REVIEWED

QUICKROUTE
Circuit / PCB Design Package

Build
- The Sprat 3.5MHz Transceiver by G3RJV
- The PW Codecard by G4PSL
- A 1.8MHz Antenna by G4BXD

Features
- Key Tips by G3XJS
- Morse Methods by G0SKR
- Practice Makes Perfect by G4SSH

WIN
An IC-706
DONATED BY MARTIN LYNCH

MFJ-9406
Budget-Boating
50MHz Transceiver
REVIEWED
One tough little dual bander!

Features

- Frequency Coverage
  - Wide Band Receive
    - RX: 76-200 MHz, 300-540 MHz, 590-999 MHz*
    - TX: 144-146 MHz, 430-450 MHz
  - AM Aircraft Receive
  - MIL-STD 810 Rating
  - Digital Coded Squelch (DCS)
  - 112 Memory Channels
  - 12V DC Direct Input
  - High Speed Scanning
  - Alphanumeric Display
  - CTCSS Encode (Decode w/FTT-12)
  - Auto Range Transpond System™ (ARTS™)
  - Dual Watch
  - Direct FM
  - High Audio Output
  - ADMS-1C Windows™ Programmable
  - Four Battery Savers:
    - Automatic Power-Off (APO)
    - Receive Battery Saver (RBS)
    - Selectable Power Output (SPO)
    - Transmit Battery Saver (TBS)
  - Time Out Timer (TOT)
  - 2.5 and 5 Watt Versions Available
  - Optional Digital Voice Recording System (DVRS)
  - Full line of accessories

For the foremost in top-performing, durable dual band handhelds there is one choice. The FT-50R. Manufactured to rigid commercial grade standards, the FT-50R is the only amateur dual band HT to achieve a MIL-STD 810 rating. Water-resistant construction uses weather-proof gaskets to seal major internal components against the corrosive action of dust and moisture. And, the rugged FT-50R withstands shock and vibration, so throw it in with your gear!

Dynamic and exclusive features set the FT-50R apart, too. Wide Band Receive includes 76-200 MHz (VHF), 300-540 (UHF), and 590-999 MHz*. Dual Watch checks sub-band activity while receiving on another frequency, then when a signal is detected, shifts operation to that frequency. Digital Coded Squelch (DCS) silently monitors busy channels. Auto Range Transpond System™ (ARTS™) uses DCS to allow two radios to track one another. And the FT-50R is ADMS-1C Windows™ PC programming compatible, too! To round out the FT-50R, it has four battery savers, and super loud audio—remarkable in an HT this size.

A reliable companion wherever you go, the FT-50R is the tough little dual bander with all the features you want!

YAESU
...leading the way™

For the latest Yaesu news, hottest products, visit us on the Internet! http://www.yaesu.com

Specifications subject to change without notice. Specifications guaranteed only within amateur bands. Some accessories and/or options are standard in certain areas. Check with your local Yaesu dealer for specific details. *Cellular blocked.
9 EDITOR'S KEYLINES
Topical news and views from G3XFD.

10 RECEIVING YOU
Readers' letters.

12 NEWS 1996
A look at what's new in Amateur radio.

16 NOVICE NATTER
Eulene Richards G4FM shares some of the 'natterings' she's received this month.

18 CLUB SPOTLIGHT
Is your club under the PW "spotlight" this month?

20 PRACTICAL WIRELESS SUBSCRIPTIONS
Free gifts for all new subscribers this month.

21 THE IC-706 'TOP-TO-TWO' COMPETITION PART 3
With an Icom IC-706 transceiver donated by Martin Lynch.

26 MORSE SPECIAL
MORSE METHODS
John Goodall G0SKR shares some of the methods he used to pass the Morse test.

30 KEY TIPS
Experienced operator Peter Barville G3XJS passes on his 'key' tips for successful c.w. OSOs.

32 THE PW CODECARD
Terry Grice G4PSL says it's on the cards - Morse skill is easy if you build his Codecard.

33 PRACTICE MAKES PERFECT
Roy Clayton G4SSH has the 'official' word on Morse procedures.

42 METERS MADE - TAIWANESE STYLE
Mike Haydon G1KVO's trip to Taiwan was a real eye opener, read how he discovered a factory that still believes in hand craftsmanship.

57 PACKET PANORAMA
MORSE SPECIAL
Softone's PackCom software is reviewed.

63 BOOK SERVICE
Looking for a book? Take a browse through our selection.

68 ADVERTISERS' INDEX
A look at what's new in Amateur radio.
THIS MONTH’S SPECIAL

YAESU FT-1000

From £1999*

FT-1000 D
upgrade kit
£299 (consists of optional filters BPF1 & TCX01)

*Carr model. Others available. Ring for further details

ANTENNA ROTATORS

AR303 Light duty ............................................... £49.95
G-450XL New medium duty model ........................ £145.00
G-650XL New H/D version of G-450XL ...................... £369.00

G-800SDX 450° deluxe model .............................. £295.00
G-1000SDX H/D version of G-800SDX ....................... £495.00
G-2700SDX H/D rotator 450° ............................... £995.00
G-500A Elevation rotator ...................................... £289.00
G-5400B AZ/EL rotator ................................. £529.00
G-5600B AZ/EL rotator H/D .................................. £529.00
RCS-1 Medium duty create ............................... £299.00
RCS-3 Medium duty + preset ......................... £439.00
RC5A-3 H/D + preset ........................................ £299.00
RC5B-3 V/H/D + preset ..................................... £399.00
GC038C Loaves clamp G-600 ................................. £250.00
MCN Loaves clamp create .................................. £499.00
GS-056 Rotary bearing up to 1% mast ................... £210.00
GS-065 Rotary bearing 2% mast ....................... £450.00
CIX6 Rotary bearing 2% mast ............................. £450.00
CD-45 Telax meter controller .............................. £315.00
HAM IV Medium duty meter controller ..................... £499.00
HIV High IV with digital controller ......................... £749.00
TZX H/D with meter controller .......................... £525.00
TZXD TZX digital controller ............................... £795.00

SOUTH MIDLANDS COMMUNICATIONS

Carr A = £2.75  B = £5.50  C = £9.50 (mobiles)  D = £13.50 (base stations)  E = £16.50

Practical Wireless, July 1996
SECONDHAND STOCK

PHONE FOR
BEST DEALS

01703 251549

Would you buy a radio from this man? No! Then buy with confidence from SMC

This month’s SPECIAL BARGAIN BUY

ICOM IC-775DSP HF Transceiver

Recommended retail price £3699.00

ONLY TWO MONTHS USE!

From £225.00

FT7900H

PX

FT7990

FT7990M

FT7990D

FT7900

FT7800

FT7700

FT7600

FT7500

FT7400

FT7300

FT7200

FT7100

FT7090

FT6900

FT6800

FT6700

FT6600

FT6500

FT6400

FT6300

FT6200

FT6100

FT5900

FT5800

FT5700

FT5600

FT5500

FT5400

FT5300

FT5200

FT5100

FT5000

FT4900

FT4800

FT4700

FT4600

FT4500

FT4400

FT4300

FT4200

FT4100

FT4000

FT3900

FT3800

FT3700

FT3600

FT3500

FT3400

FT3300

FT3200

FT3100

FT3000

FT2900

FT2800

FT2700

FT2600

FT2500

FT2400

FT2300

FT2200

FT2100

FT2000

FT1900

FT1800

FT1700

FT1600

FT1500

FT1400

FT1300

FT1200

FT1100

FT1000

FT9000

FT8900

FT8800

FT8700

FT8600

FT8500

FT8400

FT8300

FT8200

FT8100

FT8000

FT7900

FT7800

FT7700

FT7600

FT7500

FT7400

FT7300

FT7200

FT7100

FT7000

FT6900

FT6800

FT6700

FT6600

FT6500

FT6400

FT6300

FT6200

FT6100

FT6000

FT5900

FT5800

FT5700

FT5600

FT5500

FT5400

FT5300

FT5200

FT5100

FT5000

FT4900

FT4800

FT4700

FT4600

FT4500

FT4400

FT4300

FT4200

FT4100

FT4000

FT3900

FT3800

FT3700

FT3600

FT3500

FT3400

FT3300

FT3200

FT3100

FT3000

FT2900

FT2800

FT2700

FT2600

FT2500

FT2400

FT2300

FT2200

FT2100

FT2000

FT1900

FT1800

FT1700

FT1600

FT1500

FT1400

FT1300

FT1200

FT1100

FT1000

FT9000

FT8900

FT8800

FT8700

FT8600

FT8500

FT8400

FT8300

FT8200

FT8100

FT8000

FT7900

FT7800

FT7700

FT7600

FT7500

FT7400

FT7300

FT7200

FT7100

FT7000

FT6900

FT6800

FT6700

FT6600

FT6500

FT6400

FT6300

FT6200

FT6100

FT6000

FT5900

FT5800

FT5700

FT5600

FT5500

FT5400

FT5300

FT5200

FT5100

FT5000

FT4900

FT4800

FT4700

FT4600

FT4500

FT4400

FT4300

FT4200

FT4100

FT4000

FT3900

FT3800

FT3700

FT3600

FT3500

FT3400

FT3300

FT3200

FT3100

FT3000

FT2900

FT2800

FT2700

FT2600

FT2500

FT2400

FT2300

FT2200

FT2100

FT2000

FT1900

FT1800

FT1700

FT1600

FT1500

FT1400

FT1300

FT1200

FT1100

FT1000

FT9000

FT8900

FT8800

FT8700

FT8600

FT8500

FT8400

FT8300

FT8200

FT8100

FT8000

FT7900

FT7800

FT7700

FT7600

FT7500

FT7400

FT7300

FT7200

FT7100

FT7000
**Package Deal**

**SPECIAL OFFER**

Purchase the superb IC-706 along with our superb SG-230 "Smartuner" automatic antenna tuner at the very special price of

£1325.00

Carr £10.00

SAVE £269.00

**SG-230 Smartuner®**

Antenna Coupler SSB, AM, CW & DATA

£399.00

You can't buy a smarter tuner than this, An automatic antenna coupler so intelligent it precisely tunes any length antenna - 8 to 80ft - in the HF band.

The Smartuner® automatically evaluates and switches 64 Input and 32 output capacitance combinations, plus 256 inductance combinations in a "pi" network. The amazing result is over a half-million different ways to ensure a perfect match for your transceiver. And the most intelligent feature of all is that the Smartuner® remembers the chosen frequency and tuning values, and will automatically reselect those values - in less than 10ms, each time you transmit on that frequency.

Try Smartuner®

**SWR Meters**

**NISSEI RS-402**

125-525MHz

(200W)

PWR + full SWR indicator and meter illumination.

RRP £69.95 P&P £4

**NISSEI RS-102**

1.8-150MHz

(200W)

PWR + full SWR indicator and meter illumination.

RRP £69.95 P&P £4

**Microphones**

**MS-107 "K" miniature hand microphone.**

Fits Kenwood, Yaesu, Icom and Alinco.

RRP £16.99 P&P £1

**Secondhand**

<table>
<thead>
<tr>
<th>Product</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kenwood TS-50S HF transceiver (ex cond)</td>
<td>£775.00</td>
</tr>
<tr>
<td>Trio TS-520S amateur band HF transceiver</td>
<td>£345.00</td>
</tr>
<tr>
<td>Icom IC-738 HF transceiver</td>
<td>£120.00</td>
</tr>
<tr>
<td>Icom IC-2KL linear C/W matching PSU &amp; 500W auto ATU</td>
<td>£110.00</td>
</tr>
<tr>
<td>Yaesu FT-736R C/W 2M/70cms &amp; 6M (ex cond)</td>
<td>£995.00</td>
</tr>
<tr>
<td>Yaesu FT-1 HF transceiver</td>
<td>£690.00</td>
</tr>
<tr>
<td>Tokyo HT-120 20M SSB/CW transceiver</td>
<td>£149.00</td>
</tr>
<tr>
<td>RN 6M 25W Transverter</td>
<td>£149.00</td>
</tr>
<tr>
<td>Icom IC-290E 10W 2M multimode</td>
<td>£289.00</td>
</tr>
<tr>
<td>Alinco DR-112 2M FM mobile 25W</td>
<td>£120.00</td>
</tr>
</tbody>
</table>

**5 Year Warranty Available**

**Example**

Yaesu FT-1000 with 1 Year manufacturers warranty = £169.80

4 years extra warranty = £169.80

**Authorised Agents for Kenwood, Icom, Yaesu & Alinco. Full Service Facilities Available.**

Spend up to £1,200 instantaneously with a Photo Acoustics Ltd. Credit Charge Card.

PART EXCHANGE WELCOME. Ask for Kerry G6IZF or Jane.

Retail showroom open Mon - Fri 9.30 - 5.30, (Thursday 9.30 - 12.30) Saturday 9.30 - 4.30

Goods normally dispatched within 24 hours. Please allow 7 banking days for cheque clearance. Prices correct at time of going to press - E&OE.
**New DX-394**

- **Frequency Coverage**
  - LW: 150 - 509.9kHz
  - MW: 510 - 1729.9kHz
  - SW: 1.73 - 29.9999MHz
- **Fine Tune**
  Fine tunes the reception signal, especially when you tune to SSB and CW
- **Step ▲, Step ▼**
  Selects the 0.1, 1, 5, or 10 (9) kHz tuning frequency step sequentially
- **Band**
  Selects LW (150-509.9kHz), MW (510-1729.9kHz), or SW (1.73-29.9999MHz) sequentially
- **LCD**
  Large LCD display with LCD signal strength meter

---

**SRP TRADING**

SRP Radio Centre, 1686 Bristol Road South, Rednal, Birmingham B45 9TZ.
Tel: 0121-457 7788/0121-460 1581
Fax: 0121-457 9009

---

**UK's Premier Service Centre**

FINANCE NOW AVAILABLE
PART EXCHANGE WELCOME

**STAR BARGAINS**

- **ICOM**
  - IC386 mobile complete with power supply and Y30 dual band antenna: £575
  - IC730 complete with ATU: £1,299

- **KENWOOD**
  - TS450 complete with ATU: £1,199
  - TS870: £2,099

- **YAESU**
  - FT990 HF 100W (DC): £1,499
  - FT1000MP (AC): £2,499

Now stock ALINCO and WATSON – Phone for details.

PHONE 01384 298616 OR VISIT US TODAY
GEOFF G4AQU – JOHN G6VJC
Finance available – interest free deals

Unit 3, Baird House, Dudley Innovation Centre
The Pensnett Estate
Kingswinford
West Midlands DY5 8XZ
Telephone 01384 298616
Fax 01384 270224

Open Tuesday to Saturday (Late Night Tuesday 7.30pm) Closed Monday
**JOIN THE DIGITAL REVOLUTION TODAY WITH SISKIN!**

Just the sound of those words “Digital Radio” is often enough to frighten many people away from what outwardly appears to be a complex and hi-tech aspect of our hobby. Terms like “baud rate” and “RS-232” probably were not even mentioned when you swatted your way through the RAE and yet the advent of the Internet and the home PC has generated a whole new vocabulary we are all supposed to be conversant with!

At Siskin we’ll try our best to take away the guess work and guide you through the ‘techno-maze’ and chances are you’ll wonder what all the fuss was about. (Our oldest customer is 82 whilst our youngest is just 9.)

Siskin offer the W-i-D-E-S-T selection of amateur digital products in Europe available at key locations in the UK including Southampton, London, Axminster and Leeds with a staff of over 65 people ready to help you. We offer an incredibly large selection of ready-made computer-to-TNC and radio-to-TNC cables at down to earth prices and we ALWAYS include software at no extra charge.

So where to start ...

**OUR FLAGSHIP MODEL...**

**THE AEA DSP232** - at last, we have them in stock and they are going like wildfire. The DSP232 is the natural successor to the best-selling PK232 model. Using state-of-the-art Digital Signal Processing techniques the DSP232 is able to emulate many popular hardware based modem characteristics such as RTTY, AMTOR, ASCII, PACTOR, CW, HF PACKET. 1200/9600 Packet and more!

At the moment we are also bundling a free copy of PC Pakratt for Windows II software (normally £79) and ready-made cables! £479 plus carriage.

**BREAD AND BUTTER STUFF !!**

The **AEA PK-12** , a no-nonsense plug in and play 1200 baud TNC with built-in Personal Mailbox (expandable to over 100K), software DCD as standard (means you can run with the squelch wide open) and of course ready-made cable and software. A snip at £129 plus carriage. (128K upgrade model available at just £149.)

The **PACCOMM TINY 2 MKII** - over 19,000 sold and still going strong. The superbly engineered 1200 baud TNC again sports a built-in Personal Mailbox, upgradable to 9600 baud operation, lots of their party add-ons for Node and BBS operation, also makes an ideal platform for satellite operations. Again the Tiny includes ready-made computer and transceiver cables plus software, £139 including VAT plus carriage.

**THE SISKIN MINI-PAK** - well, this isn’t actually a TNC but a surface mount constructed miniature modem built inside a 9-way D Shell. The Mini-Pak is actually made for us by Baycom in Germany and unlike many dubious clones you’ll see advertised elsewhere the Mini-Pak is supplied with an official copy of the BayCom software and manual plus ready-made lead.

**THE SYMEK TNC2H** - a beautifully made German 9600 TNC2 compatible, ideal for regular AX25 Packet plus TCP/IP and satellite operations. The TNC2H employs officially licensed G3RUII 9600 technology and is gaining popularity fast. We’ve kept the price keen on the TNC2H at just £179 plus carriage including a ready-made computer cable and software. (Ready-made radio cables are available at just £14.95 each.)

**THE AEA PK96** - similar to the PK12 but with the added convenience of 9600 or 1200 baud Packet Radio with a simple software command. Supplied complete with ready-made transceiver and computer cables, software, and, if you mention the words “I SAW YOUR AD IN PW” we’ll chuck in the 128K optional ram upgrade free of charge (offer ends July 31st 1996). Price £219 plus carriage.

**AND THAT’S JUST A SMALL SELECTION OF WHAT’S ON OFFER.**

PLEASE CALL OR WRITE FOR A FREE CATALOGUE.

---

**A 10 watt 70cms 1200/9600 baud ready radio for under £100?**

Yes, that’s right, we have 100 70cms SMC 545L1 transceivers modified a per Chris Lorek’s 9600 baud Packet article in April’s HRT! Just check out the spec:

- Minimum 10 watts out at 430MHz (spurious emissions of less than 0.25µV)
- Receiver sensitivity 0.3µV for 12dB SINAD
- Selectivity -60dB at 25kHz
- Connections for 9600 Packet Radio straight from the front panel mic socket, no mods or fiddly wiring to do
- 25kHz filter fitted as standard
- These are actually MTP 1301 approved (commercial spec) radios!
- Supplied with 432.675 MHz as standard fitment
- Full 12 month warranty.

Cost - £99.00 including VAT plus £6.50 P & P

We also have a limited quantity of regular “Microphone” model versions of this radio unmodified and uncrystalled at special prices. Royce and “Club/group deals available too! Ask for Phil, Dave, Toby or Graham, Michelle or Colin.

---

**SMC SISKIN, School Close, Chandlers Ford Industrial Estate, Eastleigh, Hants S053 4BY**

Tel: 01703 254247 (Direct line 0900 - 2100)

And if it’s engaged? ...

OK, our direct line gets busy at times during office hours so if it’s an order you wish to place dial 01703 255111 and ask for Phil, Graham, Dave or Toby all of whom are radio amateurs by the way!

Or ... Fax us 01703 263507

Or ... E-mail us info@siskin.co.uk
**Alinco DR-605**
2m & 70cms Mobile inc CTSS*
Full Duplex - Cross-Band Repeat - 100 Mem
*Encode only.

**FT-736R**

**VU-30**
Dual band 1-6/30W £259
R-25 2m 1-4/30W linear £84.95
RU-45 70cm 3-15/45W linear £165.95
R-50 2m 1-7/50W linear £109.95
RU-20 70cm 1-3/20W Linear £119.95
All with GaAsFET pre-amps.

**Portables**
Can run a 100W rig or Start your car!

**ALINCO DJ-190E**
This is the new exciting handheld from ALINCO. For an unbiased opinion, read the PW Review in the May issue. It's the ideal rig to keep in the car, in the brief-case, or to take on holiday. At our price you can afford to!

- **2 metres Handheld**
- **CTCSS Encode**
- **1750Hz tone**
- **40 Memories**
- **Wideband Receive**
- **Ni-cads**
- **AC Charger**

**73kHz New Ham.Band**
Receiver converters - £39.95

**Compact Scanners**
World's Smallest

**WS-1000**
£149

**FT-1000M P-OC**
£2599
£2089

**FT-1000MP-AC**
£2849
£2279

**FT-990DC**
£1999
£1599

**FT-736R**
£1999
£1399

**FT-50R New**
£329
£299

**FT-840**
£959
£789

**FT-2500**
£399
£329

**FT-51R**
£529
£399

**FT-470**
£54.95

**R-25 2m 1-4/30W linear**
£84.95

**R-50 2m 1-7/50W linear**
£109.95

**R-20 70cm 1-3/20W Linear**
£119.95

**SWR Meters**

**ALINCO DJ-190E**
This is the new exciting handheld from ALINCO. For an unbiased opinion, read the PW Review in the May issue. It's the ideal rig to keep in the car, in the brief-case, or to take on holiday. At our price you can afford to!

- **2 metre Handheld**
- **CTCSS Encode**
- **1750Hz tone**
- **40 Memories**
- **Wideband Receive**
- **Ni-cads**
- **AC Charger**

**ADI AR-146 2m Mobile**
Our Price
£269

**DJ-G5 Dual Band**
Includes a host of exciting features. You get CTCSS built-in, 200 memories, as standard and a wideband receiver covering 101-174/430-470/600-900MHz. You’ll love its compact size and its electronic vol. / squelch controls. Send today for full details of tomorrow’s handheld.

**JUST ARRIVED**
Cushcraft R-7000 11 vertical plus optional 80m kit. (Beefed-up R-71 £369

**Power Supplies**
3 Amps to 30 Amps - Fully Protected

**ALINCO DX-70 In Stock**

**THESE DEALS END ON 31st JULY**

**VISA**
Tel: (01702) 206835 / 204965 Fax: (01702) 205843

**Shop & Mail Order**
22, Main Road, Hockley, Essex. SS5 4QS

**24 Hour Answerphone and Fax. Open Mon-Sat. 9am - 5.30pm**
Summer '96 Cirkit Catalogue now in preparation...

On Sale 25th April 1996

The Summer 1996 Catalogue has 280 pages packed with over 4000 products.

- New Multimedia CD ROM Titles
- New Radio Amateur Equipment
- Even Further Additions to our Computer Section
- PIC Microcontroller Projects and Modules
- 280 Pages, 25 Sections and Over 4000 Products from some of the Worlds Finest Manufacturers

Cirkit Distribution Ltd > Park Lane > Broxbourne > Herts > EN10 7NQ

Tel: 01992 448899 Fax: 01992 471314

Listen to Your World!
Subscribe to Monitoring Times and Satellite Times Magazines

Do you own a radio, a shortwave receiver, a scanning receiver, or a ham radio? Then Monitoring Times is your magazine! Each monthly issue of MT offers 20 pages of worldwide, English language, shortwave broadcast schedules; departments on aero, military, government, public safety communications; broadcast band, satellite television, long-wave coverage; reviews of new products and radio-related software; technical articles and projects for the hobbyist; feature articles, and much, much more.

Satellite Times is the world's first and only full-spectrum satellite monitoring magazine, exploring all aspects of satellite communications, including commercial, military, broadcasting, scientific, governmental and personal communications as well as private satellite systems. The satellite industry's most respected experts contribute to every bi-monthly issue of Satellite Times, addressing both amateurs and experts alike.

If it's in orbit, Satellite Times covers it!

Mail this subscription form to: PW Publishing Ltd., Freepost, Arrowsmith Ct. Station Approach, Broadstone, Dorset BH18 8PW.
Subscription rates include speedy Air Mail Service!
☐ 1 Year Monitoring Times - £38 (12 issues)
☐ 1 Year Satellite Times - £32 (6 issues)

Name
Address
Postcode
Telephone

If it's on the radio, it's in Monitoring Times!

Please visit our new site on the World Wide Web: www.grove.net
Radio is fascinating isn't it? Our hobby has provided me with a great deal of enjoyment over the years and I'm always amazed what 'side-tracks' interests (forgive the deliberate pun on railways) arise from Amateur Radio and I must admit that I find meteorology to be an absorbing subject indeed.

I've only had a few days in the office after returning from holiday in County Cork, Ireland (from 23rd April to 4th May), before having to rush off to the Dayton Hamvention. But I had great weather during my stay in Ireland and I really began to wonder how much connection there is between the weather and h.f. band conditions. I say this because I really do think the weather conditions on earth do play more of a part with h.f. propagation than we realise.

During my stay (as a guest of my old friend John Tait EI7BA) at the former Coastguard Station at Power Head near the entrance of Cork Harbour, I had some excellent weather and there were one or two v.h.f./u.h.f. 'lifts'. The effects of temperature inversions and 'marine dundering' also proved to be fascinating indeed.

At one time, the West Cornwall 144MHz repeater came romping in on my hand-held transceiver and 70MHz QSOs from the Derby/Nottingham areas were being received at 59+... However, the 'DX' that intrigued me was provided by my 'Orange' cellphone!

Using the Alinco DX-70 in conjunction with a crude but effective long wire antenna I was having my first prolonged session on the 17 metre (18MHz) band. The improved conditions really did seem to coincide with the clear, cold and dry weather associated with the high pressure atmospheric conditions.

I found that 14MHz was 'wide open' to the USA (east and west) until 0100UTC. I was getting 59+ reports from my temporary station running less than 70W into a what was (to be quite honest) a very crude antenna.

I would be interested to hear from anyone else who might be thinking on the same lines as myself. Is there much more of a direct connection between h.f. conditions and the day-to-day weather than we think? But whatever the outcome of my observations are, I'm now determined to be more active on 10 and 18MHz. It was great fun using the bands, and (for the time being anyway) you avoid the 'scrum' on 14MHz!
Novice Net

Dear Sir

I'm writing in connection with an article in your March '96 issue in the 'Novice Nuiter' section about Alex 2EOAJJ from Cheddar starting a QSO with myself, although it had only appeared in the May issue. I had just taken the Novice XAE exam and had gained my callsign 2E1EUQ, obviously my next step is the 5w.p.m. Morse.

I'm currently learning it at my local club Manchester & DARS and have purchased the MFI-411 Morse Tutor, which I carry with me at work.

I notice the suggested Net is obviously on a band not allocated to my callsign. So I am wondering how somebody like myself who would like to practice two-way QSOs would know what was meant by an O-1 or a triode?

Good Old Days

Dear Sir

I have just been reading the most interesting and nostalgic article "The Good Old Days" by Jack Belcher in PW May. It made me wonder how many GOs would know what was meant by an O-V-1 or a triode?

Photo Acoustics

Dear Sir

I recently purchased a used SGC Inc. SG 2000 from Photo Acoustics. After a week's use I found that the programming had become temperamental and the Transmit/Receive relay at times would quite make contact when switching over to receive.

On contacting Photo Acoustics about the problem, they in turn contacted SGC in the USA and it was decided by both firms that the radio should be returned to the manufacturers.

The radio was duly despatched and 22 days later it was back in my shack and working to full specifications. Also the radio had been brought up-to-date and had a new Control head exchanged for the old one - all this was done free of charge!

Many thanks for their excellent after sales service to Photo Acoustics and SGC Inc. USA.
Peter Igo G1ANQJ
Co. Down

Editor's comment: Many letters intended for PW's Postbag. If your letter is published you'll win a prize.

American Constructor

Dear Sir

I have recently started subscribing to your magazine and am really impressed with your publication. The construction articles are great. I have enjoyed building several of the antenna projects and had very good results with the performance of the antennas.

Here in the States, it is easy to purchase equipment, if you have the money. I enjoy building anything that I can and in this respect, find Practical Wireless a real gem for construction projects. Please keep up the good work with PW. It certainly is a great magazine and I really enjoy each issue.

