YAESU VX-1R
THE SMALLEST HAND-HELD IN THE WORLD
REVIEWED
GPS
SATellite NAVIGATION IN THE HAND
25th Year of Service to UK Amateurs

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

NEW

C-408

From HORA

70cms Handheld Full CTCSS

£89.95

FREE Postage

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

SGC-2020 QRP HF Transceiver

£599

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

1998 Catalogue

£2.95 plus £1 postage

WATSON

Hunter Frequency Counter

Features:

- 10 - 2.8GHz
- Ni-cad Pack
- AC Charger
- BNC Antenna

Full Instructions

£59.95

FREE frequency guide worth £12.95 on orders during Feb. & March.

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
EXCLUSIVE 10 DAY APPROVAL - On All Mail Order Sales

KENWOOD

ICOM

VX-1R Dual band

ICOM

FT-506 HF + 50MHz

£1895

- 100W of pure Magic
- 160 - 6M
- 50W - 30MHz
- Detachable head
- 180 Memory channels
- CTSSS & 1750Hz tone

KENWOOD

TM-V7E Dual Bander

£499

- 144 & 430MHz 50/35W
- Dual RX on same band
- CTSSS & 1750Hz Tone
- Large clear display

WATSON

W-MM1 Multimode Modem

£69.95

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

email: sales@wsplc.demon.co.uk

UK's largest Catalogue £3.95 inc. post

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

VX-1R Dual band

The world's Smallest HT

From the UK's

Biggest Dealer!

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

New price means we can offer this at a price we dare not advertise! If you want the best deal, PHONE!!!

6m 2m 70csm

All in one small package.

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

WATSON

New

$19.95

Radio Controlled 24 Hour Clock

- 24 hour digital readout
- Day, week and month
- 50 years moon phase
- Radio signal strength
- Backlight and alarm
- 107 x 85 x 47mm

Rechargeable Alkaline Cells

Pack from Now £13.99

- Start pack includes 4 x AA cells and dedicated AC charger
- No memory effects
- Charge mid cycle is OK
- 5 year charge shelf life
- 3 x capacity of ni-cads
- Very low cost

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

Starter Kit: Comprise 4 x AA cells and dedicated AC wall charger

£13.99 + £2 p&p

4 x AA cells (ready charged)
8 x AA cells (ready charged)
4 x AAA cells (uses standard charger)

Special Prices

- Dual Band 2m/70cm
- Alphanumeric Display
- Full CTCSS
- DTMF
- Up to 6W output
- Wideband Receive
- Keypad entry
- PC Compatible
- Windows Programming

SEND FOR BROCHURE
**Mobile HF+6m ATU**

£139

- 1.8 - 52MHz atu 300W max
- Built-in VSWR Xnedele meter 30/300W
- Coax fed systems *Thru button*
- 210 x 150 x 60mm

**DSP Data Audio Filter**

£139

- CW. SWO. 100.200.500Hz filter
- Suits all data modes
- Full adjustable pass band & filter

**Ameritron 811 1kW**

£799

- 1 kW linear 9dB Gain
- Uses a 5 element Monobander
- Built-in rugged AC Supply
- Instant by-pass switch
- PA VIA meter + G3 meter
- Over rated variable capacitors
- Fan cooled for long life
- Very efficient - 650W output
- Easy to tune and connect
- Size 16" x 13.5" x 5"

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

**Electronic Keyer**

£195

- Self contained - for all internal or external
- Semi auto and full auto modes
- Dot dash memory - self completing
- Weight, tone and Vol. controls
- Just plug in paddle and connect to rig
- Works with all modern rigs.

**300W Dummy Load**

£79.95

- Dummy Load
- 50 Ohm
- OK to 450MHz
- Air cooled
- SO-390
- Totally enclosed
- Essential item

**New CW Tutor**

£79.95

- "It's an Amazing Idea!"
- Displays words, letters and numbers
- 3 to 35WPM with natural CW note
- Various modes including Farnsworth
- Enormous vocabulary of words
- Actually sends QSOs as well
- Sends text just like an actual test
- A tutor that displays what it sends

**10W 6m SSB Transceiver**

£249

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

**200W Low Pass Filter**

£29.95

- 1.8 - 30MHz 200W PEP
- 50 Ohm impedance
- 50/W 50MHz 0.5dB at 30MHz
- SO-290 connectors

**Long Wire 300W ATU**

£49.95

- Long Wire ATU
- 300W pep rating
- 160 - 10m
- Tuned any wire
- Use Home
- Use Portable
- SO-290 to b.s.
All Change at Reg Ward in Axminster

We have moved Rodney, Bill and Mandy a few doors down the road into a new purpose built communications and home entertainment showroom.

Whether it’s a New amateur rig, shortwave receiver, the latest CD player, or just a chat and a cup of coffee we’d love to see you.

New Look Open Plan Showroom

We aim to take the hassle out of choosing a new rig and with Rodney and Bill on hand to offer friendly advice, you can be sure there won’t be any high pressure sales techniques!

Home Entertainment Systems

We have branched out into the world of home entertainment, and are now able to offer advice and demonstrations on the top of the range HiFi’s from Kenwood and Sony.

Pick and Play Radio Shack

Choose from any of the radios that Rodney has in stock, plug it in and try it out ‘on the air’. There’s no better way to decide which rig is best suited to you.

NEW RADIOS ON DEMONSTRATION.

<table>
<thead>
<tr>
<th>Radio Type</th>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Icom IC-746 HF</td>
<td>2m &amp; 6m Base Station</td>
<td>£1695</td>
</tr>
<tr>
<td>Icom IC-706MKII</td>
<td>2m &amp; 6m Mobile</td>
<td>£949</td>
</tr>
<tr>
<td>FT-1000MP HF Base Station</td>
<td>£2199</td>
<td></td>
</tr>
<tr>
<td>FT-8100</td>
<td>2m &amp; 70cms Mobile</td>
<td>£435</td>
</tr>
<tr>
<td>TMV-7E</td>
<td>2m &amp; 70cms Mobile</td>
<td>£495</td>
</tr>
<tr>
<td>FT-8100</td>
<td>2m &amp; 70cms Mobile</td>
<td>£495</td>
</tr>
<tr>
<td>TS-570D HF Base Station</td>
<td>£PHONE</td>
<td></td>
</tr>
</tbody>
</table>

We will match any price quoted by another authorised dealer.

Unbeatable Opening Offers

**Yaesu FT-920 HF + 6m Transceiver**

**£1399.00**

FREE Two Year Parts and Labour Warranty.

Deposit £139.90 12 payments of £104.92

**AR303 Light Duty Rotator**

Special Offer £39.00

**Manson EP920 Power Supply**

18A continuous 20A Max. £59.95

**TSB3303 Dual Band Colinear**

144/430MHz 1.15M 120W. £30.00

**TSB3608 Triband Colinear**

50/144/430MHz 2.43M 200W. £60.00

**Track Air Airband Receiver**

88-140MHz AM/FM 20 Memories £49.95

**Icom IC-746 HF + 6m Transceiver**

**£1695.00**

FREE Two Year Parts and Labour Warranty.

Deposit £169.50 12 payments of £127.12

**Siskin Axminster**

We are pleased to say that the full range of Siskin RF Data Products have now landed at Axminster.

**Timewave PK12 VHF 1200 baud TNC**

List Price £129.00 Our Price £99.00 Including computer cable and software.

**Siskin Multicat C.A.T. Interface**

For Kenwood, Icom and Yaesu

Only £69.00 Complete with DOS and Windows software, computer and radio cables.

Post and Packing £6.50 - Free Delivery on any items over £200.00 (UK Mainland Only)

Great Ways to Pay

1. 0% APR - simply pay a 10% deposit then pay the balance in 12 equal instalments.
2. Six Months Deferred - pay a 10% deposit and pay the balance at the end of six months.
3. 12, 24 or 36 month Finance plans at competitive rates. Subject to status.

Written quotations available on request.

Reg Ward Soundtalk, 1 Westminster House, West Street, Axminster EX13 5NX.

Tel: (01297) 34918 Fax: (01297) 34949. Open 10-5pm Mon., 9-5.30pm Tues.-Sat.
Look what we’re giving away!

IC-706MKII
Your chance to win an IC-706/MK2 absolutely FREE

WIN! WIN! WIN!
Spend £100 or more with us over the next three months (OR SPEND OVER £50.00 AT THE PICKETTS LOCK SHOW) at any of our branches and you will automatically be entered into our free competition to win an Icom IC-706MK2 Mobile Transceiver. There are twenty five runner up prizes available which include, handheld transceivers, clocks, books, shirts and many amateur radio accessories.

Also with every purchase over £50.00 at the PICKETTS LOCK SHOW we will be giving away vouchers to spend at our New Reg Ward shop in Axminster. This voucher will entitle you to £5.00 off any purchases over £50.00 and £10.00 off purchases over £100.00.

WIN! WIN! WIN!

SMC HQ, SM House, School Close, Chandlers Ford Ind. Est, Eastleigh, Hampshire SO53 4BY.
Tel: (01703) 251549. Open 9-5.15pm Monday-Friday, 9-1pm Saturday.
E-mail: amateur@smc-comms.com Web: http://www.smc-comms.com

Reg Ward, 1 Westminster House, West Street, Axminster EX13 5NX.
Tel: (01297) 34918 Fax: (01297) 34949. Open 10-5pm Monday, 9-5.30pm Tuesday-Saturday.

ARE Communications, 6 Royal Parade, Hanger Lane, London W5A 1ET.
Tel: 0181 997 4476 Fax: 0181 991 2565. 10-6pm Monday-Friday, Saturday 9-1pm.
Model clamps are Diecast Zinc Alloy Booms allow for end fixing as well sealed to prevent moisture ingress, and fitted with a downlead and 'N' socket All saddle are available world-wide only from EastComm Each beam is DC grounded, completely their bandwidth is excellent. Designed and built to professional standards, these beams not only do some lightweight makes fold up in the first puff of wind. but their bandwidth

**CQ-DX Antenna**

Do you remember when antennas were built to last? Not only do some lightweight makes fold up in the first puff of wind, but their bandwidth is poor due to the small diameter of the elements. CQ-DX Beams are made to last, and their bandwidth is excellent. Designed and built to professional standards, these beams are available world-wide only from EastComm. Each beam is DC grounded, completely sealed to prevent moisture ingress, and fitted with a downlead and 'N' socket. All saddle clamps are Diecast Zinc Alloy. Booms allow for end fixing as well.

**Mosley H.F. Antennas**

All Mosley Antennas have pre-drilled and colour coded element pieces which makes assembly quick and easy. All hardware is of stainless steel and tubing is aircraft grade, drawn, aluminium. This means that the telescopic tubing can be of closer tolerance.

Consider the difference that makes to wind loading and structural stability.

Mosley's unique design has two traps in each trap assembly. A Mosley 3 element, tri-bander, has only 6 trap assemblies, whilst other makes have twelve. Compare the trap assemblies as well.

**Price Match**

We match/better competitors advertised prices on current UK equipment - and give a better customer service. Phone us last, for the best deal.

**VIBROPLEX**

The only switches with built in Arc Protection

**FOR OUR FULL CATALOGUE SEND £2 IN STAMPS**

**DELTA 1.5kw COAX SWITCHES**

<table>
<thead>
<tr>
<th>Model</th>
<th>Band</th>
<th>Elements</th>
<th>Gain</th>
<th>Boom</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>CQ-DX 50/4Y</td>
<td>6m</td>
<td>4EL</td>
<td>10.6dB</td>
<td>3.8m</td>
<td>£89.95</td>
</tr>
<tr>
<td>CQ-DX 144/4Y</td>
<td>2m</td>
<td>10EL</td>
<td>13.6dB</td>
<td>3.8m</td>
<td>£79.95</td>
</tr>
<tr>
<td>CQ-DX 144/10XY</td>
<td>2m</td>
<td>10 EL crossed</td>
<td>13.6dB</td>
<td>4.0m</td>
<td>£109.95</td>
</tr>
<tr>
<td>CQ-DX 430/10Y</td>
<td>70cm</td>
<td>18EL</td>
<td>13.6dB</td>
<td>1.5m</td>
<td>£59.95</td>
</tr>
<tr>
<td>CQ-DX 430/18Y</td>
<td>70cm</td>
<td>18 EL crossed</td>
<td>17.6dB</td>
<td>2.8m</td>
<td>£69.95</td>
</tr>
<tr>
<td>CQ-DX 430/30XY</td>
<td>70cm</td>
<td>18 EL crossed</td>
<td>17.6dB</td>
<td>3.2m</td>
<td>£79.95</td>
</tr>
<tr>
<td>CQ-DX 430/24Y</td>
<td>70cm</td>
<td>24 EL crossed</td>
<td>18.6dB</td>
<td>4.0m</td>
<td>£94.95</td>
</tr>
</tbody>
</table>

**SAVE ON THESE INTRODUCTORY PRICES**

**CALLSIGN CLOCK £39.95**

Includes world-wide delivery

Hand finished with CALLSIGN on the face. An ideal gift for Radio Amateurs. A useful addition to any radio shack, and a valuable operating aid. A large face gives excellent visibility across a radio room. The hour is indicated in 12/24 hour format. Three colour with blue sky effect background. A large face gives excellent visibility across a radio room. The hour is indicated in 12/24 hour format.

**AUTEK RF ANTENNA ANALYSERS**

RF1 HF £169.95 P&P £7.95

RF5 VHF/UHF £289.95 P&P £10.00

**SWR/POWER METERS**

<table>
<thead>
<tr>
<th>Model</th>
<th>Power</th>
<th>P&amp;P £</th>
</tr>
</thead>
<tbody>
<tr>
<td>CROSS NEEDLE</td>
<td>1.8 - 250MHz</td>
<td>£109.95</td>
</tr>
<tr>
<td>CROSS NEEDLE</td>
<td>1.8 - 250 MHz</td>
<td>£109.95</td>
</tr>
<tr>
<td>CROSS NEEDLE</td>
<td>1.8 - 250MHz</td>
<td>£109.95</td>
</tr>
<tr>
<td>PORTABLE</td>
<td>140-170,400-500MHz</td>
<td>£34.95</td>
</tr>
</tbody>
</table>

**Original Bug STANDARD £179 DELUXE £219**

**IAMBIC STANDARD £169 DELUXE £199**

**Single Paddle STANDARD £169 DELUXE £199**

**Deluxe Double Key SINGLE PADDLE £369 IAMBIC £369**

**SWR/POWER METERS**

**IAMBIC STANDARD £169 DELUXE £199**

**Brass Racer IAMBIC £199**

**Straight Key STANDARD £169 DELUXE £199**

**All Our Vibroplex Keys Are Now Supplied With Ownership Certificates**

**For Our Full Catalogue Send £2 in Stamps**

**DELTA 1.5kw COAX SWITCHES**

<table>
<thead>
<tr>
<th>Model</th>
<th>Band</th>
<th>Elements</th>
<th>Gain</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delta 50/4Y</td>
<td>6m</td>
<td>4EL</td>
<td>10.6dB</td>
<td>£69.95</td>
</tr>
<tr>
<td>Delta 144/4Y</td>
<td>2m</td>
<td>10EL</td>
<td>13.6dB</td>
<td>£59.95</td>
</tr>
<tr>
<td>Delta 144/10XY</td>
<td>2m</td>
<td>10 EL crossed</td>
<td>13.6dB</td>
<td>£84.95</td>
</tr>
<tr>
<td>Delta 430/10Y</td>
<td>70cm</td>
<td>18EL</td>
<td>13.6dB</td>
<td>£54.95</td>
</tr>
<tr>
<td>Delta 430/18Y</td>
<td>70cm</td>
<td>18 EL crossed</td>
<td>17.6dB</td>
<td>£89.95</td>
</tr>
<tr>
<td>Delta 430/30XY</td>
<td>70cm</td>
<td>18 EL crossed</td>
<td>17.6dB</td>
<td>£109.95</td>
</tr>
<tr>
<td>Delta 430/24Y</td>
<td>70cm</td>
<td>24 EL crossed</td>
<td>18.6dB</td>
<td>£134.95</td>
</tr>
</tbody>
</table>

**SAFE ON THESE INTRODUCTORY PRICES**

**Carriage £10**

**CQ-DX Antenna**

Do you remember when antennas were built to last? Not only do some lightweight makes fold up in the first puff of wind, but their bandwidth is poor due to the small diameter of the elements. CQ-DX Beams are made to last, and their bandwidth is excellent. Designed and built to professional standards, these beams are available world-wide only from EastComm. Each beam is DC grounded, completely sealed to prevent moisture ingress, and fitted with a downlead and 'N' socket. All saddle clamps are Diecast Zinc Alloy. Booms allow for end fixing as well.

**Kenwood Yaesu Icom Price Match**

We match/better competitors advertised prices on current UK equipment - and give a better customer service. Phone us last, for the best deal.
**VHF/UHF ANTENNAS**

**DELUXE MOBILE ANTENNAS: P&P £1.95**

These antennas are built to ensure maximum strength and performance. Stainless steel whip, incorporating a 30" 3dBg system. A gold plated centre pin, Teflon insulator and silicon rubber gasket for perfect waterproofing.

<table>
<thead>
<tr>
<th>Model</th>
<th>Power</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>HP200</td>
<td>5/8</td>
<td>75W</td>
</tr>
<tr>
<td>142-141 5/8</td>
<td>5.95dB</td>
<td>12.3h</td>
</tr>
<tr>
<td>HP200C</td>
<td>2x1/2</td>
<td>150W</td>
</tr>
<tr>
<td>142-141/80</td>
<td>7.16dB</td>
<td>19.9h</td>
</tr>
<tr>
<td>HP700</td>
<td>5/8</td>
<td>100W</td>
</tr>
<tr>
<td>430-440 MHz</td>
<td>5.95dB</td>
<td>0.42m</td>
</tr>
<tr>
<td>HP700C</td>
<td>5/8+5/8</td>
<td>100W</td>
</tr>
<tr>
<td>430-440 MHz</td>
<td>7.15dB</td>
<td>0.73m</td>
</tr>
<tr>
<td>HP700F</td>
<td>1/4+5/8+5/8</td>
<td>150W</td>
</tr>
<tr>
<td>146-150,430/440 MHz</td>
<td>2.15+2.15dB</td>
<td>0.45m</td>
</tr>
<tr>
<td>HP707</td>
<td>1/2+2x5/8</td>
<td>150W</td>
</tr>
<tr>
<td>142-141,430-440 MHz</td>
<td>5.15+15.16dB</td>
<td>0.90m</td>
</tr>
</tbody>
</table>

**MAGNETIC MOUNT/CABLE ASSEMBLIES**

With coax terminated PL259 P&P £4.95

<table>
<thead>
<tr>
<th>Model</th>
<th>Diameter</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mag2PL</td>
<td>53mm Dia</td>
<td>£21.95</td>
</tr>
<tr>
<td>Mag15PL</td>
<td>130mm Dia</td>
<td>£26.95</td>
</tr>
<tr>
<td>Mag155PL</td>
<td>165mm Dia</td>
<td>£34.95</td>
</tr>
<tr>
<td>Mag160PL</td>
<td>210mm Dia</td>
<td>£43.95</td>
</tr>
</tbody>
</table>

**MOUNT/CABLE ASSEMBLIES**

With coax terminated PL259 P&P £5.95

<table>
<thead>
<tr>
<th>Model</th>
<th>Diameter</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trunk/Hatch MOUNT/Cable with T/T</td>
<td>£26.95</td>
<td></td>
</tr>
<tr>
<td>Panel MOUNT and cable assembly</td>
<td>£24.95</td>
<td></td>
</tr>
</tbody>
</table>

**DELUXE BASE ANTENNAS P&P £5.95**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Diameter</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>70-70 MHz</td>
<td>3.4/4, J-Pole</td>
<td>900W</td>
</tr>
<tr>
<td>70-70 MHz</td>
<td>3.4/2</td>
<td>200W</td>
</tr>
<tr>
<td>430-440 MHz</td>
<td>215dB</td>
<td>2.5m</td>
</tr>
<tr>
<td>430-440 MHz</td>
<td>215dB</td>
<td>2.5m</td>
</tr>
<tr>
<td>142-141/80 MHz</td>
<td>5.95dB</td>
<td>12.3h</td>
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<tr>
<td>142-141/80 MHz</td>
<td>5.95dB</td>
<td>12.3h</td>
</tr>
<tr>
<td>430-440 MHz</td>
<td>8.15dB</td>
<td>1.8m</td>
</tr>
<tr>
<td>SAS 600N</td>
<td>5/8+5/8+5/8</td>
<td>200W</td>
</tr>
<tr>
<td>430-440 MHz</td>
<td>10.15dB</td>
<td>2.8m</td>
</tr>
<tr>
<td>SAS 600N</td>
<td>1/2, 2x5/8</td>
<td>200W</td>
</tr>
<tr>
<td>142-141,430-440 MHz</td>
<td>5.15+15.16dB</td>
<td>1.3m</td>
</tr>
<tr>
<td>142-141,430-440 MHz</td>
<td>5.15+15.16dB</td>
<td>1.3m</td>
</tr>
<tr>
<td>142-141,430-440 MHz</td>
<td>7.15+15.16dB</td>
<td>2.7m</td>
</tr>
<tr>
<td>SD1300N</td>
<td>2x5/8</td>
<td>200W</td>
</tr>
<tr>
<td>RXC-13000</td>
<td>7x8/2W, 7x22cm</td>
<td>1.7m</td>
</tr>
</tbody>
</table>

**WE NEED QUALITY, USED, BOXED AMATEUR RADIO EQUIPMENT. BEST PRICES PAID. COLLECTION ARRANGED.**

---

**Sigma Wire Antennas**

The World's Largest Antenna Manufacturer

Sigma Antennas are easy to assemble using the supplied instructions. All antennas marked * have a 25W Current Ballast option for only £18 extra.

**Heavy Duty Deluxe G5RU's**

<table>
<thead>
<tr>
<th>Name</th>
<th>Full Size</th>
<th>Half Size</th>
<th>10/21/1015</th>
<th>51</th>
<th>102/5r/9815</th>
</tr>
</thead>
<tbody>
<tr>
<td>G5RU</td>
<td>£89.95</td>
<td>£4.95</td>
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**Shortened Dipole Antennas**

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**Receiving Dipole**

SO239 TERMINATION

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**Trapped Dipole Antennas**

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**Trapped Slopers**

**SO239 TERMINATION**

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**Baluns & Centre Connectors**


**SPB-1 Pro-Balun**

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7th & 8th MARCH

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<table>
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<th>Model</th>
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Practical Wireless, March 1998
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Maplin Electronics, PO Box 777, Rayleigh, Essex, England, SS6 8LU. Prices include VAT and are subject to change. All items subject to availability. E+OE. WHEN ORDERING PLEASE QUOTE PRIORITY CODE.
Odd Coincidence

A rather odd coincidence occurred late in the Autumn of 1997 when I received two letters within two or three days of each other, from two radio enthusiasts serving long prison sentences. One prisoner - Keith Winward - is from the North East of England and is serving his sentence in Maghaberry Prison in Northern Ireland. While the other prisoner - Don Sobey - is serving his sentence in Full Sutton prison near York.

It's not my job to comment or judge on their situation. But I always bear in mind that "But for the grace of God - and of course I was not intending to be - and of course I was more than willing to help them but in trying to do so discovered that the hobby of Amateur Radio (or even studying for the examination) is considered to be a security risk by the Prison Service.

The audio cassette Morse Code course I prepared for Keith Winward in time for Christmas was confiscated - even though it was sent through the Prison Education Service as arranged. Fortunately the Maghaberry staff relented when Keith explained that the RAE is a City & Guilds exam subject. They then realised that studying for the RAE is not a threat - especially when you consider that many prisons allow high level computing and telecommunications study courses (with obvious implications if you think obsessively of security).

Media Publicity

Personally, I think that in both cases (Full Sutton Prison are still refusing to allow Don Sobey to study for the RAE) our hobby is being considered as a 'security risk' because of Amateur's Radio's previous poor media publicity. Although I've written to the staff concerned - I feel sure that they must be influenced by the regular (ill-informed) media hype headlines we see so often.

Hopefully the staff at Full Sutton Prison will relent and allow Don Sobey to study for the RAE. I think this is important as (and I'm truly not intending to be) it will help both men to rehabilitate and prepare for their return to the community.

The obsessive imposition of 'security' (or the perceived 'security risk' factor with Amateur Radio does not stand up nowadays. Even 'ultra orthodox' extreme 'left' and 'right' wing nations allow access to our hobby. And even those nations that practice extreme religious and political doctrines and are 'closed' to the influence of the 'West' in every other sense of the word...still permit Amateur Radio. So, why can't someone study for it here in Britain...even if they are 'under punishment'?

Correspondence Course

Keith Winward has the 'go ahead' for the study of the RAE but can't afford the cost of the course (£185). But I'm willing to donate £50 towards the cost and I appeal for help from readers of like mind.

So, with your help we can assist someone to prepare to join our hobby and perhaps even a new job on his release. Our marvellous hobby of Amateur Radio is an honourable fellowship and not a threat to anyone - even if the student is in prison!

ROD Mannion

G3XFD
STAR LETTER

Scott-Taggart Memories

Dear Sir

Reading through some of my back numbers of *PW* I came across an article by Charles Miller on "Valve & Vintage", for his subject. In January and April 1997 issues, he chose that entrepreneur of the 1920s John Scott Taggart. I found the articles very interesting on this gentleman's energy on valves and radio sets.

It was later in time I remembered me, because I worked with John Scott Taggart when he was assigned to the Air Ministry as a civilian technician, where he worked on Radio-location as it was then called. I was 18 years old and as an Aerial Erector in the RAF I was instructed to work with Mr Scott Taggart on various new installations.

I found him to be a gentleman who certainly knew what he was doing, though at the time I found him a little eccentric. He used to ride a motorcycle to and from work, and on one particular occasion at the Chaln home Station in Rye in Sussex, he instructed me to take a long coaxial cable 350ft to the top of one of the transmitting towers and to fix it to a special box, he told me it was an r.f. aerial, at that time I wasn't fully technical, just did as I was told.

At the time of this Incident in 1941, there were no two-way radios and was instructed that when I was ready, to wave my arms, he watched through binoculars as I fitted the coaxial, when duly connected, as instructed, I waved my arms, he then disappeared into the block and I waited and waited. It was a very cold November afternoon and all I had for extra protection was a flying suit issued for our cold November afternoon and all.

About one and a half hours later, now nearly dark, he emerged from the Block, promptly got on his motorcycle and disappeared up the lanes away from the station. He was to have waved his arms to indicate he'd completed the exercise and for me to come down, but he completely forgot to signal me still sitting very uncomfortably 350ft in the air!

Naturally I came down as quickly as I could to find warmth in the Block, when I saw Mr Scott Taggart next. I reminded him of what had happened, he did apologise (with a smile I might add). However, I worked with that gentleman many times on similar projects until I was promoted and posted to another unit, but I will never forget Mr John Scott Taggart.

I have taken PW for three years now and always look forward to the day it arrives. It is a very likely magazine and on one last note, I would like to say how much we enjoyed the visit from Rob G3XFD to Eastbourne and Southdown ARS.

Anthony Rayner GMAWO
East Sussex

Editor's comment: Absolutely fascinating. Anthony! Thanks for the memory, and I thoroughly enjoyed my visit to the Southdown ARS too. Any more Wartime radio/radar memories readers?

Shabby Treatment

Dear Sir

If possible, I would like to express my great disappointment, via your magazine, of the shabby treatment of people like myself who have in the last year or so been trying to pass their Amateur Radio Examination. Having already passed Part 1 and now trying for Part 2, I now find that the goalposts have been moved.

If I and obviously many others do not pass Part 2 at the December '97 sitting, we now have to sit the whole Examination again. How on earth can the City & Guilds make an award and then turn round and say it is no longer valid?

Are we now, at the very least, entitled to a full refund for the money spent on gaining Part 1? What I suggest should have happened is that anyone who already has Part 1 (or Part 2 for that matter) should have been entitled to rest for the other Part required without having to sit the whole examination again!

I would be very interested in reading your comments (and others) on this matter and especially the comments of the City & Guilds of London Institute.

Ken Davies
Stirlingshire

Editor's comment: We sent a copy of Ken's letter to the City & Guilds and their reply follows:

I acknowledge the concern expressed by Mr Ken Davies with regard to the circumstances surrounding the introduction of the revised Radio Amateurs Examination in May 1998.

At the request of the Radio Society of Great Britain, City & Guilds agreed with the permission of the Radiocommunications Agency (Dept. of Trade & Industry) to introduce a revised RAE consisting of a single examination paper of 80 multiple-choice questions to reduce costs and facilitate access for potential candidates. A single examination paper also brings the RAE in line with other government licensing examinations, including the Driving and HGV theory tests.

After full consultation with both the Radiocommunications Agency (Department of Trade and Industry) and the Radio Society of Great Britain concerning the content and structure of the revised examination, it was agreed in January 1997 to introduce the revised RAE in May 1998 and discontinue the current examination after December 1997.

From February 1997 City & Guilds has given full publicity to all its centres concerning the introduction of the revised RAE including the arrangement for the phases out of the current syllabus. It was clearly stated that in the case of candidates who had passed only one of the two multiple-choice papers for the former RAE 7650-001 and 7650-002 there would be two further opportunities to take or re-sit the remaining paper in May and December 1997 only.

Because of the new structure of a single multiple-choice examination paper, it would be necessary for candidates holding a pass in only one of the former RAE papers to take the whole of the new examination from May 1998 onwards. In these circumstances it has now been considered appropriate to refund fees for any candidates having achieved one paper only in the past.

Full publicity to this effect has also been given to the Radio Society of Great Britain and by RadiCom, PW and other radio publications.

It should be noted that no major changes have been made to the content of the current

Absolutely Appalled Of Lancashire

Dear Sir

I was absolutely appalled to learn that Watson-Guphill Publications are about to discontinue the Radio Amateur Calbook and I understand that in future it will only be available on CD ROM. This sounds suspiciously like a decision made by an accountant! I do most of my reading in bed - I rest my case.

