WIN!
A GARMIN GPS III
A YAESU VX-1R

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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

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- BNC Antenna
- Full Instructions

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**NEW WEB SITE:-**

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**Kachina 505DSP HF Transceiver**

£1995

A complete PC controlled remote HF rig - In stock

**Main Features**

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

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Yaesu’s new dual band mobile makes the competition look old and out-dated. You get a detachable head, 300 memories, true dual same band rx, CTCSS encode and the best display in the business. This proving to be one of the best sellers ever - particularly at Our Price!

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**Alinco DX-70s TO CLEAR!!**

£599

1.8 - 30MHz 100W PLUS 10W 50MHz

The last few of these rigs at a very special price. Where else could you get a 100 Watt hf rig at this price?

**AT-201 Dual Bander Handy**

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- 140 Channels
- 5W on 12v
- Baudot Keypad
- Full CTCSS
- Dual Watch - Priority channel. Scanning: Dual watch: Dual band
- 1750Hz tone
- DTMF
- Channel Resett or
- Frequency Readout
- 29 programmable features
- AM/SSB shift
- DTMF
- Ni-cads and charger

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

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

**AT-146 2m 50W Mobile**

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

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**AR-146 2m 50W**

£250

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- 3 Power levels - Wideband receive
- 40 Memories plus call channel
- 7 Programmable steps
- Channel or frequency display
- The best sensitivity in the business
- Keypad mic and mounting kit
- CTCSS Encode and Decode!
EXCLUSIVE 10 DAY APPROVAL - On All Mail Order Sales

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

Includes 70MHz Transceive

**ICOM IC-746 1.8 - 144MHz** £1495

- 100W of pure Magic
- 160 - 8MHz
- SSB - CW - AM - FM
- Spectrum display
- Auto ATU

**KENWOOD TS-570 1.8 - 30MHz** £1249

- 100W of pure Magic
- 160 - 8MHz
- SSB - CW - AM - FM
- Spectrum display
- Auto ATU

**YAESU FT-920 1.8 - 54MHz** £1269

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

**YAESU FT-1000MPCD** £1999

- 1.8 - 30MHz 100W + SSB - CW - FM
- Memory channels
- Dual in-band
- EDSP filter + RF processor + RF pre-amp + Electronic keyer
- IF shift width + Collins filters
- Comprehensive menu system
- RS-232 interface and more
- Send for details

**TONNA Antennas - Perform!**

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

**March Offer:**

- Datong D-70 Clearance Offer £49.95

**Rechargeable Alkaline Cells For Starter Kit**

- This classic Morse tutor is offered at a really low price. Adjust speed, spacing and volume. Built-in speaker and powered from PP-3. Very limited stocks.

- **New Model**

**W-MM1 Multimode Modem** £69.95

- 144 & 430MHz 50-35W
- Packet. AMTOR
- CW, SSV. Fax. RTTY
- NAVTEX, SYNOP
- Transmit and receive
- Powered from RS-232 port

**DJ-C1E 2m FM** Credit card size with full CTCSS - 300mW.

**Normal** £169.95

**DJ-C4 70cm FM** Slip it into your pocket for rally use or the local repeater.

**Normal** £169.95

**YAESU VX-1R Dual band** Save £50!

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

* We are pleased to endorse the performance and design of the ICOM IC-706 Mk II transceiver as the best compact kit 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 unbeat-able back-up service plus optional extended 5 year war-
ranty for an extra £98.

- **Price Match**

**DJ-C4E 2m/70cm** £139.95

**KENWOOD THG-71E Dual band**

- Dual Band 2m/70cm
- 50 memories
- Alphanumeric Display
- Full CTCSS
- DTMF
- Up to 6W out
- Wideband Receive
- Illuminated Keypad
- PC Compatible
- Windows Programming
- Send Ear Brochure

**Special Price** £279

**KENWOOD**

- 6m 2m 70cms

**VX-1R Dual band**

- All in one small package.
- 5W output (13V)
- 25 12.5kHz 5W wideband
- Nickel Hydride battery
- Wide FM broadcast
- AM for airband
- Rapid scanning
- Alphanumeric

**Price Match** £219.95

**ICOM**

- 6m 2m 70cms

- All in one small package.
- 5W output (13V)
- 25 12.5kHz 5W wideband
- Nickel Hydride battery
- Wide FM broadcast
- AM for airband
- Rapid scanning
- Alphanumeric

**Price Match** £349.95

**UK's largest Catalogue £3.95 inc. post**
Lapel Talker £24.95
Earpiece with lapel mic and PTT Mics for all makes including Motorola. The ideal item for handsets.

OS-110 Speaker Mic £14.95
Available in versions to match all models. Just tell us which transceiver you have.

WM-710 Earpiece £14.95
Deluxe denotes removable pad and soft ear grip. Extremely comfortable - 8 Ohms and 3.5mm plug.

WS-400 Mount £9.95
Clip onto dash grill and simply push handset or GPS in between sprung fingers. No sticky pads needed. Another great idea from Watson.

WS-200 Mount £4.95
Dash mount for handhelds. Fits on dash grill vent.

WM-306 Base Mic £59.95
Superb audio quality. Can be powered from most modern rigs 8 pin mic plug or use internal battery. Full connection details inside.

SSC-Products

W-367 Cable Kit £30.00
A complete DSP audio filter and speaker you'll certainly hear the difference.

Here's a 500 Watt output solid state linear to operate between 1.6 - 30MHz. Input of 50-90W is required and the DC supply needs 10 - 18V @ 40A (SSB). PTT or RF sensing.

Power Clear DSP Filter

PW Review Short Wave
Power Clear is simplicity itself - you'll certainly hear the difference. A complete DSP audio filter and speaker unit in one smart case. Works with any receiver. Requires 12V DC. Superb unit.

£299.00

SG-500 Power Cube

160 - 10m Self Tuning Antenna
SG-230 Auto 200W ATU lets you build this waterspreader all-band end-fed antenna. Use any length of wire, connect 12V to ATU and feed it with RF. It will self-tune in a fraction of a second. Highly efficient for the small garden. Also use it for verticals and inverted 'L' systems. We have tested this and it is the perfect all-band antenna system!

£299.95

SGC-231 Auto Wire ATU
New version of "230" unit above, but covering 1.8 - 54MHz. Works with any length of wire, 12V DC. Just feed with RF.

£499.00

Great New Wire

W-3000

W-PL70 Patch Leads £6.95
A 60cm long PL-259 patch lead using semi-rigid cable that stays put. A smart idea!

£19.95

W-265 2m whip £15.95
W-7700H 2m/70cm £24.95

W-265 2m whip £15.95
W-7700H 2m/70cm £24.95

W-2500 2m-3w-70cm £88.95
W-360 2m-2w-70cm £36.95
W-570 2m £14.95
W-300 2m/70cm £99.95

All antenas have SO-239 sockets, mounting hardware for mass up to 62cm diameter and three nails. All tuned for UK bands.

Mobile Whips

Stainless Steel Mobile Whips with hinged bases. The tuned.

W-250 2m whip £15.95
W-7700H 2m/70cm £24.95

DC Mobile Lead

RSR-12F 22A 12V £14.95
W-220 1.6 - 200MHz 5/20/200W £59.95
W-240 118-560MHz 5/0-2000W £86.95
W-620 1.6 - 530MHz 5/20/200W £129.95

WPL70 Patch Leads £6.95
A 60cm long PL-259 patch lead using semi-rigid cable that stays put. A smart idea!

£19.95

Available End of March

W-7900

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

144 & 430MHz
* 6dB 3m / 7.6dB 20m
* 1.5dB 8m Power 150W
* PL-259 connector

W-7900 £24.95

W-265 2m whip £15.95
W-7700H 2m/70cm £24.95

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Limited Stock

£99.95

20% Discount

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APRIL 1998 CONTENTS

17 SUBSCRIBE & WIN!
if you take out a three year subscription you could be in for a nice surprise!

22 RADIO BASICS
25 THE DIGITAL DEBATE
As the radio broadcasting industry enters the digital age we bring you the low-down on what lies in store.

33 ELECTRONICS IN ACTION
Ttx G1TEX gathers up your electronics tips and ideas to present them in three 'action packed' pages.

37 IT'S NEVER TOO LATE TO 'TRY'A TBI
Find out why Richard Newton CORSN says that the IC-78 is an excellent triple-band radio.

41 GARMIN GPS III COMPETITION

42 WHAT IS AT
Ian Poole G3YWX looks at the light emitting diode.

44 BOOK PROFILES

48 DON'T MISS OUT ON TEN FM!
By building this simple adapter you won't miss out on 28 and 50MHz f.m. activity.

53 YAESU VX-1R COMPETITION
54 THE DAVENTRY EXPERIMENT
Brian Kendall looks at the fascinating early history of radar.

58 ANTENNA WORKSHOP
60 TO BE THE BEST!
Patrick Alley GW3KJW's thought provoking article shares some of the 'first and furthest' claims he's documented over the years.

64 A DXPEDITION TO LES MINQUES
Phil Whitchurch G3SWH tells the story of his DXpedition to activate an unusual island station.

66 CARRYING ON THE PRACTICAL WAY
'Plug-in and play' with George Dobbs G3RIV's utility transmitter.

REGULARS

11 KEYLINES
12 LETTERS
14 NEWS
16 RADIO DIARY
20 CLUB SPOTLIGHT
70 VALVE & VINTAGE
72 RADIO SCENE
84 BARGAIN BASEMENT
88 BOOK STORE
91 COMING NEXT MONTH

PW's regular report section featuring: VHF Report, HF Far & Wide, Radio 'Scope, Scene USA, Focal Point and Broadcast.

Practical Wireless, April 1998
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**QSL COMMUNICATIONS**

**TEL/FAX 01934 512757**

**YAESU FT-920**

**HF + 6**

£1449

Can be powered from most modern rigs. Low noise amp built in. Full connections details.

£59.95

**WATSON WM-308 BASE MIC**

**KENWOOD TS-570D**

**HF**

£1249

**D270 Duplexer**

£26.95

P&P £3.50

**On glass antennas**

EGM 144 - 430 dualband on glass

£39.95 + £4 P&P

On glass scanner ant

112-1200MHz

£29.95 + £4 P&P.

**G5RV HALF SIZE**

G5RV FULL SIZE

£16.95 + £4 P&P

£18.95 + £4 P&P

**YAESU FT-8100R**

2 + 70cm mobile

£445

**DAK-AD**

£9.95

P&P £2.50

Dual adaptor accepts 2 antennas for vertical or horizontal dipole. (Note: suitable for pro-am HF antennas which are sold separately).

**POWER SUPPLIES**

**P-2512 'M'**

25-30 amp. Variable volts (3-15V) twin metres

£89.95

5-7 amp £24.99

10-14 amp £44.99

**UK Scanning Directory**

New 6th Edition 25-1.8GHz

£18.50 + P&P £1.50

**ALINCO DR-605E**

2 + 70cm mobile

£399

**ALINCO DR-610E**

2 + 70cm mobile

£499

WATSON, TAIWAN SERENÉ, TONNA, CUSHCRAFT ANTENNAS ALSO AVAILABLE

**ALTAI AR300XL Rotator**

Rotator & controller

45Kg vertical load

ONLY £49

Use your handheld antenna on the roof or car when mobile. BNC connector.

£11.99 + £2 P&P

**POWER SUPPLIES**

**ALTAI**

Over voltage/current short circuit protected

**UK Scanning Directory**

New 6th Edition 25-1.8GHz

£18.50 + P&P £1.50

**CABLE**

per metre

H103 Westflex (10mm) low loss

50Ω coax............................95p

213U low loss

50Ω coax (10mm)....................80p

RG58 CU 50Ω coax (5mm)........30p

7 core rotator cable...............60p

Twin 300Ω..........................65p

Twin 75Ω...........................25p

DC 10 amp red/black..............25p

DC 15 amp red/black..............30p

Doubled screened satellite cable, 60p

Large range of connectors available. Minimum cable/connector order £10 P&P dependant on weight.

**UK Scanning Directory**

New 6th Edition 25-1.8GHz

£18.50 + P&P £1.50

FULL SPECIFICATION ON ALL EQUIPMENT AVAILABLE ON REQUEST

P&P £7 NEXT DAY ALL PRODUCTS UNLESS OTHERWISE STATED

Practical Wireless, April 1998
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WORLE, WESTON-SUPER-MARE BS22 6BX
TEL/FAX 01934 512757

<table>
<thead>
<tr>
<th>Product</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICOM IC-746</td>
<td>£1690</td>
</tr>
<tr>
<td>ICOM IC-706 MkII</td>
<td>£995</td>
</tr>
<tr>
<td>ICOM IC-T8E</td>
<td>£345</td>
</tr>
<tr>
<td>KENWOOD TH-G71E</td>
<td>£249</td>
</tr>
<tr>
<td>YAESU FT-50R</td>
<td>£279</td>
</tr>
<tr>
<td>ALINCO DJ-G5</td>
<td>£269</td>
</tr>
</tbody>
</table>

**FERRITE RING**

- **Pack of 10**
- **£10** inc P&P

**VECTRONICS**

<table>
<thead>
<tr>
<th>Dummy Loads</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>DL300M</td>
<td>£32</td>
</tr>
<tr>
<td>DL650M</td>
<td>£54</td>
</tr>
<tr>
<td>VC300DLP A.T.U.</td>
<td>£129</td>
</tr>
</tbody>
</table>

**Specifications:**
- Mic impedance 600Ω.
- Mic freq response 50-20000Hz.
- Sensitivity 65dB.
- Mic current 1mA max.
- Speaker impedance 32Ω at 1000Hz.
- Response 120-2000Hz.
- Output sound pressure level 88dB.
- Comes with wiring diagram.

**ACE MH1 HEADSET**

- **£12.99** inc P&P

**NEW PRODUCT**

- **£4.99** + £1 P&P
- Pack of three card holders
- Each card holder strip will hold 20 cards
  - 101 x 152mm
  - 4" x 6"

**QSL CARDS FROM £3.75 PER 100**

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10am - 6pm MON-FRI
9am - 1pm SAT

M5 North

M5 South

We are less than 1 mile from J21 M5

Practical Wireless, April 1998
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 - no trimming capacitors necessary. Designed and built to professional standards, these beams are available worldwide 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 and fixing as well.

Don't throw money away on short-term solutions. Buy a beam that will last! BUY CQ-DX!

---

**Model** | **Band** | **Gain** | **Boom** | **Price**
---|---|---|---|---
CQ-DX 50/4Y | 6m | 4EL | 10.6dB | £104.95
CQ-DX 144/4Y | 2m | 4EL | 10.6dB | £104.95
CQ-DX 144/10Y | 2m | 10EL | 13.6dB | £89.95
CQ-DX 144/10XY | 2m | 10 EL crossed | 13.6dB | £109.95
CQ-DX 430/10Y | 70cm | 10EL | 13.6dB | £89.95
CQ-DX 430/18Y | 70cm | 18EL | 17.6dB | £79.95
CQ-DX 430/18XY | 70cm | 18 EL crossed | 17.6dB | £94.95
CQ-DX 430/24Y | 70cm | 24EL | 18.2dB | £104.95

Carriage £10

---

**LOW PASS FILTERS**

Lowpass filters are commonly made from the lightweight materials, assembled with pop rivets, and not even any earth terminals! Their performance is, at the least, poor. Delta Filters are tough construction, with attenuation slopes avalanching down immediately after transmitting frequency range. Heavily built deep notching Chebyshev designs, prevent interference from harmonic or spurious emissions - a must for good operating. Low power models use silver-mica capacitors and phenolic connectors. High power models use thick teflon TFE insulation sheet, brass or copper capacitor plates, all connections soldered.

301 50.50W 600W 30MHz S0239 £59.95
302 50.50W 800W 30MHz S0239 £89.95
303 50.50W 500W 30MHz S0239 £59.95
304 50.50W 300W 50MHz S0239 £79.95
P&P £5.95 each filter

**TRANSCEIVING BANDPASS FILTERS**

250W 501C

412 50-50.5MHz S0239 £59.95
413 144-149MHz S0239 £69.95
P&P £3.95 each filter

These Bandpass transceiving filters are designed to lessen or eliminate interference from nearby transmitters operating in close proximity to transceivers. As they are transceive style, they will also effectively reduce any transmitted spurious and harmonic emissions from your transmitter. The 412 and 413 are two stage, parallel resonant circuit, top-coupled designs. Each unitwill pass the listed band of frequencies, and attenuate or block all frequencies above and below that band segment. The filters are connected between the transceiver output and the antenna. Direct grounding of the filter may offer better overall performance, but generally the station's earth ground will be sufficient.

**SUPPRESSORS**

Delta suppressors protect coaxial line centre conductors from DC and low frequency AC voltage/current transients. Delta suppressors deliver as much current to ground as the centre conductor of the coaxial line can. The circuit, active at all times, neutralizes minute transients which often cause receiver noise. Direct hits can be handled, but not under all conditions.

301U 1.5 - 300MHz 1kW S0239 £44.95
302U 30-500MHz 1kW S0239 £49.95
303U 30-500MHz 3kW S0239 £46.95
P&P £1.95 each suppressor

---

**AUTEK RF ANTENNA ANALYSERS**

**RF1 HF £169.95**
P&P 7.95

**RF5 VHF/UHF £289.95**
P&P 10.00

**Protective Case £14.95**
P&P 2.75

---

**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 your 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. Global map shows countries with their bearing in degrees. Models are available centred on other world areas.

**WHEN ORDERING, STATE CALLSIGN AND AREA OF THE WORLD**

FOR OUR FULL CATALOGUE SEND £2 IN STAMPS

---

**DELTA ENGINEERING**

LOW PASS & BANDPASS FILTERS, COAXIAL EMP SUPPRESSORS

---

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Fax: 01692 650925 01692 650077 Mon-Fri: 9 - 5.30, Sat: 9 - 4.00

---

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Sigina Wire Antennas
The World's Largest Antenna Manufacturer

Sigina Antennas are easy to assemble using the supplied instructions. All antennas marked * have a 3kW Current Balun option for only £18 extra.

High Duty Deluxe G5RU's

<table>
<thead>
<tr>
<th>G5RU</th>
<th>Full Size</th>
<th>Half Size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>80/40/30/10m</td>
<td>102' long</td>
</tr>
<tr>
<td></td>
<td>51' long</td>
<td></td>
</tr>
</tbody>
</table>

OCF Hall Size

- OCF Hall Size insulator is fed with 100 ft/30.48 m of 450/02 heavy duty twin ribbon feeder.
- This antenna will work with a physical length of only 70 ft/21.34 m through the use of antenna shorteners.
- The centre 'V' has copper wire, and provides 135 ft/41.15 m electrical length, well from the balanced line output of your antenna tuner.

SMD

- The top is of heavy duty stranded copper wire, and provides 135 ft/41.15 m electrical length, well from the balanced line output of your antenna tuner.
- A centre insulator is fed with 100 ft/30.48 m of 450/02 heavy duty twin ribbon feeder. It will work with a physical length of only 102 ft/30.48 m through the use of antenna shorteners.
- The centre 'V' has heavy duty stranded copper wire, with low loss end insulators.

SA11 operates on all bands 150 in - 10m. It can be installed as a flat top, sloper, or inverted Y. The top is 130 ft/39.62 m of heavy duty stranded copper wire, with low loss end insulators. A centre insulator is fed with 100 ft/30.48 m of 450/02 heavy duty twin ribbon feeder. It will work well from the balanced line output of your antenna tuner.

SMD-40K

- 40m
- 100' long
- £66.95 £5.95

SMD-80K

- 80m
- 100' long
- £77.95 £5.95

SMD-160K

- 160m
- 100' long
- £83.95 £5.95

Receive Dipoles

Trapped Dipole Antennas*

| 20/15/10m | 4 | 2 | 180° V | £95.95 £7.95 |
| 20/15/10m | 4 | 2 | 180° V | £95.95 £7.95 |
| 40/20/15/10m | 2 | 3 | 180° V | £95.95 £7.95 |
| 40/20/15/10m | 2 | 3 | 180° V | £95.95 £7.95 |
| 80/40/20/15/10m | 4 | 2 | 180° V | £95.95 £7.95 |
| 80/40/20/15/10m | 4 | 2 | 180° V | £95.95 £7.95 |
| 160/80/40/20/15/10m | 8 | 4 | 180° V | £95.95 £7.95 |
| 160/80/40/20/15/10m | 8 | 4 | 180° V | £95.95 £7.95 |
| 160/80/40/20/15/10m | 10 | 5 | 180° V | £95.95 £7.95 |
| 160/80/40/20/15/10m | 10 | 5 | 180° V | £95.95 £7.95 |
| 160/80/40/20/15/10m | 10 | 5 | 180° V | £95.95 £7.95 |

Trapped Slopers*

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| 20/15/10m | 4 | 2 | £79.95 £7.95 |
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| 40/20/15/10m | 2 | 3 | £79.95 £7.95 |
| 40/20/15/10m | 2 | 3 | £79.95 £7.95 |
| 80/40/20/15/10m | 4 | 2 | £79.95 £7.95 |
| 80/40/20/15/10m | 4 | 2 | £79.95 £7.95 |
| 160/80/40/20/15/10m | 8 | 4 | £79.95 £7.95 |
| 160/80/40/20/15/10m | 8 | 4 | £79.95 £7.95 |
| 160/80/40/20/15/10m | 10 | 5 | £79.95 £7.95 |
| 160/80/40/20/15/10m | 10 | 5 | £79.95 £7.95 |
| 160/80/40/20/15/10m | 10 | 5 | £79.95 £7.95 |

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SMD-4W

- 8 Trap
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Trammell's unique design has two traps in each dipole. A Mosley 3 element, tri-bander has only 6 trap assemblies, whereas other makes have twelve.

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

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- Soldering of antenna wire not necessary.
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Mosley's unique design has two traps in each trap assembly.
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  - 2 element beam: £34.50

**Comet Duplexers**

- **CF400**
  - 440/440MHz: £27.50

**Comet Duplexers & Triplexers**

- **CF280**
  - 280/440MHz: £21.00

**Comet Band Pass Filters**

- **CF-BF86**
  - 144/220 MHz, 150W CW: £42.50

**New! CB Antenna Mounts**

- **R520**
  - 50W CW: £42.50

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- **R520**
  - 50W CW: £42.50

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Winner to be announced
1st May 1998
I'm always very conscious that many readers make a point of reading 'Keylines' each month. That's why I enjoy writing it so much! There's always something to chat about and my biggest problem is keeping it to a page!

Occasionally however, I'm rather taken aback by the response to a particular 'Keylines'. And I honestly say - as I rapidly approach the start of my tenth year as Editor of PW - that my editorial regarding Keith Winward and Don Sobey in the March issue generated the most remarkable feedback I've experienced since I've been in the 'Editor's Chair'.

Ever generous and responsive, PW readers have sent in cheques and even cash in the post to help Keith and Don. Thank you everyone, and I can tell you that both men are very grateful indeed for our help and support.

Although the news came too late for the March issue, I'm pleased to say that The Rapid Results College in London very kindly donated an RAE correspondence course for Keith Winward. However, as I write Keith still has not received the course which was sent by RRC on February 2nd. Let's just hope that the Governor and Staff at HMP Balinderry Road, Lisburn, Northern Ireland are not withholding Keith's opportunity to study for the qualification he so much desires.

All the money coming in from readers is being safely looked after and I hope we can jointly provide an RAE course for Don Sobey in HMP Full Sutton in York. The courses cost £185 and I'm very confident together we'll raise that amount! I'm planning to visit Don in April when I'm in the area - perhaps by then he'll be studying too!

But before closing on the subject for this month (I'll provide an up-date as soon as possible) I must ask anyone wishing to send in a donation not to send cash in the post. I was taken by surprise at the response and never dreamed that £5 and £10 notes would arrive! So, please if you wish to help - write to me but make the cheques payable to PW Publishing Ltd. and not to me personally please!

Apologies To Richard G2BZQ

Some readers have queried the choice of title for Richard Marris G2BZQ's article 'The VLF-FPL Antenna For 73kHz' (published in the February issue). Richard had to point out that the title was not his choice (It was mine!) and that he does know the difference between low frequency and very low frequency operation. Sorry for any embarrassment caused Richard!

Thanks To G8UNZ

As I've often mentioned - PW readers are a generous bunch but on occasions it's very difficult to say 'thank you' - particularly when I come up against the (very annoying at times) 'Particulars Withheld' in the RSGB Callbook. Such is the case with the address of G8UNZ who very kindly sent a small box (very heavy of course) filled with lead sulphide (Galena) crystals for use in 'cat's whisker' type detectors.

Apart from his callsign and the fact I've spoken on the telephone to the kind gentleman I've no idea where to contact him - only his callsign appeared on the box. But thank you anyway kind sir - a very generous gesture indeed! So, if you ever do write to me (particularly when you're enclosing something like this)

please let me know who you are so I can write and say 'thank you' properly!

Identifying Photographs

Finally this month, and once again it's about identifying things (photographs this time) I'd like to ask you to help us keep track of your photographs. Obviously we get many hundreds each year, and if they ever get separated from the article/news item you've sent in - it's very difficult to match them up again!

So, if you're sending in photographs in please label them with the appropriate name, address and callsign and File No. (if it's an 'accepted' article you'll have this number to hand). It will help us to help you - particularly as we want more photographs from you for use in PW.

Rob
Mannion
G3FXD
Ecko From The Past

Dear Sir

I'm writing with regards to Ecko! - Past To Present. A long time ago in my youth I spent many hours in the small family kitchen constructing radio sets. Now, having retired, my interest in radio was rekindled when I rediscovered some old issues of PW in the loft. As a result of this, I purchased and restored a couple of 1950s radios.

