operational on the next band up, 5.7GHz. Congratulations!

MICROWAVE RECORD

Now to some news received from **Steve Davies G4KNZ**. On October 25 1997 the stations of G4KNZ/P and **Roy Emery G3FYX/P** worked each other over a 65km path on the 47GHz band for what is believed to be a new UK record. Roy G3FYX operated from Charterhouse (IO81PH) and G4KNZ used a site 1km south of Hackpen Hill (IO91CK). Both stations were using 100mW Gunn oscillators and diode receive mixers, provided incidentally by myself from surplus parametric amplifiers. (I had discovered that the pump source in these receive amplifiers actually worked at 49GHz and I left it up to the microwave experts to retune them down to the 47GHz amateur band.)

Prime focus dishes of 450mm (G4KNZ) and 350mm (G3FYX) were used for the test, alignment of antennas being carried out on the 24GHz band first. The tests started at 0900UTC on a clear frosty morning with no wind.

At first the signals were quite weak possibly due to lingering mist on the path. By 0945UTC however conditions improved and wide-band f.m. speech signals were exchanged both ways with 55 and 57 reports. Well done Steve and Roy.

SURGE IN ACTIVITY

Last time I reported that propagation researchers were predicting a surge in solar activity over the next few months. They had expected to see an up-swing in solar indices corresponding to the beginning of accelerated sunspot growth.

Well I can tell you that this has indeed happened and during March the Sun became a lot more active. Because of this, there was a noticeable increase in auroral activity in the UK with events being noted on at least 16 days during March.

The DX openings via F2-layer or trans-equatorial propagation (i.e.p.) on the 50MHz didn't reach into the UK but areas of southern Europe, particularly France, Portugal, Spain and Italy were lucky enough to participate in openings to Africa and South America. Conditions via tropospheric propagation on the v.h.f., u.h.f. and microwave bands were generally rather poor during March with no extensive openings being noted.

AURORAL OPENINGS

The majority of the auroral openings were quite small events reaching up to the 50MHz band but back-scatter openings on March 10 & 21 were very good allowing DX contacts to be made on the 50m, 70 and 144MHz bands. The event on March 10 commenced around 1600UTC and lasted for over four hours.

There was also a second weaker phase around midnight. On the 50MHz band a number of UK operators reported making s.s.b. contacts with the stations of ESICW (KO29 Estonia), LA4LG (JO59), LA9VDA (JO59), OZ3ZW (JO54), OZ4VV (JO46), SM3EQY and YL3AG (Latvia).

John Hilton GM1ZVJ (IO86) reports that he has recently moved QTH to Dunfermline and has taken the opportunity to upgrade his 50MHz station. He now uses an Alinco DX-70TH transceiver running 100W p.e.p. into a 5-element F9FT Yagi. During the aurora on March 10 he contacted G1YLE (JO02), G8ECI (JO03), G3VOF (JO01), GM3WOJ (IO77) and GM4WJA (IO87).

Other UK operators known to be active on the 50MHz band included GD3AHV (IO74), GI0UJG (IO64), MM0AMW (IO75) and GW0GEI (IO73). The station of GM4WJA was also active on the 70MHz band making a number of contacts into central England.

Activity on the 144MHz band was generally restricted to c.w. although the station of G16ATZ (IO74) was heard making a few s.s.b. contacts. The best DX reported was probably that of LY2SA (Lithuania) who was putting a good

c.w. signal into central England. At the QTH of **Dick PA3FJY** (JO32) a total of 14 c.w. contacts were made with stations located in DL, F, ON, OZ and PA.

On Saturday March 21 a major geomagnetic storm began shortly after 0900UTC and lasted for the next 12 hours. The probable cause for this storm was a coronal mass ejection (c.m.e.) which occurred some five days previously on March 16.

Activity was first noticed on 49MHz (Band I television) as early as 1400UTC but it took nearly an hour before activity levels built up on both the 50 and 144MHz bands. By 1700UTC it was all over but by that time a reasonable amount of DX had been worked on both bands.

Auroral signals were heard at the QTH of GM1ZVJ around 1500UTC and in the next one and a half hours John contacted 13 stations on the 50MHz band.

John's s.s.b. contacts included LA0HB (JO28), ON8MC (JO21), SM3EQY (JP81), four GM stations and six G stations in locator squares IO81, IO83, IO94, JO02 and JO03. John mentions that the GB3RMK beacon (50.060MHz) went auroral again around 1930UTC but no other signals were heard at this time.

The station of SM3EQY (JP81) is situated in an ideal location for

auroral openings. At his northerly QTH in central Sweden auroral openings are detected far more frequently and last much longer than events experienced by stations located in central Europe. He first noticed auroral sounding signals on the 50MHz band at 1330UTC and then went on to make s.s.b. contacts with stations located in OH, OH0, OZ, SM and SP. At 1456UTC he worked his first UK station, G8ECI (JO03), signals being 57A both ways.

Contacts then followed with G0JHC, G3JHM, G3SYC, G4FVP, G4OBK, G4PCI, G4VPD, G6DOX, G6EGM, G6YIN, GJ4ICD (his best DX of the event at 1780km), GM1ZVJ and GW3JXN. In total SM3EQY made 27 s.s.b. QSOs on the 50MHz band with stations in 11 countries and 21 locator squares.

Moving now to the 70MHz band and your reports show that there was a little DX activity to be found. Stations known to be active during the event included G3NKS (IO91), G4SEU (IO92), GM3WOJ (IO77) and GW3MHW (IO72).

It is unfortunate that the 70MHz band is only allocated to UK prefixes, Eire (EI), Gibraltar (ZB),

South Africa (ZS) and Cyprus (5B4). The DX capabilities via aurora are therefore very limited. This situation may change in the future if more European countries are allowed access to the band but for the time being the only auroral contacts that can be made are restricted to the UK.

Activity on the 144MHz band was as usual very good especially as the opening occurred on a Saturday afternoon. All the real DX was of course on c.w. but it was interesting to note that there was also a fair amount of activity on s.s.b. as well. According to the DX Cluster system contacts were being made from the UK with stations located in DL, EI, F, LA, ON, OZ, PA and SM.

A report from **Peter DF8IK** (JO30) mentions that he worked GM0CLN (IO85), GM0TGC (IO87), GM4AFF (IO86) and heard G4DHF (IO92) very strongly. Peter runs an Icom IC-275E transceiver, a 400W amplifier and an 11-element Yagi.

Colin Smith GM0CLN also uses an Icom IC-275E transceiver driving a 100W solid state amplifier and a 14-element MET Yagi. Late in the afternoon of March 21 he noticed some reports of a tropo opening on the DX Cluster.

Colin turned his beam to the south and started listening for any DX via that propagation mode.

Almost immediately he heard several stations via the aurora off the back of his beam.

Moving the antenna to the north-east Colin then commenced to work a string of stations on c.w. contacting stations in DL, F, G, LA, ON, PA and SM. Normally he stays on c.w. but on this occasion Colin noticed that the auroral distortion was minimal and that the use of

s.s.b. was quite efficient.

Apart from two DL and PA stations all s.s.b. contacts were with stations located in G, GM and GW. Towards the end of the event Colin switched back to c.w. to finish off his afternoon's total of 33 contacts in nine countries and 23 locator squares.

TRANS-EQUATORIAL OPENINGS

With the exception of auroral back-scatter openings (and meteor scatter) the 50MHz band during March was devoid of any other mode of propagation. Stations in southern France, Portugal, Spain and Italy however continued to enjoy trans-equatorial openings (i.e.p.) to South America and Africa on a regular basis.

From reports received the activity from South America seemed quite low with only the stations of



Fig. 1

LU2EGQ (Argentina), PP1CZ and PY5CC (Brazil) being worked. The low power beacons PY1AA (50.052MHz), PY2AA (50.059MHz) and PY25FY (50.010MHz) running 5W into a groundplane antenna were heard on a number of occasions so the band must have been in a really good shape.