Bernard Whitty G3HWX
Lancashire

Editor's reply: Let's hope they change their mind Bernard. They are certainly going to lose a lot of 'readers' - including me!

Practical Wireless, March 1998
Carrying On The Practical Way
Dear Sir
I am writing with reference to the Rev. George Dobbs GSRJ’s excellent series entitled ‘Carrying On The Practical Way’. I always find this article very interesting, being of a practical mind myself, always eager to try new ideas. I hope that the high standard of the magazine will be maintained and thanks for the interesting look back at the ‘old days’. Martin Lindars
Somerset

Morse & Band Plans
Dear Sir
Having been a bit of a c.w. fanatic in my time, I do not lean either way on a compulsory Morse test. Some people are born into a fortunate time scale, while other just have to put up with it.

To me, a more important aspect of the forthcoming connection is the implementation of a compulsory band plan, with non adherence leading to confiscation of equipment. If a station is operated correctly and in accordance with the rules of the game, then everyone will benefit and life will take on a more intelligent and tolerant outlook.
J. G. Openshaw G2AYG
Lancashire

Editor’s reply: A very good point! George GSRJ is kept busy with h.f. matters but I’ll look into the possibilities.

Varactors & Varicap
Dear Sir
I would like to thank John G6BYV for his letter which appeared in the February 1998 issue of PW regarding my article ‘What Is A Varactor Diode?’ (published in the December 1997 issue). The situation with regard to varactor and varicap diodes may seem confusing.

Some years ago the term varicap was kept for diodes used in low power applications such as oscillators and other small tuning applications. Varactors as John rightly states tended to be used in multipliers where much higher powers were often encountered as demonstrated by the fact that they had to be mounted on a heatsink.

However, both diodes are exactly the same. Now, the term varactor is used for variable reactance (i.e. variable capacitance) diodes for all applications and the term varicap is used much less, although it is still seen occasionally.

As a result of the current usage I used the term varactor to describe the diode, hoping that it would reduce the confusion.
I hope this explains the situation.
Ian Poole G5WX
Middlesex

Working order. One of the good points about it is that it allows direct reading of cube roots which I found very useful. I also still have several others, including a Simplon Churchill which I used for variable reactance. It was a very useful tool, and I still have it and it is in full working order. One of the good points about it is that it allows direct reading of cube roots which I found very useful. I also still have several others, including a Simplon Churchill which I used for variable reactance. It was a very useful tool, and I still have it and it is in full working order.

Batteryless Calculators
Dear Sir
The article by Ray Fautley G8ASG on ‘Batteryless Calculators’ in the February edition of PW bought back nostalgic memories of school days. I too bought the Woolworths £6 two and a half new pencil wooden slide rule complete with pink cardboard case.
I still have it and it is in full

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 relevant information.

I hope that the high standard of the magazine will be maintained and thanks for the interesting look back at the ‘old days’.
Martin Lindars
Somerset

MARCONI OR TESLA
Dear Sir
All my life I have always understood that ‘wireless’ was invented by Marconi, but on a recent trip to the Rocky Mountains I found out that the Americans now give credit for this to Tesla. However, they do admit that the first wireless patent was British, taken out by Marconi in 1896, pointing out that before that date, in the early 1890s, Tesla had freely given some of his radio related inventions to the world before even thinking of patenting them, and he registered over 700 patents during his life (1856-1943).

To commemorate his numerous inventions there is a Nikola Tesla museum of Science and Industry in Colorado Springs, at 2220 E. Bijou St., which is well worth a visit by any collector or amateur. Open throughout the week from 10am to 4pm, there is a laboratory tour every afternoon.

So, the Americans say it was Tesla, the Russians give the credit to Popov, the Germans to Hertz and the English of course to Marconi! Who might I ask, did actually invent radio?

By that we mean communication by means of wireless waves, then surely the credit must go to Marconi, who, one hundred years ago, was sending messages in Morse code across the Solent from the Isle of Wight to Bournemouth. Only a few years later, he crossed the Atlantic, that really was communicating!

What do other readers think about who should get the credit?
Douglas Byrne G3KPO
Isle of Wight

Everyone has an opinion - Send yours to PM and win a voucher to spend on any PW service
Mr AMSAT UK!

Over the course of the last two years, the committee of AMSAT UK have been preparing for the retirement of Ron Broadbent MBE G3AAJ from his position as Secretary, Treasurer and Editor, which he has carried out so energetically for more than 20 years. During this time, Ron’s hard work, knowledge and enthusiasm has helped to build AMSAT UK into an organisation with an international reputation as a reliable and timely source of information.

Professor Martin Sweeting OBE G3YJO says that it’s always difficult to replace someone who has played such a formative and central role in building up a society and who has, indeed, become ‘Mr AMSAT UK’. However, the Committee has a responsibility to the membership to ensure a smooth and efficient succession, and also owes it to Ron to ensure that he can enjoy his retirement safe in the knowledge that all his hard work will not disappear.

Even now he’s officially retired Ron will remain active in the Committee of AMSAT UK, relieved of the burdens of day-to-day administration, he will have a responsibility for representing AMSAT UK on and to various bodies, such as the RSGB, IARU, etc., as well as having time to enjoy Amateur Radio! This of course will mean that the AMSAT organisation will continue to benefit from Ron’s great experience and knowledge and enthusiasm has carried out so energetically for more than 20 years. During this time, Ron’s hard work, knowledge and enthusiasm has helped to build AMSAT UK into an organisation with an international reputation as a reliable and timely source of information.

The PW team wish Ron all the best in his retirement and hope that he will enjoy being able to put the ‘hobby’ back into his Amateur Radio activities! In view of Ron’s retirement all correspondence to AMSAT UK should now be addressed to: AMSAT UK, 40 Downview, Small Dole, West Sussex BN5 9YB UK, Tel: (01273) 405733, Fax: (01273) 452927.

Ed Taylor NOED, our American correspondent, reports on an issue which is a concern on both sides of the Atlantic.

Safety And RF Fields

Administrations world-wide are introducing standards for safe levels of exposure to radio frequency (r.f.) energy. This subject has become particularly important recently, because of the huge growth in the use of mobile ‘phones in many countries. Users of devices which radiate r.f. close to the human body want to be sure that their equipment is safe. Radio Amateurs have been exempt from many of the regulations which affect commercial interests. The feeling has been that enthusiasts who have learnt about (and passed examinations relating to) safe usage of their own equipment will have enough knowledge to observe sensible precautions. However, a step towards regulation (rather than recommendation) for Radio Amateurs in the USA came into effect on January 1st of this year.

While the new system is not currently enforceable by law, it’s envisaged that there will actually be a legal requirement to comply in two to three years time. From the beginning of this year, amateurs in the USA should observe a series of basic guidelines relating to r.f. exposure.

The American national society (ARRL) have been working closely with the regulatory body to develop the new guidelines. Members of the ARRL and advisors were involved in reviewing preliminary drafts. One result of their deliberations is that a series of tables has now been published, showing various frequencies, power levels and antenna configurations, so that ‘hams’ can determine whether their stations comply with the rules.

So far, everyone in America who’s involved seems to be taking the issue seriously. However, there is not a complete consensus on the extent to which r.f. fields have adverse effects, or even on the level which is considered harmful.

However, there is no doubt that human bodies ought not to be exposed to large electromagnetic fields and rules need to be followed in order to avoid possible long-term problems. In fact, amateur stations can sometimes create much stronger fields than their commercial colleagues. For example, a kilowatt amplifier feeding a high-gain u.h.f. antenna can be very hazardous to anyone standing close by and in the direction of maximum radiation.

There has generally been praise from American amateurs for the way the new rules have been introduced. The majority consider that they are not a major burden, and it looks as if most ‘hams’ will already be in compliance.

To reinforce the message about r.f. environmental safety practices, questions have been added to the licensing exams to cover the scope of these regulations. Let’s hope we’ll see more situations where the national societies and government agencies co-operate to produce rules which are fair, sensible, and achieve a worthwhile goal.

Ed Taylor NOED
First UK Digital Radio Station
As the race for Digital Audio Broadcasting (DAB) or Digital Radio gathers pace across Europe, WRN1, the 24 hour-a-day English-language channel of London-based World Radio Network, has become the first British radio station to take part in an Eastern European pilot DAB service.

Polish Radio is undertaking trials in Warsaw using a transmitter at the Palace of Culture, the Polish capital's tallest building.

Polish Radio's national channels - Radio One, a general spoken word channel; Radio 2, a classical music, arts and education channel; Radio 3, for the under-25 listener and Radio BiS, an educational service - are carried on this new DAB pilot service. As from Thursday 15 January, WRN1 has been carried 24 hours a day on the Warsaw DAB Digital Radio service.

Simon Spanswick, World Radio Network's Director of Corporate Affairs says "We are delighted to be contributing to this important project in Poland. Poland has been running DAB Digital Radio trials for some time, and now we are able to bring a high-quality English-language service to complement Polish Radio's popular national channels".

The World Radio Network has been actively involved in DAB Digital Radio for some years, and WRN1 has been broadcast via this new transmission technology in London and Birmingham in the UK as part of the GWR DAB multiplex since 1996. World Radio Network is also heard overnight in Norway on the NRK's Alltid Nyheter DAB Digital Radio programme.

"DAB Digital Radio represents the future of the radio medium", says Simon Spanswick. "It offers superb sound quality, without any of the hiss and interference that can affect f.m. or the distortion and fading of a.m. broadcasts. And besides that, it offers the opportunity for listeners to access to a wide range of new services, as well as a whole host of added-value multi-media services.

"World Radio Network is planning to expand its coverage via DAB Digital Radio across Europe and in other parts of the world as this exciting new technology captures the imagination of listeners. We are also demonstrating that DAB Digital Radio offers innovative broadcasters the opportunity to reach new audiences in new markets".

The first consumer DAB Digital Radio receivers are expected to be in the shops from the Spring of this year. So far more than 20 manufacturers have unveiled prototype receivers including in-car radios and home hi-fi tuners and mid-systems. Watch this space!

Badger Boards
Badger Boards, the supplier of p.c.b.s for Practical Wireless and Short Wave Magazine projects has moved to 12 Hazelhurst Road, Castle Bromwich, Birmingham B36 0BH.

There is also a new catalogue available, containing a range of components, projects and p.c.b.s, which is available free to anyone sending Roy or Sue Martin an s.s.a.e.
New Radio Group

Martin Hailard MOAJN, Divisional Sergeant of the Bloxwich Quad Division, has recently written to 'Club Spotlight' with information of a station recently set-up and news of a new radio group within the St John Ambulance.

The station G865J ran from 1200 on the 29th November to 1500 on the 30th November 1997. The first h.f. antenna was a half size G5RV and the second h.f. antenna was a vertical. A single band antenna was used for the v.h.f. radio and a dual-band antenna was used for u.h.f. radio. For v.h.f. s.s.b. a small beam (N6CV) was used, which was rotated by hand.

The furthest station contacted on h.f. was R97V which was a special event station in Murum, Russia. This was on a frequency of 21.2648MHz using 100W via the vertical antenna. On v.h.f., the furthest station worked was G7HUD, who was located in Birkenhead. This was done on a frequency of 144.260MHz using 10W via the HB9CV.

All radio equipment used was loaned to the group by various people who Martin would like to thank. He says that without the help of these people, the station would not have been able to run.

Operation of the station was overseen by Martin MOAJN, David GOWWA, Kevin G6KOY, Philip G6UKV, Ian G1GZM, Stuart GT9RS, Mark GWCI and Garrett GWL6S. So, thanks to all who helped out with the running of the station and those who raised sponsorship. The money raised from the sponsorship was in the region of £150.

The date for the next station is hoped to be over the weekend of the 17 and 18th October 1998 and It is raised from the sponsorship was in the region of £150. The money would not have been able to run.

The main aim of the group is to promote the use of radio within the St John Ambulance and it is also the growing interest within the St John Ambulance, it says that without the help of these people, the station would not have been able to run.

Operation of the station was overseen by Martin MOAJN, David GOWWA, Kevin G6KOY, Philip G6UKV, Ian G1GZM, Stuart GT9RS, Mark GWCI and Garrett GWL6S. So, thanks to all who helped out with the running of the station and those who raised sponsorship. The money raised from the sponsorship was in the region of £150.

The date for the next station is hoped to be over the weekend of the 17 and 18th October 1998 and it is hoped to link every county within the country. Due to the growing interest within the St John Ambulance. It has been decided to start up a radio group.

The main aim of the group is to promote the use of radio within the St John Ambulance and it is also hoped to run one special event station each year to raise money for them. It has been suggested that other areas/counties (if they are willing) start their own radio group this will make the goal of linking counties a lot easier. Help in setting up a group in other areas is available by contacting Martin MOAJN during the daytime on (0961) 808807 (mobile) or in the evenings on (0961) 808107 (mobile).

Bangor's Talk

The Bangor & District Amateur Radio Society meet on the 1st Wednesday of the month in the Clandeboye Lodge Hotel, Bangor at 8pm. A talk on Packet Radio will be given, with live demos, by Hugh GI3TTL on March 4th.

In addition, the annual Constructors Contest will be held that evening. Visitors and new members are most welcome. More information from Roy G1OWVN on (01247) 460716.

Cockenzie’s Background

The Cockenzie & Port Seton Amateur Radio Club (winners of the 1997 Club Spotlight Club Magazine Competition) was formed back in 1984 with the sole aim to help each other with any Amateur Radio problems in a relaxed atmosphere and also that there would be no official hierarchy, Chairman, Secretary, Treasurer, etc. to keep the club totally informal. From this humble beginning, the club has just grown from strength-to-strength, averaging now 33 people at each club night.

Since those early days, the club has moved on in the sense that they are now a very active group, running Novice classes, Morse tuition, Contesting, running Special event Stations, Talks, etc., but still managing to keep the totally informal system. The only difference in the ‘informal structure’ is that the club have now adopted the British Heart Foundation as their charity and have managed to raise over £3660 for them since 1994!

You may be wondering why the Cockenzie club adopted the British Heart Foundation as their charity, well, it started at the very beginning of 1994, after the very sudden death of one of the club members, Bunny Anderson (s.w.l.). Bunny was staying with her daughter and her husband at Blyth for the 1993 Christmas, when he suddenly collapsed and was rushed to Warbreck Hospital, Ashington, but unfortunately died suddenly two days later.

A wreath was purchased by the club to put on Bunny’s grave at the funeral, but as mentioned before, the club has no funds at all, so at their January Club Night, they had a ‘whip’ round, which more than covered the cost of the wreath. The question was, what were they going to do with the excess money?

Well, that was simply answered, why not donate it to the British Heart Foundation as Bunny had died from the result of a burst Aortic Artery. At that time, the club were also in the progress of organising their first Junk Night, and it was suggested that any money that was left over, would once again be donated to the British Heart Foundation, in fact, it was then decided that the Foundation would be the Cockenzie’s charity, in Bunny’s memory.

Special Event Radio Station

Club Spotlight has recently heard from Dennis K. Egan G4WXX, Secretary/Treasurer of the Prudential Amateur Radio Society (PARS), who has news of a Special Event Station to celebrate Prudential’s 150th Anniversary. Here he tells us about it in his own words.

“The last time a Special Event Amateur Radio Station was put on the air worldwide with the callsign GB3PRU was from Chief Office on the 6th August 1978 and reported in ‘Prunews’ No. 48 in September/October of that year on the front page. It was only from 1982/1984 that the Prudential Amateur Radio Society came into being from a small nucleus of licensed Prudential staff and the callsigns GB3PRU, G0PRU and G0PPS being issued by the Radiocommunications Agency. The first callsign GB3PRU being the oldest, issued on the 1st November 1978, which is the Class B licence for v.h.f. use only, which at the time was for shorter distance...
Club Reminders

Members of the Wigtownshire Amateur Radio Club (GM4RIV) meet at the Aird Unit, Stranraer Academy, Cairnport Road, Stranraer. Meetings are held on Thursday evenings at 1930 until 2200hrs local. RAE and c.w. classes are available. Any visitors will be made most welcome and a cup of tea is always available! Contact Gerry Maxwell GM4BAE on (01775) 702786 for further details.

Meetings are held each Friday night at the ECC Social Club, Highweek, Newton Abbot for the Torbay Amateur Radio Society, starting at 7.30pm. February 20 - AGM. For further details of activities, contact Peter G4VDT on (01803) 864528.

The Echelford Amateur Radio Society meet on the 2nd and 4th Thursdays of each month at The Hall, St Martin's Court, Kingstone Crescent, Ashford, Middlesex at 7.30 for an 8pm start. More information about the Society is available from Robin Newes, QTHR, on (01784) 456513.

Members of the Hoddesdon Radio Club meet on alternate Thursdays at 8pm at the Conservative Club, Rye Road, Hoddesdon. More details from Don G3JNJ on 0181-292 3678.

Meetings are held every Wednesday at 8pm at Cotterbrook Village Hall on the A49, north of Tarporley, Cheshire for the Mid-Cheshire Amateur Radio Society. After the business, coffee and biscuits are available and visitors and new members are always made welcome. Regular RAE and c.w. classes are also available. Find out more from Ted Bannister on (01606) 592207.

The Rugby Amateur Transmitting Society meet every Tuesday evening at the Cricket Pavilion, Rugby Radio Station, A5 Watling Street, Near Rugby, Warwickshire at 7.30pm. If you wish to join the Society or just make some enquiries, please get in touch with Arthur Gallichan M0ASD on (01788) 550778.

Members of the South Normanton & District Amateur Radio Club meet at the Pavillion, Rugby Radio Station. A5 Watling Street, near Rugby. The club radio and technical library are available to club members. Further information from Alan Martin GM7ONJ on (01382) 739719.

The Horsham Amateur Radio Club meet at the Guide Hall, Denne Road, Horsham, West Sussex. Further Information from Miss M. J. Dixon G7EYL, 70 Shelley Drive, Broadbridge Heath, Nr Horsham, West Sussex RH12 4NT, Tel: (01403) 5701 Daytime or (01403) 276525 evenings.

Meetings are held in the Science Lab., Hind Leys Community College, Forest Street, Shepshed. New members are always most welcome. Further information and details of activities from Ian G8SNF on (01509) 218259.

The Trowbridge & District Amateur Radio Club meet at The Railway Sports & Social Club, Rye Road, Trowbridge from 7.45pm on February 25th there is a talk on electronics. There are some great talks every month at 8pm at Club HQ, 61 Emscote Road, Warwick. All members and visitors are most welcome. Contact G8XDL on (01926) 498115 for more details.

Members of the Liverpool Amateur Radio Society meet on Monday evening for construction, computers, operating and general chat, etc. and on a Tuesday evening for a program of events. Meetings are held in the Science Lab., Hind Leys Community College, Forest Street, Shepshed. New members are always most welcome. Further information and details of activities from Ian G8SNF on (01509) 218259.

The Mid-Warwickshire Amateur Radio Society meet on the 2nd and 4th Tuesdays in the month at 8pm at Club HQ, 61 Emscote Road, Warwick. All members and visitors are most welcome. Contact G8XDL on (01926) 498115 for further details.

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The Garmin EXPERIENCE!

The Satellite Global Positioning System - What Is It?, How Does It Work and How Is It Used?

David Butler G4ASR has been roaming with the Garmin GPS III Personal Navigator. But before he did he took a look at exactly what GPS is, and after reading his article we think you'll agree it's a fascinating subject and you'll appreciate just how useful a 'personal navigator' can be.

Since prehistoric times people have been trying to figure out a reliable way to tell them where they are, to help guide them to where they are going and to get them back home again. Cavemen probably used stones to mark a trail when they set out hunting for food.

When navigators first sailed into the open ocean they discovered they could chart their course by following the stars. The next major navigational developments were the magnetic compass and the sextant.

The compass could show you in what direction you were travelling and the sextant could determine your latitude. However, mariners were still unable to determine their longitude until the development of the chronometer which could accurately measure time.

For over 200 years the compass, sextant and chronometer were used to provide bearing, latitude, longitude and time information. Prior to, and during the Second World War, several radio-based navigation systems were developed for use by ships and aeroplanes.

Some of the original ground-based radio-navigation systems, such as LORAN, are still in use today.

One drawback of using radio waves is that you must choose between a system that is very accurate (very high frequencies (V.H.F.), ultra high frequencies (U.H.F.) or super high frequencies (S.H.F.)) but doesn't cover a wide area or one that covers a wide area (medium frequencies (M.F.), or high frequencies (H.F.)) but is not very accurate.

Engineers therefore decided that the only way to cover the entire world's surface and to obtain the required positional accuracy was to place microwave radio transmitters on satellites out in space. This is one of the main principles behind the satellite Global Positioning System (GPS).

What GPS provides is an extremely accurate passive system allowing three dimensional positioning, velocity and time determination. It also calculates a common world-wide grid easily converted to other local datum's, providing real-time and continuous information in all weather conditions.

Who Owns & Operates The GPS?
Currently there are two operational satellite constellations, GLONASS and NAVSTAR. The GLONASS is the Soviet equivalent of GPS, although manufacturers of GPS receivers seem less than keen to rely on it in these changing times.

The NAVSTAR is the GPS constellation developed, funded and controlled by the United States Department of Defence (DOD). It was formally announced as being in full operational capability in 1995 (nearly 20 years after the first GPS satellite was launched!) and will be the DOD's primary radio-navigation system well into the next millennium.

Three Part System
The entire navigational system actually consists of three parts; the space segment, ground control and the user. Now I'll take a look at each of the areas in turn.

The space segment consists of a constellation of 24 operational NAVSTAR satellites plus a number of in-orbit 'spares'. They are arranged in six circular orbital planes (four satellites in each) with an inclination angle of 56°.

The satellites are located 20,200km above the earth's surface and take 12 hours to complete one orbit. Therefore the satellites do not remain fixed in the same point of the sky like a geostationary satellite would, but move slowly from horizon to horizon.

However, the constellation is arranged so that at any time a minimum of 6 satellites will be in view to users anywhere in the world. The orbital paths of these satellites take them approximately 60° North and 60° South latitudes. What this means is that you can receive satellite signals anywhere in the world, at any time. If you move closer to the poles you will still pick up the GPS satellites but they won't be directly overhead anymore.

First Launched
The first GPS satellite was launched in February 1978 and in the following 20 years a number of different types or 'blocks' have been placed in orbit.
To the civilian or commercial user however, they all carry out the same function.

Each satellite weighs almost a tonne and measures about 5.5 metres across with the solar panels extended. The satellites have a lifetime of about 10 years, similar to that of commercial geostationary satellites.

The satellites are generally allowed to "float" in their orbits and aren't rigidly held in position. However, the attitude of the satellites is controlled to keep them pointing at the earth. This is achieved by momentum wheels, magnetic coils and attitude control thrusters. Attitude control is normally maintained by the momentum wheels and by torquing against the earth's magnetic field. The thrusters are only used when the on-board computer senses unusually high momentum continuing for over two hours. The on-board transmitter has a power output of 50W and this feeds a specially shaped antenna system designed to supply even power across the face of the earth.

**Frequency Bands**

The United States positioning system has been allocated down-link frequencies in two bands: Link 1 (L1) between 1559-1610MHz and Link 2 (L2) between 1215-1240MHz. These frequencies lie in the region designated as L-Band (that's between 1000-2000MHz or 1-2GHz).

The L-band is ideally suited for satellite to earth transmissions such as GPS. At frequencies below L-band (v.h.f. and h.f.) natural conditions and spectrum crowding preclude implementation of an precise positioning signal. Ionospheric delay, galactic background noise and antenna size as well as the existence of many high-power interference sources are obstacles to the GPS.

At the other end of the scale, frequencies in the s.h.f. region have high attenuation due to the atmosphere and rain. Also spreading loss and beam pointing requirements make a GPS ranging signal impractical.

The most practical frequencies therefore lie between 900MHz and 8GHz, with the best link margins occurring at L-band. Each NAVSTAR satellite actually transmits two L-band radio frequency (r.f.) signals, L1 on 1575.42MHz and L2 on 1227.60MHz. Civilian and commercial operators use the L1 frequency for standard positioning and the military use the L2 frequency for precise positioning and other uses.

**Ground Control**

The ground control segment consists of a master control station located at Falcon Air Force Base, Colorado Springs. Remote stations at Hawaii and Kwajalein in the Pacific Ocean, Diego Garcia in the Indian Ocean, Ascension Island in the Atlantic Ocean and Colorado Springs, Colorado carry out a monitoring function. Three of the locations in the Atlantic, Indian and Pacific Ocean regions (Ascension Island, Diego Garcia, Kwajalein) are provided with up-link facilities. The monitor stations track all GPS satellites in view and collect ranging information from the satellite broadcasts.

The monitor stations then send the information they collect from each of the satellites back to the master control station, which computes extremely precise satellite orbits. The information is then formatted into updated navigation messages and transmitted to each satellite via the ground station antennas.

**Transmitted Information**

So, what information does the NAVSTAR satellite transmit? In fact it transmits the GPS signal, which contains a pseudo-random code, ephemeris data and almanac data. The pseudo-random code identifies which satellite is transmitting, in other words it simply an identification code.

The GPS receiver indicates which satellites you are receiving with a number from 1 through 32. But, why 32 when there's only 24 satellites? That's simply because there are a number of on-orbit spares and it simplifies the maintenance of the GPS constellation. A replacement satellite can be placed into the correct orbit, turned on and used before the satellite it was intended to replace actually fails! The master control station then allocates a different identification number (from 1 through 32) to identify the new satellite.

Ephemeris data is constantly transmitted by each satellite and contains "housekeeping" information such as healthy or unhealthy status of the satellite, the current date and time. Without this part of the message your GPS receiver would have no idea what the current time and date is. This part of the signal is essential to determining your position.

The almanac data tells the GPS receiver where each GPS satellite should be at any time throughout the day. Each satellite transmits almanac data showing the orbital information for that satellite and for every other satellite in the system.

The signals are transmitted using spread spectrum (s.s.) techniques. An s.s. system is one in which the transmitted signal is spread over a wide frequency band, much wider than the minimum bandwidth required to normally transmit the information being sent.

One advantage of using the s.s. modulation system is that it resists intentional and non-intentional interference. It can also share the same frequency band with other users as a spread-spectrum GPS receiver doesn't "see" other narrow-band signals. This is because it's listening to a much wider bandwidth for signals with a specific pseudo-random code sequence.

There is also one unique property that arises and how Garmin can cram the whole world in a little box!"
position, velocity and time. The GPS receivers can be hand carried or installed on cars, lorries, aircraft and ships. In fact virtually anywhere that can 'see' the satellites overhead.

**How GPS Works**

Finally it's time to pull everything together to show you how the GPS works. And to start with each satellite is equipped with an accurate clock and it transmits signals coupled with a precise time message. The clocks keep time to within three nanoseconds, that's 0.000000003 or three billionths of a second! Each satellite transmits a message which essentially says, 'I'm satellite X, my position is currently Y and this message was sent at time Z'. Your GPS receiver reads the message and saves the ephemeris and almanac data for further use and accurately sets the internal clock. This precision timing is important because the GPS receiver must know exactly how long it takes for the signal to get from the satellite.

Then to determine your position, the GPS receiver compares the time a signal was transmitted from a satellite with the time it was received by the GPS receiver. The time difference tells the GPS receiver how far away that particular satellite is. If distance measurements from a few more satellites are added then it can triangulate your position. This is exactly what a GPS receiver does.

By using a minimum of three satellites the GPS receiver can determine a latitude and longitude position (a 2D position fix). With four or more satellites, a GPS receiver can determine a 3D position fix which includes latitude, longitude and altitude. By continuously updating your position, a GPS receiver can also accurately provide speed and direction of travel (referred to as 'ground speed' and 'ground track').

**How Accurate?**

The GPS provides two levels of service, the Standard Positioning Service (SPS) and the Precise Positioning Service (PPS). The Standard Positioning Service is a positioning and timing service which is available to all GPS users on a continuous, world-wide basis with no direct charge. The SPS provides a predictable positioning accuracy of 100m (95%) horizontally, 157m (95%) vertically and time transfer accuracy to UTC within 340 nanoseconds (95%).

The Precise Positioning Service (PPS) is a highly accurate military positioning, velocity and timing service which is available on a continuous, world-wide basis only to users authorized by the US military and is denied to unauthorised users by the use of cryptography. The PPS provides a predictable positioning accuracy of at least 22m (95%) horizontally and 27.7m vertically and time transfer accuracy to UTC within 200 nanoseconds (95%).

There are several factors which can add error to your GPS accuracy. The first of these and the largest source of positional error is called Selective Availability (SA).

The SA is an intentionally imposed degradation in the accuracy of civilian GPS by the United States Department of Defense (DoD). Under SA, GPS accuracy can be degraded to a maximum of 100m but normally the DoD do not degrade GPS accuracy to that level. However, the DoD have set a goal of reducing the SA to zero by 2008 (and tasked the military to use electronic warfare techniques to selectively deny the civil link to enemy forces.) Nevertheless errors of 30m or more are not unusual with a commercial GPS.

Another factor that affects the accuracy of the GPS is the number and location of satellites it can 'see' at any particular time. For example, you could be in a screened location where a GPS receiver can only lock onto four satellites. If all four of these satellites are in the sky to the north and west of the receiver, satellite geometry is rather poor. That's because all the distance measurements are from the same general direction. This means triangulation is poor and the common area where these distance measurements intersect is fairly large. However, if you are in a clear location and those same four satellites were spread out in all directions, north, south, east and west, the positional accuracy improves dramatically. The common area where all four distance measurements intersect is much smaller and even with SA the accuracy may be within 30m or better is important.

Therefore satellite geometry becomes an issue when using a GPS receiver in a vehicle, near tall buildings, in thickly wooded or mountainous areas. When the GPS signals are blocked from several satellites, the relative position of the remaining satellites will determine how accurate the GPS position will be.