Then, a few months ago, I came across a very dilapidated specimen which looked much older and more of a challenge. Unfortunately, the back was missing, so manufacturer and model number were not immediately apparent, however, on closer inspection, the faded dial confirmed that it was an Ecko receiver.

The radio is mounted in a floor standing cabinet. Judging from the number of holes in the cabinet, woodworm had taken out a long term lease giving it an antique appearance! Functionally, the set has 3 waveband selected by push buttons, another 8 stations selected by push buttons and an extraordinary but non-operational motor-driven tuning mechanism.

Still without the model number, I had not been able to obtain a schematic, so I traced the circuit of the tuning arrangement thereby understanding the basic principles. Coincident with this, I once again browsed through the old issues of PW and was astounded to find pictures of the actual receiver. The issues of the 2nd and 9th September, 1939 covering that years' Radio-lympia exhibition show the cabinet and chassis and outlines the principles of motorised tuning, apparently all the rage at the time!

All this was made even more fortuitous when I read the letter from Ron Parry published in the January 1998 issue of PW. His excellent description explained precisely how the tuning circuit was meant to function. Also, I now know that I have a circa 58 year old Ecko receiver, model number PB289.

Hopefully, this will enable me to obtain a schematic and get the set working once again.

It is still surprising that articles published nearly 60 years ago should still give rise to interest now. Maybe in 50 years time the teenagers of today will reminisce about their multi-Gigabyte computers and early Internet experiences. Somehow I don't think so!

Brian Eeles
Reading

Local Clubs & UKRS

Dear Sir

You write 'the local club is the backbone of our hobby' which certainly explains the balance of your publication. Only, how can you know that? Of all radio enthusiasts, fully licensed, condemned to 'partial licence', or otherwise, how many are active club members?

My personal encounters with fellow enthusiasts were very largely in the surplus shops 40 to 50 years ago, when most of us were certainly not particularly inclined to 'clubbery'. What become of us all I know not, but surely I am not the only survivor, nor is the breed extinct.

As the PW Editor travels around the clubs having the 'editorial ear' bent by special interest, or bias, groups, perhaps he should just bear in mind that we are out here too, actual or potential subscribers, and think of what may interest us.

For a start, while you give space to all sorts of parochial items, it distresses me that you give none to the United Kingdom Radio Society (of which I am a member) which concerns itself with matters of much wider interest.

'Sandy' Dick GMOIRZ
Dundee

Editor's reply: It's PW's editorial policy to encourage and support all Amateur Radio activity.

Sandy. All incoming information is considered on its own merit and if the UKRS did send us...

Slide Rules Or Guessing Sticks?

Dear Sir

The article by Ray Fautley G3ASG on slide rules (aka 'guessing sticks') in your February 1998 edition bought back many happy memories of wielding these devices.

One variant not mentioned by G3ASG was the Fowler's Circular Calculator. This had the appearance of a very large pocket watch with a couple of knobs on the periphery. An effective scale length of some 10 feet was achieved by using a series of concentric circles - thus allowing quite high accuracy, albeit with a tendency to drive the user cross-eyed after any lengthy period of using the beast.

Perhaps the biggest advantage of the slide rule over the digital calculator was that one never took the answer for granted. Some
Morse & Meccano

Dear Sir

On the subject of Morse code I would like to make some comments. As a lad (some 40 years ago or so), I was interested in Meccano, chemistry, nature and was a keen scout. My interest in radio was listening to ‘Journey Into Space’ on the wireless. I had never heard of ‘Hams’ (This was long before Hancock). 

One on occasion, when I was eleven, I had a bout of ‘flu. I was bored, so my mother bought me a book of Things To Do On A Rainy Day. An item that caught my interest was how to build a radio. I quickly recovered from the ‘flu and armed with a short shopping list, strolled into a (then) well known emporium in Hammersmith.

I walked up to the proprietor, glanced at my list and asked for a valve! When the laughter stopped, I eventually came out proudly clutching the ubiquitous HL2. The radio, an O-V-0 was duly built and an interest in the subject kindled.

It just so happened that one of the scout’s parents was a Radio Amateur (G2CAJ), who has long since passed away. Well, the rest is history, and I was hooked. I

nervously took and passed the RAE at 14, and then started struggling with the Morse. (This was long before Class B licence). I had regular sessions with my Mentor but found it very hard going.

Eventually, I took the test and passed. There I was, 15 years old, keen, licensed and no money! In those days it was easy to get on the air. Surplus receivers were cheap and abundant. Mine was an R1155. A beautiful set that I wish I still had!

Amplitude modulation (a.m.) was the order of the day then, s.s.b. and transceivers were still some way off. ‘Top Band’ was popular and an easy band to start with. My first 1.8MHz transmitter used parts scrounged from old radios. The p.a. was a 6V6 and the p.a. coil was wound on a toilet roll tube!

The power supply was similarly ‘Heath Robinson’, and certainly would not have scored any points for safety! However, the pride when this motley collection of bits actually resulted in several watts of r.f. was indescribable.

I had not built a modulator so my first venture on the air was to be Morse. I chose a quiet spot on 1.8MHz (there were not so many then, but QRN was far less) and called CQ. Imagine my joy when someone replied. The joy, however, was short lived.

The response was from another newly licensed amateur (G3P- series). I was still not fully comfortable with copying Morse speed so I sent QRS. The reply came back to the effect that if I could not copy at that speed, then I should not be licensed. Needless to say, that was my first - and last - c.w. contact. I built a modulator.

Many years later, during a house move, I accidentally let my licence lapse and had to go through the trauma of re-sitting the Morse test. It was just as much hard work, but I passed. However, the earlier scars prevented me from using c.w. if I wonder if my original contact is reading this and can remember the incident? I am certainly not anti-Morse. I love the concept of its simplicity. This can not be surpassed by any other mode and is never likely to be. I just wish that I found it easier to copy, but many hours of dedicated listening never brought the results that I hoped for and expected.

All people are different. Some are extrovert, some are introvert, some are natural athletes, some find it easy to speak several languages, some play musical instruments with ease, some find Morse a ‘doddle’. Others, who are keen enough, will struggle with things and, through perseverance, will succeed, some will give up. So, I would like to say to new or potential Radio Amateurs to persevere with the Morse code and to gain the pleasure of its beauty and simplicity and to all amateurs to encourage not discourage those who might not be as adept as yourself.

Dave Skye G3PLR
Hertfordshire

Wild Waves

Dear Sir

in ‘Carrying On The Practical Way’ in February PW, the Rev. George Dobbs G3RJV challenges readers to come up with the name of the company which used the phrase ‘what are the wild waves saying’ on its plug-in coils. And I am pretty sure the answer is Igranic.

I just wish I still had some of the wonderful wireless sets that I was given as ‘old junk’ when a child, some of which used such coils.

Justin Underwood
Berkshire

Letters Received

Via The ‘Internet’

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

Editor
Just released from the Kenwood 'stable' is the new TM-G707E dual-band v.h.f./u.h.f. mobile transceiver. This has been introduced to complement their TM-V7E but has a simpler format including 'one band at a time' operation rather than full duplex dual receive. Features of the TM-G707E include:

- **High Visibility Display** - capable of displaying up to seven large alphanumeric characters and the orange LCD has a built-in four-step dimmer control.

- **Five-In-One Programmable Memory** - as well as its regular profile, the TM-G707 can store four other operating profiles ready for instant recall at the touch of a button.

- **Memory Name Function** - allows you to identify each of the 180 channels with up to seven alphanumeric characters (and six dots). You can also switch instantly between the frequency and memory name displays.

- **Multi-Scan Functions** - full band and program band scans, memory scan with channel lock-out and call scan can all be carried out.

- **Built-in CTCSS Encoder/Decoder** - enables operation of the 38 EIA standard CTCSS sub-tone frequencies.

- **Quick Release Front Panel Kit** - if you opt for the quick release kit you can mount the front-panel of the TM-G707E virtually anywhere.

The recommended retail price for the TM-G707E is £439.95. For more information contact any Kenwood approved dealer or Kenwood Electronics UK Limited direct at Kenwood House, Dwight Road, Watford, Herts WD1 8EB. Tel: (01923) 8516444.
New Regulations
The following report has been kindly supplied by Lirpa Loof, EEC Director of International Communications, Brussels:

“It has been reported that the new CEPT regulations will require that the RAE and Morse Test must be passed in the three languages that are currently used on the Amateur Radio Validation Document - English, French and German. In due course more languages will be incorporated into the document and will therefore have to be tested. This ruling will be retrospective and all existing Radio Amateurs must be retested in the languages that were not included in their original examinations. Those who do not pass the new multilingual test will only be allowed to conduct QSOs within their own countries.”

You have been warned!

Anniversary Weekend
During the weekend of 9 & 10 May County Morse test teams will on the air to commemorate the 12th Anniversary of the RSGB Morse Test Service. To help with identification all stations taking part will use a special event GBO prefix followed by the county code suffix, for example the Isle of Wight will use the callsign GBOIOW.

A 12th anniversary certificate (like the sample shown) will be available to any Amateur who makes contact with at least 10 of the GB station. The cost of claiming the certificate is £2.50 (cheques or postal orders made payable to the RSGB please), £5 or 6 IRCs. All applications complete with log extracts (QSL cards are not required to claim the award, which is also available to listeners) should be sent to Roy Clayton G4SSH, Chief Morse Examiner, 9 Green Island, Irton, Scarborough, North Yorkshire Y012 4RN.

The Special Event stations to listen out for are:

- G80SCD: Strathclyde
- G80SPF: Shropshire
- G80SXE: Sussex East
- G80TWR: Tyne & Wear
- G80YSE: Yorkshire East
- G80YSN: Yorkshire North

Activity will be concentrated on the 3.5 and 7MHz bands and in a bid to encourage newcomers to apply for the award each team will spend some time calling slowly in the Novice c.w. section of the 3.5MHz band. There are no restrictions on the type of key used and everyone is welcome to ‘call-in’ and enjoy the friendship.

Busy Again!
Mary Pink MIBUB, the manageress of S.R.P. Trading, has gained her Class B Amateur Radio licence last year and has been busy studying again and is now the proud owner of the Class A callsign MOBMH on passing her 12w.p.m. Morse test. Having achieved this Mary is now very active on the h.f. bands on both ‘phone and key.

Mary is a member of the Sandwell Amateur Radio Club and was tutored through her Morse by Clive G0TVR and Steve MOALH, to both of whom, she extends a large vote of thanks. So, look out for Mary on the air or why not pop-in to SRP for a chat and coffee when you’re passing by?

G8OCW: Chief Morse Examiner
G80MTS: Deputy Chief Morse Examiner
G80ARM: Co Armagh
G80ATM: Co Antrim
G80BFD: Bedfordshire
G80BUK: Buckinghamshire
G80CNL: Cornwall (Poldhu)
G80DHN: Co. Durham
G80DVN: Devon
G80ESX: Essex
G80GDD: Gwynedd
G80GRN: Grampian
G80HLD: Highland
G80IW: Isle of Wight
G80LCN: Lincolnshire
G80LEC: Leicestershire
G80LDN: London
G80MSY: Merseyside
G80NHM: Northamptonshire
G80NOR: Norfolk
New Book

This month to the PW Book Store is Basic Radio Principles and Technology by Ian Poole G3YWX. This paperback hobbyist’s book has been written to cover the major aspects of radio (assuming the reader has a basic knowledge of electronics).

Capacitors, inductors, resonance, which of course are crucial to radio, are covered in some detail and naturally radio propagation, modulation techniques, frequency hopping and spread spectrum are all covered. In addition to this receivers, transmitters and antennas are dealt with, as are broadcasting (including digital broadcasting), satellites and cellular ‘phones.

Basic Radio Principles and Technology is in stock now and costs just £14.99 plus £1 P&P UK, £2 P&P overseas. So, what are you waiting for? Order your copy today by calling (01202) 699530.

KENT KEYS SUNK!

No, don’t worry Bob Kent has not gone out of business and his keys do not really sink. But one of his straight keys has certainly earned a claim to fame.

One of Bob’s straight keys features in the radio scene shot in the block busting movie Titanic. The four minute scene cost a staggering eight million dollars to shoot and if you look carefully you’ll see Bob’s key in view for 20 seconds with a four second fully focused shot.

So, if you’re going to see this watery epic keep an eye open for that Morse key and don’t forget Bob is very much on the ‘crest of a wave’ with his Morse key business. If you’re interested in Bob’s range of keys why not contact him at 243 Carr Lane, Torlenton, Preston, Lancashire, PR4 6BY. Tel: (01772) 814998?

March 14: The 5th West Wales Amateur Radio & Computer Rally will be held at Tregaron School, Aberystwyth. Doors open 1030 to 1600 (disabled visitors from 1000). Admission is £1 only. There are good parking facilities with easy access for disabled and there is a full stalls, demonstration area and catering facilities. Features include Amateur Radio, Books & Buy, computers, software, hardware and electronics, h.f. and v.h.f. on air, packet stater, repeater group, RARAS, КВ и УКВ, W4R, RAYNET and other special interest groups, trade stalls and lots more. Talk in on S22. Come and enjoy yourselves. For details and trade stand bookings contact Katy GWOSPO on (01545) 580679.

March 16: The Northrec Amateur Radio, Electronics and Computing Exhibition by the Northern Amateur Radio Societies Association is to be held at Northrec Castle Hotel, Exhibition Centre, Greens Promenade, North Shore, Blackpool. Doors open from 1045 to 1600. There will be over 100 trade stands, club booths, Bring & Buy, RGBD stand and book stall, construction competition, amateur computer stands and free car parking at the hotel, bus from extra car park. There is also a refreshment area to all the exhibitor stands. Talk on radio on S22. Admission is £2, OAPs £1 and under 16 free. Peter Denton G1CoP on 0151-630 5790.

March 19: The Tiverton SW Amateur Radio Club. Stands 1000 with all the usual excellent displays and catering facilities. Alan GOMAS on (0804) 252259.

March 22: The Bournemouth Radio Society will hold its 11th Annual Sale at the Kinison Community Centre, Pelhams, Kinson, Bournemouth, Dorset. Doors will open from 1000 until 1600. Talk in by RAYNET will be available on S22. As usual, there will be a mixture of radio and computer equipment on sale plus a Bring & Buy stall. More information from Alan G1OIKH on (01202) 538219 or mobile on (0580) 240931 or E-mail: jzrntonradio@guard.co.uk or via Packet as g1oikhp@furse.com with ‘BRS Sale’ as the subject.

March 29: The Cumbiniingham District Amateur Radio & Computer Rally will be held at the Magna Centre, Harbourside, Irvine, Ayrshire, Scotland. Doors open at 1045 (1030 for disabled visitors). There will be a Bring & Buy, Morse tests and all the usual traders, etc. Mr W. Gobie on (01950) 321000. E-mail: superpilot@msn.com or gm3uas@lincs.net

March 29: The Pontefract & District Amateur Radio Society Component Fair is to be held at the Magenta Centre, Pontefract. Doors open at 1045. There will be a large traders stand cover the whole of the venue. Doors open from 1000 to 1600 (disabled visitors only). There will be a large traders stand. Talk in on S22. Admission is £2, OAPs £1 and under 16 free. Contact Nigel G6BRBPX on (01977) 616395 in the evening or on (01977) 606345 during the day. E-mail: g6brbp@ac.com

March 29: The Pontefract & District Amateur Radio Society Component Fair is to be held at the Magenta Centre, Harbourside, Irvine, Ayrshire, Scotland. Doors open at 1045 (1030 for disabled visitors). There will be a Bring & Buy, Morse tests and all the usual traders, etc. Mr W. Gobie on (01950) 321000. E-mail: superpilot@msn.com or gm3uas@lincs.net

April 8: The Cambridgehire Repeater Group CRC are holding their annual rally at the Gt Bottisham Sports Centre (Part of Village College), Locie Road, Bittisham, near 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 may be obtained from: Paul Dyke G0LUC, 41 Kiln Lane, Puckeridge, Ware, Herts SG11 1RX or telephone on (01920) 825136.

April 9: A Radio Fleamarket is to be held at the University Sports Centre - Ula Williams, Antwerperveld in Brugge, close to A-12, Belgium. Open from 1200 to 1600 local time. Radio on 145.7825MHz Repeater Antwerp and 145.425MHz simplex free. Call OANOSS. More information from ON4CDV Gatan CMarg, E-mail on4cdv@tms.net. Website: http://www.wovan.demon.co.uk/antwerp.html

April 18: The SAMS’98 Computer & Electronic Show is to be held in the Bingley Hall, Staffordshire Showground, Weston Road, Stafford (ASB Stafford-Utterwater Road), signposted from junction 14 on M5, (but watch for the 11th Annual Sale at the Bingley Hall, Stafford (ASB Stafford-Utterwater Road), signposted from junction 14 on M5), (but watch for the 11th Annual Sale at the Bingley Hall, Stafford (ASB Stafford-Utterwater Road), signposted from junction 14 on M5). Doors open 1000 to 1600. Admission for adults is £3, children under 14 50p, Concessions. £1, OAPs £2, RGBS Members, Student Card, £4, (Advance Ticket £2 plus £1.50). The event is the 11th consecutive year and the 13th AMS (All Micro Show) at Bingley Hall. Last year saw an attendance of approx 3000 and around 100 trade stands covering the computing spectrum, along with accessories, software, books, components, radio, satellite and much more. There will be masses of free parking a licensed bar from 11am and refreshments, meals and a cottage pie day out! Sharon Alward, Sharward Promotions, Knightshares Business Centre, 30 Knightsdale Road, Ipswich, Suffolk IP1 1AV. Tel: (01473) 745833, FAX: (01473) 741361 or E-mail: services@harward.co.uk

April 19: The Novold ARC 14th QRP Convention is to be held at Digby Hall, Hound Street, Sherborne, Dorset. Doors open 0900-1200, there will be a high quality lineup of speakers with the Reverend George Dobbs as VIP, plus trade stands, Bring & Buy and refreshments, etc. Talk on in S22. Entry is £2, which includes prize raffle, Peter G5CWO on telephone on (01938) 831034.

April 19: The 17th Mobile Rally of the Lough Erne Amateur Radio Club will be held at the Killyleagh Hotel, Enniskillen, Northern Ireland. Doors open at 12 noon. Tyrone Amateur Electronics will be there and it is housed from Yeus, Waters & Stanton as well as the usual interesting variety of other traders and the Bring & Buy, John G3OSN, Tel: (01473) 436063 (daytime) and (01363) 327133 (evenings).

April 20: The Drayton Manor Radio & Computer Rally will be held at Drayton Manor Park, Fazeley, Tamworth, Staffordshire on the AGM. Main traders are in the car park and there will also be a large outside traders flea market, a Bring & Buy stall, local clubs and special interest stands. Directions: From junction 10 on the M6 take the A559 towards Penkridge, then take the A516 to Rugeley. At the roundabout take the 1st exit onto Wollescote Lane. Follow the road to the Bottisham Sports Centre. (Part of Village College), Locie Road, Bittisham, near 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 may be obtained from: Paul Dyke G0LUC, 41 Kiln Lane, Puckeridge, Ware, Herts SG11 1RX or telephone on (01920) 825136.

April 21: The Thame Mobile Rally of the Lough Erne Amateur Radio Club will be held at the Killyleagh Hotel, Enniskillen, Northern Ireland. Doors open at 12 noon. Tyrone Amateur Electronics will be there and it is housed from Yeus, Waters & Stanton as well as the usual interesting variety of other traders and the Bring & Buy, John G3OSN, Tel: (01473) 436063 (daytime) and (01363) 327133 (evenings).

May 10: The Drayton Manor Radio & Computer Rally will be held at Drayton Manor Park, Fazeley, Tamworth, Staffordshire on the AGM. Main traders are in the car park and there will also be a large outside traders flea market, a Bring & Buy stall, local clubs and special interest stands. Directions: From junction 10 on the M6 take the A559 towards Penkridge, then take the A516 to Rugeley. At the roundabout take the 1st exit onto Wollescote Lane. Follow the road to the Bottisham Sports Centre. (Part of Village College), Locie Road, Bittisham, near 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 may be obtained from: Paul Dyke G0LUC, 41 Kiln Lane, Puckeridge, Ware, Herts SG11 1RX or telephone on (01920) 825136.

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Please mention Practical Wireless when replying to advertisements
The 'Spotlight' Is On Again!

It's time to turn the 'Club Spotlight' on again as we invite you to enter your club magazines into the 1998 Practical Wireless & Kenwood Club Spotlight Magazine Competition. Local clubs entering will be competing for the magnificent original trophy - kindly donated by Kenwood - and 'national' clubs will be competing for the Bert's Bell award, which was instituted in 1997 in tribute to the late Bert Newman G2FIX.

It's very simple to enter the Club Spotlight magazine competition and all you need to do is to send us the three most recent copies of your magazine and a covering letter. The covering letter should make it clear what category of club your club is eligible for. For example, the British Amateur Radio Teledata Group - BARTAG - winner of the 1997 national award - can only enter as a national club section, whereas the Cockenzie & Port Seton Club - last year's winners, now have to specify that they are a local club.

National Or Local

For either category (national or local) your covering letter should provide the following details: How many people there are on the Editorial team and the type of job they do/or did (if retired), how long the magazine has been established, how it's produced (on your computer or text supplied to 'outside' printer for professional printing, etc.) and whether or not the publication is 'sponsored', the number of copies printed and membership size of your club. It would also help the judging panel if you could provide some historical details on your club.

The judging panel this year includes Jim Bacon G3YLA, David Barlow G3PLE (who of course first suggested the competition!), Zoé Crabb, Dave Wilkins G5HY and Rob Mannion G3XFD. Additionally - and for entries in the national category only - the Salisbury Club will be providing one extra judge to decide the winner of the Bert's Bell Trophy, which was Instituted in 1997 in tribute to the late Bert Newman G2FIX.

Entry to the competition is open now and all entries should be at the PW offices in Broadstone no later than Wednesday 1st July 1998. This is because the presentations are to be made at the Leicester Show in September (the new venue of course) and members of the judging panel live in places as far apart as Cornwall, East Anglia and Greater London, so it will not be possible to consider late entries!

So, make sure your club's entry reaches us in good time by sending it to Zoé Crabb, Club Spotlight Magazine Competition, Practical Wireless, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. The Editor's decision as head of the adjudication panel is final and no correspondence will be entered into. Good luck and we look forward to reading YOUR magazine!

Rob Mannion G3XFD

Competition Time!

Back in August of last year, Club Spotlight received a very interesting letter from Geoff Theasby G8BMI in Keighley, suggesting a possible club quiz to be run in these pages. Both Rob and I thought it was a great idea, but with limited room in the last few months, we haven't been able to run the quiz, so this month, with space permitting, here it is!

So, what do you have to do? Well, if you (or your club) would like to enter, there are 50 questions in total to answer. To receive these questions, all you have to do is send an s.a.e. to Geoff at the address below, who will send out the questions on request (answers to be returned to him also!). The closing date for the competition is 1st May.

Southampton Amateur Radio Club

Malcolm Troy G0WFO has recently moved his QTH to South Wales. This means that the Southampton Amateur Radio Club has lost its Chairman, but at a recent committee meeting, a new Chairman was elected. He is Pete Walkling G8RNT. Members of the club still meet on the 1st and 3rd Monday of the month at Cantell School, Violet Road, Southampton, and the club has recently purchased an h.f. transceiver to help generate interest at club meetings. Full details of membership, etc. can be obtained from Harold McIntyre G3FKL (Secretary), 42 Dunvegan Drive, Lordswood, Southampton SO16 8DD. Tel: (01703) 737715.

Change Of Name

The Siemens Plessey Christchurch Amateur Radio Society (SPCARS) has now changed its name to the Christchurch Amateur Radio Society (CARS). Meetings are held on Thursday evenings at 8pm at The Radio Club Room, behind the Sports & Social Club, Grange Road, Somerford, Christchurch. Visitors are welcome.
1996, so there's plenty of time for all of you out there to enter!

Once Geoff has marked all of the answers, he will forward the results to us and the winner will receive a one year subscription to *PW*. However, in the event of a tie, Geoff will pose a tie breaker question(s) by post to the relevant clubs, but to avoid replies coming together by post, not knowing which is first, the winner will be the first to telephone Geoff with the correct answer by a particular time on a specified day.

So, contact Geoff Theasby G8BMI at 31 Middleton, Cowling, Keighley BD22 0DD and who knows, you could be a winner!

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**Bromsgrove & DARC**

The Bromsgrove & District Amateur Radio Club meet every Friday at 2000 at The Avoncroft Arts Centre (a registered RAE Exam Centre), Bromsgrove. RAE courses are on Mondays at 1930 and Morse classes are held on Tuesday at 1930 with NRAE courses on Thursday at 1930.

Further details from John Burford G4OAZ on (01527) 871903.

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**CARA is 21!**

The Cheltenham Amateur Radio Association (CARA) celebrates its 21st Anniversary in 1998. The club was formed back in 1977 by the amalgamation of The Cheltenham Group of the RSGB and The Cheltenham Amateur Radio Society. Its first meeting was in November of that year and in common with many clubs, CARA has met with mixed fortunes in the years between, but is currently enjoying a renaissance.

Membership has increased from 30+ at the start of 1996 to 60 at the close at 1997.

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**Don't Keep Zoe Waiting, Send in Your Club News & Information Now!**

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**Salop's Activities**

Members of the Salop Amateur Radio Club meet every Thursday evening at The Telepost Club, Railway Lane, Abbey Foregate, Shrewsbury, starting at 8pm. Alternate evenings are Natter Nights and Nights On The Air. The club has a fully functional shack covering most bands.