The (almost!) definitive list of stations contacted in the African continent during March includes FR1GZ (Reunion Island), TR8CA, TR8CE and TR8XX (Gabon), TT8IE (Chad), V51C, V51E and V51KC (Namibia), Z21AFR and Z22JE (Zimbabwe), 3C5I (Equatorial Guinea), 7Q7JL and 7Q7RM (Malawi) and 9G1BJ (Ghana). Strictly speaking the contacts from Europe to TR8, TT8, 3C and 9G cannot be t.e.p. as they are all located above the equator.

The propagation may well be some type of E-layer propagation or an ionised scatter mode. The beacons V51VHF, ZD8VHF (Ascension Island) and 7Q7SIX were also heard on a number of occasions.

Contact was also made with stations situated in South Africa, the most active of these being ZR6VE, ZS6AXT, ZS6BTE, ZS6DN, ZS6PJS, ZS6WB and ZS6XJ. However, not all stations situated in South Africa were able to work the DX in southern Europe. Some stations are located on the southerly fringe of the t.e.p. zone in similar circumstances to the UK which is located on the northerly fringe.

Shawn ZR1EV (JF96) reports that whilst operators in the ZS6 call area have been enjoying some spectacular openings to Europe, those in the ZS1 call area (approximately 1700km further south) have only been listening to white noise. Occasionally he has heard bursts of c.w. and s.s.b. signals on 50.110MHz but signals have always been very weak and no positive identification could be made.

Recently Shawn installed a tape recorder to monitor various frequencies in the 50MHz band. On March 14 he set the receiver to 50.040MHz leaving it on during the afternoon. On re-winding the tape he was surprised to identify a short burst of signal from the SV1SIX beacon. Shawn was really pleased as this was the first time he had heard anything further than 1700km since 1992!

In my opinion you should make a note of all the call signs just mentioned as I'm sure UK operators will be working them during the next equinoctial periods in October 1998 and March 1999. I kid you not!

CONTEST ACTIVITY

Now I'll turn to your reports of the 144/430MHz contest held over the weekend of March 7/8. David Dodds GM4WLL (IO85) reports that conditions at his QTH were quite poor on the 144MHz band.

In total David made 61 contacts, well down on what he had hoped for. David uses a Trio TR9130

transceiver, a Tokyo 100W amplifier, a Spectrum masthead pre-amplifier and an 8-element Yagi at 6m above ground level. His best DX of the contest was ON50GRC (JO10) at 775km.

Other DX contacts included ON1DO (JO11), G7RAU and M1BWR (both in IO90), G3YVR and G8OFA (in IO91) and G4PIQ (JO01). He was also pleased to work GI3LLQ/P (IO74) and GI3PDN (IO64). David mentions that he was surprised to hear the PI7CIS beacon at good strength only ten minutes after the contest had ended!

On the 430MHz band David used a Belcom Liner 430 transceiver running 4W into a 24-element Yagi at 5m above ground. Not surprisingly his best DX was only to G4KUX (IO94) at 140km but several Midland stations did report hearing GM4WLL peaking S8. Obviously receiver technology has moved on a long way since the Liner 430 was first built in the early 1970s.

Now another letter from Scotland and this one is from Jim Martin MM1BGI. Jim has spent a lot of time recently upgrading his portable radio system, the biggest addition being a 20m trailer mounted tower.

Gone are the days when putting up antennas meant using scaffolding poles, ropes, gin poles and a lot of luck! Now all it takes is to extend the trailer legs, fix the antennas to the stub-mast, connect the cables and wind-up the tower. All very safe and easy.

Jim reports that conditions on the contest weekend were not good with high winds and roads blocked by snow. Despite this he still used his usual contest site on Mainslaughter Law (IO85).

For the contest MM1BGI/P used an Icom IC-290 transceiver with 24W to a 13-element Cushcraft Yagi. On the 144MHz band a total of 53 stations were worked in 4 countries, the best DX being ON50GRC at 693km.

On the 430MHz band Jim used an Icom IC-706 h.f. transceiver driving a Microwave Modules transverter to 8W output into a 21-element F9FT Yagi. Conditions on this band were very quiet with only 12 s.s.b. contacts being made, the best DX on this band being G0HNW (IO94) at 259km.

That's it again for another month. Don't forget that the PW 144MHz QRP contest is being held between 0900-1600UTC on Sunday June 21. Rules are unchanged from recent years and can be found elsewhere in this issue. Please forward any news, views, comments or photographs of your activities to the address and by the date given at the top of the column.

THANK YOU FOR YOUR LETTERS AND GOOD LUCK WITH THE VHF DX. SEE YOU AGAIN NEXT MONTH.

73 David GAASR

HF FAR & WIDE

REPORTS & INFORMATION (AND PHOTOGRAPHS) BY THE 15TH OF EACH MONTH PLEASE.

LEIGHTON SMART GW0LBI,
33 NANT GWYN,
TRELLEWIS,
MID-GLAMORGAN
CF46 6DB, WALES

TEL: (01443) 710749 (9AM - 6PM)

FAX: (01443) 710789 (9AM - 6PM)

LEIGHTON REPORTS THAT MARCH SAW GOOD CONDITIONS ON ALL OF THE HIGH FREQUENCY BANDS. THE 21, 24, AND 28MHZ BANDS SUPPORTED RELIABLE LONG DISTANCE CONTACTS THROUGHOUT, ACCORDING TO OUR INTREPID REPORTERS.

Welcome to 'HF Far & Wide' and down here in South Wales I've been monitoring the 28MHz band. In particular over the past four weeks, and have logged most parts of the world coming in at varying signal strengths on almost every day.

Perhaps the month of May is the time to get out into the gardens and sort out the antenna farm. Or, as in my case, the antenna allotment! Whatever the case, it seems that propagation conditions are improving steadily, and with good conditions prevailing, even amateurs with modest antennas such as wire dipoles and verticals will be able to work the DX on a regular basis.

LANKAWI ISLAND DXPEDITION

Some news came in via a telephone call from Johnny Melvin G3LIV of his trip to Lankawi Island, Malaysia (AS-058) in early June. Johnny says that he'll be operating on the 14, 18 and 21MHz bands "as long as I can find a friendly tree"! He also states that it's not a 'multi-multi station,' just him and a few watts of c.w.

Johnny will be on Lankawi between the 5 and 13th of June and would appreciate UK stations listening out for him there and giving him a call. He would also like to thank Yaesu, who have agreed to be co-sponsors of the special QSL card for the expedition.

YOUR REPORTS

Space is at a premium this month, so I'll start with the 7MHz band. A warm welcome back to Eric Masters G0KRT of Worcester Park, Surrey, who has been busy working the DX on the band. His log for March shows 5W c.w. contacts with KC1F, N2NU and W3LPL in the USA between 2000 and 2300UTC.

Meanwhile, on the Isle of Sheppey in Kent, Ted Trowell G2HKU lists c.w. contacts with the rare 9M0C (Spratly Islands), 8P9EJ (Barbados) and 5B4AGC (Cyprus) at around 2000. While operating slightly later at 2200UTC brought in P4/K2LE (Aruba Island).

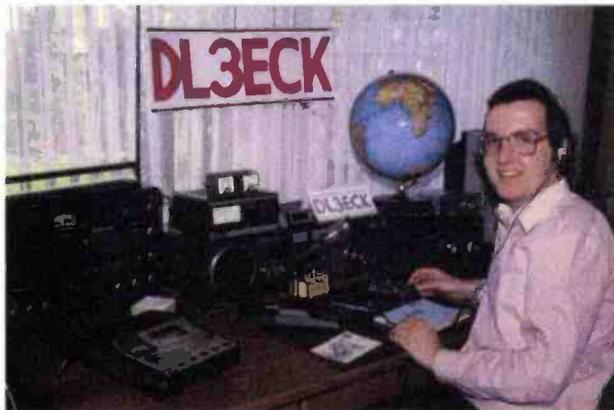
New 'old time' reporter Angie Sitton G0HGA of Stevenage offers a long log of which I can squeeze in but a short selection. Using a 36m long wire antenna and 100W of c.w., she worked 8P9EJ (Barbados) at 2047, WBOX (Texas) at 0700 and RZ9OO (Asiatic Russia) at 2237. Welcome back to 'HF Far & Wide', Angie!

PROPAGATION REPORT

In his monthly propagation report, Don McLean G3NOF of Yeovil says that "Conditions have been good on both 3.5 and 7MHz this month with most parts of the globe being heard."