A good GPS receiver indicates not only which satellites are available for use but where they are in the sky (azimuth and elevation) so that you may determine if the signal of a given satellite is being obstructed.

Other sources of error include multipath effects, propagation delays due to atmospheric effects and internal clock errors. In most cases the GPS receiver is designed to compensate for these effects and will do so quite efficiently. But very small errors due to these items can still occur.

So in reality a typical civilian GPS receiver may have an accuracy of between 20 to 100m, depending on the current status of selective availability, the number of satellites available and the geometry of those satellites. However, this can be reduced to 5m or better (in some cases under 1m) through a process known as Differential GPS (DGPS). The DGPS system employs a second receiver (such as the Garmin GBR-21 beacon receiver) to compute.
corrections to the GPS satellite measurements.

The Garmin GPS III Personal Navigator
So, with the background information under your belts here is my review of the Garmin GPS III Personal Navigator.

The new Garmin GPS-III is a global positioning system with a difference. It's loaded with an electronic map covering millions of miles of motorways, normal roads, railways, rivers, towns, villages and shorelines.

So the GPS-III not only calculates your speed, time and distance to destination, it also displays your position on a real-time moving map. There's also a handy trip odometer, compass bearing, average and maximum speed, and a radial bearing from each visible satellite. The Garmin GPS-III not only calculates the current position co-ordinates, date and time. Your speed is displayed in miles per hour (mph), if required, and it also provides an RS-232 compatible output allowing an easy interface to a wide range of external devices. These can include a computer, differential beacon receiver (DGPS), a second GPS receiver or a marine auto-pilot unit. The small flip-up antenna is detachable and connects with a standard BNC connector allowing remote-mounted antennas to be attached.

The Garmin GPS III Personal Navigator comes with a user's manual, a quick reference chart, wrist strap and Velcro mount as standard. Optional accessories include a vehicle dash bracket, bicycle handlebar bracket, cigarette lighter adapter, p.c. kit (with data cable), power/data cable, carrying case, remote antenna (GA26) and a differential beacon receiver (GSB-21).

Navigator Capabilities
The GPS III features six main pages, which are shown on the i.c.d. screen. These display the satellite status, position, map, compass, highway and active route pages.

You can scroll through the pages in either direction using panel mounted buttons. The satellite status page features a sky view of all available satellites, corresponding signal strength bars and the status of your current fix (poor coverage, 2D or 3D fix). It also indicates the accuracy of the position fix, using dilution of precision (DOP) and estimated position error (EPE) figures.

The DOP measures the number of satellites received and where they are relative to each other. The EPE uses this DOP figures and other factors to calculate a horizontal position error, in feet or metres. A bar graph also tells you how much battery power is available.

Position & Map Pages
The position page displays a graphic compass showing your direction of travel (track), current position co-ordinates, date and time. The current position read-out can be displayed in latitude/longitude (in degrees, minutes, seconds or decimal degrees), Universal Transverse Mercator (UTM) or Universal Polar Stereographic (UPS) grids, six other grids including the British Grid system (to show your WAB square, e.g. SO34) and Maidenhead locator (e.g. IO81MX).

There are six user-selectable data fields which also display your current speed, average speed, trip odometer, trip timer and sunrise/sunset times at your current location. All the user-selectable fields can be changed to display other information if required.

The map page shows your real-time track log (an electronic "bread crumb" trail that appears directly on the map as you move) and your present position as a pointer icon in the centre of the map. But it can do much more than just plot your course and route.

The map also displays background details such as town names, road names, rivers, lakes, coastlines and countries. An on-screen cursor lets you pan ahead to nearby locations (waypoints) to determine the distance and bearing to any new map position while you navigate.

There are 24 selectable map scales ranging from 800km (500 miles) down to 30m (120ft). The map can be oriented with the top of the page always pointing north, oriented along your desired course or it can automatically rotate to keep your current direction of travel (track) at the top of the screen.

Compass & Highway Pages
The GPS III features two different navigation pages, compass and highway. The Compass page provides graphic steering guidance to a destination waypoint with an emphasis on the bearing to your destination and current direction of travel. The middle of the screen features a rotating 'compass ring' that shows your course over ground and a bearing pointer that indicates the direction of the destination.

The Highway page places greater emphasis on the straight-line desired course and the distance and direction you are off course. The middle of the screen provides visual guidance to your destination on a moving graphic 'highway'. A line down the middle of the highway represents your desired course. As you move towards your destination the highway will actually move indicating the direction you are off course.

Active Route Page
Before you can use the GPS III to guide you somewhere you have to mark a position as a waypoint. The Garmin III Personal Navigator can store up to 500 such waypoints in its memory, assigning each a name and icon.

Once you've stored a waypoint in memory you can use the GPS III to guide you to it by using the GOTO feature. This function is displayed in the last of the six main screens within the Active Route page. In addition to the six main screens you can also access the Main Menu which gives you many additional pages (sub-menus). These are

Practical Wireless, March 1998
Did you Know?

Useful GPS Facts

The first GPS satellite was launched in 1978.

There are currently two operational satellite constellations - GLOSTAR and NAVSTAR.

The NAVSTAR satellite constellation came into full operation in 1995.

GPS satellites are situated some 20200km above the earth's surface.

Each NAVSTAR satellite transmits two r.f. signals on 1575.42 and 1227.60MHz.

The GPS satellite signals are transmitted using spread spectrum techniques.

The Garmin GPS Web site can be found at: www.garmin.com

"It's amazing! It really did it!"

I used to create or edit waypoints, create routes, list nearby waypoints, review trip information and times, alter interface formats and to make changes to the GPS III system settings. You can set limits that bring up an alarm if you stray off course and you can even use it as a conventional alarm clock!

Personal & Compact

When I first took the Garmin GPS III Personal Navigator out of its box I was surprised how compact it actually was. The case is fully- sealed water proof to IPX7 standards and made of high-impact plastic.

A lot of thought has obviously gone into the design of the GPS III and I was pleased with the way it felt, the size of the display screen and the layout of the user buttons. It really is ideal for carrying in your pocket, in your hand or for discretely mounting within a car.

Unlike other equipment reviews I've carried out I really did need to read the manual first but at 90-pages this can be rather time consuming. However, Garmin have thought of this and have provided a training mode accessible from the main menu page. The simulator is excellent and I was able to pick-up the basic features very quickly.

The first time you turn on the GPS III you need to initialise it. This basically means you have to reset the unit, by scrolling the map to your approximate location (within 350km or so), and then wait for the satellites to lock in.

The auto-locate mode normally takes up to five minutes but when I first turned it on it came up with a location centred on Poole, Dorset. (Obviously someone in the PW offices had been playing with it before sending it to me!). As it didn't need the initial (once only) set-up, it only took about 30 seconds for the unit to acquire the requisite number of satellites.

The unit then automatically 'jumped' to the correct map location, my home OTH in Herefordshire. It's amazing! It really did it!

As I had the review model over the Christmas period I was able to test out the automatic acquisition and map function whilst carrying out the annual 'Christmas present run' around the country. My first journey was from Herefordshire to London and I found the interests of safety I located the Personal Navigator in the back seat with my children, Ben and William.

Before leaving I had detached the flip-up antenna and connected a remote mounted antenna on the rear of the car. On switch-on the unit acquired the satellites and automatically jumped to the map location again within 30 seconds.

Throughout the three hour journey to London Ben and William were able to correctly tell me every A-road and Motorway we were travelling on. The 'bread crumb' trail accurately followed all the roads of our journey.

The next leg of the journey was from London to Ingatestone, Essex. The previous evening I had spent considerable time putting in numerous waypoints (it gets easier with practice) to enable Ben and William to navigate us to a location they had never been to before. A teenager and his 12 year old brother navigating! This was risky stuff!

Using a combination of the active route page and map page they got me to within 3.2km of my destination. As the last part of the journey was on an unclassified road, Ingatestone wasn't shown on the map (most smaller villages aren't) and as I didn't have a precise grid reference of my brother-in-law's house I wasn't really surprised.

Even so we were all very pleased with how this little box of tricks could navigate us around the country. The only thing that worried me was that my kids could tell how fast I was driving along the motorway!

The next trip was to my parents' house in Ferndown, Dorset. This time I left the GPS switched off as I wanted to see how quickly the unit could switch to a new map location when I arrived on the south coast.

On arrival I parked in a slightly screened area, with many tall (and wet) pine trees above me. Even so, it only took 42 seconds for the unit to acquire the satellites and for the correct map location to automatically 'pop-up' on the screen.

The review model comes with a moving map of the UK and Europe. But exactly what detail does it show? Well it shows all major towns, cities, A-roads, Motorways and other fixed features.

In the UK for example the map shows Lerwick in the Shetland Islands, Merthyr Tydfil in South Wales and the A650 in the Highlands of Anglesey. Features such as the railway track at Ryde on the Isle of Wight, the River Wye through Hereford and Graftham Water (a lake near Huntingdon are also accurately shown).

The unit doesn't identify country lanes and some very recent roads but it's still very accurate. Surprisingly though, it didn't show the M50 and that's been around for nearly 20 years or so! Nevertheless I was very impressed.

On switch-on the unit displays the message 'International Land Data, Version 1.01, 1996'. I just wondered whether the GPS III could be upgraded at a later date with a new ROM map? This level of detail is carried throughout all of western Europe.

In Germany for example it shows all major roads and even the town of Weinheim, the location for Europe's largest v.h.f. convention.

As you scroll around the western European level of detail decreases but even so all the cities and major road routes are still shown.

As you scroll around to the other side of the world, say Australia or South America, the map shows all major cities, individual countries and major cities, only losing the road detail. I just can't understand how Garmin can cram the whole world in a little box!

Magnetic Antenna

Outdoor performance of the GPS III using the built-in antenna is very impressive. However, you do need to keep the unit a reasonable distance away from your body to reduce shielding effects and to increase the overall accuracy.

With the information being updated once every second, it's really amazing to see how fast you are walking and quickly showing that you've changed direction. I found the 'personal navigator' always picked up about six satellites or more, even when in a fairly screened location.

For use in a vehicle though I recommend that you use an optional antenna. As well as the GPS III, I was also loaned the Watson GPS-150 remote antenna. This is an active antenna for GPS receivers, with a magnetic mount and 5m of coaxial cable terminated in a BNC plug.

Proving that size is not everything, the GPS-150 antenna measures only 40mm square by 10mm high. It really is unobtrusive and doesn't advertise the fact there may be a GPS unit in the car.
When I used it in my car I located the antenna on the rear boot lid of my car. The coaxial cable is very thin and easily slipped in the gap at the rear of the boot without any problems. The magnetic mount makes fitting extremely easy and the 5m length of cable is long enough to reach from one end of the car to the other.

The performance of the Watson GPS-150 antenna is impressive and was considerably better than the flip-up antenna mounted on the GPS III. It consistently picked up more satellites, normally a minimum of nine and the signal strengths were also much stronger. The increased performance is probably due to having the antenna located in the clear with an excellent ground plane beneath it.

The high contrast, back-lit liquid crystal display, measuring 60 x 40mm, is very sharp and easily viewed. There are three levels of back-light intensity so, it’s even possible to view the GPS in total darkness. The contrast and the back-lighting shut-down periods are adjustable from the main menu to allow optimum viewing in all lighting conditions. All display pages can be orientated to horizontal (landscape) or vertical (portrait) format to suit it’s use either in a vehicle or as a hand-held on hiking trips.

The only down side to all this constant GPS activity is that the batteries don’t last all that long. Garmin claim eight hours but I reckon it’s less than this, especially if you leave the unit running for many hours at a time. Certainly in a car or other vehicle it would make sense to use the optional power cable. If using it for hiking I would only turn it on when necessary and there’s no kidding that would definitely take a spare set (or two) of batteries with me.

Software Kit

If you’ve got a personal computer (PC) and want to fully maximise and complement all features of the GPS III it might be worthwhile considering the Garmin PCX5 software kit. It’s designed for use with Garmin GPS units which do not contain a Jeppesen aviation database, i.e. the Garmin GPS III, 40, 45, 75, etc.

The PCX5 kit consists of a PC interface cable, a 3.5in disc containing the software program and a 38-page owner’s manual. The interface cable is terminated in a four pin plug which connects into a socket on the GPS unit. The other end is terminated in a 9-pin D-type connector which connects to the p.c. serial port.

The minimum p.c. requirements for the PCX5 are an IBM-compatible computer (AT, 386, 486 or Pentium), 640Kb memory, 3.5in (1.44Mb) floppy disk drive, a hard disk drive and an EGA or VGA graphics adapter. Once running on a suitable PC the software can be used to either download (from your GPS unit) or upload (to your GPS unit) route, waypoint, proximity waypoint, almanac and track data for editing, plotting, processing and analysis.

You can display the digital map in real time for mapping and navigation guidance or you can print files to your system printer for track analysis. Data files can be manipulated, zoomed and panned. Great Circle range (distance) and bearing calculations can also be made. All this and more can be achieved by use of the PCX5 software kit.

In use the software was found to be a little dated insofar that it runs from DOS, rather than in a proper WIN95 environment. It can be used with a keyboard but a mouse is essential for ‘zooming’ and ‘panning’. These functions would be even easier if they could be carried out using ‘Windows’ scroll bars instead of clicking and dragging with the mouse.

To print you need to first use DOS ‘GRAPHICS.COM’ to set up the printer before launching the program and there’s no on-line help. Perhaps the next software version will take these points into account?

On the positive side, though the software is simple to Install, it runs very well and without any crashes. Up-loading and down-loading is very easy and the manual is well written. It simply does everything you would need it to.

Other Uses

Okay, so you’ve already got a road map covering all of Europe in the car and you don’t like hiking. So, what amateur radio uses can you use the GPS III for?

Well, how about connecting it to a packet radio terminal node controller (t.n.c.) and 144MHz transceiver? This can form the basis of an Automatic Position Reporting System (APRS), a mapping program that tracks mobile stations via Amateur Radio.

Some of the applications could include keeping track of Raynet resources as they move about, fox hunting (using packet radio) or direction finding. Mobile Worked All Britain (WAB) enthusiasts could find the GPS III indispensable when trying to locate a particular WAB square. Similarly it could be very useful when you fancy a bit of portable v.h.f. operating and don’t know what locator square you’re in.

Another use could be to use the precise timing function of the GPS to calculate radio propagation delays and hence path length. And this is exactly what a few operators have been doing on the 50MHz band with the use of timed pulse signals.

Powerful System

The Garmin GPS III Personal Navigator is a powerful navigation system providing detailed mapping in a convenient compact package. As well as all the standard navigation features it has those little extras that make it very useful for Amateur Radio use. And of course it’s got that map!

Truly amazing! So, if you really want to know where you are, where you’ve been and where you’re going I would thoroughly recommend the Garmin GPS III. Do I really have to give it back?

My thanks go to Waters & Stanton PLC of 22 Main Road, Hockley, Essex SS5 4OS. Tel: Free-Phone Order Line (0500) 73 73 88 or Enquiries (01702) 206835 for the loan of the Garmin GPS III Personal Navigator, which is available from them for £349.95. Thanks also to a colleague of mine, Mike Preedy, who comprehensively tested out the PCX5 software.

"What GPS provides is an extremely accurate passive system allowing three dimensional positioning, velocity and time determination".

Prize Competition

To win the Garmin GPS III as reviewed by David Butler G4ASR see next month’s PW for our special competition! Make sure you keep this copy of PW to hand as the questions will be based on the fascinating subject of GPS.

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- Altitude & Estimated Time of Arrival
- Maximum Speed, Average Speed & Trip Distance
- BNC Flip Up Antenna - works on dashboard
- RS-232 data interface

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Although I realise that people are continually picking up PW from the newsagent's shelves and getting going in the radio hobby - I was rather taken aback by the amount of interest and requests for the diodes and earphones on offer in the January issue (I was also delighted by the response!). But by now everyone who wrote asking for earphones, etc., should have received them.

I apologise for the delay in getting the diodes and notes out - but I caused an extra delay by individually testing each diode and earphone on a test receiver set up at home. And I can tell you - after testing well over 100 diodes and earpieces I was rather weary of listening to Radio France International (the short wave station I was tuned into). Weary not because of the programme content - but because I was only hearing it 'snatches' as I tested the components!

**Interview:**

Rob Mannion G3XFD was taken by surprise by the interest shown by readers in the simple diode receiver project published in January 1998. So, this month he takes the opportunity to further discuss the project and techniques to help you build your version.

**Radio Basics**

**Tuning & Earphones**

Another source of puzzlement for beginners, judging from the letters I've received, concerns the variable tuning capacitor and earphone/earpiece. However, both problems are easy to overcome.

Undoubtedly, the most suitable type of variable tuning capacitor is the traditional 'moving vane' version which is still used in modern radio equipment - although it's slowly being superseded by other tuning techniques. If you go to a radio rally you can often find them for sale for around the £1.50 mark - but bought new they can cost more than a 'ready made' receiver! However, they can be recovered from scrap radio receivers, as shown in Fig. 2.

There are other alternatives for tuning, and a popular method involves the 'solid dielectric' variable capacitor, also shown in Fig. 2. Unfortunately however, this form of variable capacitor does not provide the same results as the traditional 'open type' as there are some 'losses' on an important factor when you remember that the diode receiver is providing minute signal levels.

Unfortunately, finding a pair of suitable headphones can be a problem! Unless you're fortunate to own an old fashioned pair of sensitive 'high impedance' headphones or you have a sensitive (telephone type) earpiece - the only easy-to-obtain choice nowadays are 'Walkman' low-impedance style, which aren't sensitive enough for good results.

So, in this column next time I'm planning to provide you with a very simple amplifier circuit. This will 'boost' the signal and enable cheap, readily available headphones to be used.

In the meantime I'm preparing a free 'information sheet' (please send an A5 stamped and addressed envelope and request Basics Information Sheet 1) to help you further. Cheerio for now - and keep writing. In return I'll do my best to help and advise you how to discover the basics.

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Practical Wireless, March 1998
It's the time of the year when you've got every excuse to stay indoors and switch the soldering iron on! So, to help you get organised on the 'home-brewing' - particularly if you're enjoying our 'Radio - Discover The Basics' series, the PW team have selected some interesting books. Read on - and switch on!

**Radio Receiver Projects You Can Build**
Homer Davidson

Although originally aimed at the American reader, this book is a winner - it's full of good, well thought out projects (33 in total) presented in a thoroughly good practical way. It also includes a valved receiver and despite the fact that some of the projects use the ZN414 and ZN416 integrat ed circuits which are becoming difficult to purchase in the UK - this book will prove absolutely ideal for anyone starting in the hobby, and especially anyone following 'Radio - Discover The Basics'. Filled with good ideas, projects, easy-to-understand theory and backed up with plenty of diagrams, photographs and illustrations it will prove to be very helpful. Very Highly Recommended at £18.95.

**Projects For Radio Amateurs & SWLS**
R. Penfold

This little Babani book will prove helpful to anyone progressing into the hobby as it offers interesting (and instructive) working projects ranging from 'add on' beat frequency oscillators, crystal calibrators, various filters and an 'active antenna' circuit. The author is well known for his straightforward approach and the book will provide hours of home-brewing ideas, construction and instruction all at the same time. Helpful, practical and affordable at only £3.95.

**Coil Design & Construction Manual**
B. B. Babani

This little paper back book has become a little 'classic' over the years. Essentially unchanged from the time it was first published in 1960, it has proved extremely useful to any home construction enthusiast who is particularly keen on working with valved equipment. Some of us still have their original 1960 copies on the workbench!

So, if you're 'into valved equipment' this book will help you design wound components ranging from radio frequency tuning coils to interstage audio coupling and output transformers. Additionally, if you are one of the ever increasing band of valued 'hi-fi' enthusiasts - it could help you in the never ending quest for good quality reproduction. A helpful reference source for valved equipment. The Coil Design & Construction Manual costs just £3.95.

**Power Supply Projects**
R. A. Penfold

Power supplies probably cause the inexperienced constructor more problems than any other project - but quite unnecessarily in many cases. Added to the fear of the 'unknown' there often seems to be some trepidation when it comes to the dealing with the 'mains' power.

To help - this little book, from the busy word-processor of R. A. Penfold - seeks to provide simple and straightforward ideas backed up with informal instruction. Dealing with everything from transformation, rectification, fixed and variable voltage regulation and associated techniques, it provides in 'one package' self-tutoring and projects you can build in a weekend. Power Supply Projects is a Very useful and well prepared book costing £3.99.
Packet Selection

For all you Packet and Data mode enthusiasts here's a selection of books that you should think worthy of a place on your bookshelf.

Packet Radio Primer
Dave Coomber & Martyn Croft

There aren't many British written and published books on packet radio - but Dave Coomber G8UYZ and Martyn Croft G8NZU have done well to produce this informal but informative introductory guide. They've aimed at producing the book in the 'American Style' - complete with the occasional cartoon, lots of information and good illustrations. With a short introductory section on data communication the authors take the reader through how packet works, the packet station, setting parameters, PMS mailboxes and servers, writing messages and getting files. And if you're interested in using packet radio via Amateur Radio satellite links - that's also included. Altogether this book provides a very well produced 'primer' and reference source for both the beginner and active packet radio enthusiast. Recommended at £8.95.

Your Packet Companion
Steve Ford IN1381MY

Although it's very American in approach, with the slightly larger typeface expected from the USA today, backed up with a profuse number of photographs, diagrams and illustrations, this book will provide good reading for any British reader. If it did nothing else (and in fact it does much more) the book provides a very interesting look at the American packet radio scene in the late 1990s.

It also provides an 'American Style' approach to getting going on Packet with examples of what equipment you can use. Very readable, helpful and 'non stuffy' approach. Good Reading. Your Packet Companion costs £5.95.

Packet: Speed, More Speed and Applications

This 'advanced' concepts and ideas book from the ARRL is essentially a collection of circuits, ideas, projects and suggestions gathered from many different sources. This fact is clearly shown in the variety of styles of typography, design, text lay-out and drawing quality throughout the book.

Although profusely illustrated, with many good photographs and drawings, some pages and sections while having a very high technical standard reflect their non-ARRL origins as they clearly differ in style and quality of presentation. It should be regarded as a working 'workshop' book rather than a textbook and as such is ideal for the advanced packet radio enthusiast. Excellent Advanced Reference Source and good value at £11.50.
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The Yaesu VX-1 is described as a 'ultra-compact' dual band transceiver with wide band coverage. 'Ultra compact' is a little bit of an understatement if you ask me! I have a Kenwood SMIC-31 speaker-microphone for my own hand-held and my speaker-microphone is the same size as the VX-1.

The Yaesu VX-1 is supplied with a belt clip and strap, a battery pack, wall charger, helical antenna and a very well written and presented handbook. And rather unusually - the charger unit also acts as a mains power supply unit.

The helical antenna connects to the top of the radio by use of a SMA fitting. However, I wanted to be able to see how the VX-1 performed on an external antenna. My local emporium, The Shortwave Shop in Christchurch, kindly lent me an adapter that enabled me to connect the radio to the normal BNC type fittings. These adapters retail at around the £5 - £6 mark.

Transceiver Coverage
The VX-1 covers an incredible range of frequencies, and in order to organise the transceiver's coverage, Yaesu have divided the frequency range into nine bands of operation. Each has its own pre-set channel steps and operating modes programmed, however these can be changed. (I would have liked to have been able to disable and enable bands but I could not find a way to do this).

The VX-1 offers a choice of memory configurations. You can have 52 memories that store simplex or semi-duplex frequencies (including odd splits) tone mode and tone frequency. The other option is 142 memories that would only hold simplex frequencies, although repeater shift can still be saved.

Memories in both configurations I've mentioned would also store power output level, memory skip information and an alphanumeric name if you added it. In addition to these memories, the VX-1 has 10 pairs of programmable band scanning memories, 31 'Smart Search' memories (I'll mention 'Smart Scan' a little later) and 10 memories for the broadcast band. This all adds up to quite a comprehensive memory configuration!

Nine Bands
The nine bands on the VX-1 include the medium ('a.m.') wave broadcast band, (yes: 500kHz to 1.7 MHz!). What a shame they didn't go a little further and give us 1.8MHz ('Top Band') as well! The Band II v.h.f. 'f.m.' broadcast band, the v.h.f. and u.h.f. 'Airband', the 144 and 430MHz amateur bands and the Television audio frequencies are also included.

To get the most from each band, Yaesu state that the supplied antenna may have to be replaced with a dedicated whip or external antenna system. And although I agree with Yaesu on this point, I'm pleased to report that I received transmissions on all the bands mentioned with the supplied antenna, although of course some were rather marginal.

The VX-1 is so small, it would easily fit into a pocket, one of those lady's 'clasp' bags or a cigarette packet! When I wore it on my belt it was like wearing a pager!

The Controls
The controls on the VX-1 are few but the facilities are numerous. A menu that can be accessed very easily, and a 'one-button' depression sets most of the advanced features.

Yaesu have been clever in their use of multi-function buttons. Most of these on the transceiver have two or even three functions - depending on how long they are depressed and if they are used in conjunction with the "F" (Function key).

I'm not going to describe each button in detail. Instead I think it's sufficient to say that the backlighting is very effective, and the buttons are well labelled and thoughtfully laid out. (The display is large and the readout is very easy to see, the display is actually larger than others I have seen on much bigger radios!).

The VX-1 has a power output of 500mW on 'high' power and 50mW on low power when operated from the supplied battery. It takes 6V external power, and when using this the power output is 1W 'high' and 200mW on low power. (All

Richard Newton
GORSN·PW's 'hand-held' transceiver specialist - takes a look at a truly 'compact' transceiver.

"Ultra-compact? - A Little bit of an understatement if you ask me" I says Richard Newton
Manufacturer's Specifications

General

Frequency Ranges
Receive: 0.5 - 1.7MHz
76 to 3000MHz
300 - 580MHz
580 - 999MHz

Transmit: 144 - 146MHz and 430 - 440MHz

Channel Steps: 5/10/12.5/15/20/25/50/100kHz

Frequency stability: ±50Hz (±10°C to ±60°C)

Repeater shifts (default): ±600kHz (b.h.f.) ±1.055, 0.87MHz (a.h.f.)

Emission types: F3 (OE), F2

Antenna impedance: 50 ohms

Supplied Voltage: 3.6V d.c., negative ground

Nominal: 3.6V d.c., negative ground (ext. d.c. jack)

Current consumption: 150mA (Receive) 50mA (Standby, Saver Off)
16mA (Standby, Saver On) 200mA (Auto Power Off)
400mA (500mW transmit vhf/uhf)

Operating Temperature: -20°C to +60°C

Dimensions: 47 x 81 x 25mm (w/o knob, ant.)

Weight: 125g. (Approx. w/ent. & battery)

Power Output: 1W (@ 8V ext. d.c. input) 500mW (@ 3.6V d.c.)

Modulation type: Variable reactance

Maximum deviation: ±5 kHz

Spurious emissions: At least 60dB below carrier

Microphone impedance: 361Ω

Receiver

Circuit Type: Double conversion superhet (v.h.f.u.h.f.)

Single conversion: 500kHz to 1.7MHz

Intermediate frequencies: First 41.45MHz (v.h.f.u.h.f.), 455kHz (500kHz - 1.7MHz)

Intermediate frequencies: Second 450kHz (Narrow fm.)

Intermediate frequencies: 10.7kHz (Wide fm.)

Sensitivity: 0.2µV for 12dB SINAD (144 - 145MHz)

Sensitivity: 0.2µV for 12dB SINAD (430 - 440MHz)

Selectivity (±60 dB): 15kHz (55 kHz on narrow fm.)

Audio output: 50mV @ 8Ω for 10% THD @ 3.6V d.c.

Audio output impedance: 8Ω

my tests were carried out with the supplied battery pack.

The Yaesu VX-1 has full CTCSS and DTMF as standard. It also has a new facility similar to CTCSS called DCS (this is said to be far more reliable than CTCSS at controlling squelch operation).

A wise person once told me 'the proof of the pudding is in the eating'. So, in following this advice I tuned to the local 145MHz repeater, GB3SC in Bournemouth. I accessed this from my home on the outskirts of the town. I was very impressed with the audio from the small speaker in the front of the radio. I also heard the Portsmouth repeater GB3PC this is about 50km away. Needless to say the 500mW and helical antenna was not quite enough to actually access it!

And although I could also hear the GB3SZ 433MHz repeater in Bournemouth, I could not access it. I could, however, access GB3DT. This 433MHz repeater is about 24km away near to Blandford Forum.

Over the Christmas holiday I took the Yaesu VX-1 away with me to Minehead in Somerset to see my family. We were planning to stay a while so I was looking forward to speaking to someone on the VX-1.

One afternoon following a rather generous lunch, the family decided to take a walk on the nearby beauty spot - North Hill. Some readers may have heard of North Hill as it's a rather impressive bit of high ground overlooking the Bristol Channel and has a good 'radio' take-off.

My father John G8EAM and my brother William G7GMZ, accompanied me. We walked to a high point on the hill, I have to say not the highest (remember I had eaten the rather generous lunch!) and I put out a call on 145.500MHz, but nothing was heard.

So, undeterred I put out a call on 433.500MHz but again nothing was heard. I continued calling on 145.500MHz and got a reply from Stan G3RNB.

Stan lives near a place called Woolston Moor, but again nothing was heard. I continued calling on 145.500MHz and got a reply from Stan G3RNB.

Stan and I had a rather difficult contact and he was able to give me the report: "You are modulating the noise!" (Thanks Stan!). However, I was told that the fact that Stan even heard me at his location when I was using 500mW and a helical antenna was a good result!

My brother William then kindly offered to help me with a little test as he had to travel about 5km across town and offered to see how far we could keep in contact. He was using his mobile set-up on 145MHz (using a 58 wavelength antenna). I was using the VX-1 on 500mW with the helical antenna.