Visitors are very welcome to attend and can learn first hand about this absorbing hobby. Classes are also held to enable those interested to qualify for an 'A', 'B' or Novice class licence, and recently, the club have enjoyed very high pass rates.

The club enters many of the official contests that take place during the year and also hold a construction contest, quiz contests with local clubs, a Junk Sale and an Equipment Sale, plus social evenings are held each year. Visits are also arranged to various sites of interest, not always radio oriented. More information from T. G. Davies G0JIX, 20 Kirkwood Court, Shrewsbury SY1 3SX.

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**Talk At Cockenzie**

The Cockenzie & Port Seton Amateur Radio Club will be hosting a talk by Tom Wylie GM4FDM on the subject of IOTA/105A, in Resources Room 2, Port Seton Community Centre in Port Seton on Friday March 20th from 7.30 until 9.30pm. All will be made welcome and a nominal entry fee of £1 will be made, with all proceeds going to the club's adopted charity, the British Heart Foundation.

For more information contact Bob Glasgow on (01875) 811723.
Amplifier Circuit

The amplifier circuit uses the commonly available BC109 npn type of transistor. It only requires one capacitor and a resistor together with the 9V battery power supply. You don't even need a switch as the battery can be disconnected when the receiver is not in use.

In fact, the audio 'gain' of the amplifier is such that it will provide enough output from a 9V battery source to drive a very small loudspeaker which you could incorporate into 'home-made' headphones or stereo cassette type headsets. I even found that BBC Radio 4 could be heard using one of the very cheap (and relatively inefficient) 'in the ear' headphones, which can be bought for around 50p.

Building & Testing

Building and testing the receiver and amplifier is very simple indeed and enjoyable following the 'drawing pin and board' method. So, all you need is a soft wooden board or section of thick cork flooring tile (these take the drawing pins very well) and off you go!

If you've already built the diode receiver all you have to do is to disconnect the headphones/earpiece and following the diagram in Fig. 2, assemble the components after placing the drawing pins. Tin them with solder first as they take a few seconds to cool, but when soldering a component you only have to melt the solder where you're attaching the component.

Take care to connect the transistor correctly as in the diagram, as it can be destroyed quite easily.

And once you have finished the building process you can test the amplifier by providing a potential input signal with your soldering iron on the base input (centre connection of the three on the device). However, before you do the test - make sure the headphones are not directly over your ears as the resulting buzz can be quite loud!

The loud buzz which should be produced by the application of the hot soldering iron comes from the 100kHz (remember - 50 positive and 50 negative pulses from the alternating current mains supply) being radiated from the tip of the tool. And if all is well - connect the antenna and hear your amplifier doing its job.

Best Signal

In practice I've found that the 'centre tap' coil (or any long, medium or short wave frequency) provides the best strength signal and best separation ('selectivity') between stations. And with the little amplifier added - reception is much easier.

Here in Dorset, with a 10 metre length of wire for the antenna and a good earth connection I've found that the BBC Radio 4 Droitwich (near Birmingham) 198kHz long wave transmitter comes in very well using a coil of 80 to 100 turns on a small ferrite rod. And with 40 or so turns (coverage will depend of your coil and capacitor combination, so be prepared to experiment) I found that I could hear stations all over Europe.

Fascinating Fun

This little project provides fascinating fun! I found myself sitting with headphones (and using single earphones inserts and small speakers) on and trying all sorts of different coil and capacitor combinations.

The capacitor used and the resistor I've chosen provided the best results I could get. Next time I'm going to describe how you can add a radio frequency amplifying stage to your simple receiver - and the difference this can make will really make yours ear prick up!

Join me next month - and in the meantime have fun discovering the radio basics!
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- South West, 117 Beaumont Road, St Judes, Plymouth PL4 9EF
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The radio broadcasting industry is about to enter the digital age. The world-wide digital revolution has been gathering pace for some time and the developments in Digital Audio Broadcasting (DAB) mean that the UK radio industry will not be left behind. And of course it also will have great advantages to Radio Amateurs in respect of EMC problems.
Advanced technologies are converging, especially in broadcasting and this has led to lengthy debates about the introduction and development of DAB around the world. The European approach has been to define a new digital standard for radio broadcasting and the tailor-made system, Eureka 147, has also been adopted in the UK.

In August 1995, the UK Government's White Paper on Digital Terrestrial Broadcasting gave the 'green light' to the development of DAB for independent national and local radio. Transmission provider to most of the UK's Independent radio stations, NTL, is a major player within the broadcasting industry and was instrumental in advising the Government on the white paper. The company has been at the forefront of DAB and is committed to the introduction of digital radio services in the UK.

**Spectrum Allocation**

Out of the seven available frequency blocks, one has been assigned to BBC national radio, one to independent national radio and the remainder to local and regional radio. There are currently three independent national radio operators, Virgin, Classic and Talk Radio who are already guaranteed places on the national multiplex.

This will leave room for an additional three or more DAB stereo only services or many more mono services. At a local level, there is capacity for six or 12 local or regional services depending on the location.

In preparation, NTL has had full time commercial and technical staff working on DAB since 1995 and is well placed to bring the technology to market. They also operate in satellite services, broadband telecommunications and the Internet and the synergy with these businesses has resulted in a genuinely innovative technical approach to DAB.

To ease the transition into the digital age, NTL has been running a series of technical trials in conjunction with major broadcasters. In November 1995, the UK's first live DAB multiplex for commercial radio was launched at the Sound Broadcasting Equipment Show in Birmingham.

The following year, in March 1996, NTL launched a similar service for the London area. The broadcaster currently involved consists of Kiss FM, Capital FM, Melody FM, Sunrise Radio, Talk Radio, Virgin, EKR and BBC Radio 5 Live.

The digital transmissions aim to provide a long term marketing test-bed for commercial DAB. More recently, NTL has conducted a set of field trials to help small scale digital radio planning on behalf of the Radio Authority.

With the preparation for the introduction of DAB in place, the spring of 1998, will be a key-time for the industry. Local radio stations are not guaranteed a place on a multiplex and it's the responsibility of the UK regulator, the Radio Authority, to oversee the bidding.

The first commercial digital licences will be advertised early to mid-1998. Radio companies will bid to operate a multiplex of a group of six or more distinct digital audio services with the licence awards due for late 1998. At this time, the Radio Authority propose to advertise a national multiplex and six regional multiplexes.

**Bright Future**

The take-up of DAB in the UK is still unclear, as there are questions that remain unanswered. The Radio Authority is offering an incentive of an eight-year licence extension to any commercial radio company which participates in DAB and there is growing optimism among digital receiver producers that DAB will be a success.

Larger manufacturers have identified the in-car market as the entry point for digital radios and the first prototypes were launched at the IFA consumer electronics exhibition in Berlin last year. The cost for a digital receiver stands at around £500 at the moment, but as with any electronic consumer goods, the costs will no doubt come tumbling down once mass production is up and running.

**Emerging Technology**

There are bound to be questions about an emerging technology but the benefits of DAB are clear and NTL believes its future will be a bright one. From the listener's point of view, there will be interference free reception, enhanced audio quality and fresh programme formats.

Advertisers will also no doubt welcome DAB as there will be the ability to embed supporting information in the data stream (Programme Associated Data - PAD) and explore the multimedia capabilities of digital radio. Programmers will be able to explore new formats and utilise the powerful data handling capacity of DAB.

**Jon Trowsdale,** General Manager for the NTL radio group, sums-up the Digital Debate with the following comment: "The Company has the expertise to make digital radio a reality for commercial broadcasters. Radio stations are naturally anxious to secure a return on their investment before committing to a new infrastructure and our aim is to be a technology partner, giving them a helping hand into the digital age".

Practical Wireless, April 1998
The following information has been prepared by Jon Trowsdale of NTL in response to the many conversations he's had with people in the radio and music industries who want to know more about Digital Radio but who are baffled or bored by the technicalities. So, this is very much a non-technical guide, concentrating on the programming and business issues.

What is Digital Radio?
Digital Radio is a new transmission system that will in time replace amplitude modulation (a.m.) and frequency modulation (f.m.) broadcasts.

What's wrong with AM and FM?
We live in a digital communication world. Just about every communication process we engage in, from making a 'phone call to booking an airline flight, is in the digital domain. Except, that is, broadcast radio and television.

Incidentally f.m. was invented in the 1940s and a.m. in the 1920s. So, many businesses are using a delivery system that is anything up to 70 years old. Is this sensible? - You decide!

Is there more than one Digital Radio standard?
For all practical purposes, no. The European standard is called Eureka 147. This has also been adopted by Canada, Mexico, South Africa and Australia. The only country trying to develop an alternative standard is the USA and they are struggling. So, when we talk about Digital Radio, we really mean Eureka 147.

What are the advantages of Digital Radio?
To begin with, DAB is virtually immune from interference and fading. So there will be no more losing programmes when you drive under power lines or through tunnels. And there will also be more annoying f.m. 'flutter' (multi-path distortion) in built-up areas. And it sounds better too - CD quality in fact!

Using digital technology you can transmit data along with your audio. So, broadcasters will be able tell listeners which song is playing, or broadcast continuous traffic information, or tour date information, or even use it for promotional uses.

Does it use up extra frequencies?
No. Digital radio uses the radio spectrum more efficiently than a.m. or f.m. This is possible because each digital radio transmitter broadcasts up to six stereo services on one frequency, as opposed to just one with a.m. or f.m. It's also possible for the broadcaster to have 12 mono services. Or four stereo and four mono. It all depends how multiplex is configured.

What is a multiplex?
A multiplex is just a collection of signals all bound up together. Another word for it is ensemble. An important advantage of digital radio is that it's possible to change the configuration of the multiplex at any time.

For example, suppose a broadcaster wanted to...
Oxford-based Solid State Logic Ltd., founded in 1969, specialise in inventing, developing and producing technology for the manipulation of sound, providing equipment for professionals all over the world from their modern international headquarters at Begbroke north of the University City, winning the Queen's Award For Export Achievement in 1997. Illustrated is the 'Axiom' digital production system. (Photo courtesy of Solid State Logic Ltd.)

Is it true that receivers for DAB will be very expensive?
The potential market for digital radio receivers in Europe alone is 400 million sets. That's big money and the manufacturers are already gearing up for mass production. And although initially the receivers will be expensive prices will fall quickly, like any consumer electronics goods.

Does this mean that digital radio will be simulcast with AM/FM broadcasts in the beginning?
Yes, but there's nothing new in that. In the 1970s and a large part of the 1980s most commercial radio stations transmitted the same programmes on a.m. and f.m. This was because most people listened on medium wave (m.w.), with f.m. as the minority 'quality' service. Remember all those station jingles that identified the station by its medium wave dial position in metres?

Will digital radio transmissions be very expensive?
Not necessarily. In fact, our calculations at NTL indicate that, on a per user basis, digital radio transmissions may actually be cheaper than a.m. and f.m.

What does the Radio Authority think about digital radio?
The Radio Authority is very keen to see digital radio spread in the UK. They will licence the national commercial digital radio multiplex in spring next year, which will be followed very soon by licences for the major metropolitan areas. The Authority have already licensed experimental digital radio services and NTL are working very closely with them on this.

Why will businesses invest in Digital Radio?
Apart from the opportunity to develop their business on a new digital platform, there are other reasons to invest in digital radio. The Broadcasting Act allows for rollover of existing analogue licences for stations who invest in digital. Investment in DAB is really investment in the future.

There are some 'parallels' between professionals and Radio Amateurs in that 97.4 Gold Radio has its audio processing and Radio Data System (RDS) and the main 200W transmitter sited literally just outside the studio door. With a 'stand-by' transmitter the units are completely automatic and cooling for the p.a. stages is provided by natural air flow over the large heat-sinks. The station also has its own diesel-powered electrical generator for emergency use.

(Photographic facilities courtesy of 97.4 Gold Radio.)

broadcast a sports programme, while at the same time continuing with their 'hot rocking' music service. Because you can get away with less bandwidth for speech, you can squeeze the overall bandwidth of your multiplex allocation to accommodate both.

So who looks after the multiplexes?
According to the Broadcasting Act, they'll be looked after by Multiplex Operators. The Radio Authority will award 12 year licences to multiplex operators on a competition basis.

Incidentally the Broadcasting Act is now law and the Radio Authority has said that the first digital radio licences will be advertised very soon in a 'fast burn' rollout. In other words, the digital radio 'train' is about to leave the station!
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W. Midlands showroom
Unit 1, Canal View Ind. Est., Brierley Hill, W. Mids.
Tel: 01384 481681
Open Mon-Fri 9.30-5pm. Sat 9.30-2pm

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**YAESU**

**FT-1000MP (AC)**

- HF transceiver: £1799.95
- With free FM unit & AM filter: £1299.95
- Base microphone: £199.95
- Miniature: £239.00

**FT-920**

- 90W HF + 6m (all mode): £1699.95
- Base microphone: £199.95
- Base headset: £199.95
- Waterproof bag: £139.95

---

**ALINCO**

**DX-70TH**

- 100W HF + 6m transceiver (all mode): £659.00
- DR-400: £215.00
- DR-61: £259.00
- DJ-45: £159.95

**KENWOOD**

**TH-G71**

- Dualband handheld with optional wideband receive: £249.00
- 2m + 70cm mobile: £495.00
- 2m handheld: £149.95
- Deluxe headphones: £52.95
- Small headphones: £35.95
- Low pass filter: £45.95
- Box headset: £52.95
- Clip mic-earphone: £24.95

**ICOM**

**IC-746**

- Flagship HF transceiver: £574.00
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- 2m handheld: £159.95
- 70cm handheld: £159.95

---

**COMMUNICATION RECEIVERS**

**YAESU**

**FRG-100**

- Communications receiver: £399.99
- As above plus WEFAX decoder: £199.99
- Sony S/W portable: £149.95
- Portable S/W + RDS: £169.00
- S/W portable + cassette: £199.95

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**MANAGER'S SPECIALS**

**YAESU FT-920**

- Optranet HF + 6m transceiver: £1299.00

**ICOM IC-756**

- The ultimate HF + 6m transceiver on the market: £1495.00

**STANDARD C-5900R**

- The only triple band mobile available, 2/6/70cm: £595.00

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**Practical Wireless, April 1998**
**HAYDON COMMUNICATIONS**

MAIL ORDER: 0181-951 5781/2

**NEW BASE ANTENNA**

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<tr>
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<th>Description</th>
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<tr>
<td>TSB-3301 GF</td>
<td>144/70/548 (3m)</td>
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<td>TSB-3302 GF</td>
<td>144/70, 4.5/708 (1.7m)</td>
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<td>TSB-3303 GF</td>
<td>144/70, 3/68 (1.1m)</td>
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<td>TSB-3313 GF</td>
<td>144/70, 0.5/118 (3.4m)</td>
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<td>TSB-3600 GF</td>
<td>50/144/70, 211/6.2/8.4dB gain</td>
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**ACCESSORIES**

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<td>TS-6001N</td>
<td>Duplexer (+coax) 2/70 (N/NS99)</td>
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<td>TS-6003</td>
<td>Duplexer (Coax) 270/509)</td>
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<td>CTX-514</td>
<td>Triplexer (6/70/270)</td>
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**MOBILE ANTENNAS**

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<td>DB-7900</td>
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<td>DB-1304</td>
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<td>DB-125E</td>
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<td>DB-285</td>
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<tr>
<td>PL-6M</td>
<td>50/80 MHz x wave (1m)</td>
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**Q-TEK 2L SPECIALS**

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**Q-TEK YAGIS FOR 2/4/6 + 70cm**

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<td>2m</td>
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<td>4m</td>
<td>7ele (boom 126'/11/6Bd)</td>
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<td>7ele (boom 72'/11/6Bd)</td>
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<tr>
<td>70cm</td>
<td>13ele (boom 83'/12/6Bd)</td>
<td>£99.00</td>
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**NEW MOBILE WHIPS (PL-259)**

- Easy to mount HF mobile whips ready to go with PL-259 fitting
- 2m: 80 m whip (approx 1.5m long) £21.95
- 4m: 80 m whip (approx 1.5m long) £19.95
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- 5 section telescopic masts. Starting at 2" in diameter and finishing with a top section of 1/2" diameter we offer a 6 metre and a 12 metre version. Each mast is supplied with guy rings and stainless steel pins for locating the sections when erected. The closed height of the 8 metre mast is just 5 feet and the 12 metre version at 10 feet. All sections are extruded aluminium tube with a 16 gauge wall thickness.

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  - QW-800 800LB £27
  - QW-1000 1000LB £31
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**NISSEI METERS**

<table>
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<tr>
<th>Model</th>
<th>Frequency</th>
<th>Price</th>
<th>P&amp;P</th>
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<td>RS-102</td>
<td>1.8-130MHz (200W)</td>
<td>£59.95</td>
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<td>RS-402</td>
<td>125-255MHz (200W)</td>
<td>£59.95</td>
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<td>RS-101</td>
<td>1.8-60MHz (3kW)</td>
<td>£79.95</td>
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<td>RS-502</td>
<td>1.8-525MHz (200W)</td>
<td>£99.95</td>
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<tr>
<td>RS-40</td>
<td>144/430MHz Pocket PWR/SWR</td>
<td>£34.95</td>
<td>£1</td>
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<tr>
<td>RS-40N</td>
<td>As above with N-type</td>
<td>£39.95</td>
<td>£5</td>
</tr>
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**GARMIN GPS-III**

Latest UK version complete with moving map of UK & Europe. £339.00

**VECTRONICS VC-300DLP**

UK’s most popular 300W ATU with built-in dummy load. £129.95

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HF digital SWR analyser + 1.8-170MHz counter/resistance meter. £225.00 & P&P £5

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**S.W. PORTABLES**

SONY SW-100E Award winning miniature portable SW receiver. Its performance is brilliant for its size. The best shortwave receiver for under £250.

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
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<tbody>
<tr>
<td>RRP £220</td>
<td>SALE PRICE £149.95</td>
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**SONY SW-55E**

Superb quality portable SW receiver with 125 presets. 100Hz step tuning for shortwave. Includes compact antenna, stereo headphones and carry case. RRP £249.95.

<table>
<thead>
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<th>Model</th>
<th>Price</th>
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<tr>
<td>RRP £235</td>
<td>SALE PRICE £169.00</td>
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**ROBERTS R-861**

Portable SW receiver with built-in cassette recorder. RRP £299.95

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<th>Model</th>
<th>Price</th>
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<tbody>
<tr>
<td>RRP £199.95</td>
<td>OUR PRICE £199.95</td>
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</table>

**TECHTOYZ MICRO COUNTER**

Optoelectronics are ready to pioneer the market by producing the smallest frequency counter in the world with a frequency coverage of 10MHz-26GHz. The AA alkaline battery which powers the counter acts as the antenna, so no external antenna is needed.

<table>
<thead>
<tr>
<th>Model</th>
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<tr>
<td>RRP £89.95</td>
<td>INTRO PRICE £69.95</td>
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**OPTOELECTRONICS**

Optoelectronics are ready to pioneer the market by producing the smallest frequency counter in the world with a frequency coverage of 10MHz-26GHz. The AA alkaline battery which powers the counter acts as the antenna, so no external antenna is needed.

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<tr>
<td>RRP £349.95</td>
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</table>

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'A COMPLETE PC BASED ELECTRONICS COURSE'

If you are looking for an easy and enjoyable way of studying or improving your knowledge of electronics then this is the software for you.

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

Once again let me start with a few books that I think may be of use to you. In these days with the need for property security what better than a book, to help. The Practical Alarms Projects by R.A. Penfold looks into various types of security alarm. There are plans to build your own basic, delayed, infra-red or audio alarms. Other types of alarms, such as ultrasonic and windows alarms, are not forgotten either. An excellent book if you would like an alarm but are more frightened of the cost of one, or you have an unusual alarm requirement.

Also from the Bahani stable, is a book from A. Flind, Practical Oscillator Circuits, and it's just what the name suggests - a book full of circuits covering almost all requirements. The seven chapters in the book cover signal generation using the ubiquitous '555' or similar i.c.s, the 4000 series c.m.o.s. i.c.s, operational amplifiers (op-amps) for audio and with specific waveform generator i.c.s such as the MAX038. Oscillators for radio circuits haven't been forgotten either. two chapters cover LC and crystal oscillator types. A good source of ideas.

From Newnes comes the Electronics Engineer's Pocket Book by Keith Brindley. The tall-slim hard-back book is an ideal format to hold in one hand, or slip into a pocket for safekeeping. Over 300 pages of data on a very wide range of electronic topics, and there's three broad sections cover components and their data, miscellaneous electrical data and circuits and systems. It's ideal to slip into the back pocket as an aide-memoire.

The ARRL books are noted for their ease of reading and the ARRL Electronics Data Book by the late Doug DeMaw W1FB is no exception. There are nine sections in the book, and I find the sections on 'Inductor And Transformers', 'Networks And Filters', and the 'Antennas And Transmission Lines' very useful reference material. There are however, sections on time and frequency, transistor, digital and other i.c. pin-out details within the pages. Not to be ignored for everyday use.

From the pen of Joseph J. Carr comes a thick hard-backed book called Secrets Of RF Circuit Design (Second edition). It's an excellent reference book for any r.f. design engineer. That is not to say it's difficult to read, because it isn't. It makes fascinating reading throughout the 26 chapters dealing with a subject in simple, but fine detail. You are shown how to design and build radiators from v.f.f. to u.h.f., simple direct conversion to radio astronomy receivers. There's something for every part of the hobby in this book, it's inexpensive for such a large amount of information.

News Items

Just a few news items to let you know about this time. Available from PSS Services of 217 Prestbury Road, Cheltenham, Gloucester GL52 3ES is Tec200, a transfer film that may be used in making your own p.c.b.s from magazine layouts or of your own design. Originally developed by DL2OM in the 1980s, TEC200 film can have an image photocopied, or printed onto it by laser printer. This image is then transferred to a cleaned piece of p.c.b. material by 'ironing' it on. At about £1 an A4 sheet (depending on quantity) it's an easy way of making your own p.c.b. masks. For more details contact PSS Services at the above address, or Tel: (01242) 254108.

Supplied by The PC Solution of 2a High Road, Leyton, London E15 2BP is WinDRAFT 2 a Windows based schematics or p.c.b. layout design program. The remarkable part about the package is that it can grow as your layouts become bigger. The trial package, although it is the full package, is limited to 100 pins. You buy the capability you need - as and only when you need it. Contact The PC Solution as above, or on Tel: 0181-926 1160 or on E-mail: info@thepcsol.com or look at their home page of: http://www.thepcsol.com.uk

The IT6400 hot-air desoldering station from JBC Soldering Solutions Ltd. should make desoldering small or surface mount components both quick and safe. A shield cap that fits tightly against the p.c.b. restricts the hot air to the component to be desoldered. For more details contact JBC at Marshall House, 255 Wellington Road, South Stockport, Cheshire SK2 6NG. Tel: 0161 474 0299 or FAX: 0161 474 0288.

Any of the above books may be obtained from the PW Book Store featured elsewhere in the magazine.
Your Letters

Now let's have a look at your letters. From Ron G3DSV (G3DSV@aol.com) came an E-mail saying "Even though I have had my ticket for around 50 years, I still like to read about other peoples ideas. Learning in Amateur Radio need never stop. I was interested in the p.c.b. production. The nearest photocopier to me is in Exeter some six miles away". But Ron has come up with a method similar to the method described, in the February 1998 'E-i-A' column, by Glyne GW3TFS.

Ron went on to detail his method of producing p.c.b. artwork using the software Print Artist supplied with an Epson inkjet printer and Epson 'Iron-on' transfer paper. He wrote "If I first use a simple hand scanner to get the p.c.b. layout from the magazine into the computer, then I clean it up to get it how I want it, this usually only means increasing the width of the connecting tracks a little, then reverse the image (Print Artist caters for this), and print it onto Epson Iron on transfer paper. The print is then ironed onto the p.c.b. board. After cooling it is simply peeled and 99% of the time the result needs no retouching once you have got the iron temperature sorted".

In response to Dave Fairhurst's 'etch-in-a-bag' idea (p19 PW Feb '98) Ron said "Using the echant in a plastic bag, why on earth did I not think of such a simple thing! A very useful tip indeed" and I have to agree with you Ron, the simple ideas are often the most difficult to dream-up.

Tex's Conundrum

I'm surprised that no one seems to have noted that the closing date for the conundrum was over 10 years ago. Oooops! However, for those who ignored that date and sent in an answer anyway, I'll continue. The circuit, an inductor L1 (1µH) and two capacitors in parallel, C1 (100pF) and a variable capacitor C2 (3-50pF), certainly appears to have caused some 'fun' amongst you. I've had answers from (sadly) completely wrong to being given to eight decimal places (MHz). I only wanted the answers to within one kilohertz of the nominal frequencies.

The two frequencies I was looking for as the answer, were 12.955MHz when the variable is set at the maximum value of 50pF (Ctotal = 150pF), and 15.682MHz when the variable is at its minimum value of 30pF (Ctotal = 103pF). The winner, drawn out of the editorial hat on Monday 9 February 1998 was F. Cloke GOEON. I would however, like to extend a very worthy mention to Fred Ward G2CVV who sent in an answer,

Digital Scope

It's my opinion, that one of the most useful items of test equipment that any amateur can have in his workshops is an oscilloscope. I've heard 'excuses' that they are seen to be both rather large and far too expensive for everyday use. Well the OsziFOX combined digital 'scope and voltmeter unit from No Nuts Ltd. should take away both of these considerations. Costing a little under £80 and about the size of a large marker pen, it's both affordable and portable.