"14MHz has been staying open until 2200 as we get the longer daylight hours, and I found conditions to the West Indies and south America very good in the evenings. 18MHz has been patchy this month, although it has been open around 0800 on the long path to Australia and New Zealand, then changing to short path at 1000 until 1200.

"On 21MHz, north Americans were often heard strongly between 1200 and 1900. Africans came in during the afternoons, with south Americans during the evenings. 28MHz showed some regular, if



Leighton GW0LBI provided Frank DL3ECK with his first 1.8MHz c.w. QSO.

RadioScene

patchy openings to north America around 1400, while African and south American stations came in during the afternoons".

Thanks for your report Don. Things are looking up aren't they?

THE 14MHz BAND

Don G3NOF's 14MHz band log for March shows 14MHz s.s.b. contacts with FG5FC (Guadeloupe) QSL via F6DZU, P4I2UIY (Aruba Islands), V44NEF (St. Kitts Island), and 9M0C (Spratly Island).

For his 14MHz log s.w.l. Derek Blunden BRS 171057 in Swindon lists s.s.b. reception of V2RP (Antigua Island), JE8BKW (Japan) at 0825, 9H1DF (Malta) at 1350, VE3HBF at 1403, and VU3NAX (India) at 1634UTC.

Down in Skewen, West Glamorgan, comes Carl Mason GW0VSW, who's been QRPing on 14MHz this month. His log shows 5W c.w. contacts with PY2CJ (Brazil) at 0900, EA8/DK7TI/QRP (Canary Islands) at 1737, LU9HRP (Argentina) at 2157, while 4W of s.s.b. brought in LA2NC in Oslo, Norway at 1333UTC.

Another gigantic log again this month from Sean Gilbert G4UCJ in Milton Keynes. Using two power levels of 5 and 25W, he lists c.w. contacts with HF0POL (South Shetland Islands) at 1947, KR8V/C6A (Bahamas) at 2038, W6AX (California) at 1548, KG4ZK (Guantanamo Bay) at 2057. Then he logged EP0MKO (Iran) at 1630, VK4NM (Australia) at 0829, 6W6JX (Senegal) at 2019, and finally a two-way 3W contact with ZL3RG (New Zealand) at 0712UTC. **Editorial comment:** Congratulations Sean - how many 'miles per watt is that?' Editor.

THE 18 & 21MHz BAND

The 18 and 21MHz bands are where Charlie Blake M0AII of Milton Keynes usually 'hangs out' nowadays when on the air. His log shows s.s.b. contacts on 18MHz with EA9IE (Ceuta) at 1018, T77M (Republic of San Marino) at 1233, and SV2CWY (Greece) at 1409UTC.

Tuning up to 21MHz brought Charlie QSOs with 4X1MJ (Israel) at 1116, D2AI (Angola) at 1632 (QSL via CT1EGH), and 9K2/G4NQQ, part of the NBC news crew (QSL via N6LUI).

Don G3NOF lists his s.s.b. contacts on the 18MHz bands with A92GE (Bahrain) QSL via Box 1976, Manama, BV4QC (Taiwan), 5A2IPA (Libya) QSL via ON4APS, and J68BW (St. Lucia).

Angie G0HGA suffered a 'gotaway' in BV7FC in Taiwan on 21MHz (better luck next time!), while Ted G2HKU did well on the

same band with his c.w. reaching out to XA5T (Mexico), VQ9JC (Chagos Islands), ZF2NE (Cayman Islands), 9G5XA (otherwise known as G3XAQ in Ghana), and VU2LT (India), all around 1000UTC.

THE 28MHz BAND

Finally for this month, let's take a brief peep at the 28MHz band, dear old '10 metres'. Jon Wheeler G0IUE in Melksham tells me that he has stuck to 28MHz this month, and using around 100W and a 2-element beam antenna worked VU2GTE (India) on 29MHz f.m., while s.s.b. brought in contacts with VP8CXV (Falkland Islands), 9X0A (Rwanda), CX8CP (Uruguay), TT8JWM (Chad), along with ZS4I and ZS6BXN (South Africa).

Jon also hooked up with local Novice Trevor 2E0ARM who was busy working the DX with his 3W. Trevor mentioned that it was hard work with just the 3W, but hoped the Radiocommunications Agency would increase the allotted power soon. Quite right too, Trevor!

SIGNING-OFF

Well that's about it this time around! Thanks for your support for the column and your patience! Keep up the good work, and good luck with that DX!

FOCAL POINT

REPORTS & INFORMATION TO ME PLEASE.

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GRAHAM HANKINS G8EMX
ROUNDS-UP THE LATEST ATV
NEWS.

Summer is here, bringing with it fine weather (I hope!) and Amateur Television contests. Fixed and portable Amateur Television (ATV) stations can be operating within the allocated parts of the available bands - 430MHz (70cm), 1.3GHz (24cm), 2.3GHz (13cm), 10GHz (3cm) and 24GHz (1.2cm).

The main object of an ATV contest is to encourage direct station-to-station contacts, so ATV repeaters must not be used for a contest exchange. Fixed stations, i.e. operators at their permanent address, will be rotating their directional antennas to seek out pictures from every point on the compass, but as a house cannot be moved to higher ground for more distant contacts so, the real adventure is to be found in operating portable.

A portable station is defined as one not located in a permanent building, so vehicles, tents or caravans become ATV studios for the duration. Antennas cannot be supported from a permanent structure, but those guy wires to the mast have to be attached to

least one camera!

It is becoming commonplace and a cause for concern in some circles, that many ATV contest stations do not take a video camera with them. This may appear a contradiction in terms but how can you have an ATV exchange without a camera?

Well, the exchange itself consists of the transmission, in vision, of a four-digit number which the receiving station has to resolve and identify. Contest rules specify how this number is chosen, but the digits can be computer-generated or come from an EPROM. This is often more economical in 12V power (remember those batteries?) than a written card in front of a camera lens.



Antennas used by Graham Hankins G8EMX for portable ATV contests. From top: 24, 70cm and 2m for ATV calling. Note: even the 2m antenna is mounted horizontally. Larger antennas would be preferable.

something. Radio amateurs can be an ingenious bunch, so wing mirrors and caravan handles take on a purpose unexpected by their designers!

Perhaps the greatest challenge for a portable ATV contest station lies in providing enough of the necessary volts, amps and watts. Equipment used for a portable contest cannot be powered from the mains electricity supply, so a petrol generator is a possibility but expensive, heavy and sometimes noisy solution.

As 12V is the probable final supply voltage needed, the car battery would, at first sight, seem the obvious power source. But be warned, car batteries are primarily designed to deliver lots of amps for short durations to turn an engine, not lesser currents at prolonged discharges. And remember, you have got to start the car again!

A 'leisure battery' or two, or three, is what a portable ATV station operating over a weekend really needs. Add up all the loads, there are the ATV and speech transmitters and receivers to supply, a few TV monitors, plus lighting for night operating. And, please, at

CONTEST WORKING

Contest working with ATV has a more relaxed pace than with telephony alone. There are fewer stations to be worked, so after the 'formal' part is over and a score has been achieved time can be spent, arguably should be spent, sending 'live' pictures from a camera. Indeed, there are some opinions that 'live' pictures should form a part of the scoring procedure.

Amateur Television contests start at 1800UTC on a Saturday, finishing at 1200UTC on a Sunday. The usual procedure is that contestants call 'CQ ATV contest' on the 2m band ATV calling channel of 144.750MHz. If that call is returned, antennas will be rotated to peak up that 2m path before attempting a 70cm or 24cm vision contact, because all antennas are, of course on a common mast.

The stations then agree who will transmit in vision first, and a correctly identified number counts as a 'score' for the contest log, with distance and band multipliers as determined by the rules. Full information, logsheets and ATV contest rules can be obtained from

Richard Guttridge G4YTV, Ivy House, Rise Road, Skirlaugh, Hull, East Yorkshire, HU11 5BH or E-mail via g4ytv@aol.com

Contests for ATVers in 1998 include the **International** (September 12/13) and **Autumn Vision** (November 14/15). But the nearest is the **Summer Fun** which takes place during the weekend June 13 to 14.