William intended to travel to the other side of the conurbation and over a hill. We both expected to lose contact when he dropped down on the other side of the high ground. However, to our amazement we did not lose contact once. I was still talking to him when he reached his destination.

Needless to say - I was very impressed!

After the festive season I returned home to Bournemouth, a little disappointed that I had not been able to speak to anyone on 433MHz. This was no reflection on the VX-1 but more the lack of activity on the band. This was all put right by a chance QSO I had with Terry 2E1EJC. Terry was mobile about 5km away from my home location, we had a very pleasant chat, the VX-1 got an excellent report from Terry, and in return Terry got an excellent cup of tea from me.

Eye Catching Features

The VX-1 comes with several features that really caught my eye. One is an Alarm function and when depressed for a few seconds the alarm button activates an alarm sound, this is emitted through the radio's speaker and the unit automatically switches to high volume. It also defaults to a user-programmed 433MHz frequency and should the operator press the p.t.t button, the alarm sound is transmitted.

I would have to question whether the alarm sound is loud enough to summon help unless it was very close by. It may well be enough to distract a would be attacker, at least long enough to aid an escape.

However, when all is said and done - it's all credit to Yaesu for thinking of the alarm feature. No identification is transmitted, just the sound, so it relies on someone knowing who you are and where you are, a family member or a friend for example.

Another useful feature is Automatic Range Transpond System (ARTS), which is perhaps useful for Scout or Guide groups with licensed members or maybe RAYNET. The ARTS uses the DCS code to keep two operators using VX-1s informed whether they are communications range or not.

When active and using ARTS, both transceivers automatically poll each other every 15 seconds and beep to confirm whether they're in range or not. A callsign can also be sent in c.w. to confirm a station's identity. If they are out of range for more that one minute a warning signal sounds and the radio displays OUTRING, meaning 'Out of Range'. It also tells the operator when they're back in range of the other transceiver!

The other VX-1 feature I'd like to quickly mention is the Smart Scan feature. This can continuously scan a user defined frequency range and automatically save any busy frequencies. It has many uses, and the one that springs to mind for me is that when you away on business or on holiday you can set the VX-1 to scan the 145MHz repeater band and let the VX-1 automatically save all the active repeater frequencies to the Smart Scan memories!

Practical Wireless, March 1998
I connected the Yaesu VX-1 to my main WX1 dual-band base station antenna. I have on the rear of my bungalow. The antenna is not that high and I normally use it for local communications. My main antenna is out of use at the moment due to rather bad flooding in the main shack and the odd tornado being too close for comfort!

I tuned the 145MHz band and heard G4TST and G4RUC in QSO with another station. I did not manage to get their names but I think one of them was operating from the Portsmouth area. They were a good signal with me...but the 500mW was not enough to join in and say hello.

The next (rather impressive!) reception was from FSZBS in France, via the Caen repeater whose output lies on 145.325MHz. It was romping in, and I have to admit that this shows that conditions were a little "up" but despite this it was impressive.

Somewhat "tongue-in-cheek" I called through the Caen repeater, and to my amazement I accessed it! To my further amazement F1AMZ replied: "QRZ QRZ the 'GO' station..." My luck then ran out. Another G station that obviously used the input frequency of 144.725MHz for a local chat Net came up and completely knocked out the French repeater! (Not his fault, he was not to know, but how frustrating!).

I called out on 145.500MHz and got a reply from Phil GODDI. He lives in an area between Poole and Ringwood called St Leonards; this is about 10km away from my QTH. Phil gave me a very good report, my 500mW was being received 99+ and Phil said the audio was very good.

Phil listened while I called him using the helical antenna and a quarter-wave telescopic. Nothing was heard from me on the helical and the telescopic just broke the squelch at Phil's.

**Medium Wave**

The Yaesu VX-1 handbook says that you should not expect to hear very much on the medium wave ("a.m.") broadcast band with the supplied helical antenna. Instead, they recommend you should use a long wire and I agree that a long wire would be preferable.

However, I have to say that Yaesu may have done the VX-1 a dis-service in their advice. I used the helical antenna and tuned the band and found several stations with good signals.

On the medium wave broadcast band the display only gives a linear representation of the band, it does not display frequency. I did not find this to be a problem. I quickly located the local station "Classic Gold" on 828kHz and I have to say the audio quality was superb.

The Band II v.h.f. ("f.m.") broadcast band really needed a dedicated antenna. However, I did tune to 88.5MHz to Radio 2's frequency and it was booming in. Again the sound was incredible.

The Air band frequency is one of my favourites as I live very close to Bournemouth International Airport. The VX-1 received the low power departure information service from the Airport with the helical antenna (this is always a good test). On the external antenna it compared well with a dedicated receiver and I was very impressed with the VX-1 on Air band.

The other band of frequencies I played with were the TV audio transmissions. This, on the face of it would seem pointless, however, do please do read on!

The VX-1 received all four (we don't get Channel 5 where I live) channels with the helical antenna. I have two small children, and like most people under five they are a little loud! I like listening to the news once in a while, normally my pleas to the boys go unheeded and I normally miss the news because I am too busy telling them off! But not while I had the VX-1! It was a case of switching the TV on, turning the sound down and switching the VX-1 on. Bliss! Seriously though, those who are hard of hearing and have access to a VX-1 could also benefit in the same way as I did. You never know - you may find someone standing outside of the local Television shop window with their VX-1 pressed against their ear watching the football!

**Excellent Radio**

The Yaesu is an excellent radio for what it is. It's truly a very small, QRP rig, jam-packed with useful goodies and very easy to use. For me however, it's not a main rig, but that choice would depend on personal needs.

Despite what I've said, the Yaesu VX-1 would be my first choice as a second radio. What a companion this radio would be on camping holidays, days out, walks around the neighbourhood, and even at work!

The Yaesu VX-1 is also a very smart, well made versatile radio. Considering its vast coverage I did not experience any problems as far as 'break-through' goes, living in a pager dominated area this was a pleasant surprise. The receiver seems to be very good 'across the board' and the audio quality, both received and transmitted is excellent.

I'm not normally one to carry a radio around with me all the time. The VX-1 changed that. It was small enough and interesting enough to be my constant companion. With a charge time of two hours and a battery that seems to last forever, it was rarely away from my side.

In conclusion, I would offer a word of caution for owners of this tiny transceiver. Whatever you do - don't attempt to use this equipment when you have a cold - because if you sneeze you may never find it again!

My thanks go to Barry Cooper G4RKO of Yaesu (UK) at Unit 2, Maple Grove Business Centre, Lawrence Road, Hounslow, Middlesex TW4 6DR, Tel: 0181-814 2001, FAX 0181-814 2002, for the loan of the transceiver. The recommended price for the VX-1R is £269 it's available now from approved Yaesu dealers.

Prize Competition

To win the VX-1, make sure you see next month's PW.
Wireless Comes to Britain

Ron Ponting provides a personal history of his memories, which trace from the time he first encountered the 'magical' term wireless through to the changes he's seen right up to the present day.

A switch was pressed on the box with the copper rods, and a bright spark jumped across from one rod to the other, making the bell ring in the other room. I looked for any sign of connecting wires, but there were none, so the energy was being transferred through space!

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6V batteries. The light given off from these valves was almost enough to dispense with the room light!

On several occasions, when we had overlooked the charging of the battery, someone would remove the car battery (6V in those days and mostly fitted onto the running board of the car) and use this until such time as the car was needed once again. These valves were referred to as 'bright emitters'. Shortly after, known as 'dull emitters' came onto the market. These were still 6V heaters, but emitted hardly any light.

One aspect about home-made sets which is worth a mention was that misuse of the tuning system caused the detector valve to oscillate so that the set became a transmitter. This meant that all other sets in the neighbourhood tuned to the same wavelength not only heard the broadcast, but also a loud whistle (I proved for myself that this interference could be heard even over 8km away). Quite often the announcer at the broadcasting station would ask folks in certain areas to take more care as they were causing interference to their neighbours.

Periods of transmission were somewhat limited in the early days. Broadcasting usually commenced at 1pm and closed down at 1030pm. Programmes consisted of orchestral concerts, song recitals, entertainers at the piano, and short one or two act plays. As Sir John Reith was Head of the Service, Sunday broadcasts were strictly limited to sacred or classical music, religious talks or readings from the Bible. Nothing of a secular nature went out on the Sabbath.

It was around this time, 1928 I think, when I got a job, some 32km away, in a radio business. The premises consisted of a workshop in which radio sets were made, and a large shed where anything from 300 to 500 batteries could be on charge at the same time.

The sets we manufactured were of the two or three valve types, and named 'Melody Two' and 'Golden Chimes Three'. These sold extremely well and were installed complete with antenna scaffold poles, which were supplied by a local firm.

**Fortunate**

Whilst working away from home I was fortunate in being able to lodge with my grandparents. My grandfather was a charge hand, working in a large railway works. From then on things moved quickly. Portable sets were developed. These 30 or 35 pound sets were only 'portable' in that one could carry them from room to room or take them in the car.

Next came the mains receiver which required no batteries. Home construction, by now, had almost ceased. One reason for this was that a much improved circuit had been introduced known as the superheterodyne, which improved efficiency and meant there was no risk of interference with the neighbours.

Mains receiver sets were soon constructed for use on long, medium and short wave bands, and then frequency modulation (f.m.) came into being. This, again, improved the quality of the music and speech and there was no possibility of station interference.

So, now this brings us up to the present day, with the development of receivers, which fit into the waistcoat pocket, hand-held television sets and remote control of radios and TV. What delights are we in for next I wonder!

**"A forty-five feet high antenna! Gosh! I could listen to the world."**

Soon I was getting up at around 4am and listening to America, and, wonder of wonders, news from Australia complete with the introductory Kookaburra bird!

From then on things moved quickly. Portable sets were developed. These 30 or 35 pound sets were only ‘portable’ in that one could carry them from room to room or take them in the car.

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"A forty-five feet high antenna! Gosh! I could listen to the world."
Carrying on the Practical Way

This month the Rev. George Dobbs G3RJV discusses simple methods of using a separate transmitter and receiver - after his usual (appropriate!) quotation of course!

When I first began to disturb the ionosphere by generating radio waves, the integrated transceiver was still to come. We all used separate transmitters and receivers. It was a completely different game!

In the 'old days' the operator had to net the transmitter to the receiver frequency and devise methods of changing from transmit to receive. This could be as simple as a manual switch to remove the antenna from the receiver and attach it to the transmitter together with some method of protecting the receiver from the high signal levels during transmission.

I thought my first station, a valved transmitter for 1.8 and 3.5 MHz used in conjunction with a BC342 receiver, was rather sophisticated. This was because it had a foot operated change-over system!

In truth, the foot switch consisted of two pieces of plywood with a microswitch screwed to the bottom piece of wood. The lever action operated the microswitch, which in turn operated a series of relays to perform the transmit-receive changeover functions. It was laughable by today's standards but I thought it was the cutting edge of Amateur Radio technology!

Modern Station

The modern Amateur Radio station is usually a complete integrated transceiver. The frequency control is common to both transmit and receive functions and the changeover from transmit to receive is a built-in function.

Nowadays, the only time that you're likely to see separate transmitters and receivers in operation is the station of a home constructor.

One of the more simple routes to a homemade Amateur Radio station is to make a QRP transmitter and use it with an existing receiver. However, such a set-up requires the use of a system to operate the receive-to-transmit functions.

A modern transceiver may have a very complex series of transmit/receive operations. These will switch functions of the transmit and receive sections in a sequence that will produce a quick and efficient changeover without damage to circuit elements or annoying 'clicks' and 'bumps' in the receiver audio signal.

However, adding a QRP transmitter to an existing station receiver can be done with a minimal list of requirements. It really is easy!

The antenna has to be disconnected from the receiver input and attached to the transmitter output. The receiver input circuits may require protection from the strong signals present even after the receiver input has been removed from the antenna. It's also helpful to mute the received audio signal and perhaps add a sidetone signal to monitor the keying, in the case of a c.w. (Morse) transmitter.

The Circuit

The circuit, in Fig. 1, shows how the minimal requirements can be achieved with a simple QRP c.w. transmitter. It follows ideas from Ian Smith VK8CW, in the LoKey Magazine and circuits I have used in earlier projects.

The 2N2905A pnp transistor acts as a d.c. switch controlled by the transmitter key. The 33kΩ resistor goes to the key and when the key is down the transistor switches on. This places 12V on to the collector of the 2N2905A. The appearance of the 12V at the collector follows the action of the keying. The circuit allows this keyed voltage to be available to drive a sidetone oscillator. (Almost any simple audio oscillator circuit could be connected between the collector of the transistor and ground).

The collector of the 2N2905A is connected via a diode to the gate of a VN10K VMOS device. This is switched on and off by the keyed 12V and operates a relay in the drain circuit. The VMOS device makes an ideal d.c. switch and is either 'hard on' or completely 'off' depending upon the state of the collector of the 2N2905A.

It's best to avoid the antenna changeover relay following the action of the key. This is
because it would produce a constant clattering of the relay, annoying clicks in the receiver audio signal and possible clipping of the keyed signal.

A better method is to allow some 'hang time' on the relay action. This is done by adding a capacitor and resistor to the gate circuit of the VN10K.

When the key is pressed and 12V appears at the collector of the 2N2905A, the VN10K switches on and the capacitor charges up. When the key is released and the 12V disappears from the collector, the capacitor discharges through the resistor. This 'holds on' the VN10K for a short time.

The hang time is governed by the values of the capacitor and resistor. (The decaying voltage does not affect the collector of the 2N2905A because this is on the other side of D2).

**Relay Closed**

The aim with a simple set-up of the type I'm describing is to keep the relay closed during normal keying speeds, only allowing it to switch back to the receive mode when the keying ceases. The ideal hang time is somewhere between 0.5 and 1 second.

In use the changeover remains in the transmit mode throughout the normal keying of the transmitter because the capacitor is being recharged every time the key is pressed. When normal keying ceases the capacitor discharges and the relay switches back to the receive mode.

The hang time can be changed by adjusting the values of the resistor and capacitor. Higher capacitance will increase the time, lower resistance will decrease the time. A VMOS device requires only low capacitance values (small C, high R) and is ideal for this application.

The relay has a protection diode, D3, to prevent high 'back e.m.f.' voltages destroying the VN10K. In practice D3, like the other diodes, can be any common silicon type. (I used a 1N4148 for all the diodes). The normally closed contacts join the antenna to the transmitter and the normally open contacts join the antenna to the transmitter.

**High Input Signals**

In spite of the fact that the receiver input is disconnected from the antenna, it can receive very high input signals. Don't forget...it's only the distance of a relay contact away from the transmitted signal!

The diagram, Fig. 1a, shows an easy way to protect the input circuit of the receiver. A couple of diodes (again 1N4148 or similar silicon diodes) are placed 'back-to-back' across the receiver input circuit. They act as a limiter, only allowing about 250mV (quarter of a volt) of signal to reach the receiver input. This should avoid any possible damage to the input circuit.

Despite the diodes - the input signal is still high and will produce a resounding audio signal. And in an ideal world a muting circuit should be added to the receiver.

Some receivers are easy to mute but others are not. In practice the automatic gain control (a.g.c.) circuit, if present, will help reduce the amount of audio output.

I usually just turn down the audio gain control. If this can be set at a reasonable level, it can be used as a monitor for the keyed signal, doing away with the need for a sidetone monitor.

The diagram, Fig. 2, shows an alternative system which allows complete break-in operation. This term is used when the changeover function follows the speed of the keying.

My illustration shows a common circuit in use amongst QRP home constructors. It's based upon an original idea by Roy Lewallen W7EL, in his 'Optimised Transceiver' first published in QST, August 1980.

**Typical Output Stage**

The circuit in Fig. 2, shows a typical transmitter output stage with an r.f. choke in the collector of a bipolar transistor. The r.f. output goes via a capacitor to a lowpass filter, and then to the antenna.

The receiver input is taken from the input of the lowpass filter, which then serves as an input filter to the receiver. This input is taken through cC1 and cC2 via cL1 to the receiver. When transmitter, the diodes, D1-D4, protect the receiver and the capacitors become part of the lowpass filter circuit.

When receiving, the capacitors and the inductor form a low-Q series resonant network to reduce signal attenuation. The values are chosen to maintain an approximate 50Ω impedance to the receiver input.

In the circuit described no physical switching occurs and the changeover function is instantaneous. The trimmer capacitor, cC2, is adjusted for the best received input level without reducing the transmitter output level.

Unfortunately however, there's one drawback of this circuit in that it requires component values for a particular band. The values required for various bands are listed in the table. Again, the diodes can be any common silicon types.

Well, there you are - it really is easy to 'home brew' some change-over systems. Now you know - it should encourage you to try a QRP set-up for yourself. Go on, plug that soldering iron in and have a go!
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**CLEARANCE BARGAINS**

**THE NEW KENWOOD THG-71E**
Full feature, 6W Dual band hand held (with optional battery pack), 200 memories and PC line-up with software (not inc.)
£249.99
Now available from stock

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HF, Six metres, 100 Wats on all bands and only £1099
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**ICOM IC-T8E**
Who's first to have a TRIPLE BAND 2/6/70 Handle then? Icom of course! Enter the IC-T8E
£949.99
£112.75 deposit & 12 x £90 p.m.

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The best value HF-Six Meter Transceiver got even better! Now offered with FREE FM board & AM filter by Icom.
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The only HF+6+2m MULTIMODE/BASE
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BUY BOTH FOR ONLY £499
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**STANDARD C156 PRICE BUSTER**
£149
New with 5W Ni-Cad & Charger

**LONDON AMATEUR-RADIO & COMPUTER SHOW**
**VISIT THE MARTIN LYNCH & SON STAND IN THE RED HALL. MARCH 7th & 8th**

**PICKETTS LOCK 1998**
On Guard WITH A PHOTO-ELectRIC 'Sentry'

The possible theft of Amateur Radio equipment is always there - whether it be from your car or at home. And for many of us with 'outside' shacks - it's an even bigger problem.

Despite the problems however, help is at hand and as an example - the B&Q catalogue for March 1997 says it's a proven fact that constant light is one of the best deterrents against crime. A suitably mounted photo-electric (PE) cell will give constant lighting when daylight fades to 70 lux.

By installing such a light you could deter potential theft of your radio equipment and make it easier to unload equipment (and even the family shopping!) when you come home in the dark. It's also a very simple job to carry out.

Porch Light

The photograph, Fig. 1, shows the existing type of porch light at my QTH. And of course, if you've got a shack set-up in a shed or building remote from the house - a separate installation could be useful there.

The photo-electric cell in its plastic moulded 'function box' which can be easily stick a piece of 30 x 23mm stiff plastic sheet over the rockers. This converts the switch to double-pole change-over operation, as shown in Fig. 3.

The cell switch is drawn in the normal On position. The Off position by-passes the cell enabling your light to work on manual control from the existing hall light switch (not shown in the diagram).

However, the switch (the type supplied with mine was made by MK Ltd.) does not isolate the photo-electric cell socket because its contacts only have limited separation and also because of the 'cross coupling' at the additional switch. You must be aware of this for safety reasons.

For anyone competent to install mains wiring, this is an interesting, satisfying, and worthwhile little project. It could help you in many ways other than purely improving security - it could even encourage you to venture out to the shack on those cold dark nights to build something!

Fig. 1: The familiar 'porch' light - which can be easily arranged to operate via a photo-electric switching unit.

Fig. 2: The photo-electric cell unit (available from B&Q Ltd.) shown mounted at G4UBB's home.

weatherproof housing is shown in Fig. 2, adjacent to my v.h.f. mast/flagpole. Just out of 'shot' is the wind vane and anemometer cups of my 'Davis' electronic weather station. (This may be the subject of a separate report at a later date).

Basic Wiring

Now, let's consider the basic wiring diagram, which is shown in Fig. 3. Incidentally - the 'Apt' photo-electric cell (the type used), socket and wall bracket kit (catalogue number PEC 1000)70 lux), by UK and Ireland it's essential to remember that the old standard for mains cabling was: Red (live), Black (neutral) and plain green for Earth.

John Brown G4UBB, describes his ideas on how to help protect your valuable radio equipment - by using a simple DIY photo-electric 'sentry' device. It doesn't require any 'rest' and is on duty whenever needed.

The specified switch has flat rockers adjacent to each other, using impact adhesive.

Shopping List & Equipment Details

Required: One 'Apt' photo-electric cell unit, socket and wall bracket kit (catalogue number FEC 100/70 lux), by ElectroReplacement Ltd. Switch 2-gang 2-way rocker type light switch (MK Ltd.). Moulded junction box, four terminal SA type, grommet to suit cable entry of cell unit and box to suit switch mounting.

PW
1998 will be the ninth year at Picketts Lock for the London Amateur Radio and Computer Show. A traditional event with bargains galore. Again, a two day event with over 100 trade stands including the special events section, with our huge BRING AND BUY stand looking just like Aladdin’s Cave. Also disabled facilities, bars and restaurants.

It’s the event with something of interest to every radio and computer enthusiast!

As those of you who have been to PICKETTS LOCK before know, there’s something about the events which take place here that just feel good.

IF YOU’RE ONLY GOING TO ONE SHOW THIS SPRING, MAKE SURE IT IS THIS ONE.

RadioSport Ltd • 126 Mount Pleasant Lane • Bricket Wood • Herts • AL5 3XG
Tel: 01923 893929 Fax: 01923 678770
Here's a pre-Picketts Lock look at who you can expect to find at this year's London Amateur Radio & Computer Show, together with the delights that will be on offer! (We've tried to include as many companies as possible but with over 130 exhibitors expected, we haven't had room for all you! So, this time we've concentrated on the dealers rather than the manufacturers).

**Eastern Communications**

Antennas built to last are featured on the Eastern Communications stand this year. Tim G4CTT and his colleagues will be displaying the CQ-DX beam antennas which are aimed at users who remember the days when antennas were really 'built to last'. The new range includes models for 50, 144 and 430MHz.

For keen c.w. enthusiasts the new Vibroplex 'double' Morse keys will be on display. These feature the Vibroplex 'straight' key with either the classic single paddle Vibrokeyer or the Lambic paddle on one combined base, allowing instant switching from an electronic keyer to the 'personal touch' of the straight key. Also featured will be band-pass filter from Delta Engineering and many other interesting products.

**Martin Lynch & Son**

Martin Lynch says that he and his band of 'merry men (women and children!)' have secured the largest stand at this year's Picketts Lock event.

As Martin was the very first retailer in the UK to place orders for the new Yaesu FT-847 50, 144, 430MHz & h.f. all-mode transceiver, he will be giving it 'pride-of-place' amongst his emporium of new and used equipment. In addition to this the new Icom IC-746 will also be on offer and Martin promises a 'show down' between this and the new Yaesu as both radios will be in operation and available for demonstration through the two days of the show.

As usual the Lynch Mob will have plenty of bargains to choose from and with the facility of arranging finance for your purchase there's a good chance you'll come away from Martin's stand with a new addition to your radio 'family'!

**Linear Amp UK**

The Ranger 811H is Linear Amp's latest addition to their h.f. amplifier range. It's being billed as a low cost amplifier that doesn't compromise on power.

Four vertically-mounted Svetlana 811A valves give the Ranger an output power of over 800W with 100W drive from any h.f. transceiver. Although the cost of the Ranger is only £895 Gwen and Peter of Linear Amp tell us that the efficiency and construction quality have not suffered in any way.

The standard features of the Explorer and Hunter amplifiers, such as the backlit flush mounted meters, front panel a.l.c. and 6:1 reduction drives on the tune and load controls, have been incorporated into the Ranger. The power supply consists of a specially designed toroidal transformer and a voltage doubler board provides 1700V.

The first models are expected to be available at the end of February. For a demonstration of the Ranger 811H why not visit the Linear Amp stand at the show?

**AOR (UK) Ltd**

Derbyshire-based AOR (UK) Ltd., a company well known for their specialised communications equipment have announced the launch of the portable ARD-2 ACARS & NAVTEX decoder and display unit. The new unit is completely self-contained and can be powered by four AA batteries or from an external 12V d.c. source.

A built-in l.c.d. screen provides two lines of 32 characters with a 'scroll back' 512 character buffer. The l.c.d. screen means that it's not necessary to connect it to a computer, although an RS232 port is required for terminal operation, etc. An optional custom Windows based PC software package is under development and will be available in the near future.

Richard Hillier and the AOR 'team' look forward to demonstrating the ARD-2 for you at the show.

**Vann Draper Electronics Ltd**

Vann Draper Electronics Ltd., who manufacture and distribute test and measurement equipment will be exhibiting Kenwood equipment at discount prices. The company, who are based in South Wigstone in Leicestershire, are planning to exhibit a wide range of products that are new for 1998.

Of interest to the constructor will be a range of temperature-controlled soldering equipment, including the SL20 bar graph display soldering station and the SL30 digital display soldering station. Also available will be the SL916 for soldering and desoldering, and all units are claimed to be "very low cost".

Vann Draper have also informed PW that they plan to have a wide range of digital multimeters on show, including the MX620 45 model which incorporates frequency measurement up to 20MHz. Additionally power supplies by Kenwood, Vann Draper and Wonix will be available, including the dual-tracking APD-S305D 0 to 30V 5A power supply.

**Lowe Electronics**

Lowe Electronics will be showing several new and exciting products.

On a recent visit to Taiwan, representatives from Lowe spotted the super mini Hora 430MHz shirt-pocket sized transceiver, which since their introduction to the UK have been selling like 'hot cakes'. According to Lowe this is no surprise as they say the Hora 'represents the best value in an Amateur Radio transceiver that they
**No Nuts**
Fancy a combined oscilloscope and digital voltmeter? This little piggy will fit into your shirt pocket. The 10MHz bandwidth oscilloscope is digital, while the digital voltmeter will display in percentages to 1%. With scales of 1, 10 and 1000V the oscilloscope measures d.c. and a.c. voltages to around ±1% accuracy. The oscilloscope kit is £199.99 inc. Vat. The oscilloscope will be available for demonstration on the Nevada stand at the show. 

**AKD**
On display in the AKD stand this year is the new model of the popular Targador communications receiver - the TPFSE. Following their success with the original Targador receiver, AKD state that their new HEPSE "has tighter filtering than existing models, more memory, touch back-lit lighting, utilising 64 steps on the volume control and data sending and receiving codes'. This version costs £259.99. The long established range of AKD budget equipment made from tinplate transceivers includes the 200H by 144MHz, which is now available with 2.5kHz channel spacing. The 50MHz version, the M50T, is now available with CTCSS tone and full repeater facilities. (A kit is also available for customising and grading for older transceivers.)

**Waters & Stanton PLC**
There will be many delights on offer on the Waters & Stanton stand. These will include the first stocks from the Vectronics and Mirage product ranges, as well as the new SG 2020 QRP receiver, which will be on sale for £599. Other products will include the new Cushcraft X-7 tri-band Yagi, the latest Fairhaven receiver, and of course the Garmin GPS III Navigational Unit. The newly introduced Kachina 505 DSP computer controlled h.f. transceiver will also be on display and working demonstrations will be taking place throughout the two days of the show. So, if you stop by at the Waters & Stanton stand you're assured of lots of surprises.

**Haydon Communications**
Mike Haydon is aiming high this year! Mike's Edgware based company is launching a new lightweight portable 30 foot mast kit in 1998. The PM-30K mast, retailing at £99 will be of interest to anyone contemplating portable or fixed station working on the amateur bands. Fabricated from aircraft-grade aluminium the mast consists of five swaged 2in diameter poles, which allow the mast to attain 30ft when fitted together (they are then secured by stainless steel bolts), and it comes complete with a galvanised base plate, braided nylon guy ropes and tensioners, a three-way guy ring and three steel ground stakes.

**Radioworld (West Midlands)**
Annette and David Hayward G1LBE of Radioworld are a fairly new to the amateur radio world and to the advertising pages of Practical Wireless. If you visit the London Show you'll be able to put faces to the names, as Annette and David will be travelling from their usual base, which is situated just five minutes away from Junction 11 on the M6 in the West Midlands to meet you at Picketts Lock. As well as being official dealers for AOR, Icom, Kenwood and Yaesu, Radioworld have a large selection of second-hand equipment, which they state is the largest selection in their area. So, why not judge for useful and visit their stand at the show?

**C. M. Howes Communications**
Dave Howes and his team will, for the first time, be showing their new and up-dated version of the DXR20 h.f. communications receiver kit. The DXR20 s.s.b. and c.w. receiver covers the 3.5, 7 and 14MHz bands as standard and has the provision for adding optional plug-in band modules to extend the frequency coverage. The new version of the receiver has been designed to make interlinking with transmitter kits easier than it was with the previous version. The DXR20 now has the same connection points for adding optional kits as their single-band DC2000 receiver kit. This enhances the 'mix and match' concept of the Howes Kits range, which enables a simple beginner receiver to be expanded into a full amateur transmitting station in easy stages. The full range of Howes accessory kits, including a.t.u.s. digital frequency displays, audio filters and transmitters remain compatible with the new version of the DXR20. The C. M. Howes team look forward to welcoming you to their stand where the full range of Howes Kits will be on display available for purchase.
The RANGER 811H is our NEW economical amplifier with excellent value for money. It will give over 800 watts O/P with any 100W transceiver. The 811 was originally used in the very popular Collins 308.1 but in those days used the RCA811. Now Swedans produce the 811A which is a very robust triode and with four in parallel give nearly the same power as a pair of 3-500Z. The replacement price of an 811A is only around £25 so even if one gives up it will not break the bank.

**RANGER 811H Features:**
- 10-160m with individual O/P switching on all bands, including 12, 17 & 30m.
- Soft-start fitted as standard
- Front panel adjustable ALC
- New specially designed toroidal transformer by S.I.G.A. Electronics

The amplifier is built to last many years and nothing has been compromised. Compare the imported models and check for value for money. We expect the first models to be available by the end of February. Please send further details and specifications and see the RANGER 811H on our stand (Red G) at the LONDON SHOW, Picketts Lock.