Ed Slade NSTQP
USA

Editor's reply: Nice to hear from you Ed and the team hope you carry on enjoying the magazine. Incidentally, Ed sent us details of an interesting construction project which we are now researching for use in PW and we'd also like to hear from our other worldwide readers about kits and projects that they've built which originated from their country.

Antenna Reviews

Dear Sir

It's nice to see reviews of antennas in your magazine. Is it possible to review a 3.5 to 28MHz vertical sometime, as this is what I'd be personally interested in. I believe that there are three on the market, one from Cusker, another from Nevada and the third I can't remember. Of course there may be more. Verticals without ground planes is what we want!

Meanwhile thanks for the interesting magazines. I particularly liked the 'Filters in Receivers' reference to the Ian Poole's 'Farewell To Ferranti' article in the April '96 issue. It brought back many memories.

Howard G3UPZ
Reading

Editor's comment: Bearing in mind that many readers are stuck for antenna space, we intend to devote a future edition of 'Antenna Workshops' entirely to vertical antennas. In the meantime Howard I hope you found our recently published 'Antenna Data Sheet' (presented free with the May PW) helpful, especially as loop and cubical-quad antennas are actually very good for 'tight' locations.

Ferranti

Dear Sir

After reading Roger Barrow GSILD's letter in the April '96 issue of Practical Wireless I feel I must also write with reference to the Ian Poole's 'Farewell To Ferranti' article in the February '96 issue. I started work at Ferranti, Edinburgh, in 1956 and retired in 1992. Two names stuck out from Ferranti's the early 'Cold War' days. One, Sir John Tootle, was an Englishman who loved and did a great deal for Scotland, and a Scot who he employed to head a team to design and build a system to machine the complex waveguides required for radar systems. Early circuit boards, discrete components, hand


Ferranti, most British machine tool manufacturers are history. I have no doubt that as a small boy in Edinburgh, Theo Williamson read *Practical Wireless* and it’s ironic that its readers today probably are along with hi-fi magazine readers, the only ones to have read anything about Williamson. Dean Thomson Edinburgh

**Flying The Flag**

**Dear Sir**

Reference the subject of ‘invisible antennae’ in the June issue of *PW* (‘Antenna Workshop’, p48), there is yet another means of erecting an ‘invisible’ sky wire. That is by no means a temporary ‘flagpole’, hunging at the bottom to a short post and at the top by a removable bracket. Thus held in place, it can truly be described as being of only a temporary nature.

However, be sure to fly a flag from the top on such occasions as highdays and holidays as well as birthdays and suitable occasions. Then the neighbours will not have any suspicions as to its true purpose, and will merely think you are slightly round the bend!

The actual aerial can be an inverted ‘V’, a vertical trap dipole running up the side of the (wooden) pole and the other side to the neighbours house, or even a very thin horizontal inverted ‘L’ - so thin that nobody will notice it from a few yards away.

Douglas Byrne G3KPO Isle of Wight

**Editor’s comment:**

Who I was on holiday recently, I worked several people on the h.f. bands who had overcome the problem of ‘no antenna’ rules at their home. One (a Dutch radio amateur) was legitimately able to park his sailing dinghy in his driveway, and although not ideal, the metal mast made a very useful 7m high mast (no doubt an anchor chain would make a good counterpart). Many other operators operate from their cars, or even connect the mobile antenna to an operating position in the house. If you operate amateur radio under difficult ‘planning’ conditions, please write, we’d like to hear from you.

**Trapezoids, Triangles & Squares**

Dear Sir

I am much indebted to Patrick Allely GW3JKW on his excellent article ‘Trapezoids, Triangles & Squares’ (PW June) in which he very clearly explained the difference in locators and WAB squares. One point he mentioned quite rightly was that Irish amateurs were asked for their WAB location which did not apply.

However, here in Northern Ireland we do have WAB squares based on the Irish National Grid and we often refer to them when asked for a WAB location, for example, my WAB reference is H47 (only one letter is used in the Irish National Grid) - just a slight correction and thanks once again.

Kenneth Allen GI4RSI Co. Tyrone

---

**Transmissions Below 30MHz**

Dear Sir

As a relative newcomer to amateur radio, I would like to express my opinion regarding ‘Transmissions below 30MHz’, why should I have to pass a Morse test? I cannot think of any reason other than it’s a traditional method of radio communication.

I regularly listen to QSOs on h.f. and find it annoying that I am not allowed to reply to a CQ call on s.s.b. or f.m. just because I do not understand a series of dots and dashes. I don’t ask my wife if the tea is ready by sending Semaphore and asking her to reply by Aldis lamp!

My RAE course and exam were thorough and covered all aspects of amateur radio and I think a newly licensed operator should be asked to obtain several years’ experience before becoming a ‘real radio amateur’. Most of the Class A operators I know have forgotten the code and never used it since passing the test!

Steve Eastwood G7POT Castletford

---

**Practical Wireless**

Forty years ago was always a rather special occasion for radio amateurs, with the number of QSOs made on special occasions. Let alone on their birthday, or Christmas. Sometimes we used to take a QSO on our ‘anniversary’ for example.nderstanding that they have only been submitted to Practical Wireless. Please ensure that your letter is clearly marked ‘for publication in Receiving You’ and that it has not been submitted to other magazines. We reserve the right to edit or shorten any letter.

The views expressed in letters are not necessarily those of Practical Wireless.
Hand-in-Hand - SMC & Siskin

As briefly reported in last month's *PW*, South Midlands Communications have recently acquired Siskin Electronics, the UK's premier supplier of digital amateur radio equipment transmission equipment. Phil Bridges G4DLJ, the well known driving force behind Siskin, has moved the complete company operation to a dedicated facility at SMC's HQ in Eastleigh.

Phil has said that he feels the acquisition is "great news for all Siskin's customers old and new, which will mean better demonstration facilities together with the additional bonus that Siskin products and 'know-how' will be available at all of SMC's branches".

Graham Taylor SMC's Retail General Manager, commented that 'Siskin's approach to a 'plug-in-and-play' solution with all the radio/computer cables being ready-made and bundled with software has got to be the answer for today's busy radio amateur. As Siskin and SMC were both already Official Factory appointed AEA distributors it made sense to team up and offer our customers a complete solution. All existing Siskin products, will be introduced into SMC branches making one-stop shopping for the radio enthusiast a reality at last. We also intend to apply Phil's expertise to many of our commercial radio projects.'

For further information on the full range of products available please contact Graham Taylor or Phil Bridges at South Midlands Communications Ltd, SM House, Chalmiers Ford Industrial Estate, Eastleigh, Hampshire SO53 4BY.
Tel: (01703) 255111, FAX: (01703) 263507 or E-mail: smc@tcp.co.uk.

New Amateur Band

The Radiocommunications Agency (RA) have just announced a new amateur band allocation in the I.F. part of the radio spectrum. The allocation of 71.6 - 74.4 kHz has been assigned as a result of many requests from the amateur radio community.

Operation on the new 73 kHz band is permitted on an experimental basis by Notices of Variation (NoV) to holders of individual A Class Amateur Radio Licences, which wish to investigate I.F. propagation including transmission to underground caves. All operation should be carried out from the main station address with an e.r.p. of 1W on any mode.

No mobile or maritime mobile operation is permitted on the 73 kHz. Any Amateur wishing to use a Temporary Location needs to give seven days notice to the District Office of the Radio Investigation Service.

The Radiocommunications Agency has arranged for the RSGB to process all applications for NoVs. All requests must include Name, Callsign, Main Station Address, Modes to be used and the details of whether the applicant intends to operate from a temporary location.

Some background information explaining the reasons for making the application and its intended use must also be included when applying for a NoV. Applications should be sent to I.F. Allocation, HF Committee, RSGB, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE.

Knutsford Knowledge

For the last 20 years or so, Cheshire-based Gordon Adams G3LEQ has been producing cassette-based audio teaching courses to help students learn Morse.

Gordon's system is based on the idea that most people have access to a cassette recorder, and that it can be turned to their advantage as a 'teaching machine' for learning Morse and other requirements. Gordon says in his promotional material that "The sets of C90 cassettes have helped many radio amateurs get their A licence".

More recently, Gordon has introduced a set of cassette-based RAE lessons, which covers the full syllabus of the examination on 10 C90 cassettes.

Full details of RAE course, prices and syllabuses of the Morse Course are available direct from Gordon Adams G3LEQ, 2 Ash Grove, Knutsford, Cheshire WA16 8BB. Tel: (01565) 62562 or FAX: (01565) 634560.

Holdings Streamlines

Harry Leeming G3MIL, proprietor of Holdings Amateur Electronics, 45 Johnston Street, Blackburn BB2 1EF. Tel: (01254) 39895 has recently been looking at the possibilities of separating the sales and repair side of his business, to allow him more time to concentrate on repairs and renovation of second-hand equipment. He had hoped that a partnership could be arranged but unfortunately this has not been possible, so Harry has decided to reduce the shop's opening times.

From July, Holdings Amateur Electronics will open on three consecutive days only, Thursday, Friday and Saturday. This will enable Harry and Brenda more time to themselves and will mean that Harry can spend more time in his workshop.

Eddystone User Group

Owing to increasing numbers of membership enquiries Ted Moore of the Eddystone User Group has been experiencing difficulties in dealing with all the incoming mail himself. Therefore, Ted has arranged for all newsletter and technical mail to be dealt with by Jim Murphy, EUG, 63 Wrose Road, Bradford, West Yorkshire BD2 1LN and all requests for subscriptions and copies of manuals to be dealt with by Mr Graeme Wormald 15 Sabrina Drive, Bewdley, Worcestershire DY12 2RJ.

Practical Wireless, July 1996
Reducing That Noise!

Lake Electronics NRF2 Noise Reduction Filter

Many simple receivers have one major problem, excessive high frequency noise (hiss). This noise on a signal makes it very tiresome to listen to for long periods. What is needed is a noise filter - to take away the noise and just leave the wanted signal.

An ideal filter wouldn't need a power supply, and may be added to any receiver. The Lake Electronics NRF2 filter is such a filter.

The NRF2 is a simple looking 70x48x24 mm box with an input lead, an output socket and a switch to bring the unit in and out of operation. It’s supplied with two adapters (3.5/6.3mm and 6.3/3.5mm) to fit into the headphone socket of the radio, the NRF2 can cope with any combination of socket on the plug on the radio and headphones.

The NRF2 is very effective. (The noise almost disappears leaving a quieter but more clear signal - a useful addition to any receiver. G1TEX), and costs £16.50 plus £1 P&P. To order yours contact Alan Lake at 7 Middleton Close, Nuthall, Nottingham NG16 1BX. Tel: (0115) 9382509.

Optoelectronics Catalogue

A new 22-page full colour Optoelectronics catalogue featuring frequency counters, recorders and many items of hobby related equipment is now available from UK distributors Waters & Stanton Electronics. To receive your copy just send your name and address together with a first class stamp to 22 Main Road, Hockley, Essex SS5 4QS.

Introducing QRP

Dick Pascoe GB8PS of Kanga Products has just published his second book. Introducing QRP is an A5 sized book containing a wealth of information. Chapters include: 'What is QRP', 'Typical QRP Equipment', 'Antennas', 'Q Codes' and 'QRP Clubs around the world' to name a few.

Introducing QRP is written in the same similar, friendly and easy to understand format as Dick’s first book, Pascoe’s Penny Pinchers and should fit comfortably on the book shelf of both the established and would-be QRPers alike. Dick’s book should make a useful reference guide, no matter what your level of QRP expertise and is a must for any serious QRPer.

To order your copy of Introducing QRP contact Kanga Products, Seaview House, Crete Road East, Folkestone, Kent CT18 7EG. Tel/FAX: (01303) 891106.

Single Frequency Radio Travel

Eurotunnel, NTL and Radio Services Ltd. have launched a new concept in radio broadcasting. Travellers heading down the M20 towards the Channel Tunnel can now hear music, news, travel information and weather reports on Channel Travel Radio which is broadcast on 107.6MHz.

Channel Travel Radio works by using multiple low power transmitters all on the same frequency. This means that listeners don't need to re-tune as they head towards the Channel.

The Crawley (Hampshire) based company NTL were awarded the contract to design, build and operate the single frequency network by Eurotunnel. The network installation consists of a main transmitter near the Eurotunnel terminal building in Folkestone together with three 'repeater' sites covering the M20 approach road back beyond Ashford.

It’s hoped that the single frequency network (the first of its kind to be constructed in the UK) will be adapted to run along other British motorways. This would give road users their own dedicated radio service and would do away with the need for re-tuning to local stations as travellers from region to region.

STOP PRESS New National Society

As this issue was going to press we received news of the United Kingdom Radio Society (UKRS), which aims to become a new national radio society. The UKRS organisers say that has been formed in response to overwhelming demand from all over the United Kingdom and will cater for enthusiasts in all aspects of the radio hobby.

The UKRS press release states that one of the main aims of the UKRS will be to take demonstrations into schools and colleges giving youngsters an insight into amateur radio. They also say it’s hoped that a combination of the UKRS and the RSGB working in parallel for their members common interests will have a much wider reach for radio.

Low Power Introduction

Among the attractions planned for the SSMC show will be a free draw, rig checks, Morse testing, local BBS and Packet cluster demonstrations. There will also be all the usual SSMC product lines available together with special offers and bargains. Why not make a date in your diary to go along and meet the team?
**VHF/UHF HANDHELDs**

**NEW YAESU FT-50R**
Yaesu’s answer to the Icom T-7E new ultra compact dual band transceiver with wideband Rx. 76-990MHz (AM, FM, FM-N).
RRP £289.95

**ICOM IC-T7E**
Rx available 108-180/400-500/850-950MHz Compact dual band h/held. Incredibly, everything you would possibly want incl CTCSS fitted as standard along with high power nicad + charger. RRP £289.95.
Our Price £299.00 + FREE speaker mic

**VHF/UHF MOBILES**

**YAESU FT-2200**
2M FM mobile transceiver with mobile mount/mic + DC lead. Supplied.
FT-2500M £339.95
FT-2900II £219.95

**YAESU FT-736R**
Multitmode-VHF/UHF full duplexe base. Fitted with 2M & 70cm (25W both). Optional 6M + 23cms, RRP £413.95.
Our Price £1399.00

**ICOM IC-2710H**
Dual band FM mobile with detachable head. Optional Rx: 108-180/400-500/850-950MHz. RRP £675.
IC-2350H dual band mobile RRP £599.50

**HF TRANSCEIVERS**

**30 DAY SPECIAL**

**YAESU FT-1000MP (AC)**
State of art HF transceiver. RRP £2849.

**YAESU FT-840**
UK’s best selling HF transceiver. We're giving away a FREE P-2512 power supply with every transceiver sold. RRP £1995.
Our Price £799.95

**IC-704**
HF transceiver with 6M + 2M. Give us a call for the best part-ex deal or lowest UK price.
Our Price £1899.95

**HF ACCESSORIES**

**P-2512**
25-30 amp power supply with variable volts (3-15). Dual meters (VS + amps) and over voltage protection.
Most of our competitors are selling the 20A versions for the same price. RRP £299.95.
Our Price £89.95

**VECTRONICS VC-300DLP**
UK’s best selling ATU. 300W (PEP), dummy load, VSWR meter, 3 way ant, switch & balun for open wire feeders.
RRP £129.95
Our Price £119.95

**MFJ-259**
HF digital SWR analyzer + 1.8-170MHz counter/resistance meter.
RRP £249.95
Our Price £249.95 + P&P £5

**ACCESSORIES**

**SWR METERS**

**Nissei RS-402**
125-525 MHz (200W) FWD/REV/AVE/PEP + + FREE PSU worth £90.
RRP £69.95

**TSA-6601**
144-444MHz (60W) pocket PWR/SWR meter
£34.95

**HANDHELD MOUNTS**

**MA-339**
Mobile Holder. Fits all h/held radios. Sticks onto dashboard of car. RRP £9.95
GS-200 Air-vent h/held holder......£9.95
GS-300 Dash top h/held holder......£19.99

**COAX SWITCHES**

**CX-401**
4 way (ISO-239) £39.95

**NS-902**
2M FM handheld amplifier
1/5W input 30W output.
RRP £49.95

**MICROPHONES & EAR PIECES**

**MICROPHONES**

MS-107 'K' miniature hand microphone. Fits Kenwood, Yaesu, Icom and Alinco
(Please specify brand of radio when ordering)
RRP £16.95

**Nissei EP-300**
Deluxe over the ear earpiece. Fits Kenwood, Yaesu, Icom and Alinco
(MP P& P £1)

**Nissei EP-300T**
Over the ear earpiece with lapel mic & PTT. Fits Kenwood, Alinco, Yaesu or Icom (Please specify brand of radio when ordering)
RRP £22.95

**Nissei EP-300**
Deluxe over the ear earpiece. Fits all handheld radios.
Our Price £9.99

**NEXT DAY DELIVERY (UK MAINLAND) £10**

**MAIL ORDER - LONDON SHOWROOM**

TEL: 0181-951 5781/2
132 High Street, Edgware, Middlesex HA8 7EL
Close to Edgware underground station (Northern Line). Close to M1, M25, A406.

Fax: 0181-951 5782

Practical Wireless, July 1996
SIMPLY THE BEST

ANTENNAS

SERENE BASE ANTENNAS

FT-3321 SF 144/220, 8.5/1148 (5.4m) £129.95
TSB-3301 SF 144/220, 5/528 (2.5m) £59.95
TSB-3302 SF 144/220, 4.5/268 (1.3m) £59.95
TSB-3303 SF 144/220, 4/238 (1.1m) £59.95
TSB-3304 SF 144/220, 3.5/188 (o.7m) £59.95
V-2000 SF 5m/7m/10m/2/6/8/4 (2.5m) £134.95
GPM-300 Cord 2m/70cm 3/5.2/6.1/5.5 (2.4m) £124.95

ACCESORIES P&P £2.00 on the following

TSO-6000 Duplex/Ext/Coax 2/70 £24.95
TSO-6993 Duplex/Socket 2/70 £19.95

HIGH QUALITY NISSEI MOBILE ANTENNAS P&P £4.50

DB-7000 144/70 MHz vertical 3.5m £49.95
DB-7001 144/70 MHz vertical 4.5m £24.95
DB-1301 144/70, 2.5/80 MHz 41 cm £19.95
DB-EL2E 144/430 MHz, 4.5dB (1.8m) £29.95
DB-245 144/430 MHz, 3.6dB (1.3m) £15.95

ACCESSORIES P&P £2.50 on the following

MT-1301 H/Duty Mag Mnt + Coax Top Quality £24.95
MT-3932 H/Duty Hinge/Tmnic Mnt Top Quality £24.95

HF ANTENNAS P&P £10

R5 10/12/15/17 MHz vertical £255.00
R7 10 thru to 40 vertical £389.00
AV-3 14-21/21 MHz vertical 4.3m long £389.00
AV-5 3-7/14-21/28 MHz vertical 7.4m long £196.00
AP9 8 Band Vertical £196.00
A25 14-21/28 MHz Yagi £389.00
Carnine Windom 2-40 10m (60ft) £89.95
Carnine Windom 80-10 120 (12ft long) £84.95

HUSTLER RANGE NOW IN STOCK

4BTV Four band HF vert 16, 15, 20, 40 1.5kW £169.95
5BTV Five band HF vert 15, 20, 40, 80 1.5kW £189.95
RM-20 20m mobile (reduced length) 400W £24.95
C-32 Ball mount assy plate (small fitting) £26.95

S.W. PORTABLES

SANGEAN ATS-803A

UK's best selling portable SW receiver with SSB.

OUR PRICE £129.95

SONY SW-100E

Award winning miniature SW receiver with SSB, RRP £224.95

OUR PRICE £199.95

SW-7600G RRP £199.95 our price £179.95
SW-95 RRP £229 our price £259.95
SW-77 RRP £339 our price £359.95

OPTOELECTRONICS

OPTO SCOUT 31-Mk2

Mini frequency finder will capture and memorise up to 400 frequencies that can be recalled directly into the AR-8000. Supplied with antenna, nicads and fast charger. RRP £399

OPTO CUB

10MHz-26GHz frequency finder. Supplied with antenna, nicads & charger. RRP £139.00

NEW DB-32

A miniature wideband antenna. Receives 30-1200 MHz. Transmits 2m/10cm, BNC fitting only 1.5" long. It's superb for its size. RRP £29.95 P & P £1

SCANNERS

AOR AR-8000

The ultimate handheld receiver covers everything from 500kHz-1900MHz all mode (AM, NFM, WFM, USB, LSB, CW)

SPECIAL OFFER £369.95

NETSET PRO-44

Listen to aircraft, ham, marine and much more with this superb scanner. Covers 66-88/108-174/380-512MHz RRP £499.95

OUR PRICE £119.95

REALISTIC PRO-25

100 channel portable scanner covers 66-88/108-174/406-512/806-956MHz. OUR PRICE £179.95

HANDBLED ANTENNAS

HICOM IC-706

Ex-demo model £899.95

FT-726 2M/70cm 6M fitted £899.95
IC-728 FT-3000C £1099.95
TS-8565 £1399.95
TS-1405 TS-4007 £199.95
TS-403FT £240.95
TS-3050 £345.95
TS-5050P £549.95
FT-902 £229.95
FT-101 £299.95

WEST MIDLANDS BRANCH NOW OPEN

UNIT 1, CANAL VIEW INDUSTRIAL ESTATE, BRETTLENE LANE, BRIERLEY HILL, W MIDS DY5 3LO

TEL: 01384 481681

15

Practical Wireless, July 1996
Hours Of Enjoyment

If you have a h.f. amateur bands transceiver, then you have a piece of equipment capable of providing many hours of enjoyment. Over the next few months I want to look at each of the bands individually - who uses them, why and what will you hear. Let me know if you have any questions you want answered.

Firstly I want to look at the receiving side of the set. Let's assume we are looking at a middle range (and middle priced!), modern amateur multi-mode transceiver.

Many of these amateur multi-mode radios cover most of the modern-day amateur bands for the transmitting side, and something like 10kHz-30MHz or so on the receiving side. As you don't need all this coverage to listen on the amateur bands, what is it there for? Answer: Lots of things!

Even the most ardent amateur radio enthusiast is going to come across an evening when they just can't find anything interesting to listen to, or anyone to talk to. It does happen - not often, but it does happen!

So, you can either switch off and go and watch the TV or you can tune around and find something different. There are a lot of things around on all kinds of bands that you may find interesting.

How about a bit of marine band listening, or air band for that? You can listen to air band radio from the top end of 2MHz right through to something like 23MHz, all on single side band (s.s.b.).

There are also marine stations operating right through the h.f. bands. There are many frequency guides available from places like the PW Book Service that will help you find your way around these bands.

Short Wave Bands

By far the most well-known area of non-amateur listening must be the short wave broadcast bands. For some who have recently come into the amateur hobby this is regarded as 'old-fashioned' and boring, but it's not!

Recently I had cause to stay up late (very late!) using the computer, I put the radio on for company and found it very interesting. There are several radio stations that run programmes just for the dedicated radio listener.

Radio Netherlands (RN) for example has a programme that goes out on the air several times on a Thursday called Media Network (e.g. 0730 on 9.72MHz; 1330 on 9.89, 13.7 & 13.15MHz; 1730 on 6.02, 7.12 or 11.655MHz; 2130 on 1.14MHz). In forthcoming programmes, RN’s Jonathan Marks will be reviewing the Grundig Yacht Boy 320 and the Telefunken MR1500 receivers.

It's difficult to get exact dates from stations like Radio Netherlands as the programmes are made on a Wednesday evening and then broadcast on a Thursday. So, with the lead times I have, I can't give you any further detailed information, however you could write to Radio Netherlands at PO Box 222, 1200 JG Hilversum, The Netherlands and request a programme schedule so you know what to listen for and when.

Other broadcasters have interesting music programmes, documentaries or special programmes. If you were listening to Radio Osterreich International on April 20 then you may have heard their Shortwave Panorama programme when they linked up with the special event station OEM1M celebrating International Marconi Day. If you did hear that programme you can send for the special QSL card too.

You can even learn a foreign language by listening to broadcast stations, stations like Deutsche Welle run language courses with textbooks available! Their language course, German - why not?, teaches the everyday usage of German and is aimed mainly at young adults.

The books that go with the course are available free of charge from Deutsche Welle, 50888 Cologne, Germany. You can choose any one of 29 different languages for the course book from English to Russian and Bengali to Swahili!

All broadcast stations produce schedules of their programmes and once you discover the ones you find most interesting it's worth getting these schedules for reference. Try listening around one evening, you may find it interesting and it is another aspect of our amazing hobby!
Short Wave Special Event

Whilst reading Monitor, the Newsletter of the International Short Wave League (ISWL), I read about a very unusual special event station. During July, the station EISINS will be on the air celebrating the golden jubilee of the Irish Naval Service.

The unusual thing about the EISINS station is that there is a set of seven QSL cards available for working or hearing the station, one for each band from 1.8 ("Top Band") to the 144MHz band. They will be operating both c.w. and s.s.b. on the h.f. bands and f.m. on the 144MHz band, so hopefully many amateurs and s.w.l.s will have a good chance of collecting all seven of the cards.

Having mentioned the Monitor newsletter perhaps I should tell you a bit more about what you can expect to read in it each month. The A5 newsletter is sent out to members of the ISWL and contains many regular columns as well as interesting articles.

The "Amateur Bands Review" column in Monitor gives details of stations heard by members during the month of February in their March issue. The column starts with 1.8MHz and works its way through the bands to 28MHz.

Each person who has sent in a log is listed along with the most interesting stations they heard on the band as well as the time at which they heard them. For example on 18MHz, Arthur Miller heard FS5PL at 1600 UTC on v.f.m. as well as T2LL at 1400 and 9Y4NW on 1500.

There is also a 'QSL News' column with details of QSL managers for special events heard on the air. Other interesting columns for the radio amateur are 'Transmitting Topics', 'Equipment Review', 'Contest Reports' and 'QRP Corner'.

So, you can see that there is quite a bit to interest the transmitting amateur. For details on the International Short Wave League, you should contact the ISWL HQ at 3 Bromyard Drive, Cheltenham, Derby DE73 1PF. Don't forget to include an s.a.e. with any queries.

The ATC was formed in 1941 and since 1948 cadets have been operating the radio on the frequencies allocated to them by the RAF. They still have a Sunday morning h.f. Net, but now also have v.h.f. and u.h.f. allocations.

That's all the 'natterings' for this month so, until next time cheerio and don't forget to write to me with your hints and tips for interesting radio. Letters should be sent to me at PO Box 1863, Ringwood, Hants BH24 3XD.

Practical Wireless, July 1996
Raising Money - The Amateur Radio Way

Tony Faulkner G6SKG shares his story of how he became a licensed radio amateur.

I took my City & Guilds examination in 1991 holding the callsign G7JYX until I passed the Morse test in September 1992. My callsign now is G6SKG.

Now, you may say, so what? But I suffer from Multiple Sclerosis and heart problems. The hobby has however kept me in remission now for the past four years. On top of that, I wanted to put something back into the hobby.

I first became a Novice Instructor doing one-to-one teaching at my own home. To date all those I have tutored have passed first time. Then I began to teach Morse c.w. on the 144MHz band.

To date I have assisted about ten people through to obtain their 'A' licence callsigns. My claim to fame here is getting the youngest English person through. A ten year old girl who passed the 12w.p.m. test at her first attempt. I was beaten for the record by a nine year old living in Northern Ireland.

I was then approached by the RSGB to take up the post of Regional Liaison Officer (RLO) for the West Midlands, a post I have held now for the past 18 months. This again gives me the opportunity to put back a little more into the hobby. I can honestly say that the benefits I have had from all this, plus the friends I have made, make each and every day worth living.