The OsziFOX needs only a 12V supply at about 100mA to be ready for use. The unit, Fig. 1, uses a small, but clearly backlit, liquid crystal display (l.c.d.), Fig. 2, to show the digitised input waveform. The various controls are shown in Fig. 3: to make the unit more effective a serial connector allows an IBM PC to be used as a larger display unit for the digitised waveform.

The unit is shown in use in Fig. 4 with three screen 'grabs' in Figs 5, 6 and 7. The actual screen on the unit (with scales of 1, 10 and 100V f.s.d.), although small is adequate for field work. It produced a surprisingly useful picture of the waveform, though I found that keeping the PC screen on all the time was the best option. One thing I did find out was that when the OsziFOX is displaying voltages, the PC screen still shows the 'live' waveform.

The PC screen 'grab' of Fig. 5, shows the output of a simple oscillator I've been using as the L.o. of a direct conversion rig for the 7MHz band. I'd not used a 'scope on the output before, even though I'd thought several times that it seemed a 'bit rough'. But as 7MHz is a very strong signal band I'd ignored it. The waveform shown in Fig. 5, is the basic 7MHz oscillation with a 50kHz modulation on it. (No wonder it sounded rough!).

Although there are only three ranges (1, 10 and 100V) on the unit, it will measure a.c. or d.c. Combine this measuring facility with the unusual zero level offset, set by a very slim toothed control by the side of the display, and you have a very useful piece of test equipment. It's also quite something to have an a.c. voltmeter with a bandwidth of 20MHz. The unit is actually useful to a much higher frequency, but with less accuracy. You can immediately see any changes in level of the voltages being measured.

I think I shall add an OsziFOX to my workshop, even though I have a 'full-sized' dual beam unit already. To get hold of one for your workshop, contact Adam at No Nuts Ltd., New Road, Aldham, Essex CO6 3QT. Tel/FAX: (01376) 561373 or Kim on Tel/FAX: (01206) 213322.
with the working all clearly laid-out but, without using a calculator or slide rule. Fred said he would like to see more of them. I'll see what I can do Fred! Thank you all who took part, and if anyone would like a sheet detailing the steps and calculations taken in working out the two frequencies, then send a request (Self addressed label + stamp) marked 'Answers -1' to me at the office and I'll send a copy on. The new conundrum, on a similar vein (but

**Win Two Copies**

Two readers have a chance to win copies of StripboardMagic. And it even includes anyone who already has a copy, and knows StripboardMagic offers excellent value for money. Ambyr have offered to refund the price of the program to anyone who wins, but already has a copy of StripboardMagic. I don't have the space for the competition this month, but I've been promised space next time for a the month, but I've been promised space next time for a the

![Fig. 10: The circuit of Tex's Conundrum No. 2. (See the text for the questions, then see if you can get the right answers).](image)

Once again I've come to the end of this session of E-i-A. Don't forget to send your electronics ideas and tips to share them with other readers. I also hope to be exploring some of the intricacies of electronic circuits so, let me leave you with the small problem shown in Fig. 10. Assume, this time, that the components are perfect - now what are the upper and lower frequencies (again to within 1kHz) of this circuit? Answers to be sent to the editorial address marked **Tex's Conundrum No. 2.**

The winner, drawn out of the editorial hat on Tuesday 14 April 1998, will get his (or her) name 'in lights' within the June issue of Electronics-in-Action. See you then.

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It’s Never Too Late To ‘Tri’ A T8!

When we said to Richard Newton GORSN ‘think of a dual-bander, add 50MHz and what have you got’? He knew instantly that we were about to ask him to test the Icom IC-T8E Tri-band hand-held. Although this radio has been available for a little while as Icom say in their advertising: “It’s never too late to try a T8.”

... the IC-T8 offers an excellent quality triple-band radio with a little more besides.

Icom IC-T8 offers an excellent quality triple band radio with a little more besides. And it has operator selectable 12.5/25kHz channel spacing.

The Icom IC-T8E is supplied with a 6V 700mAh nickel metal-hydrde battery, a helical antenna, belt clip and hand strap. It also comes with a wall type charger. The handbook supplied is well written and illustrated however, I did feel that it could have been a little more comprehensive in places.

Having said that, the radio itself does have ‘on-line’ help. When you enter the ‘Set Mode’ and don’t touch a button for a few seconds, an explanation of the function you have selected starts scrolling across the screen. I liked this and found it useful on those many occasions I had forgotten to take the handbook with me. In fact this radio is so helpful it even tells you the battery voltage every time you turn it on.

The IC-T8 is a relatively small unit for what it offers. It’s well finished in dark grey metal and plastic and has a good ergonomic design.

The well labelled controls are set out in a sensible way and are easy to operate. The radio’s display is easy to see and is automatically back lit for a few seconds when a button is pressed (with the exception of the p.t.t. and can be disabled if you wish.). The back light is very good, alas however, it does not back light the DTMF keyboard or any of the main controls.

The controls are well spaced out. The rotary knob on the top of the radio controls tuning of the v.f.o., paging through the ‘Set Menus’ and selecting squelch settings.

The external speaker microphone

<table>
<thead>
<tr>
<th>Antenna Used</th>
<th>Result Achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplied Helical Antenna</td>
<td>Signal hardly detectable under squelch</td>
</tr>
<tr>
<td>Airband helical Antenna 145MHz whip</td>
<td>Signal received 5 and 5 Full deflection</td>
</tr>
</tbody>
</table>

Table 1: Icom IC-T8E Reception of Airband low power transmission.
connections are also on the top of the radio as is the 50Ω SMA type antenna fitting. The On/Off control is on the front of the radio, as are the majority of controls. The volume is controlled by up down buttons on the front panel.

**Fingers Fall**

What first struck me was just how easy this radio is to use - my fingers seemed to just fall on the buttons as I needed them. This is an excellent reflection on how well thought out the design is.

The Icom IC-T8 has seven bands of operation and a couple of 'bonus' receive bands. The bands include 50MHz, the v.h.f. broadcast band, Airband, 145MHz and 433MHz. The 70MHz band is one of the bonus bands.

The IC-T8 will receive on 70MHz (4 metres). This is at the highest end of the 50MHz v.f.o. range. The other bonus band is the Marine band that can be found in the same v.f.o. band range as 145MHz (the Marine band is a receive only band).

The operation of the Icom tri-bander is very easy indeed. It can be picked up and used as soon as you unpack it. This is always a good test of how user friendly a radio is.

Obviously to use the more advanced features and therefore get the best from the radio a good read of the manual is required. However, changing between the bands couldn't be simpler.

It's a very versatile radio and employs the use of two types of Set Menus to enable the user to set up a multitude of user programmed preferences. These include showing the memories as channel numbers only, the tuning steps for v.f.o. use, power save function and lamp functions to mention just a few.

The T8 has all the functions that modern handhelds normally feature. It has DTMF capability and full CTCSS functions including the ability to scan an incoming signal and display any sub audible tone that may be present.

The CTCSS also has a 'Pocket Bleep' function. This enables you to agree a matching tone with a friend and use the radio as a simple tone pager as long as you are in simplex range.

**Impressive Memory**

The IC-T8E has an impressive memory configuration. It boasts 100 memories. On top of these are 10 pairs of 'Scan Edge' channels. It's also possible to 'clone' the transceivers memories and frequencies to another T8.

The Scan Edge channels are for scanning between two user defined frequencies. These frequencies can be set to cross-over onto another band. As if that wasn't enough Icom have also included a 'Call' or 'Home' channel for the 50, 145 and 430MHz bands.

The particular facility I liked within the memory configuration was that all memories are grouped together, no matter what band they were from. In other words, you can simultaneously scan memories that include your favourite frequencies on every band.

It does not end there though. The Icom IC-T8E is so adaptable that should you only want to scan your memories in one particular band you can do so with ease.

Scanning with the IC-T8E could not be easier. All you have to do is press the Scan button and then quickly toggle through the available options with the rotary switch on the top of the radio.

You can scan an entire band, a limit set in the Scan Edge channels or the entire range of the radio from start to finish. In memory mode you can scan all the memories or just the memories containing frequencies from either Airband, 50, 145 or 433MHz.

**On Air**

Having got to grips with the IC-T8 I couldn't wait to see how it fared on the air. I wanted to use external antennas to do some tests, and as the antenna connection is SMA I must thank The Shortwave Shop for the loan of a SMA to BNC adapter.

In my opinion, the perfect external antenna for my experiments would be the...
W2000 triple band antenna, covering 50, 145 and 433MHz. Unfortunately mine is out of use at the moment so, Terry G7VJJ kindly offered me the use of his one Sunday morning. I also used the supplied helical antenna and one of Terry’s telescopic whips for some other tests.

Our first test was on the Airband frequency and as Terry has a rather nice dedicated airband receiver, we tuned it to 121.950MHz, the low power continuous loop transmission from Bournemouth International airport, which is only a few miles away from Terry’s home.

Terry’s receiver was using its own airband helical antenna. The signal was about 5 and 3. So, I tuned the IC-T8 to the same frequency and the results using different antennas are shown in Table 1.

The Icom IC-T8 out-performed a dedicated Airband radio using the same antenna. However, I was beginning to suspect that the supplied helical was a bit too much of a compromise.

I then decided to tune the IC-T8 to BBC Radio 2 on 88.5MHz and listen to some music. There was a full deflection on the S-meter and the sound reproduction was really superb considering the unit’s size.

The next tests were carried on 145MHz. Call after call on 145.500MHz went unanswered, so I tuned to GB3SC, the local repeater about 6km away from my location in the centre of Bournemouth. With the supplied helical antenna SC was rather scratchy. This was disappointing.

However, it was a different story with a 145MHz telescopic, 5 and 9+ was the result this time. Again confirming my suspicions that Icom may have been expecting a little too much from just one antenna.

Having had no luck calling on 50MHz with the supplied helical antenna I decided to bring in the ‘big guns’ and connect the IC-T8 to the W2000 base station antenna. I fed the radio with 13.8V, this gave the full output of 5W and called on 51.51 MHz.

I got a reply from Mike 2E1FTT in Ferndown. He was about 6km away from Terry and I. Mike was kind enough to give us a very good report on both signal strength and audio.

Mike then very kindly agreed to go to 433MHz and give us a report there too. And this was very favourable. The received audio was also excellent.

Another station, this time it was Mike 2E1FKG also called us on 433MHz. He was in Poole, about the same distance away as the other Mike but in the other direction. Mike also had a chat with us on 50MHz and again gave the IC-T8 a very good report indeed.

I then went onto work all the local 433MHz repeaters and spoke to Steve G1NY and Bob G6DUN. Bob was mobile and working through GB3SZ, the 433MHz repeater in Bournemouth.

Bob also listened on simplex and gave a good report both through the repeater and direct. He mentioned how good the audio was before I asked him to comment!

The IC-T8 did get rather hot during my tests. At one point the radio got so hot it was uncomfortable to hold.

Practice Wireless, April 1998

The heatsink did its job well and the radio soon cooled down after use. This is something to perhaps bear in mind but it is not a criticism of the radio. All hand-held radios will tend to do this, so be aware if you like to talk a lot like me!

I also took the IC-T8E to work with me one day. I work in Poole, and as some of you may know this is rather a busy port and listening to the Marine band frequencies can be very interesting.

I tuned to the normal Coastguard frequencies and the Port Control. The radio did very well but I did lose the signal at places and distances that I would not have expected to. I put this down to the supplied antenna. I am certain that if I had remembered to take my Marine band antenna with me things would have been better.

The Icom IC-T8E is very well made. It has a rugged looking design and long lasting feel about it. It performs extremely well on all the amateur bands it’s designed to cover.

Its performance overall was most impressive, it even works well on the broadcast and airbands. And I must say I was particularly impressed with the airband tests.

Lots Of Appeal

I am sure that the Icom IC-T8 will appeal to lots of different people for lots of different reasons. Perhaps the casual user who wants as much as possible in a small package to take away on holiday, or maybe the ardent RAYNET operator who needs flexibility of frequency use but does not want to have to carry numerous radios. These include the camping enthusiast who is a licensed Radio Amateur, Airband enthusiasts, marine band listener, and those whose family enjoys listening to the v.h.f. broadcast bands in the morning. I am sure the list is endless.

There have been triple-band hand-held radios before the IC-T8, none of which seemed to be that successful. I am of the opinion that the T8E will enjoy a better fate. It offers a lot for a ‘radio compact’ and performs very well. Above all it does not try too much of a compromise.

My thanks go to Icom (UK) Ltd., Sea Street, Herne Bay, Kent CT6 8LD. Tel: (01227) 741741 for the loan of the IC-T8, which is available from all Icom approved dealers for the recommended price of £349.

PW

Icom Approved Dealers

Icom have many approved equipment dealers here’s a list of a few:

Low Electronics (Matlock)

Nevada (Portsmouth)

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40
Practical Wireless, April 1998
In the March issue of *PW* David Butler G4ASR introduced us to the ‘Garmin Experience’. In his comprehensive article he provided an insight into the fascinating subject of Global Positioning Systems, together with a review of the latest in ‘personal navigators’ in the shape of the Garmin GPS III.

If after reading David’s article you quite like the idea of owning your very own GPS III unit, this month we’re giving you the chance to do just that by entering our competition. All you have to do is answer three very easy GPS questions (all the answers can be found in last month’s GPS feature article, back copies available for £2.30 inc. P&P from the Post Sales Dept.), send your entry to us and then wait patiently to see if your entry is the lucky one pulled from the Editor's “biscuit tin”!

Send your entry to Garmin Competition, Practical Wireless, PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. The Editor’s decision on the winner is final and no correspondence will be entered into. Please do not include other correspondence in with your entry (photocopies are acceptable).

Entries to reach us by Friday 1 May 1998.

**QUESTIONS**

1. How many operational satellite constellations are currently operational and what are they called?

2. Name the six main pages that are featured on the GPS III unit.

3. In what year was the first GPS satellite launched?

**ENTRY FORM**

1. 

2. 

3. 

Name: 

Callsign: 

Address: 

Postcode: 

☐ If you do not wish to receive future mailings as a result of entering this competition please indicate here.
Ian Poole G3YWX asks the question
What is A ... LED?

Light emitting diodes (I.e.d.s) are in widespread use in today's electronics. This is proved by the fact that over 20 billion are produced each year. They are used in a wide variety of applications from small indicator lamps to more complicated alphanumeric displays.

Although I.e.d.s have been superseded in some areas by the much less current hungry liquid crystal displays (L.C.D.), they are nevertheless still used in vast quantities in many areas with no sign of their use falling. As indicator lamps they have the distinct advantage that they have an almost indefinite life if they are used correctly. As a result the small tungsten lamps which were previously used are now a thing of the past.

First Noticed

Although I.e.d.s are thought of as a product of today's high technology semiconductor industry, the effect was first noticed many years ago. One of Marconi's engineers, H. J. Round, was famous for many valve and radio developments, was the first to see it in 1907 when he was working with Marconi, silicon and germanium crystal detectors. These discoveries were first reported in Electrical World in 1907.

The idea of the I.e.d. lay dormant for some years before it was observed again by O.V. Losov in 1922. Unfortunately, Losev lived in Leningrad and he was killed during the Second World War. Although he published a total of four patents during the period between 1919 and 1942, his work was not discovered until after his death and it's likely that any examples were destroyed in the war.

The I.e.d. resurfaced in 1951 when a team of researchers led by K. Lehovec started to investigate the effect. This research continued with many companies and researchers including Shockley becoming involved. The diode was eventually refined sufficiently and it started to be market-ed in the late 1960s.

Specialised Junction

Light emitting diodes are essentially a specialised form of p-n junction fabricated using a compound semiconductor. The most commonly used semiconductors are silicon and germanium which are simple elements and cannot be used for I.e.d.

However, compounds like gallium arsenide, gallium phosphide and indium phosphide are widely used for I.e.d.s and they are formed from two or more elements. In the example of gallium arsenide, gallium has a valency of three and arsenic a valency of five and as such they are known as group III-V semiconductors. Other compound semiconductors are also formed from group III-V materials.

In a forward biased junction, holes from the p-type region and electrons from the n-type region enter the junction and recombine like a normal diode. In this way current flows across the junction. When this occurs energy is released, some of which is in the form of photons (light). It's found that for a number of reasons more light is usually produced from the p side of the junction, and this is kept closest to the surface of the device to ensure that the minimum amount of light is absorbed in the structure.

I.e.d.s are used in a wide variety of applications from indicator lamps to more complex displays. For example gallium phosphide gives green light and aluminium indium gallium phosphide is used for yellow and orange light. Most I.e.d.s are based on gallium semiconductors.

Two Main Structures

Two main structures are used for i.e.d.s. The first is called a surface emitting diode and the second is an edge emitting diode as shown in Figs. 1m & n. Of these the surface emitting diode is the most common because it emits light over a wider angle, although there are a number of applications where a narrow angle is required.

Once the diode structure has been manufactured, it has to be packaged in a form that can be used and protected. Many of the small indicator I.e.d.s are potted in an epoxy whose refractive index is between that of the semiconductor and the outside air (see Fig. 2). In this way the diode can be protected and the light transmitted to the outside world in the most efficient way.

Current Limiting

Like ordinary diodes, I.e.d.s have no form of internal current limiting and if placed across a battery they would be destroyed. To prevent this happening, an ordinary sili-con diode can be placed across the I.e.d. in the reverse direction to prevent any reverse bias being applied.

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<table>
<thead>
<tr>
<th>Model</th>
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VSWR Meters

GSV-3000 PSU
30 Amp Power Supply
Variable 9 - 15V DC
Fan Cooled

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Duplexers & Triplexers

Lightning Arrestors

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<td>CA-23R</td>
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Base Antennas

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<td>X-50</td>
<td>2m/70cm/4.9/2.6dB</td>
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<td>X-300</td>
<td>2m/70cm/6.5/9dB</td>
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<td>CP-5</td>
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<td>EL-2E</td>
<td>2m 7/8th</td>
<td>£35.95</td>
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<td>NR-770</td>
<td>2m/70cm/35.5dB</td>
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<td>NR-790</td>
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Handy Antennas

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<td>RH-701</td>
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<td>RH-101</td>
<td>2m/70cm 19&quot;</td>
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<tr>
<td>RH-9</td>
<td>2m/70cm 12m long</td>
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<tr>
<td>RH-3</td>
<td>2m/70cm 4.5cm long</td>
<td>£19.95</td>
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E-mail sales@wsplc.demon.co.uk
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Many Radio Amateurs and listeners like myself like to listen in to f.m. transmissions on 28MHz (10 metres) using a h.f. receiver and also to 50MHz (6 metres) and above using converters.

Although a.m. receivers can resolve f.m. using slope detection (see Response Diagram in Fig. 1.), this method becomes difficult on a good receiver with a maximum bandwidth of (let's say) 12kHz (6kHz in my case). This is because as the deviation of amateur f.m. transmissions can be greater than this.

The greater deviation results in distorted 'hissey' audio. This is due in part to the receiver's intrinsic lack of bandwidth and also to the need to detune on to the slope of the i.f. response curve, further reducing the bandwidth available.

I have found it frustrating to receive a signal at S9+ only to have to detune it until it is about S7 or so to listen. Obviously, weaker signals may not be heard at all even though they register on the s-meter. Hence the need for a suitable n.b.f.m. adapter.

### Project Described

The project described here was originally developed to add narrow band f.m. capability to my Trio R1000 Communications Receiver using the NE604, see block diagram in Fig. 2.

This i.c. requires few external components and can be used with any i.f. up to 21.4MHz with appropriate replacements for filter F1 and the Quadrature Coil.

The circuit is shown in Fig. 3, and in this an f.e.t. buffer prevents loading the stage in the receiver from which the i.f. signal is taken off to the adapter board and also presents the correct 1.5kΩ impedance to the i.c. input on pin 16. I also added a 5V regulator to provide a stabilised supply for the adapter, allowing it to run from any positive voltage line between 7 and 30V in the host receiver without modification.

The a.f. output is taken from pin 6 via a 1μF capacitor, C17, with C9 providing de-emphasis. Thin coaxial cable should be used for the i.f. input and for the a.f. output.

After studying a circuit diagram of my receiver a suitable take-off point was found for the i.f. signal - after the final i.f. amplifier and before any filtering - and a single sided board was designed for use at the final i.f. of 455kHz.

The buffer stage on the n.b.f.m. board is an adaptation of an existing buffer in the receiver and should not require shielding at this i.f.

Two switches are necessary, one for f.m. muting (optional) and one to switch between the f.m. audio output from the adapter and the a.m. audio in the host receiver. This second switch becomes the f.m. selector and should be located between the product detector and the first a.f. stage (see block diagram).

The board, shown in Fig. 4, measures only 50 x 38mm and should fit easily into most receivers.

### Printed Circuit Board

Once the board has been produced or purchased, holes can be drilled using the following drills: 0.75mm or 1mm drill for all

---

**Fig. 1: Plotted response diagram illustrating 'slope' detection process (see text).**

**Fig. 2: Block diagram showing how the n.b.f.m. adapter is used (in the author's case the receiver is a Trio R1000).**

Practical Wireless, April 1998
components, plus a 2mm drill for the quadrature coil can lugs.

To start assembling the project I suggest you begin with the NE604 IC. Ideally, it should be soldered directly onto the board but performance will not suffer too much if a good quality i.c. socket is used.

Filter F1 is next, and as its lower single pin is not a standard distance from the others, a bit of gentle coaxing is needed to get it to fit. If an i.f. other than 455kHz is to be used, F1 may have a different pin-out and possibly a different termination impedance, so R4 may need to be a different value to match this.

The quadrature coil used has an internal 180pF capacitor, Cr, which will resonate it at about 468kHz. Coils for other i.f. frequencies may have their internal capacitors connected differently or may have to have an external capacitor fitted underneath.

Use a heat shunt when soldering the f.e.t. and 7805 regulator which are next, followed by the rest of the components. Some of these are a tight fit so populate the board in stages to make sure they all fit.

The capacitor C7 must be a tantalum type. Resistors are mounted vertically. Once the board is complete, the leads can be soldered in place.

Use thin coaxial cable for i.f. and a.f. connections and coloured ribbon cable for the rest. Don’t be tempted to cut the leads too short - they can always be cable-tied back inside the host receiver, making relocation and servicing much easier should it be necessary.

The d.c. biasing must not be upset when breaking into the first a.f. stage to locate

Connections & Wiring
I strongly recommend that when it comes to connections and tracing wiring in your receiver that you use a circuit diagram. Takeoffs for the adapter supply and i.f. input need to be found in the host receiver. These connections are made in parallel with existing wiring so no track breaks are necessary.

The author sourced all the non-polarised capacitors - miniature ceramic low inductance types from Philips Semiconductors r.f. communications products quoting specifications for NE/SA604A.

Fig. 3: Circuit of the n.b.f.m. adapter (see text).

**Shopping List**

**Resistors**
- Metal film miniature 0.25W 5%.
- 1kΩ 1 R3
- 1.6kΩ 1 R2 (will also work with 1.5kΩ with no noticeable problems)
- 2kΩ 2 R4
- 100kΩ 1 R1, 5

**Capacitors**
- Miniature ceramic low inductance types
  - 6.8pF 1 C1
  - 10pF 1 C14
  - 150pF 1 C11
  - 10nF 1 C3
  - 15nF 1 C13
  - 100nF 8 C5, 6, 8, 9, 10, 15, 16, 17
- Tantalum bead type
  - 6.8µF 1 C7
- Electrolytic
  - 100µF 1 C4

**Inductors**
- Coil Toko YMCS2A740A (10EZ type) from Cirkit

**Filter**
- F1 Murata CFW455F (Cirkit)

**Semiconductors**
- Transistor
  - 2N3819 1 Tr1
- Integrated Circuits
  - 78L05 1 IC1
  - NE604 1 IC2

**Miscellaneous**
- Single sided p.c.b., 1 metre thin coaxial cable, multicoloured ribbon cable, two miniature double pole double throw switches, small cables ties.
Fig. 4: Printed circuit board design for the adapter, with associated component placement overlay.

Fig. 5: The p.c.b. (lower centre) installed in the author's Trio R1000 receiver.

installing the board, attach a 9V battery to the power leads and note the current drawn by the adapter. It should be in the region of 6mA.

**Testing & Aligning**

It's easiest to set up and carry out the aligning of the adapter once it has been installed in the receiver. To do this you should tune in to an f.m. signal and switch the adapter in.

Next you should adjust the core of the quadrature coil using a nylon trimmer only (these cores are fragile) until the audio is optimised. You will most likely have to screw the core down if your i.f. is 455kHz as the coil is tuned to 468kHz. Now switch to a.m. and note the difference in sound quality.

With the mute output connected to the positive rail, muting is OFF. Grounding it will cut the a.f. output. I'm hoping to develop a simple squelch circuit based on received signal strength (RSSI output on pin 5) to control muting in the near future.

**Screening Desirable**

Screening may be desirable at higher i.f. s. Fortunately, suitable screening can be made easily from the soft plated 'tinplate' used on foods tin or similar canisters. They can be cut to shape with strong scissors or 'tinsnips' and soldered together.

**Editorial warning:** Anyone contemplating cutting 'tinplate' material with 'tinsnips' are strongly recommended to wear protective gloves and to be fully aware of the extremely sharp edges that can result. **Please take care!**

wiring points for the a.m./f.m. switch. A track must be broken or an interstage capacitor removed (snip off the body leaving its wires as connecting points) to do this. A replacement for this capacitor must be soldered onto the a.m. side of the switch.