**Price:** £895.00

**Phone/Fax:** 01964 550921
**E-mail:** peter@linearampuk.u-net.com
**Website:** [http://www.linearampuk.u-net.com](http://www.linearampuk.u-net.com)

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**Cheshunt Marriott Hotel**

Once again, the Cheshunt Marriott Hotel is very pleased to offer preferred hotel rates for all Exhibitors and Visitors to the London Amateur Radio Show, Picketts Lock, Lee Valley Leisure Centre.

**FRIDAY 6 MARCH 1998 & SATURDAY 7 MARCH 1998**

£64.00 per Twin / Double
£58.00 per Single

Inclusive of Full English Breakfast and VAT, and complimentary use of our Swimming Pool, Gym and Jacuzzi.

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If you want to get the best results from your antenna, it needs to be impedance matched to the receiver. If there is a mismatch, then not all of the signal energy will be transferred to the receiver, and signals will be weaker than they could be. An ATU (antenna tuning unit) should be used to correct the antenna mismatch and so improve reception.

A well designed receiving ATU will also reduce signal levels away from the desired frequency, and so help reduce noise and interference too. Both these benefits are provided by the Howes CTU8 and CTU9 tuners. Fully guaranteed and backed by our expert technical advice service, these ATUs and the ASU8 antenna selector/attenuator are an excellent way to improve your reception.

**HOWES CTU8**
- Receiving ATU
- 500kHz to 30MHz
- "T" Match
- 80239 sockets
- 12 month warranty
- £49.90

**HOWES ASU8**
- Antenna Selector/Attenuator
- DC to 30MHz
- Three 80239 inputs
- One 80239 output
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**HOWES CTU9**
- Receiving ATU
- 500kHz to 30MHz
- 4:1 Match
- 4:1 Balun
- Bypass switch
- 80239 sockets
- Terminal Posts
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- £69.90

Please add £4.00 P&P to your order. Delivery normally within 7 days. These are factory built items, please see separate advert for the Howes MT range.

See them on our stand at Picketts Lock!
Visit the Practical Wireless and Short Wave Magazine stand at this year's London Amateur Radio & Computing Show and you’re sure of a big surprise...

Sign-up for a three year subscription to Practical Wireless or Shortwave Magazine at this year's London Show and we'll only charge you for a two year sub! By taking advantage of this very special offer, not only are you ensuring that you get your monthly dose of radio reading without fail, but you're also getting a full year for nothing!

The price of these very special offers is not to be missed at any price!, A PW sub will cost you just £50 (usual 3 year rate = £25 x 3 = £75), while a SWM sub will only cost you £60 (usual 3 year rate = £30 x 3 = £90).

So, what are you waiting for? This offer is only available during the 1998 London Show, so make sure you don't miss out!

Offer applies to UK subscriptions only.

Make sure you visit PW Publishing Ltd. on Stand T in the Red Hall

Practical Wireless, March 1998
Rob Mannion
G3XF D is a regular visitor to the 'Bring & Buy' stands at the major shows and Picketts Lock is no exception! Here he passes on some advice to help you find what you need - particularly if you're starting off in the hobby.

Whenever I'm at major shows I make a 'beeline' for the 'Bring & Buy' section. I do this not because I'm necessarily on the look-out for something myself - but often it's just to evaluate what's available on the second-hand market. I'm also on the lookout for those seeking bargains - particularly those searching for 'beginner's equipment'. I do this because I've learned over the years that it's at this stage that anyone coming into the hobby is at their most vulnerable stage.

It's not that I think 'first time' buyers are liable to be cheated at the average Bring & Buy. No, it's more fundamental than that - because unless they have advice and help the beginner can be totally overwhelmed by what's on offer and go for something that although it's otherwise a good buy - is totally unsuitable for what they need.

**Classic Example**

A classic example of someone being overwhelmed by technology was clearly demonstrated to me at the 1997 Leicester Show where I met a delightful chap from County Donegal (now living in Leicester). He and I chatted about his beautiful part of Ireland before going on to discuss how he'd been mistaken in buying a 'scanner' for general purpose short wave listening.

The scanner my friend had bought worked extremely well but was fiendishly over-complicated and unsuitable for his requirements. Both he and I realised that a plain and simple older communications receiver would have suited him better - had he received the correct advice. So, I steered my new friend in the direction of the Leicester Club and I hope now he's amongst other friends who can advise him.

**Success Story**

One success story started when I first met young James Reed at the Leicester show back in (I think) 1991. James got to hear about Amateur Radio through something at school. He wrote to me and I suggested he and his father meet me at the Leicester show a few weeks later.

Fortune smiled on us that day and I was able to immediately suggest to James and his father that he should buy (it was either a Heathkit RA1 or a 'Mohican' - I can't remember exactly!) for £25. And after a look round the show we kept in contact and he got busy studying.

Within a year James got his B licence. Next - in between his studies preparing for university - he worked on his Morse. Then came my annual meeting at the Leicester show when he announced he was now GWOUDM. I was very proud - and even prouder when I heard he was off to Medical School (he chose Birmingham because it had a good and active Amateur Radio Club!). It just 'shows' what can be achieved via a Bring & Buy doesn't it?

**Right Receiver**

The secret of success (if there is any secret) with James GWOUDM is that we aimed at something that wasn't too complicated. I also avoided choosing the (very attractively packaged but unsuitable) Japanese 'all singing and dancing' broadcast type receivers masquerading as communications receivers.

But despite the fact that James had chosen an older receiver it had many advantages. It was simple, straightforward to use, provided good reasonable selectivity and was capable of being easily modified. And quite honestly - I don't think you can go wrong with this approach.

Six years or so later things have changed on the Bring & Buy stalls. Older equipment is becoming prized and prices have risen. Eddystone equipment prices in particular have gone crazy and the chances of a 'beginner' s.w.l. getting an Eddystone 750, 888, 888a, 680, etc., have reduced dramatically. Even the good old reliable KW range of receivers and transceivers are becoming 'collectable' - complete with high prices!

"... make a 'beeline' for the 'Bring & Buy'"

So, nowadays the enthusiast just entering our hobby has to look carefully because there is so much on offer. But it's always worthwhile asking for help - and although the hard-pressed sales staff on a Bring & Buy will often assist (if they've got time) - don't forget you can always ask for advice on the PW & SWM stand.

I and my colleagues will always be pleased to help, as of course will your local club. (I hope you've joined!). Finally, to sum up my advice I suggest you do the following: Join your local club and talk to your new friends. You may even get a 'loan' receiver (many clubs do this) along with good advice.

Additionally, it's well worth looking at older (valved amplifier staged) transceivers such as the Yaesu FT-101 range. They can be bought for reasonable prices, and if you're worried about temptation someone will disable the transmit side until you get your licence. In this way you'll get good performance, a good buy and an incentive to get your RAe pass!

But whatever you do - please ask for help before buying. The help is there for the asking - and I and many others are waiting to help when you call. Now get searching - and look carefully!
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<td>Icom IC-8500</td>
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All prices include VAT. Next day delivery available.
Cushcraft Spreads A Yagi
The Cushcraft Corporation of America has a new Yagi antenna designed specifically for spread spectrum use in the 928-960MHz band. The PC9010N 10-element Yagi has a nominal 12dBd gain with a v.s.w.r. of less than 1.5:1 over the band.

Yaesu Rotates - CE!
Two new rotators are available from Yaesu. The G-450C and the G-650C rotators comply to EEC standards (EMC and LVD), and bear the CE Mark to show this. Based on an improved G-450XL and the G-650XL designs the rotators have a 450° turn capability with a 600kgf-cm turning torque. To reduce the stress on the rotator gears and so reduce binding, the GA-2500 and GA-3000 Tower Mounted Absorber Joints are suitable for a range of Yaesu rotators. These items are available now from Yaesu stockists.

Nevada Goes Outback
Nevada Communications have asked A-i-A to let the readers know that the range of Australian Outhacker mobile antennas has been increased by two. Both the Outhacker Junior Plus and the Outhacker Perth Plus antennas, cover the 3.5 to 28MHz bands plus the 50 and 144MHz v.h.f. bands. Both antennas feature a full 100W capability on all bands, and are available from Nevada Communications, 189 London Road, North End, Portsmouth, Hants PO2 9AE. Tel: (01705) 662145/613900 or FAX: (01705) 690626.

Procom’s UHF Bases
Procom of Denmark have sent A-i-A details of their CXL range of u.h.f. base station antennas. There are seven antennas available, tuned within the 380-470MHz range. The smallest of the group is the CXL-70-1 with 0dBd gain and a height of 560mm depending on the frequency. At the top end in gain is the CXL 70-8HD with 8dBd gain from its 5.8m (approx) length. For more information about the CXL or their other ranges of antennas, contact Procom A/S, Vinkelvangen 21-29, DK-3330, Gurise - Denmark. Tel: (+45) 48 27 84 84 or FAX: (+45) 48 27 85 48. In the UK contact: Communication Technical Services Ltd., Unit 15 The Gatwick Metro Centre, Balcombe Road, Horley, Surrey RH6 9GA. Tel/FAX: (01293) 822602.
antenna workshop

Why is it a Skeleton Antenna? Well, it gets its name because it's just the 'bare bones' of a complete discone antenna. A discone antenna is essentially a horizontal disc mounted vertically above the apex of a cone as in Fig. 1. This vertically polarized antenna has proved to be very effective for use with v.h.f. and u.h.f. scanner type receivers due to its broadband and omnidirectional characteristics, together with peak performance at a very low angle to the horizontal.

To what extent could the antenna be 'skeletonised' whilst still retaining its desirable characteristics? What compromises would be acceptable? My own experience of the discone type of antenna was to design a suitable u.h.f. antenna for military use. The minimum number of elements that could be used to represent the disc and the cone, whilst retaining the required specification bandwidth, was found to be four for each part.

The 'disc' elements are essentially just two strips or wires for the lower frequency version of twice the design dimension D, soldered together at their centres at right angles to each other. Further, it was found that each disc element D should be mounted vertically above each sloping cone element L, spaced by dimension S (at the apex). The last dimension necessary for the design of the antenna was the angle between the legs. This was found to be 40° to give near horizontal radiation and provide a feed-point of 50Ω.

Ray Fautley G3ASG 'comes clean' and describes the skeleton that he's been hiding away for a long time. Here he shows you how to calculate the dimensions involved.

Resulting Design

The resulting design gave a useful bandwidth of up to 25% above the lowest useful frequency. More simply, if the lowest usable frequency was f(MHz) then the antenna could be used successfully up to 1.25f. It had to be fairly rugged but light in weight and very easy to transport. My first thought had been to use metal rods or tubes, but these would necessarily have to be made into a suitable flat pack for carrying about. This requirement would mean that the elements would have to be screwed together to assemble and then unscrewed each time to repack - a bit time consuming.

Further thoughts lead me to utilise the type of metal strip used in manufacturing flexible steel rules. By using several strips riveted together for the first part of the sloping sides at the top of the cone, one less for the next part and so on, more strength was added to the weakest part at the top of the cone. This is where high winds would produce most leverage and consequently, metal fatigue.

Desirable Feature

Solid versions of discone antennas have the very desirable feature of being operable over several octaves above a lowest frequency, which depends (not unexpectedly!) upon the dimensions of the disc and the cone sides. If we restrict operation to a single amateur band, the skeletonized version becomes practical because, although its bandwidth is no longer several octaves, it is still 25% of the design frequency.

For example an antenna designed for the 14MHz band would have a bandwidth of some 3.5MHz with a standing wave ratio (s.w.r.) not exceeding about 1.5:1 for an optimum terminal resistance of 50Ω. This means that it would be usable from 14MHz to about 17.5MHz. As the antenna is unbalanced with regard to earth it is suitable for direct connection of 50Ω coaxial cable. The coaxial cable inner wire is connected to the four skeleton disc elements and the cable outer screen to the four skeleton cone elements as shown in Fig. 2.

Design Procedure

Now let's have a look at the design procedure. First you must decide the
lowest frequency of operation \( f_{\text{min}} \) for the antenna. From which, the design frequency, \( f_p \) is obtained via the formula:

\[
f_p = 0.8 \times f_{\text{min}}
\]

where both \( f_{\text{min}} \) and \( f_p \) are both measured in MHz.

Next, calculate the length of the sloping sides (of the cones) \( L \) measured in metres via the equation:

\[
L (\text{m}) = 75 + f_p.
\]

The length of the horizontal elements \( D \), also measured in metres, may be calculated now this is also the diameter of a full disc using the formula:

\[
D(\text{m}) = 0.85 \times L.
\]

The last dimension we need to calculate is the spacing between the horizontal elements and the apex of the sloping sides, \( S \), again measured in metres from the equation:

\[
S = \frac{0.75}{27}.
\]

When constructing the antenna, the angle between the sloping sides and a vertical from the centre of the horizontal elements should be 20°. So the angle between any two sloping sides (the cone angle \( \theta \)) will be 40°.

The effective upper frequency \( f_{\text{max}} \), of the antenna will be:

\[
f_{\text{max}} = 1.25 \times f_{\text{min}}
\]

So, the effective bandwidth is from \( f_{\text{min}} \) to \( f_{\text{max}} \).

**Worked Examples**

Let's look at a couple of worked examples. First a design for use in the 144MHz (12m) band which is 144 to 146MHz. The design frequency \( f_p \) for an \( f_{\text{min}} \) of 144MHz is:

\[
f_p = 0.8 \times f_{\text{min}} = 0.8 \times 144 \text{ (MHz)}
\]

On the calculator this would look like:

\[
115.2
\]

So the design frequency of the antenna is 115.2MHz.

Next find the length of the sloping legs \( L \):

\[
L(\text{m}) = 75 + f_p
\]

On the calculator we have:

\[
133.39285114
\]

The sloping legs will be 13.39 metres long.

Now the length of horizontal elements \( D \) where \( D = 0.85 \times L \)

\[
D(\text{m}) = 11.38
\]

So, the horizontal elements, \( D \), will be 11.38 metres long.

Lastly, we turn to the spacing \( S \), worked out using the formula:

\[
S = \frac{(13.39 - 75)}{27} = 0.25925113
\]

Giving the spacing \( S \) as 0.259m.

Leaving, of course, only the upper frequency \( f_{\text{max}} \) to be calculated, which for our 7MHz (40m) antenna, will be:

\[
f_{\text{max}} = 1.25 \times 7.0
\]

\[
= 8.75
\]

**Useful Bandwidth**

This h.f. skeleton discone antenna should have a useful bandwidth of 7 to 8.75MHz. It could be made of wires, but would need a centre support at least 15m above ground, which isn’t possible for most of us! Although this design procedure should provide a footprint of about 592, it is always worthwhile using an antenna tuning unit between the shack end of the feeder and the transceiver. Yes I know - I have mentioned it before!

That about wraps up the skeleton discone story. I would appreciate feedback from anyone who uses these rules to have a go and make one for their own use.

**Discone antennas**

have the very desirable feature of being operable over several octaves above a lowest frequency.
My intention is to try and explain in a practical fashion, the whys and wherefores of standing waves. Those who are qualified will doubtless spot the simplifications. But I'm talking to the poor chap who eyes glaze at mere thought of s.w.r. I won't go into the subject of transmission lines, as that was covered by Gerald Stacey G3MCK in an 'Antenna Workshop' (October 1995 issue of PW).

So, let's get down to it! We could prove the value of the characteristic impedance (Z0) of any given line to be constant at any frequency in the r.f. range, it does change when we get down into the audio range), in transmission lines of all types. Another effect (common to measuring devices were available. This method of measuring the standing wave is and how strong they were used before accurate frequency accurately, the wavelength of the standing wave is and how strong they are. This method of measuring the wavelength (and thus the frequency) is called the Lecher line method, and it is an ideal line, right down to around 0.66 for solid polythene coaxial cable. To illustrate its use, assume a 14MHz signal in a line with a velocity factor of 0.66. The standing waves will appear to be, not ten metres (in round terms) long as you might expect, but 6.6m instead.

You've been told that radio waves travel at the speed of light (modified by the velocity factor). So, how can there be an r.f. wave that stands still? This would appear to be a contradiction in terms! However, the answer is that s.w.r. is a pattern, like the wheels of a stagecoach that, on TV, seem to run backwards or even stand still (technically this is known as 'Aliasing').

**Power Absorbed**

If the line is terminated in the characteristic impedance then all power is absorbed in the load (the antenna) and the s.w.r. is 1:1. But should the load resistor be any other value than the characteristic impedance, there will still be some power left unabsorbed. So, I'll now consider the load to be an open circuit, where nothing can be absorbed. As the r.f. energy hits the open circuit, none is absorbed, leaving it no alternative but to go straight back to the transmitter. Now, due to interaction of the various flows of r.f. energy a pattern of voltage peaks and troughs (standing waves) appears on the transmission line.

Mathematically, the frequency multiplied by the wavelength equals the speed of propagation. From the physical distance from the load, you can calculate this distance in terms of wavelengths. Consider a point (A) on the transmission line near the load defined as a fraction of a wavelength. The distance from A to the load and back is a constant fraction of a wavelength.

So, whatever the mis-match, the phase relationship between the outgoing signal at A and the return signal is constant. It can only change by changing the wavelength (frequency). Now plot the voltages present at A ( algebraically summing both outgoing and return). Another pattern may be created by algebraically summing the currents at point A.

Now, imagine other points on the line, where each has, by the same argument, its own constant phase relationship between the outgoing and returning wave. So, if you repeat the summing exercise at these other points, and plot the results... you've just plotted a standing wave pattern!

Additionally on a transmission line with no load, at a point one half-wavelength back from the load, there's also an open circuit condition. At one quarter-wavelength back from the end, you will see conditions implying a dead short. At other points along the line there will exist something other than an open or short circuit (inductive or capacitive).

Up to now I've talked about the s.w.r. from a purely resistive termination. In a practical antenna, the termination is a combination of reactive impedance as well as resistance. The difference now, is that the reactance of a capacitor or inductor changes with frequency (ZL=2πfC or ZC=1/(2πfL). So, when we change signal frequency, the s.w.r. will change as well.

**Purely Resistive**

Given a 2:1 s.w.r. (created by a 'pure' resistive termination) it's 2:1 at any r.f. frequency. But for a real antenna, a change of frequency for the outgoing signal changes the s.w.r. readings. Because in a 'real' antenna load there are reactive components that cause changes in loading with changes in frequency, changing the s.w.r. at the same time.

By terminating a 600Ω line to give 2:1 s.w.r. (using a 'pure' 1200Ω rather than 300Ω), at the 'half-wave back' point there exists the same voltages and currents as at the termination. At a point a quarter-wave back from the...
load, the voltages and currents would represent a resistance of 1200Ω. (The illustration of Fig. 2, shows the basic idea).

At other points along the line there are different combination values of resistance inductance and capacitance. With the aid of mathematics or, of a Smith Chart, you can predict what impedances are present, given the Z0 of the line and the load impedance. You can then see what loading the transmitter end will see due to the effect of the line length.

Knowing the effect of line length on reflected impedance, you can then go on to use this effect to make a stub to turn an awkward impedance into something more amenable (but only at one particular frequency). Since the impedance at the end of the line is repeated at half-wave length intervals, it’s usual when measuring the feed-point of an antenna to employ a feeder line of precisely (electrical) half wave long.

Cloud Nine

Now it’s time to come off ‘Cloud Nine’ and look at what s.w.r. means in real practical terms. Modern textbooks seem to place great importance on s.w.r. and I wonder why? The old Admiralty Handbook didn’t even mention s.w.r. and they managed to communicate well enough! Again, I ask why?

I’ve talked of a perfect transmission line, but in a practical line, the spacing method and material all contribute to the losses. And of course Ohms Law applies to any practical feeder of any type. The common ribbon twin feeder is markedly affected by the presence of clamp or raindrops on the spacing section between the conductors (the web), for which silicone polish is a partial cure. It’s also quickly broken by strong wind, and better material can help here. And with any practical feeder, losses per unit length increase as the frequency used increases.

Often the s.w.r. is the only parameter of an antenna system that you can measure. And that’s certainly true when using home constructed or simple test equipment. It’s also easy to look for resonance with a suitably adapted grid (or gate) dip oscillator (g.d.o.), but this provides only an indication of the impedance.

Let’s take for example, a dipole for 14MHz to be resonant at 14.175MHz (using the g.d.o.), and this will present a resistive load on the transmission line at mid-band. If at the antenna feed-point, you have some form of matching device such as a gamma or delta match, it is possible to achieve a ‘perfect’ 1:1 s.w.r. Then it’s a fair certainty that the antenna is ‘doing its thing’.

But let’s now return to our finite length of ‘ideal’ line, and still with fixed frequency but no termination. In this situation a small amount of radiation will still occur at the end. Now, it follows that if you have a transmitter with a ‘front-proof’ (protected or insensitive to high reflected voltages) p.a., most of the r.f. output to reach the ‘far-end’ will ‘bounce’ straight back to the transmitter end.

At the transmitter the energy will again encounter a mis-match, and be reflected back up the line towards the open circuit end again. In the end all the c.f. will radiate, even if some goes up and down the line: ‘umteen’ times. The perfect line, therefore, does not cause significant losses. (Various levels of reflected power and the resulting s.w.r. are shown in Fig. 3).

Practical Line

But what about the practical line in the same situation, one with a quoted 3dB loss in the run between rig and antenna? However, you should bear in mind the 3dB loss figure applies when new. Older ‘tatty’ cable has even greater losses.

Now let’s imagine 100W of r.f. energy from a transmitter put into the line, but only 50W gets to the load end. A little of the energy reaching the load is radiated, but most is reflected, of which only 25W arrives back at the transmitter end. On the second trip these figures are 12W at the load and 6W at the transmitter. (I’ve simplified and ignored adding the transmitter power in again).

As I’m sure you have noticed most of the power from the transmitter is used up in the coaxial line. So, the greater our feeder line loss, the more you should worry about a high s.w.r. Notice though, that the losses due to s.w.r. are, in fact, due to the line deviating from perfection. A lossy line will give a ‘better’ s.w.r. than it should be.

So, if your s.w.r. gradually improves over a period of several months, you can lay odds that when you check you’ll find the cable has deteriorated, usually (but not always) due to ingress of water. Of course, if the s.w.r. gets worse in service, then something has gone wrong: up aloft, but it’s not likely to be a feedline problem.

Lossless feeders

With lossless feeders, the s.w.r. figure doesn’t mean anything! Before the Second World War, amateurs simply used open wire line feeders and tuned for maximum ‘urge’ using an r.f. ammeter in each leg of the feeder. The p.a. current meter ‘dip’ would have been a good indication. Though crude, the system worked nonetheless, and everybody had fun communicating.

Then, after the Second World War came full television coverage on Band I channels and the ‘horrors’ of ‘a.c./d.c.’ television receivers. Suddenly Radio Amateurs found they had problems! Or rather they realised just how many problems they had had - and had not noticed them before!

To reduce interference, low-pass filters to reduce the harmonic content became the order of the day. Fortunately filters that need to work in a matched line, are easily made in a coaxial configuration. Another improvement was to use a high-pass filter in the TV antenna lead, again in a coaxial configuration.

There were many myths that came about in the early TV period. Interestingly enough these myths were largely generated by professionals, though to be sure amateurs believed and propagated them. To this day, the professional engineer who understands
transmission lines and antennas is quite a rare bird.

Soon, because of TV, coaxial cable suitable for 100W transmitters was available at the local TV shops. And Lo! 'King Coaxial' cable had arrived. Unfortunately however, coaxial cable, (length for length) has more losses than open wire feeder, and open wire feeder can be home-brewed! But King Cable got another boost when the transistor came along. Transistors being low voltage and high current, output impedances are of the order of an ohm or two. Many early solid states p.a. stages died instantly if mismatched, so the solid state p.a. that, by serving s.w.r. shut down when disaster loomed. So, although the s.w.r. doesn't matter too much, we must take more care for our s.w.r. to maximise the output power.

Is there an alternative approach? You could just use a single 'Top-Band' half-wave centre fed antenna with an open wire feedline as an all-band antenna. All that's needed is an a.t.u. to transform the bottom of the feedline into 50Ω for the transceiver. The antenna might put loaves in differing directions on other bands, but you'll get it to radiate. Given an a.t.u. that is versatile enough, you can load up any old piece of wire, or an old bedstead!

**In Practice**

Now that you've seen that it exists, and that modern rigs like a low s.w.r. in practice, you can live happily with any old s.w.r., just so long as the feeder from a.t.u. to antenna is not lossy. However, you need to consider carefully just how to build an antenna system that works, and how you can satisfy yourself in the future that it still works as well as the day it was put up. Obviously, to do this you need some test equipment.

You can start with a multi-range test meter with decent ohms ranges up to 20MΩ, followed by a g.d.o. or its solid-state equivalent, covering all bands for which you are likely to want. If necessary, you could accept two g.d.o.s, one for h.f. and one for v.h.f./u.h.f. You'll also need some sort of s.w.r. indicator that we can accept up to the highest frequency to be worked on, and this may be a commercial s.w.r. meter or home-brew.

**Accurate Instrument**

Whatever s.w.r. indicator used, it's vital that, within reason, it's an accurate instrument to the highest band to be used. I know that W6SAI claims that the ‘Antennascope’ design given in his Beam Antenna Handbook is good to 150MHz if built to the instructions. It uses the g.d.o. for energisation. If you are lucky enough to have a Bird Thruline bridge, then you need to have the correct head or heads to cover the range. (But beware of extrapolating outside the range of an existing piece of equipment).

One thing that often first flags up a problem with an antenna, is a change of s.w.r. You should record the s.w.r. measured across the bands when you first put the antenna up. Every so often repeat the measurements and compare the results. You should also record the weather condition on the day you took the original measurements. If the s.w.r. has just gone up markedly, you probably have either a short or an open circuit. It could be likely that one leg of the feeder has come adrift. (Some people recommend the addition of a 1MΩ resistor across the feedpoint of the antenna so, you can then check the feeder continuity by using the ohms range of your meter).

Should the s.w.r. show the same basic pattern as before, but the s.w.r. at the ends of the band is lower ('better') than before, then the chances are that your coaxial cable (if you're using it) contains water. If your coaxial cable is ancient surplus from the junk box, the problem may well be that the plasticiser used in the pvc outer sheath has corroded the braid. Either way, you should drop the antenna and investigate.

I'd recommend using ribbon or open wire feeder and the same general pattern although the details will change. But remember that 300Ω ribbon is dreadfully prone to break off up from the effects of wind. And that in wet weather, it is normal for the 300Ω ribbon to become lossy due to rain upon the 'web' as I've mentioned before.

Unless you are lucky enough to have some reliable means of measuring a change of s.w.r., you'll have to look out for changes in the setting of the a.t.u. to give you warning of trouble. So, it's fortunate you've already plotted and recorded the readings across the band when it first went up!
Tex takes a look at the SWR-121 HF and SWR-121 V/U graphical antenna analysers from AEA and a Lake Electronics TU4 antenna tuning unit to build.

The matching pair of s.w.r. and antenna analysers from AEA. The two units are the SWR-121 HF for the h.f. bands from 1-32MHz, and its up-frequency sibling the SWR-121 V/U covering sections of the 120-475MHz range. The units work in exactly the same way, only the frequencies are different. So, let’s have closer look at them!

I’ve shown in the photograph, Fig. 1, the h.f. SWR-121 HF, but the v.h.f./u.h.f. version looks almost identical. They are large hand-held units (204 x104 x54mm) that weigh in at about 750g, though they give the impression of being a little heavier. The outer casing has a pleasant feel to it and sits in the hand very well.

The energising c.f. power comes from a phase-locked loop oscillator covering 1-32MHz in the case of the SWR-121 HF and 120-175, 200-225 and 400-475MHz for the SWR-121 V/U version. There are 110 distinct frequency steps on each range which can be selected from 1-200kHz per step on h.f. or 10-1000kHz per step on v.h.f./u.h.f. Each unit can be ’locked’ to supply a single frequency for measurements.

The output of the oscillator is some 5mW into a 50Ω load, which is normally attached to the output socket of the s.w.r. bridge. The bridge impedance measurement is internally selectable between 50 or 75Ω and capable of measuring an s.w.r. of between 1:1 and 65:1, although the maximum displayed s.w.r. is 9:1. But let’s face it antenna system giving an s.w.r. reading of 5:1 or higher is really a problem so, the displayed s.w.r. range is more than adequate.

Everything is controlled from the large membrane keyboard (although there is a ‘scientific’ work to finish the antenna project off.) Above the keyboard is a very readable liquid crystal display (l.c.d.) that has a number of indicators on it. Have a look at the close-up view of a typical screen, shown in Fig. 2, where I’ve shown the readings from my low-slung receiving dipole.

In use, the units are simple to use with the centre frequency, Fc, being set up to start with. and on the display shown in Fig. 2, it’s shown as ‘Fc=15000’ or 15.000MHz. To the left is the legend ‘150’ signifying that every dot (step) is 15kHz so, the whole display is 16.5MHz wide. The display show a55 steps each side of Fc.

The two other figures shown on the legend are the actual s.w.r. figure at Fc and the return loss, again at Fc. Although it may be difficult to see on the photograph, my antenna exhibits a low s.w.r. at around 9.6MHz (about 1.8:1 at that frequency). Similar displays may be obtained on v.h.f./u.h.f. antenna systems using the SWR-121 V/U.

I would like to have seen coverage of the 500Hz band, outside of America the 200-225MHz band is less useful. Perhaps AEA have it ‘in the pipeline’. That would, to my mind, make the SWR-121 V/U a very much more useful box. But I cannot fault the SWR-121 HF as it’s an excellent piece of test equipment.

I would certainly like to add one of the AEA instruments to my workshop. It would complement the MFJ antenna analyser that I already have. I’d use the MFJ one for the preliminary ‘guestimation’, and the AEA-121 HF would be brought on to do the more scientific work to finish the antenna project off.