Well, 18 months ago I decided, after a visit to Helen Ley Home (a respite care centre for people who suffer from MS), to try to raise money to equip a new physiotherapy unit being built at this very moment. With the help of other amateurs, in particular Mr. G. Woodford G6KNM, the event is taking place on June 22/23rd 1996.

The hobby has given me the opportunity to put back a little more money. For those stations abroad, all relevant information will be written on the inside of the award asking for a donation to obtain the award, they incidentally will only need to contact one station. The other way we have of raising money is from donations of radio equipment from the following firms, like Stuart Crystal, Tandys, Currys, Morleys Communications who are donating two prizes, total value £300. Practical Wireless has donated a 12 month subscription plus binders.

Waters & Stanton Electronics are pledging a further two more prizes to the value of £100. Other firms I have written to have yet to contact me with their pledge.

I have spoken to Martin Lynch, Lowe Electronics and SM Communications who are also donating something. As yet I know no what. A bottle of 12 year old Malt whisky is being donated from a friend whom I met through the RAE and a 35mm camera has been donated by two anonymous friends.

The idea is to make up a list of prizes and (at a cost of £1) and the draw will be done by a well known personality on the Sunday, just prior to the event closing. One last thing, sponsorship forms are available for anyone who wishes to raise money.

For further details, contact Tony Faulkner G6SKG, 165 Corby Road, Russell's Hall Estate, Dudley, West Midlands DY1 2JZ.

North Wales Activity

The North Wales Radio Rally Club meets every Thursday at 7pm at the YMCA Drive, Queens Drive, Colwyn Bay, where Novice classes and Morse tuition is held and occasional guest speakers give talks on different aspects of the hobby. Also h.f., v.h.f. and u.h.f. is on air using the club callsign GW0WNR/GW7NTU.

The club organise the Llandudno Radio, Practical Wireless, July 1996
Practical Wireless, July 1996

**Club Reminders**

Meetings are held at 8pm (on Fridays) for the Dunstable Downs Radio Club at Chews House, High Street South (A5), Dunstable, Bedfordshire. Some events to come will include construction competitions, talks, junk sales, fox hunt, etc. as well as the usual net nights.

New members and visitors are always welcome. Just drop in or call Paul G7TSJ on (01582) 861136.

The Strathmore & District Amateur Radio Club meet every Tuesday, from 7.30pm at 2231 Squadron (Far flare) Air Training Corps, Leighton Road, Forres. Club shack is available for use and Morse classes are run.

RSGB videos are shown on the last Tuesday of every month with lectures/visits on the second Tuesday. More information can be obtained from Alan GM4JCM on (01382) 664585.

Members of the Salisbury Amateur Radio Club meet every Tuesday at the Scout Hut, St. Mark's Avenue, Salisbury at 7.30pm. The club runs a course for the RAE and caters for the many interests of members.

Further information and details of the club's forthcoming activities are available from George Tollisson G7OM on (01722) 233398 or from Dick Fox GM2ZI on (01722) 337111.

Secretary Mr D. Webster has written in with information about the Derbyshire Amateur Radio Society. Meetings are held at the Ambleside Community Centre, New Ollerton, Notts on the 2nd Tuesday of each month at 7pm. The club callsign is G4XTL.

**The Rooster Net & GB3WD**

Nearly another year has gone by since 'Club Spotlight' mentioned the 'Rooster Net Breakfast' in the August 1995 issue. So, what's been happening?

Well, the 'Rooster Net' in the south west continues to flourish - Paddy Baker G0TQR explains all.

"There has been good attendance at all the breakfasts that have been held at different locations all over Devon and Cornwall. As well as our famous breakfasts, Ken GOYUG organised a Christmas dinner at a local pub and everyone had a very enjoyable meal and good company on the night.

By the way, Ken has taken over as Net Controller from Ray G0KZQ, who is now mostly in listening mode. Ray still organises the breakfasts and attends them all, and it is a great pleasure to see both him and his good lady Gwen at these events.

**Spotlight Trophy**

David Barlow G3PLE has great admiration for Amateur Radio Club magazines and newsletters - and the people who put the hard work into producing them. So David, a retired Marketing professional and former member of the Birmingham Press Club who now lives in Cornwall, wrote to the Rob Mannion, Editor of PW, and Zoe Shortland suggesting a special trophy for the best Radio Club Magazine or newsletter.

Rob and Zoe thought David's idea was an excellent way of encouraging the (often hard-pressed!) magazine and newsletter editors. Dave Wilkins G5HY of Kenwood (UK) Ltd. thought so too! The result is that a new award, The Spotlight Trophy, Awarded To The Radio Club Magazine of The Year by Practical Wireless and Kenwood (UK) will be presented at the Leicester Show in October.

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

To enter your Club Magazine for the award, send two of your most recent club magazines and details on how they're published, to the PW Editorial offices at the very latest by 22nd July. Remember to mark your envelope 'Spotlight Club Magazine Competition'.

The panel of judges: Dave Wilkins G5HY, Zoe Shortland, Jim Bacon G3YLA, David Barlow G3PLE and the Editor are looking forward to reading your club's magazine! Get busy, the spotlight's on!

George K4DSD and his wife Pattie will be visiting from Florida shortly and as always we are all looking forward to his wise cracks and of course trying to get him to speak the 'Queen's English' correctly (only kidding George!). Reminds me of the time way back in 1960 when I first met my wife June and she said because of my Belfast accent that she was going to send me to elocution lessons. I went for two weeks and now there is a fellow in Plymouth who talks just like me!

The Net uses the repeater GB3WD has been playing up a bit. There is an intermittent fault for people living on the east side of Dartmoor where sometimes we get low output from the repeater.

As I use the A38 to travel to and from work, sometimes I am not able to access until I reach the new flyover at Marshalls. With summer fast approaching I hope the problem will be soon be sorted out.

Speaking of summer, anyone who happens to be down this way on holiday, don't forget to give a shout on 145.700MHz and you will be made more welcome and better still, if you would like to come along to one of our famous breakfast's throughout the year on the first Saturday of each month, I know you will leave a better person.

Remember, you don't need to hold a transmitting licence, just have an interest in radio. There are no fees either way, just the price of a cup of tea or coffee. Hope to see you soon!"

Send your club information to Zoe Shortland at the PW Offices.
Q: WHY BOther TO SUBSCRIBE TO THE UK’s BEST SELLING AMATEUR RADIO MAGAZINE?

A: BY SUBSCRIBING YOU’LL GET THE EXTRA BENEFITS OF:

- Getting PW delivered direct to your door every month.
- Avoiding cover price rises during the period of your subscription.
- Making extra savings on special offers throughout the year.
- Receiving your copy before PW goes on general sale.

AND when you subscribe this month you’ll receive a Practical Wireless HANDY REFERENCE CHART, 2m REPEATER DATACARD and a 70cms REPEATER DATACARD absolutely FREE!

Subcription Rates:

- UK £25
- Europe (1st Class) £30
- Airmover (Rest of World) £32
- Airmail (Rest of World) £37

Taking out a subscription is easy. All you have to do is fill in the Order Form on page 62 of this issue or telephone the PW Credit Card Hotline on (01202) 659930 and quote PW7, then sit back and wait for your issues to come through your letterbox.

Isn’t it time you subscribed to Practical Wireless and got the VITAL COMPONENT to bring your hobby to life?

June 16: The Newbury & District Amateur Radio Society are holding their 9th Annual Radio Boot Sale at the Recreation Ground, Cold Ash, Newbury, Berkshire. The site is just under two miles from the A34/A50 road junction and is well signposted. Admission and parking are free for buyers and a generous prize will be available at 12.00 to those selling. Access allowed to the site for setting up from 9am. Refreshments/refreshed parking and children’s playground on site. Talk-in with G4NBS on S22. Further information from George on (01488) 682814.

* June 20: The 39th Longleat Amateur Radio and Electronics Rally, organised by the Bristol Group of the Radio Society of Great Britain, will be held at Longleat Park, near Warminster, Wiltshire. A major feature of the rally will be the Big & Buy section. There are also all the normal Longleat facilities such as the Safari Park, House and beautiful lake and grounds. Gordon G0KJK/G1, on 6177-940 2950.

* July 13: Comish Radio Rally. More information from Ken G0FC on (01299) 821073.

* July 14: The 16th Sussex Amateur Radio & Computer Fair is being held at the Brighton Race Course from 10am to 4pm. There will be over 100 trade stands, free parking and admission is only £1.50. The rally is one of the largest in the South of England. Refreshments and bars at reasonable prices. A rally not to be missed. (01275) 501106.

* July 21: The 13th McMichael Mobile Rally and Car Boot Sale will take place at the Haynall Youth and Community Centre, Burnham Lane, Slough, near Burnham Railway station. Talk-in on S22. Door open at 10am and admission is £1.50. Car boot sale £7 per pitch on the day (60 advanced bookings). For trade bookings, contact Chris G0MZ/N on 874870. Other details from Dave GJ5ST on (01268) 466554.

* July 28: The Rugby ATS 8th Annual Radio Rally will be held at the BP Tracklop on the A5, three miles east of Rugby and just 2.5 Miles north west from junction 18 of the M1 motorway. Door open from 10am and admission is £1 per car and facilities include a good cafeteria and toilets. Talk-in on S22. (01269) 552449 or Steve (for bookings) on (01785) 824214.

* July 28: The Scarborough Amateur Radio Society Amateur Radio, Electronics and Computer Fair will be held at the Spa, South Foreland, Scarborough. More details obtained from Ross Newton G4GZV or (01723) 257074.

* August 11: The 9th Annual Derby Mobile Rally takes place at the Littleover Community School, Pastures Hill, Littleover, Derby. Doors open at 9.30am. The school is located off the A5290 (Burton Road) south of Derby, one mile south of the village of Littleover and the A511 Derby Ring Road. There will be a large flea market, tables by the hour, wide range of radio and computer traders, monster radio & computer junk sale run by the society - with silly prices, fun and starts at 11am. There will also be a wide range of refreshments available. Ample accommodation if wet. Martin G3SZZ, QTHR, Tel/FAX: (01332) 558875.

* August 11: Flight Refuelling ARS Hamfest 96 will take place at the Flight Refuelling Sports Ground, Merley.
Martin Lynch has very generously donated an IC-706 together with 10 of his T-Shirts printed with his logo as prizes for this very special competition.

**FIRST PRIZE** IC-706, a Martin Lynch T-shirt & a three year subscription to Practical Wireless.

**SECOND, THIRD & FOURTH PRIZES** A Martin Lynch T-shirt & one year subscription to Practical Wireless.

**RUNNERS-UP PRIZE** A Martin Lynch T-shirt

**How To Enter**

All you have to do is answer the three multiple choice questions below, all the answers can be found in this issue, get your answers from the May & June issues and then tick the appropriate answer boxes on the form below. Don't worry if you've missed a set of questions as back copies of the May & June issues of PW are available from our Post Sales Dept. on (01202) 659930.

**Questions**

Q1: What do the initials FB stand for in Samuel Morse's name?

A. Flynn Baker  
B. Frederick Brown  
C. Finley Breese

Q2: How much is the IC-706 prize worth?

A. Over £3000  
B. Over £1000  
C. Over £1500

Q3: On which band does the Simple Loop Antenna operate as described by G4BXD?

A. 1.8MHz  
B. 10MHz  
C. 28MHz

**IC-706 Entry Form**

<table>
<thead>
<tr>
<th>May Answers</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>Q2</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>Q3</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>June Answers</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>Q2</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>Q3</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>July Answers</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>Q2</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>Q3</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
</tbody>
</table>

**Name** ____________________________________________________________

**Callsign** ____________________________________________________________

**Address** ____________________________________________________________

**Postcode** ____________________________________________________________

☐ If you do not wish to receive future mailings as a result of entering this competition please indicate.

Send your entry (photocopies acceptable with corner flash) to: IC-706 Competition, PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Editor's decision on the winner is final and no correspondence will be entered into. Closing date for entries is Friday 26 July 1996.
By David Butler G4ASR

David Butler G4ASR puts the new MFJ 50MHz 'budget priced' transceiver through it's paces to discover it's potential on the 'Magic Band'.

As a keen 50MHz DXer I'm always pleased to see new equipment being developed for use on this exciting band. And I was even more pleased when I was asked by Rob Manning G3XFD if I would like to get my hands on the latest delivery from the MFJ stable to review it for PW!

In recent years a number of the major manufacturers have been producing transceivers that cover the h.f. bands and the 50MHz band as well. Of course these all singing, all dancing rigs do have an obvious attraction but they also have one major drawback!

You can end up paying a fair amount of your hard earned cash on facilities that you don't want or are not allowed to use. Indeed, for a number of operational reasons, many DXers prefer not to put all their eggs into one basket opting instead to use separate transceivers for different bands.

The radio I'm reviewing is tailored specifically for single band 50MHz operation...admirably fitting the bill. And because it's an entry level transceiver the price won't make a big dent in your bank balance either.

Transceiver Coverage

The MFJ-9406 is a 10W s.s.b/c.w. transceiver with coverage encompassing the band 50.000 to 50.300MHz. Although the 50MHz band in the UK is 2MHz wide, this 300kHz frequency slot adequately encompasses all of the present activity to be found on both s.s.b. and c.w. modes.

If conditions are right you'll be able to explore all of those exotic propagation modes that I've been describing recently in my 'VHF Report' column. These can include sporadic-E, F2-layer, aurora, meteor scatter, tropo and many more besides.

The transceiver covers the beacon and c.w. areas of activity (at the 11. end of the band). It also covers all of the DX segment (approximately 50.090 to 50.150MHz) and frequencies used for local communication, centred on 50.200MHz.

Within Europe, a number of countries have much narrower allocations than we're fortunate to have been granted in the UK. These include for example France and Andorra (no operation allowed below 50.200MHz) and Italy (a 25kHz slot around 50.160MHz).

Importantly this transceiver covers all of these and similar allocations throughout the world.

Another feature of the MFJ-9406 is that it uses energy efficient analogue circuitry and is thus suitable for both fixed station, portable or mobile operation. Because of it's low power drain the unit can either be operated from a fixed 13.8V power supply unit, a NiCad battery pack or an optional MFJ-4110 wall socket transformer and regulator module.

Low Noise Receiver

Now I'll take an in-depth look at the receiver. This basically comprises of a single-conversion superhetodyne using a 10MHz intermediate frequency (i.f.) and an analogue variable frequency oscillator (v.f.o.) running on the low-side at 40MHz.

At the front-end of the receiver a four-pole band-pass filter pre-selects the incoming signal before being amplified in a low noise preamplifier. Following amplification, the signal is passed to an active mixer and mixed with the v.f.o. frequency.

The resultant 10MHz i.f. is then filtered by a six-pole crystal ladder filter, as used in the receive side. The filtered u.s.b. signal is then compressed.

Practical Wireless, July 1996
Compact Transceiver

The MFJ-9406 transceiver is very compact. It measures 170mm wide, 60mm high and 150mm deep.

The main chassis is of pressed steel construction with a tough vinyl-clad case. The front panel is simply laid out with controls for main tuning, fine tune and volume. The power switch, microphone and Morse key input sockets are also located on the front panel as is an I.E.D. to indicate when the transmitter is keyed.

An analogue meter displays signal strength on receive and doubles as an indicator of microphone processor gain on transmit. On the rear panel are located sockets for 12V power, external amplifier control and an SO-239 for the antenna connection. Also located at the rear is a screwdriver slot for microphone gain adjustment.

All circuitry associated with the transceiver are located on a single high quality through-plated printed circuit board (p.c.b.). The board is screen-printed with each component being individually identified.

Alignment adjustments and test points are clearly marked. I liked these features very much as they are a great aid when it comes to any possible servicing of the equipment outside of the warranty period.

All components are wire-ended, no surface mount technology (s.m.t.) here, another great aid to do-it-yourself. I should also add at this point that I found the instruction manual to be very informative. Not only did it include a complete circuit diagram and explanation of all circuitry but it also gave a comprehensive tune-up guide and technical assistance contact points.

Operating The Radio

Now it was time to actually put the transceiver to test. (I don't know if you're like me but when I get a new radio out of the box I want to be able to play with it right away).

Unfortunately it wasn't immediately possible with the MFJ-9406 because there's no power lead supplied. So, it was out with the soldering iron, find some solder and side-cutters, hunt around for some suitable cable and then terminate the wires onto the supplied plug. (Yes I know it's a budget price radio but I'm sure it wouldn't have been too much trouble to supply it with a power lead!).

Operation of the radio is very simple. With the receiver switched on it was gratifying to hear the background noise increase when the antenna was plugged in. I say this because it immediately indicates that the receiver has sufficient sensitivity.

Simply put, if you cannot detect an increase in (sky) noise when you connect your antenna into a 50MHz receiver then it's totally dead and needs corrective action!

The sky noise temperature at 50MHz is quite high and is basically the inherent background noise that is always present. (Fitting an external low noise amplifier or designing a radio with a super low noise front-end is a total waste of time as the limiting factor is the background noise. You won't achieve any more sensitivity, you'll only end up overloading the receiver).

Tuned Around

I immediately tuned around the band looking for a signal but, typically for the 50MHz band, none were to be heard. (Unfortunately I was testing the radio in March/April when there is always a distinct lack of "popular" propagation modes).

I could however, hear the GB3NHQ beacon some 200km away from my QTH coming in at its normal 569 signal. So, there was nothing for it but to put out a CQ call having first checked that the microphone gain control was correctly adjusted. This is simply achieved by speaking normally into the microphone and adjusting the microphone gain potentiometer for correct deflection on the front panel meter.

My CQ call was immediately replied to by G7MWW (located in the Forest of Dean). He then reported that my transmission sounded very distorted. I listened on my monitor receiver and sure enough it did sound distorted.

I then carried out some tests during which I ascertained that the receiver was also badly out of alignment. Tuning in a s.s.b. signal gave indications to my well trained ear that all was not well.

I had no doubt that the six-pole crystal lattice filter, common to both transmit and receive, was very much mis-aligned. Furthermore the balanced modulator was also mis-aligned as I could detect a large amount of injected carrier.

Unfortunately I was not able to carry out further testing with G7MWW as after only six minutes use the transmitter stopped working. I could just detect the transmitted signal weakly on my monitor receiver so I suspect that something in the driver/p.a. department had failed.

Two weeks later I received
After seeing a copy of G4ASR's review, Jeff Stanton G6XYU sent us the following comments:

As MFJ's largest export customer, Waters & Stanton have the opportunity to test and publicise pre-production and prototype products from this prolific manufacturer. The first two 6m (50MHz) rigs which David Butler G4ASR had were early prototypes and as soon as we heard of the prototypes and as soon as we heard of the problem we passed this to MFJ who modified actual production and now we are not seeing this problem with the transceiver. Similarly, we asked for a headphone socket to be provided at some stage. MFJ plan to include a d.c. lead free of charge in the next production.

Jeff Stanton G6XYU

Another MFJ-9406 from the importers, Waters & Stanton. I immediately plugged it in, having kept the original power lead!

Straightaway it was obvious to me that this radio was a completely different animal from the first review model. I heard two local stations having a 'rag chew' and decided to join them.

But first I did some tuning tests to see how the controls felt. I must admit that I thought I would have trouble tuning in stations quickly and accurately with the 'coarse' analogue tuning mechanism.

Pleasantly Surprised

However, I was pleasantly surprised. The tuning was very smooth and agile and it was very easy to 'zero in' on stations. The fine tune control, which gives ±3kHz tuning either side of nominal, actually seemed a little academic because of this. Some operators might need it but I certainly didn't.

Although I didn't have time to carry out any proper measurements the selectivity provided by the crystal filter seemed excellent and well matched for s.s.b. communication. However it should be noted that there's an awful lot of difference between two stations having a 'rag chew' on a flat band compared to an intense summer Sporadic-E opening!

My only criticism in the tuning department refers to setting a frequency. I was actually unable to set the receiver accurately to any specific frequency.

The printed dial is calibrated every 10kHz with indicating marks every 25kHz. Tuning to a specifically marked frequency on the scale, 50.2MHz in this instance, and checking on my monitor receiver showed I was 2.8kHz off frequency.

Next I made a guess at where 50.100MHz, the DX calling channel, was. (Don't forget that the nearest calibration marks are at 50.100MHz and 50.125MHz.) In this case I was over 4kHz out. I suspect if you own one of these transceivers you'll end up with a dial full of ball-pen marks of your favourite frequencies!

Finally it was time to join those two stations, G1URJ and G1UPX, who I heard having the 'rag chew'. Both are located in Oxfordshire, about 120km away from my QTH so I was pleased that the 10W was reaching them on tropo.

Each station then gave me critical reports of signal quality. The operator at G1URJ said the audio quality sounded very good and G1UPX was very similar in his appraisal reporting that the rig possessed nice audio with a good treble sound.

Sporadic-E opening!

My only criticism in the tuning department refers to setting a frequency. I was actually unable to set the receiver accurately to any specific frequency.

The printed dial is calibrated every 10kHz with indicating marks every 25kHz. Tuning to a specifically marked frequency on the scale, 50.2MHz in this instance, and checking on my monitor receiver showed I was 2.8kHz off frequency.

Next I made a guess at where 50.100MHz, the DX calling channel, was. (Don't forget that the nearest calibration marks are at 50.100MHz and 50.125MHz.) In this case I was over 4kHz out. I suspect if you own one of these transceivers you'll end up with a dial full of ball-pen marks of your favourite frequencies!

Finally it was time to join those two stations, G1URJ and G1UPX, who I heard having the 'rag chew'. Both are located in Oxfordshire, about 120km away from my QTH so I was pleased that the 10W was reaching them on tropo.

Each station then gave me critical reports of signal quality. The operator at G1URJ said the audio quality sounded very good and G1UPX was very similar in his appraisal reporting that the rig possessed nice audio with a good treble sound.

Manufacturers' Specifications

Receiver Section

- Frequency coverage: 50-50.300MHz
- Receiver type: Single-conversion Superhet
- Frequency control: Heterodyne v.f.o.
- Intermediate frequency: 10MHz
- Intermediate freq. selectivity: -6dB @ 2.5kHz
- Automatic gain control: Audio-derived 70dB dynamic range
- Sensitivity: 0.15µV for 12dB S/N
- Audio output: 1W into 8Ω at 10% THD
- Average receive current: 60mA (S-Meter bulb disabled)

Transmitter Section

- Power output: 10W p.e.p.
- Matching (v.s.w.r.) tolerance: 3:1 Maximum
- Peak transmit current: 2A
- Speech processor: r.f. compression, syllabic rate
- Spurious attenuation: 60dB
- Microphone input: 600Ω dynamic
- Morse (c.w.): 600Hz tone (optional generator)
COLOMOR (ELECTRONICS) LIMITED
VALVES WANTED - NEW & BOXED

KT66 - GEC £35 each
KT88 - GEC £50 each
EL34 - Mullard £12 each
EL37 - Mullard £10 each
DA30 - GEC £80 each

We also buy other types of new and used valves, amplifiers, test equipment & components. Factory & warehouse clearance. Confidentiality assured.

Telephone or Fax list for offers.

Day Tel: 0181-743 0899 Fax: 0181-749 3934

Colomor (Electronics) Limited
170 Goldhawk Road, London W12 8HJ

Evening (to 10pm) Tel/Fax 01403 782275 Please quote ref PW

FAIRHAVEN RD500
A NEW KIND OF RADIO RECEIVER

G4ZPY PADDLE KEYS INTERNATIONAL

Manufacturers of Hand Crafted Pump (Straight) Keys and Paddle Keys.
A selection of 57 to choose from. All Keys are made to order.

Phone your order or send SASE or 2 IRC’s for our brochure.

41 Mill Dam Lane, Burscough, Ormskirk, Lancs L40 7TG

Phone/Fax: (0) 1704 894299

FAIRHAVEN RD500
A NEW KIND OF RADIO RECEIVER

EASTCOMM
Europe’s Largest Amateur Radio Showroom

PROFESSIONAL WIRE ANTENNAS
Sigma wire antennas are the fastest selling range of wire antennas. Now with over 150 models available, there’s one for each location.

For full catalogue send 4 x 19p stamps.

Eastern Communications, Cavendish House, Happisburgh, Norfolk NR12 9RU. Monday - Friday 9.00 - 5.30, Saturday 9.00 - 4.00

VISA - ACCESS - AMEX
01692 - 650077

C.M. HOWES COMMUNICATIONS

Mail Order to: Eydon, Daventry,
Northants. NN11 3PT
01327 260178

SSB/CW Receiver
The DXR20 covers 20, 40 & 80m bands with optional extra band modules for 15m, 30m, 15m or 10m amateurs or 5.45MHz or 11.175MHz HF air. Many high performance features!

DXR20 Kit: £39.90
DC52 "$meter" Kit: £10.90
HA20R Hardware pack: £28.90

SWR Indicator
Build a great looking SWR bridge with the SWB30 kit and the new HA31R hardware pack.

HA31R Hardware: £10.90

Morse Oscillator
The ST2 Sidetone/ practice oscillator gives a nice sine wave note. Plenty of volume. Works from your key or by RF sensing.

ST2 Kit: £9.80
HA12R hardware: £10.10

Top Value Receiving ATU
CTU8. Covers 500kHz to 30MHz. Matches antenna impedance and helps reduce spurious signals and interference in the receiver. S2235 sockets. Kit (inc. hardware): £29.90

Factory Built: £49.90

Receiving ATU with balun
CTU9. All the features of the CTU8 plus a balun for balanced feeders, bypass switch for U/V filters, additional terminals for balanced inputs, single wire and earth.

Kit (inc. hardware): £39.90
Factory Built: £69.90

Clean up your reception!
- Reduce noise and interference
- Sharp SSB/Speech filter with faster roll-off than IF crystal filters
- 300kHz bandwidth CW filter
- Printed and punched front panel
- All aluminium case
- Simply connects between radio and external 'speaker or 'phones
- Suits all general coverage receivers & transceivers
- ASL5 Kit plus HA5U hardware: £29.80

Please add £4.00 P&P, or £1.50 P&P for electronics kits without hardware.

HOWES KITS contain good quality printed circuit boards with screen printed parts locations, full, clear instructions and all board mounted components. Sales, constructional and technical advice are available by phone during office hours. Please send an SAE for our free catalogue and specific product data sheets. Delivery is normally within seven days.

73 from Dave G4KQH, Technical Manager.
Morse Methods

By John Goodall G0SKR

Samuel Finley Breese Morse, 1791 - 1872, devised the code named after himself. Morse Code. But I often wonder just how many radio operators, who use Morse code, ever look to the man who started it all.

All those years ago this code was transmitted over land by wire, using simple make and break of an electrical circuit. Only the advanced methods of sending and receiving the code has changed over the years. From that early journey on the Steamship Sully, in 1832, when Samuel Morse devised it, to the present day, the code has changed little. During the late 1800s speeds of some 70w.p.m. were regularly being sent and received via cable.

Regular radio communications with Morse code was being used by Marine operators during the early 1900s. Paring on my retired hat (or helmet!) this reminds me of a particular piece of radio history. The arrest of a well-known arch villain from the past, Dr. H. Crippen, had brutally murdered his wife and with mistress in tow, had set off for Canada on the SS Montrose. The Captain of the vessel soon became aware of the true identity of this passenger and partner. He sent a Morse Code radio message direct to the Commissioner, New Scotland Yard. As a result Crippen was duly arrested and brought to justice.

Fascinating Sound

Over 35 years ago I first became fascinated by the sound of Morse Code. The musical notes emitting from the loudspeaker of the old 19-set proved simply mysterious. What were those Dots and Dashes - oh? Forgive me, I must start as I mean to go on - Dits and Dahs - what were they saying.

I must surely be able to learn how to read this 'ere Morse Code. After all I was a budding musician, and the grey cells were as sharp as a razor. I was a budding musician, and the grey cells were as sharp as a razor. However, many years were to elapse before I was to be rewarded with that pleasure. I tried to learn the code using books, tapes and even early computer programs, all unsuccessfully. During the 1970s, short wave listener Bill Bennett of Coventry, couldn't push or kick me to success.