Before

Ground connections for a buffer screen will require extra holes to be drilled in the p.c.b. for connecting wires (component lead off-cuts). As the copper track at the edges of the p.c.b. is at chassis potential, a complete screen can be soldered around the board edges if desired.

A mounting bracket can also be made from a piece of food tin which can be bent using pliers or a small vice. Make sure the underside of the p.c.b. is kept well away from the circuit of the host receiver.

**Filter & Coil Alternatives**

Your receiver might employ a 10.7MHz i.f. And to help I've suggested the filter and quadrature coil alternatives listed below for use with a 10.7MHz i.f.:

<table>
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<th>i.f.</th>
<th>F1</th>
<th>Z(R4)</th>
<th>COIL</th>
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<tr>
<td>10.7MHz</td>
<td>10MΩ8A</td>
<td>1.6KΩ</td>
<td>KACS9339REV +68pF in parallel</td>
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Any i.f. up to approximately 20MHz may be used with this board, but the user will have to research filter and coil data as follows: The filter must have a maximum bandwidth of ±12-15kHz @ -18dB, and R4 must match its termination impedance.

The quadrature coil must be resonant at the i.f. And please note that the p.c.b. track that runs under the coil - may require to be modified, together with the fitting of a resonating capacitor for the coil under the p.c.b.

**Adapter Performance**

With the specified filter, the adapter performance was as follows on 144MHz: an S9+20 voice on 145.475MHz produced no audio and no s-meter reading on 145.490MHz and 145.455MHz.

As adjacent channels are rarely used on 144MHz in my locality, the 27MHz f.m. CB band with 10kHz channel spacing was tuned in. Two S9 signals on adjacent channels produced no noticeable interference.

My shack computer causes broad spectrum r.f. noise - you might be luckier, but try the adapter with your PC switched off at first!

**Performance Improved**

The performance of the adapter could be improved by adding another filter between the buffer stage and the NE604 input on pin 16. Impedances are already matched for a filter at this point.

Holes for the three earth pins could be drilled in the ground plane to the right of the existing filter in order to secure the filter by soldering, and 2.5mm clearance holes, countersunk on the copper side, drilled for the input and output pins which would have to be wired directly under the board to the holes left by removing the now redundant C3.

So, armed with this simple adapter - you don't have to miss out on 'Ten' f.m!
**Practical Wireless, April 1998**

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Entries to reach us by Friday 1 May 1998.
Following the brief mention of early 1930s high-frequency experiments at the former BBC Daventry transmitter in PW last year, Brian Kendal, Chairman of The History of Air Navigation Group Royal Institute of Navigation, looks at the fascinating early history of radar.

I doubt whether there will ever be agreement between nations as to who ‘invented’ radar. The fact that radio waves could be reflected and refracted had been discovered by Heinrich Hertz in his very earliest experiments long before the turn of the century is usually totally ignored.

In 1904 a German engineer, Christian Hulsmeyer, patented a device for detection of ships and other obstructions which he called the ‘Telemobiloscope’. The basic equipment gave the bearing of the target but no range indication, but Hulsmeyer also experimented on ranging techniques using a triangulation technique.

Safety at Sea

The Telemobiloscope was effective up to ranges of about five kilometres and as such could have proved a valuable aid to safety at sea. However, ship owners had recently invested in wireless telegraphy equipment and were reluctant to spend any more on ‘new fangled’ schemes. As a result, there were no sales and Hulsmeyer eventually allowed his patents to lapse.

By the early 1930s pulse techniques had been developed in various ionospheric research programmes, as had the use of the cathode ray tube for timing purposes. In Germany, the basic principles of pulse radar had been established and several companies were developing equipment under a shroud of secrecy.

In Great Britain, however, it was not until 1935 that an official programme of development was initiated. And of course...
the production of fever heat in an airman's blood by a death ray. It took little calculation to realise that the r.f. output power required would be in the order of five million kilowatts radiated from a half-wave dipole to have an effective range of 600 metres!

Even if a high gain antenna was used, the r.f. power necessary was still totally beyond the technology of the time. And on receiving this information, Watson Watt replied "Well, if that's not possible, how can we help them?"

Wilkins knew that Post Office Engineers had noticed disturbances to v.h.f. reception when aircraft were in the vicinity and suggested that this may be a possible way of detecting enemy aircraft. A few more calculations then indicated that such a proposition should be quite practical. Furthermore, range, bearing and elevation measurements could be made by techniques already in use for ionospheric research.

**Two Memoranda**

Armed with the information, Watson Watt produced two memoranda which he presented to the Committee on the 12th February. Considering the timescale, these were very far reaching.

The first memoranda demonstrated the impracticability of the Death Ray whilst the second not only gave the basis of the future 'Chain Home' (CH) radar system, but also considered the principles for a method for the identification of 'friendly' aircraft. The Committee accepted the reports. But the Air Member for Research and Development, Air Marshall Sir Hugh Dowding, felt that a practical demonstration was necessary to show that sufficient power for detection purposes would be reflected from an aircraft.

On being told of the requirement for a "practical demonstration", Wilkins realised that, within the time scale available (10 days), it would be impossible to install a transmitter specifically for the purpose. Fortunately however, he knew the BBC Overseas Service transmitter at Daventry (callsign GSA), which he had often used as a signal source during his previous work, had the required characteristics.

**Daventry On 49 Metres**

Daventry, located in Northamptonshire in the southern English Midlands, operated on 49.8 metres with an output power of 10kW. The antennas, Fig. 1, were an array of horizontal dipoles which gave a horizontal beamwidth of 60° and a vertical beamwidth of 10° in a southerly direction.

A transmission on the Daventry wavelength was selected for the tests as the wingspan of the heavy bombers of the period was about 23 metres, corresponding very closely to a half wavelength, thus ensuring optimum echoes.

On the 25th February, Wilkins loaded his equipment in a small Morris Commercial van, Fig. 2, (euphemistically called "the travelling laboratory"), left the Radio Research Station at Slough accompanied by a driver, a Mr Dyer, and drove to a field near Weedon Bec, some 11km from the BBC transmitting station at Daventry.

On arrival they found a suitably located but rather muddy field which the owner allowed them to use. There they erected the antennas before leaving to find a Hotel.

After dinner they returned to the site to test the equipment on the transmission from GSA, which was due to close at midnight. Only then did they realise that the test had been arranged in such a hurry that they had forgotten that it would be dark when they were setting up the receiver!

Consequently no provision for lighting inside the vehicle had been made. The internal light of the van was not working with the result that the numerous connections had to be made by the light of flickering matches! Despite this, the receiver was brought to life with five minutes of the transmission remaining and Wilkins was just able to make the necessary adjustments in the time available.

When they came to leave the site, Wilkins and Dyer realised to their dismay that, while they had been working, there had been a keen

Fig. 2: The 'travelling laboratory' used for the Daventry tests. (Photo courtesy of Marco, Radar Systems)

Fig. 3: Diagram depicting the antenna set-up and the basis of the 'Daventry' experiment (see text).
frost and the ground had frozen so hard that the van could not be moved. Fortunately, Dyer found a spade in the van tool locker and they were able to dig themselves out and return to their hotel.

The following morning, Watson Watt and the Air Ministry Observer, Mr A.P. Rowe, left London by train, bringing with them Watson Watt’s nephew, Pat for the ride. As, however, he could not be let into the secret, on the route between the railway station and the site, Pat was unceremoniously deposited at the roadside and told to amuse himself for a couple of hours!

Two Dipoles

At the site, Wilkins and Dyer had erected two dipoles and coupled the feeders to a phase shifter. This had then been adjusted to all but null out the transmission from Daventry, leaving just a small residual signal visible on the cathode ray oscillograph (CRO, or oscilloscope) which was being used as the signal strength indicator. Any increase in signal strength would then be due to reflections from the target aircraft (see Fig. 3).

It had been arranged that a Heyford bomber, Fig. 4, from the Royal Aircraft Establishment (RAE) Boscombe Down in Wiltshire, flown by Flight Lieutenant ‘Bobby’ Blucke (who was destined to lead the squadron which four years later would discover the German Knickebein beams) would fly up and down the Daventry ‘beam’ to provide a target. The aircraft arrived on time and immediately the van driver, Mr Dyer was sent to a far corner of the field for he, like Watson Watt’s nephew, was not “in the secret”.

The first approach of the Heyford was too far to the east and no deflection of the CRO display connected to the receiver (Fig. 5) could be seen. The second approach, however, was far nearer the mark and this time a rhythmic beat was seen on the cathode ray tube. As the aircraft flew off to the south, good ‘beats’ were observed and it was estimated that the aircraft had been followed for about 13km.

**Britain Again An Island**

After the ‘beats’ died away from the screen of the cathode ray tube, Watson Watt is reported to have breathed a sigh of relief and then turned to Rowe and said “Britain is again an island”. Watson Watt and A.P. Rowe were elated and immediately rushed back to the railway station.

It was only when they arrived at the station did Watson Watt realise that they had completely forgotten to pick up Pat, his nephew, from where they had left him on the roadside. A rapid retracing of the route was therefore necessary before they could catch their train to London. Arnold Wilkins and Dyer then packed up their equipment and started on their long journey home.

When the success of the experiment was made known to the authorities, it was immediately classified ‘Top Secret’ and £10,000 was allocated for research. As a result of this an experimental site was set up on the Essex coast at Orfordness, the team arriving there on the 13 May.

At the new site, progress was extremely rapid and by the 16th of June the team were able to demonstrate aircraft echoes at a range of 27km. Within a month the range had been doubled and by early 1936, over 160km had been achieved.

During the initial period also, the operational frequency was increased from 6 to 30MHz. The culmination of this work resulted in the Chain Home (CH) radar chain which remained in use until the early 1950s.

**Second World War**

By the outbreak of the Second World War, a chain of 20 radar stations ringed the southern coast of the United Kingdom. Additionally, the first Airborne Interception radar had been installed in RAF aircraft and the first naval radar equipment was being installed.

By modern standards, the CH radar system was crude, slow and inaccurate, but for its time it was a remarkable achievement. Taking only four years from conception to full operational service it revolutionised the principles of air defence and this was just in ‘the nick of time’.

After the war, Adolf Galland, who had overall command of the German attack in 1940 said “The British had from the first an extraordinary advantage, never to be balanced out in the whole war: their radar and fighter control network. It was for us and for our leadership a freely expressed surprise, and at that a very bitter one, that Britain had at its disposal a close-meshed radar system, obviously carried to the very highest level of current technique, which supplied Fighter Command with the most complete basis for direction possible. We had nothing like it”.

There can be no higher praise for a system which had its origins in a muddy field near Weedon Bec on a cold and frosty morning in February 1935.
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Over the past year or so there has been a lot of very interesting articles in this magazine about modern version of some old style antennas. I thought that this time we could go back in time a little and have a look at some of the old favourites that many of the modern designs are based upon.

Certainly one of the most famous wire antennas of all time is the G5RV from Louie Varney of the same G5RV callsign. But what we see today is not what Louie originally designed. His original design is shown in Fig. 1. The original antenna was fed by a link transformer, made up with a variety of turns of different size. The size of the link transformer and number of turns it consisted of, depended on the constructor's choice.

The pair of matching variable capacitors with their centre to ground made this link transformer the equivalent of the modern a.t.u.. The coupling of the link was variable too (see below). This 'a.t.u.' fed the 31m long dipole section from 30012 open wire feeder, which at that time would have been home made. In this case, the antenna would have been at least 1/2 wavelength above ground on the preferred band.

Around in Many Forms

The G5RV antenna has been around in many forms over the years with some modern versions using ribbon feed direct to the rig via a balanced a.t.u. The most widely found commercial versions have ribbon feeder part way from the dipole feed point, then coaxial cable the remainder of the way to the shack. The Windom antenna is another named antenna that was hugely popular some years ago. I well remember my article in the April 1990 issue of *PW*, when I wrote about 'The Windom revisited'. That article provoked comments from as far afield as Nigeria, where one Amateur claimed it was the 'Bees Knees' ...or as our American cousins say 'The cats meow'.

The Windom Antenna, shown in Fig. 2, is named after General Loren G ('Windy') Windom W8GZ who allegedly 'stole' the idea from other amateurs who had used it successfully some time before. However, as is often the case 'He who publishes first - gets the credit'.

The original Windom design used a single wire as the feeder, but with modern electrical appliances spreading rapidly around the world this simple feed soon became a 'balanced' type to help stop the feeder picking up, or creating interference.

We even got a 'Double Windom', Fig. 3, design from DJ2KY where he used two, 'back-to-back' style Windom antennas fed by open wire feeder. The centre point being 3.35m from the feed-point of each wire in the feeder (the diagram shows it better). In this case the 5-band
Early Antenna
Another early antenna name often heard, is Zepp. This antenna, shown in Fig. 4, wasn't named after a person but because the antenna was used successfully by the radio operators in the Zeppelin dirigible airships. The diagram shows the antenna uppermost, but in use with the Zeppelins it would have hung from the airship with the wire trailing from the underside.

To get some idea of the dimensions to use: On the 3.5MHz band try a length of about 42m of wire with 20.75m of open wire feeder. Note that, although the feeder is of the twin-feeder form, only at the transmitter end are both sides connected.

The double Zepp antenna, shown in Fig. 5, is made up of two Zepp antennas attached to each other. Again, for the 3.5MHz band try a top length of 55m, for the 7MHz band, 27.5m and for the 14MHz band the much more manageable 13.5m length.

Long Time
The W3DZZ antenna has been around for a long time and is typical of the 'Trap Antenna' where a trap is fitted to make the antenna resonant on two or more bands. Many verticals and multi-band beam antennas use traps. In this case shown in Fig. 6, the inductance and capacitance making up the trap, are resonant on 7.17MHz, which gives an antenna that can be used on 3.5MHz through to 28MHz. A fellow amateur Alan G4YFP, has used one of these antennas for several years and swears by it.

The W3EDP antenna, Fig. 7, is another fed by open wire feeder and, like the G5RV described earlier, is fed by a link transformer and a variable capacitor. In the case of the W3EDP antenna, we can see the relationship with the feeder link and the band used. With an antenna length of 25.6m, the counterpoise lengths are as shown.

The final antenna of this selection is an antenna of wire box section that has a fair amount of gain over the ever so 'humble dipole'. I'm referring to an antenna called the 'Sterba Curtain', made up from several /2 long sections of wire as shown in Fig. 8, with /4 wave vertical sections. Extra sections can be added as space permits.

You can probably imagine that on 28 or even 500kHz the 'Sterba' antenna can be quite small. Imagine though, a Sterba Curtain antenna for the 1.8MHz band. Now that would be impressive! Note the feed arrangements, one side to the right. The other to the left.

The link transformer method of feeding antennas, is not new, many of our elder statesmen in the hobby used this method to feed their antenna systems. I remember helping with a shack clearance after an elderly G2 became a silent key. His a.t.u. was made on a plank of wood, an elderly, but robust huge variable capacitor and a small coil of wire on an adjustable rod.

The feeder arrangement came into the shack via two plate capacitors on the window (the original 'through glass' feed) and to a larger coil. Moving the smaller coil towards the larger provided the necessary adjustment.

Open Wires
During this article I've made reference to 'open wire' or 'ribbon' feeder. Normally this will refer to ribbon feeder, as there are many commercial versions available through various sources in the UK and elsewhere. In general use, the twin feeder commonly used, may have a characteristic impedance of 300Ω or even higher impedance (400 and 600Ω are common commercial values found).

Open wire feeder is more often a home-brew version but that doesn't mean it less useful or efficient. Remember that, in amateur circles, coaxial cable didn't appear in any quantity until after the Second World War and, before that time Radio Amateurs used what they could make easily, which was very often just open wire feeder.

Open wire feeder may be made up of a parallel run of two length of any type of wire kept apart by spreaders. Commercial spreaders are available these days, but I have seen many methods used to keep the wire apart.

I've seen separators made from the plastic rings, cut from old plastic bottles to hand carved wooden spreaders that were works of art. The source of the material doesn't matter.

When making spacers, use whatever insulated material you have available. Use enough of them to maintain the spread and stop the wires touching. The impedance will vary according to the wire you select and the spacing, but I've seen and used separations distances of up to 100mm with success.

So, that's it. Get out there into the garden, and try one of these oldies, you may be surprised at how well they work when compared to a modern computer-designed antenna.

Practical Wireless, April 1998
Radio Amateurs are competitive, make no mistake about it, we all want to be the best, we want to be first to work the rare DX and we don't mind climbing all over our fellow enthusiasts in order to do it! In order to satisfy our needs to excel, we organise contests, draw up lists and use different frequencies, some of which are totally unsuitable for the task in hand.

Inevitably, it's the 'big guns' who succeed most often, their high power and large antenna systems working to their advantage, but every now and again, the little station will do something unexpected and gain grudging recognition by the rest of us, secretly jealous that we weren't first or that we didn't work as far as the next man. The satisfying thing about succeeding is that the contact is often publicised in the amateur press so that everyone can read and share the joy of the person who made that all important contact.

First & Furthest

Over a number of years I have been collating 'Firsts' and 'Furthest' claims on the frequencies of 50MHz (6 metres) and above and although I am well aware that my records are far from complete, I have found that UK radio amateurs have displayed an enthusiasm for the hobby that shows no sign of abating. There are many firsts which have yet to be claimed and the 'furthest' is merely an arbitrary figure just begging to be beaten!

My sources of information have come from magazines, direct information over the air and from correspondence. I have accepted these claims without any proof in the belief that if someone says something is true then it is.

I have no doubt that what I say may be disputed. Some will say 'I did that first, not him', this being the case, please let me know...
in order that I may modify my records, (which, incidentally, I collate on behalf of the Radio Society of Great Britain).

Now let me get down to the odd facts that I have found, what might term the 'did you know corner?' The 50MHz band is comparatively new, but for many years before it was open to all, certain amateurs had special licences to operate on it. It was on the 5th November 1947 that G6DH worked W1HDQ for the first trans-Atlantic 50MHz contact.

It is another fact that the 'claimed' distance record for the 50MHz band is a staggering 17239km between GJ4JCD and VK2FHL in a contact made on the 14 October 1991. This can be beaten as the equatorial circumference of the earth is 40,075.9km, so a distance of more than 20000km is possible. But to where I know not. As far as I can ascertain, the first inter-G QSO on 50MHz was made in 1958 between G4LX and G2BDO, whilst G5BY worked ZS7P on the 1 April 1948 - definitely not a joke.

The frequency 58.5MHz was in use just after the Second World War and before TV closed it down, this band produced good contacts. I was interested to learn that G5MO worked H1RA, GW6OK and F3JB on the 19th May 1946, the band was in use up to 1948. The 70MHz band was granted to UK amateurs on the 1 November 1956 (but not if you lived near Jodrell Bank!) and became very popular, with amateurs sitting on 70.260MHz night after night waiting to 'hi-jack' the unwary newcomer to the band.

On the 2nd November 1956 G5KW worked G8KW, perhaps the first recorded 70MHz (4m) QSO, the problem with this band is its restricted use by other countries, but certainly CT1, FA (Algeria), TF, 5B4, ZB, CN, PX (Andorra), EI and HB9 as well as the UK countries have been worked at various times. Distance has never been a problem, just lack of countries, but in May 1960 G5MR worked CN8MG at 2061km and in June 1981 GW4ASR/P worked 5B4AA over a distance of 3471km.

Favourite VHF Band

So, how about the 144MHz (2m) band, the favourite v.h.f. band I think. This band was granted to Radio Amateurs on the 1 September 1948 and not because of pressure by Class B licensees as I was once informed!

The first QSO apparently took place at 0015 on the 19th May between G6VX and G2XC and six days after the band was granted G2AJ/P worked G5MQ/A over a distance of 225km and since that time the distance achieved on 144MHz has increased enormously.

In March 1952 G5UF worked SM6ANR over a path of 1210km, G3DAO had a QSO with LZ2FA of 2172km in June 1974, while in September 1981 GD6EXI worked EA8XS over a sea path of 3025km. This distance had been exceeded three months earlier when G3VYF grabbed a first and furthest with a 3540km QSO with 4X41X.

Impressive as these distances appear, they do not compare with a 4000+km QSO between EA8XS and TF6IG in August 1981 or a contact between W6NLZ and KH6UK in July 1957 over 4186km. Even these records have been beaten by trans-equatorial propagation (t.e.p.) contacts such as the one between ZS6DN and SV1DH in February 1979 over a path of 7100km and two weeks later a contact between 4EAT and ZS3B over 7450km. (You will note that I haven't included contacts by satellite, man-made or artificial in this article).

Records on 430MHz

My 430MHz (70cm) records are woefully lacking in content, it would appear that the 432MHz exponents are bashful about their deeds, or perhaps they think it's all been done before! However, I do know that G2FKZ worked G3CU on the 30 October 1948, just two months after the band was allocated for Amateur use. The distance worked was 2km, I know this sounds miniscule and that you can shout the distance, but it was, at the time, the leading edge of electronic experimentation, and these amateurs were showing us all what to do.

Some 11 years later in June 1959 G3KEQ worked the well known v.h.f. exponent SM6ANR over a distance of 1047km. The present claimed UK distance record is 2884km between GW3KJV (Pat himself of course, being modest! Editor) and EA8ACW on a sea path on the 10th September 1988. I fail to see why this has not been exceeded, I'm sure it has, and I'd love to hear from whom and when. The distance has been exceeded on a number of occasions by contacts of 3982km between W6 and KH6, again on a sea path.

Going Up

Going up the frequency to the 1296MHz (23cm) band has produced little information from Amateurs, but I do have a record of G6CW working G8DD on the 17 November 1949. The distance claimed was 7.2km.

Some 36 years later in June 1985 G6LEU in Cornwall using 4 x 23 element Yagis and 10W of 'power-out' had a QSO with Salva EA8XS who was also using 10W fed into a dish antenna. This QSO over a sea path of 2620km and started on 144MHz, moved up to 430MHz, and then again moved to 1296MHz for a great record. It just shows what can be done if the conditions are favourable for maritime ducting.

The 13cm or 2.3GHz band is too high for me, but not for G8IH and G3BGN who on the 6 June 1948 made a contact over a distance of 3.5km. I suppose magnetrons or klystrons were used. The thought of a gunn diode had not yet germinated.

Some four months later in October 1948 G8IH now/P worked G3CBN over a path of...
39km, imagine, 13cm in 1948 from a portable location. I wonder how wide the carrier frequency was?

As the years passed, the expertise widened and in 1972 the well known u.h.f. exponent G3LQE using 1W to a dish antenna worked PA0DBQ over a distance of 224km. Two years later in January 1974, now with 15W to a dish, he worked DJ2HF/P over 400km.

In October 1982 G4BTV using 15W generated by a 2C39 tube, 2 x NGF1402 front-end receiver and a 6in dish worked OK1AIY/P over 1028km. This was exceeded by G0VHF/P in October 1995 when this contest station contacted OE3EFS/3 over a distance of 1100km.

Records for 3.4GHz are hard to find unless you are one of the select few who use this frequency. However, I do know that in October 1995 G8IFT/P worked DF0RB over a distance of 825km, no mean feat!

Oddly enough, there is more information on the next band 5.6GHz (6cm), although I have no early history, (perhaps someone would enlighten me) it would be a shame to lose the exploits of the pioneers of amateur radio in the u.h.f. field. However, in July 1974 G3YLV worked GU3JWJ, a distance of 113km.

Some 20 years later in October 1994, G3FYX jointly with G3JMY worked SM6ESG, the distance being 1137km which had been beaten two days earlier by G4BCH when he worked SM6HYG over a distance of 1178km. Again, sea ducting making long distance contacts possible. This theory of sea ducting being borne out by the fact that distances of 3982km have been made on this frequency between W6 and KH6.

Going up another band to 10GHz (3cm), the records are poor, which is surprising considering how popular the band is. The first record I can find is a QSO between G3LZ and G3BAK on the 20th January 1950, this is reported to be the first 10GHz QSO in the UK and the distance was just a few kilometres.

How technology has changed! I say this because during the October 1995 contest G0VHF/P worked over a path of 1185km to OE4MDA/1. The claimed world record was 1191km achieved by VK5KZ with a VK6 in January 1995, but on the 14 January 1997 G3GNR worked SM6ESG over a distance of 1275km path.

The Esoteric Bands

Now we come to the esoteric bands. On the 24GHz band in August 1974 G3BNL worked G3EEE over a distance of 74km from Cleve Hill to Cleve Hill in Shropshire. Imagine the planning and dedication that must have gone into setting-up these two stations and the satisfaction of having achieved what they set out to do! Another u.h.f. expert G4DJK worked PA0EZ in June 1995, the distance being 268km, beating the claimed record of 208km worked by OZ2DBN with OZ1UM in June 1993. This distance was exceeded by G4KGC who worked PA0EZ over a path of 391km on the 14 January 1997.

Up again now to 47GHz and there's just two mentions for the UK. Two well known amateurs G3HBR and G3HBW worked over 13km on the 21 August 1991 whilst in 1993 OZ2DBN with OZ1UM over 208km, beating the then world record of 166km set up by HB9MIN with HB9MIO in 1992. The UK record of 41km was achieved on the 14 December 1996 when G4KNZ/P worked G3FYX/P.

I have no 76GHz record for the UK but the Danish challenge of OZ2DBN and OZ1UM worked over a path of 8.8km in June 1993, using 5W and 25cm dishes.

Finally, 147GHz, again no UK mention, but on the Continent on the 9 June 1993, DF6NT/DF9LN worked OZ9ZI/DJ5HN over open water having several QSOs, the longest being 3.1km, each station using 5W of power. Even this was exceeded in January 1995, when OZ2DI worked OZ1UM over 11km using a talk back frequency of 47GHz!