The units cost £299 (inc. VAT) for the SWR-121 HF and £399 (inc. VAT) for the SWR-121 V/U and are both available from Nevada Communications at 189 London Road, North End Portsmouth, Hants PO2 9AE. Tel: 01705 662145, or FAX: 01705 690626.
Lake's ATU

As a little light relaxation over the holidays, I built up a Lake Electronics TU4 Antenna Tuning Unit. Lake Electronics claim that they supply 'kits with all the bits' so, I thought I'd put it to the test over the holidays. The TU4 unit, based on the well-known 'L-match' circuit, and has the ability to match a very wide range of antenna (or feedline) impedances to the 50Ω required by most modern rigs.

On opening the kit up I found a number of components and parts, a large(ish) box made from two interlocking 'U's and two soft 'aluminium' facia panels. There was also a rather strange flat coil made from a piece of p.c.b. material with the tapped, rectangular coil etched on it. To complete the kit of course were the instructions, comprising six double-sided A4 sheets stapled together.

So, down to work - read the instructions first! The steps involved in putting together the TU4, shown in Fig. 3, are described in the instructions in an order that is fairly easy to follow. There's a bit of 'metal-bashing' to do and I prefer to use handtools. More so as the chassis provided is quite soft and power tools can 'run away' occasionally.

There are several round holes to be made in the front and rear panel, for which I used two sizes of fluted reamer, shown in Fig. 4 and 5. The 'T' handled reamer is ideal for sizes up to 12mm, for the slightly larger holes I find that an old chuck from an electric drill makes a good 'handle' for the other reamer.

There are two rectangular holes to cut out, one for the meter on the front panel and a larger one for the 'patch panel' on the back of the TU4. I tried a hand 'Nibbler' for these, before cleaning up the edges with a file. Of the other small mounting holes to be made - there's nothing that needs a power drill. When you're satisfied with the holes (and with great care) the printed legend front and back panels can be stuck on and carefully trimmed to fit.

The multi-tapped p.c.b. coil is shown in Fig. 6 fits across the unit and should be mounted after the tuning capacitor is fitted. On the insulated mounting block and to the front panel. The s.w.r. sensing board, Fig. 7, is fitted in the left rear of the chassis, leaving only the interconnecting wiring to be done, Fig. 8.

What makes the Lake Electronic TU4 such an interesting unit is the 'patch panel' on the rear of the unit, Fig. 9, allowing the coil and capacitor to be 'wired up' in a variety of ways to suit the impedance to be matched. The input is by ubiquitous SO239 coaxial cable through an SO239 socket, but output to the antenna may be by either, via another SO239 socket or through a Balun transformer and out to balanced twin feeder.

The TU4 unit makes an ideal unit for either receiving or for QRP work. I tried it on my low-slung dipole, and several 'long-wires' into a selection of receivers and I found I could get an improvement in signal in all cases. I also found I could even tune-up two short lengths of wire to give an adequate signal into the receiver.

The TU4 is available as either a kit or as a fully built unit. The kit costs £68, and as a fully built unit £88. Post and package is £4 in either case and is available from Lake Electronics, 7 Middleton Close, Nuthall, Nottingham NG16 1BX.

I let several people in our radio club 'loose' on it as a QRP transmitting accessory. The s.w.r. meter works with less than 1W on the h.f. bands. But because of the many possibilities of connection you would have to do several experiments to find out the best set-up for your antennas on each band.

That's all I have time for this session. See you all in the next issue of A-i-A.
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TOP PRICES PAID FOR SECONDHAND EQUIPMENT
Desk Microphones, Speakers, Antennas, Filters.

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- Kenwood ATT-50 ATU for TS-50 .......................... £175
- FT-990 CW filter XF-455K 250MHz (new) ........... £50
- Yaesu FT-110 CW filter X435 ................................ £320
- Kenwood TR-751E 2m W2 ................................ £105
- Kenwood TH-205 2m lunch ................................ £95

ALL TYPES OF ACCESSORIES WANTED

Practical Wireless, March 1998 59
DX-70TH Award winning HF Performance
HF Transceiver with 6 mtrs

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 DX pedition. 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 + 6mtrs
- RX - general coverage
150kHz - 30MHz
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 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

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

EDX-2
Automatic Random Wire Antenna Tuner
Quickly matches random wire antennas, masts, whips, verticals, inverted Ls, etc. with EDX-2 but can be used with most HF Transceivers.

- 1.6MHz - 30MHz
- 200W PEP

HFM-1
HF stainless steel mobile antenna complete with spring base
- Covers: 80/40/20/15/10
- Length: 5.65 metres
- Power: 500 watts
- Mounted on a radials on top of the vehicle.

VHS Jr
High quality multi-band omni-directional vertical antennas
- Covers: 80/40/20/15/10
- Length: 5.65 metres
- Power: 500 watts
- Mounted on a pole or mast above ground level.

EDX-77

- Covers all HF Amateur Bands
- General coverage receive (150kHz - 30MHz)
- 100 memories
- 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 upgradable to (T) model
- with - EJ33U Electronic keyer
- EJ340 CTCSS
- EJ33U CW filter

DX-77 (T) Standard

£675.00

DX-77 (T) with options

£775.00

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**DJ-G5EY**

**Dual Band Handheld**

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

**NEW LOWER PRICE**

**£269.95**

DR-140E

2 Metre Mobile/Base

The DR-140 is simple to operate, easy to program and dependable in use. The clean design, large controls and display show that Alinco are listening to what operators are saying. The DR-140 combines solid construction and easy maintenance with popular features and advanced functions.

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

**£249.95**

**£8 P&P**

**DR-150 2 Metre Mobile**

A full featured 50W 144MHz FM mobile radio that’s crammed full of extras.

- Optional extended receive AM/FM 136-950MHz with gap
- Channel Scope
- CTSS encoder
- 100 memory channels
- On air cloning

**£279.95**

**£8 P&P**

**DR-430 UHF Mobile**

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

- 460 - 490MHz
- 35W RF output
- CTSS encoder
- 20 memories expandable to 100
- Frequency or channel display

**£259.95**

**£8 P&P**

**DR-610E Twin Band Mobile**

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 & CTSS encoder

**£499.00**

**£8 P&P**

**DR-605E Dual Band Mobile**

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

- 50W (2m) - 35W (70cm)
- Full duplex
- CTSS encoder fitted

**£399.95**

**£8 P&P**

**DR-M06TH**

6mtr FM Mobile 50 - 54MHz

With the new 6 metre repeaters now up and running, this is the ideal radio for the Band. With an optimised receive front end, CTSS encode and easy to use controls you will be amazed at the range achievable.

**£249.95**

**£8 P&P**

**DJ-190E**

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
- CTSS encoder
- DTMF fitted
- Battery save facility
- Scan functions
- Time out timer

**£169.95**

**£8 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
- CTSS tone encoder fitted
- Battery save function
- Scan function
- Time out timer setting

**£149.95**

**£8 P&P**

**MICRO SIZE Handhelds**

**NEW LOWER PRICE**

**£169.95**

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Wafer thin credit card size transceivers

- 50mW RF output - repeater offsets - CTSS

**DJ-C1**

2mtr Handheld

- 144 - 146MHz transmit
- Extendable receive 118 - 174MHz including (AM) Air band.

**£169.95**

**£8 P&P**

**DJ-C4**

70cmsg Handheld

- 430 - 440MHz transmit
- Extendable receive 420 - 458MHz

**£169.95**

**£8 P&P**

**EMS-49**

Miniature speaker mic with clip for use with DJ-C1 and DJ-C4.
February 16: Northern Cross Rally to be held at the Thomas Park Athletics Stadium, Wakefield, West Yorkshire, just out of town on the Horbury Road, Easy access from M1 junctions 39 & 40. The event is well signposted and talk-in will be on 144 and 436 MHz. Doors open at 1100 (0930 for disabled visitors and Bring & Buy). Details from Peter G0GBC on (01294) 727566 or mobile on 09769 1802. Internet at rally@waveg.demon.co.uk.

February 28: The 13th Rainham Rally to be held at Rainham, Colchester, Essex. Details from John GUM on (01202) 775335 or E-mail: on4cdifemail.dma.be club site - main.htm

March 5: The London Amateur Radio & Computer Show will be held at the Lawns Court Centre, Pickets Lock Lane, Edmonton, London, N1. Doors open 1000 to 1700, each day. There will be 350 stalls, almost all with their own sign boards, Plus a Bring & Buy, RSGB committee and book stalls, on-demand Morse tuition and special interest groups, disabled facilities, bar, hot food and drinks and refreshments. There is a large hardstanding carpark, a licensed bar, hot food and drinks and refreshments. Please arrive somewhere to sit and eat, Martin 6EAAK on Medway (01634) 365860 at any reasonable time.

March 7: The London Amateur Radio & Computer Show will be held at the London Exhibition Centre, Islington, London, N1. There will be 600 exhibitor stalls, almost all with their own sign boards, a Bring & Buy, RSGB committee and book stalls, on-demand Morse tuition and special interest groups, disabled facilities, bar, hot food and drinks and refreshments. Please arrive somewhere to sit and eat, Martin 6EAAK on Medway (01634) 365860 at any reasonable time.

March 10: The Bournemouth Radio Society will hold its 11th Annual Rally at the Kinson Community Centre, Pelhams, Kinson, Bournemouth, Dorset. Doors will be open from 1000 until 1800, plus a Bring & Buy, RSGB committee and book stalls, on-demand Morse tuition and special interest groups, disabled facilities, bar, hot food and drinks and refreshments. Please arrive somewhere to sit and eat, Martin 6EAAK on Medway (01202) 851529 or (0208) 4992722 (daytime) and1013651 327133 or E-mail: jburtonsleisgard.co.uk or via Packet as g6tkgh7b/nnnn with BRS Sal as the subject.

March 18: The Wytch Radio Club are holding their 13th Annual Radio Club Rally at Wytch Park, Silver Street, Wytch, near Bexhill, East Sussex. Details from the A455, just two miles from junction 3 of the M42. Doors open from 1000 to 1700 and admission is just £1. There will be the usual traders in three halls and a large marquee, bar and refreshment facilities. On site plus a Bring & Buy and talk-in. Stand on S22. Contact Chris GUEJO on 0121-246 7257 or (079) 6121-247 7256 or 6EAAK, or via Packet as g6tkgh7b/nnnn with BRS Sal as the subject.

March 22: The Cunningham District Amateur Radio & Computer Rally will be held at the Mugham Centre, Harbridge, Irvine, Aryshire, Scotland. Doors open at 1100 (1030 for disabled visitors). There will be a Bring & Buy, Morse test facilities and all the usual traders, etc. M W Gobbie on (01650) 321099. E-mail: superg@lnmsb.com or gmb94@net.com

March 24: The Pontefract & District Amateur Radio Society are holding their 3rd Annual Rally at Carlton High School, the venue is 300 yards from the Carlton Community Centre. Car parking will be at the school as usual. The event will be signposted from the major roads. There will be a talk-in on 2m. For unlicensed visitors, Nigel Fergison G4SIPK can be contacted on 0900 to 1400 on mobile (0411) 420409 for directions. Doors to the fair at 1100 (disabled visitors will be admitted at 1030). Once again all traders will be on the ground floor. The bar and tea room (tea room open for early visitors) will be on the first floor. Morse tests will be conducted. Admission will be £2. Details from Nigel G0SIPK on (01977) 616035 in the evening or on (01977) 606345 in the mornings. For general enquires, call Colin GONN on (0177) 677000.

April 5: The Cambridge Riverside Repeater Group (CRG) are holding their annual rally at the University Parks Caravan Park, of a Village College, Lode Road, Bottisham, Cambridge. The event will feature a Auction Sale, Trade Stands, a Bring & Buy and a Car Boot Trading Area. For further details and booking in of traders please contact Colin GINNN on (01223) 424119, evenings please.

April 7: The Portsmouth Radio & Computer Club Rally will be held at the University Parks Caravan Park, of a Village College, Lode Road, Bottisham, Cambridge. The event will feature an Auction Sale, Trade Stands, a Bring & Buy and a Car Boot Trading Area. For further details and booking in of traders please contact Colin GINNN on (01223) 424119, evenings please.

April 8: A Radio Reaparket is to be held at the University Centre - Urk Wijkrijksuniversitert in Bergen, close to A12, Belgium. There will be 100 stalls, a Bring & Buy, RSGB committee and book stalls, on-demand Morse tuition and special interest groups, disabled facilities, bar, hot food and drinks and refreshments. Please arrive somewhere to sit and eat, Martin 6EAAK on Medway (01202) 851529 or (0208) 4992722 (daytime) and1013651 327133 or E-mail: jburtonsleisgard.co.uk or via Packet as g6tkgh7b/nnnn with BRS Sal as the subject.

April 18: The Yeovil ARQ 14th QRP Convention is to be held at Digby Hall, Hound Street, Sherborne, Dorset. Doors open 0900-1800. There will be high quality lectures with the Reverend George Dobbs as VIP, plus trade stands, Bring & Buy and refreshments. Talk-in on S22. Entry is £2, which includes prize draw. Contact Tony G4LLZ on (01268) 4431188 or E-mail: tony@nqyrs.org.uk for further details.

June 7: The 30th Annual Rally of the Southend / DARS Radio Club is to be held at Springsfield Exhibition Centre, Springfield, Southend, Essex, on Saturday 7 June. Doors open at 1100 (0930 for disabled visitors and Bring & Buy). There is easy access for all disabled visitors, a licensed bar and catering, trade stands, a huge car boot area for second hand car booting, Mick PEL1 G4PAV on (09756) 271765 or Dennis Houtt G4OO on (01775) 705382.

June 21: The Denby Dale (Fri Hall) Amateur Radio Society are holding a rally at the Alma Inn, a 200 year old, 200 bed Free House, at Shelley High School, near Huddersfield, making a fresh start as it celebrates its 25th Anniversary as a Club. There will be free and easy parking and free access for all disabled visitors, trade stands, a Bring & Buy, raffles, in addition to Computer Traders with hardware and software plus great catering and a talk-in on S22 and Morse test facilities. Look out for signs on the A629 from Huddersfield to Huddersfield, at Junction 30, A63 or A61 - M67 then A63 towards Derby. Doors open at 1100 (1030 for disabled visitors) and attracts an average of 600 visitors. Details from Sue GOWFE, Rally Manager, on (01484) 861768 or Tony GALLZ, Secretary, on (01484) 864369.

June 26: The Newbury & District Amateur Radio Society will be holding their 12th Annual Amateur Radio Car Boot Sale at Cold Ash playing field, near Newbury. Selling items will include radios, TVs, tape recorders, CD players, speakers, headphones, test equipment, etc. There are tables only for £60, no earlier please. The sale will be open from 0900 to 1500, Ian Trosclair, Secretary 6EJIT, 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 Morale Federation. The Rally is held on one level with very good access for disabled visitors. Food and drink are available and all the usual items will be made available. Details from Tony G4LLZ, contact 01268 4241188 or E-mail: tony@nqyrs.org.uk for further details.

July 5: The 9th York Radio Rally will be held in the Knavesmire Building, York Racecourse, York. Doors open at 1100, each day. Entry to the car park is £1.50. Children accompanied with an adult go free. There will be car parking, radio tuition, exchange, Morse test facilities and other group events. Details from Pat Track GD0OR on (01903) 628006.

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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The best HF + 6m transceiver on the market. Outperforms its rivals from other manufacturers. Buy one this month and we’ll give you a free power supply and matching speaker worth £155.

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<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Price</th>
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<tbody>
<tr>
<td>IC-775</td>
<td>Flagship HF transceiver</td>
<td>£1895.00</td>
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<tr>
<td>IC-746</td>
<td>HF + 6 + 2m transceiver</td>
<td>£1399.95</td>
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<td>IC-706 MkII</td>
<td>HF + 6 + 2m transceiver</td>
<td>£1199.95</td>
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<tr>
<td>IC-706</td>
<td>HF + 6 + 2m transceiver</td>
<td>£1199.95</td>
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<tr>
<td>AT-180</td>
<td>Auto ATU</td>
<td>£329.00</td>
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<td>SP-21</td>
<td>Base station loudspeaker</td>
<td>£65.00</td>
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<tr>
<td>SM-20</td>
<td>Base microphone</td>
<td>£120.00</td>
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<tr>
<td>IC-281</td>
<td>2m + 70cm base (all mode)</td>
<td>£120.00</td>
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**Yaesu**

**FT-847**

100W HF, 100W 6m, 50W 2m + 50W 70cm. Phone today for the lowest UK price.

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Price</th>
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<td>FT-1000MP (AC)</td>
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<td>FT-1000MP (DC)</td>
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<td>FT-920</td>
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<td>FT-840</td>
<td>HF transceiver</td>
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<td>SP-8</td>
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<td>MD-100A8K</td>
<td>Base microphone</td>
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<td>FT-290R</td>
<td>2m all mode mobile</td>
<td>£399.00</td>
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<tr>
<td>FT-810R</td>
<td>2m + 70cm mobile</td>
<td>£399.00</td>
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<tr>
<td>FT-50R</td>
<td>2m + 70cm handheld</td>
<td>£249.00</td>
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<tr>
<td>VX-1R</td>
<td>Microphone</td>
<td>£13.95</td>
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</tbody>
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**Scanners**

**Yupiteru MVT-7100EU**
The UK's best selling handheld scanner. Covers 0.1-1650MHz (all mode). Include nicads, charger, DC lead & antenna.

**Model** | **Price** |
<table>
<thead>
<tr>
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<tr>
<td>MVT-9000</td>
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<td>AR-8000</td>
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<td>X-10</td>
<td>£225.00</td>
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<td>AX-400</td>
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<tr>
<td>Soft case for AR-8000</td>
<td>£17.95</td>
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<tr>
<td>Soft case for 7100/9000</td>
<td>£19.99</td>
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**Kenwood**

**TH-G71**
Dual band handheld with optional wideband receiver. Buy one this month and we’ll throw in a hand microphone worth £17. ONLY £249.00

**Model** | **Price** |
<table>
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<td>HF transceiver</td>
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<td>2m + 70cm mobile</td>
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<td>2m handheld</td>
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<td>Deluxe headphones</td>
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<td>Small headphones</td>
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<td>Low pass filter</td>
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<td>Box headset</td>
<td>£52.95</td>
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<tr>
<td>Clip mic-earphone</td>
<td>£24.95</td>
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<td>Waterproof bag</td>
<td>£13.95</td>
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**Communication Receivers**

**Yaesu**

**FRG-100**
Award winning communications receiver covers 50Hz-30MHz (all mode). Our Price £499.99

**Model** | **Price** |
<table>
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<td>Communications receiver</td>
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<tr>
<td>Communications receiver</td>
<td>£159.00</td>
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<tr>
<td>As above plus WEFAX decoder</td>
<td>£199.00</td>
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<tr>
<td>Sony S/W portable</td>
<td>£149.95</td>
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<tr>
<td>Sony S/W portable</td>
<td>£235.00</td>
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<tr>
<td>Portable S/W + RDS</td>
<td>£169.00</td>
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<tr>
<td>S/W portable + cassette</td>
<td>£199.95</td>
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</tbody>
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**Managers Specials**

**Yaesu**

**FT-840**
100W HF transceiver

ONLY £649.00

**Yaesu**

**FT-290RII**
2m all mode transceiver

ONLY £399.00

**Yaesu**

**FT-50R**
2m + 70cm handheld with wideband receiver

ONLY £239.00
SERENE BASE ANTENNA

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Price</th>
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<tr>
<td>TSB-3301</td>
<td>144/70, 4.5/7dB (1.7m)</td>
<td>£69.95</td>
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<tr>
<td>TSB-3302</td>
<td>144/70, 3/6dB (1.1m)</td>
<td>£39.95</td>
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<tr>
<td>TSB-3315</td>
<td>144/70, 8.5/11dB (5.4m)</td>
<td>£149.95</td>
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<tr>
<td>TSB-3608</td>
<td>50/144/70, 7.15/6.2/4.6dB gain</td>
<td>£79.95</td>
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ACCESSORIES: P&P £2.00 on the following

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<tr>
<th>Model</th>
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<tbody>
<tr>
<td>TSK-6001N</td>
<td>Duplexter (+Coax) 2/70 (W/259)</td>
<td>£24.95</td>
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<tr>
<td>TSK-6003</td>
<td>Duplexter (Coax) 2/70 (PL/259)</td>
<td>£19.95</td>
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<tr>
<td>OFX-514</td>
<td>Igplexer (6/7/70) (Coax)</td>
<td>£36.95</td>
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MOBILE ANTENNAS: £8.50 delivery

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<th>Model</th>
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<td>DB-1004</td>
<td>144/70 om, 3/5(48) 1.5m</td>
<td>£29.99</td>
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<td>DB-770M</td>
<td>144/70 om, (3/5, 361) 1m</td>
<td>£24.95</td>
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<tr>
<td>DB-1304</td>
<td>144/70 cm, (2.15/8.4/8.4) (7dB)</td>
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<td>DB-ELZE</td>
<td>144MHz, 3, 4.58 (1.8m)</td>
<td>£6.95</td>
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<tr>
<td>DB-285</td>
<td>144MHz, 3, 4.58 (1.3m)</td>
<td>£19.95</td>
</tr>
<tr>
<td>PL-6M</td>
<td>50MHz x 1/4 wave (11m)</td>
<td>£16.95</td>
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Q-TEK: P&P £9.50 on the following

<table>
<thead>
<tr>
<th>Model</th>
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<tbody>
<tr>
<td>TQ-303</td>
<td>2m boom pass filter</td>
<td>£9.95</td>
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<tr>
<td>TQ-404</td>
<td>2m band pass filter</td>
<td>£12.95</td>
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<td>TQ-505</td>
<td>2m band pass filter</td>
<td>£16.95</td>
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SERENE BASE ANTENNA: £45.95

NEW Q-TEK WINCHES

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<tr>
<th>Model</th>
<th>Description</th>
<th>Price</th>
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<tbody>
<tr>
<td>Q-TEK WINCHES</td>
<td>A range of fully galvanized all steel construction winches with safety ratchet. (Send SAIE for spec sheet)</td>
<td>£54.95 P&amp;P £8.50</td>
</tr>
<tr>
<td>D-308B BLACK DELUXE DESK MIC</td>
<td>(with up/down) Super quality. Supplied with 8pin pre-wired Yesso lead</td>
<td>£49.95 P&amp;P £5.50</td>
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OPTIONAL LEADS: P&P £1.50

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<tr>
<td>A-08</td>
<td>8 pin “Alinco” round</td>
<td>£9.95</td>
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<tr>
<td>K-08</td>
<td>8 pin “Kenwood” round</td>
<td>£9.95</td>
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<tr>
<td>I-08</td>
<td>8 pin “Icom” round</td>
<td>£9.95</td>
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<tr>
<td>AM-08</td>
<td>Modular phone “Alinco”</td>
<td>£9.95</td>
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<tr>
<td>YM-08</td>
<td>Modular phone “Yaesu”</td>
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NEW MOBILE WINCHES

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<td>OCF-254</td>
<td>8 pin “Yaesu” round</td>
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<td>OCF-255</td>
<td>8 pin “Kenwood” round</td>
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NEW G5RVS

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<tbody>
<tr>
<td>NEW Q-TEK WINCHES</td>
<td>Multi-stranded plastic coated heavy duty antenna wire. All parts resealable. Stainless steel and galvanised fittings. Full size - 1029.</td>
<td>£24.95 P&amp;P £3.50</td>
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Only Half size 511. Only £39.95 Carryage £6.00.

STANDARD G5RVS

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<td>1029</td>
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<tr>
<td>Half size 511</td>
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NEW Q-TEK INDUCTORS

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<th>Model</th>
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<th>Price</th>
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<tbody>
<tr>
<td>80mtr inductors. Add them to your ½ size G5RV and convert it to a full size.</td>
<td>£22.95 P&amp;P £2</td>
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COPPER WIRE

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<td>(ALL 50MTR ROLLS)</td>
<td>Enamelled for indoor use</td>
<td>£9.95 P&amp;P £5</td>
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<tr>
<td>Hard drawn</td>
<td>£12.00 P&amp;P £5</td>
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<td>Multi-Stranded (Grey PVC)</td>
<td>£8.95 P&amp;P £5</td>
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<tr>
<td>Extra H/D (Clear coated)</td>
<td>£20.00 P&amp;P £5</td>
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<tr>
<td>Flexweave (H/d)</td>
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<td>Flexweave H/D (20 mtrs)</td>
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END FED HALF WAVES

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<tr>
<td>Ground plane free</td>
<td>£9.95</td>
</tr>
<tr>
<td>4m Length</td>
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<tr>
<td>6m Length 126” (S0239)</td>
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<tr>
<td>2m Length 52” (S0239)</td>
<td>£25.00</td>
</tr>
<tr>
<td>70cm Length 26” (N-type)</td>
<td>£20.00</td>
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GET THE ACCESSORY CATALOGUE

Send £1 in stamps to receive your copy of the accessory catalogue full up with 100s of accessories that you have always needed

### NISSEI METERS

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<tr>
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<td>RS-102</td>
<td>1.8-150MHz (200W)</td>
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<td>RS-402</td>
<td>125-525MHz (200W)</td>
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<td>RS-101</td>
<td>1.8-60MHz (3kW)</td>
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<td>RS-502</td>
<td>1.8-525MHz (200W)</td>
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### HANDHELD ACCESSORIES

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### S.W. PORTABLES

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### POLICE STYLE HOLSTER HHC-2

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The huge pile of old PW 'back numbers' on the desk tells us that it's Phil Cadman G4JCP's turn to look after the 'shop'. This time he's looking at a 'classic' transmitter design first published in PW in 1963.

Rather belated 'Happy New Year' from 'darkest' Dudley! I hope you enjoyed the holiday...but now it's time to start 'work'. The Editor tells me that he has received numerous requests to re-publish some old valve transmitter circuits. The transmitter designed by Steve Appleyard G3PND, whilst he was studying for the RAE, being particularly popular in this respect and the story behind it was featured in 'A Hobby For Life' by G3PND on page 58 of the August 1997 issue.

Not wishing to upset the Editor (he's bigger than I!), I'm devoting the whole of this column to Steve's transmitter. The circuit - which was first published in the April 1963 issue of Practical Wireless - is reproduced in Fig. 1 together with the original components list and numbering. The original article also included a power supply but I've omitted that because of space considerations.

I'm not proposing to lead you through the construction of the transmitter. Instead, I'll be dealing with the obstacles you might encounter should you decide to build the transmitter and haven't got a well-equipped junk box. And even if you have all the necessary components to hand there are EMC issues that need to be addressed before this, or any similar transmitter, is used on the air.

The Circuit

The circuit, Fig. 1 is straightforward and the v.f.o. is a standard Colpitts oscillator. Notice that it can be switched independently of the rest of the transmitter. This is to let you tune the v.f.o. to the frequency you want simply by listening for it on your receiver. (You'll find the equivalent of switch S1 frequently marked 'net' in similar designs).

I'd suggest one circuit modification associated with S1 - put a 1N4007 rectifier diode between the 'top' of R3 and the cathode to the 'top' of R5. Then, when S4 is closed, power will also be applied to the v.f.o.

As the circuit stands it's possible to apply power and key the p.a. with no drive present whatsoever. Alternatively, substitute a double-pole switch for S4 and connect the extra pole in parallel with S1.

The frequency of the v.f.o. is varied by adjusting VC2. The low-value variable capacitor (VC1) in parallel with VC2 is only there to help with fine adjustments. It can be left out of circuit if VC2 is fitted with a slow-motion drive (or if you have steady 'slow-motion' hands!).

The next stage, incorporating V2, operates as an un-tuned buffer on 3.5MHz and as a frequency doubler on 7MHz. In addition, the potentiometer VR1 controls the power output of V2 and hence the amount of r.f. that is fed to the driver valve, V3. Unusually, the circuit shows no by-pass capacitor connected to V2's screen grid. (A 10nF capacitor from pin 8 to ground wouldn't hurt).

The driver valve V3, which is un-tuned on both bands, feeds the p.a. valve V4. Nothing special here, the output stage uses a familiar pi-network to match the aerial to the p.a. valve.

Winding Coils

No winding details for the coils were given for L1 and L2 in the original article. They can be wound purely by trial and error but to start you off the combination of L1, VC1 and VC2 has to resonate over the range 3.500MHz to 3.800MHz. That gives a value of about 7µH for L1.

The combination of L2 and VC3 has to resonate over the range 7.000MHz to 7.100MHz. Remember, L1/VC3 are only in-circuit when V2 is operating as a frequency doubler. Try 10µH for L2.

I suggest you either dig out my June 1996 column, which gave design equations for winding coils, or get the book Coil Design and Construction Manual by Babani - see the PW Book Store. Alternatively, both The ARRL Handbook and the RSGB's Radio Communication Handbook have coil design charts.

If you are going to wind r.f. coils on a regular basis then get hold of a grid-dip meter and learn how to use it. Steer clear of LCR bridges and modern digital LCR meters as they are not generally suitable for measuring very low inductances.

Radio frequency chokes are a problem! Once upon a time, all radio component shops sold radio frequency chokes. These days new ones are about as common as 'hen's teeth'. I'm loathe to recommend any of the so-called r.f. chokes found in the components catalogues. It seems they are mainly designed for use in transistor circuits and switched-mode power supplies. Has anyone used them successfully in valve designs, I wonder?

Wattage Ratings

Use either carbon or metal film resistors with the wattage ratings specified. Don't worry if you can't get the exact value. As long as you're within 20% of the stated resistance then it'll still work.

The wire-wound potentiometer, VR1, is more of a problem. Maplin sell a 4765W, 2W, carmet type but it's expensive. If you haven't got something in the junk box try asking around. Don't be tempted to use a carbon potentiometer. The track will quickly overheat and cause problems and the smell is dreadful!

Fortunately, the fixed capacitors are easy to get hold of. You may already have noticed that only two values are required - 100pF mica and 0.01µF (10nF) paper. For the 100pF mica you could use Maplin's 'High Stability Silvered Mica' type WX13P. Similarly, each 10nF paper capacitor could be replaced by Maplin's 630V-rated 'High Voltage Metallised Polyester Film' capacitor type DS81C.