Despite his ability to read Morse at a steady rate, Bill tried tirelessly to teach me. Many hours of frustration usually ended with a mug of tea and 'Another day tomorrow!' I must have been a lousy pupil!

After my retirement, in the late 1980s a move to the sunny South Coast followed. Sometime later, by chance, I bumped into Rob Mannion G3XFD. Editor of this very magazine.

Rob listened to my tales of failure and offered to help. Monday evenings for over three months saw me undergoing the Three M's. 'Mannions Morse Method' (MMM)! PW June 1995 carried the article 'Mannions Morse Method', back copies available for £2.30 on (01202) 639930. Ed.

Allow me a brief description of MMM. Nothing special, Rob would say, but the proof of the pudding is in the eating. As with most Morse learning processes, the alphabet and numerals were mastered first. This I found not too difficult as I had been trying for 35 years! With the aid of the Datong 1970 Morse Tutor, several groups of letters were first played at 7w.p.m. with maximum delay (3 seconds) between characters. Rob announced and copied the correct letters and the pupil, myself, copied, hopefully, likewise.

Answers were then checked and corrected and the whole process repeated. The Morse sessions lasted no more than one hour, with a compulsory half-time tea break. The 'delay' between characters is gradually reduced and speed increased.

I have used the MMM system with several pupils of my own and it certainly works. Once a satisfactory speed and copy result have been achieved, progress to the test format must follow. This should ideally be on a one-to-one, hand sent basis.

Varied Applications

Many varied applications for learning Morse Code are available. I will say at this point that no one method suits everyone. Each person should turn to the one that he or she is most comfortable with.

No matter what method an individual chooses to use, here is an important tip. From the start, the character speed should be set as near as that of the final speed required, with a large thinking time gap between letters (This is Rob's method).

The thinking gap can be progressively reduced until the correct overall timing is achieved. Reducing this gap, or thinking time, gives the impression of increasing the overall speed.

One favourite method of mine, tried and tested over the years, is that of Margaret Mills G3ACC. She advocated several lessons with set letters to be learnt for each lesson. Margaret's method again uses a trained operator or a programmable computer program. Her methods were excellent up to and including the old style Morse test.
Computer Programs

Computer Programs are readily available for learning Morse Code. These again are many and varied. Some are good and some are not so good, but there are far too many to list here.

I am not a believer in sticking with computer generated Morse right up to the test. However, that is my personal view and I do know of test candidates who have done just that - and passed. I also know of many who have failed!

I feel it's often far better to have some one-to-one hand sent Morse prior to the test. After all, the 12w.p.m. Morse test is hand sent!

One program I was impressed with was the Supa-Tuta Morse Tuition System from Derek Brandon G4UXD. A single 3.5in disk for IBM (or compatible) computers, gives an extremely comprehensive Morse Tutor.

Do not be fooled by the single disk. This is one powerful program!

The Supa-Tuta Morse Tuition System has a vocabulary of no less than 4200 words, character speeds of between 10 and 100w.p.m., random letters, random numbers, random callsigns (over 3000 stored), no less than 150 ready made QSO format exercises, punctuation and Morse test practice. Morse Tests, punctuation, abbreviations, Q-Codes, choice of 238 ‘three minute’ plain text, Class A or Novice and a host of other useful goodies.

The price of the disk at only £10.99, does not reflect the power of this program. You can even stick your key into your PC, and it will read your sent Morse Code. A shock for a few who have never tried that before!

It doesn’t like badly sent Morse! It doesn’t like badly sent Morse!

Learning The Alphabet

A mention at this point on learning the alphabet. One of the methods employed by the Royal Signals is the Flip Cards system. The cards are similar to playing cards but have Morse characters on one side, with the respective letter, number or punctuation on the other.

I use a pack of Flip Cards for teaching from square one, with both Class A and Novice and find them a very useful item for Morse Instructors.

The cards can still be obtained from Flip Cards, Longheadland, Ombersley, Worcester. Tel: (01905) 620000. (Flip Cards operate a Mail Order service).

Comfortable Key

The key I use in my shack is a Standard Key. I usually recommend the first and second finger lightly resting on the top of the knob, with the thumb positioned just under the rim of the knob. But each to his own preference and what is best for the individual.

The movement should be from fluid and from the wrists. Don’t stab at the thing as though you are chopping an onion! Smoothness is what it’s all about.

Keys Available

Hi-Mound produce a wide variety of keys, with a budget class key the HK-705 at around £40. The HK-708 Hi-Mound Standard key sells for around £50 and is one of the most popular of the range.

Kent Keys have been around for quite a time, and the size and feel of the traditional Kent straight key is a pleasure to all. This low profile traditional brass pump handle is a joy to use and available at around £60.

A relative newcomer to the world of Morse Keys is Watson. They produce hand-made keys out of brass with solid wood bases. From the GMV model at around £35, to the HK-705 at around £40, they are very well made and comfortable to use.

Waters & Stanton Electronics, 22 Main Road, Hockley, Essex SS5 4QS Tel: (01702) 206835.

Kent Keys produce a wide range of keys and keyers.
Watson keys are handmade from brass with solid wood bases. Stillwell's key is high precision engineered throughout and is smoothness at its best when in operation. Truly a 'Rolls Royce' of Morse keys.

**Paddles And Keyers**

Paddles and keyers are the next thing for the enthusiast to venture into. This area is a vast market with something for everyone. Too vast indeed to include all within this article.

However, sometime ago I had the pleasure of testing a range of Samson keyers. A new addition to this range is the ETM 9C-X3. The ETM 9C-X3 is a CMOS controlled keyer with built-in paddles. It features state of the art technology having a host of functions.

Variable speeds from 5 - 60w.p.m. with ultra speeds from 70 w.p.m! Memories for over 1500 characters. Some keyers with built-in paddles have the paddle blades too high from the operating surface. Not so the ETM 9C-X3 has its blades in a very comfortable position and tireless to use.

The ETM 9C-X3 is powered from three AA batteries and would be a favourite in any shack. It is available from the sole UK supplier Frank Watts G5BM.

Operating paddles with a keyer does take some time to get used to. Again, comfort is the all essential factor. Have the paddles placed where you are relaxed and comfortable and resting the wrist on the operating surface does help. In right-handed operation the left blade sends dits and the right one sends dahs. This obviously can be changed over to suit individual tastes.

Smooth squeeze operation between thumb and first finger is all that is needed. After practice you will find the method most suited to you so, don't give up after a couple of sessions. Practice makes perfect and errors soon become less and less.

**Outdated Mode?**

Morse Code. an outdated mode of communication? I think good old Samuel Finley Breese Morse can rest peacefully. I am certain his Code will be around for many many years yet. Dah dah dit dit - Di di dah dah de John G0SXR.

My thanks go to all those who have helped me through the years with the Morse Code, particularly Bill Bennett, Rob Mannion G3XFD, Audrey and Don King G0IRL and G0JJE. Thanks also to suppliers of review material and equipment for the loan of the same.

John G0SXR used the a Datong D70 Morse Tutor to help him get his 'A' ticket.

Why not build your own keyer? This one designed by Ben Nock G4BXD was featured in PW June 1995 (back copies available on (01202) 659930, price £2.30).

---

**Continued from page 27**

Morse Methods
Most advertisements are legal, decent, honest and truthful. A few are not, and, like you, we want them stopped.

If you would like to know more about how to make complaints, please send for our booklet: 'The Do's and Don'ts of Complaining'. It’s free.

The Advertising Standards Authority.

We’re here to put it right.

ASA Ltd, Dept 7, Brook House, Torrington Place, London WC1E 7JN.

This space is donated in the interests of high standards of advertising.

Practical Wireless, July 1996
Much has been said recently about the future of continuous wave (c.w. or Morse), and its value within amateur radio. Whether or not it should continue to form part of the requirements for obtaining an h.f. licence is an argument which can easily distract from the ability to appreciate the mode for the extremely effective, and enjoyable, means of communicating.

The level of activity to be found on the c.w. segments of the various h.f. bands surely challenges those who dismiss the mode as being outdated. Take a listen!

So, whilst many may see c.w. simply as an obstacle to obtaining their h.f. licence, there can be no doubt that a very high percentage of operators around the world choose to use the mode on a regular basis. In fact, many use the mode exclusively. For the QRP operator, c.w. tends to be the preferred mode, and it's certainly true to say that the two interests (low power operating and c.w.) go very much 'hand-in-hand'.

That's not to say that QRP operators don't get a look in. I know that many enjoy using low power s.s.b. with excellent results.

There is no doubt that c.w. is one of the most effective modes for providing reliable communication under difficult conditions. In other words - when the chips are down, c.w. is more likely to get through than almost any other mode.

One reason is that the receiving station is able to use a narrower filter, and so reject much of the noise and QRM (interference). It can be quite astounding what results are possible when running just a watt or two of c.w., even against powerful competition in a 'pile-up' situation.

**Back to Basics**

I suspect most QRP operators, such as myself, are supporters of the 'back to basics' school of amateur radio. Although many QRPers use commercial equipment, many others build their own transmitters, receivers and/or transceivers. Simple QRP equipment is so much easier to build than an s.s.b. circuit, and the sense of satisfaction which results from using a home-brew station is impossible to achieve in any other way. It also underscores that there are plenty of ways to enjoy the hobby without spending 'loads of money', and that an output of 100W (or more!) is not necessary most of the time.

There are many QRP clubs in different countries around the world, and the G-QRP Club is certainly amongst the best. Its quarterly magazine *Sprat* always contains a number of constructional ideas, many of which are very simple, covering from keyers to antennas.

Back issues of *Sprat* are a rich source of information for anybody looking for QRP circuits. If you want to put together a small portable station, or something for the shack, that's a pretty good place to start.

**Commercial Equipment**

However, there is no reason not to use commercial equipment for QRP c.w., and there's even some which has been specifically designed as QRP rigs. For example, MFJ market a small monoband 4W c.w. transceiver (the MFJ-9020 is the 14MHz version) which is ideal for taking on holiday. I've had several QRP/QRP contacts with stations using the rig from exotic locations. If you are looking for a more sophisticated multi-band QRP rig then try the Index Labs QRP Plus Transceiver (The MFJ and Index rigs are available from Waters & Stanton Electronics).

Most of the modern commercial high power transceivers provide excellent c.w. facilities, including narrow filtering and full break-in. They also normally have provision for reducing the output power.

However, not all transceivers will go down to true QRP c.w. levels (5W, or less). If this is the case, there is usually an internal adjustment with which you can pre-set the minimum power output available with the main (front panel) power control.

If you don't like the idea of getting inside that expensive 'grey box', it should be possible to reduce the power by applying a small negative voltage to the a.c.e. pin on its accessory socket (on the back panel). This is most easily achieved using a PP9 battery, and suitable potentiometer, mounted in a small box.

The current drain will be negligible and so battery life is not a problem. If a switch is included in the circuit, then it becomes very quick and easy to switch between high and low power levels.

One of the most enjoyable aspects to QRPing is that QSOs between QRP stations tend to be of a very relaxed nature, and often consist of an exchange of ideas and opinions about different QRP circuits, or rigs. The internationally recognized QRP calling frequencies on each band are real meeting places for like-minded operators and many good friends can be found there.

**Give It A Try**

So, you want to give it a try? Your rig is producing some low power c.w., perhaps the power meter is barely moving and you are anxious to get some reports.

Probably the best first port of call will be the 3.5MHz QRP c.w. calling frequency, 3.560MHz. Unless conditions are very poor, it's unusual not to raise other QRPers on that part of the band.

Try calling "CQ QRP" and await results. Alternatively, you may well
hear others calling 'CQ QRP' themselves, or already in QSO.

By the way, I suggest you do not use 'QRP' as a suffix to your callsign (eg G3XJS/QRP) as this is not strictly legal. If you wish to indicate that you are a QRP station, it is better to simply leave a space between your callsign and the 'QRP' (eg G3XJS QRP).

The other widely used QRP c.w. frequencies are 7.030 (7.040 in the States), 10.106MHz (although 10.116 is now more commonly used), 14.060, 21.060 and 28.060MHz. On both 7 and 14MHz there has been a recent tendency for some of the high powered digital mode stations to creep a little low in the band and reconverge into the c.w. sections.

The digital stations cause considerable QRM to QRP operators, but they are otherwise both good bands for finding other QRPers, and for making good two-way QRP contacts. For some reason, the QRP world has not yet been able to reach the same level of agreement over the choice of recognised frequencies for 18 and 24MHz.

There is no reason not to work QRO (high power) stations, of course, and so you don’t have to stick to the QRP frequencies. Neither do you have to announce that you are a QRP station when calling. In that way, you will receive a genuine report, and probably surprise yourself with the difference between an output power of 100W and 1W is 20dB - which translates between an output power of 100W and 1W is 20dB - which translates - which translates - which translates - which translates - which translates - which translates to a change in the receiver output signal level of just less than 1dB.

For example, the difference in output power of 10W and 1W is 20dB - which translates to a change in the receiver output signal level of just less than 1dB. The output power is around 1W on the I.f. bands, but this decreases on the higher bands.

The OXO transmitter with suitable output filtering will transmit on any h.f. band depending on which crystal is fitted. The output power is around 1W on the L.f. bands, but this decreases on the higher bands. The OXO transmitter with suitable output filtering will transmit on any h.f. band depending on which crystal is fitted. The output power is around 1W on the L.f. bands, but this decreases on the higher bands.

**Careful Thought**

However, it pays to apply some careful thought about the best way to operate with low power when away from the QRP frequencies. You will obviously be weaker than a station running QRO, but the difference may not be as much as you might imagine.

For example, the difference in output power of 100W and 1W is 20dB - which translates to a change in the receiver output signal level of just less than 1dB. The output power is around 1W on the I.f. bands, but this decreases on the higher bands.

The OXO transmitter with suitable output filtering will transmit on any h.f. band depending on which crystal is fitted. The output power is around 1W on the L.f. bands, but this decreases on the higher bands.

**Portable Operation**

Most QRP equipment can be very small indeed, and the current drain of about 1W on the I.f. is very small, and so it is ideally suited to portable operation. By 'portable', I do mean portable.

With some of the newest home-brew QRP rigs (I’ve seen (particularly the small home-brew equipment) it’s almost a case of ‘slip it in your pocket portable’. But back-packing is certainly a real possibility.

However, quite a few commercial rigs well suited to portable operation, are available for use. For example, there are now three very small multi-band, multi-mode, h.f. transceivers on the market, the Kenwood TS-50, Icom IC-706 and Alinco DX-70, all of which are small enough to be easily transportable.

Although the lowest of the TS-50’s three pre-set power levels is 10W, and therefore too high for true QRP c.w. operation, there’s an internal adjustment which will bring the output down to 2W, or less. The specification of the IC-706 quotes the lowest h.f. power setting as 2W, which is just OK, but the DX-70 has to be adjusted internally, like the TS-50.

When choosing a rig for c.w. operation, it’s also very important to compare the c.w. filtering available for each. A narrow c.w. filter, and i.f. shift control, will make it far easier to copy signals amongst the QRM.

Both the Icom and the Alinco allow c.w. reception on either sideband. This is another useful facility when lighting QRM.

But real fun can be had, particularly when portable, by using something you’ve built yourself. Perhaps a small single band transceiver from one of the numerous kit suppliers, or something based on one of the many circuits to be found in the various QRP journals.

If you’re going to try portable operation, the sealed ‘maintenance free’ rechargeable 12V batteries can be an ideal power source. Details of simple antenna matching units are also easy to find, and so the antenna shouldn’t be a problem.

A resonant dipole, fed with coaxial cable, will often be the easiest to use (although 1.8 and 3.5MHz dipoles can be difficult to handle), but it’s usually a case of using whatever you can put up in the particular location. Tall trees are not always just where you want them! If you’ve not tried the QRP style of amateur radio before, give it a go. Remember, QRPers do it for fun, and (if you’ll pardon the pun) c.w. is the key to it all!
The basis of the PW Codecard was to create the proper sounds of the Morse alphabet and numbers no matter how hamfisted you are. Some would say if you cannot send Morse code properly you're not hamfisted. But, I'm not going to get into an argument over that!

The method of producing Morse code using the PW Codecard goes back to the first years of Samuel Morse's system. At first, Morse code was sent using a series of mechanical switches to create the correct makes and breaks of the circuit. Only later did the human hand replace the machine almost completely.

Have a look at the p.c.b. layout of Fig. 1 (which is shown at 80% size to get it on the page). This also happens to be the circuit diagram for the PW Codecard as well. The switches are the various copper areas (lands) of the p.c.b. Take the letter 'A' for instance, one short (dit) land and a longer (Dah) land.
When the stylus is drawn horizontally across the plate beside the letter 'A', the buzzer will produce 'Di-Dah', the correct sound of the letter 'A'. Similarly, drawing the stylus across say the number 8 line gives 'Dah-Dah-Dah-Di-Dit'. It's difficult to imagine how it could be made easier!

The circuit consists of a 9V battery (such as a PP3 type) and a buzzer connected intermittently by the lands and a stylus. I used a probe from a multimeter for the stylus. But if one isn't available, then the body of a ballpoint pen and a 2.5 or 3.5mm jack plug could be pressed into service as a stylus.

When I made my prototype, I mounted the battery in the middle of the reverse side of the board with double sided 'servo tape'. In this position, it also acts as a 'foot' to angle the board in use. The sounder is mounted with its pins as shown, facing forwards on the board. Should your sounder not have the correct pin spacing, then merely mount it on flying leads and stick it to the board as well.

A useful modification would be to drill a couple of holes near the righthand edge of the board (without breaking the copper track) to act as a tie-down point for the stylus lead. This will make the lead less likely to break in use. That's it: it couldn't be simpler. It's clever this Codecard eh (Di-Di-Dah-Dah-Di-Dit).

---

The PW Codecard in use.

---

Practice Makes Perfect! - Official Morse Procedures

As Chief Morse Examiner Roy Clayton G4SSH is familiar with the common problems encountered by Morse test candidates, here he passes on some useful hints and tips, which, if followed, should help you gain the pass slip, the coveted entry 'key' to h.f. operating.

By Roy Clayton G4SSH

The United Kingdom amateur radio Morse test consists of a typical exchange of signals as used on the amateur radio bands. It's designed to ensure that the instruction undertaken is of practical use for world-wide communication, using basic equipment, and enables successful candidates to go straight onto the c.w. part of the h.f. bands, to exploit the exceptional advantages of the mode.

The most common fault is for candidates to place the Morse key at arm's length in front of them, lay their arm on the table and attempt to shake dots off the end of their fingers, resulting in little control. In many cases the candidates have been taught to do this by colleagues who use an automatic key in this position.

The highest success rate is among candidates who have received tuition by an experienced c.w. operator, listened to the GB2RS slow Morse broadcasts or had skeds on the air. With the demise of the traditional apprenticeship of a period spent as an s.w.l., many newcomers have never listened to a live QSO on the amateur bands, and need the benefit and guidance of an skilled instructor.

The following advice I'm passing onto candidates can make the difference between success or failure.

Receiving

Your biggest problem on the receiving test will be nervous tension. During the test this will be transferred to your fingertips causing you to grip your pen hard, with excess pressure on the writing pad. Although it's difficult to relax under test conditions, do try to write at a steady rate, reading one or two characters behind if possible.

The examiner will send at a steady 12w.p.m. You must avoid writing frantically at a very jerky 25w.p.m. by scribbling the individual letters onto the paper just as soon as the Morse symbols are sent.
Martin Lynch & Son

Dear Sirs,

I wish to place on down. Too often nice to be able to fightnight later. 0930 hours on could not get me on the phone to advise me it was dealer could have of taking out May I add that thanks again for a record my thanks to organisation when my set was uplifted at and it was back improved on your the set being very efficient and it was a dealer when it is a dealer has paid benefit

I phoned Andy on the Saturdays, the set was uplifted at 0910 hours on the Monday and it was back with me a fortnight later. I would have had it sooner but you could not get me on the phone to advise me it was ready. So that is excellent service and I doubt if any dealer could have improved on your timings.

May I add that the advice you gave me on the benefit of taking out insurance for an extended warranty has proved invaluable, the set being collected and returned free of charge under the extended scheme, it might seem a little bit extra at the time but it has paid me to take it out, especially when it is a dealer like yourself who can repair equipment on the premises.

Congratulations on the addition to your family and thanks again for a very efficient repair to my FT-1000.

N McCormack CM0KBC
Ayr, Scotland

5 YEAR WARRANTY IS AVAILABLE ON ALL LISTED PRODUCTS

prime used stock

FOR THE LARGEST SELECTION OF USED EQUIPMENT IN EUROPE, CALL OUR FAXBAX SERVICE - TODAY

MARTIN LYNCH & Son
THE AMATEUR RADIO EXCHANGE CENTRE

140-142 NORTHFIELD AVE
0181 - 566 1120

LOW PRICES - QUALITY CUSTOMER SERVICE GUARANTEED

ICOM

The IC-736 from Icom is the only HF base station to offer so much in the way of features, for so little price.

Just look at what the IC-736 has to offer:

- A full 100 watts on all modes
- Amateur bands 160-10m (Inc WARC)
- A full 100 watts on 6 metres
- A built-in AC power supply - no noisy external power supply required
- Built-in high speed auto ATU - no need for more external boxes!
- Dual antenna inputs, auto switching
- Dual display showing second and split operating frequency

Items 1-736 100w 10m, 10w set HF base station, incl. PSU & auto ATU

ICOM IC-736 100w 10m, 10w set HF base station, incl. PSU & auto ATU

- RRP £1499
- Deposit £499, 12 payments of £92.65

- RRP £1999
- Deposit £499, 24 payments of £55.21

- RRP £2399
- Deposit £499, 24 payments of £91.18

- RRP £2599
- Deposit £499, 24 payments of £91.18

- RRP £2899
- Deposit £499, 24 payments of £108.79

- RRP £2999
- Deposit £499, 24 payments of £108.79

- RRP £3499
- Deposit £499, 24 payments of £120.24

- RRP £3999
- Deposit £499, 24 payments of £120.24

For credit card please add 2.5% to total value. Finance on all products is also available, Subject to status.
E&OE. £10 p&p
Finance is subject to status. Full written details are available on request.
Martin Lynch is a licensed credit broker.
Your brain will be racing ahead of the Morse, attempting to guess the word before it’s finished. You must react to spaces between words, and even more importantly, do not leave a space if one is not sent. Nine out of ten candidates will write the text ‘QTH ISTANBUL’ as ‘QTH IS TANBUL’.

Error Signals
You must practice receiving the error signal in the middle of a passage and recovering, so that this will not cause you to panic during the test. The examiner will not deliberately make a mistake when sending the test passage, but should this occur by accident, do not let it throw you. Look upon this as a bonus!

The examiner will send eight dots and start the word or group again, so you will have two shots at that word. If you are uncertain where the word started, then just continue writing after the error signal, you will not be penalised for writing the word twice, or joining words together.

Try to put a dot every time you miss a letter. This can assist you greatly at the end of the QSO when you are trying to make sense out of the passage.

If you wish to correct a word then cross it out and write the correct version above. Corrected errors are not counted in the receiving test, but you will not have time to re-write the entire passage.

If you can leave a double space between lines when copying the passage then you will have space to write any corrections afterwards. You are allowed a total of six uncorrected errors, but the maximum number of errors that you can be penalised for in one word or group is two.

For example, if you missed the name of the QTH and this was ‘WOLVERHAMPTON’ you would only pick up two errors, even though you missed 13 letters.

At the end of the test passage you will be given two minutes to read through your copy and make any corrections. Remember that a bad guess at a letter is no worse than a space, so fill in the gaps.

Check that your call signs at the start and finish are identical. If not, then one is wrong. Can you remember having difficulty with one of the characters?

Which letters do you have problems with? A common difficulty occurs on words that consist of all dots. If so, then try substituting words that do not make sense with other dot-type letters.

You would be surprised at the number of candidates who turn in a test passage reading ‘UR RHT IS H79’ instead of ‘UR RST IS 579’.

Without A Key
It never ceases to amaze examiners that some candidates turn up for a Morse test without a Morse key.

There will be a choice of keys for you to select, but a Morse key is a most personal object and individuals get used to a particular gap and spring tension. To attempt to send perfect Morse on a strange key is an obstacle that you should never burden yourself with on the day of the test.

You will be given an opportunity to send a short practice passage. Take advantage of this and get used to the note and volume of the oscillator.

When you are given the test passage to send, read it through first and check that you understand the procedural signals as written. If you have any queries at this stage then please ask the examiner before you commence sending.

The candidate does not have to send ‘CT’ to start the sending test, and it is not written on the test passage, but this is a good habit to get into. Quite a few candidates are nervous and make a mistake on the first character of the test.

Sending ‘CT’ is not part of the test and is not marked, so you have not commenced the test. Take all the advantages going.

Another common cause of failure is a candidate who makes a mistake in sending and does not correct with the error signal. It’s no use muttering under your breath, or shouting ‘sorry’.

If you make a mistake Stop. Send eight distinct dots (slowly, and count them) then commence the word or group again.

The Department of Trade & Industry stipulate that the error signal is eight dots (not a minimum of eight dots). If you send seven, or nine dots you have made an uncorrected error that will count as an automatic failure.

Practice sending the error signal until you are perfect. There is no excuse for not sending eight dots correctly, it indicates to the examiner that you cannot control the Morse key.

Practice Contacts
Practice, practice, and listen to live on air c.w. contacts if possible. Copy Morse from more than one person with a variety of different oscillator notes.

There are no difficult test passages. Every single one is based on actual QSOs heard on the amateur radio bands.

The examiner has 100 different passages from which to choose, and will pick one at random just before the test commences. The test passage will be changed for each batch of candidates, so ignore any tips in the waiting room from candidates who have been in the test.

On The Day
Give yourself plenty of time to get to the test centre and find a parking place if travelling by car. Remember to take along two passport-type photographs, and if you want to use them, a pair of headphones and a Morse key.

Although there will be a selection of pens, you will feel more comfortable if you take along your own (with a spare). You may consider using a pencil, which cannot run dry in the middle of a test.

The examiners are not looking for perfection. All they ask is that you can demonstrate your ability to receive Morse and control the key when sending, making corrections when necessary.

You are no longer preparing yourself just to pass the test, but to communicate on the International Amateur Radio bands using a new language and procedures that will enable you to carry out a conversation with fellow amateurs all over the world, regardless of language difficulties. This must be worth the effort involved.

If you pass the QSO format Morse test then you can be absolutely certain that you are competent enough to commence using c.w. on the h.f. bands straight away.

Average Year
In an average year, the Radio Society of Great Britain Morse Test Service examines over 1000 candidates, ranging from eight to over 80 years old, with a pass rate of around 70%, so seven out of ten candidates pass first time. The only people who fail to pass the Morse test are the ones who give up trying.

So, ‘good luck’, but even more importantly, good preparation!
Ben Nock G4BXD describes a simple loop antenna design which could solve your 'Top Band' problems and provide good performance within a small space.

Fig. 1: The overall picture of how the loop should be mounted (not to scale).

Fig. 2: The transformer is made from a section of coaxial cable and four ferrite rings.

The antenna I'm describing was originally developed by Robin Wood G4UDK of Redditch. It will fit into a very small space, needing only six metres or so of length, yet will radiate very well on the 1.8MHz band.

It's simple and the design consists of the loop itself and a small matching transformer. None of the elements in this design were critical, Robin simply experimented until he got good results!

Actually, the design, erection and use of this antenna are all the more surprising considering that Robin is in fact a 'white stick' operator. The diagram, Fig. 1, shows the typical layout of the loop.

In the actual location where it's used the loop is anything but vertical, the wire running at all weird angles, around the shed, up the pole, etc., but its very general appearance is of a vertical loop.

Lowest Leg

The lowest leg is only some 1.5 - 2m off the ground. The top of the loop is held up by any suitable fixings, in the design QTH a small stand-off mast holds up the highest end, about 8m high from the ground with a tree the other end.

The loop can be supported with the traditional 'egg' insulators or by using the polypropylene type of rope. At the feed point corner a small strip of plastic, or Paxolin, can be used to hold them apart.