I plan to join this contest, with 70cm and 24cm ATV/P using my caravan from the local 'high spot' in the Midlands. Maybe some readers of 'Focal Point' will be around in vision, perhaps?

REPEATER NEWS

Dave Webster G6SKO is keeper of the Nottingham 24cm ATV repeater **GB3NV** and **Harold Bent G0EZW** was a regular user. Unfortunately the repeater lost its original site at Mapperley Plains because the antenna's position on the mast was needed for commercial services.

Harold writes: "GB3NV is presently transmitting in beacon mode from its new site at Watnall, but will resume full repeater operation when a new logic unit has been completed. The old Alford-Slot antenna has been improved, thanks to some handy machining by Dave".

Harold G0EZW needs the GB3NV repeater because working simplex ATV from his home station is difficult. So, when 'NV lost its old site and was off-air, he took his ATV gear out portable. Harold says: "I set up a portable location near Junction 27 of the M1, with a rebuilt Quad-Loop antenna. ATV stations worked included P5 pictures to **G7SLC** near Loughborough and P4 to 5 vision to **Fred G4CNJ** in Nottingham".

Now to Birmingham, where **Alan Kendal G6WJ** (Stourbridge) is chairman of the **Beacons Repeater Group (BRG)**. The group has submitted an application for a 10GHz repeater at Sedgley, meanwhile a dual Alford-Slot antenna has been received by **G8EMX** (hi folks, yes me again) for use in the BRG's 1.3GHz repeater, which will be sited just a few miles north of central Birmingham.

The dual Alford-Slot antenna for north Birmingham has been bought from an antenna manufacturer. Several ATV groups with workshop facilities available have successfully made their own, but the design can be difficult to reproduce so I took the 'easy option' here. Coverage testing from the site will begin soon, as an attended /P exercise with my own call sign of course.

THAT'S ALL FOR THIS MONTH SO, CHEERIO FOR NOW, KEEP SENDING ME THAT ATV NEWS, FROM WHEREVER YOU MAY BE.

73 Graham G8EMX

RADIO 'SCAPE

REPORTS & INFORMATION TO ME PLEASE.

MIKE RICHARDS G4WNC, PO BOX 1863, RINGWOOD, HANTS BH24 2ZD

E-MAIL: mike.elaine@btinternet.com

WEB SITE: <http://www.btinternet.com/~mikespage>

THIS MONTH MIKE RICHARDS G4WNC LOOKS AT WEB PAGE CONSTRUCTION AS WELL AS REPORTING ON A NEW ACARS DECODING PROGRAM.

I'm sure you've all heard the Internet hype that claims that every family will have their own Web page by the year 2000. And if you've ever taken a detailed look at the construction of a Web page you could be forgiven for being a bit daunted by the task. So, in this short introduction I'll try and give you a practical introduction, along with a few tips and tricks on how to build your own Web page.

Let's start with a brief look at HTML, although you don't have to worry too much about this as I'll show you how to build a Web page with absolutely no knowledge of HTML.

So, what on earth is HTML? Well it's an acronym for Hyper-Text Mark-up Language. This is really very much like the macro language that's built-in to most modern word processors.

The system lets you enter codes and more sophisticated commands so that you can change the layout or format of the document part way through. The most simple examples being the ability to show part of the document in bold type or maybe to select a different font.

You will note however, that when you do change the formatting in this way all you see on the screen is the change to the text. However, if you were to look at the document with a simple text editor you would find that a code had been inserted at the beginning and end of the section with the bold type or font change.

Exactly the same principle is used to handle Web pages but here the system of codes used to control the way the document behaves is called Hyper-Text Mark-up Language or HTML. If you want to see just what HTML looks like, log on to the 'Net and load a Web page.

If you are using **Netscape Navigator** go the View menu and select View Document Source. This will open-up a new window with the full details of the page you are viewing. You will find that the page probably looks very complicated rather like the example of my page that I've shown in **Fig. 1**. What you can see now is the original text plus all the HTML codes that are used to control the way the page looks.

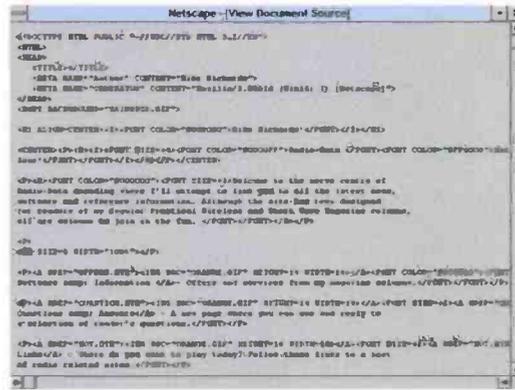


Fig. 1: Example of raw HTML code in G4WNC's Web page.

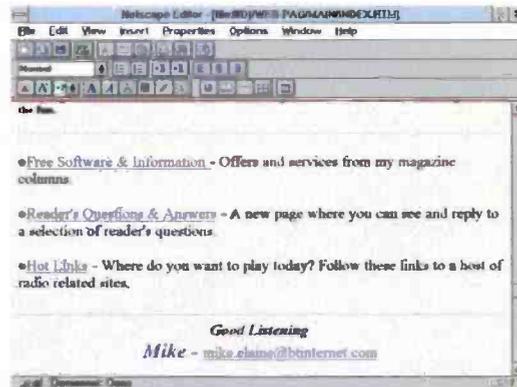


Fig. 2: The G4WNC Web page being edited in Netscape Gold.

You're probably beginning to think that building your own Web page is purely for computer anoraks! Don't worry, there's help at hand!

BUILD YOUR WEB PAGE

By far the easiest way to build your first Web page is to use what's known as a WYSIWYG Web editor. The WYSIWYG bit is just jargon for What You See Is What You Get, which means you can see your page build-up on the screen without having to write a single line of HTML code.

One of my favourite WYSIWYG editors is the old **Netscape Navigator Gold** which has now been superseded by the **Communicator** suite. However, this latest program is rather resource hungry so you'll need at least a 486DX66 and preferably a Pentium PC to run it. If you don't have this much computing power at your disposal, there are some other options you can try.

A recent check of the Netscape Web site shows that the old Navigator Gold is still available as version 3.04 from their archive site at <http://archive.netscape.com/archive/index.html> This site is a very good source of Web browsers and other tools for those with slightly older PCs.

If you want to try another pseudo WYSIWYG editor take a look at **HoTMetal** from SoftQuad.

This is available as a freeware version on the Web at <http://www.sq.com> Whilst I personally don't think it's in the same league as **Navigator Gold** it's still relatively easy to use.

Another program well worth a look is **WebWizard** by ARTA. This can be found at www.halcyon.com/webwizard and offers a wizard style of constructing a basic Web page complete with graphics, etc. While **WebWizard** is very convenient, it does lack the flexibility required to make your page a bit different from the norm.

If you want to get really serious then the editor to go for at the moment is **HotDog Pro**. This is also available on the Web at <http://ftp.sausage.com/pub/hotdog.hotdog16.exe> Now that you know where to find your chosen Web editor, the fun can begin.

The first problem is just how to lay-out the page? If your page is going to be successful you do need to put some thought into just how you want it to look. I would strongly recommend starting with pen and paper just to outline what you want to include. At this point you need to be very careful you don't try and put too much information on each page or your readers will be scrolling up and down the screen to find what they want.

The real trick to good Web page design is to ensure that it loads quickly and all the important

RadioScene

information can be seen or found from the main page. You will find that you really have to put some thought into keeping the information to a minimum or the screen will very quickly get cluttered.

Let's just divert here and see how a typical page is put together. To put some life into it I'm using the latest version of my Home page (<http://www.btinternet.com/~mikespage>) as an example.

Rather than being just one document, the page is actually made-up from several files that are combined by the Web browser to make the image that you see on your screen. Just to show you how this works on my page, here are the component files along with an explanation of what their used for:

Index.htm: This is the main HTML document that contains the necessary code to bring all the files together. It's common practice to shorten the file extension to htm because DOS only supports 3 character file extensions.

orange.gif: This is a small graphics file with the orange blob used for the start of each line of text.

mainbkgd.gif: This is another small graphics file that contains the background image for the page. Although this is only a small file, the Web browser fills the page by making internal copies of the pattern and displaying them as if they were one image.

offers.htm, question.htm and hot.htm are simply other pages on my site.

wxgraph1.exe, hell.zip, hv9610.zip and raft201.zip are all program files that can be accessed via my offers.htm page.