One of the variable capacitors might be a problem. The p.a. 'tuna' capacitor, VC4, needs to be a wide-spaced air-dielectric type due to the high r.f. voltages present at the anode of V4. Standard air-spaced types liberated from (or intended for) broadcast receivers are likely to flash-over in this application.

One point; the specified maximum capacitance of VC4 seems a little on the high side. A 250pF capacitor ought to be sufficient. I hope so because you're more likely to find a wide-spaced 250pF capacitor than you are a 500pF capacitor.

If you haven't got a suitable capacitor to hand
then you'll need to either ask around or scour the surplus and ex-equipment advertisements in the magazines. Wide-spaced variable capacitors can be bought new but they are very expensive. At least a broadcast-receiver type is more than adequate for the p.a. 'load' capacitor, VC5.

Valves Available
All the valves used in the transmitter are readily available. Steve G3PND originally suggested using a 6V6 instead of a 6L6 for V3. I'd go along with his suggestion because a 6V6 will do the job and it's cheaper, smaller and only takes half the heater current of the 6L6. The base connections are the same as the 6L6.

Actually, both the 6V6 and 6L6 are metal types and are likely to be expensive. Far more appropriate for this job is either a 6V6G or 6L6G, both of which have glass envelopes. Even better is the 6V6GT, which has a much smaller glass envelope than the 'G' version. It's usually cheaper, too.

The p.a. valve, V4, is an 807. This is a bit of a nuisance because it uses a UX5 base and has a top cap. You could try the octal-based 6L6G here but do take care to keep the anode and grid wiring well separated.

If you are content to run low power then a 6V6/GT will work fine in the p.a. However, you must reduce the h.t. to 300V. In fact, it might be a good idea to run the transmitter on 300V anyway.

The lower voltage is marginally safer and you can use a receiver-type p.a.u. as long as it will supply 90mA or more. Moreover, the reduced drive requirements of a 6V6/GT p.a. might mean that another EF80 would suffice for the driver valve, V3. By the way, the EF91 has a B7G base and the EF80 has a B9A base. All variants of the 6L6 and 6V6 take octal bases. All the valves I've mentioned have the same 3.6V heater voltage but the total heater current will, of course, depend on the actual valves used.

The following information will help you work out the heater current the transmitter will require. The EF91 has a 27B base and the EF80 has a B9A base. All variants of the 6L6 and 6V6 take octal bases. All the valves I've mentioned have the same 3.6V heater voltage but the total heater current will, of course, depend on the actual valves used.

In Operation
In operation and with a 6L6 or 807 for V4, the p.a. can be loaded to around 60mA, which is an input of 24W. However, you should keep to around 45mA if you use a 6V6/GT instead. These figures may seem overly conservative but at least at these power levels the p.a. valve cannot be damaged through over-dissipation.

When operating on 7MHz, adjust VC3 for maximum r.f. output. And on both 3.5 and 7MHz you should increase V2's screen voltage (adjust the drive control) until the r.f. output flattens off. Overdriving the driver and p.a. doesn't help either efficiency or harmonic suppression.

Don't forget to switch both S2 and S3 together. Get them backwards and you'll be wondering why the p.a. won't tune or you'll end-up doubling in the p.a. (which is rather frowned upon). And no, you can't use a double pole switch for S2/S3. (You'd get feedback from the anode of the p.a. to the grid of the driver. Very bad news!)

Harmonic Suppression
As it stands, the original transmitter design has poor harmonic suppression for use in these EMC problem filled days! And this is particularly true on 3.5MHz where only the p.a.'s pi-tank provides any real suppression of harmonics, all the other stages being un-tuned.

Although the transmitter can be tested into a dummy-load as-is, you must use a suitable filter between it and the antenna.

Unfortunately, the common 30MHz low-pass filters that are commercially available are in no way suitable by themselves.

Consider the transmitter operating on 3.575MHz. The second harmonic will be at 2 x 3.575 = 7.150MHz. A low-pass filter with a cut-off of 30MHz will have almost no effect at this frequency (if it does, take the filter back to the shop and ask for your money back). The commercial broadcasters on 7.150MHz, and their listeners (and the RAI) will not be pleased.

The third harmonic at 10.725MHz will also upset the h.f. broadcasters. While the fourth harmonic at 14.300MHz might result in you being chastised by a nearby 14MHz s.s.b. DX'er.

Changing band will not help. Tune the transmitter to 7.020MHz and you'll upset the c.w. types on 14.040MHz. And as the transmitter will still have significant output on 3.510MHz (the v.f.o. frequency) you'll have the 3.5MHz users on your back too.

Common Problem
The problem of poor harmonic and sub-harmonic suppression is common to all transmitters of this type and not just to Steve's design. The only satisfactory way to operate this, and similar transmitters, is to follow it with a low-pass or band-pass filter specifically designed for the band in use.

In our case, a 4MHz low-pass filter is sufficient when operating on '80' because the transmitter's output is at the same frequency as the v.f.o. Therefore, there are no sub-harmonics to worry about. But on 7MHz, the output is at twice the v.f.o. frequency. A 7MHz low-pass filter will not attenuate the v.f.o.-frequency component that makes it through the pi-network. So a band-pass filter is necessary.

Both the ARRL and RSGB Handbooks have filter design tables, although, in my opinion, neither devote enough attention to band-pass filter design. One final point - key clicks. The only key-click suppression included is C19, a 10nF capacitor. This is unlikely to be sufficient and so I'd recommend augmenting this with additional filtering. Again, both Handbooks have suitable designs.

Cheerio until it's my turn 'in the shop' again. Please send your comments and letters to me either via the PW offices, via E-mail to phil@oldpark.demon.co.uk or direct to: 21 Scotts Green Close, Scotts Green, Dudley, West Midlands DY1 2DX.
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VHF REPORT

REPORTS & INFORMATION BY SATURDAY 28TH FEBRUARY.

- DAVID BUTLER G4ASR, YEW TREE COTTAGE, LOWER MAESCOED, HEREFORDSHIRE HR2 0HP.
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- Packet radio: @ GB7MAD
- UK DX Cluster: @ GB7DXC

THIS MONTH DAVID BUTLER G4ASR HAS REPORTS OF THE GEMINIDS METEOR SHOWER, AURORAL OPENINGS AND NEWS OF WHAT'S BEEN HAPPENING 'DOWN-UNDER' ON THE 50MHz BAND.

Propagation conditions during December were generally quite poor. Apart from a few days of meteor scatter (m.s.) propagation during the Geminids meteor shower and some brief auroral back-scatter openings very little else was reported. In other parts of the world conditions have been excellent. This was especially so on the 50MHz band with many contacts being made via Sp-El and Trans-equatorial Propagation (i.e.p.).

GEMINIDS METEOR SHOWER

The main propagation event during December was the Geminids meteor shower which occurred between December 10-15. As with all major meteor showers it provided the opportunity to contact DX stations on the 50, 70 and 144MHz bands. The principle of m.s. is relatively straightforward. Both stations point their antennas towards each other and, using timed periods, await for an incoming meteor or to briefly orientate the element region between them to allow communication to occur. Because the meteor trail occurs in the E-layer, around 90-120km high, the two stations will normally be nearer than the minimum 1000km distance. So, if your QTH or to contact stations as far away as 1000-2000km apart. Sometimes you can make use of meteor trails in other directions, as long as you're not shielded QTH or to contact stations a little nearer than the minimum 1000km distance. So, if your QTH is screened in any particular direction both participating stations could beam to a specific bearing, well away from the direct path, to make backscatter or side-scatter contacts.

All m.s. activity is conducted via high speed c.w. or conventional s.s.b. High speed meteoric scatter (h.s.m.s.) involves the use of Morse nominally at 400w.p.m. A memory key or computer is usually used for transmit and a multi-speed tape recorder, computer or the DF7KF DTR (digital recorder) used on receive.

The 50MHz band is ideal for h.s.m.s. propagation but strangely there is very little activity on this band especially in the UK. Perhaps everyone wants to make those easy Sp-E contacts in the summer instead?

Activity on the 50MHz band is very limited primarily because of the geographical constraints in the UK. Occasionally an expedition may be active from Cl or GM but these usually take place during the Perseids meteor shower in August.

Most m.s. activity takes place on the 144MHz band with hundreds of enthusiasts all over Europe. From the UK it's possible to contact stations as far away as Iceland, Scandinavia, the ex-Russian, Bulgaria, the Mediterranean area and North Africa.

As a means of creating further activity, the Bavarian Contest Club (BCC) organised a c.w. meteor contest to coincide with the Geminids meteor shower. The aim of the contest held between December 11-15, was to make random contacts on the 50MHz band to encourage LIIII and LASS

13-14I but did make a number of random c.w. contacts using the letter system during the contest period. These were FA3VH (Spain) at 1250kms IC8FAX (Italy) at 1822km, LY3GM (Lithuania) at 1740km, KW2F (Kaliningrad) at 1615km and SP2OFW (Poland) at 1422km.

I also heard many stations calling c.q. including DL4NAE (Germany), EA6SA (Balearic Is), I6IOI (Italy), LA8BY and LA2AB (Norway), OE3JC (Austria), OH2SNH (Finland) my longest distance heard at 1943km, SP4MFP (Poland), SI5AT and S57AE (Ireland), 9A1CA (Croatia).

Bill Thomas G4AEP complete contact was not made. My best DX ever via the m.s. mode is three contacts with OH4LE (KN93) at 2107km.

Claudio I4XCC (I4S3) reported a 2020km contact with R011A (KO48) and amazingly O9FUV (KP34) heard ICFAX (JN70) over a distance of 2783km, although not impossible. The current UK top five European distance records for m.s. on the 144MHz band are GW4CQT (IO81) to UW6MA (KN97) at 3101km, made over five very active nights on August 12 1977, OZ1IUK (IO66) to UA1CDT (IO41) 2354kms, OZ1TDH (IO65) to U6MY (KN93) 2153kms, GM4CKM (IO75) to UA1MC (KP59) 2293kms and PA0MV (JO21) to JX7DFA (KZ50) 2279kms.

During the BCC contest some stations did manage to crack the 2000km barrier.

Unfortunately, I missed the peak of the Geminids (December 14) by 72 hours. Wasil made a number of contacts using the letter system during the contest. Must try for January's Lyrids which are particularly active over the Aegean Sea region. I also heard many stations calling c.q. including DL4NAE (Germany), EA6SA (Balearic Is), I6IOI (Italy), LA8BY and LA2AB (Norway), OE3JC (Austria), OH2SNH (Finland) my longest distance heard at 1943km, SP4MFP (Poland), SI5AT and S57AE (Ireland), 9A1CA (Croatia).

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first v.h.f. and u.h.f. QSO’s and the first contacts via satellite.

Every year since Wardi’s death the Bulgarian club have organised an m.s. expedition during the Perseids meteor shower. Last year the group (shown in the picture) operated from locator square KN21. Because the distance between Bulgaria and the UK is very long only two s.s.b. contacts were made via m.s.

However the Bulgarians were very fortunate to catch an Sp-6 opening on August 14 and completed s.s.b. contacts with 37 stations. Amongst these were the stations of GOCUZ, GOFIG, GOGAVS, GOKAS, GOKVA, G11YA, G3BNE, G3C0O, G3MV, G3HWM, G3WT7, G3YVR, G4RKV, G4CSEU, G4TFI, G4VPD, G6HKM, G6ZDOG, G7MHZ, G8YIG, G4W4UR and G4QWZ. The equipment at L1KWT consisted of a Yaesu FT-736R, 2 x 4C250B running 1kW and a pair of 16-element FF Yagi with a G4sas f.e.t. head pre-amplifier.

AURAL OPENING
Ken Osborne G4IGO (IO90) reported hearing a weak auroral opening between 1800-2100UTC on December 6. He noticed that TV video signals at 48MHz were being reflected on a beam-heading of 330° whereas signals at 49MHz were peaking on a beam-heading of 40°. The station of PA3FIY (10832) also heard the 49.25MHz TV carriers go auroral from 1745UTC. However, Zaba OH1ZAA disputes whether it actually was auroral backscatter. He mentions that he has heard similar signals under very quiet conditions.

Sometimes the v.h.f. spectrum sounds very vibrant and signals exhibit a very rapid fading with a Shaky, Zaba reports that the Finnish magnetometer (situating in locotor KP37) shows the magnetic activity to be extremely quiet during the period but he does question whether the magnetometer signals are sensitive enough to detect very weak auroras. He also wonders if there are any other geophysical processes that exist which generate a similar auroral type sound received on signals.

Neil Spokes AB4KY suggests that the auroral sound could be caused by meteoric clouds of very low mass particles. Neil surmises that there could be endless belts or clouds of particles orbiting the sun in unpredictable directions.

The clouds would be detectable, orbiting the sun for millennia until they encounter the earth’s magnetic field. The impact with the earth could then give rise to aurorally sounding signals.

Whether it was a “true” aurora on December 6 we may never know but there definitely was one on December 30. It commenced around 1530UTC and lasted for nearly three hours. On the 50MHz band a number of operators reported the stations of G3MOVO (IO77) and MANDAMW (IO75) putting good signals into central England. Up on the 144MHz band Scottish stations were heard making c.w. and v.h.f. contacts into ON, PA and DL.

From Scandinavia the Swedish station SMSSBS2 (IO98) was putting in a cracking signal for much of the opening and was reported as far south as the London area. Dick PA3FJY reported working a total of 15 stations, mainly in LA and SM, between 1650-1850UTC. The only UK station worked on the 144MHz band was GM0GMD (IO86).

SOUTHERN HEMISPHERE
As you no doubt know when it’s winter time here, it’s summer in the southern hemisphere. Whilst, similarly, whilst the northern hemisphere can only dream about last year’s Sp-E openings, operators on the other side of the world are actually witnessing the opening in their DX season right now.

Over in the Antipodes some of the paths being worked include VK (Australia) and ZL (New Zealand). Similarly, whilst the northern hemisphere can only dream about last year’s Sp-E openings, operators on the other side of the world are actually witnessing the opening in their DX season right now.

One recent success was when the station of NSOLSHX was contacted on v.h.f. who then alerted the G3MOVO (Australia) and ZL (New Zealand) station. Bill AH8A (running 60W into a quarter-wave vertical, then made a number of contacts with stations in VK and ZL.

Mike ZL1TIC (New Zealand) reported that this year’s Sp-E season is quite different to that in 1997. At this QTH more long haul indicators are being heard, such as video from Japan on 44MHz and 50MHz band between North America and Europe on December 12. A report from Tom Mott WZ6DZ (FN02) mentions that he heard the station of DL2UM (Germany) being heard in VHF but signals disappeared into the noise.

Although unconfirmed I can’t totally dismiss the WZ6DZ report as they have been actually seeing something peaking in their DX season right now.

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(three-yearly) IARU meeting, the next one being held in 2000.

That's it again for another month. Don't forget to keep sending me your list of locator squares, counties and countries worked for the 1997 table. Forward any news, views, comments or photographs to reach me at the address and by the date given at the top of the column.

THANKS FOR SENDING IN YOUR REPORTS KEEP THEM COMING, SEE YOU NEXT MONTH.

HF FAR & WIDE
REPORTS & INFORMATION BY THE 15TH OF THE MONTH

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As I write this just before Christmas, the month of December has brought the first snow of the winter. But along with the cold weather, we've also been witnessing some very good propagation conditions on both the high frequency and lower frequency bands. Our reporters this month continue to log that conditions are steadily improving. However, on some days the bands have been somewhat flat at times. The lower h.f. bands have shown a marked improvement during the dark evenings. This became evident even to the extent that on one particular evening I was receiving strong north American stations on the 1.8MHz band as early as 2100, as' From this point onwards I was receiving stations all over Europe. I even managed to work the USA on 1.8MHz with an end fed wire (this is not exactly a DX antenna on this band: one needs a vertical for real DX work here of course, but still it was a first for me). Mind you, I had to run 50W to make the contact - a massive amount of power for a "normally" QRP operator.

The 21MHz band has been supporting DX traffic on a regular basis of late, as well as a few openings on the 24 and 28MHz band during the dark evenings. This was shown a marked improvement during the dark evenings. This was somewhat flat at times. The lower h.f. bands have shown a marked improvement during the dark evenings. This becomes evident even to the extent that on one particular evening I was receiving strong north American stations on the 1.8MHz band as early as 2100, as well as stations all over Europe.

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THE DX NEWS

Now it's over to the RSGB's DX News Sheet, edited by Chris Page G4BUE. And to start, for enthusiasts of SSTV there's news that Camel TZ2BK is regularly active using this mode on the 14MHz band, while Agalega & S. Brandon Islands will be activated by Dow AZ4DX and others during the month of May, callsigns will be 3B7AZ and3B7/H9AJ.

Charlie K4VUD will be active from Nepal as9N1UD during March. For more details he can be contacted on 407-349-221. Fiji Island is where Hide M1LJS will be operating under the callsign 3D2LU between the 30th of April and the 7th of May. QSLs to go to his home call address.

Using QRP from the Canary Islands during March will be G3MXQJ, operating as EA8/G3MXQJQP - QRP. Any QSLs should be to go to his home call address.

THE ZB2FU/M SAGA

It seems that the ZB2FU saga has continued! Following reports in the column a few months ago regarding the pirating of the ZB2FU/M callsign, and the later claim by someone purporting to be ZB2FU/M that he was legitimate, all three callsigns are illegal. So readers beware! It's a shame that this sort of thing goes on, but many thanks to ZB2/V and his colleagues for clearing this matter up.

SOUTHERN HEMISPHERE 1.8MHz

One of the most well known 1.8MHz operators in the southern hemisphere is Jim ZL2JH, pictured in Fig. 1. And with 146 countries worked on 1.8MHz certainly puts out a remarkable signal on the band.

Jim, on the left in Fig. 1, is pictured with Bernie G4CWO on a recent visit to New Zealand. Apparently Jim's QTH consists of 25 acres rising to 350ft above sea level, adjacent to the shore. "However", says Bernie, "all is not sweetness and light, as across the bay, just two and half kilometers away is a 370ft mast pumping out 1.5kW of a m! Luckily Jim has been able through much experimentation, to neutralise any untoward side effects from this station'. (Whew! I'd like to know how he does it, because I can't even escape from the timebase QRM emitted by my TV set downstairs!)

YOUR REPORTS

On your reports now, beginning with 1.8 and 3.5MHz. First comes all-c.w. man Ted Tr0well G2HKU in the Isle of Sheppey in Kent, who hooked up with 7F3IRA (Iceland), and 1KSNN (Costa Rica) at 0700, along with OH1KFB (Finland), LA4PHA (Norway), and FM3GUI (Martinique Island) at around 2100 on the 1.8MHz band. Ted has been taking it easy of late, on doctors orders, so hope he's feeling better now Ted.

Next comes Eric Masters G0KRT from Worcester Park in Surrey, who due to examination work has not been as active as he's like. Nevertheless, Eric's QRP c.w. signals went out to DL7Q (Germany) at 2045 on 1.8MHz, and 1KSNN (Costa Rica) at 0700, along with 7F3IRA (Iceland) at 1719 on 3.5MHz.

Your scribe GWOLBI managed to hook up with 7F3IRA (Iceland) at 2300, K3UL (USA) at 0117, and IB8YO3RA (Sardinia) on 1.8MHz using 30W of c.w. on lower power 5W of c.w. brought contacts with UU4IMG (Russia) at 0055, LAS7FA (Norway) at 2355, and UA2FL (Kaliningrad) at 0014, again on 1.8MHz.

THE 7MHZ BAND

Using a G5RV dipole on the 7MHz band is Sean Gilbert G4UCJ in Milton Keynes. This month he reports c.w. contacts with NP3G (Punta Rico) at 2337, EP2KXO (Iran) at 2319, Z5A2 (Libya) at 0200, 9Y4S (Trinidad) at 0135, SV7A (Togo) at 0028, SY6A (Jamaica) at 0013, and 3J9A (Grenada) at 0037 UTC. Seems like the band has been open rather well to the Caribbean area. Ted G2HKU lists a couple of contacts on 7MHz in the form of DJ4GH/H3 (Dominica) at 0800, with W0DIK (USA) and VP2EB...
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GEOFF G4AQU - JOHN G6VJC

PHONE 01384 221036 OR VISIT OUR SHOWROOM TODAY
(Antigua) coming in around 2100 UTC

Eric G0KRT reached out with his 5W c.w. to UT3EH (Uruguay) at 2332, and K1WGM (USA) at midnight.

Down in deepest Somerset Don McLean G3JNO in Yeovil used s.s.b. to hook up with F4SCU (Martinique island) at 2300 and YV4AR/BQP (Venezuela) at 0019 UTC.

**THE 14MHz BAND**

Over to Don G3JNO again now, for his monthly propagation report followed by your 14 MHz band reports. Don says the bands 14-28 MHz have generally been open during daylight hours. 14 MHz has been open around 0700 - 0900 on the long path to Australia and New Zealand, and the west coast of the USA came in at around 1500 to 1700. Generally the band was closed by 1800, although on a couple of days it stayed open until 2000.

Don continues: "The 18 MHz band was a 'bonanza' most days, openings around 0830 to 1000 on the long path to New Zealand, with a few Japanese stations being heard, along with other Pacific area countries. 21 MHz was often open on the short path to Australia around 1100 to 1230, while north America and some African countries came in at around 1300 and 1700.

The 24 MHz band has been poor, although on some days there were long path openings to Asia and the Pacific area between 0900 and 1130. Some African stations were also heard at this time. On 28 MHz, African stations came in during the mornings and afternoons, along with south American stations quite strong during the afternoon as well!"

Don's worked report includes 14MHz s.s.b. contacts with FG3FCC (Guyana) at 0723, 1936, G5/AM1M (Hawaii) at 1842, VE7DXX (Canada) at 1646. Finally, there was ZL2O (Ascension Island) at 0251 UTC.

**New reporter**

Robert Adlington G7UTO in Knebworth has been actively s.w.l'ing on the 14MHz band, and lists reception of VP6TFR (Falkland Islands) working DL5EIE in Germany at 0700, 9X0A (Rwanda) working 1019UTC at 1300, A9GE (Bahrain) in contact with W9HAM in the USA at 1351, and 7XZB (Algeria) working 1004UTC in Italy at 0820UTC. Welcome to the column Robert!

Also busy at the receiver is Derek Bunden G8SJS in Swindon. Derek’s 14MHz log shows s.s.b. reception of VE6LCC (Australia) working E4AMY at 0925, 2Q5T (Tanzania) in contact with EA1DT in Spain at 2047, FG7GTT (Guadeloupe) working YU1AVC at 0514, and YA4BOU (Benin) in contact with PA2NWZ at 0635 and ZL2XSK in Bulgaria at 0944UTC.

Meanwhile, Ted G2HKU hooked up with V6HBY (Canada) P40 (Anuta island, Netherlands Antilles) and WA7T (west coast USA). All QSOs were around 1700 UTC.

**THE 18 & 21MHz BANDS**

The 18 MHz band was where Charlie Blake M0AAL may have been rather busy of late. Using just a simple straightforward dipole, Charlie hooked up with G1WQY (Senegal) at 0900, C23FT (Madeira Island) at 1129, and 4Z59S (Israel) at 1100 UTC.

Opening on 21 MHz, Charlie also ‘snagged’ CN8BNK (Morocco) at 1257, 9K2MU (Kuwait) at 1230, EA8BYR (Canary Islands) at 1443, and EU7DDT (Azores Islands) at 1144 UTC. All contacts were using s.s.b.

Down to Skewen now, and Carl Mason G0WSW/5W, who, using 70W of c.w. and a G5RV dipole on 18 MHz worked BV7FC (Taiwan) at 0800, and SV2CDF (Greece) at 1546, while on 21 MHz he worked SB4/UA9LAC (Cyprus) at 0900, ZPSKF (Paraguay) at 1115, HMSCA (Ecuador) working 28/4013 (Costa Rica), and C5A/N4ARF (Bahamas) at around 1300, CE2HZWMY of the coast of Brazil at 1429, and 6H8FV (Colombia) at 1712 UTC.

Operating under his Novice call sign of 2E6ANZ, John Constance, otherwise known as G0VZGD of Aylesford in Kent lists contacts using 3W of c.w. on 21 MHz with 23ZCY (Macau), 9A19G/M (USA) at around 1300, V36MJP (Canada) at 1520, I5GAL (Russia) at 1225, and IXTRX (Korea) at 1000.

**THE 28MHz BAND**

The 28 MHz band has been open of late, but not on a regular basis. However, any signs of life on this band is a good sign of better conditions to come. John Wheeler G0UIE in Newmarket has his 5W of c.w. to UT5EH (Ukraine) at 2332, and K1WGM (USA) at midnight. Well that just about ‘ties up the ribbons’ for this month folks as it’s ‘signing - off’ time. Thanks to all our reporters for your invaluable help and assistance with the column.

**KEEP UP THE GOOD WORK AND GOOD LUCK WITH ALL THAT JUICY DX OF COURSE!**
interference from Amateur Radio transmitters can be a real headache. For most the only time you have to even think about interference problems is when you get that fateful knock at the door with plans of cleaning up planning of problems with his 'phone/video/TV/hi-fi/computer,' etc.

Other than having to muster-up the appropriate level of tact you then find yourself craving for information as to how to work-out whether it’s his or your equipment that’s at fault. Fortunately for those of you with Internet access there’s a new source of help in the form of the FCC Interference Handbook.

The FCC Interference Handbook excellent document is now available online and can be found at http://www.fcc.gov/Bureaus/Compliance/WWW/tvibook.html in addition to providing some interesting text, the handbook also contains a number of TV images showing the effects of different types of interference. Remember the golden rule with all interference problems is to tackle the problem in a logical step-by-step process carefully recording the results and so eventually finding the root cause by a process of elimination.

FREQUENCY GUIDE
Knowing that many of you like to try your hand at utility listening from time-to-time you may be interested to know that the latest Super Frequency List on CD-ROM is available from Joerg Klingenfuss. This latest version has been much enhanced and looks to be very interesting.

As well as featuring an extensive database covering more than 11,800 frequencies there are a few other goodies on the latest version of the Super Frequency List. To help you get started with utility listening there’s a copy of the excellent Radiokit decoder by F61FT.

Included are full schedules of all clandestine, domestic and international broadcasting services on short wave. This database has been compiled by Michel Schaa and is available in full open access as a standard db file. This means you can easily export the data and process it in a host of different formats. There is also a huge glossary of abbreviations and a list of over 15,000 formerly active stations. In case you’re wondering, these old frequencies are still useful to know because the host stations usually retain them for use in case the satellites links fail.

As if all this is not enough, the latest CD also contains demo versions of some of the best rig control programs currently available. Included on the sample was Radio Manager, INTERFERENCE HANDBOOK. The predictions can be broken down into two distinct groups, i.e. those providing a general view of propagation conditions and those providing specific predictions for the propagation between two defined sites.

The range and detail of the predictive material available from the GWinProp program is really quite amazing. Probably the most informative for the new user are the graphical displays. I’ve shown an example of the Local Prediction output in Fig. 1. This shows the maximum usable frequencies (m.u.f.) and frequency optimum transmission (f.o.t.) at ten radial distances and bearings from your home position, or any other that you care to specify. This sort of data is really useful for DX work.

If you want to get really serious the full numeric outputs are also provided in separate screen displays. I’ve only scratched the surface of the potential of this program and if space allows I’ll provide some more detail later.

One of the really great points about the GWinProp program is that Gordon has made it freely available for non-profit use, so you should soon see it starting to appear in all the usual software archives.

I’m also hoping to add it to my own web site soon. My thanks to Gordon for the excellent work he’s done in producing this excellent package.

SPECIAL OFFERS
If you’d like a copy of Hamcon}/TVX, 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 for you, as 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.
THE MILLENNIUM PROBLEM

The year 2000 is fast approaching and the possible computer clock problem is worrying lots of commercial organisations. I recently saw a program being circulated on the Packet network.

It's freeware so, I am reproducing it here for those of you that missed it. If you would like the .EXE version, send a disk together with the usual miser and return postage or you won't receive a reply!

The program is in QBASIC source code for your use. If you have a PC and virtually any DOS version from 5 you will have QBASIC available to you. Enter the following text as a program by copy and paste or loading.

REM START PROGRAM HERE!
REM This program is written in QBASIC for the PC.
REM It checks to see if your PC will have any problems when the year 2000
REM comes along; Some machines will not update their clock correctly.
REM These problem machines will be very rare. The biggest problem will
REM be the software run on these, and other machines. Most current software
REM will need a re-write to solve the software problem.
REM
REM REM This program is FREEWARE and you can do with it as you wish, including
REM modifying the code. If you do modify the code or distribute please have
REM REM Help yourself and have fun!
REM
REM

CLS
PRINT " YEAR 2000 CLOCK CHECKER, BY STRINGRAY SYSTEMS (1997)"
PRINT " MMDANT @G7EDN @FT7GGR EURO robert@fview.nildram.co.uk"
LOCATE 4, 1
PRINT "Wait until 9 seconds...."
DO dS = DATES: dS = MID(SIdS, 4, 3) + LEFTSIdS, 3) + RIGHTSIdS, 4)
15 = TIMES
LOCATE 4, 36
PRINT IS; ": Pistol LOOP UNTIL RIGHTSIdS, 2) = "50"

is$ = TIMES
cdS = DATES

PRINT DATES = "12-31-1999" TIMES = "23.59.50"

LOCATE 4, 1; PRINT " WAIT WHILE TESTING..."
DO dS = DATES: dS = MID(SIdS, 4, 3) + LEFTSIdS, 3) + RIGHTSIdS, 4)
15 = TIMES
LOCATE 4, 36
PRINT IS; ": dS LOOP UNTIL RIGHTSIdS, 2) = "10"

IF VALID RIGHTSIdS, 4) + 10 AND VALRIGHTSIdS, 2) + 0 AND RIGHTSIdS, 4) <> "2000" THEN PRINT " The clock will fail after year 2000"

IF RIGHTSIdS, 4) = "2000" THEN PRINT "Your clock is GOOD for year 2000."