Then the loop is brought into the downstairs shack. Finally, it's coupled to the rig via the transformer.

The Transformer

The transformer itself consists of four large ferrite rings with a 150mm length of large diameter coaxial cable passed through them, as in Fig. 2.

The loop is attached to the inner of the coaxial cable via a 300pF variable capacitor in series with one of the legs. Note that both ends of the capacitor are in line so it cannot be screwed to any conducting surface.

The two ends of the coaxial cable's outer screening are then taken to either the rig via a short length of coaxial cable or to an antenna tuning unit (a.t.u.).

At Robin's location an FC902 a.t.u. is used to 'tweak' out the very lowest v.s.w.r. On direct connection, I discovered the v.s.w.r. was around 1.5:1 to 1.8:1, but careful pruning could get this lower.

I suggest you use a small plastic box to house the rings and coaxial cable with the tuning capacitor mounted on the top. A large insulated knob should be attached to the capacitor spindle as otherwise you will get r.f. hums. However, having warned you, there's no real reason to worry. Just use common sense!

In use the loop's performance is such that in general, if a station can be heard they can be worked. Operations from Robin's QTH have brought QSOs with GMs, GWs and south coast stations alike.

Considering the very small space needed, this antenna should appeal to those with the limited gardens or the desire not to have something looking like a Bank Radio Telescope in the back yard!

The design is very simple and lends itself to experimentation quite well. No complicated winding of coils is required and no great masts need erecting. Have a go, and I hope it gives a few PW readers ideas to play with. See you on 'Top Band'!

Practical Wireless, July 1996
The Sprat Transceiver

By Rev. George Dobbs G3RJV

The Rev. George Dobbs G3RJV has come up with a compact QRP c.w. transceiver for the 3.5MHz band. We’ve called it the ‘Sprat’, to commemorate the G-QRP Club’s own magazine, which of course is edited by G3RJV!

The 3.5MHz band offers good pickings for the QRP operator. Many QRP operators hang around the International QRP Calling Frequency on 3560kHz and QSOs with the whole of the UK and many continental countries are easily available with a few watts of r.f. power.

The Sprat project was designed to provide a viable QRP Superhet (superhet) c.w. station. It’s ideal for low power operation on 3.5MHz although the Sprat receiver is so designed to be used alone.

This also means that the receiver, always the trickiest bit of a transceiver, can be built first. Once the receiver is working, the constructor can go on to complete the transmitter board.

The receiver would be a useful project in its own right for those who only wish to listen on the band or would like a stand-by receiver for 3.5MHz. It also makes a very compact stand-alone receiver.

Novice Operators

The 3.5MHz band is available to the Novice operator so the transmitter is designed to deliver the 3W output allowed to Class C amplifier, so common in builders, the ‘wing and a prayer’ to be a waste of power. But for novice licensees, the power amplifier, a single m.o.s.f.e.t. device, is operated in Class AB.

My choice design may appear simple QRP transmitter designs, can lead to all sorts of problems.

Why Sprat? Well - the Editor of PW suggested this little project to me, saying that he wanted it to be called the ‘Sprat’ in tribute to another (rather special) journal. Sprat is the name of the journal of the G-QRP Club, which I’ve edited for the last 21 years.

The name Sprat is quite appropriate because it stands for Small Powered Amateur Radio Transceiver following as a suggestion from G3DNF when the journal first appeared.

The Receiver

The receiver (Fig. 1.1) is a superhet circuit based on the Motorola MC3362 chip. The MC3362 was designed as a single chip narrow band v.h.f. f.m. receiver but has enough internal functions available at the pins to receive c.w. Several designs for h.f. receivers, configuring the MC3362 with a product detector, have appeared in recent years.

The first person to exploit the MC3362 for h.f. c.w. use was Gary Breed K9AY, in his “Portable QRP C.W. Transceiver” in QST, December 1990. There was a simplified version of the circuit by Peter Parker VK6BWI, published in Lo Key, the journal of the VK C.W. Operators QRP Club in March 1993.

The MC3362 had not been featured in any UK designs and my first prototype suggested that it could produce a very useful little h.f. receiver. Although no sooner had I completed the first full version of the Sprat than a design from Bernie Pallet G3VML, appeared in the October and November issues of RadCom using the MC3362 in a receiver!

But after consultation with Rob G3XFD, I decided to proceed with my original project. After all, we were almost ready to go in any case!

The Circuit

Considering the circuit from the input: C1, L1, and D1-4 form an input protection circuit for the transceiver to operate in full break-in mode.

A two-pole band-pass filter, around L2 and L3 selects the 3.5MHz band signals which are coupled, via C5, to the first balanced mixer in the chip.

The MC3362 performs all the receiver functions as far as the audio stages.

The i.f. selectivity is provided by a three-pole 4-433MHz crystal filter, XL1, XL2 and XL3. The filter is of the ladder configuration, computer designed with Butterworth coefficients for a nominal 500Hz bandwidth.

Several filters have been built using standard “off the shelf” TV colour burst crystals. All worked well without any need to find a matched set of crystals.

The second I.o. (using pins 3 and 4 and another colour burst crystal) is used for the beat frequency oscillator (b.f.o.). A trimmer capacitor ‘pulls’ the crystal to vary the beat note.

The recovered audio (at pin 5) passes to Tr1, the audio muting part of the change-over system. The receiver is on in both receive and transmit modes so during transmit,
The Sprat transmitter is designed to produce a comfortable 3W of r.f. power thus complying with the requirements of the novice and QRP operator. It’s perhaps a somewhat ‘over designed’ but very simple transmitter circuits have an unpleasant tendency to misbehave.

The transmitter circuit, Fig. 1.2, shows the complete transmit board.

The signal from the receiver board is fed to a BC183 buffer stage, which produces a clear signal which doesn’t shift frequency between receive and transmit. A preset control, R14, adjusts the amount of drive available to the mixer.

The mixer stage is the commonly used NE602 (IC5). The internal oscillator of the NE602 generates a signal at the 4.433MHz i.f. The crystal may be ‘pulled’ by C37 to align the transmitted signal to the received signal.

Because the receiver remains on, but muted, during transmit, the transceiver monitors the actual transmitted note. This not only provides a ‘live’ side tone to monitor the Morse but ensures the transmitter and receiver are on the same frequency. Additionally, if the station being worked is at the same audio pitch as the monitored transmitter signal, the transceiver is netted with the other station.

The transmit mixer output is coupled to a 3.5MHz band-pass filter (L5/L6), followed by a two stage buffer-driver circuit to the power amplifier stage. In this project the power amplifier is an IRF510 m.o.s.f.e.t. device running well within its power handling capabilities. However, it does require a heatsink.

As an attempt has been made to keep the p.a. stage trouble-free and stable the power amplifier has a manually controlled biasing circuit, set by R24 across Zener diode D7. There is also some feedback via C53 and R22.

The output is through a trifilar wound 4:1 balun transformer (T1) (5 turns 0.32mm wire on a FT37-43 toroid). Note the heavy decoupling at the top of this transformer (C49/52) which helps to minimise r.f. leakage to the 12V power source.

The output is taken through a seven element low-pass filter. This filter follows the W3NQI values for standard capacitor value low pass filters. Coils L9 and L11 are 25 turns of 0.32mm (32swg) enamelled copper wire on a T37-2 toroid. Coil L10 has 27 turns on a T37-2 toroid.

The input to the receiver is ‘picked off’ between C57 and the low-pass filter allowing the filter to remain in circuit on receive.

The transmitter mixer and buffer stages are keyed via Tr1, a PNP transistor acting as a switch. The power amplifier remains on all the time. This produces a nice keying characteristic (good reports have been obtained on the air).

I’m sorry that’s all I have space for this time. Next time I’ll show you how to build the Sprat Transceiver.
With the debate about the relevance of retaining Morse code for h.f. licensing still raging, I thought it might be useful to let readers know how a relative newcomer has been faring with c.w. It was thanks to John G3SJE's efforts on the air and during club evenings that I passed my Morse test in December 1992 and then sat the RAE exam later that month.

I received my callsign in March 1993 and made my first s.s.b. contact later that month. However, it was not until May that I attempted my first two-way c.w. QSO.

I had tried c.w. a little earlier, but the mistake I made was trying to reply to CQs from stations sending a lot faster than I could receive. The other 'problem' I noticed was that amateurs working c.w. on 14MHz aren't terribly friendly!

Anyway, to cut a long story short, I bought myself a Sandpiper whip antenna for 7MHz and attached it to my wife's rotary clothes dryer in the back garden, in the hope that it could be used as a ground plane antenna. For radials, I used four lengths of insulated bell wire about 6m long and buried them in the ground.

The antenna worked surprisingly well. I disconnected my microphone and plugged in my straight key for some serious operating.

Operating Limited

Because of work and family reasons, most of my operating was limited to the late evening, usually after 10.45pm. I also tended to answer CQs rather than initiate them.

Although most of my first QSOs were punctuated by 'PSE QRS' and 'SRI NAME AGN BK' things have improved a little, but most of the time I have tended to sail rather close to the coast and get by with 'rubber stamp' QSOs with exchanges of signal report, QTH and name.

There are six permutations to this! I have undertaken a statistical analysis of my first hundred c.w. QSOs and the results are as follows: mean duration of QSO - 14.3 minutes, sample range 1-37 minutes!

Notable rag chews were with Bill G0OUI in Middlesborough and Harms DL8NDN in Bamberg (both over 25min). In all, I worked 29 UK stations and my best DX with Alex UD6DCP in Baku and Rob WB4FNH in Florida.

Gained Confidence

Having gained a little confidence on 7MHz, I decided to graduate up to 14MHz, again taking G3SJE's advice to stay clear of the lowest end of the band and to concentrate my efforts between 14.040-14.060MHz. I dismantled by whip, re-attached my coaxial cable to the magnetic loop I normally use for the band and tuned it to resonate at 14.050MHz.

My first QSO with a Swedish station and my second was with Mike N8UJZ in Weston, West Virginia! I was even more pleased to hear Bill G0SFR tail-ending with N8UJZ, but I think he must have been hit a little later with some very heavy QRM, (did you manage to get through, Bill?).

Other 14MHz notables were with two VE3s within ten minutes or so. I also had a 30 minute ragchew with HB9/DL2YEF/P on a caravan holidaying in Vaduz.

You can see from what I've done that I've found c.w. quite a useful mode for communication. It does require a little perseverance initially and without the help of some 'good' G stations and a few like minded Europeans willing to slow down, I don't think I would have enjoyed myself as much as I have.

Encourage Operators

I hope this short piece will encourage other newly licensed operators to take the plunge and maybe even a few of the more senior members as well. You will soon find that identifying individual Morse letters is NOT the way to go - it is actually a lot easier to pick up c.w. phrases enbloc.

particularly like the palindromic sequences such as BEST and 73, but with a little practice it will be quite easy to identify frequently used pro-signs and abbreviations such as CQ, QTH, etc. I achieved 100 c.w. QSOs in two and a half months. This is an average of 1.3 QSOs a day - well within the reach of most of us. Give it a try - I promise you won't regret it!
In August of last year I was privileged to be invited to The International Electronics Show in Taiwan’s capital city - Taipei. The show runs for five days and attracts buyers from around the globe.

At the exhibition visitors find anything from the very latest in communication equipment to laser light equipment. You can even buy a ‘Flow Solder Machine’ if you’ve got room in the shack at home!

Taiwan is a delightful country to visit, with over 18 000 square miles of beautiful countryside and culture that spans back many hundreds of years. With a population of nearly 21 000 000 people, most of whom seem to speak some English, you’ll certainly not get lonely there.

The country is becoming a major contributor to the world’s computer and electronics industry with most of its manufacturing concentrated into Taipei. I would like to add that on my visit I found the Taiwanese people to be incredibly friendly and extremely hospitable - qualities which the British were known for not so long ago!

Taiwan Nissei

During my visit I was fortunate to be invited to the factory of ‘Taiwan Nissei’ - an offer I could not refuse! Taiwan Nissei are a fairly large sized company, employing over 120 staff. The company is part Japanese and part Taiwanese owned. Principally, they’ve been making moving coil meter movements for over the last 30 years for such customers as Sony, Uniden, Yahama and many other large Japanese and American companies.

Arriving at their factory site early one morning I couldn’t believe my eyes. No, I wasn’t expecting a mud hut building, but in fact I found a very impressive large sized factory unit. I was greeted by Nissei’s Managing Director, Mr Kevin Lin, and their General Works Manager, Mr Yueh Chung. Both gentlemen spoke very good English. After a brief meeting to discuss future products I was invited on a tour of the factory. This is the bit I was waiting for!

First stop was the accounts office (the boring bit I hear you say). Well, to be honest I’ve never seen so many attractive ladies busy with computers and up to their arms in reams of invoices. I wanted to stay a while but I think they’d been forewarned about English men!

Next stop was a very small room surrounded by drawing boards and a handful of staff, scratching their heads. This seems a familiar sight, although there was not one computer to be seen in this office.

Research & Development, as most people are aware, is very important to any company. And to illustrate this, I should mention that Taiwan Nissei spent over 15 months from start to finish on their first range of s.w.r/power meters.

The new power meter was the pride of the company. It was the first time the company had gone one step further from just producing a ‘meter movement’ to producing a complete product.

Production Room

Next stop was the meter production room. Access to this room was through an air conditioned hall, which had a peculiar type of rubber coated flooring.

Before I was permitted to enter the room I had to remove my shoes and replace them with what looked like a pair of ‘flip-flops’. If that wasn’t enough, I then had to put on a large white overcoat - I felt like a holiday camp entertainer!

On entering the room I could not believe my eyes. There, in front of me, were over 30 members of staff sitting at what looked like sewing machines.

The people were actually winding the ‘coil’ sections of the meter by hand. This was carried out using a mechanical counter to monitor the number of turns made onto the ‘former’, a normally cylindrical mandrel used to shape the coil on and hold it in its permanent position.

Further up the room there were a number of staff sat at desks with what appeared to be a selection of needles, pot of paint and a paintbrush in front of them. Yes, you guessed it - they were in fact painting the ‘pointer’ or indicator needle by hand, which was later to be fitted to the meter assembly.

Practical Wireless, July 1996
Spring Section

Next I was shown the 'spring' section. Here, minute springs were assembled by hand which would later give the 'pointer' its return action required to read 'zero'. A job for the steady hands only!

A few tables along there was perhaps the hardest job of all - the assembly of the meter movement and parts. Here, very careful hands assembled the coil and magnet into the plastic meter housing (made downstairs in yet another department) and then attaching the return spring and pointer into the assembly.

Next job, (one I didn't fancy having a go at) was the soldering of the 'moving coil' wires to the rear solder tags. Small hands again were needed for this task.

By now I think I would have found myself on hands and knees trying to find the missing return spring. (I bet you too have tried to repair an old watch with the same 'indicator' plate attached before it head off for testing. Each one is fully assembled. It made me sweat really!

The meter then had its final 'indicator' plate attached before it was ready to be mounted. Each and every one is assembled by hand which would later give the 'pointer' its return action required to read 'zero'. A job for the steady hands only!

Printed Circuit Boards

Time pressed on and it was now time to leave the 'sweat shop' (where you couldn't even have a smoke) and visit the p.c.b. assembly room. Here again everything is assembled by hand.

Staff were busy building the calibration p.c.b. along with the s.w.r. sensor unit. All soldering was done by hand and there was not one flow soldering machine in sight.

Assembly of the 'r.f.' sensor unit is a very skilled job. Great care has to be taken in not damaging the configuration of the components and so altering the s.w.r./frequency response of the meter. (The r.f. sensor is a small box, normally made of tin, located at the rear of the s.w.r. meter housing).

The unit uses special diodes, the r.f. passing through what appears to be waveguide. Here it's sampled and the current generated provides the basis on which the meter can indicate forward/reflected power levels.

Once the sensor and calibration p.c.b.s were finished, it was time to assemble the main unit. Both the meter and calibration unit were then fitted into the prefabricated (injection moulded) front panel which was then attached to the 'pressed' aluminium/tin rear housing box.

Test Equipment

Next I was taken to yet another small room surrounded by Marconi & 'Bird' test equipment. I even spotted a Kenwood multi-bander on each of the test benches (well, they need something for reference!).

In the test room the meter was calibrated using a Bird Thru-line test unit. Power checks were made at various pre-determined power levels for the necessary fine tuning to be made. The v.s.w.r. checks were made against numerous loads with pre-defined v.s.w.r. ranging from 1.1-1 to 5-1 to verify the accuracy.

The meter was finally ready to be fully assembled and last checks carried out. Amazingly, it was a totally hand-made product! This was the pride of the company, their first complete product made from start to finish entirely by them. Well done!

Large Scale

Taiwan Nissei are now producing the meters on a very large scale (forgive the deliberate pun!). All products are still made by hand.

The company are slowly adding other products to their range. And I was truly amazed during my visit to see that everything, within reason, was made by hand and the attention to detail that was needed at every stage of the production.

Nowadays, we all tend to think that everything comes off the end of a conveyor belt as a finished product. Let's hope that there will always remain a need for such quality hand craftsmanship.

My visit would not have been possible without my hosts' welcome. So, I would like to thank Mr Kevin Lin and members of staff at Nissei for their kind hospitality and patience in providing me with answers to my continual questions. And next time you look at your meter, spare a thought for Kevin Lin and all his workers. PW

The r.f. test and alignment 'department'. Mike Haydon spotted a Kenwood transceiver amongst the test equipment, where initial tests are made on the partially assembled power/v.s.w.r. meters.
Part of my task within the magazine is checking and if necessary creating circuit diagrams and p.c.b.s for the various projects within PW. So, when a new version of Quickroute v3.5 became available, Rob Mannion, the Editor, asked me to have a look at it. Here at PW we are very 'Mac' based. Almost every part of publishing the magazine, as you see it, is carried out on Apple Macintosh computers.

But Quickroute is designed to run on IBM PCs (or 'clones') under Windows 3.1. The question is, would it be as easy to use, or make the circuits look as good? Should I dust off an ancient '486/33 PC to get to grips with the program. But let me first say what my machine has in the way of 'bits'. It's a '486/33 with 16Mb of RAM, a 170Mb hard disk and a 1Mb video card. I've tended to go for more memory as an aid to running programs more effectively than the pure processor speed would imply. But would my system be suitable for such a program as Quickroute?

The object of Quickroute is to create circuit diagrams or p.c.b.s as easily as possible. As with other electronic circuit and p.c.b. programs available, these two similar processes are quite separate. You choose to create a schematic or a p.c.b. layout. Two additional tricks 'up the sleeve' of Quickroute is that if you produce a correctly connected circuit diagram, it can dramatically shorten the time to creating the p.c.b. It can also create a 'Netlist' to be exported to the SpiceAge program, which will analyse your circuit from an electrical viewpoint.

### Two Disks

When I opened the package I was surprised to find only two high density disks, a 180 x 225mm ring bound manual and a similarly sized manual of the extended library symbols.

The answer is that the program is written to fit onto one of the two disks (as it's supplied), Quickroute is more aimed towards the digital or 'computer' type of project. I say this because within the various symbol libraries there are few symbols for r.f. components.

The lack of r.f. symbols seemed to be a limitation. However, I then came across a section in the manual showing how to create your own symbols. Within the package you can create almost unlimited new symbols to suit yourself, so the lack of symbols is only a small irritation. And making your own circuit symbols turned out to be a relatively simple operation.

When creating your own (or editing existing) symbols the user should try to get the input and output pins on the correct spacing. I found that if I made the grid step too small it was very fiddly to connect up later on. (This created problems with 'Netlisting', but I'll explain that later).

### Well Laid Out

The program is extremely well laid out with three separate areas to consider on screen. You'll see this by having a look at Fig. 1, where I've shown a complete screen.

The start of the circuit is shown in the main area, with the tool area above. Over on the right hand side is the 'Parts Bin'. This is where commonly used components are kept during creating a circuit.

You can add, or remove, parts to the Parts Bin at any time, while working on a diagram. This is done by moving the pointer over the Parts Bin, clicking on the left hand mouse key and adding the current symbol to the bin, for quicker selection later. Clicking the right hand side mouse key removes the current symbol.

Incidentally, the reason there are so many types of resistors and capacitors is that each one relates to a different p.c.b. pad layout. Take capacitors for instance, a 220µF electrolytic can have different can sizes. It can also have both pins at one end or at opposite ends.

The same principle applies to resistors, and I've not even considered

By 'Tex' Swann G1TEX

Ancient PC

So, I dusted off an ancient '486/33 PC to get to grips with the program. But let me first say what my machine has in the way of 'bits'. It's a '486/33 with 16Mb of RAM, a 170Mb hard disk and a 1Mb video card. I've tended to go for more memory as an aid to running programs more effectively than the pure processor speed would imply. But would my system be suitable for such a program as Quickroute?

The object of Quickroute is to create circuit diagrams or p.c.b.s as easily as possible. As with other electronic circuit and p.c.b. programs available, these two similar processes are quite separate. You choose to create a schematic or a p.c.b. layout. Two additional tricks 'up the sleeve' of Quickroute is that if you produce a correctly connected circuit diagram, it can dramatically shorten the time to creating the p.c.b. It can also create a 'Netlist' to be exported to the SpiceAge program, which will analyse your circuit from an electrical viewpoint.

Two additional tricks 'up the sleeve' of Quickroute is that if you produce a correctly connected circuit diagram, it can dramatically shorten the time to creating the p.c.b. It can also create a 'Netlist' to be exported to the SpiceAge program, which will analyse your circuit from an electrical viewpoint.

Simple Project

To try the software out I decided to recreate a version of a simple project that I made some time ago. It was a mono to stereo adapter to help with listening to Morse on crowded bands. The first impression I got was that (as it's supplied), Quickroute is more...
coils! On that score you will have to create most of your own coils as they are not very well catered for in Quickroute.

I have one small observation with the colour of the symbol as it's being positioned prior to placing. It's a yellow colour that doesn't show up very well. And if you turn off the 'display in colour' it disappears altogether!

The 'screengrab' in Fig. 2 shows a new circuit element being chosen from the 'Linear Component' library. On choosing the component it's then available to place anywhere on the diagram. The cursor is of the 'snap-to-grid' type. The grid being defined as 20 to 0.2mm in eight steps (or 1 to 0.001 in, again in eight steps).

**Circuit Diagram**

After a while I had the start of my circuit diagram as shown in Fig. 3. (Notice I've 'turned off' the Parts Bin area to make more room on the main area). This is a big help for those with only a VGA or small display size (640x480 pixels) screen.

Now take a look at the close-up in Fig. 4, which shows an i.e in more detail. Note that circuit component 'joinings' have to be made very accurately, otherwise when you come to make a 'Net Compile' they aren't considered to be coupled together electrically (I'll explain later).

To create a p.c.b. layout automatically using Quickroute, the circuit diagram must be absolutely correct. All points that should be linked must be linked. Have a look at Fig. 5, this shows a few errors that I made early on.

In Fig. 5 the joined points are shown with a solid dot. While those only approximately joined have outlined circles at their common (similar) points.

To show you what happens if the circuit is not absolutely correct, I've carried out a 'schematic capture' at that point, before corrections. However, before making a schematic capture you must save the circuit diagram, as schematic capture replaces it with a 'rat's nest' p.c.b. layout.

As you can see with the rat's nest layout in Fig. 6 there are very few lines connecting the p.c.b. layout symbols that correspond to the circuit components.

**Rubber Banded**

When you move the components around on the p.c.b. the connecting tracks are 'rubber-banded'. (They act as if the points are connected together with a length of rubber).

To complete the p.c.b layout you have to manually move tracks to achieve non-contact. This can be easier said than done on complex circuits.

To save a little time I took a demo circuit file and created the rat's nest p.c.b. layout as shown in Fig. 7. As you can see, the main components are in the right places, but the tracks need a bit of 'pulling' around until you can end up with one layout as shown in Fig. 8.

When you've finished your circuit diagram and p.c.b. layout, you can export circuits and layouts using the clipboard. You could now incorporate the diagrams into your own newsletter. Depending on the level of the program you're using you can import and export information to and from other programs.

To make Quickroute easier to use, many of the commands are on the tool button bar shown in Fig. 9. Each of the commands (and any keyboard shortcuts) are well documented in the manual, which should be read thoroughly before attempting your first 'real' circuit diagram and p.c.b.

**Very Capable**

The overall package that I've reviewed is a very capable circuit and p.c.b. drafting program. It also offers extremely good value for money for such a comprehensive package.

I had the opportunity to try running Quickroute on a variety of PCs and anything greater than a 386/20 seems to provide a more than adequate performance.

An early portable 386/20 PC with only 4Mb and built-in video (poor) was used to create drawings fairly easily.

My thanks go to Robinson Marshall Europe PLC, Nadella Building, Leofric Business Park, Progress Close, Coventry CV3 2TF. Tel: (01203) 233216 for the review copy of Quickroute 3.5.

Contact Robinson Marshall at the above address (or by E-mail: Qroute@rne.co.uk) for a demo copy of Quickroute 3.5.

The program is available in: Personal, Designer, PRO and PRO+ versions. The costs of these versions are: Personal - £68, Designer - £149, PRO - £249 and £399 for the PRO+ version.

PW
It's Charles Miller's turn to look after the PW vintage 'wireless shop' again, and he continues the story of the fascinating characters and exciting developments in the early days of radio.

While the shrewd managers with de Forest were in full cry in America, back in Britain various rather less flamboyant, not to say exclusive, figures were busy. They were 'beavering' away in the laboratories of the Post Office in search of a repeater for long distance telephone circuits.

A team of engineers had been assembled and was working towards producing a valve to do the job when the work was pre-empted by the arrival of a young man called S. G. Brown. He devised what he called a relay, which was already up and running.

Brown's idea was a straight electromechanical 'gubbins'. Effectively, it was an earphone connected to the incoming call was coupled to a microphone which then re-sent the outgoing call.

Mechanical advantage in the coupling was supposed to give a gain of about 20. Brown's technique sounds a bit improbable, but it satisfied the Post Office enough to figure that it was worth carrying on where the GPO team had left off!

Eventually Captain Round came up with a 'soft' (low vacuum) triode. It had an oxide coated filament (an idea borrowed from some German inventors) and tubular oxide coated filament (an idea borrowed from some German inventors) and tubular grid and anode.

Round's valve depended on there being a slight amount of gas inside the envelope. To provide this there was a little extra tubular bit of glass above the anode in which lived a pellet of asbestos.

Fortunately for progress, this took place some 70 years before the EEC took control of Britain. Otherwise Round would undoubtedly have been imprisoned for sheltering safety directives in all directions!

As it was, Round bunged in the asbestos and lived to tell the tale, and the device actually worked. The interesting thing was that when these valves were new they started to function within three seconds of the current being applied to the filament.

However, as they aged the waiting time gradually got longer. It would have been embarrassing had not some bright spark discovered that the valve could be goaded into action by the application of a lighted match to the glass around the asbestos pellet (not surprising, really, since anyone would get a move on with a lighted match stack up his anode). Perhaps this was the origin of the term 'warming-up time'?

Patent Agreement

A couple of years after Round had produced his 'soft' valve MWT got together with Telefunken of Germany and signed a cosy patent. With this agreement MWT was to concentrate its efforts on receiving types and Telefunken on transmitting types.

Had it worked out, the agreement would have given the two firms a near duopoly in European valve manufacture. But unfortunately the respective Governments, like Tweedledum and Tweedledeed, resolved to have a fight.

It was rather strange for two countries ruled by royal cousins! But all families have disputes now and again.

In August of 1914 the shooting by a student of a Grand Duke in Sarajevo provided a suitable excuse for the quarrel to erupt into a war. It was a war that would last four years and wipe out almost a generation of British, French and German manhood plus a great number of the Americans before it was finally sorted out.

True to tradition ('follow me lads, I'll be right behind you!') no casualties were reported among the brave politicians who had got everyone into the fine mess in the first place!