Now, what about all those fancy graphics you see on the Web? Most new HTML authors become extremely daunted by the thought of having to create all their own graphics.

Don't worry, it's common practice to pinch designs from other Web pages! The nature of Web browsing makes this very easy as every time you view a Web page you download all the graphics. All you have to do is decide which bits you want to use and save them to your hard disk.

Let me take you through the

way to do this using *Netscape Navigator*. The process is very similar in other browsers.

First you find a Web page that has either a graphic or maybe a background that you rather like. You then view the page and move your mouse pointer to the graphic you want.

Then just press the right mouse button and you should be presented with a menu of options. The two you need to concentrate on are 'Save Image as ..' and 'Save background as..'. These are fairly self explanatory and just let you choose a file name and location for the selected images. It really is as easy as that.

PAGE DESIGN

Let's take a look at a few do's and don'ts for good Web page design.

Probably the most common error made by new authors is to over complicate the page and insert too many graphics.

Whilst graphics can certainly transform the look of a page, there is one big

disadvantage. Any decent graphic usually ends-up as a fairly large file. Remembering that all the components of the page have to be downloaded, you can see that adding large graphics to your page can make it very slow to load.

If the link to your site is on the busy side (often the case with free home page servers) you may find people give-up before your page has downloaded which rather defeats the whole object! So remember, keep it small and quick.

Now just a few more tips that will make life easier for your 'readers'. Make sure you date your page and use the unambiguous January 6 1998 format rather than the lazy 6/1/98 which could be January 6 or June 1 depending on where you live!

It's also a good idea to put your E-mail address clearly on all the pages so people can get hold of you. The easiest way to do this is with what's known as a 'mailto:' link.

You will see the mailto link as one of the options on the menu of your Web editor. The advantage of using this system is it takes the reader directly to their chosen mail client with your E-mail address already inserted, making contact that

WARNING!

You do need to be a bit careful when 'pinching' images from other Web pages and follow a few guidelines. First of all don't tinker with trademarks or company logos - that's just asking for trouble. I would also suggest you keep away from photos, unless they have clearly been made available for all to use. You are generally quite safe to use background textures or icons to brighten-up your page.



Fig. 3: SoftQuad's HotMetal HTML Editor.



Fig. 4: WebWizard page construction.

much easier.

Once you've finished building your Web page you now need to know how to get these files to your Internet Service Provider (ISP). You should find that your ISP has comprehensive instructions on this action available from their main page. But I'll just take you through what normally happens.

The action of putting your Web page onto the server is called 'Publishing' and all you're really doing is sending copies of your Web page files to a special directory on your ISP's main computer. For this reason I suggest you keep all your files in a separate directory on your hard drive - it makes the transfer so much easier.

In order to make the transfer you obviously need to know exactly where to send the files. You will also need a password so that your files are protected from anyone who may take sinister delight in modifying your site. The password and location details will be supplied by your ISP.

There are lots of ways to move your files to the ISP site and perhaps the most basic is to use one of the File Transfer programs that I've mentioned recently. Whilst this is a perfectly acceptable method there are much easier ways.

If you've been using a Web page editor such as *Netscape Gold* you will find that it has special support for publishing built-in. All you have to do is go to the 'Editor Preferences' and enter the ISP site

name, directory and password details. Once this is complete, pressing the Publish button starts an automatic upload to your Web site. Using this system really does make it very easy to update your pages.

That about concludes this introduction to building your own Web page. If you decide to have a go why not send me your Web address so I can pass it onto other readers?

NEW DECODING PROGRAM

I know it's not really Amateur Radio but I know lots of you like to have a dabble on the air bands from time to time so I thought you might like to know about the latest Aircraft Communications Addressing and Reporting System (ACARS) decoding program. Those with an interest in RTTY will no doubt be familiar with *Hamcomm*, well the author (**Wilhelm Schroeder**) has just completed developing a brand new ACARS program.

The ACARS program is called *Sky Spy* and is currently being handled in the UK by **Pervissell**. Before I talk you through the program here's just a brief introduction to ACARS.

The ACARS system is rather like a Packet radio network for aircraft. Each aircraft and base station has a unique identifier and all the signals are sent on a limited number of frequencies. If you want to have a

listen, the busiest frequency in the UK is 131.725MHz using a.m. - as is common practice on the air bands.

So, what's it used for? Because the ACARS system lends itself so well to automation it's used primarily to handle all manner of routine traffic between the aircraft and various interested parties on the ground. This could range from the Airline wanting to know how much fuel the plane is burning through to ground control requesting a weather report.

Because the on-board equipment is very sophisticated ground crews can now interrogate the control system of an aircraft to find out how it's doing without having to bother the air crew! As you can see it's a very sophisticated system.

As ACARS uses a fairly basic data transmission mode it's quite a simple process to monitor and decode these messages. However, in order to make some sense of the coded messaging system to you need some sorting and filtering software. This is where the ACARS programs come in to their own as they usually combine a basic reception system with some fairly sophisticated sorting to bring the data to life.

SkySpy is a brand new Windows '95 based ACARS program that features a decoding system along with some very good sorting and filtering systems to make sense of all that data. Being a Windows '95 based installation it's extremely simple and the first time you run the program you will need to enter the encryption key.

Once it's up and running you just connect your Hamcomm type interface to the appropriate COM port, tune your radio and you're ready to start decoding. Because ACARS signals occur intermittently, it is common practice for experienced listeners to just store the data into a log file and review it later.

SkySpy makes creating log files very easy and even adds a unique filename so you don't have to bother! Once you have your log file you can really start to use SkySpy's filtering and sorting options features to bring the data to life.

An added bonus is SkySpy's uses of the Microsoft Access database format. This means that providing you have access to this program you can carry-out some really powerful data processing.

One of the really great things about SkySpy is its price, Pervisell are selling registered versions at just £24.99, which represents really excellent value for money. For more information contact Pervisell on (01494) 443033 or via their Web site at <http://www.pervisell.com>

SPECIAL OFFERS

If you'd like a copy of Hamcomm/VFAX, etc. I've arranged a very special offer with the Public Domain and Shareware Library (PDSL). They have put together a library set of all five disks for just

£12, all inclusive.

Using PDSL also makes ordering simpler as they accept all the usual credit cards so you can order by 'phone - you don't even have to write a letter! Please direct all orders and enquiries about this disk set to PDSL, Winscombe House, Beacon Road, Crowborough, 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 - JVFAX 7.1, HAMCOMM 3.1 and WXFAX 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.

THAT'S ALL FOR THIS TIME, SO UNTIL NEXT MONTH CHEERIO AND DON'T FORGET TO KEEP YOUR LETTERS AND NEWS COMING TO ME. PLEASE USE THE ADDRESS AT THE HEAD OF THE COLUMN.

73 Mike G4WNC

BROADCAST

REPORTS & INFORMATION TO ME PLEASE.

PETER SHORE,
C/O PW EDITORIAL OFFICES,
ARROWSMITH COURT,
STATION APPROACH,
BROADSTONE,
DORSET BH18 8PW

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A NEW INTERNATIONAL BROADCASTER IS ON THE SHORT WAVE BANDS, PETER SHORE REVEALS ALL.

The final day of March was marked by the last broadcast in a foreign language - at least for the time being - from Portugal. Radiodifusao Portuguesa, based in Lisbon, has transmitted English programmes since 1955 and French since 1962.

Radio Portugal has used the same frequencies year in year out to reach listeners in Europe with a 30-minute programme each evening, with variable reception from eight elderly transmitters, seven rated at 100 and one at 300kW. These are now being used solely for the Portuguese-language programmes which are on air throughout the day for listeners world-wide.

The same week as that European station closed, a new continent-wide station was unveiled by US President Clinton. During the final days of his African tour, Clinton made the surprise announcement that Radio Democracy for Africa would come on stream in July 1998. The new station will broadcast in nine languages to 19 countries and

the range of output means considerable overlap with existing Voice of America (VoA) broadcasts to Africa.