LOOP UNTIL RIGHTSIdS, 2) = "10"

DATES = dS
b = VALLEFTSIdS, 2)
m = VALMIDSIdS, 4, 2)
m = m + 1
IF m = 60 THEN m = 0; b = b + 1; m = 0
cS = LTSTR(MIDSTR(sI)) + " " + LTSTR(MIDSTR(m)) TIMES = LEFTSIdS, 5) + "10"

LOCATE 4, 1; PRINT "SPACER(29)"
LOCATE 10, 15; PRINT "Correct time has been set.. PRESS A KEY TO EXIT..."

DO dS = DATES: dS = MID(SIdS, 4, 3) + LEFTSIdS, 3) + RIGHTSIdS, 4)
15 = TIMES
LOCATE 4, 30
PRINT(IS; ": pistol LOOP UNTIL RIGHTSIdS, 2) = "00" OR INKEYS = "0"

CLS
SYSTEM
REM This is the last line of the code. <<END OF FILE>>

My thanks to Robert MM0ANT for this program and I'm sure he won't mind me reproducing it here. His old call-sign is GM7AVE and he can be found on MIVATV's website on the Packet Page which can be found at http://www.amber.force9.co.uk or http://Fast.to/amber
For those without Internet Access send two 1.44 disks in a padded envelope enclosing return postage and Rob will return all files and information to you.

Robs' packet address is: m1ATV @ GB7NND and his e-mail address is m1ATV@amber.force9.co.uk

Editor's note: This will be the last edition of 'Data Diary'. I've had to take the decision to close this column because of the inevitable and increasing 'cross-over' and parallel subject coverage of this column and the Mike Richards' column. The PW team thank Roger G3XFD for all his hard work in the past and of course he will still be writing reviews and other articles for Practical Wireless on a regular basis. So thank you, Roger!

Rob Mannion G3XFD.

BROADCAST REPORTS & INFORMATION TO ME:

- PETER SHORE, C/O PW EDITORIAL OFFICES, ARROWSMITH COURT, STATION APPROACH, BROADSTONE, DORSET BH18 8PW.
- E-MAIL: petershore@pwpub.demon.co.uk

THIS MONTH PETER SHORE HAS NEWS OF A NEW AMERICAN SHORT WAVE STATION APPROACH, CATCH UP ON THE AUSTRALIAN SHORT WAVE STATION, AND A LOT OF CURRENT SCHEDULES FOR YOU TO CATCH UP ON.

Choosing the right broadcast channel at high frequency is an art; some people, including frequency engineers, might suggest that it's something of a black art! At almost every international radio station is a group of highly experienced frequency engineers who plan the expensive use that is made of the short wave broadcast bands to reach listeners worldwide using limited transmission facilities.

Making sure that signals reach the correct target at the right time with decent strength means working out the propagational path from transmitting station to target zone. As well as making sure that there is a transmitter and antenna with correct characteristics for the frequency that has been selected as not all antennas operate at all frequencies. Broadcasters which have a large number of language services which need to reach a particular geographic region simultaneously find that the greatest difficulties in marshalling these finite resources and keeping programme makers and listeners happy.

The BBC World Service, for example, needs to serve East Africa with English (sometimes both the African and European streams), Somali and Swahili during peak listening times, and yet has only two 500kW transmitters on the Seychelles, the nearest transmitting station. So, it has to rely on the East Mediterranean relay on Cyprus and signals from the UK to serve all its audiences. And each of the transmitting stations will have to operate on different frequencies and different bands to take account of the differing propagation paths from each of the transmitting stations. Not to mention sunspot numbers and the maximum useable frequency (Mu.f.), which is dependent on the time of day!

TRICKY PROBLEMS

To help the engineers with the tricky planning problems is a raft of software which has been developed by the biggest broadcasters to calculate all the imponderables. And listeners now have access to some of this software. The Voice of America has its Coverage Analysis Program (CAP) available for anyone to download free-of-charge from the VOA Internet site (www.cia.gov). The CAP is about 50MB in size, and you'll need a reasonably fast computer to run the program with any degree of success.

Once you've got the CAP, you have access to pretty much the same sophisticated planning tools that the world's largest short wave engineering department uses. It will take you some time to work out how it works, but if you fancy a career in high frequency engineering, then the program is definitely something that will give you a good insight into how international broadcasters get reasonable results from the 'ionospherically challenged' short wave bands.

NEW RELAY STATION

The Voice of America's frequency engineers in Washington DC are currently working on the plan for the broadcaster's powerful new relay station in Sri Lanka. This station will ultimately have four 500kW transmitters currently one is under test.

The station will improve reception for listeners in India and the former Soviet Central Asian republics. The station can be heard testing between 0300 and 1100 and 1200 to 1400 UTC on a variety of frequencies.

There have been reports of a station in Eritrea, formerly part of Ethiopia, being heard around 1700UTC. Radio Fana, which may be a clandestine, is on the air using 6.21MHz and apparently can be received by mail through PO Box 37072, Addis Ababa, the Ethiopian capital. This address leads me to think that the station may be beaming anti-Eritrean propaganda to the young country.

In neighbouring Somalia, Radio Hargeisa has been noted around 1600UTC on a variable frequency of 7.065MHz. The station seems to sign-off at 1800UTC.

Across in west Africa, there's a new station in Liberia. Radio Veritas Liberia seems to be a Christian Catholic station. It has been reported on the air during the European evening until sign-off around 2200. Try 3.45MHz during the evening period, and the early morning at around 0400UTC.

TWO TRANSMISSIONS

Radio Budapest's English service is on the air with two transmissions for European listeners every day. Tune in at 2000-2030UTC on 3.975 and 9.840MHz and on the same frequencies two hours later.

CURRENT SCHEDULE


Radio Prague, which looks set to continue during 1998 despite government attempts to entice a private organisation to run the country's external broadcasting service, can be heard with English: 0000-0027 on 5.93, 7.345; 0100-0127 on 5.93, 7.345; 0300-0327 on 5.93; 7.345; 0330-0357 on 7.35, 9.48, 11.60; 0800-0827 on 9.505, 11.60; 1000-1030 on 7.485, 21.705; 1130-1157 on 7.345, 9.505 (Europe); 1400-1430 on 13.58, 21.70; 1700-1727 on 5.93, 9.43 (Europe); 1800-1827 on 5.93, 9.43; (Europe); 2100-2127 on 5.93, 7.345 (Europe) and 2230-2257 on 5.93, 7.343MHz.

NEW USA STATION

A new US short wave station, WWBS, was due to be on the air by the beginning of February. Located in Georgia in the southern USA, WWBS plans to use 9.11MHz to reach Canada. Let me know if you hear this station soon after its launch.

Radio New Zealand's current short wave schedule is as complex as ever. Here it is in full: 1650-1850 on 9.810 Monday-Friday; 1631-1950 on 11.735 Sunday-Friday; 1859-1950 on 11.735 Saturday; 1951-2050 on 15.115 Sunday-Friday; 1859-2155 on 15.115 Saturday; 2136-0458 on 17.675 Sunday-Thursday; 2205-0458 on 17.675 Friday-Saturday; 0459-0815 on 9.015 Saturday & Sunday; 0816-1206 on 9.700 Monday-Friday and 0751-1206 on 9.700MHz Saturday & Sunday.

THAT'S ALL FOR THE TIME BEING, UNLESS NEXT TIME, GOOD LISTENING, AND GOOD LUCK WITH YOUR RADIO HUNTING, POTENTIALLY INTERESTING, BUT DOUBTLESS ELUSIVE, AFRICAN STATIONS! DROP ME A LINE IF YOU FIND THE RIGHT OFFICES IF YOU'RE SUCCESSFUL, THOUGH.

PW

Practical Wireless, March 1998
Please mention Practical Wireless when replying to advertisements

ICOM’S LATEST MID-PRICE TRANSCEIVER

The IC-746 is Icom’s latest HF/VHF transceiver, providing wideband coverage: HF to 50MHz through to 144MHz. Superior design. VHF base station capabilities. DSP and 100 watt RF output will make this THE transceiver to own in '98.

- 1.8MHz-144MHz multimode coverage
- 100W output for all HF, 50MHz and 144MHz bands
- DSP fitted as standard
- Continuously adjustable noise reduction
- Auto notch filter
- Selectable AF with 3 passband widths
- Large, easy-to-read function display
- Auto antenna tuner with preset memories
- Compact dimensions 287 x 120 x 317mm
- Memo pad with 10 channels
- Tone squelch standard with 50 tone frequencies
- AMple CW functions with 4-channel memory keyer
- 12.5kHz FM narrow capability
- 3 different antenna connections
- 2-step pre-amp (single for 144MHz)
- Optional UT-102 voice synthesizer

£1695.00 (PRICE MATCH)

ICOM IC-T8E

Tri-band handheld 2/6/70. NEW.
- 600mW output on 2/70
- Wide band Rx
- WBFM for FM broadcast RX up to 5W output!
- Splash resistant
- CTCSS as standard
- Switchable TX narrow FM (12.5kHz) for AM band
- 123 memories
- Very compact - smaller than most single banders

RRP £299.00

AUTHORISED AGENTS FOR KENWOOD, ICOM, YAESU & ALINCO. FULL SERVICE FACILITIES AVAILABLE

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RSGB Book Stand - featuring:
- All the Society publications - old favourites and new titles
- Special Show Offers - save £s with these reduced prices
- Special Edition items to celebrate 100 Years of Amateur Radio
- Membership information and assistance
- Introduce a new Member who joins at the show and claim your free gift - An RSGB 1998 Amateur Radio & SWL Diary or RadCom Easibinder

AND

In the Green Hall - Stands F and H
RSGB Committee and Council Representatives and Special Youth Stand:
- Specialist Committees
- Council Members
- Special Event Station run by young people from various youth organisations

PLUS
On Sunday 8th in the Green Hall - DON'T MISS:
- Special Announcement on the Millennium Project - MILLECOM
- 1998 RSGB Diary Draw

REMEMBER - the RSGB's work is for the benefit of all radio amateurs but by joining the Society you can actually get much more out of your hobby by being on the ‘inside looking out’

Radio Society of Great Britain
Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE  01707 659015

http://www.rsgb.org
WANTED. AMATEUR RADIOS AND EQUIPMENT. TOP PRICES PAID

Kit: £18.50
Assembled KB modules: £27.60
AB118 Optimised for long distance reception on 118 to 137MHz air-band
Kit: £19.90
Assembled PCB modules: £28.90
AA4. Covers 25 to

“Time the receiver... you will be amazed” — RadCom

HOWES DC2000
Amateur SSB/CW Receiver Kit — £22.90
The ease of construction combined with excellent performance make this a great project for both the beginner and the experienced operator. Plug-in band modules (one included) give flexible frequency coverage. There is a full range of matching accessories including transmitters, so you can expand your receiver into a transceiver as you build up your station! There have been excellent reviews in many radio magazines, (UK and overseas). Enjoyable to build, great results, and expandable! The ease of construction combined with excellent performance make this a great project for both the beginner and the experienced operator. Plug-in band modules (one included) give flexible frequency coverage. There is a full range of matching accessories including transmitters, so you can expand your receiver into a transceiver as you build up your station! There have been excellent reviews in many radio magazines, (UK and overseas). Enjoyable to build, great results, and expandable!

PLUS LOTS MORE AT LOW PRICES

HOWES KITS contain good quality printed circuit boards with screen printed parts and technical advice are available by phone during office hours. Please send an SAE for our

Mail Order to: Eydon, Daventry, Northants. NN11 3PT
Hot Line
01327 260178

HOWES DC2000
Electronics kit: £22.90
(Extra band module kits £7.90 each).
HA22R Hardware (case etc., pictured): £18.90

ACCESSORY KITS
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AK56 RF Antenna Selector/Matcher £27.90
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73 from Dave G4KQH, Technical Manager.
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**WATERS & STANTON** 01702 206835

**LOWE ELECTRONICS** 01629 580800

**SOUTH EAST COMMUNICATIONS** (REP OF IRELAND) 00353 51 871728

**NEVADA** 01705 662145

**PLEASE NOTE** SECOND-HAND ITEMS COME WITHOUT OWNERS MANUAL AND A LABOUR GUARANTEE. FOR MORE INFORMATION PHONE BARRY MACGREGOR 01702 280002 OR FAX 01702 280680.

**HF TRANSCIEVERS**
- Icom IC 770 Base Transceiver 12v £495
- Icom IC 722A Base Transceiver 22v £1050
- Icom IC 722H Base Transceiver with 18v £995
- Kenwood TS-870D Base Transceiver £2950
- Kenwood TS-930AS Base Transceiver with £3750
- Yaesu FT-226R Base Transceiver with £299
- Yaesu FT-750 Base Transceiver 12v £25

**YAESU BASE/MOBILE TRANSCIEVERS**
- Yaesu FT2400E 2m/440MHz £179
- Yaesu FT2200 2m/440MHz £289
- Yaesu FT2726R 2m/60MHz multimode base £649

**DATACOMMS**
- Kantronics KAM multimode £195
- Adcom DIES 259 Antenna analyzer £189
- Diamond DL-1000 dummy load £109

**ACCESSORIES**
- Icom IC 422 HF transceiver 12v £495
- Icom IC 7315HF Transceiver £995
- Kenwood TS560 Mobile HF transceiver £550
- Kenwood TS530S HF transceiver £495
- Kenwood TS520HF Transceiver £395
- Yaesu FT470XHF Transceiver £295

**SHORTWAVE RECEIVERS**
- Yaesu FT726 2m/60m multimode base £649

**SHORTWAVE RECEIVERS**
- Yaesu FT-51R top spec handheld £129
- Yaesu FT-470R Dual Band handheld £259
- Yaesu FT-707R 2m/60m handheld £199
- Yaesu FT-7000RHF Dual Band Mobile with detachable front panel £375

**HF RECEIVERS**
- Lowe HF 225 HF Receiver with all accessories £345
- Lowe HF 225 Europa HF Receiver £450
- Sony ICFWS55 World portable £225
- Lowe HF 150 Portable HF Receiver £295
- Grundig Y1217 Portable receiver £195

**SCANNERS**
- AOR AR2800 Base Scanner with SSB £160
- AOR AR27100 handheld Scanner £169
- AOR AR1000 handheld £169
- AOR AR2800 Base Scanner without SSB £119
- AOR AR27100 Base Scanner £119
- AOR AR-1000 handheld £119
- AOR AR-1100 handheld £139
- AOR AR-2700 Base Scanner £119

**SCANNERS BASE/MOBILE**
- Kenwood TS650 with extra filters £995
- Yaesu FT1000M/PM/DC demo £1000
- Icom IC7200AT auto ATU etc £899
- Icom IC9000DC boxed with auto ATU £899
- Kenwood T560A HF+6m base/mobile transceiver £649
- Kenwood TS530S also ATSO ATU £699

**YOUR GUIDE TO SECOND-HAND EQUIPMENT**

Please mention Practical Wireless when enquiring about any items on these pages!
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Lake Electronics
7 Middleton Close, Nuthall, Nottingham NG16 18X. Tel/Fax: 0115-938 2509
E-mail: lake@compuserve.co.uk

New TECHNOLOGIES

DTR Series Transceivers
A choice of three single band, CW, transceivers for 3.5, 7.0 or 10MHz. All rated at a nominal 5 watts output, all include a quality case, harness and AIL components. Kit price £195.00. Built to order £218.00. Postage (UK) £4.00.

PM20 Power Meter/Dummy Load
A "terminated" (50Ω) power meter permitting power readings as low as 25mW and up to 20W to be made with ease and accuracy. VSWR typically less than 1.3:1 at 150MHz and less than 1.3:1 at 430MHz. Kit price (with case and calibrated meter) £22.50. Ready built £30.50. Postage (UK) £5.00.

Haydon Communications

SPECIAL NOTICE

Please note, the address printed in their advertisement in our last issue was incorrect.

It should be:-
133 High Street, Edgware, Middlesex HA8 7EL

We would like to apologise to Mike Haydon and any of his customers who may have been inconvenienced by this mistake.
For Sale

3kW mains transformer, primary 240V 50Hz, secondary (taps) 110, 240 and 380V, with an output socket, ideal for running 110V equipment, £60 o.n.e. Peter Lewis, 115 Tolerand Road, Devrick, Ballinloum, Co. Antrim, N.Ireland BT53 8BS, Tel: (01290) 742167.

50MHz/2 transceiver RN Electronics 0.2-3.2 input, 25W output, £40 and 6 or 4m £3 or 70/2) 3-element beam, £30 or £160 the lot, plus P&P. Rod GW7RDV on 1013521 731524 answeringphone.

460XK 250 1.76GB HD Blaster soundcard, £150. IBM PS2 80 meg HD, 4GB hard drive, £30. HP PS2 80 meg, £25. £300 KW E-ZEE computer with disk, £200. Tel: (01953) 884305.

A41 (MK1) complete with frame, canvas and aerials, handset, etc., see Ben Nick 040420 review in Jan '98 issue; offers or o.n.o. Tel: 0151 7051255.

Alt AD1020 2m (144MHz) handheld, boxed as new, £70. Army receiver R216, 15-157MHz, made by E. K. Cole Ltd., October 1995, as new, in original cardboard box with service manual, £10 o.n.e. Peter, Norfolk. Tel: (01769) 337483.

AKD model 2001 144MHz f.m. receiver, boxed, new and unmodified. Tel: Mike GM0DF, Gloucs. Tel: (01791) 527155.

Alinco DX70T h.f. 6-50MHz mobile transceiver, £150. Alinco ED1X manual, £10, both very good condition. Manuals, hardly used, quick sale required, £30. Eddy. Tel: (01949) 70409 after 6pm.

Adverts from traders for or about equipment is professionally built, house-brewhed 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.

FREE ADVERTS

Now’s your chance to send in a photograph of your equipment (a good idea if it’s really unusual or an accessory to accompany your advert. Please note that all photos will 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 your contact details. Please use the order form provided.

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For Sale

'North's mainlander, probably' 240V 50Hz, secondary (taps) 110, 240 and 380V, has an output socket, ideal for running 110V equipment, £60 o.n.e. Peter Lewis, 115 Tolerand Road, Devrick, Ballinloum, Co. Antrim, N.Ireland BT53 8BS, Tel: (01290) 742167.

50MHz/2 transceiver RN Electronics 0.2-3.2 input, 25W output, £40 and 6 or 4m £3 or 70/2) 3-element beam, £30 or £160 the lot, plus P&P. Rod GW7RDV on 1013521 731524 answeringphone.

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f.m. transverter, v.g.c., unused, £200, v.g.c. Welz 150-500MHz Radio modules, £200, £80 Send s.a.e. for further details.

KW Vicary s.t.c.£2.50 for 10W transmitters, 10m through to 80m (35-24MHz), good condition, £75. Class A Nov. 1 MHz wattmeter, £125, 1934 Canadian 5 Set, second-hand, working condition, three bands, 1.7-4.3-5.8-7.6MHz, £100 Peter GM2PH, Tel 01773 625034.

Kenwood TS-790, as new boxed, 1.8MHz s.s.b. filter £90. Alcomo DR-50TH (50MHz) mobile, £195, still has the plastic over the display; genuine for sale, £90 GOMVE, TEL Herts 1015821 522007.

KW200B s.s.b. transceiver for six amateur bands, 10-161m (1.8-28MHz) (no VOR), complete with kit, manual, extra microphone, handbook and circuit, v.g.c., sale by original owner. £140 KOW, Tel 0141-632 538502 or 1017821 522007.

KW790, 1.25MHz s.s.b. transceiver, as new, £250. £80. £950 the lot PC Interface unit used, all in pristine condition, £750 H. Johnson, 7 Bums Moor, Cheshire CW3 9AH. £1175. Also radios, 1953 HMV, 135 Model 581, £200, 1952 Murphy console, £35 or 1931, £125. £175 Yaesu 757 astu., Yaesu desk radio, £265. 4m Tandy DX-394 short wave receiver. £265. £115. £350 the lot.

KW transverter, freeze out, as good as new, £250. £350 the lot.

KW200B, 1.25MHz s.s.b. transceiver, as new, £250. £80. £950 the lot PC Interface unit used, all in pristine condition, £750 H. Johnson, 7 Bums Moor, Cheshire CW3 9AH. £1175. Also radios, 1953 HMV, 135 Model 581, £200, 1952 Murphy console, £35 or 1931, £125. £175 Yaesu 757 astu., Yaesu desk radio, £265. 4m Tandy DX-394 short wave receiver. £265. £115. £350 the lot.

KW transverter, freeze out, as good as new, £250. £350 the lot.
Wanted

13.6V d.c. p.s.u. at 20/30A to fit IC-701. Peter G3OXH on 0113 290196.

50MHz module for FT-729, $80. P.R. for FT-729, also CTCSS boards for the above radios, $50.00 transverter 144 or 200kHz L, IC-700 or TS-60X. DX-70, TS-690, IC-575 or similar. Tel. Norfolk (01695) 843015.

50MHz radio for packet. must be fully working and ready to go, 70-897, 70-3250, 70-3125, please write with details. Paul, 22 Grassover Road, Eppingford Park, Wolverhampton WV4 6LY.

A MiiH, YRM, MWHO or any other resistance WWlicht suitcases type radios for collection, any condition welcome, good price paid, swaps possible on some items. Bill on 0181-805 0388.

All early wireless gear, crystal sets, valves, horn speaker, top prices for items made by Marconi, Burnmire Ltd, BPO, GEC, two or more collector, will pay well and collect any area. Jim Taylor G4RYS, 5 Luther Road, Winton, Bournemouth, Dorset BH9 1LA, Tel: (01202) 516400.

Aluminium cover or valve type 42, vacuum tubes for R196 and R197, p.s.u., HRO ARISE loud sounder, brown PVC 3 core mains flex, MCR1 2/3 and 2/4 knob, AE trimmer. Andrew Humphries on 01922 421230.

Antenna Cushcraft AV5 or Mastor 68T, h.f. base or equivalent.

Buttermilk MFV vertical decoder at a reasonable price. Tel: Derbyshire (01625) 211670.

Any Morse keys, old, new, military type FT-200, Navy, USA, etc., (not Kent), also radio sets military like No. 11, 12, 21, any "small" sets in platinum, sets to swap. Ben on (01656) 742353 or 106312 10510@compuserve.com.

Any radio related props for Acorn Electron Computer, such as decode, c.w. RTTY and others, please. Frank on (01293) 670106.

AOR AR2002 must be in A1 condition or AOR ARISEOXEX or Realistic PRO-2000, reasonable price paid, just ring. Mr Tansley on (01274) 573370.

Army radio W531 MiiH, Hendgear assembly for W545, also back accessory box for W545, any condition, Soviet block radios, military radio handbook, any language, private collector Bob Warner, 43 Eastry Close, Ashford, Kent TN23 5RS. Tel: (01233) 631165.

Army Wireless Set No. 42, p.s.u. No. 34, case accessory No. 3, W5C5, R190, and valve, 10K if modified it back. Peter G4VUN on 0113-266 3846 or (Redifon 11E11 F111111 71E111111)

Collins TCS TX (big price paid for one p.s.u., hope to get on M. Worsley Next). Tel: (01267) 634001 works OTL, 8-9pm, will ring you back. Peter G4VUV.

Collins TCS211 (type) transmitter (OK if modified In good order), good price paid £P P.Peter on (01274) 634317 5-Spm, will hang you back.

Crystal filters 1.75MHz, s.s.b. and a.m. bandwidths (Redlion if possible, was not tested, but anything considered). David Limmer, 29 Orchard Street, Oldby, W. Yorks LS21 1UJ. Tel: (01933) 430372.

CW filter FL03A for Icom IC-705, also handbook for FDY multi 700AX or copy of, will pay all expenses. Bill W5OSUU on (01440) 701705 evenings.

Daiwa 1600 rotor or similar, Tel. 0161-678 1215.

Desperately seeking PW April 1992, in good condition, will pay almost anything asked! Nigel Sturrock on (0666) 401025.

Details of Ily 5, 13 and 14, used in BBC Compact Master project to activate the RISIS22 port, particularly IC1 as it appears to be a special Jack McKinley, 33 Heathstreet Road, Bangor, Co. Down BT19 1AE.

Edystone 640 in working order. Tel: (02462) 366914.

Edystone 1830 (analog) receiver table model urgently required in good working order, any condition please. Jim McGowan, 20 Keates Avenue, Romford, Essex RM3 4FJ. Tel: (01704) 300343.

Edystone E835 Mk1, II or 115, also Drinke, SWR, later version, 10kHz to 30kHz. Tel: Barnet 0181- 549 2529 after 9pm or anytime weekends.

FC-92 tuner, also SSB mic for 40m, please write with details to: DJMKKA, 17 Trevor Road, Sudwold, Manchester M27 9JH.

Grandprix International Satellite short wave radio, model 400 or Grundig professional Satellite model 2400 or Sony 13 band world radio, model GRF160. Hugh McClaian, No. 8 Strathard Close, Coleraine, County Londonderry, N. Ireland BT53 3ES. Tel: (01203) 43736.

Heathkit HW101 p.s.u. wanted, would consider non working one. If complete, also c.w. filter for HW101 (available as an optional extra), also transistors 240V, 220kHz output at about 1 Amp, Tony GOMK on (0161) 624986, have you bought one in Yugoslavia, please let me know.

HEQ7-243 Ham band c.w. crystals $12/c.f. chokes 500W and bases, must be good. Tel: (01254) 832250.

Hobbyist IC type SL610, one or two set. GOMK/AK, Tel (01686) 435111.

Printhead for Victor VP22 24 pin dot matrix printers or info. where available. Roy G4KXG @ G8BYF on (01758) 712108.

R155 in good working order and p.s.u. and speaker, buyer will collect around 150 miles of London Tel: 01-584 4109.

Racial items wanted by collector, transmitters, receivers, pan adapter, etc., Racial cabinets, accessory units and spares, chromo facing strips, deals, handles, etc, anything by Racial considered. Tel: (01422) 468962.

Scrap Yaesu FT-290 and FT-790 rigs, I need the serpent II pay cash, etc, can collect Manchester area. Andy G1HBE on 0161-301 8285.

Share 44: Saganza ZA-19 equipped pop or something, will collect. Tony G4MOS on (01603) 777139 or 777202.

HMF magentic loop with control box. Norman G4RYS on 0133-3846.

Hoka Code 3, v0. decoder. 21EFEK on 0115-556 2750.

HRO and p.s.u., any condition. Tel: Carlisle (01228) 26430.

Info. on a Dansette RG30 radio, i.e. age, etc. 21E1EN on (01332) 741164.

Instruction book or photos/graph for a Rank-Aids Electric-Synchro Recorder, model no. 1925-2. This cassette recorder is used in conjunction with a slide projector. William Mulvenna, Flat 4, James Drive, Kansas Avenue, Amritl Road, Belfast 15 5AZ.

Old QSL cards postally used wanted by researcher/collcctor, also any postcards relative to radio and wireless world-wide, Tom on (0161) 624649.

DFX-294s Ham band c.w. crystals $12/c.f. chokes 500W and bases, must be good. Tel: (01254) 832250.

Plessey IC type SL610, one or two set. GOMK/AK, Tel (01686) 435111.

Printhead for Victor VP22 24 pin dot matrix printers or info. where available. Roy G4KXG @ G8BYF on (01758) 712108.

R155 in good working order and p.s.u. and speaker, buyer will collect around 150 miles of London Tel: 01-584 4109.

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Share 44: Saganza ZA-19 equipped pop or something, will collect. Tony G4MOS on (01603) 777139 or 777202.

HF magnetic loop with control box. Norman G4RYS on 0133-3846.

Scrappy Basement

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- Wanted
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Telephone Number

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Please only write in the contact details you wish to be published with your advert, ie, do you want your name, address, or just your telephone number?

Your advert, you decide!

Practical Wireless, March 1998

85
Valves

VALVES GALORE. Most valves available from stock. Otherwise obtained quickly. Please send Station Approach, Broadstone, BH18 8PU. Tel: 01758 740712. Fax: 01758 699250. Tel/Fax: 01758 659250. Tel: 01758 740712. Fax: 01758 659250. Tel: 01758 659250. Tel/Fax: 01758 659250.

VALVES WANTED: Send 2 x 1st class stamps for latest list of books, bits & pieces etc. Old Time Supplies, PO Box 209, Banbury, Oxon OX16 7XR.

JAPANESE TRANSMITTING TUBES and microwave semi-conductors for broadcasting, communication and industrial use. T. Yoshihara, Osaka, Japan. Fax: 81-3-338-3381.

RESTRICTED SPACE AND FULL SIZE MULTIBAND AERIALS 28/132ft, built. kits, parts, baluns, data. SAE. Aerial Guide £1.50. G2OYM, Uploxford, Devon EX17 7PH. Tel: 01388 831215 anytime.

Educational

CITY & Guilds Radio Amateurs Exam. Pass your exam the easy way with an RRC home study course. For details write or phone THE RAPID RESULTS COLLEGE, Dept. JX400, Tuition House, London SW19 4DS. Tel: 0181-547 2211.

NORTH WALES HOLIDAYS - Caravan - bunkhouse - camping. Elevated rural site, two miles from beach, use of shack and antennas. Open all year. Tywynos, Mynytho, Pwllheli. Tel: 01758 740712.

Holidays

Winter Wonders - Caravan - bunkhouse - camping. Elevated rural site, two miles from beach, use of shack and antennas. Open all year. Tywynos, Mynytho, Pwllheli. Tel: 01758 740712.

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YAESU UK LTD. Unit 2, Maple Grove Business Centre, Lawrence Rd., Hounslow, Middlesex, TW4 6DR, U.K. 0181-814-2001