Radio Achievements

There you have it, a potted history of v.h.f. and u.h.f. radio achievements, the first and the furthest, but are they? As the years go by we lose more and more of the original experimenters, often without knowing what they achieved.

Every month I look in the radio magazines and see silent key sales with transceivers and associated gear for sale, but what happens to their log books, QSL cards, the important parts of their stations, and as far as we are concerned, the important part of our history? I fear that these valuable documents are thrown on the back of fires or binned, a situation which is deplorable.

To my mind, a log book showing contacts made over 50 years ago is far more valuable than a commercial piece of electronics, which is only as good as its operator. So, if anyone is looking after such a sale feels inclined to throw away a logbook or QSL cards, please throw them in my direction.

Also, please remember that my records are only as good as the information received, if you think you have a first or furthest please get in touch. I will be delighted to hear from you and update the history of our hobby.

... a log book showing contacts made over 50 years ago is far more valuable ...
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unusual
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Isles!

GJ3RTE/P
Jim
Maîtresse Ile, Les Minquiers, Jersey
IOTA EU-099

GJ3SWH/P
Phil

im Kellaway G3RTE and I first started talking about a joint IOTA expedition in mid-1995, shortly after Jim had returned from his trip to Rathlin Island (EU-122). We both had various projects in mind, but it was not until we met at the 1995 RSGB HF Convention that we agreed to do 'something' together in 1996.

Jim had taken a holiday in Jersey in 1995 and whilst there had made some useful contacts whilst investigating the possibility of an expedition to Les Minquiers. Les Minquiers are a group of islands and rocks about 18km south of St Helier. Commonly known as 'The Minkies' by Jerseymen, there is only one habitable island, Maîtresse Ile, which is about 200m long by 50m wide at high tide.

Island Ownership
There has been a long standing Anglo-French dispute concerning ownership of the islands originating in 933AD, when William the Conqueror extended his rule to the Channel Islands. Although they have been administered by Jersey for many decades, in the years following the Second World War, the dispute was revived and became important as sovereignty of the islands determines the allocation of rights to the economic development (specifically petroleum) of the continental shelf. As a result of a non-contentious hearing in November 1953, the International Court of Justice in The Hague found in Britain's favour. The same case allocated Les Iles Chausey to the French. These events are immortalised in Nancy Mitford's hilarious novel of the period, Don't Tell Alfred.

Although Les Minquiers count as Jersey (GJ) for DXCC purposes, the total geographical area covered exceeds 130 square kilometres. They therefore count separately from Jersey for IOTA purposes, having been allocated the reference number of EU-099. There have been several previous operations from the islands, the most recent being by G302F and G4JVG in the 1994 IOTA Contest. Another expedition thus seemed timely.

Although neither of us are WAB Square chasers, we do recognise that many people are. Enquiries on the BBS and PacketCluster system brought a general consensus that the Channel Islands do not count for WAB. One person suggested that the islands were in TV41 Square, which proved totally incorrect. Another helpful soul gave me the reference of my home QTH! When we got to the island, the correct reference of WV84 was provided by a Jersey amateur.

Jim had made contact with the owner of a small boat who also owns a cottage on the island. He agreed to transport us to and from the island and to make his cottage, with cooking and sleeping facilities, available to us. Jim also negotiated the use of the Customs House. We thus had two habitable buildings available and set about planning our operation.

It was our intention to run two stations simultaneously, one on s.s.b. using the callsign GJ3RTE/P and one on c.w. using the callsign GJ3SWH/P. To minimise mutual interference, we needed two generators and the maximum spacing between antennas which could be achieved. We believed computerised logging to be essential.

Weekend Decided
We decided upon the weekend of 29/30th June as good weather was likely and it avoided major contests. After many 'phone calls and letters, I met Jim at his brother's house near Crewkerne on the evening of Thursday 27th June. My car was already full of equipment, we added his to it and set off for Weymouth to catch the 11.30pm sailing of the MV Havalet, arriving in St Helier at 7.30am on the Friday.

On arrival, we were met by Frank Lawrence, the skipper of the Barbarella B, which was to take us to the island. Frank is a Jerseyman from a family of five generations, standing, a retired Master Mariner and until recently responsible for training the Jersey Harbour Pilots. We could not have been in better hands.

The Barbarella B is a diesel driven, 20 foot cabin cruiser which can carry up to 10 passengers. Maurice, (his crew!) used to be a senior Jersey policeman before retiring.

The boat was moored at the Jersey marina and Frank kindly organised parking space for my car within the compound. We made a quick trip into town to collect the keys to the Customs House and to buy final food, water and petrol stocks. We then loaded all our equipment, plus a generator of Frank's onto the Barbarella B and set off for the island at about 0930.

Plotting Our Course
The sea was calm, the sun shone and I had great fun plotting our course on the GPS display unit. We made good time, arriving after about 1 1/2 hours sailing. At low tide, there is a naturally sheltered harbour formed by the surrounding rocks and we moored to a buoy within it. Our position was: lat. 48° 58' N, long. 02° 03' W.

There are four or five buildings in a good

Practical Wireless, April 1998
The state of repair, a few ruins, a concrete slipway, a helicopter landing pad and a 10m flagpole. The communal toilet has the doubtful distinction of being the most southerly building in the British Isles!

We had to transfer all the equipment from the *Barbarella B* to shore using an inflatable ‘Zodiac’ rubber dinghy. This was achieved without mishap in four or five trips. I was first ashore and started to manhandle it to the top of the slipway.

The island is home to many species of birds. Great black backed gulls, such as Cormorants, Oystercatchers, Turnstones and several other species. It was the end of the breeding season, and Maurice warned us that many had chicks, as they can sometimes be quite aggressive when protecting them.

The first task was to run up the States of Jersey flag, which flew all the time we were on the island. Following a recent series of thefts and vandalism, all the habitable buildings are heavily shuttered, and the next job was to remove the shutters and let in some daylight.

Frank’s cottage is very well appointed. It’s equipped with a table, easy chairs, double bed, gas stove, fireplace and a simple electrical installation powered by Frank’s own generator.

After showing us the various facilities, Frank and Maurice re-boarded the *Barbarella B* and set off back for St Helier, promising to return on Monday morning. By mutual agreement, Jim set up his station in Frank’s house and I set-up mine in the Customs House, which had a table, chair and four bunk beds.

Perfect Support

The flagpole at the north end of the island was the perfect support for my multi-band wire dipoles, even though it was about 75m away. I had brought a drum of UR-M70 coaxial cable which was quickly run out. When rigged as inverted ‘vees’, the centres of the dipoles were about 25 metres above sea level at low tide, with a clear take off over 360°.

Jim put up a 20m ground plane at the south end of the Island and used sloping dipoles on 7 and 3.5MHz. Experiments proved that we could operate simultaneously on 14MHz, Jim on 14260kHz and me on about 14015kHz.

We both made our first QSOs about 1315UTC on Friday 28 June. Operating from separate buildings with different generators was a great success. We were each able to vary our operating times without upsetting the sleep pattern of the other.

I laid out my sleeping bag on an old mattress in one of the bunks in the Customs House, and Jim laid his out in Frank’s cottage. However, apart from cooking and eating times we saw very little of each other!

Number Equal

The s.s.b. station proved to be the more popular, although the final numbers of QSOs were almost equal. We gained the impression that those working the s.s.b. station were mostly interested in IOTA, whereas those working the c.w. station were mainly interested in DXCC. As far as we have been able to confirm, this was the first operation from Les Minquiers to use the WARC bands.

Our last QSO was at 0635UTC on 1st July, after which we started to dismantle the stations and pack up ready to leave. The wind had increased overnight and was blowing at about force 4-5 from the north-west.

Frank and Maurice arrived at about 9.30am, just before low tide. They very obviously wanted to get loaded and back to Jersey as soon as possible. The sea outside the little harbour was really quite rough, with white-capped waves.

We again used the ‘Zodiac’ to transfer the gear to the *Barbarella B* without mishap. Once aboard, we securely stowed it below and set off back to St. Helier.

Uncomfortable Trip

The one and a half hour trip was very uncomfortable as the poor *Barbarella B* was tossed around in some quite heavy seas and Frank was kept very busy keeping us on course. Jim and I stood on the afterdeck and hung on to whatever piece of superstructure we could find. Nobody disgraced themselves by being sick, I’m pleased to say!

On arrival back at the marina, Frank arranged access for us to use the shower facilities as by then we were in desperate need of refreshing ourselves. Much refreshed, we spent a very pleasant day exploring Jersey before taking the evening ferry back to Weymouth.

I dropped Jim back at his brother’s house and drove home from there. We were both very tired but reasonably pleased with our efforts, having made over 5200 QSOs from the island.

Full colour QSL cards have been printed. I am handling the QSL chores for both call signs, and will respond to either direct (I’m QTHR in any callbook since 1970) or bureau requests.

Our special thanks must go to our XYLs, Cheryl and Jan for allowing us to go, to Frank Lawrence and Maurice for safely getting us there and back, and for the use of the cottages. And to Neville Cheadle G3NUG for the loan of the FT-900AT, without whom this operation would not have been possible!

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---

**Partial List of Contributors**

- Frank Lawrence
- Maurice Lawrence
- Jim Kellaway
- Phil Cheadle
- Cheryl
- Jan

**Practical Wireless, April 1998**
The Rev. George Dobbs G3RJV describes his ‘Utility Transmitter’, an easy-to-build c.w. transmitter with several band options. And of course — he hasn’t forgotten the appropriate quotation!

"... let use be preferred before uniformity, except where both may be had"  
Francis Bacon (1561 - 1626)

I like standard little circuits which can be easily duplicated and perform to order but the usual problem is that most of them are limited in their application. How much better it is to have a circuit which is uniform and widely useable. As Bacon suggested ...

"uniformity and usefulness are a good mix".

In 1977 the late Doug Demaw W1FB and Wes Hayward W7Z01 described a universal transmitter board in their book, Solid State Design for the Radio Amateur. This was a two stage crystal controlled transmitter which, by the changing of some components, could be used on a variety of bands.

Over the years I have built the ‘universal’ circuit a number of times. It has always performed well, without any problems.

Recently I thought that the circuit’s usefulness could be improved by bringing it up-to-date. With a few changes it could be even more universal.

Table 1: Transmitter components that change depending on the band in use.

<table>
<thead>
<tr>
<th>Band (MHz)</th>
<th>C2* (pF)</th>
<th>C3 (pF)</th>
<th>C4 (pF)</th>
<th>R1 (Ω)</th>
<th>RFC (μH)</th>
<th>T1 (turns)</th>
<th>T1a (turns)</th>
<th>Core</th>
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<tbody>
<tr>
<td>3.5</td>
<td>120</td>
<td>100</td>
<td>220</td>
<td>39</td>
<td>25</td>
<td>43</td>
<td>6</td>
<td>T50-2</td>
</tr>
<tr>
<td>7.0</td>
<td>120</td>
<td>100</td>
<td>None</td>
<td>39</td>
<td>15</td>
<td>35</td>
<td>4</td>
<td>T50-2</td>
</tr>
<tr>
<td>10.1</td>
<td>60</td>
<td>47</td>
<td>None</td>
<td>47</td>
<td>15</td>
<td>35</td>
<td>4</td>
<td>T50-6</td>
</tr>
<tr>
<td>14.0</td>
<td>60</td>
<td>33</td>
<td>None</td>
<td>47</td>
<td>15</td>
<td>27</td>
<td>4</td>
<td>T50-6</td>
</tr>
</tbody>
</table>

* Murata 5mm Ceramic Trimmers 1120p - Black, 60p - Brown

Variable Crystal Oscillator

In the version I’m describing here the crystal controlled oscillator is converted to variable crystal oscillator control (VXO). Additionally, there’s an option to obtain a wide VXO ‘swing’.

The original lowpass filter was a simple 3-element, Pi type, filter. However, even with only about 1W of output, this hardly provides enough harmonic suppression to make it legal within the licence requirements. So, I have added a 7-element filter based on the W3QN values for standard values of capacitance.

The original circuit did not indicate how to use the transmitter in conjunction with a receiver. Fortunately though it’s easy enough to provide a changeover switch or a semi break-in system using a d.c. switched relay (but full break-in is a better option).

I have added the break-in circuit based upon the W7EL circuit used in his ‘Optimised Transceiver’ (QST for August 1980). This circuit has re-appeared in countless other transceiver designs. I have called the finished design the Utility Transmitter - a useful and easy-to-build transmitter board for a range of bands.

Final Circuit

The final circuit of the Utility Transmitter is shown in Fig. 1. The transmitter uses a crystal controlled oscillator feeding a bipolar transistor power amplifier.

In my design the crystal oscillator has the facility to shift the frequency of the crystal and has a tuned output for the band in use. The oscillator is keyed which is useful because there is no r.f. output at all during the receive mode.

A whole variety of npn transistors may be

Table 2: The seven pole low-pass filters, using the W3QN values, reduce harmonic output significantly.

<table>
<thead>
<tr>
<th>Band (MHz)</th>
<th>C0, 12 (pF)</th>
<th>C10, 11 (pF)</th>
<th>L2, 4 (μH)</th>
<th>L3 (μH)</th>
<th>Core (type)</th>
<th>Wire (mm)</th>
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</thead>
<tbody>
<tr>
<td>3.5</td>
<td>470</td>
<td>1200</td>
<td>25</td>
<td>27</td>
<td>T37-6</td>
<td>0.375</td>
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<tr>
<td>7.0</td>
<td>270</td>
<td>680</td>
<td>19</td>
<td>21</td>
<td>T37-6</td>
<td>0.45</td>
</tr>
<tr>
<td>10.1</td>
<td>270</td>
<td>560</td>
<td>19</td>
<td>20</td>
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<td>0.45</td>
</tr>
<tr>
<td>14.0</td>
<td>180</td>
<td>390</td>
<td>16</td>
<td>17</td>
<td>T37-6</td>
<td>0.56</td>
</tr>
</tbody>
</table>

Note: Wire size is not critical. Wind the turns to fill 75% of the core circumference.

...
used for the oscillator, Tr1. My prototypes used the 2N2222A, although I have had similar results with both the BC182 and the BC183. Any junk box transistor with similar properties will probably do the job.

The crystal used, must be operated in the fundamental mode. The values for C2 and C3 and the tuned circuit in the collector vary according to band (see tables).

The output from the oscillator tuned circuit forms an r.f. voltage across R5 and drives the power amplifier transistor, Tr2, into Class C. The resistor R5 and the radio frequency choke (RFC) in the amplifier collector vary according to band.

Since the output from the power amplifier (p.a.) is about 1W, the impedance presented to the collector is near enough to 50Ω. This output from the power amplifier is coupled via a capacitor, C8, to the low-pass filter.

As the amplifier is operating in Class C, the output is rich in harmonic content which could cause problems. The seven-element lowpass filter effectively attenuates them and all the examples I built the harmonics were all at least 40dB down after the low-pass filter.

Change-over Circuit

The change-over circuit takes the receiver input from the antenna via the low-pass filter, adding a little more input filtering to the receiver. This input is taken through C13 and C14 via L5 to the receiver. When transmitting, 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. The capacitor C14 is adjusted for best results with the receiver.

You’ll finally end up with a small transmitter board with complete break-in. The operator simply plugs in the antenna and the receiver and keys the transmitter.

It may be that the receiver will require some extra muting if its automatic gain control (a.g.c.) cannot deal with the considerable (even at QRP levels) r.f. input. This may be possible with some receivers but I just turn down the audio gain control.

The result is a ‘plug in and play’ transmitter that can offer an easy option to get on to a range of bands with a 1W signal. My first prototype was built for 14MHz and I worked seven countries in the first two days of use. You could do the same!

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Table 3: The components, making up the receiver interface, also change depending on the band used.

Table 4: To make up the VXCO circuit, use either the combination of fixed L1/C2 or the system suggested by DJ1ZB using two close coupled inductors for L1.

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<td>GPS 38</td>
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<tr>
<td>GPS 12</td>
<td>£169.99</td>
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<td>GPS MAP 220</td>
<td>£Call</td>
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<tr>
<td>GPS III new</td>
<td>£Call</td>
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<td>SSB and CW external filter</td>
<td>£15.90</td>
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<td>A69</td>
<td>Kit Antenna Selector/Isolator</td>
<td>£37.90</td>
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<tr>
<td>CS4</td>
<td>Internal SSB &amp; CW Filter for our Kits</td>
<td>£15.90</td>
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<tr>
<td>DC52</td>
<td>“S” Meter for direct conversion kits</td>
<td>£19.90</td>
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<tr>
<td>DM24</td>
<td>Crystal Calibrator to link to our AT160</td>
<td>£14.90</td>
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<tr>
<td>DF04</td>
<td>Add-on Digital Realdata for ssb/cw</td>
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**TRANSMITTERS**

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<th>Description</th>
<th>Price</th>
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<td>20W AM/SSB/CW/RTTY</td>
<td>£39.90</td>
</tr>
<tr>
<td>TX2000</td>
<td>5W CW, plug-in kit</td>
<td>£24.90</td>
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<tr>
<td>LN2000</td>
<td>Links the above transmitters to DC200</td>
<td>£16.30</td>
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For a businessman, the nearest thing to being given a licence to print money is to be awarded an open-ended Government contract. And it was in this agreeable sort of financial climate that the mass-production of valves began in this country.

I've already mentioned previously, how, in the First World War, once the Generals had discovered that the 'new-fangled' wireless could assist them in slaughtering as many of the opposing forces as possible, they demanded more and more radio equipment. This in turn called for huge quantities of valves.

The obvious candidates for valve manufacturing contracts were firms already possessing the necessary glassware and vacuum pumping techniques. These included of course firms such as electric light bulb manufacturers.

Included in the list were the Edison-Swan Electric Light Co. (Ediswan), the British Thomson-Houston Co. (BT-H.), The General Electric Co. (GE) which used the trade name Osram, The Metropolitan-Vickers Co. (Metrovick) and the Z Electric Lamp Co. (ZELC). These included of course firms such as electric light bulb manufacturers.

The answer to the challenge was the setting up of the British Radio Valve Manufacturers' Association (BVA) in 1924 as a fully-fledged 'trade union' with an imposing sounding policy. This was stated as being to: "...promote, encourage, foster develop and protect the manufacturers of Thermionic Valves and to impose such conditions on the conduct of the Trade as in the opinion of the Association may be conducive to that object".

In his book *Saga of the Vacuum Tube* the American writer Gerald F. J. Tyne commented wryly that: "the list of beneficiaries should have been reversed to show the true order of priorities". The original members of the BVA were BT-H, A.C. Cossor Ltd., Ediswan, GEC, MWT and Mullard Radio Valve Co., plus three other small concerns, Burndept Wireless Ltd., Cleartron Radio Ltd. and Electron Ltd. Burndept in 1926 was a company with a bright future behind it. Once powerful, it had been one of the founder members of the *British Broadcasting Company* but was already 'on the skids' and would last only another twelve months.

Cleartron was a wholly-owned subsidiary of the American Clarion Vacuum Tube Co. This concern simply imported most of its stocks from its parent although it did produce a small number over here, presumably to justify its being included in a British association. In any case, it appears to have faded away only a year later.

Electron was making valves at a plant near Ealing and selling them under the brand name 'Six-Sixty'. But in the same year as the formation of the BVA it ceased manufacture and started to buy in from Mullard.

Two years later Mullard took the Electron company over altogether. Despite this fact, it would never have been guessed by the public from Six-Sixty's...
advertisements: "...no valves on the market today...can boast of a longer life..." was a masterpiece of ambiguity.

Metrovick, with its Cosmos valve range was the only major firm outside the BVA on its formation but joined a month later and promptly upped its prices to BVA levels. It was also wholesaling valves to two other firms for resale under their brand names, which was against BVA rules but was allowed to carry on doing so for another year or so.

In any case, Metrovick's days were also limited. In 1928 it merged with BT-H and Ediswan to form Associated Electrical Industries (AEI), when the Cosmos production lines were taken over by Ediswan.

**Numbers Reduced**

The number of players in the lucrative valve game were beginning to be reduced most satisfactorily from the point of view of the BVA. In 1928 GEC sold its interest in A.C. Cossor to M-OV, which resulted in the latter firm obtaining a seat on the Cossor board and a useful ear for new developments at its Highbury works.

The following year MWT, strapped for cash, sold its domestic receiver subsidiary, Marconiphone, plus its half-share of M-OV to The Gramophone Company (better known as HMV) which was itself owned by the Radio Corporation of America (RCA).

Then RCA brokered a merger between HMV and the Columbia Gramophone Co. in 1931 as Electric and Musical Industries (EMI). This concern then started large scale production of radio receivers using, of course, Osram valves obtained from M-OV at advantageous prices. Neither did it do RCA any harm to have access to valve developments at M-OV and, indirectly, to those at A.C. Cossor.

**Another Independent**

Meanwhile another 'independent' valve name had arrived on the scene. This was Lissen, a name already being used by a firm set up in 1923 to exploit the radio home construction market.

In 1928 Lissen was bought by the Ever-Ready battery concern and the sale of valves was announced. Initially these were obsolete Ediswan and BT-H types, bought in and re-based. When supplies of these ran outEver-Ready turned to manufacturers on the Continent.

Eventually, in 1935, Ever-Ready bought the SixtyValve Co. from Mullard. They scrapped its name but continued to buy in valves from its previous owner to be sold under the Ever-Ready banner.

Not surprisingly, Ever-Ready valves were to be found in Ever-Ready receivers and also those sold under the name of Lissen. Little wonder that by this time the hapless British valve buyer had but little idea of whose products they were really purchasing, but if they read American magazines they might well have wondered why valve prices 'over there' were a fraction of those 'over here'!

Another nominally independent valve maker was Standard Telephones and Cables, Ltd. (STC). This was in fact a larger reincarnation of the old Western Electric Co.

In the early 1920s Western Electric produced the first true miniature valves. They were sold here in the UK under the firm's own name (STC after 1925) and also by Mullard under the name "Wescovale".

For some years STC flirted in an 'on and off' fashion with domestic valve manufacturers before finally getting down to business in earnest in 1932 with the brand name 'Micromesh'. Two years later this was changed to 'Brimar', an acronym for British Made American Range and STC duly became a member of the BVA.

**Old Established**

The old-established electrical manufacturer Ferranti Ltd. commenced making valves in 1932 and immediately signed up to the BVA. Curiously enough, it was not until this year that Philips, which owned Mullard, was admitted to the BVA as a manufacturer under its own name.

The radio set manufacturer E. K. Cole, made non-BVA valves between about 1935 and 1938. But these were used exclusively in the firm's own products and not sold to the public.

The only significant competition to the BVA came from British Tungsram. This was a subsidiary of a large firm based in Hungary whence valve components were sent to this country for assembly at plant in London.

Another company - The High Vacuum Valve Co. (Hivac), was known chiefly for its miniature valves and the multi-purpose Harries valve. Both British Tungsram and Hivac gained a certain share of the market but in general by the mid-1930s the vast majority of valves sold in this country were done so under the price-fixing and other agreements of the BVA.

Just how effective and lucrative the agreements were is demonstrated by the famous '88' receiver sold just before the Second World War by the London mail order store of Barker, Ltd. This complete eight-valve - using non-BVA imports - set sold for eight guineas, far below what the valves alone would have cost from BVA sources!

**Second World War**

With the coming of the Second World War and the resumption of Government contracts, plus the cessation of imports, BVA members must have felt that heaven on earth had arrived! However, Britain's precarious financial position after the war largely ruled out the resumption of valve imports...but just in case Philips bought out British Tungsram in 1952.

After 30 years, the bubble finally burst in 1956. This was when the Board of Trade's Monopolies and Restrictive Practices Commission, set up especially for the job, filed a damning report on the BVA.

The report was followed by a general shake-up of the valve industry in which amalgamations, take-overs and re-branding abounded. And you might ask - Did it make much difference to the price of valves though? And in reply I can say that's a different story for me to tell you later!
**VHF REPORT**

REPORTS & INFORMATION BY SATURDAY 28TH FEBRUARY.

- **David Butler G4ASR**, YEW TREE COTTAGE, LOWER MAESCEDD, HEREFORDSHIRE HR2 0HP.
- **Tel:** (01873) 860679.
- **E-mail:** davebuo@ndh1l1.agw.bt.co.uk
- **Packet radio:** @ G87MAD
- **UK DX Cluster:** @ G87DXC

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**THIS MONTH DAVID BUTLER G4ASR HAS REPORTS OF RECENT METEOR SHOWER ACTIVITY AND THE RETURN OF F2-LAYER PROPAGATION ON THE 50MHz BAND.**

Replace the text with the content of the image. The text reads:

A short spell of activity during the Quadrantids meteor shower in early January was the period was devoid of any significant propagation events. The Ascension Island beacon ZD8VF (50.012MHz) was heard very weakly in Jersey at 0030UTC on January 9 and there was a small sporadic-E (S-E) opening around 1300UTC on January 11 when the station of CT1DXY heard G1VHH (I093) and G4VDP (I092).

**METEOR SHOWERS**

Although the Quadrantids meteor stream is classed as a major shower, this annual event is still relatively short-lived. In practical terms, it’s only usable between January 2-4 with the peak occurring this year on Saturday January 3 between 1230-1350UTC. Because the peak is very short, (usually less than three hours and difficult to predict), making schedules can be a hit and miss affair.