As this edition of PW goes to press details are sketchy. But it is believed that the new station will be part of the Voice of America station, concentrating however on different aspects of broadcasting (such as lifeline programmes for refugees) but following the same VoA editorial charter.

NEW BROADCASTER

On 28th March anyone tuning around will have heard a new international broadcaster on the short wave bands. Merlin Network One celebrated the first anniversary of the management buy-out company that now controls all the BBC World Service UK transmitters and operates the overseas sites (which are still owned by the BBC).

A 24 hour transmission was carried on short wave from the Merlin sites at Rampisham in Dorset and Skelton in Cumbria plus satellite relay on the Astra satellite across Europe. The programmes were put together at Country Music Radio's studios in London, and included output from Radio Caroline plus a specialist communications programme called Media Zoo.

Unfortunately, Merlin only announced the day of broadcasting a little over one week before the event. This meant that I couldn't bring you news in advance.

However, Merlin is now trialling a weekly programme stream - also branded Merlin Network One - which can be heard in Europe on

Wednesday: 1700-1900 on 15.20; 1900-2100 on 15.59; 2100-2200 on 11.915; 2200-2300 on 9.465 and 11.915; 2300-0100 on 9.645 to North America; 1900-2100 on 13.69; 2100-2200 on 11.985 and 13.69; 2200-2400 on 9.78, 11.985, 13.69 and 2400-0100 on 11.985 and 13.69MHz.

FREQUENCY NEWS

Some more frequency news now. Israel Radio has English: 0400-0415 on 9.435, 11.605 and 17.535MHz; 1030-1035 on 15.64 and 15.65MHz; 1400-1430 on 12.535 and 15.64MHz; 1545-1555 on 11.605, 15.65 and 17.515MHz; 1900-1925 on 9.435, 11.605, 15.64 and 15.65MHz.

Swiss Radio International in English via short wave in Europe is at: 0400-0430 and 0530-0600 on 5.84 and 6.165MHz; 1000-1030 and 1200-1230 on 6.165 and 9.535MHz and 1900-1930 on 6.165 and 9.885MHz.

Neighbouring Austria has programmes in English at: 0430-0500 and 0730-0800 on 6.155 and 13.73MHz; 1230-1300 and 1630-1700 on 6.155 and 13.73MHz; 2130-2200 on 5.945 and 6.155MHz.

Further north, Radio Sweden is on the air during the European evenings: 1730-1800 Monday-Saturday on 6.065 and 15.735MHz plus 1179kHz medium wave; 1730-1800 Sundays on 13.855 and 15.735MHz; 1930-2000 on 6.065MHz and 1796kHz medium wave; 2030-2100 on Saturday and Sunday on 6.065 and 13.83MHz plus 179kHz medium wave; 2130-



The IRIB Station features in a letter from John Noble G-20961 (see text).

RadioScene

2200 on 6.065 and 9.43MHz plus 1179kHz medium wave.

RADIO CHINA

A letter from **John Noble G-20961**, in Rainham, Kent, who tells me that he has received a letter from **Radio China** enclosing an entry form for a seven question competition on Macao and Hong Kong. With it they supply a covering sheet that gives all the answers. Six winners will have an expenses-paid trip to Beijing and Macao and he thinks the whole thing seems to be merely a con-trick to encourage people to listen and write to China.

An interesting point, John. Most of the contests which China Radio International (CRI) has run over the past couple of years have adopted the same technique. It makes me wonder whether CRI is worried that no one can actually manage to find the station on the short wave dial, particularly because of the interesting choice of frequencies they make.

You can listen to CRI in English in Europe: 2000-2100 on 5.22, 6.95, 7.16, 9.44, 9.635 and 9.92MHz; 2100-2130 on 5.22, 6.95, 7.17, 7.18, 9.535, 9.67 and 9.92MHz; 2100-2130 on 3.985MHz via Switzerland and 2200-2300 on 7.17MHz.

John has also been in contact with the **Islamic Republic of Iran Broadcasting (IRIB)** station in

Tehran. English is on the air to Europe at 1930-2030 on 7.16, 7.26 and 9.022MHz. The most notable point about IRIB for John, however, is the station's idea of collecting QSL cards. The station will issue a QSL for a listener's first correct report, and then issue further cards for greater numbers of reports.

For example, to gain eight QSL cards you will need to submit no fewer than 140 reports, and to gain a third degree diploma, you have to send in 250 reports. When you get to 500 reports you will become a member of the IRIB DX Club, complete with a certificate of membership. In the meantime, at your 200th and 500th report, you will be 'given some precious gifts' according to the IRIB blurb.

"I don't know what IRIB are thinking of but it would take years to complete and cost a fortune in IRCs and postage," bemoans John. Thanks for your letter, and do let me know if you make any progress towards membership of the IRIB DX Club. Of course if any *PW* reader has managed to join, please let me know!

WITH THAT SOBERING THOUGHT I'LL SIGN OFF. UNTIL NEXT MONTH, KEEP TUNING ACROSS THE SHORT WAVE BANDS.

GOOD LISTENING, PETER.

A view of the IRIB World Service building.



PRACTICAL WIRELESS MAGAZINE STOCKISTS

The following is a list of local dealers who currently stock *Practical Wireless*. If you can't find it in on display in their showrooms please ask. If your local dealer doesn't stock *PW* why not ask them to call Michael Hurst, *PW* Book Store on (01202) 659930 to find out how to order copies?

Amateur Radio Communications
Merseyside

Axon Systems
Berks

BBC World Service Shop
London

Components & Electronics Ltd
Surrey

Foztech
Plymouth

Jaycee Electronics Ltd
Fife

QSL Communications
Weston-Super-Mare

Leeds Amateur Radio
Leeds

Low Electronics
Bristol

Low Electronics
Derbyshire

Low Electronics
Newcastle-Upon-Tyne

Modern Radio
Lancs

Micron Electronics
Belfast

Northern Shortwave Centre
Carlisle

NRG Electronics
East Sussex

Photo Acoustics
Buckinghamshire

Poole Logic
Dorset

Radio Amateur Supplies
Nottingham

ShortWave Shop
Dorset

Ward Electronics
Birmingham

Waters & Stanton
Essex

FREE ADVERTS

Now's your chance to send in a photograph of your equipment (a good idea if it's really unusual) to accompany your advert. Please note that all photos will only be published at our discretion and are non-returnable.

When sending in your advert, please write clearly in **BLOCK CAPITALS** up to a maximum of 30 words, plus state your contact details. Please use the order form provided.

Bargain Basement

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.

For Sale

6m (50MHz) amp, GS35 triode 80W drive, 100W output, professionally built, £850. Icom 551 6m (50MHz) 10W, £275. New 8874 triode, £150. 2C39BA valves, £18. 23cm (1296MHz) 'H' frame for 8 x 23-ale, £10. Eric, after 6pm on (01925) 490283.

50 channel hand-held PRO-70 scanner, excellent condition, £90, NiCads and new, boxed, battery pack, instruction manual, v.h.f., Air, amateur, u.h.f., 70cm u.h.f. 'T' band with charger, post free, r/duck antenna. George on (01443) 437345 or 436073.

60ft 4 section Altron tilt-over tower with electric hoist winch and Ham M rotator, various spares, two new ropes, ground post cut off at ground level and requires extension, £350. Hygain TH5 5-element tri-band, £275. G3BWW on (01892) 750555.

AEA PK900 TNC dual port multi-mode, as new condition, little use, leads, manual, s/ware, boxed, cost £380, accept, £190. AVD meter OA116, as new, £70. AVD meter model 8 Mk5, £50. GW40TQ on (01745) 857119. E-mail: dgibbon@globalnet.co.uk

Alinco 2m (144MHz) hand-held model DJ-1SE with NiCads, spare battery case, d.c. power lead, car adapter, £110 o.n.o. G4BRX, QTHR. Tel: Cheltenham (01242) 675321.