So in the euphoria of Summer, 1914, the gallant First Hundred Thousand marched off to be slaughtered. All that could be heard was the sound of cash registers in Whitehall ringing up taxpayers' money to finance the adventure.

Good Communications

Since good communications are a great help to those hell-bent on killing as many people as possible in the shortest time, money flowed. It also filtered through to fund the development of radio telephony, both on the ground and in the air.

By this time Round had developed his 'C' type valve which again used the asbestos pellet idea and was reputed to have as much gain as any three other types put together. The 'C' was to find its way into a number of military receivers, together with the later type 'N'. The type had the advantage of being capable of working in 'reflex' circuits whereby a single valve...
deal simultaneously with both radio frequency and audio frequency signals.

Transmitting Valves

With the enforced laying of the Telsittransnica agreement Round had also moved on making transmitting valves. These commenced with the ingeniously named 'T' type.

The 'T' type was a "hard" (high vacuum) valve which worked at far higher anode voltages than the "soft" varieties. This factor enabled it to generate the high power oscillations needed for transmission.

The 'T' was followed by the 'LT' (a low vacuum) valve which worked at far higher anode voltages than the "soft" variety. This factor enabled it to generate the high power oscillations needed for transmission.

The Royal Flying Corps, next to its anode!). We'll be hearing quite a lot about a certain Captain Stanley Mullard, formerly of the Royal Flying Corps, and we'll be hearing quite a lot about a certain Captain Stanley Mullard, formerly of the Royal Flying Corps. And we'll be hearing quite a lot about a certain Captain Stanley Mullard, formerly of the Royal Flying Corps. And we'll be hearing quite a lot about a certain Captain Stanley Mullard, formerly of the Royal Flying Corps.

We'll be hearing quite a lot about a certain Captain Stanley Mullard, formerly of the Royal Flying Corps. And we'll be hearing quite a lot about a certain Captain Stanley Mullard, formerly of the Royal Flying Corps. And we'll be hearing quite a lot about a certain Captain Stanley Mullard, formerly of the Royal Flying Corps. And we'll be hearing quite a lot about a certain Captain Stanley Mullard, formerly of the Royal Flying Corps.

We'll be hearing quite a lot about a certain Captain Stanley Mullard, formerly of the Royal Flying Corps. And we'll be hearing quite a lot about a certain Captain Stanley Mullard, formerly of the Royal Flying Corps. And we'll be hearing quite a lot about a certain Captain Stanley Mullard, formerly of the Royal Flying Corps. And we'll be hearing quite a lot about a certain Captain Stanley Mullard, formerly of the Royal Flying Corps. And we'll be hearing quite a lot about a certain Captain Stanley Mullard, formerly of the Royal Flying Corps. And we'll be hearing quite a lot about a certain Captain Stanley Mullard, formerly of the Royal Flying Corps.

The Royal Flying Corps, next to its anode!)

We'll be hearing quite a lot about a certain Captain Stanley Mullard, formerly of the Royal Flying Corps, next to its anode!)

We'll be hearing quite a lot about a certain Captain Stanley Mullard, formerly of the Royal Flying Corps, next to its anode!)

We'll be hearing quite a lot about a certain Captain Stanley Mullard, formerly of the Royal Flying Corps, next to its anode!)

We'll be hearing quite a lot about a certain Captain Stanley Mullard, formerly of the Royal Flying Corps, next to its anode!)

We'll be hearing quite a lot about a certain Captain Stanley Mullard, formerly of the Royal Flying Corps, next to its anode!)

Valve filament supplies were provide by 2V accumulators and many people can remember having to take them to the local garage for 'recharging'. Meanwhile, valve designers were desperately trying to reduce filament current consumption without effecting other characteristics.

An M-O 'R' valve with a 4V 700mA filament. It required an anode voltage of between 30 and 100V. Note the attractive silvering effect of the "gettering".

which, in the low temperatures encountered at high altitudes became reluctant to start working. So, as it was not a very safe proposition to play about with lighted matches in the cramped quarters of a wood-and-canvas biplane carrying large quantities of petrol, a special electrical heater for the asbestos pellet was devised to fit around the valve!

Valve Manufacturing

The BT-H Company also went into valve manufacturing, initially making a British version of the de Forest Audion. Two were successful, proving able to work over the frequency ranges of military equipment.

However, the Audion's limited useful life brought about their abandonment within 12 months in favour of a new type developed in BT-H's own laboratories. It was itself based on a French military valve called the 'TM' (from Telegraphique Militaire).

The new valve, the 'R' type became perhaps the best known of all the early British valves. Examples still change hands nowadays at high prices between collectors. And almost incredibly, even after 80 years the odd brand-new-in-a-box one will still turn up!

The 'R' was a hard valve with a tungsten filament that was comparatively economical at the time, being rated at 4V, 700mA. The grid was a wire helix surrounding the filament, and the anode a nickel cylinder enclosing the whole.

The valve worked with between 30 and 100V on its anode and had an amplification factor of nine. Its globular envelope with a scaling "pip" at the top and a four-pin base that subsequently became a standard in Britain make it, perhaps for the first time, recognisably a valve to modern eyes.

Generic Name

In fact 'R' became something of a generic name for a number of types closely or otherwise related to it. The valve was not perfect - we'll look at its faults in a moment - but it was so much better than what had gone before that all the British valve manufacturers of the time were contracted to produce it.

(Rivalries were not quite abandoned in this war-effort co-operation, however, Ediswan calling its version the ESL).

Something rather odd now happened. It is not certain exactly what was happening that produced the phenomena. At any rate, when the 'R' proved to have too restricted a frequency range for all military applications, and moreover was "microphonic" (sensitive to slight mechanical shock), BT-H appears to have "stepped back".

The company regressed for a while to soft valve techniques with the gas-filled type 'R2'. Initially the gas used was hydrogen, but this was changed during the production run to helium. (I can't help wondering if these valves had to be toned down to prevent their floating off into the stratosphere!)

Cheerio from Charles. See you in October.
Ed Taylor WT3U finds out about the man who invented, and gave his name to the Morse Code. He also looks at US Morse tests, and asks if we're being unnecessarily demanding in the UK.

You can be on the air using Morse for quite a while before discovering that the code you're using is named after a real person. You may be even more surprised to learn that the inventor of Morse Code was responsible for a communications revolution, comparable to TV and the Internet in our own era.

We take it for granted that we know what is going on anywhere in the world almost as soon as it happens. Maybe a sister in Australia has broken her leg, maybe a president has been assassinated but we expect to hear immediately.

However, until just over 100 years ago, the fastest way of getting a message through was by horse, train and ship. You might have waited for months to find out whether or not your country was still at war.

A remarkable American changed all this. Professor Samuel F. S. Morse, who looks out at us from Fig. 1. It's no exaggeration to say that his electric telegraph, and the methodology needed to use it (Morse Code), had a dramatic effect on communications. For the first time ever, information about events could be made available to everyone in a matter of minutes.

Foundation For Success

I should say right now that the efforts of many other scientists laid the foundation for the success of Samuel Morse. He studied the work of other pioneers, such as Ampere, Oersted, Volta and others, whose names have been used for electrical units we are familiar with.

One of the most interesting aspects of Morse's life is that he was accomplished in several fields of study. When he was born, in 1791, there was not the same separation between science and art that there is today. A well-educated person was expected to have a knowledge of science as well as traditional subjects.

Samuel Morse studied to become an economist, but to the dismay of his father he decided to make his famous portrait of US President Monroe.

While supporting his family as an artist, Morse was busy with research into electricity and other areas of applied physics. Many of his experiments related to the living as an artist. In fact, it seems he preferred to go out shooting with his friends, and had to repeat part of his course!

To London

But he finished university, and set off for London to study painting, even though Britain and the USA were at war. You might think that anyone who arrives in a country which is at war with their own is likely to be arrested as a spy, or at least, deported. But, Morse found the British quite friendly, and experienced little prejudice.

He was a keen art student, and after four years was expert enough to make his living as a portrait painter. Before the development of photography, this was a valuable skill.

Morse returned to the USA in 1815, to live in New York state, where he received commissions from eminent families. His pictures are considered to be of high quality and many were for eminent families, including a developing field of electromagnetism.

Samuel Morse was aware that a battery connected to a coil of wire would create a magnet. With a strong enough battery the same effect could be produced many miles away.

It was on one of his many transatlantic crossings in 1832 that he formulated his major inventions - Morse Code in conjunction with the Electric Telegraph.

Others had speculated that messages could be communicated by signalling over wires, but Morse actually made the telegraph work. While other proposed systems were using 20 or 30 wires to represent numbers and letters of the alphabet, Morse found that a pair of wires would be adequate for the purpose.

Distance Barrier

The attenuation of signals over distance was thought to be a barrier to long distance communication. As it turned out, by using enough batteries, the problem was partially resolved.

Anyway, Morse didn't know this,
World-Wide Success

Morse petitioned the US congress for funds to construct a telegraph to send real messages, and eventually was given $30 000. He put up a line between Washington DC and Baltimore (about 40 miles). After many tribulations, the system worked, and was a big success. Soon lines were springing up all over the USA, linking major cities.

Now in his 50s, Morse began to achieve fame and fortune, in a field far removed from that of portrait painter. The next major step was to cross rivers.

Then ultimately, in 1858, the telegraph crossed the Atlantic. Given the technology of the time, it was amazing this was achieved so quickly. A diagram of various cable designs for underwater use is shown in Fig.5.

Professor Morse was never a wealthy man, although the royalties from his inventions kept him comfortable in later years. He had to defend his patents, which came under attack from many sources. Ten European countries (not including Britain) awarded Morse the splendid sum of 400 000 Francs as a mark of their appreciation of his work. In an unsavoury act of chauvinism, his British patents were turned down, even though his claims were legitimate.

By this time, Morse Code was being used globally, and Professor Morse was an international celebrity. A special circuit was connected to his house in upstate New York (pictured in Fig. 6), so he could send and receive messages in his old age.

Morse met and was honoured by many international leaders and a statue was erected in Manhattan’s Central Park. When he died in 1872, the news was sent around the world in hours something which Morse himself had made possible.

When radio became a reality early in the next century, Morse Code was the obvious way of communicating for the now medium. What an amazing inventor Samuel Morse was!

Morse Testing

I think Samuel Morse would have been gratified to know that his code, changed only a little, was still in use a century and a half after he invented it, and for a purpose (radio) he could only have dreamed about.

So, now let’s find out what is required for the US amateur radio licence now as far as Morse testing is concerned. (We’ll continue our look at theory exams in the October issue).

The US Morse tests are administered by volunteers, and it’s fair to say that they are less selective than those in the UK. The three speed levels tested correspond to various classes of licence, and are at 5, 13 and 20 words per minute (w.p.m.).

Examinees are given 100% copy of any one minute of code out of the five. Then the actual test passage. It lasts five minutes and reproduces a QSO. Examinees are given 10 questions about the text, and have to answer seven correctly.

The questions asked are about the "contact". For example, ‘What is the home town of the station who called CQ?’ and so on.

Amateur failing that can also pass by showing 100% copy of any one minute of code out of the five. There is no sending test.

I wonder what you think of this? Personally, I feel the accuracy required in UK Morse testing is unnecessarily high.

Since we are not passing life or death traffic, I think we do not need to achieve a super-high level. A standard similar to the Americans’ would be perfectly adequate.

Additionally, the fact that there is no sending test is probably realistic. Particularly at 21w.p.m., when most operators will be using an electronic key or keyboard rather than a straight key.

Correspondence

Many thanks to those who have written with comments, suggestions and criticisms. I am still collecting information from those who have obtained a reciprocal licence for the USA. Please let me know your experiences of getting the licence, of travelling with equipment and of operating in America.

Here are some of the ideas that you have had. W6GWAFT writes regularly about many topics. He is a Novice instructor, and envies the US system of low-cost examination and licensing, as well as the speed with which exam results and licences can be obtained.

Dave GB2RE has had positive amateur radio experiences from his US trips. While Peter G3CCX has had difficulty getting a reciprocal licence.

Tom G0GOXJ visits the USA every year, so decided to take the tests and get an American callsign (NSWIF). He was keen enough to become a Volunteer Examiner (VE) for US exams.

Keith G0OZK is concerned that standards of knowledge and operating have declined, and enquires about the situation in the USA.

Allan G3JMO has sent several good suggestions for future inclusion in ‘Scene USA’, thank you. Keith G1HRB proposes a change in licensing requirements, given that most Class A licensees learn Morse for the test, then never use it (same in the USA!).

That’s all I’ve got room for this quarter so 73, I appreciate all your thoughts so, please write to Ed Taylor W13O, PO Box 261304, Denver, Colorado 80226, USA, or on E-mail at 102662.2222@compuserve.com The deadline for October column is the middle of July.
As I write this month’s column, the birds are singing, the trees are bursting into life and the birds are singing, the trees are bursting into life and spring is well and truly in the air – at least last! However, the impression from our reporters is that the improvement in the weather has not corresponded with a long-awaited improvement in h.f propagation conditions!

Conditions as it seems, are still having to use all their skills, knowledge, and talents to dig out that juicy DX on the bands. Are they still having to use DXers? Yes, the DXers are still having to use all their skills, knowledge, and talents to dig out that juicy DX on the bands.

I heard recently that the low point of the sunspot cycle was over, and that over the next couple of years we will see an improvement in general propagation conditions. Well, I don’t know if you’re like me, but I wish that improvement would come a little sooner!

Perhaps I should stop wishing my life away! I did however receive a telephone call from Eric Masters GOKRT as I was preparing the column (the 28th of April) who informed me that 28MHz had been open for most of the day. So, it looks as if the Sporadic ‘E’ season has started. At last, I can give my 28MHz rig a bashing!

Transceivers For CB

Following the debate over the conversion of 28/27MHz transceivers in the pages of PW over the past few months, I received a letter via the Editor. It’s from someone who claims that ‘a great many of the stations using 27MHz s.s.b. are radio amateurs, both in the former Soviet Union and the UK’.

The letter’s author says the possibility of converted rigs getting “back into the hands of ‘pirates’ are not slim”. However, not having any evidence of this allegation, I’m not convinced. All the amateurs I know on a personal level want to keep their licences, and even if they wanted to, would not operate on 27MHz s.s.b. for fear of losing both their ticket and their equipment.

The writer signed the letter ‘Anon’, so it was impossible for me to reply directly to the letter and the points raised, but if he/she would like to write to me direct, I would like to debate this matter directly. I will of course print any correspondence in this space so as far as identity is concerned.

Editorial comment: Anonymous letters cause us great problems. It’s difficult for us to reply to or act on anything in cases like Leighton mentions. So, please supply your full name and address so that a reply can be sent or the matter dealt with. I guarantee full confidentiality. It’s unfortunate that we have to literally ignore interesting comments, questions or statements because they can’t be attributed to a source as they are unsigned or return-addressed.

The Index Laboratories QRP Transceiver is favoured by GOKRT (see text).

Leighton Smart reports on the past month’s activities, compiled from your reports. It’s the column which can’t be prepared without your help!

DD/FSPWJ until September on all bands, QSL to F5PRP.

There’s news that Terry G3WUX, who is a white stick operator, will be operating from Greenland between the 10th of July and 26th of August as part of the Trans-Greenland Expedition. They’ll be using c.w. on 14.002MHz and s.s.b. on 14.200MHz with a 5 watt ORP Plus transceiver and window antenna; QSL to his home call. Good luck Terry, hope to hear you!

Finally, Ron ZL2TT says that the May ZL8RI operation from Kermadec Island has a “target of 40 000 contacts”. He says that thanks to the support from both commercial amateur radio companies and amateur clubs and individuals, the expedition should be a success. Listen out for them and help them reach that target!

Your Reports

I’m starting your reports with 1.8 and 3.5MHz. As usual, we’ll see what ‘ace QRPer’ Eric Masters GOKRT in Worcester Park, Surrey, has turned up on the bands this month.

Eric is pleased with working K3VLN in New Zealand on 1.8MHz. He’s surprised with what his antenna is not designed for ‘Top Band’ operation.

The GOKRT 1.8MHz c.w. list includes EL6AK (Republic of Ireland), at 2159, HB9ATA (Switzerland) at 2120, and UA2BD (Kaliningrad) as YL2GKB (Latvia) at 1825UTC. Provided it’s over to ‘our Ted’ Trowell G2HUK on the Isle of Sheppey, Kent. Ted used his ORP (Icom IC-721S) at 5W output c.w. and a G5RV antenna on 3.5VHz to hook up with T9/LA8PT (Bosnia-Hercegovina) at 2000. And using his 70W Ten Tec Omni V transceiver, in conjunction with G5RV, magnetic loop, and vertical antennas, accounted for c.w. contacts with DJ3X6 (Germany) at 0633, as well as YL20KB (Bulgaria) at 1855UTC.

Now it’s over to ‘our Ted’ Trowell G2HUK on the Isle of Sheppey, Kent. Ted used his ORP (Icom IC-721S) at 5W output c.w. and a G5RV antenna on 3.5VHz to hook up with T9/LA8PT (Bosnia-Hercegovina) at 2000. And using his 70W Ten Tec Omni V transceiver, in conjunction with G5RV, magnetic loop, and vertical antennas, accounted for c.w. contacts with DJ3X6 (Germany) at 0633, as well as YL20KB (Bulgaria) at 1855UTC.

Finally for the two lower bands, s.w.i. Charlie Blake RS9334, in...
Milton Keynes, who, by the way, has just passed his 12w.p.m. Morse Test and is now having a go at the RAIE (Well done, Charlie!), offers 3.8Mhz reception reports of SV2ASP (Greece) working WA3DCG in the USA at 0442, and 9H1EU (Malta) working 5S6B (Gineau Bissau) at 210UTC, all on s.s.b.

The 7MHz band

Starting '40' off this month is Ted G2HKU. He's again been 'GQping' with his 5W rig.

On 7MHz Ted has listed c.w. contacts with 3V8BB (Tunisia), 5V4A/DL8KWS (Cyprus), and 7Z2W (Turkey) all at 1500 with his 5W, while 70W of c.w. gave him J6WSH (Svalbard Island) in the Arctic Circle, YV6ACZ (Venezuela), VK3AR (Australia), PJ2AM (Netherlands Antilles), and C5ECW (Gambia), all contacts taking place around 0600UTC.

Meanwhile, Charlie RS6004 has been maintaining a keen watch on his favourite band. (Won't be too long till you'll be heard here yourself, Charlie!)

He reports s.s.b. reception of HK4DF (Colombia) working 15D (Honduras) and 7N9OUTC.

Back to Eric GOKRT now, who has passed his 12w.p.m. Morse Test and is now having a go at the RAE Garden of Malta' working GOUSM, OY1AO (Finland) working VE3FG (Ontario) at 1300, and K5AA (Florida) working VE5IOS (Ontario) at 1306 UTC. Eric GOKRT lists EA5FLQ (Spain) at 2028, OH5MMO (Finland) at 1804, UR5VX (Ukraine) at 1355, and ES2RV (Estonia) at 2055UTC.

The 10MHz Band

The 10MHz allocation is a band that isn't featured in this column very often. It's not for lack of interest I assure you - but for lack of space! It's not for lack of interest I assure you - but for lack of space!

It's the 14MHz band that still carries most of the daylight DX traffic at this point in the sunspot cycle. It's the most reliable of the higher bands, although 18 and 21MHz are allowing some reasonable DX communication at times.

Ted G2HKU has been cracking some nice stuff, and his list includes c.w. contacts at 70W output with 7ZCR (Algeria), RZ90X/T (Dickson Island), 6V6/K3/PK (Somalia), OJ0/OH2K (Market Reef), 9H1BM (Malta), W9KN/6 (USA), VO8DX (Chagos Island), CO6E (Cuba), and C5ECW (The Gambia) at around 1600UTC.

Now over to John Heys G3BDQ near Hastings, who says that the lack of sunspots is really hitting his h.f. DXing. But nevertheless he still managed s.s.b. contacts with 9Y7MV (Taiwan), CN2L (Morocco), 7XBB (Tunisia), and JH4JMG (Japan) despite the low numbers. Eric GOKRT had loads of fun with his low power c.w. during the European DX Contest. He worked all s.s.b. His single s.s.b. report was with CU2DX (Azores Islands) at 1404UTC.

The 10MHz Band

The 10MHz allocation is a band that isn't featured in this column very often. It's not for lack of interest I assure you - but for lack of space! It's not for lack of interest I assure you - but for lack of space!

Charlie Blake RS-96034 listens: 0500-0700 on 7.061MHz s.s.b. with an NRD 525 receiver & Sloping Wire antenna.

Steve Locke GWOSGL operates: 1100-1500 most days around 14.180MHz s.s.b. using a Kenwood TS-940 & TH7 beam antenna, normally beaming to OC.

Don Mclean G3NOF operates: 1030 Saturdays on 3.685MHz on the ISWL. Net or 1030 Sundays on the Yeovil ARC. Net 3.666MHz s.s.b. using a Kenwood TS-950 & trap dipole antenna.

Leighton Smart GWOLBI operates: Most Sundays at around 1000-1300 on 28.500MHz s.s.b./c.w. using a Ham International Concorde 2 transceiver and a wire dipole antenna.

Rob Mannion G3XFD listens and operates: (weekdays & weekends) 1800-1830 3.7MHz 100w s.s.b., & 3.530/3.560MHz ORP c.w. using a KW2000B/Trio TS-120V and trap dipole/long wire antennas. Also at 2300 on either 3.530, 7.025MHz (c.w.) or 3.7MHz s.s.b. Occasionally on 7.025MHz c.w. between 0100-0200.

Gordon Foote G7NCR listens: 1730-1930 & 2030-2200 (weekdays) and 1430-1630 (weekends) on 14.250MHz s.s.b. using a Howes DcRx receiver and loft mounted wire antenna.

T. Ibbotson G0VIT listens: each evening between 1900-2000 on around 7.020MHz c.w., or 14.036MHz c.w. using a Ten Tec Scout at 50W.

David Kennedy G7GWF listens: on 7MHz using a Howes Lake DTR 7 Transceiver.

The LCARC are entering five students for the Novice exam in June, and recently built and used the 'Weekend Special' antenna featured in last October's PW. The club logbook indicates using this antenna on 21MHz and 100W of s.s.b. with ZS1AU (South Africa) at 1520, SU1SK (Egypt) at 1436, C6DX (The Gambia) at 1616, and HSANX/25 (Botswana) at 1400UTC.

Signing-Off

Well that 'wraps it up' for this month, it's time to be signing-off. Thanks to our dedicated reporters who provide the material for this column.

I'm always inundated with information, and it's great that I receive. Space is my only limitation, but I try as best I can to 'squeeze you all in'.

My apologies for not being able to reply on an individual basis to all reporters. But my work schedule is now so heavy, (up to 60 hours a week at present, including weekends) that all I seem to do these days is work and sleep! As usual, reports and information by the 15th of each month to: Leighton Smart GWOLBI, 33 Nant Gwyn, Trelawny, Mid-Glamorgan CF46 6DB, Wales. Tel: (01443) 411459. Cheers for now.
This month David Butler G4ASR takes a look at a transatlantic challenge which investigates the possibility of contacting North America on the 144MHz band.

The month of February this year marked the 75th Anniversary of the first attempt in 1921 to hear amateur radio signals across the Atlantic. This followed reports in the previous year of long-distance (DX) contacts being made on wavelengths of around 200m (1.5MHz). Although a considerable number of amateurs took part in the February 1921 tests no signals across the Atlantic were reported.

In December 1921 another series of tests were conducted which resulted in positive identification of transatlantic signals. The next obvious challenge was to complete a two-way contact between the British Isles and North America. A further series of tests were arranged to take place in December 1922 which culminated in success. The transatlantic path had finally been bridged!

Since those early days many radio amateurs have attempted and succeeded in establishing two-way transatlantic achievement on frequencies much higher than 1.5MHz. Nowadays of course this feat is normal practice. Transatlantic OSOs are made regularly over much of the h.f. spectrum, even as high as 28MHz band when solar conditions are favourable.

Higher Frequencies

But what of even higher frequency bands? On numerous occasions it has been proved that transatlantic contacts can be made on the v.h.f. bands. As you’re probably aware I’ve been reporting openings on the 50MHz band for a considerable time.

In recent years, 50MHz openings have been occurring regularly each summer via multi-hop sporadic-E (Sp-E). Around the years of sun-spot maximum, lengthy openings via F2-layer propagation are also possible, not only to North America but worldwide.

During the periods of high solar activity crossband contacts have even been made on the 70MHz band between the UK and Canada. This is a number of DX operators wondering whether it was possible to raise the limits to the 144MHz band.

Over a decade ago a few dedicated enthusiasts (myself included) arranged extensive transatlantic tests on the 144MHz band. Although the tests proved very interesting with parts of callsigns being heard no confirmed terrestrial two-way contact between Europe and North America has ever been made at such an elevated frequency. Incidentally, there were some readers who regard the 144MHz band as only capable of short distance communication. This however is far from the truth!

Long distance contacts up to 2000kms are routinely made by top-notch DXers via propagation modes at E-layer heights. Tropo ducting over sea paths, particularly between the UK and the Canary Islands, occur nearly every year enabling paths in excess of 3000kms to be worked.

I’ve included details, in the chart Fig. 1, of existing European distance records on the 144MHz band. I think you’ll be surprised at the distances that have been achieved so far.

It’s because of these European distance results that interest has been generated in establishing the first terrestrial two-way OSO on the 144MHz band across the Atlantic Ocean without the aid of satellites or other orbiting ‘reflectors’.

The Brendan Trophies

In 1995 Paul Martin EI2CA, a very keen 144MHz DXer, initiated the transatlantic challenge. An approach was then made to the Irish Radio Transmitters Society (IRIS) to establish the 144MHz transatlantic challenge. The Waterford Crystal Company were contacted and they kindly agreed to donate a pair of Waterford Crystal cut glass trophies for the 144MHz Transatlantic challenge. The glass vases, known as the Brendan trophies, are named after St Brendan, who was an 6th century Irish Abbot and missionary.

As an explorer, St Brendan sailed widely in the north Atlantic region reaching Iceland, Greenland and possibly Newfoundland. St Brendan later founded a monastery in Galway and died in Annaghdown, Galway in 577AD. St. Brendan’s Day is celebrated on May 16.

Transatlantic Challenge Rules

The Brendan Trophies are awarded to each of the operators of the two amateur radio stations which first establish two-way communication between the continents of Europe and America within the 144MHz band. The two stations must be located on land or non-tidal waterways within the continental shelves of Europe and America.

Operators applying for the award must have held a current amateur radio licence at the time of the contact. They must have operated during the contact, particularly in respect of power and frequency limitations.

Any information regarding the stations demanded by the award panel must be provided. If required, the stations must be made available for inspection by nominated representatives of the awards panel.

Confirmation Of Report

Two-way communication will be deemed to be established when each station has received both callsigns in full, received a signal report and received a confirmation (R or Roger). The generally accepted systems of reporting are the RST or meteor scatter number system.

All information must be exchanged within a maximum period of four hours. The contact must be made via natural reflectors within the atmospheric mantle of the earth.

The use of man-made reflectors such as aircraft or satellites as well as e.m.e. is excluded. The contact may be made in any mode, for example s.s.b., c.w. or digital.

Proof Of Contact

The onus of providing proof of the contact rests on those involved. The level of proof required by the awards panel will depend on the circumstances under which the contact was established.

For example, if the contact was pre-arranged via a series of schedules, then the panel would expect a high level of proof. This would probably take the form of recordings of the signals.

On the other hand, if the contact resulted from random operation then signed statements of both operators may be all that is required. However, all relevant facts will be taken into consideration when evaluating a claim.

Applications for the award must be made in writing to the Chairman of the awards panel, a sub-committee of the Irish Radio Transmitters Society.

The challenge has now been set. Experts would say that this venture is far more difficult to achieve than the early transatlantic short wave contacts established three quarters of a century ago. It’s now up to dedicated radio amateurs in Europe and North America to prove the experts wrong.