At my QTH (I091) I had arranged two scheduled contacts (both arranged via E-mail incidentally) with the stations of ES2RJ (K029) and IK7UXY (I909). My first sked was on the 144MHz band with ES2RJ between 0400-0500UTC on January 4, the morning after the peak of the shower. Unfortunately, nothing was heard both-ways over the 1913km path.

My next schedule, also on the 144MHz band, was another one hour long test between 0500-0600UTC with IK7UXY. The distance for this attempt was 2093km and although brief signals were heard at both ends of the path the contact could not be completed. At my QTH I received three bursts of high speed c.w. containing both our callsigns but no signal reports. I also received 16 very short duration ‘pings’ containing no decipherable information at all. At the QTH of UK7UXY only three pings of approximately 0.1 second duration were received.

One technique of extracting as much information as possible from the transitory bursts of information via meteor scatter (m.s.) is to increase the transmitted c.w. speed. In Europe it’s conventional practice to use c.w. at speeds of between 1500 - 2000 letters per minute (l.p.m.), equating to 300 - 400 words per minute (w.p.m.). However, with the introduction of the DF7KF Digital Tape Recorder (the d.t.r. is shown in the photograph, Fig.1) or by using computer processing with a built-in sound card it’s possible to significantly increase the throughput of information.

Surprisingly, high speed meteor scatter (h.s.m.s.) in North America (NA) has only recently started to take-off in the last 12 months. Before that there was very little c.w. meteor scatter activity, unlike Europe where this technology has been established for over 25 years.

Because stations in NA are new to h.s.m.s. they are using the very latest PC processing techniques unlike Europe where multi-speed tape recorders have been the norm, especially in eastern Europe and the ex-Russians Republics.

Using specialist m.s. software a few USA operators have been pushing back the barriers and on January 30 the stations of W8WN and KCOU1 set a new speed record of 16,5001.p.m. (3300w.p.m.). At this speed you can receive 273 letters (55 words) in one second.

More importantly a ping of say 0.1 second will contain 27 letters or approximately five words. Thus it’s now possible to receive both callsigns and reports (G4ASR, IK7UXY, K6R26, K6R26, G4ASR) within a time frame that previously would have been impossible to decode with a tape recorder or even the d.t.r.

What this means in reality is that you can now make contact with stations with high power over far greater distances than were normally thought possible. Paths of over 2000km always produce weaker signals with more short duration pings than bursts. Similarly you could also use lower transmit powers over medium-term distances. The use of QRP over optimum path lengths of between 1000-1500km will also produce a number of very short duration pings but these can now be effectively deciphered. The only snag to increased c.w. speeds in Europe is that the majority of operators are using the old ‘slow speed’ technology and it’s impossible to change to more efficient techniques overnight.

What’s happening is similar to the situation that established telephone providers are having at the present time. Their networks have been built on an ageing copper (cable/wire) infrastructure whereas new providers are coming into the business with totally new fibre (cable) infrastructures. What the existing providers want to do is to rip up all the copper wires and replace them with optical fibre systems, this is a lengthy (and expensive) process. Nevertheless, it will happen and will so the increased use of very high speed c.w. for future scatter work.

Another problem with high speed c.w. is finding an ‘off-the-shelf’ transceiver that is capable of being keyed at a high speed. Although a few old transceivers, such as the Yaesu FT-221 or FT-225, are able to work up to 600w.p.m. by simply taking out the audio in the keying circuit, the same cannot be said of newer radios.

So, to get round the problem a number of stations are using audio keying instead of conventional hard keying. The audio output (around 1kHz or so) from a function generator, keyed by a PC or memory keyer, is applied to the microphone socket. The transmitter is switched to s.s.b. mode and every time the audio output reaches an audio level, the audio dot or dash the transmitter produces a similar r.f. output. This technique is very simple and effective.

Onset PC processing has been using low power for m.s. tests is that of Miguel Valera E4AE0Z (IN80). He uses an FT-290R only running SW to a 9-element Yag. The high speed c.w. keying is provided by the use of OH5TY m.s. software and the decoding is carried out using the DF7KF d.t.r. during the Quadrantids meteor shower.

Miguel worked PE1OGF (also running SW) over a 1400km path. So, if you’re able to generate medium power but unable to put up big antennas then the use of h.s.m.s. will make you more competitive.

At 0710QTH of Steffen DD0V (NO61) there is a restriction on putting up large antennas so he has to make use of a small 2-element HBPCV antenna mounted outside his window. Although the antenna has a gain of less than 4dBI he has been successful in making h.s.m.s. contacts with UK and OH5TY. Steffen runs 100W and as the feed-line has a 1dB loss this gives an effective radiated power (e.r.p.) of 200W, which is sufficient to make h.s.m.s. contacts when conditions are right.
Maritime Mobile

Andy Adams GW0KZG/MM has sent me two E-mails from the Royal Lineship ships. FS0GSH Dansev located off the north-west coast of Spain. The first was sent from locar IN52 where he was active during the period of December 21 to January 3 between 1330-1630UTC.

Andy recounts that the shower peak was around 1400UTC with good conditions being between 1315-1445UTC. Five random (unscanned) cw contacts were made on 144.125MHz with the stations of DL1AR1 (144.125MHz), DL0IZQ (144.125MHz), ON4AX (14000MHz), ON4F1 (14000MHz) and PA2DHV (15000MHz). Andy was also,based by the station of DH4ULS (601) who received a temporary burst at 86 over the 2050km path.

The second E-mail from Andy was 'posted' on January 8 from locator square IN42 in the Atlantic Ocean. Andy reported that the weather was horrendous with gales and 40ft seas making his operation rather difficult.

However, Andy did manage to complete two cw schedules before going QRT. Both the rotator and 11-element Yagi were damaged in the storms but replacement parts have been ordered and will be repaired when the ship is back on dry land.

Andy reports that he has been operating Maritime Mobile on the 144MHz band for over ten years. In that time he has worked over 145 different locator squares, 85 of them (totally or virtually) wet. The 'virtual' squares are those with a small bit of land in them such as JM17, JM27, JM37, JM44 and JM45 off the north coast of Algeria and Tunisia. He has only five worked squares in the North Sea and 35 left in the 'I0' field and wants to finish these off before starting all over again on the 50MHz band.

Andy's next two trips, both of five weeks duration aboard the RRS Charles Darwin, have already been scheduled. On Sunday May 19 he will sail from Southampton (ID09) around the coast to work areas in IO12, IO25 and IO33 (400-500km west of Ireland) and then sail to Fairlie, Scotland (IO23) to arrive there on May 15. A few days later, on May 19 he will set sail from Fairlie to work areas in IP80, IP81and IP90 (Shetland islands) before returning to Fairlie on June 24.

Andy will usually be active on the 144MHz band, his specific frequencies of operation being 144.12040MHz sb, 144.25MHz cw, for random m.s. and 144.1200MHz c.w. for scheduled m.s. contacts. Although he now has a high power permit allowing 1kW output via his small Yagi antenna he normally runs about 600W output to conserve the 3CX800 p.a. valve.

For m.s. operation Andy will transmit during the first 2.5 minute period at a speed of 1200W.p.m. His preferred receive speed is 1500W.p.m. as this saves him having to change the operating parameters of the d.t.r. unit for each m.s. contact.

It's expected there will be much activity from Andy GW0KZG/MM as his first trip will coincide with the Lyrid meteor shower (April 19-25, peaking on Wednesday April 22 at 2100UTC) and the Eta Aquarids shower (April 19 to May 20, peaking on Tuesday May 3 at 1300UTC). His second trip to the west of the Shetland Islands should be even more exciting as it will not only coincide with three meteor showers but it will also occur during the peak of the summer Sp-E. station. The meteor showers by the way are the Arieten (May 20 to June 3) peaking on Sunday June 7 at 1300UTC, the Zeta Perseids (May 20 to July 5, peaking Tuesday June 9 at 1300UTC) and the June Lyrids (June 10-21, peaking on Monday June 15 at 0400UTC).

Widespread Openings

Although Europe was not favoured with Sp-E propagation during January 2000, Andy reckons he had quite a few for other parts of the northern hemisphere. In the USA for example there were some widespread openings on the 50MHz band particularly during the first two weeks of the year with January 1, 2, 6, 11, 12 and 13 experiencing some excellent propagation.

On January 12 the station of K5S8R reported a field aligned (f.a.) opening on the 144MHz band from the Gulf of Mexico 5000km opening which lasted for 6-hours. On January 20 there was an Sp-E opening on the 144MHz band across a large part of the USA. Also that day the stations of WP4O and WAMP61L (Puerito Rico) were heard by LUSEGQ (Argentina) on 144.300MHz c.w. Unfortunately, LUSEGQ was only running 25W so he was unheard over the 6000km path.

The really extraordinary 50MHz news of the month however was the first reports of true F2-layer propagation made from the USA for Solar Cycle -23. Emil Pocock W3EP of Pocock W3JPW passes on the news that on December 31 at 2342UTC the station of K6QXW worked ZL2TPY followed quickly by ZL2NW.

No doubt Bob's 1.5kW and four stacked 10-element Yagis helped but soon afterwards other alert 50MHz DXers, OP0X and YL0Z also found the New Zealand stations. Although the main action was between New Zealand and Texas there were indications that propagation was more widespread.

Mike Faulsttler ZL3OTC (RE65) reported working W7CI in Arizona and hearing W2 and XE2 (Mexico). The station of ZL2TPY heard W4DR in Virginia on 50.110MHz but couldn't attract his attention.

From Gill Bieszegh ZL3AVU around 0055UTC on s.s.b. and tried calling on c.w. but to no avail. According to informed sources the station of ZL2APA also worked a few New Zealand stations. Finally, VX2BA (Australia) worked KS1UA and heard several other stations but couldn't attract their attention.

According to W3EP the W-ZL path is one of those 'easy paths' in terms of maximum usable frequency (m.u.f.) expectations. Areas that lie adjacent to or cross the geomagnetic equator tend to have the highest F-layer density and therefore the highest m.u.f.'s. (Other easy paths are USA to northern South America, eastern USA to South Africa, southern Europe to southern Africa and western Europe to South America and so on). The W-ZL path although 'multiple-hop' is more or less along the equator. Normally the 'single-hop' north-south paths are expected first but the W-ZL path is not unusually early in the cycle.

Station Activity

Henk PA3AWW passed on the news that he will be active on the 50MHz band from Ghana from February. He will be using a Yaesu FT-920, an Icom IC-706 and a 50MHz Yagi antenna. Look out for Henk using his previous callsign 9G1AA. This was a welcome addition to the other operators, 9G1BH (GM1QVQ) and 9G1VW who I mentioned previously in the January issue. Incidentally the RSG6 donated a number of RA6 and Novice RA6 Manuals to PA3AWW so that Henk could train some potential Radio Amateurs in Ghana.

The Support To the Amateur Radio Service (STARS) committee (run by the Region 1, International Amateur Radio Union) has also arranged sponsorship by Schaut Communications, Netherlands, of a Yaesu FT-920. The equipment is to be given to the Ghanaian Amateur Radio Society (GARS) as a means of developing amateur radio in Ghana. Jim Martin MM1BCI (IC8S) reports that he was pleased to catch an auroral opening late last year on November 22. On the 144MHz band he contacted the stations of SM6TVX and G3PDN. He was also pleased to work the GI on the 50MHz band especially as his QTH is completely blocked to the west. This is one advantage of making contacts via auroral back-scatter.

You don't have to point your antenna at the other station, you only need to direct your beam towards the (normally) northerly located auroral curtain.

Jim mentions that he is working at his c.w. (well done!) and hopes to pass the test soon. He then will be able to participate in working the 'real' DX that is often found on the 50 and 144MHz bands.

The c.w. will also come in useful for contest working, an aspect of the hobby that Jim is very interested in. He says that working with a low power station from Scotland is a problem as the QSO rate is never high and it seems that radio waves stop just south of Yonder! Jim has recently upgraded his portable antennas to a 6-element Yagi on the 50MHz band, a 7-element Yagi and a 21-element Yagi for the 430MHz band. So, point your beams to the north and keep a look out for MM1BCI during this year's v.h.f. contests.

SATELLITE NEWS

Reports from around the world confirm that RS-17 ceased transmitting on December 29. The little satellite, (a one-third scale replica of the original Sputnik), beeped its way around the globe for 55 days, more than two weeks longer that it was expected to last. The Sputnik beacon on 145.820ke was monitored and recorded around the world. Those tracking RS-17 reported that the beacon signal had continued to get weaker as the end approached.

Finally a reminder that AMSAT-UK's long standing Secretary Ron Broadtind G3AAJ has now retired from the well. Please allow him a few weeks to adjust before directing all enquries about AMSAT satellites to the new Secretary, Fred Southwell G6ZRU (QTHR). The new telephone number for AMSAT-UK is (01273) 492973 and the FAX number is (01273) 492972.

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That's it again for another month. Propagation is slowly taking a turn for the better and I want to hear what you've been up to. Forward any news, views, comments or photographs to the address and by the date given at the top of the column.

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

73 David G3ASR
The higher bands are certainly now carrying more regular DX traffic compared to a couple of years ago, and many amateurs are having a great time digging for the DX. However, the i.e. bands have really come into their own, with 1.8, 3.5, and 7MHz offering amateurs some very good opportunities. North Americans have been very prominent on all three bands, with New Zealand, stations in Japan and Australia being worked by many amateurs on a very regular basis on 1.8MHz.

This time of year has always been a favourite for the 'Low Frequency gang', and armed with their verticals and other very effective antennas for these bands, they've been having a whale of a time, although, I must admit that my high-angle end-fed wire only permits me to hear the DX, not to work it (Or it!).

On the subject of DX, news comes from Eddie GW0XHL that the semi-submersible oil-drilling rig Borgny Dolphin is eructing from UK waters to the Falkland Island in the South Atlantic with Carl G4VUF/MM on board. Carl plans to be active on 3.750, 7.050, 14.150 and 21.360 MHz. Times (recommended by Eddie GW0XHL) are 1145 most days and 1745 hours on 1.972MHz 'Top Band' each night.

The Borgny Dolphin featured in the article by GOHXL and G4VUF in the June 1997 PW will be in VP8 for quite a long period. Further details from Eddie on E-mail at e.calro@virgin.net Good DX everybody and thanks for the information Eddie.

BEWARE OF INTRUDERS Beware of intruders! No, not the loutish type that turn up and knock on your door, but the more vindictive and plain nasty kind. I say this because at the latter part of 1997, Steve Locke GW0SGI, a dedicated and enthusiastic DXer who has often reported to this column, was visited by an individual or individuals of this kind. They for reasons best known to themselves, decided to completely wreck his tower along with the T-H 7 beam antenna which it held aloft, and the results are shown in Fig. 1.

"Under cover of darkness" says Steve "they knocked out the pin which secured the tower in place. The result was that the antenna was completely smashed, and the tower is a write-off!"

Steve reminds me that the same thing also happened to the tower and antenna installed in a local Amateur Radio club around four or five years ago. So, it seems that this is purely a local phenomenon.

However, Steve says that he offers the information to the column in order to remind Radio Amateurs elsewhere just how easily accessible their antenna installations are to unwelcome and unstable people such as these. "Chain it all up" seems to be the advice from Steve.

YOUR REPORTS Space is limited this month, so I'll start with your reports for the 7MHz band. First off the mark was Ted GOWFF on the Isle of Sheppey. Apologies to Ted, as I inadventurously stated in the February issue that he was operating with a.s.b.t.

As we all know, Ted is an all-c.w. man, and his report this month shows contacts with 5A4GKX/H (Dominican Republic) at 0900, while operating between 1800 and 2000 brought him contacts with 5B4EU1A (Cyprus), and BV2F1 (Taiwan).

Sean Gilbert GW4UCJ in Milton Keynes is also a 'man of the key' and lists his 7MHz contacts with 3X5AA (Chenahua) at 2315, CO2B (Cuba) at 0113, 8PR5M (Barhados) at 0304, LU1ZC (South Shetland Islands) at 0103, and J6/DF2SS (St. Vincent Island) at 0133. Sean uses powers of 5 or 25W for all contacts.

Somebody has been spending a little more time on 7MHz of late is Don Mclean GINOF of Yeovil, Somerset. In his monthly propagation report, Don says "On 7MHz, I only checked the band between 2200 and 0100. Conditions were good to north and south America as well as Africa at these times. The 14MHz band has only been open for very short daylight hours, with north American stations coming in very strongly from the west coast. A few Asian signals were heard around 1500 to 1600 on the short path."

"Up on 18VHz, the long path to Australia and New Zealand was sometimes open between O300 and 1500, with the short path to the same areas open between 1100 and 1300. The short path to Australia was open on 2140 UTC between 1100 and 1200, with north America coming in during the afternoons. Both 24 and 28MHz have been patchy, but north America has been heard during the afternoons on an irregular basis."

Don's log for 7MHz lists s.s.b. contacts with F6KCU (Martinique Island), HIJFVA (Dominican Republic) QSL via KG8VC, J696E (St. Lucia Island) QSL via PC9 1298, Castries, St. Lucia, J2VP2E (Anguilla Island). Also worked were YN1GSR/JC1 (Equatorial Guinea) QSL to E5ASBP, YV5DPO (Venezuela), and 8PR5M (Barhados) all between 2200 and 0100UTC. "Bashing the key" was what John Constance GOVD from Kent did this month. His c.w. went out to VEBRJ (Canada), 8E1EK (Mexico), N4NO (USA), and CM21Z (Cuba) all contacts taking place around 0500UTC.

THE 14MHz BAND Operating with an Index Labs QRP Plus rig and G3RV dipole we find Carl Mason GW0V5W of Skewen in West Glamorgan. With his SW of c.w. Carl worked 7XSA (Algeria), and CT1E3GK (Portugal) during a morning session. While operation later in the day brought contacts with W3TS (USA), F5CWW (Martinique Island), and EA8BWS (Canary Islands).

Fellow QRP enthusiast Eric Masters GOKRT of Surrey has also been busy with his tiny mini-signals. His log includes c.w. contacts on 14MHz with KW3AI (Russia), CT1BOH (Portugal), SH5AGI (Sweden), and HA2ZT (Hungary) between the hours of 1200 and 1300UTC.

Meanwhile on the other end of the power scale, Richard Lewis GW8WII from Sennen uses the legal limit of 400W on the 14MHz band, showing s.s.b. contacts with Z59G7SH (South Africa) at 1837, VK5NP (Australia) at 1226, H50UK/MR8HR (Thailand) at 1457, SR8KH (Madagascar) at 1649. Also heard was H6GJ/AN (Ann Maria Island) at 1538, and JA8BOP in Nagasaki, Japan) at 0845UTC. It’s over now to short wave listener Derek Blunden RS1/17057 in Milton Keynes, who uses simple wire antennas all round. Derek lists reports on 14VHz with R1ASP (Kolfin Island) at 0757, USBLRA (Khazakhstan) at 1140, R29OZ (Siberia) and 5B5ES (Cayman Island) at 1000, and lists his 7MHz contacts with RU8LA (Khazakhstan) at 1140, and 5B5ES (Cayman Island) at 1000, and lists his 7MHz contacts with RU8LA (Khazakhstan) at 1140, and 5B5ES (Cayman Island) at 1000, and lists his 7MHz contacts with RU8LA (Khazakhstan) at 1140, and 5B5ES (Cayman Island) at 1000, and lists his 7MHz contacts with RU8LA (Khazakhstan) at 1140, and 5B5ES (Cayman Island) at 1000, and lists his 7MHz contacts with RU8LA (Khazakhstan) at 1140, and 5B5ES (Cayman Island) at 1000, and lists his 7MHz contacts with RU8LA (Khazakhstan) at 1140, and 5B5ES (Cayman Island) at 1000, and lists his 7MHz contacts with RU8LA (Khazakhstan) at 1140, and 5B5ES (Cayman Island) at 1000, and lists his 7MHz contacts with RU8LA (Khazakhstan) at 1140, and 5B5ES (Cayman Island) at 1000, and lists his 7MHz contacts with RU8LA (Khazakhstan) at 1140, and 5B5ES (Cayman Island) at 1000, and lists his 7MHz contacts with RU8LA (Khazakhstan) at 1140, and 5B5ES (Cayman Island) at 1000, and lists his 7MHz contacts with RU8LA (Khazakhstan) at 1140, and 5B5ES (Cayman Island) at 1000, and lists his 7MHz contacts with RU8LA (Khazakhstan) at 1140, and 5B5ES (Cayman Island) at 1000, and lists his 7MHz contacts with RU8LA (Khazakhstan) at 1140, and 5B5ES (Cayman Island) at 1000, and lists his 7MHz contacts with RU8LA (Khazakhstan) at 1140, and 5B5ES (Cayman Island) at 1000, and lists his 7MHz contacts with RU8LA (Khazakhstan) at 1140, and 5B5ES (Cayman Island) at 1000, and lists his 7MHz contacts with RU8LA (Khazakhstan) at 1140, and 5B5ES (Cayman Island) at 1000, and lists his 7MHz contacts with RU8LA (Khazakhstan) at 1140, and 5B5ES (Cayman Island) at 1000, and lists his 7MHz contacts with RU8LA (Khazakhstan) at 1140, and 5B5ES (Cayman Island) at 1000, and lists his 7MHz contacts with RU8LA (Khazakhstan) at 1140, and 5B5ES (Cayman Island) at 1000, and lists his 7MHz contacts with RU8LA (Khaz
providing some tutorials on various aspects of the Internet.

You could argue that you can find out about the Internet by buying one of the many computer magazines on the market. However, I will be giving you the information with a strong radio bias, so I hope I can satisfy your curiosity without you having to buy another magazine.

GETTING STARTED
Where to start is a real challenge for those that are just considering moving into the Internet. The decision can be likened to buying a car before you've even started to learn to drive! This means it's very easy to make mistakes and choose completely the wrong option for you.

The starting point for most is to get a modem. The choice you make here is vital as a few pounds saved on a slower speed unit may well be paid for in increased 'phone bills.

You really should be buying the fastest modem you can afford and at the time of writing the best value is a v34 plus 33.6k unit. The v34 plus is just the name of the protocol used by the modem, whilst 33.6 is the maximum speed that the modem can transfer data - 33.6 meaning it can send and receive 33600 bits per second.

The important point to note here is that the quoted speed is the maximum you can expect to see and the rate you actually get depends on the ability of your modem to work with the distant modem to accurately compensate for, and adapt to, the 'phone link. In most cases you will find that the flow of information from the Internet to you is primarily limited by the server you are connected to and its links into the Internet.

Some of you are probably wondering why I've made no mention of 56k technology? The prime reason is that at the time of writing there has been no agreement on which of the two conflicting 56k standards will be taken-up by the Internet Service Providers (ISP). This makes buying a 56k modem a risky business as there's a 50:50 chance that you will choose the wrong standard and your investment may be wasted.

A second reason for holding back is the rapid development in other technologies such as ATM (Asynchronous Transfer Mode) and ISDN (Integrated Services Digital Network). These systems are already used in the business world to provide very fast data connections and the market looks set to make these technologies more affordable for domestic use.

If the timing works out right 56k technology could just have a very short life! But if you really want to go for 56k technology I would recommend you contact your ISP to see which of the two systems they are favouring.

The knock-on effect of the intense 56k battle has meant a drastic cut in the price of 33.6k modems so that they really are excellent value. Looking at the main suppliers, I note that you can get a 33.6k unit for as little as £45 inclusive of VAT whereas 56k modems cost at least 70% more.

The next dilemma is whether to go for an internal or external modem. My advice would be to go for an external unit. This is because serial ports on the PC are a precious commodity.

Although the humble PC has the capability to handle up to 4 serial ports, the two prime ports, COM1 and COM2 are the ones that are used by a large proportion of Amanda software that requires a serial port. As you will often find your mouse uses COM1 and so the second port becomes your only route to the outside world.

If you use an internal modem this will most likely take-up the second port and leave you with a real problem if you want to branch out into any of the data modes. The solution is to use an external modem and connect it to the COM port via a readily available multi-way data switch. In this way you can connect an infinite number of devices to this one port - you just have to select the correct one when you start the program.

The other great advantage of using the multi-way data switch system of connecting a modem, is that you don't have to take the covers off your PC and try and work out which slot to use and all the risks associated with delving inside something that you don't fully understand. You do have to pay a little more for an external modem (about 10-20%), but it's well worth it for the flexibility you get.

CHOICE CRITICAL

The Internet Service Provider (ISP) that you choose is absolutely critical. A wrong choice can cost you dearly in 'phone charges or just pure frustration. I know many new users have been put off the Internet by the frustration of having a slow connection or busy lines.

When making your choice there are two basic options either a) one of the national ISPs or b) a local ISP. The national ISPs are led by the likes of Pipex Dial, Demon and BTinternet to name a few. In addition to providing full national coverage at local call rate, you can expect these companies to provide top quality support services to help you get started and keep going. You can expect to pay between £10 and £15 per month for unlimited connections with these companies.

If you have any local Internet companies it may well be worth giving them a try as they often provide very good value for money. If you're going to do this make sure you either get a free trial or sign-up for no more than one month at a time.

Another type of service provider to consider is what are known as on-line service providers. Examples of these are AOL, CompuServe, LineOne and Microsoft Network (MSN). As well as providing Internet access these companies provide a dedicated site locked full of useful information that can save you having to search around the Internet. These companies are often a good bet for those that are completely new to on-line computing as they usually come with dedicated software packages that give the user a very easy to interface service.

The downside is that the charging can sometimes get a bit complicated and you may soon lose interest in the built-in data. It's generally very easy to try these
After the browser the next vital package is the E-mail system so that you can start communicating with others. All the ISPs supply a compatible mail system, but the front runners from independent suppliers are Pegasus Mail and Eudora. These programs are packed with helpful features to make the management of E-mail as simple as possible. My personal favourite is Pegasus because of its price and easy to use features.