Alinco DJ-580 v.u.h.f. handie with charger and two batteries, £115. Toyo thruline p.w.r./s.w.r. meter 144/435MHz, £25. FT-480 multi-mode with 50W linear, £125. Collins 30L1 linear, £300. Tel: (01491) 838735 evenings.

Alinco DX70 h.f. + 6m (50MHz), hardly used, sell for, £500 or swap for h.f. base rig with tuner, also 2m (144MHz) v.h.f. transceiver, NDI with mobile bracket, £40. Tel: after 6pm (01902) 496241 any day.

All types of valves for sale, new/used: PM valves KT88, EL34, ECC, 81, 82, 83, etc., many other valves. Tel: 0113-240 3496.

AOR 7030, excellent condition, complete with remote power supply, instructions, etc., £495. Buyer pays P&P. Tel: (01772) 882189.

AOR AR8000, 500kHz to 1900MHz, a.m., n.f.m., w.f.m., u.s.b., l.s.b., c.w. scanner, case, NiCads, charger, boxed, sensible offers or swap for Yaesu FRG-100 plus cash or AOR AR7030 plus cash. Tel: (01243) 268816.

AOR AR8000, less than year old, hardly used, boxed, power supply, 500kHz to 1900MHz, no gaps, all modes (a.m., f.m., w.f.m., u.s.b., l.s.b., c.w.), 1000 memory channels, full manuals, £275. John, Essex. Tel: (01708) 445961 evenings, after 8pm.

AR3030, bought 16/9/97, as new, cost £684, fitted Collins 2.5kHz filter + v.h.f. converter, 140-169.999MHz, boxed, manual, power supply, plus G5RV antenna, 51ft. CTU8 antenna tuner, freq. book, sale for £450. Bill, Morecambe. Tel: (01524) 833506.

AR7030, almost new, £450. AR2800 base or mobile, s.s.b., boxed, £150. Kenwood R-2000, v.h.f., boxed, £275. Grundig Satellite 2100 multi-band, £145. Grundig Yacht Boy 230, Toshiba 11 band, £60. Sony ICF-7600G, s.s.b., £80. Sony ICF-77, boxed, £180. Zenith 1000 in leather case, like new. Tel: W. London 0181-813 9193.

Armstrong stereo 55 valve receiver, Leak Delta 75 receiver, 2 Leak stereo, 30 amplifiers, matching tuner quad FM1 tuner, Roberts valve portable and more, £200 for all. Please write to David Palmer, 23 Jubilee Terrace, Elmwell, Bury St Edmunds, Suffolk IP30 90H.

Bargain! V-212 20MHz dual-beam oscilloscope, hardly used, signal generator CT-452A ex-Navy, very stable, 10Hz to 72MHz, Black Star (Meteor 100) freq. counter, 5Hz to 100kHz, lab standard, prefer buyer to collect, £70 o.n.o. Tel: Sheffield 0114-287 2957.

CapCo mag loop, 10m, 15m, 20m (14/21/28MHz) + rotator, etc., good performer, £50. Tel: Suffolk (01284) 768084.

Century 22, HW7, HW9, PCR1, mains battery p.s.u. Wanted Akai portable v.c.r. Tel: (01609) 772702.

Channel Master Colorator with bearing, new, boxed, £55. Yaesu FR-50B amateur receiver, £60. HF-3 Target receiver, £80. Both very good condition Band II 5-element aerial, 10 x 1 1/2 in alloy mast, £10. 80m length of Popes HF-100 coax

u.h.f. 50k TX, £30. Steve, Devon. Tel: (01392) 430776.

Chelcom CAHFV1 80m (3.5MHz) vertical aerial, little use, £80 plus carriage. 386 m/board and cpu, £10. 4 x 1Mb RAM, £10. 80Meg HD, £15. Panasonic KXP1081 printer, stand, ribbons, re-ink, paper, £30. Hugh MOACF, Wilts. Tel: (01225) 706687.

Computers: two of 486DX2, 80MHz, 8Mb memory, 2 hard disks, SVGA monitor, two Tafts 500s, v.h.f. and u.h.f. oscilloscope, 50MHz Hitachi l.c.d. colour display lap top 286, 2.5Mb, all to go. Tel: (01308) 642506 home or (0411) 550306 mobile anytime.

CR100 receiver, good condition and in full working order, with original service manual, £100. G8AHE on 0121-458 2406.

Eddystone EC-958 30kHz to 30MHz RX, 19in rack mount, spares or repair, £25. Buyer collects or pays carriage. Tel: (01691) 831312.

Eddystone EC10 RX, g.w.o., £60. Tel: (01767) 627498.

Eddystone EC958/5 alias Marconi Nebula, 10kHz to 30MHz, ships main receiver, £150. Les GONXI, Newton Abbot. Tel: (01626) 351994.

Ferrograph vintage reel-to-reel tape recorder, series 7, model 713H, mono, three speeds, three heads, £20. Tel: 0121-373 4965.

For spares or repair receivers: Heathkit RA1, Trio JR310, Grundig Satellite 2000 with BFD, no time or space. Tony on (01905) 641759.

Front panels: FT-757, £10. IC-728, £10. IC-575, new, £15. FT-736R, as new, £15. IC-970, as new, £20. Wanted SP20. Tel: (01953) 884305.

FT-900AT, few hours use, unmarked, as new, mic., manual, box, £749. FT-1000D 200W, £400 worth of options fitted, very reluctant sale, unmarked, as new, latest serial number, £1995. FRG-7 RX, £99. Carl G4GTW, Nr. Southampton. Tel: (01489) 789960.

Grundig world receiver radio Yacht Boy 400, complete with compact antenna, short wave quality earphones, power adapter, instruction book, world-wide call sign book, little used, £50. Tel: Nr. Oxford (01993) 830815.

Heathkit GR54 200kHz-30MHz, g.w.o., £100 o.n.o., suit beginner or collector. Disabled person, must sell. Yaesu 221R 0-30W, f.m., l.s.b., u.s.b., g.w.o., showing its age, £150 o.n.o. Ted Bardy G6DDA, QTHR. Tel: 0171-739 7773 9am to 3pm.

Heathkit transmitter DX-404 with variable frequency oscillator VF-1U, £100 the pair. Also Eagle Morse (bug) key, £25. Tel: Norfolk (01485) 520903.

HF-3 Target receiver, 150kHz to 30MHz, l.s.b., u.s.b., a.m., as new, p.s.u., antenna, manual, £120. Roger Kennedy, 7 Wyvatt St., Kettering, Northants NN16 0OT.

Howes CTU8 a.t.u., g.w.o., boxed as new, £15 if collected or postage extra or w.h.y.? Howes RA30 r.f. attenuator, built as new, £4. John on (01634) 233058.

Hustler 5BTV vertical antenna, 10 to 80m (3.5 to 28MHz), as new, £97. Tel: (01320) 366331.

Icom 706 MkI, mint condition with s.s.b. filter, £600 o.n.o. Tonna 70cm power splitter, 2-way, £25 o.n.o. Ricoh KR10 s.l.r. camera, 35mm, mint condition, £45. Pentax ME Super body, £60 o.n.o. Tel: 0181-423 0576 after 6.30pm.

Icom 775DSP, excellent condition with SM20 base mic., £1750. Kenwood TS-850SAT, £750. Yaesu FT-102, excellent condition, £350. Gary on (01203) 559702.

Icom IC-3210 2/70 mobile, £225. Kenwood PS31 20A, as new, £115. Microset RU20 70cm (430MHz) amp, unused, £55. Realistic HTX100 mono band mobile, as new, £140. FT-101ZD f.m. board, £40. CW filter, £40. Fan, £20. Tel: (01953) 884305.

Icom IC-706, £600. Yaesu FT-736R dual/b multi base, £875. FT-726R 2, 70, 6 + SAT board, all-mode base, £750. All as new and boxed. FTV-144 v.h.f. module, unused, £65. AOR 2002 1300MHz scanner, as new, £185. Tel: (0468) 756762.

Icom IC-735 with A2H and controller, £550. IC-228H 45W, manual, £150. Les GONXI, Newton Abbot. Tel: (01626) 351994.

Icom IC-751A, £575. Yaesu FT-4700RH 2m/70cm (144/430MHz) 50W f.m. mobile, extended receive, £275. RN Electronics 4m (70MHz) transverter, 2m i.f., 10W, £110.