Propagation Modes

So, how is the transatlantic contact going to be made and what propagation modes will be usable? Without going into the technicalities, this type of contact can only be made with the use of high power c.w. or s.s.b. equipment.

The antenna system will also be a vital part of the overall system. So I suggest you invest in the double-optimised Yagis that the DXers use.

Let’s take a brief look at the different propagation modes you could use. If you look at the chart, Fig. 1, you’ll see I’ve mentioned five propagation modes.

The greatest distance worked in (Europe) so far is the 7843km contact made via trans-equatorial propagation. Unfortunately though, this mode only works for paths that cross [at 80°] to the geomagnetic equator.

The next greatest distance worked is the 4281km path achieved via Sp-E propagation. In my opinion this mode is a definite contender for the transatlantic path. Also a strong contender are...
contacts made via extended tropo. Although super DX (over 3000km) via this mode is normally worked to the south of the UK I don’t have any problems in envisaging an opening across the Atlantic at some time in the future. We can always dream! Finally I’m going to discount the last two remaining modes, that of meteor scatter and aurora. Because of the non-optimum geometry of these modes, the resultant signals will be inaudible over such a vast distance. Therefore I suggest you plan your tests to coincide when the greatest incidence of Sp-E and tropo openings occur.

**Stations Active**

One operator who has been monitoring North American stations via Sp-E is Mark Holloway G4YRY (IO20). This followed contacts made via Sp-E with stations located in the Canadian Islands, some 2500kms from G4. Mark suggests listening for f.m. broadcast stations on Band II (88-108MHz). He mentions that signals from the same area off the African coast are consistently heard every year.

Andy Nicholls G3VMZ is another operator who has been keeping records of DX openings via Sp-E for a number of years. He reports that a 3500km path on the 144MHz band is very probable on several days during the summer.

Andy suggests that stations should beam towards VO1, VE1 and VE and pay special attention to the band at peak times. He suggests this would be between 1800-0100UTC during the last two weeks of May and throughout the month of June.

Ken Osborne G4IGO reported last year that his records also indicate that these sort of distances are possible. However, although he agrees that it is very likely to occur on southerly paths, he disagrees that it would apply to the westerly UK-USA transatlantic path.

Nevertheless Ken suggests that UK operators should look for evidence of v.h.f. E-layer propagation over this path. And one station you could look for is that of Fred Archibald VE2ESEI. He sent an E-mail on behalf of the West Island Amateur Radio Group, Montreal reporting that the greatest transatlantic challenge.

**Nova Scotia**

The Canadian Group have been undertaking v.h.f. DXpeditions for several years and are planning to operate this year from two different locations in Nova Scotia during July. It’s expected that one week’s operation will take place from a lighthouse on Seal Island. The Canadian Group will then move to the old Marconi station in Glace Bay to operate for a further week. Using the call sign XJ1CWI they will run 750W output into a 42 -element ‘ladder’ antenna beaming to Europe.

The 42-element ‘ladder’ antenna (featured in QST March 1995) provides an approximately 226dB gain and will be located at 3m above smooth ground overlooking the Atlantic Ocean. An automatic c.w. keyer will operate beacon style for much of the time sending the message ‘QD DX de XJ1 CWI...K’ followed by a 30 second receive period.

Obviously to make a serious attempt at the record requires close co-ordination. To arrange this you can contact Fred VE2SEI by telephone on 001 514 694 3441 (evenings) or via FAX: on 001 514 630 4134. Fred can also be contacted via E-mail, archibald@gapriam.ca or at archibald@knash.publink.net.ca.

It’s interesting to note that v.h.f. signals from Nova Scotia have already been heard in the UK. Derek Hilleard G4COM (IO70) has been carrying out transatlantic tests on the 144MHz band since 1989.

As an aid to propagation Derek monitors the 88-108MHz f.m. broadcast band with a Sony receiver and a 5-element Yagi beam at 290°. Last year on June 15 between 2314-2319UTC and on June 22 between 2148-2158UTC. Derek heard identifiable signals from CBC, Sydney, Nova Scotia. According to the station of VE1KG this local broadcast station, on 95.9MHz, runs 500W e.r.p. (effective radiated power).

The results on the 88-108MHz band are very encouraging. However, there’s a world of difference between these frequencies and the 144MHz band. So, will someone ever make that elusive transatlantic QSO?

Contacts on the 50MHz band via 3 or 4-hop Sp-E are common enough to be no longer surprising. Also broadcast stations on 100MHz (Band II) have been heard many thousands of kilometres away.

Within Europe three stations (to my knowledge) have made Sp-E contacts over 4200kms on the 144MHz band. In the US a few operators have made contacts as high as the 220MHz band.

On balance therefore I would say that it’s possible that someone will eventually make that elusive contact. You never know, it could be you!

**Beacon Stations**

To aid research into propagation over the transatlantic path, a number of high power beacons operating within the 144MHz band need to be built and commissioned. These should be situated in optimum locations within Europe and North America, beaming towards each other.

As an initial start to this project, the keeper of the beacon station VE1SMU (FN84) has agreed to beam the antenna towards Europe during the Sp-E season. Operating on 144.285MHz it runs 26W (too low for real results I suspect) into an 11-element Yagi.

In my opinion, a beacon running around 1kW e.r.p. is the absolute minimum for this type of experiment. That equates to 100W into a 10dB gain antenna.

Although they don’t have any beacon equipment the Poldhu Amateur Radio Club does have a superb location. Their club house is located on the site of the famous Marconi radio station at Poldhu, Cornwall.

The location on the south-west tip of England is ideal for transatlantic propagation experiments. According to the Chairman G3AGA, the Poldhu club is quite small without much in the way of financial or technical resources.

However, the Poldhu club are willing to consider providing accommodation for a beacon to any group or organisation wishing to install one. This is course is subject to detailed agreement. Beacon groups interested in this exciting project can contact G3AGA on (01736) 710454.

End

**Deadlines**

It's deadline time again. If you do manage to make any Sp-E contacts this summer please let me know about it. Send reports, or any other news (to reach me by the end of the month) to Yew Tree Cottage, Lower Maescoed, Herefordshire HR2 0NP. You can also contact me via packet radio @ GB7MAD, the DX Cluster @ G9/DXC or E-mail via daveha@midhll.swlgb.co.uk Alternatively you can telephone me on (01873) 866675.
SUSSEX AMATEUR RADIO & COMPUTER FAIR
SUNDAY 14th JULY 10:30 to 16:00
BRIGHTON RACE COURSE
Admission £1.50
FOR DETAILS Tel: 01273 501100
or write to:
TENNAMAST SCOTLAND
81 MAINS ROAD
BEITH, AYRSHIRE KA15 2HT

AERIAL ROTOR FOR ONLY £49.95!
AR300XL Aerial Rotor, Control Unit and Optional Alignment Bearing
Large selection of New/Used Equipment on Show
- NEW 5 WATT CW TCVR FOR 80
- NEW 5 WATT CW TCVR FOR 80
- 80W ATU/SWR METER
- New 9th Edition
- The UK Scanning Directory

NEW QRP KITS... COMPLETE WITH ALL THE BITS!
- NEW 5 WATT CW TCVR FOR 80
- NEW 5 WATT CW TCVR FOR 80
- 80W ATU/SWR METER
- New 9th Edition
- The UK Scanning Directory

QUARTZ CRYSTALS
CUSTOM MANUFACTURED CRYSTALS AND OSCILLATORS
FUNDAMENTALS OVERTONES

<table>
<thead>
<tr>
<th>Price</th>
<th>Mode</th>
<th>Frequency Range</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>£3.00</td>
<td>1st Oct</td>
<td>20.0 to 80.0 MHz</td>
<td>£2.00</td>
</tr>
<tr>
<td>£3.25</td>
<td>2nd Oct</td>
<td>40.0 to 120.0 MHz</td>
<td>£3.25</td>
</tr>
<tr>
<td>£3.50</td>
<td>3rd Oct</td>
<td>80.0 to 200.0 MHz</td>
<td>£4.50</td>
</tr>
</tbody>
</table>

Best seller...the bargain priced Adapt-A-Mast
- Lifts to 25ft
- Wall mounting
- Complete with all brackets, cable and winch
- Accepts 2in stub mast
- Adaptable to tilt over
- Available hot dip galvanised BS729
- Simple four bolt installation

BUY YOUR S/H EQUIPMENT IN FOR SALE
WE SPECIALIZE IN ALL TYPES OF PLUGS, ADP, ETC
MUTEK PRODUCTS, BARENCO EQUIPMENT, MFJ PRODUCTS

NEW 1996 CATALOGUE
Send £1 for our latest 34-page catalogue, which you will receive back by return of post.

AERIAL TECHNOLOGY
11 Kirt Road, Pankerton,
Poole, Dorset BH12 2EH.
Tel: 01202 738323
Fax: 01202 716951
Mike Richards G4WNC rounds-up
the latest news and views from the 'computing in radio' world.

The Ham Radio Bookmarks page can either be downloaded direct from the Web page or via a compressed archive file titled ham- www4.zip. This can be found on many of the popular Internet archive sites. If you want to go directly to the bookmark page the Web address is: http://uhavax.hartford.edu/diskuser data/faculty/news/biwww/ham www4.html. Yes, I know it's a mouthful, but it really is worth the effort!

Quest Questionnaire

Jeff Harris of QUEST has just sent me version one of their RAE Questionnaire and Information Disk. This is an easy-to-use DOS based package that could prove very useful to anyone just starting in amateur radio. As the QUEST program is DOS based the computer requirements are very modest. All you need is an IBM PC or compatible with MSDOS 2.0 or later and at least 640K of RAM. Even the old Amstrad 1640 can manage this!

The package is very closely based on the RSBF book Radio Amateur's Examination Manual (available from the PIV Book Service priced £7.99 plus P&P) and it's recommended that you have a copy handy to make best use of the program. One of the problems with basing the program so closely on the Radio Amateurs Examination Manual is you really do need to have a copy in order to use the program - this is an additional cost. Once the program is installed and running, you are presented with a simple text display of menu options. Pressing the appropriate letter takes you directly to the next step in the program. The display system was really very crude indeed and there had been no attempt to format the text or even use simple line draw characters to provide a more professional look to the package. Whilst the test features of the program were quite useful, there were a few minor bugs present. At the end of one question the program failed to let me know whether or not I'd answered correctly. I also came across a few minor typing errors.

In addition to the RAE training program, the disk contained a number of useful amateur shareware programs designed to assist anyone learning about radio/electronics. The complete package is available from QUEST 44 Fourth Avenue, Frinton-on-Sea Essex CO13 9DX. The price is £9.99 plus £2.50 post and packing.

Worked All States Map

The Worked All States Map program is not particularly new, but the latest version (v2.7) looks to be very good. This Windows based program has been written by John Kirkham KC2B and, as the name implies, provides an electronic map for those trying for the Worked All States (WAS) award.

The original idea for the WAS program came from the practice of colouring in paper maps to keep track of WAS progress. Whilst this is OK for a single band award, it can get expensive and cumbersome if you're going for a multi-band award. By creating computer based maps you can easily maintain a separate map for each band. This program is designed to do just that and there are a full set of maps that you can mark-up as you work the various states.

The map is automatically completed in colour and you have the option to select your colour preferences. The latest version of this excellent package is currently available through Compuserve's HAMNET forum and registration is just $10 US.

IBM PC Software (1.44Mb disks)

- Disk A (Order Code DKA) - JVFAK 7.0, HAMCOMM 3.0 and WEFAK 3.2.
- Disk B (Order Code DKB) - DSP Starter plus Texas device selection software.
- Disk C (Order Code DKC) - NuMorse 1.3.
- Disk D (Order Code DDD) - UltraPak 4.0.
- Disk E (Order Code DKE) - Mscan 1.3 and 2.0.

Printed Literature

- Beginners Utility Frequency List (Order Code BL).
- Complex Signals Utility Frequency List (Order Code AL).
- Decode Utility Frequency List (Order Code DL).
- FactPack 1 Solving Computer Interference Problems (Order Code FP1).
- FactPack 2 Decoding Accessories (Order Code FP2).
- FactPack 3 Starting Utility Decoding (Order Code FP3).
- FactPack 4 JVFAK and HAMCOMM Primer (Order Code FP4).
- FactPack 5 On the Air with JVFAK and HAMCOMM (Order Code FP5).
- FactPack 6 Internet Starter (Order Code FP6).

For the printed literature just send a self addressed sticky label plus 50p per item (£1.50 for four, £2.50 for seven and £3.00 for nine). For software send £1.00 per disk (£1.75 for two, £2.50 for three or £3.00 for four and £3.75 for all five) and a self addressed sticky label (don't forget I provide the disk). Please make cheques payable to M. Richards.

Practical Wireless, July 1996
I you’re lucky enough to be going off on your summer holidays to the Mediterranean this year, you might like to tune in to stations broadcasting from that part of the world to get you in the mood for all that sand, sea and... distant DXing! If you plan to visit Malta, maybe you could put on your ‘Sherlock Holmes’ hat and find out what the Voice of the Mediterranean is up to. During April, the station carried out some test transmissions on 9.88 and 11.925MHz. Nothing unusual in that you think, except that this station used to be transmitted from the Deutsche Welle relay station on the island, which regular readers will remember closed at the beginning of the year. In where is it being beamed from? We’ve tried to contact the station by FAX, but as this column went to press, there has been no reply. Try yourself, if you want to. The FAX number is +356 241501. If you discover anything, let me know and I’ll pass the news on through this column.

Holiday Briefings
If Turkey is your destination, tune to the English service of the Voice of Turkey. You’ll find it on the air at: 0400-0500 on 7.225, 9.435; 0530-0600 on 6.45 and 9.435; 1300-1430 on 9.445; 1930-2030 on 9.445; 2300-2400 on 7.28 and 9.815MHz. During April, the station carried out some test transmissions on 9.445, 11.605 and 15.615MHz. Radio Yugoslavia is on the air with English at 1830-1900 on 6.10 and again at 2100 on 6.10 and 6.855MHz.

Summer Schedule
Although many stations now make only two major frequency changes each year (at the end of March and September), China Radio International transmitters with its frequencies four times a year. The summer schedule, which took effect on 7 May, lists English to Europe: 0400-0415 on 7.465 and 9.435; 1400-1430 on 12.075 and 15.615 and 1000-1030 on 7.465, 11.605 and 15.615MHz. Radio Korea is also beamed to Europe: 0400-0415 on 7.465 and 9.435; 1400-1430 on 12.075 and 15.615MHz. Radio Yugoslavia is on the air with English at 1830-1900 on 6.10 and again at 2100 on 6.10 and 6.855MHz.

Language Teaching
Short wave radio has the potential to be an excellent educator. Many people in the developing world have learnt English listening to the BBC World Service, Voice of America or Radio Australia. But language-teaching is not restricted solely to English. Some years ago I collected the course books that supported language courses broadcast from a number of radio stations. There was Dutch by radio, Russian by radio and Chinese by radio. I was also amazed to see that Radio Korea still runs its ‘Let’s Learn Korean’ course. It is broadcast each week in the current programme line-up from Seoul, and you can write for free course books. The address is Radio Korea International, 18 Yoido-dong, Yeongdung-po-gu, Seoul 150. Radio Korea International broadcasts to Europe in English direct from South Korea: 0800-0900 on 7.550 and 13.67 and 2100-2200 on 6.88 and 15.575MHz. And from the BBC World Service transmitter at Skelton in Cumbria: 1830-1900 on 9.465MHz.

News From Israel
Israel has been in the news again recently with its incursions into southern Lebanon trying to wipe out the Hezbollah who, it is believed, are launching attacks, in Israel. You can follow the news from Jerusalem by tuning to Kol-Israel, the Voice of Israel.

International Broadcast Bands
As mentioned in previous editions of Broadcast Round-up, the Summer Schedule list of international broadcast bands is only an indication of what stations are likely to be heard during the summer months. It is not a complete list. As the name suggests, the schedules are subject to change. If you are familiar with the operation of a particular station, you can make your own decisions about which frequencies to try.

Voice of America
It has English transmissions beamed to Europe: 0400-0415 on 7.465 and 9.435; 1400-1430 on 12.075 and 15.615 and 1000-1030 on 7.465, 11.605 and 15.615MHz. Radio Korea is also beamed to Europe: 0400-0415 on 7.465 and 9.435; 1400-1430 on 12.075 and 15.615MHz. Radio Yugoslavia is on the air with English at 1830-1900 on 6.10 and again at 2100 on 6.10 and 6.855MHz.

Radio Korea
Radio Korea International broadcasts to Europe in English direct from South Korea: 0800-0900 on 7.550 and 13.67 and 2100-2200 on 6.88 and 15.575MHz. And from the BBC World Service transmitter at Skelton in Cumbria: 1830-1900 on 9.465MHz.

Voice of Nigeria
Finally this month, rumours abound that the Voice of Nigeria is soon to return to the short wave bands. The station has been off the air since last autumn when its last remaining transmitter gave up the ghost. The station had been operating on 7.225MHz at times including 1000-1600.

The World Radio TV Handbook lists the Nigerian transmitting station at Ikorodu as having five 500kW, one 300kW and two 100kW short wave transmitters and suggests that it was one of the 500kW transmitters that was last on the air, but running at half-power. The handbook says that there is a listeners’ answerline on +234 1 269 3078, but as anyone who has tried to ring to Nigeria knows, getting through is all but impossible, unless you are prepared to try at three o’clock in the morning!
Packet Panorama

Roger Cooke G3LDI has news of new software, a round-up of who's who at BARTG, as well as some tips for newcomers.

Roger Cooke G3LDI, The Charter, although long, was undertaken to write a Users Charter. The Charter, although long, was undertaken to write a Users Guide. The Charter, although long, was undertaken to write a Users Guide.

Packet Newcomers

Newcomers on packet are often confused, not only by the enormous amount of new jargon that needs to be learned, but also by a new mode of operation which with the modern TNC, is daunting to say the least. The first thing that any newcomer wants to do is to get on the air.

You wonder how many really read the book first and then put the TNC to the air? More often than not, it will be the other way round.

However, most BBS carry 'help' files of some sort. Some are written by UK amateurs, like the series by Brian Grasso.

These 'help' files can usually be found in the Library or files section of the BBS. The trick for the newcomer is knowing how to obtain them in the first place!

Guiding the user to the right place is often done with a LOGON message, or new-user help file. The most useful server to appear for a long time, for the newcomer, is the Teletext type server.

Lots of help files can be arranged in such a way that the new user can plough their way through them just by typing numbers, from the index page 200 upwards. This is much like the Teletext on the television channels and is extremely easy to use, with no limitation as to the size of file, or number of pages.

There have recently been some changes in BARTG. Here is an update on the 1996 committee together with mailing, Home BBS and E-mail addresses:

G3GAR Bob Cannings G3GAR, News Editor, Green Lane Cottage, Eastfield, Longmoor, Herefordshire HR6 9BN, G3GAR @ GB3MAD.com, bcalnings@k33t.direc.co.uk

Ken Godwin GPOCA, Publications & Bulk Co-ordinator, 11 St Lukes Way, Althambury, Kent ME3 9RF.

GPOCA @ DKO1TV, 10146.2055@compuserve.com

Arthur Bard G1XKZ, Datacom Editor, 5 Union Park, Oak Park, Cumpton, Devon EX15 1TE, G1XKZ @ GB3MAD.com, arthur.bard@blindnet.com

Ray Dobson VKSDI, Packet Panorama, May 57

Bryan Le Grys G3GOT, Membership Secretary, 8 Kitchener Way, Shottley Gate, Ipswich, IP3 1RW. G3GOT @ GB3MAD.com

Andy Mathison G3ZFY, Chairman, 1 St Edward's Close, Bromwell, Suffolk IP2 2LP, G3ZFY @ GB3MAD.com, g3zfyg@anglian.net, Mike Perry G4BMM, Computer Querries, 2 Beacon Close, Saxford, East Sussex BN25 2JZ. G4BMM @ HB9AK, 100111.1320@compuserve.com

Ian Brethwell GALEAN, Secretary, 56 Arnott Hill Road, Arnold, Nottingham, N05 8LD. ibc@cs.net.ac.uk

Nigel Roberts GANZ, Awards & Companents Manager, 13 Rosemore Close, Hummury, North Yorks YO14 0NB.

John Barber G6SKA, Contest Manager, PO. Box 2, Tiverton, Devon EX16 6YU

Sam Halis G6TX, Treasurer, 22 Western Way, Croydon, Herfordshire S4 2NX.

100115.2029@compuserve.com

Alan Hobbs G6GOJ, President, 33 St Peters Street, South Croydon, Surrey CRZ 7DG.

Peter Adams G6ZJB Committee Member, 16 Whippoorwill Road, Watford, Herfordshire WD1 7PT. Please note there's been a change of membership Secretary and all enquires should now be addressed to: Bryan W. Le Grys G3GOT, 8 Kitchener Way, Shottley Gate, Ipswich, Suffolk IP3 1RW. G3GOT @ GB3MAD.com. Please enclose an s.a.e. with all enquires.

That's it for this month. Happy packeting, Reports, messages and news to me at The Old Nursery, The Dell, Sawston, Norwich, Norfolk NR14 8LD. Tel: (01508) 578278. G3LDI@GB7LDI

END
For Sale

1555 receiver complete except for audio sense switch, also swap, C186, Channel 15 (9.99), and variometer, working order, £22.95. Wasted 18 and 22 Sets and also many valve aux. units, plugs, sockets, etc. Trevor GTJKTH, QTHR. Tel: (01274) 826916.

Tel: (01274) 792667.

Alloco DJ-38HE 2m/70cm (144/430MHz) hand-held inc. extended RX, remote mic., case £37.50. Kenwood NC-105CS, £25, each £40 for sale or exchange. These are new parts.
Tel: W4 JSJ (01475) 70148 evenings.

ANRO-9900A receiver, excellent condition for indoor use for £25-30000Hz, £9.50. Pern, Lancs.
Tel: (01324) 701689.

Base type microphone AM-303W, perfect condition, £19.50 o.n.o. Tel: (0121) 228 1720.

Circuits, manuals, etc. Also plug-in modules for HP317A computer, oscilloscope available. Tel: (01268) 794332.

Clark Beam 40 telescope pump up mast, ex-service, free standing, £250 o.n.o. Buyer collects. Atlas goes up to 400. Tel: DofE (01432) 536197.

Clear out sale! Can’t list it all, all untested or working radio equipment, one gaz, computer equipment, misc. items, etc. Sold as one lot for a fix on EAX, almost £100 worth items. Tel: (01502) 678284. PO Box 19, Beccles.

Collector’s h.f. radios ARSSLF 678246. PO Box 19. Beccles. Computer equipment, misc. items, etc. o.n.o. Buyer collects. Mast goes up to Clachamish, Bemisdalt, Isle of Skye, Scotland.
Tel: (01524) 701089. 730148 evenings.

Tel: (01274) 824816.

Wanted 18, 19 and 22 Sets and variometer, working order, £225. Aural sense switch, also scrap set, 1155 receiver complete except for dip meter receiver to 1GHz, £150. Tel: (01274) 792667.

The Publishers of Practical Wireless also wish to point out that or modified. Advertisements (not traders or for personal use) will not be accepted. No responsibility will be taken for the equipment is shown. Adverts are published only if photos are submitted and are non-returnable.

Now’s your chance to send in a photograph of your equipment (a good idea if it’s really unusual) to accompany your advert. Please note that all photos will only be published at our discretion and are non-returnable.

When sending in your advert, please write clearly in BLOCK CAPITALS up to a maximum of 30 words, plus state your contact details. Please use the order form on page 62, which is published every other month. In the months between, a photocopy of the order form (with corner flash), or your advert written on a postcard (with corner flash) will be accepted - no corner flash - no advert!

Adverts are published on a first-come, first-served basis. All queries to Zoe (01202) 659910.

All adverts should be sent to: Zoe Shortland, Basement House Free Ads, Arnsworth Court, St Albans, Broadstone, Dorset BH18 8PF.

Free adverts? Yes it’s true! As of now, all adverts will be FREE of charge, to readers and subscribers.
YAESU FT-530D dual-band hand-held in good condition, £250.

Practical Wireless, July 1996

YAESU FT-401B 560W transceiver, p.s.u./speaker, mic., and all info, mint, £200.

Supplied, 20m coaxial cable, s.w.r. 5-element beam, new, £20. Power SWR and power meter, 3.5-150MHz, bearing, two years old, f/250 o.n.o.

Versa Tower 40/50 feet, wind up. Tel: 0181-255 6573 after 6pm.

Mark, SW London.

Mint, £50. Scanning directory, £10.

Newish, £25. 40m (7MHz) RG213/Y.

Yupiteru 7100 wideband receiver, Tel: Lines (01406) 380037.

2m (144MHz), 70cm (430MHz) transceivers. Both in immaculate condition, rechargeable batteries and owner's manuals. £475. Tel: 0161-301 3750.

Two Yaesu FT-101Z h.f. transceivers, both in immaculate condition, £275 and £345. YAESU FTVC101C (rev.prot, 4m (144MHz), 2m (144MHz) FM/SSB models, s.h.b. s.m., F.C.V., immaculate condition, £300.

Tel: Lines (01460) 380207.

Uniden UR202MWL-1 wideband receiver, good condition, £100.

Telephones 7100 wideband receiver, various accessories, £50 o.n.o.

Marty, Coveney.

Tel: (0203) 6705724 (24 hrs).

Vestrics VC200MHz s.h.b., £55, o.n.o.

Tel: (01793) 826491.

Stereo TS300 dual-band antenna, new, £25. 40m (7MHz) 6042/14, £35. Radioelek-RD45/14, t.r. receiver, mint, £50, Scanning directory, £10, M. London.

Tel: 0181-255 6573 after 6pm.

Yaesu FT-100 MKI rig, also FT-902 t.r. new, various new a.s.w. £10 for receive only, £700.

Tel: (01121) 700 003 (day) or (02177) B2187 evenings.

Yaesu FT-901D dual-mode receiver, 10m to 16m (28-10MHz), £250. Yaesu FT-711C filters, mini. condition, boxed with manuals, £455. FC-942 s.a., £135, 144MHz linear, £240, 2m (144MHz) low loss, £300, £50.

Tel: Brighton (01273) 462696.

Yaesu FT-402TM all-mode receiver, 10m to 16m (28-10MHz), £250. Yaesu FT-711C filters, mini. condition, boxed with manuals, £455. FC-942 s.a., £135, 144MHz linear, £240, 2m (144MHz) low loss, £300, £50.

Tel: Brighton (01273) 462696.

Yaesu FT-2001D all-mode transceiver, 10m to 16m (28-10MHz), £250. Yaesu FT-711C filters, mini. condition, boxed with manuals, £455. FC-942 s.a., £135, 144MHz linear, £240, 2m (144MHz) low loss, £300, £50.

Tel: Brighton (01273) 462696.

Yaesu ft-1812 E.F., very good condition with many extras, £250 o.n.o.

Roy, NE London.

Tel: 0181-504 3200.

Yaesu FT-102A s.m. board fitted, narrow filters, spare driver and r.e.a. workshop manual, v.g.c., £475. Also Tele-Tor Corner F with matching p.i.p.trimmer, mic. and all info, mint condition, £625. Tel: NE Lincscheck (01234) 617841.

Yaesu FT-401B 350W transmitter, good condition, £250 o.n.o. Roy, NE London.

Tel: 0181-504 3200.

Yaesu FT-102A s.m. board fitted, narrow filters, spare driver and r.e.a. workshop manual, v.g.c., £475. Also Tele-Tor Corner F with matching p.i.p.trimmer, mic. and all info, mint condition, £625. Tel: NE Lincscheck (01234) 617841.

Yaesu FT-401B 350W transmitter, good condition, £250 o.n.o. Roy, NE London.

Tel: 0181-504 3200.