A good ‘news reader’ is probably one of the most essential items of the Freeware arena so to speak. The state-of-the-art in Internet software comes in the form of the latest fully integrated suites such as Netscape Communicator. These come complete with browser, mailbox, news, file transfer, chat and many other utilities and can really make life easy. The only drawback I’ve found is that you really need an up-to-date PC as they require lots of processor speed and huge amounts of memory.

One of the newer developments that’s really worth a look is Mozilla. I’ll cover this in more detail in a future column, but it’s great for those who want to download files from the Internet as it helps ensure you are connected to the fastest download site. Not only does this take some of the frustration out of downloads but it saves you money on your phone bill. The latest version can be found at www.mozilla.net/gozilla

TELEPHONE BILLS

If you really get hooked on the Internet you’ll need to make sure you are aware of the telephone charges. You can cut your costs by checking your calls.

a) Get in contact with your ‘phone company and make sure you know the cheapest times to make local calls.

b) Make sure you’re signed-up for the various discount options, i.e. BT’s Friends & Family.

c) If you want to download a large file especially from a US site, do it during their small hours of the morning if you can – it will be much quicker and therefore cheaper.

NETWORK MONITORING

Once you’ve gained some experience on the Internet you will probably build-up a set of regular favourite web sites that you tend to visit to keep you up-to-date with your particular interest. You will also know how frustrating it becomes when you spend long periods waiting for one of these sites to download a Web page.

To help a little you can use a ‘network monitor’ to keep an eye on your favourite sites and give you a condition report on their availability. One such program is Network Monitor for Windows by John Junod. This excellent program provides a map of the network with the state of each site illustrated by its colour.

In the version of Network Monitor for Windows which I reviewed green was used for a good site, yellow for border-line and red for poor availability. The program can be fully customised so you can add and delete hosts and alter the timing thresholds.

One excellent development in the latest version is the ability to nest the network maps. As a result you can store lots of different layers of the Internet and then choose, with the click of a mouse, which one you want to monitor. No other does this program provide an excellent Internet tool but it’s distributed as freeware! If you want a copy you can find it on Just about all the shareware sites under the filename WS. Watch.

SPECIAL OFFERS

As a special offer for readers wanting radio related software for use on IBM PCs I’ve collated a set of programs for you. If you’d like a copy of Hamcomm/FAX, etc. I’ve arranged a very special offer through the Public Domain and Shareware Library (PDSL). They have put together a library of all five disks for just £2.11 each.

Using PDSL also makes ordering simpler as they accept all the usual credit cards so you can order by phone, you don’t even have to write a letter. Please direct all orders and enquiries about this disk set to PDSL, Winscombe House, Beacon Park, Crowborough, Sussex TN6 1UL. Tel: (01825) 662298 and request library volume: H80673Rabote.

The software is only available as a set of five disks as follows: IBM PC Software (1.44mb disks) Disk A - FAXPAC 7.1, HAMCOMM 3.1 and WXFAX 7.1, Disk B - DSP Starter Plus Texas device selection software, Disk C - NuMorse 1.3. Disk D - Ultrafax. 4.0 and Disk E - Mocan 1.3 and 2.0.

THAT'S IT FOR ANOTHER MONTH, SO UNTIL NEXT TIME... KEEP SURFING THE NET AND LET ME KNOW OF ANY INTERESTING RADIO SITES THAT YOU COME ACROSS, PLEASE SEND ALL YOUR NEWS TO ME AT THE ADDRESS AT THE TOP OF THE COLUMN AND DON'T FORGET TO POINT YOUR BROWSER AT MY WEB SITE!

73 Mike G4WNC

SCENE USA

REPORTS & INFORMATION FOR MY JULY COLUMN TO ME BY THE 15TH APRIL PLEASE.

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WE TEND TO THINK OF RADIO AS AN EUROPEAN INVENTION, BUT SIGNIFICANT ADVANCES WERE MADE ON THE OTHER SIDE OF THE PACIFIC. IN THIS, THE FIRST OF A TWO-PART SERIES, ED INVESTIGATES SOME AMERICAN PIONEERS OF THE EARLY DAYS OF RADIO.

T the United States of 1870 would have been an alien concept for a scientist. The 19th century, and particularly the period after the American civil war, was an era in which many scientific and technical advances were being made. Technologically, the USA was beginning to become a world leader.

Radios were being put up very tall buildings, thanks partly to the American invention of the elevator. Long bridges were being constructed and the railways were expanding.

The electric telegraph was connecting the Atlantic and Pacific, as well as linking the USA to the rest of the world. There were developments in photography, oil exploration, transport, sound reproduction and power distribution.

On top of all this, the US population was growing at a dramatic pace. Millions of immigrants were pouring in from Europe. The interior was becoming better explored, and there was undoubtedly a feeling that the country was becoming a major power. It’s not surprising, in this atmosphere of advancement and change, that American contributions were being made to the development of radio.

RECOGNITION OF HENRY

I suppose one of the highest marks of recognition by the scientific community is for a unit of measurement to be named after a scientist. Such was the case with the Henry, unit of inductance, named after Joseph Henry.

Joseph Henry was an American physicist, who experimented in the 1830s with coils and electromagnetism. Although he worked independently of Michael Faraday in Britain, he made similar discoveries, specifically that electricity can be converted to magnetic force and vice versa.

Henry also invented a form of electric motor, and devised a type of relay, which was further developed by Samuel Morse and used in
telegraph systems. He also built the largest electromagnet of the time. It could lift a third of a ton, which was a stupendous achievement in those days.

Joseph Henry’s work laid the foundation for the principle of resonance, critical to the development of radio. And for example in 1842, he observed that electrical discharges into a coil caused damped oscillation (at a frequency which depended on the size of the coil).

It was later discovered that by connecting a coil and a condenser (or an inductor and a capacitor, as we would say now), a circuit can become a resonant circuit, which would allow electrical discharges into a coil to resonate at a certain frequency. This idea became the basis for tuned circuits in all subsequent communications equipment. Henry achieved fame and distinction, and like many scientists of those days was something of a polymath, being involved in founding the US Weather Bureau and the National Academy of Sciences.

OTHER HEROES

Other heroes in the story of radio are not well remembered now. We all know about Heinrich Hertz and Guglielmo Marconi, but how many have heard of Mahlon Loomis? He was a dentist in Washington D.C., who became interested in “Hertzian waves”. Although we would consider his theories inaccurate now, in 1865 he conducted significant experiments.

Loomis thought the upper atmosphere contained an electric field which we could utilise. He called it the ‘electrical sea’, and sought to tap into it by using a kite to hold up a wire which he called an ‘aerial’ through which he sent signals to another over a distance of some 20km. His sketch in Fig. 1 shows how he thought the apparatus worked.

The deflections of his galvanometer (a current measuring device) must have been rather weak, and such an experiment nowadays would probably fail because of the high level of radio and other man-made noise. Loomis discovered that the reliability of this system was not consistent, and that sometimes the signals would become fainter. We now know he was experimenting, for the first time, the vagaries of ionospheric propagation, which later became well-known to Radio Amateurs. It might seem that Loomis’ experiments led to a dead end, but he actually established a couple of useful principles for others to follow. Firstly, he showed that an electric field could really carry a message over quite a distance without the use of wires.

Secondly, Loomis demonstrated that an elevated aerial was a good way to achieve this, although it was a while before it was realized that the length of the aerial was also an important factor. Nonetheless, every Radio Amateur knows something about antennas, which Loomis established over 100 years ago: the higher the better!

PROLIFIC INVENTOR

One of the most prolific inventors of the 1800s was Thomas Edison. He is credited with more than 1000 patents over a period of six decades.

Many of Edison’s patents do not relate to radio, but to cover even those which do would require a whole book! I will mention one though, which (like most similar developments) pushed forward the boundaries of knowledge, so that the next person could make more progress.

Edison was born in Ohio in 1847 and was, apparently, a troublemaker at school. One of his teachers described him as ‘addled’.

These days, it might be recognised that he was ‘gifted’, and bored with the slow pace of lessons.

Thomas Edison received very little conventional schooling as a result and was taught by his mother. He was a enthusiastic reader of books from where he got most of his knowledge.

Edison worked for a while on the railways, and quickly became interested in the telegraph, which had become essential for operation of the rail system. Learning all the time and applying his enormous energy, he quickly suggested improvements to the telegraph system.

After years of prodigious invention, he set up a large research laboratory in New Jersey.

In 1875, Edison said he had discovered a new ‘etheric force’. He had been experimenting with a magnetic vibrator, producing a train of sparks, which affected equipment some distance away. Although, he couldn’t exactly explain what was happening, he was sure he had found something new. He now knew that his instruments were only capable of detecting d.c., and the crude radio transmission he had created depended on alternating current, which he could not initially measure.

Edison continued to develop his etheric force system (see Fig. 2) and received a patent. There was some confusion at the time as to whether the effects being noted were the result of magnetic force, or whether there really was a new kind of ether wave. It took a little longer for experimenters to find out that radio signals depended on waves of a type discovered by Hertz, and that ‘etheric force’ was actually electromagnetic radiation.

Other scientists investigated Edison’s results and a notable demonstration took place in London, England in 1882. Amos Dolbear, of Massachusetts, used a spark coil and automatic interrupter to send signals throughout a building.

It might seem that Loomis’ work was probably the first display of wireless telephony, albeit with a range of only a few feet. He was awarded a patent for the system, but did not seek to exploit it, being more interested in research than the rewards to be had from improving communications.

NICOLA TESLA

Nicola Tesla is not well-known, but deserves to be, not least because he also joins that group who had a fundamental unit named after him. The unit of magnetic flux density is Tesla. Some would argue he was the true inventor of radio.

It might be more accurate to say that Tesla played a significant part, and that there is no single person who could be described as the inventor of radio. Marconi was the chief exploiter of the new invention, but (as is often the case) many earlier inventors contributed to his success.

Tesla was born in 1856 in Croatia. He received a good education, although suffering from bouts of ill-health. He was
fascinated by electricity and was determined to learn as much as possible about this emerging science. After working in Budapest and Paris, he emigrated to the USA in 1884, arriving in New York with four cents in his pocket and a letter of introduction to Thomas Edison. It seems that Tesla was impressed by Edison at first. He was amazed that a man of such limited education could accomplish so much in technical fields. Edison, however, was unimpressed by Tesla, who was likely to solve a problem by sitting down and thinking for a while. To Edison, who used trial-and-error methods, the long cogitations that Tesla indulged in were a waste of time, even though Tesla was quickly achieving exceptional results.

The association of the two men did not last long. They fell out over the issue of whether power should be distributed by a.c. or d.c. Tesla, favouring a.c., won the battle in the end, although it took many years to prove the point. He began working with the Westinghouse company and soon became a wealthy man.

Tesla was granted a large number of patents, some in connection with polyphase generators and transformers. As far as radio is concerned in 1890 he discovered the principles of tuned circuits to his coils, and applied for his invention to be known as Tesla coils. These produced very high voltages, which could be utilised in several ways, one of which was to generate radio signals.

In 1893 Tesla gave a lecture in New York about his experiments on radio transmission with tuned circuits. His system had developed by 1899 to the extent that he was able to demonstrate wireless control of model boats at New York’s Madison Square Garden.

When asked what he thought about Marconi’s transatlantic transmissions in 1901, Tesla said, “Marconi is a good fellow, let him continue. He is using 17 of my patents”. He was being magnanimous to Marconi, who had once worked as his assistant, and soon became a wealthy man.

Radio began to be played about in America in 1904, and Tesla, who was working on radio, which was the subject of local folklore, built up to some extent by the media. He was however, a fascinating individual, well worthy of being included with the other colourful characters who helped to form our hobby into what it is today.

THE AMERICAN PIONEERS ARE OFTEN FORGOTTEN WHEN THE ORIGINS OF RADIO ARE DISCUSSED.

but his attitude later changed, following many years of patent litigation between the two men.

A long time afterwards (in 1943) the US Supreme Court ruled in favour of Tesla and against Marconi. Of course, by that time, the point was rather academic, but nonetheless Tesla appears to have beaten Marconi by a couple of years in the patent race.

CURIOUS TALE

I’ll close with a curious tale, which sometimes gets distorted in the retelling. Look at Fig. 5, which shows a monument to be found in Kentucky to the inventor of radio.

Stubblefield carried out some interesting experiments, and might have gone on to become rich and famous. However, he suffered from a paranoia which made him excessively secretive about what he was doing. This secrecy also led to a belief by his neighbours that he was working on radio, which was not really the case.

Stubblefield had been interested in telephones and had an idea which he thought would eliminate the need for telephone poles and wires. He had been reading about electromagnetic induction, which was then well-known.

Electromagnetic induction is the principle used by the transformer, where a primary coil of wire is positioned around a secondary. A varying current passed through the primary will induce current in the secondary. If the primary is large, say room-size, the secondary can be contained in and drive, a set of headphones worn within the room. This method has been used in theatres to distribute sound to the hard of hearing.

One afternoon in 1892, Stubblefield called upon the assistance of a local boy, Rainey Wells. He gave him a telephone receiver connected to a 1000-turn coil about 250mm in diameter. Stubblefield had previously wound his primary of over 100 turns around the trees in an orchard. He told Rainey to go into the orchard and listen. Unsurprisingly, when Stubblefield spoke into the microphone connected to batteries and the primary coil, Rainey heard the voice and almost jumped out of his skin!

Of course, Stubblefield experiment is not Radio as we know it, since induction does not involve the transmission of waves and the effects are not perceptible for more than a few metres. Still, Stubblefield could have made more scientific contributions if he had been willing to co-operate with others.

Stubblefield was afraid that his inventions would be stolen, a valid concern, since later in his career he was the victim of fraud. He worked with some success on what was called ‘natural conduction’, the transmission of signals through the ground, (a technique since used by the military).

Stubblefield died in poverty and became the subject of local folklore, built up to some extent by the newspapers. He was however, a fascinating individual, well worthy of being included with the other colourful characters who helped to form our hobby into what it is today.

THIS ENDS MY BRIEF LOOK AT SOME OF THE AMERICAN PIONEERS OF RADIO FOR NOW. LATER THIS YEAR I’LL DISCUSS AMERICAN CONTRIBUTIONS TO RADIO IN THE 20TH CENTURY. IN THE MEANTIME LET ME KNOW WHAT YOU THINK.

73 Ed NoED

FOCAL POINT

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THIS MONTH GRAHAM TAKES A LOOK AT THE WORK OF THE BRITISH AMATEUR TELEVISION CLUB AS WELL AS KEEPING YOU UP-DATED WITH THE LATEST REPEATER NEWS.

After connecting to my local Packet mailbox (GB7SOL), this month I am going to list all the bulletins or messages relating to Amateur Television which have appeared in the ATV category. All manner of ATV questions have appeared on the Packet network. A ‘callsign’ in Manchester wanted to know which type of antenna is best for 1270MHz (24cm); another asked if a 24cm transmitter p.c.b. could be obtained anywhere. There are also messages from people seeking advice on converting satellite receivers for ATV use. One amateur (with a very recent callsign and keen on 10GHz ATV) was looking for the necessary kits.

I try to respond to Packet ATV messages with as direct an answer as possible. But my reply always includes a question of my own — does the keen 10GHz ATVer know about the British Amateur Television Club (BATC)? ATV is a specialised mode, so any amateur station with ATV should really be among the BATC’s 2000 strong membership.

THE BATC

The British Amateur TV Club aims to encourage and co-ordinate all aspects of television as a hobby, and is the world’s largest such specialist

Fig. 4: Nicola Tesla, whose contribution to radio technology is often forgotten.

Fig. 5: The monument in Kentucky to Nathan Stubblefield, the ‘inventor of radio’.

RadioScenes
Some of the video processing p.c.b.s that have been available from the BATC.

organisation. The club maintains a technical library, publishes books and a regular magazine, stocks many video components and holds p.c.b.s for magazine projects. The BATC also offers support to affiliated Repeater groups and represents Amateur TV interests at national and international level.

The BATC's quarterly magazine CQ-TV began in October 1949 and early editions, like the broadcast TV at the time, were 'flatack and white.' By contrast, the latest issues of CQ-TV could easily stand with many other magazines along a newsagents shelf. A gloss cover, in colour, encloses nearly 100 pages of ATV news, circuits, repeater updates and a variety of features.

A regular feature in CQ-TV is 'Satellite TV News' by Paul Holland G3TZO. Here, Paul gives updates of the latest 'hinds' (satellites) plus new channels, products, recent and upcoming launches with plenty of frequencies, transponder details and 'footprint' maps.

The BATC Publications currently stock three ATV handbook titles, including one on Slow-Scan AN. This is the Best of CQ-TV and is a compilation of the most popular recent constructional articles and a limited number of booklets are still available.

The centre pages of CQ-TV contain the 'Members Services' supplement. Here club members can order vidicon camera tubes, video circuit p.c.b.s and video components - particularly vision processing integrated circuits. It's perhaps worth emphasising here that 'Members Services' means exactly that, the value added tax (VAT) regulations mean that goods can only be bought by club subscribers.

ANNUAL RALLY
On Sunday April 26 the BATC will be holding its annual ATV rally at the Sports Connexion near Ryton, just outside Coventry. This is the place to go for ATV kits, bits and lots more too. Maybe your local Repeater Group will be there! Visit the club display to join the BATC, meet committee people, spend money or simply just talk ATV - we just love doing lots of that!

The ATV Rally also attracts a contingent of privately owned and equipped 'scanners'. These are sizeable vehicles fitted with ex-broadcast studio suites - monitors, faster and vision mixing consoles, open reel video recorders and, of course, several weighty cameras. 'Wannabe' camera operators can be seen panning or focusing, while inside the vans an assortment of 'directors' are seated focusing. This is great fun, believe me!

Every two years, the BATC organises a Conference on Amateur Television (CAT). A CAT is not a rally, there would be fewer but more specialised trading stands and a running lecture programme. CAT '98 is due to take place around September, so watch this space.

REPEATER NEWS
Now some news from two ATV repeaters, GB3TT in Derbyshire and G83KTT near the Isle of Sheppey.

Tony GONHF is the contact for GB3TT in Chesterfield and confirms: "Yes 'TT is still on air; but now uses timed control to cut down on electricity costs during the day when the repeater is little or never used. The repeater now only transmits during the day at the required intervals for identification purposes."

The GB3TT repeater is very active most evenings. Local users in Chesterfield are Ian G1XXR, Malcolm G1HFT, Paul G6AMM, Ray G7TQZ, Ian G6ZVE and of course Tony GONHF.

About 45km further away is Bob G7AVU, whose QTH is Gainsborough, Lincolnshire. Tony comments: "Not a bad distance I guess! Mind you our Bob spends a lot of time building amplifiers and bits and pieces to get that little bit further!"

The Kent Television Group (K TG) secretary and technical co-ordinator Chris Gibbs G6GHH sends an update for the Isle of Sheppey. 1.3GHz repeater GB3KT "GB3KT continues to give good service, although the ageing dual-slot antenna will need replacing this year. The KTG has now grown to 45 members and its existence has stirred up some local enthusiasm for ATV - including a bit of home brew, which is all too scarce in these days of 'plug and play'!" Thanks for that Chris.

We have ATV pictures, but what about the sound? The 24cm f.m. (and higher bands) band has the advantage of sub-carrier audio, providing a simultaneous speech channel.

In New Zealand, the Auckland ATV Interest Group are taking this a stage further, says Michael Shepheld ZL1ABS: "The ATV kits being considered by the Auckland Group include a German/Australian sub-carrier sound generator, using 5.5MHz plus 5.74MHz f.m. carriers with stereo/bilingual mode switching sub-tones. A complete set of boards for this and a companion receiver is nearly ready".

Stereo audio is already being used for all 24cm ATV contacts between Wayne ZL1UKJ and Grant ZL1WTT.

THAT'S ALL FOR THIS TIME. SO CHEERIO FOR NOW, KEEP SENDING ME YOUR ATV NEWS, FROM WHEREVER YOU MAY BE! SEE YOU AGAIN IN THE JUNE ISSUE.

73 Graham G8EMX

SOME USEFUL ATV ADDRESSES:

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Web site: http://www.batc.org.uk

The Chesterfield ATV Group
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BROADCAST

REPORTS & INFORMATION TO ME PLEASE

- PETER SHORE
C/O PW EDITORIAL OFFICES, ARROWSMITH COURT, STATION APPROACH, BROADSTONE, DORSET BH18 8PW

- E-MAIL: petershore@pwpub.demon.co.uk

RADIO NEW ZEALAND IS UNDER THREAT AND THE VOICE OF CHINA NOW HAS A NEW NAME. READ ON AND SEE WHAT ELSE IS HAPPENING ON THE BROADCAST BANDS!

Last month I reported how it's possible to be your own high frequency engineer using the same propagation computer program that the professionals employ in some of the world's leading international broadcasters. Now we learned about another Internet resource that allows anyone to look at the important maximum and lowest useable frequencies for propagational paths between key geographic regions. If you can access the World Wide Web, check out http://www.concentric.net/~jernhall/

Bad news from the Pacific. Radio New Zealand International (RNZI) is under threat. There are plans afoot, proposed by the New Zealand Treasury, to close this respected service.

The usual to-ing and fro-ing between politicians, radio experts and the public is underway (with a similar level of response seen during the Radio Canada International and Radio Australia crises of recent years). As we go to press there is no decision; so, keep your ears on these RNZI frequencies: 0459-0816 on 11905 (to 0758 Saturday and Sunday); 0816-1206 on 9700 (from 0758 Saturday and Sunday); 1650-1850 on 9610 (Mon-Fri); 1951-2050 on 15115 (from 1859 Saturday); 2156-0458 on 17675 (from 2205 Friday and Saturday) and 2306-0458 on 15115MHz.

DEPRESSING NEWS
There's also depressing news from Moscow. The Voice of Russia is facing continued pressure from the Russian Foreign Ministry, despite extensive lobbying from the station. It seems that the Foreign Ministry does not appreciate the value of international radio from Russia.

Eight hours of English were cut at the beginning of January along with reductions in Albanian, Polish, Portuguese, Spanish, Chinese and Serbo-Croat. There may be further cuts during 1998, so tune in while you can!

English from the Voice of Russia to Europe is on at 1500-1600 on 4.94, 4.975, 7.13, 7.235, 7.26, 7.39, 9.47, 9.725, 9.84, 9.86MHz; 1600-1700 on 4.94;

**NEW NAME**

There is a new name for an Asian international radio broadcaster. The Voice of Free China ceased operations at the end of December 1997, but it was reborn the following day as Radio Taipei International. The station retains much of the same output heard under its old name, but the new title is clearly an attempt to placate Chinese authorities in Beijing who had always complained about the 'provocative' name.

The station can be received on medium wave in Israel, which has a 954kHz m.f. transmitter in Haifa. Since the middle of December, the station has been broadcasting in full time on 954kHz. This was the position of Radio Taipei before it ceased operations.

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**ERRORS & UPDATES**

ON GUARD WITH A PHOTO-ELECTRIC 'SENTRY'

Page 42 PW March 1998

There was an unfortunate error that crept into the circuit shown on page 42 of the March 1998 issue of PW. The two lines (brown and sleeved green/yellow), from the switch, out to the photo-electric cell unit should be connected to the 'L1' terminals in each case (and not the L2 terminals as shown). The green/yellow wire should, in the interests of safety, have a sleeve on this end of the wire too.

The layout around S1b in Fig. 2 on page 44 of the February 1998 issue has an error, please amend your circuit diagram to be as shown here. In the paragraph headed 'Simple Calibration', the capacitor C2 is adjusted to give the lowest reading in the reflected position.

**CARRYING ON THE PRACTICAL WAY**

Page 44 PW February 1998

The layout around S1b in Fig. 2 on page 44 of the February 1998 issue has an error, please amend your circuit diagram to be as shown here. In the paragraph headed 'Simple Calibration', the capacitor C2 is adjusted to give the lowest reading in the reflected position.

My apologies for these errors Ed.
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</tr>
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</tr>
<tr>
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</tr>
<tr>
<td>Miscellaneous</td>
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Index to Advertisers

AKD ........................................... 40
Ambyr ........................................ 36
ARC ........................................... 81
BATCH ........................................ 57
Castle Electronics .......................... 81
Centre Electronics .......................... 87
Chevet Supplies ............................. 87
Eastern Communications ................. 6/7
EPT Educational Software ............... 32
Haydon Communications ................. 29, 30/31
Howes C M ................................. 57, 69
Icom UK ..................................... 1BC
J Birkett ..................................... 87

Lake Electronics ................................ 57
Langrex Supplies ......................... 69
LAR Communications Centre .......... 69
Leicester AR Show ......................... 40
Linear Amp UK ............................. 40
Lowe Electronics ......................... 24
Maplin Electronics ....................... 52
Martin Lynch & Son ....................... 46/47
Mauritron Technical Services .......... 87
Monitoring Times .......................... 91
Moonraker .................................. 57
Multicom 2000 ............................ 18/19
Nevada Communications ................. 8/9

No Nuts ..................................... 36
Northampton Communications .......... 87
Photo Acoustics ............................ 51
QSL Communications .................... 4/5
Quarlstab Marketing ..................... 87
Radioworld ................................. 23
RAS Notts .................................. 87
RSGB ......................................... 63
SMC .......................................... 10
SMC .......................................... 10
SPR Trading ............................... 63
Sunrise Electronics ....................... 68
Waters & Stanton .......................... IFC/1, 2, 43
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