Katsumi keyer EK150, £40. Pye A206 6m (50MHz) linear, 50W o/p for 6W in. G4DHJ, Warwickshire Tel: (01789) 773286.

Icom IC-901E dual-band 2m/70cm mobile transceiver with detachable front, complete with UX-S92E 2m (144MHz) s.s.b. unit, UXR-91A wide band receiver unit plus lots of extras, was very expensive. Tel: W. Yorkshire (01274) 880895.

Icom IC-R10 hand-held, f.m., w.f.m., a.m., c.w., s.s.b., 0.5 to 1300MHz, v.s.c., 1000 memory bandscope, multi function dot matrix display, full computer access, tunable bandpass filters, 14 tuning steps, £200. Frank on (01295) 670108.

Icom IC-R70 base short wave receiver, excellent condition, instruction manual, £380 o.v.n.o. genuine reason for sale. Mick, Reading. Tel: 0118-941 4605 evenings, Sundays.

Icom IC-R7000, 25MHz to 2GHz, mint, boxed, service manual + d.c. cable, £550. Marconi TF2008 a.m.-f.m., signal generator, also sweeper, 10kHz to 510MHz, g.w.o., service manual, £175. SE Labs counter/timer fitted, 10MHz crystal oven d.c. to 150MHz, g.w.o., £40. Cliff, Surrey. Tel: 0181-656 3137.

Icom IC-R8500, mint, £835. Grundig Satellit 5000A, £75. Icom multi-mode, mint, £225. MVT-7100, new, £170. CVR8800 Tele reader, £70. 38 Set MkII, £20. Tel: Essex (01279) 815020.

Icom IC-R9000 receiver, 0-2000MHz, all mode spectrum scope, seven filters included, i.f. shift notch, 1000 memories, TV output input, N8 r.f. gain, alpha numeric, etc., worth £5000, best radio ever, £2250. Tel: E. London 0181-478 7490.

Icom ICR-71E receiver with IC6X257 f.m. unit, boxed with manual, mint condition, £450. Icom ICR-10 all-mode scanner receiver, mint, boxed, £185. Kenwood TH-22E trans/rec. hand-held, mint condition, boxed, £150. Graham after 6pm on (01634) 717365.

JRC NRO-535 general coverage receiver with optional boards fitted, £895. Also Lowe Europa HF-225 with keypad, £325. Both excellent condition and Yaesu FRG-7700 in v.g.c., £225. David on (01206) 512575.

Kenwood 790E u.h.f./v.h.f. multi-mode base, as new, £995. Yaesu FT-7 h.f. TX/RX, as new, £220. Meteor 600MHz Ireq. counter, £70. FC-707 a.t.u., £95. FTV144 transvert module, unused, £65. TSU7 CTCSS, unused, £25. Tel: Dereham (01362) 821125.

Kenwood TM-733 144/440MHz f.m. dual bander, 50W 2m, 35W 70cm data port fist mic., manual, as new, boxed, £325. For full details telephone or E-mail. Tel: (01773) 810010 or E-mail 113006404@compuserve.com

Kenwood TM255E 40W 2m (144MHz) multimode mobile transceiver with detachable front panel, boxed, like new with instructions, used by non-smoker and never been used mobile, bargain at £395, no offers. Barry MOAPO on (01274) 880895.

Kenwood TM733E, mint, 2m/70cm (144/430MHz), 5, 10, 50W, 3, 10, 35W, boxed, £400 o.n.o. Swap for Icom IC-706 MkI or Alinco DX70 h.f./6m (50MHz), with cash difference. Also wanted 23cm gear, info., help, please 'phone after 6pm. Mike 2E1FCG, 18a High Street, Hoyland, Barnsley S74 9AB, Tel: (01226) 742971.

Kenwood Trio TR-9130 2m (144MHz) multi-mode, fist mic., base mount, mobile bracket, manual, also Adonis AM-805G compressor desk mic. to fit above radio, g.w.o., £325 o.v.n.o. Len MOBOS on 0151-346 9062.

Kenwood TS-120 h.f. transceiver, £250. Nova 2m (144MHz) mobile, £90. Kenwood BC10 hand-held charger, £10. Solatron dual trace scope, swap for Thandar or other portable scope. Wanted Kenwood SM220 monitor/scope. Tel: (01603) 745512, weekends only.

Kenwood TS-450S, good condition, silent key sale, £550, carriage extra. Dave on (01443) 683912.

Kenwood TS-50, mint, £675 o.n.o. CapCo a.t.u., £275 o.n.o. Comet CD160H meter, £95 o.n.o. Tel: Somerset (01278) 795495.

Kenwood TS-850SAT with extra filters and built-in a.t.u., £750. Kenwood MC-60 dynamic mic., £65. Kenwood HS-5 headphones, £55. Bencher Iambic paddle, £50. Manson p.s.u., 30A, £40. All never used and boxed. Tel: Bath (01225) 331643.

Kenwood TS-870 h.f. transceiver (d.s.p.) plus Manson EP925 p.s.u., all boxed with manuals, £1250. Icom 701 h.f. transceiver plus Icom p.s.u. ICP520 and manuals, £385. Datong Morse tutor and keyer, £50. Yaesu FRG-7 receiver, excellent condition plus manuals, £135. B. Brown on (01222) 832253.

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LAR omni-match a.t.u., g.w.o., as new, £20 or exchange, w.h.y.? Buyer collects or postage extra. John on (01634) 233058.

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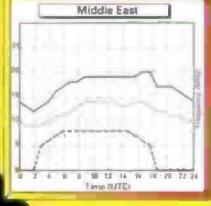
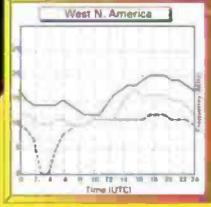
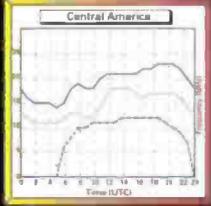
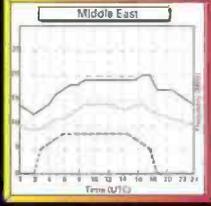
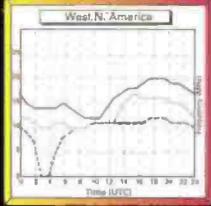
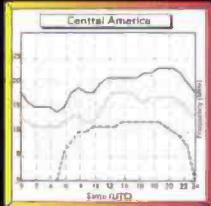
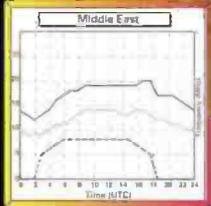
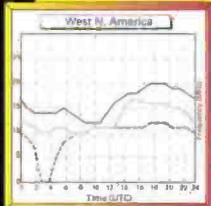
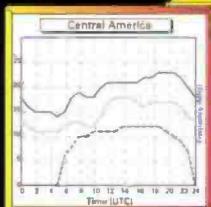
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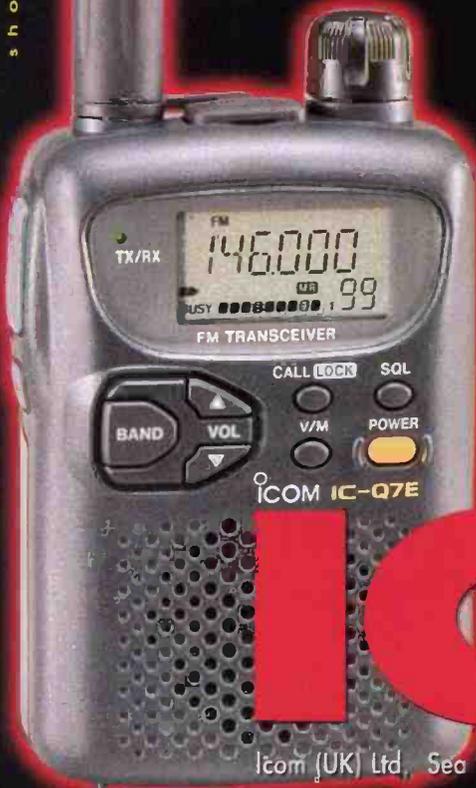
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