Yaesu FT-102A s.m. board fitted, narrow filters, spare driver and r.e.a. workshop manual, v.g.c., £475. Also Tele-Tor Corner F with matching p.i.p.trimmer, mic. and all info, mint condition, £625. Tel: NE Lincscheck (01234) 617841.
LITZ WIRE
Silk covered Litz copper wire suitable for RF-mductors, transformers, loop aerials, loudspeaker crossover etc. 1 to 150 strands in various gauges and reel sized.
SAE/FAX number for stock list.
Audiolab, Fitzmaurice Road Tel: 01202 484358
Christchurch, Dorset BH22 2DY Fax: 01202 459614

TOP PRICES PAID
for all your valves, tubes, semiconductor and ICs.
Langrex Supplies Ltd., 1 Mayo Road, Croydon, Surrey CR0 2QP.
Tel: 0181-684 1166, Fax: 0181-584 3056.

ORDER FORM FOR CLASSIFIED ADS

Please write in block capitals.
The prepaid rate for classified advertisements is 42 pence per word (minimum 12 words), box number 70p extra. Semi-display setting £13.90 per column centimetre (minimum 2.5cm). Please add 17.5% VAT to the total. All cheques, postal orders, etc., to be made payable to the PW Publishing. Treasury notes should always be sent by registered post. Advertisements, together with remittance should be sent to the Classified Advertisement Dept., Practical Wireless, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: (01202) 659920, Fax: (01202) 659950.

Please insert this advertisement in the issue of Practical Wireless (if you do not specify an issue we will insert it in the next available issue of PW) for _______ insertion/s. I enclose Cheque/P.O. for £___________.

Name:
Address:
Telephone No.:
Fax No.:

Box Number @ 70p: Tick if appropriate.

Category heading:

Whilst prices of goods shown in advertisements are correct at the time of going to press, readers are advised to check both prices and availability of goods with the advertiser before ordering from non-current issues of the magazine.
**DISCLAIMER**

Some of the products offered for sale in advertisements in this magazine may have been obtained from abroad or from unauthorized sources. Practical Wireless advises readers contemplating mail order to enquire whether the products are suitable for use in the UK and have full after-sales back-up available. The publishers of Practical Wireless wish to point out that it is the responsibility of readers to ascertain the legality or otherwise of items offered for sale by advertisers in this magazine.

**PRACTICAL WIRELESS PCB SERVICE**

Printed Circuit Boards for Practical Wireless constructional projects are available from the Practical Wireless PCB Service.

The boards are made in 1.5mm glass-fibre and are fully tinned and drilled.

When ordering PCB's please state the article title, magazine cover date and the board number.

Mark your envelope Practical Wireless PCB Service.

Cheques to be crossed and made payable to: Badger Boards.

Please print your full name and address in block capitals and do not enclose any other Practical Wireless correspondence with your order.

Please allow 28 days for delivery.

Send orders and remittances to: Badger Boards, 80 Clarence Rd, Erdington, Birmingham B23 6AR.

Tel: 0121-384 2473
### Order Form

**FOR ALL MAIL ORDER PURCHASES IN PRACTICAL WIRELESS**

---

**SUBSCRIPTION RATES**

<table>
<thead>
<tr>
<th>PRACTICAL WIRELESS – 1 YEAR</th>
<th>£25.00 (UK)</th>
<th>£30.00 (Europe 1st class)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECIAL JOINT SUBSCRIPTION WITH SHORT WAVE MAGAZINE – 1 YEAR</td>
<td>£25 (UK)</td>
<td>£30 (Europe 1st class)</td>
</tr>
<tr>
<td></td>
<td>£32 (Rest of World Airmail)</td>
<td>£37 (Rest of World Airmail)</td>
</tr>
</tbody>
</table>

- Please start my subscription with the ____________ issue.
- I have taken out a subscription this month please send me my Free Reference Data Chart & Repeater Datacards.

**BINDERS**

- Please send me __________ PW Binder(s) @ £5.50 each

**POSTAL CHARGES:**

- £1 for one, £2 for two or more (UK), £2 per binder (overseas surface).

**BOOKS**

- Please send me the following book(s)

**POSTAL CHARGES:**

- £1 for one, £2 for two or more (UK), £2 per book or £10 for five books or more (overseas surface).

**NEW FASTER NEXT DAY SERVICE (UK MAINLAND ONLY)**

- £4 per parcel (orders must be placed by 12 noon)

**GRAND TOTAL**

---

**PAYMENT DETAILS**

Name ____________________________________________
Address ____________________________________________
Telephone No. _______________________________________ Postcode ___________________________________
Telephone No. _______________________________________ Phone:__________________________
I enclose cheque/PO (Payable to PW Publishing Ltd.) £__________
or/ Charge to my Access/Visa Card the sum of £__________ £__________
Card No. _______________ _______________ _______________ _______________ Valid from _______________ to _______________
Signature ____________________________________________
Telephone No. _______________________________________ Phone: ____________________________

Orders are normally despatched by return of post but please allow 28 days for delivery.
Prices correct at time of going to press.
Please note: all payments must be made in Sterling.

---

CREDIT CARD ORDERS TAKEN ON (01202) 659930
FAX ORDERS TAKEN ON (01202) 659950

---

**This month’s Star Buy is** The ARRL Handbook For Radio Amateurs 1996. This is one book we feel that no amateur should be without and therefore we’ve selected it as our Star Buy for this month.

Now in its 73rd edition this well established book is packed with information covering topics such as What Is Amateur Radio? through to Practical Design, Construction Techniques and Operating Practices. Not only that, for the first time the ARRL Handbook includes a disk of software which should prove useful to all amateurs, no matter which specialist fields their interests lie in. The disk contains a Windows database TISFIND, software applications for Pi Network Design, SSTV active filter design, etc.

Containing 1200 pages and costing just £25 plus £1 P&P (UK), £2 P&P (overseas) the ARRL Handbook For Radio Amateurs would make a welcome addition to any shack bookshelf and is well worth considering whether you are an ‘old hand’ or a newcomer to the world of radio.

---

Practical Wireless, July 1996
LISTENING GUIDES

Airband

AIR BAND RADIO HANDBOOK 5th Edition
David B. Rouse
This book covers all aspects of safe flying, radio communications, information about various stations covering v.h.f. and u.h.f. airband communications, and a brief look at aeronautical radio. The majority of the book is broken down by section 1, which lists all known stations, in three different sections by airlegs, sky and by international radio. This book is an excellent reference for all amateur aeronautical enthusiasts. 272 pages. £11.00

WORLDWIDE AERONAUTICAL HF RADIO HANDBOOK 3rd Edition
David B. Rouse
This book covers all aspects of airband radio communications, voice and digital, with the range of v.h.f. and u.h.f. radio frequencies, regulations and how to listen. 128 pages. £7.95

AIRWAVES

The Compusoft/WP Book Service/World Frequency Directory
David B. Rouse
This book offers a wide range of information on all aspects of aeronautical radio communications, including details on all airband frequencies used by airlines, military and the business world. The latest edition provides a comprehensive guide to the basics of short wave listening, including charts and maps, to help you understand more about the world of airband radio. 192 pages. £6.95

ispers and emergency procedures to name a few. This comprehensive book provides giving details

AIRCRAFT CALLSIGN DIRECTORY

David J. Smith
This book covers all aspects of airband radio communications, voice and digital, with the range of v.h.f. and u.h.f. radio frequencies, regulations and how to listen. 128 pages. £7.95

PASSPORT TO WORLD BAND RADIO 1997

This book gives you the information you need to understand how to listen to the world of world band radio listening. It includes features on different international radio stations, receive equipment and details on how to tune in to different parts of the world, and will tell you how to obtain your own world band licence. 176 pages. £145.

SHORT WAVE MARITIME COMMUNICATIONS

Peter Rouse and Mike Shephard
This book covers all aspects of airband radio communications, voice and digital, with the range of v.h.f. and u.h.f. radio frequencies, regulations and how to listen. 128 pages. £7.95

AIRCRAFT CALLSIGN DIRECTORY

David J. Smith
This book covers all aspects of airband radio communications, voice and digital, with the range of v.h.f. and u.h.f. radio frequencies, regulations and how to listen. 128 pages. £7.95

The first edition of this book was published in 1990 and is now in its third edition. It provides useful information on all aspects of aeronautical radio communications, including details on all airband frequencies used by airlines, military and the business world. The latest edition provides a comprehensive guide to the basics of short wave listening, including charts and maps, to help you understand more about the world of airband radio. 192 pages. £6.95

INTERNATIONAL AIR BAND RADIO HANDBOOK

David B. Rouse
This book covers all aspects of airband radio communications, including details on all airband frequencies used by airlines, military and the business world. The latest edition provides a comprehensive guide to the basics of short wave listening, including charts and maps, to help you understand more about the world of airband radio. 192 pages. £14.50

INTERNATIONAL AIR WAVE LISTENER’S HANDBOOK

Jon Klingenfuss
This book covers all aspects of airband radio communications, including details on all airband frequencies used by airlines, military and the business world. The latest edition provides a comprehensive guide to the basics of short wave listening, including charts and maps, to help you understand more about the world of airband radio. 192 pages. £14.50


W. E. Fernhill
This book covers all aspects of airband radio communications, including details on all airband frequencies used by airlines, military and the business world. The latest edition provides a comprehensive guide to the basics of short wave listening, including charts and maps, to help you understand more about the world of airband radio. 192 pages. £14.50


W. E. Fernhill
This book covers all aspects of airband radio communications, including details on all airband frequencies used by airlines, military and the business world. The latest edition provides a comprehensive guide to the basics of short wave listening, including charts and maps, to help you understand more about the world of airband radio. 192 pages. £14.50

RADIO LISTENERS GUIDE 1996

Clive Worner
This book covers all aspects of airband radio communications, including details on all airband frequencies used by airlines, military and the business world. The latest edition provides a comprehensive guide to the basics of short wave listening, including charts and maps, to help you understand more about the world of airband radio. 192 pages. £14.50

A GUIDE TO THE WORLD’S RADIO STATIONS

Clive Worner
This book covers all aspects of airband radio communications, including details on all airband frequencies used by airlines, military and the business world. The latest edition provides a comprehensive guide to the basics of short wave listening, including charts and maps, to help you understand more about the world of airband radio. 192 pages. £14.50

MARINE WAVE COMMUNICATIONS

Peter Rouse and Mike Shephard
This book covers all aspects of airband radio communications, including details on all airband frequencies used by airlines, military and the business world. The latest edition provides a comprehensive guide to the basics of short wave listening, including charts and maps, to help you understand more about the world of airband radio. 192 pages. £14.50

AIRCRAFT CALLSIGN DIRECTORY

David J. Smith
This book covers all aspects of airband radio communications, including details on all airband frequencies used by airlines, military and the business world. The latest edition provides a comprehensive guide to the basics of short wave listening, including charts and maps, to help you understand more about the world of airband radio. 192 pages. £7.95

MARINE VHF OPERATION

Peter Rouse and Mike Shephard
This book covers all aspects of airband radio communications, including details on all airband frequencies used by airlines, military and the business world. The latest edition provides a comprehensive guide to the basics of short wave listening, including charts and maps, to help you understand more about the world of airband radio. 192 pages. £14.50

RADIO LISTENERS GUIDE 1996

Clive Worner
This book covers all aspects of airband radio communications, including details on all airband frequencies used by airlines, military and the business world. The latest edition provides a comprehensive guide to the basics of short wave listening, including charts and maps, to help you understand more about the world of airband radio. 192 pages. £14.50

A COMPLETE SHORT WAVE LISTENER’S HANDBOOK

W. E. Fernhill
This book covers all aspects of airband radio communications, including details on all airband frequencies used by airlines, military and the business world. The latest edition provides a comprehensive guide to the basics of short wave listening, including charts and maps, to help you understand more about the world of airband radio. 192 pages. £14.50

MARINE VHF OPERATION

Peter Rouse and Mike Shephard
This book covers all aspects of airband radio communications, including details on all airband frequencies used by airlines, military and the business world. The latest edition provides a comprehensive guide to the basics of short wave listening, including charts and maps, to help you understand more about the world of airband radio. 192 pages. £14.50

SHORTWAVE MARITIME COMMUNICATIONS

Peter Rouse and Mike Shephard
This book covers all aspects of airband radio communications, including details on all airband frequencies used by airlines, military and the business world. The latest edition provides a comprehensive guide to the basics of short wave listening, including charts and maps, to help you understand more about the world of airband radio. 192 pages. £14.50

WORLDWIDE AERONAUTICAL HF RADIO HANDBOOK

David B. Rouse
This book covers all aspects of airband radio communications, including details on all airband frequencies used by airlines, military and the business world. The latest edition provides a comprehensive guide to the basics of short wave listening, including charts and maps, to help you understand more about the world of airband radio. 192 pages. £14.50

AIRCRAFT CALLSIGN DIRECTORY

David J. Smith
This book covers all aspects of airband radio communications, including details on all airband frequencies used by airlines, military and the business world. The latest edition provides a comprehensive guide to the basics of short wave listening, including charts and maps, to help you understand more about the world of airband radio. 192 pages. £7.95

The books listed have been selected as being of special interest to our readers. They are supplied direct to your door. Many titles are overseas in origin.

Pw BOOK SERVICE

(01202) 659930 (24 HOURS)

Internet orders: bookstore@wpoub.domon.co.uk

TO ORDER: PLEASE USE THE ORDER FORM ON PAGE 62 OR TELEPHONE THE CREDIT CARD HOTLINE ON (01202) 659930 (24 HOURS)
**Practical Wireless, July 1996**

**Bay Petri GOAT**

As the 16 sections of the book deal with aspects of book for the new Novice licensees. However, Novices 813 pages. £7.99

**THE NOVICE RADIOAMATEUR QUESTION & ANSWER REFERENCE MANUAL 1996**

Ray Petri G0AIPG

This book has sold itself over four editions and new copies with many up-

dates and illustrations in this latest 1996 edition. Ideas for the last-

examinations and multiple choice exam questions. This book is a must for the novice radio amateur.

**RAE REVISION NOTES (RSGB)**

S. E. Brown G3RZT


**REVISED QUESTION FORTHE NOVICE (RSGB)**

Even Peter G0AIPG

This section of the book could be considered as being a training manual for the RAE. Answers are supplied and a useful reference is provided.

**THE NOVICE LICENCE STUDENT’S NOTEBOOK**

John Cross G3WPL

This is the recommended course book for anyone taking the Novice Licence. Covers all aspects of amateur radio and electronics it is the best way to start in amateur radio. Every left hand page is for you to write down your notes of explanation.

**SHORTWAVE RADIO LISTENING FOR BEGINNERS**

Anita Louise McCormick G1ASK

This a brightly coloured map clearly showing callsign prefixes for the world and is enhanced. This wren) thought out, coloured map others from N. Africa to Iceland and worldwide CISI. bureau. etc.

**INTERNATIONAL LISTINGS 1996**

This standard spirally bound amateur radio log book has 100 pages and is marked out with the features required in the US. There are columns for date, time, frequency, power, QSOs, address, QSL, QSL card sent, QSL received, QSL information and remarks.

**AMATEUR RADIO LOG BOOK**

Dick Biddulph G8PDS

This companion bound format amateur radio log book has 100 pages and is marked out with the features required in the US. There are columns for date, time, frequency, power, QSOs, address, QSL, QSL card sent, QSL received, QSL information and remarks.

**WORLD AT THEIR FINGERTIPS (RSGB)**

In 74th edition this 1200 page book is packed with information on everything from What is Amateur Radio through to Practical Design to Construction Techniques and Operating Procedure.

**THE ATV COMPENDIUM**

This book covers every aspect of television (TV) and radio and QRP

*Computed AN INTRODUCTION TO COMPUTER COMMUNICATIONS* (BP77)

W. A. Pemberton

Details of various types of modem and their applications, plus how to interface communication equipment and the telephone system. Also networking terminologies and BBS 12 pages. £3.50

**HOW TO EXPAND, MODERNIZE AND REPAIR PCs AND COMMUNICATIONS** (BP27)

W. A. Pemberton

This book takes a look at the techniques of being a radio amateur. There are chapters dealing with QRP equipment, short-wave receivers and much more.

**AMATEUR RADIO OPERATING MANUAL (BP57)**

Ray Ewer G4FCI

This book is four in its fourth edition and is designed to cover the essential operating techniques required for most aspects of amateur radio. It contains the latest information on such topics as navigation, contesting, special event stations and much more. It’s a must-have book.

**AMATEUR RADIO TECHNIQUES RSGB**

The book covers every aspect of television (TV) and radio and QRP

*Propagation AN INTRODUCTION TO RADIO WAVE PROPAGATION* (BP195)

W. A. Pemberton

How do the suns and storms affect the propagation of the radio waves which are the basis of our radio land? This book explains all aspects of propagation and much more. It’s a must-have book.

**LOW PROFILE AMATEUR RADIO - OPERATING A HAM STATION FROM ALMOST ANYWHERE (ARRL)**

Jim Salter N1YJ

This book covers every aspect of television (TV) and radio and QRP

**PRACTICAL GUIDE TO PACKET OPERATION IN THE UK**

Milo Mansfield G6WBD

Written for all amateurs, including beginners. An introduction to packet radio and its applications.

**RADIO COMMUNICATION HANDBOOK (RSGB)**

Dick Biddulph G8PDS

This book covers every aspect of television (TV) and radio and QRP

**SHORTWAVE RADIO LISTENING FOR BEGINNERS**

Anita Louise McCormick G1ASK

This is an excellent introductory guide. It describes in easy-to-

**THEodate and Repeal PC and COMMUNICATIONS** (BP27)

W. A. Pemberton

This is an excellent basic reference work. 101 pages £6.59

**EXAMINATION HANDBOOK (BP375)**

An excellent basic reference work. 101 pages £6.59

**HOW TO PASS THE RA010 AMATEURS’ EXAMINATION**

An excellent basic reference work. 101 pages £6.59

**SHORTWAVE RADIO LISTENING FOR BEGINNERS**

Anita Louise McCormick G1ASK

This is an excellent introductory guide. It describes in easy-to-

**THE INSTRUCTOR (RS611)**

R. A. Telford’s book could be considered as being a training manual for the radio amateur. This book is given to sample examination questions so that candidates can familiarise themselves with the examination and assess their ability

**THE ATV COMPENDIUM**

Milo Mansfield G6WBD

This is an excellent introductory guide. It describes in easy-to-

**SHORTWAVE RADIO LISTENING FOR BEGINNERS**

Anita Louise McCormick G1ASK

This is an excellent introductory guide. It describes in easy-to-

**THE ATV COMPENDIUM**

Milo Mansfield G6WBD

This is an excellent introductory guide. It describes in easy-to-

**SHORTWAVE RADIO LISTENING FOR BEGINNERS**

Anita Louise McCormick G1ASK

This is an excellent introductory guide. It describes in easy-to-

**SHORTWAVE RADIO LISTENING FOR BEGINNERS**

Anita Louise McCormick G1ASK

This is an excellent introductory guide. It describes in easy-to-

**SHORTWAVE RADIO LISTENING FOR BEGINNERS**

Anita Louise McCormick G1ASK

This is an excellent introductory guide. It describes in easy-to-

**SHORTWAVE RADIO LISTENING FOR BEGINNERS**

Anita Louise McCormick G1ASK

This is an excellent introductory guide. It describes in easy-to-

**SHORTWAVE RADIO LISTENING FOR BEGINNERS**

Anita Louise McCormick G1ASK

This is an excellent introductory guide. It describes in easy-to-

**SHORTWAVE RADIO LISTENING FOR BEGINNERS**

Anita Louise McCormick G1ASK

This is an excellent introductory guide. It describes in easy-to-

**SHORTWAVE RADIO LISTENING FOR BEGINNERS**

Anita Louise McCormick G1ASK

This is an excellent introductory guide. It describes in easy-to-

**SHORTWAVE RADIO LISTENING FOR BEGINNERS**

Anita Louise McCormick G1ASK

This is an excellent introductory guide. It describes in easy-to-

**SHORTWAVE RADIO LISTENING FOR BEGINNERS**

Anita Louise McCormick G1ASK

This is an excellent introductory guide. It describes in easy-to-

**SHORTWAVE RADIO LISTENING FOR BEGINNERS**

Anita Louise McCormick G1ASK

This is an excellent introductory guide. It describes in easy-to-

**SHORTWAVE RADIO LISTENING FOR BEGINNERS**

Anita Louise McCormick G1ASK

This is an excellent introductory guide. It describes in easy-to-

**SHORTWAVE RADIO LISTENING FOR BEGINNERS**

Anita Louise McCormick G1ASK

This is an excellent introductory guide. It describes in easy-to-

**SHORTWAVE RADIO LISTENING FOR BEGINNERS**

Anita Louise McCormick G1ASK

This is an excellent introductory guide. It describes in easy-to-

**SHORTWAVE RADIO LISTENING FOR BEGINNERS**

Anita Louise McCormick G1ASK

This is an excellent introductory guide. It describes in easy-to-

**SHORTWAVE RADIO LISTENING FOR BEGINNERS**

Anita Louise McCormick G1ASK

This is an excellent introductory guide. It describes in easy-to-

**SHORTWAVE RADIO LISTENING FOR BEGINNERS**

Anita Louise McCormick G1ASK

This is an excellent introductory guide. It describes in easy-to-

**SHORTWAVE RADIO LISTENING FOR BEGINNERS**

Anita Louise McCormick G1ASK

This is an excellent introductory guide. It describes in easy-to-

**SHORTWAVE RADIO LISTENING FOR BEGINNERS**

Anita Louise McCormick G1ASK

This is an excellent introductory guide. It describes in easy-to-

**SHORTWAVE RADIO LISTENING FOR BEGINNERS**

Anita Louise McCormick G1ASK

This is an excellent introductory guide. It describes in easy-to-

**SHORTWAVE RADIO LISTENING FOR BEGINNERS**

Anita Louise McCormick G1ASK

This is an excellent introductory guide. It describes in easy-to-

**SHORTWAVE RADIO LISTENING FOR BEGINNERS**

Anita Louise McCormick G1ASK

This is an excellent introductory guide. It describes in easy-to-

**SHORTWAVE RADIO LISTENING FOR BEGINNERS**

Anita Louise McCormick G1ASK

This is an excellent introductory guide. It describes in easy-to-

**SHORTWAVE RADIO LISTENING FOR BEGINNERS**

Anita Louise McCormick G1ASK

This is an excellent introductory guide. It describes in easy-to-
PHOTOGRAPHIC ELEMENTS OF ELECTRONICS - BOOK 6

Chapter 1: Photographic Materials
Chapter 2: Light and Photography
Chapter 3: Cameras
Chapter 4: Printing
Chapter 5: Color and Photography
Chapter 6: Digital Photography
Chapter 7: Special Effects
Chapter 8: Photography and the Environment
Chapter 9: The Future of Photography

References
Index

66 Practical Wireless, July 1996
Plug into the LATEST in Amateur Radio

FREE! THE PRACTICAL WIRELESS MORSE REFERENCE DATA CHART!

REVIEWED!
- The MFJ-91780 Loop Antenna in a box!
- Yaesu FT-50R Dual-Band Hand-Held Transceiver.

NEW SERIES!
- Join George Dobbs G3RJV as he 'Carries on the Practical Way'.

BUILD!
- A Trolleymast Antenna.
- The Hairpin Match.

FEATURES!
- Trials & Tribulations of Taking the RAE.
- Electronics Service Manual - Book Review

Not forgetting our popular regular features 'VHF Report', 'Antenna Workshop', 'HF Far & Wide' together with your own personal favourites!
*contents subject to change.

AUGUST ISSUE ON SALE 11 JULY 1996 - DON'T MISS IT!

HOW'S YOUR RECEPTION?
This Month - June
Antenna Special

USING Scanners and Longwire Antennas CONSTRUCTION - Inexpensive Passive Pre-selector BUILD - A Remote Tuned Loop REVIEWED - AOR AR5000 Professional Grade 10kHz - 2.6GHz receiver.

Making Connections - an in depth look at feeding antennas with Joe Carr.

A Ferrite Loop Converter by Richard Q. Marris.

Billboard a novel. v.h.f. LPDA scanning antenna. I Did It My Way. John Wilson tells all.

Plus Regular Columns covering Utility and Data Modes Listening, WXSAFs, Scanning, Broadcast News and Logs and much, much more.....

Next Month - July Airband Special

Practical Wireless, July 1996
ICOM

NEW PRODUCT

IC-T7E

Compact Dual-band Handheld

This is NOT a single band handheld. It may look like one, and in fact is smaller than many. However, the IC-T7E is a dual band handheld! ICOM's advanced technology has enabled the use of a single PA power module (MRF-5007) for both VHF and UHF circuits. Additional miniaturisation is achieved through the use of single circuits for the receiver IF and transmitter drivers.

Compact - with slim dimensions of 57(W) x 122(H) x 29(D) mm, including the battery pack, the IC-T7E fits comfortably in the palm of your hand, unlike many other dual-band handhelds. Carry it around in your shirt pocket or a small bag.

Easy to use - ICOM's IC-T7E features a streamlined function set, eliminating difficult operations such as those for a pager and code squelch functions. All keys are well spaced and both primary and secondary key functions can be accessed with a single push; push momentarily for the primary function; push for 1 second for the secondary function. Additional items for operating simplicity include a single volume control knob, a sliding lock switch and a large function display which allows only one band’s frequency at a time. And, for the ultimate in simple operation, select channel indication mode; only channel numbers are displayed.

Tone Squelch Standard - a CTCSS tone encoder/decoder is standard and provides 50 independently programmable tone frequencies for repeater and tone squelch use. Additionally the tone scan function allows you to find easily the sub-audible tone needed to access a repeater or decode a tone squelch signal.

And More -

- Up to 4W output on VHF and up to 3W output on UHF
- Microphone simple remote control function (An optional HM-75A is required).
- Accepts 4.5 to 16V external DC power supply.
- 70 memory channels (60 regular, 4 pairs of scan edges + 1 call channel for each band.
- Full/programmable scans and all/band select memory scans for versatile signal searching.
- Adjustable LCD contrast.
- Auto-power OFF function.
- 9 DTMF (16 digits each) memories for auto dialling.
- Auto power-saver function with selectable duty rate.
- LCD backlighting for easy night operation.

ICOM manufacture a top range of base-stations, mobiles and handheld transceivers and receivers covering all popular Ham frequencies.

ICOM (UK) Ltd. Sea Street Herne Bay Kent CT6 8LD
INTERNET: http://www.icomuk.co.uk/ E-MAIL: icomsales@icomuk.co.uk.

Count on us!
Ideal for HF/VHF/UHF Amateur radio bands, FM broadcast band, UHF TV band, CB, PMR bands, VHF Marine band, VHF Taxi band, etc.

Improve your scanner's reception with this active, broadband aerial. The aerials supplied with most scanners are perfectly adequate for local reception, but a significant improvement can be made in the reception of long distance (DX) and weak stations by using a fixed, active aerial like the Super Scan.

**INDOOR OR OUTDOOR USE**
**POWER SUPPLY THROUGH DOWN LEAD**
**NO TUNING REQUIRED**
**LOW POWER CONSUMPTION**
**MASTHEAD SIGNAL AMPLIFIER**
**HIGH GAIN * WIDEBAND ANTENNA**

Available ready-built and tested or in kit form for you to build!

The ready-built and tested Super Scan includes:
- Super Scan antenna
- Power supply interface
- Mains power supply
- 15m coaxial down lead
- Adaptors to suit a wide range of scanners
- Ready assembled with 1m connecting cable
- Aerial clamp
- Instruction leaflet (XV54J)

Order code 51274,
**Assembled Super Scan, £79.99**

UK Carriage £5.90

Information leaflet available, order code XV54J, price 30p NV

Order code 51275,
**Super Scan Kit, £29.99**

Build it yourself – save £££s

The Super Scan is available as a kit which includes all the parts to construct the basic aerial and preamplifier. To allow the aerial to be custom-constructed to suit your exact requirements, general items (those marked * above) are not supplied in the kit version. The 32mm plastic pipe is readily available from DIY suppliers. The kit contains comprehensive assembly instructions (available separately, order code XV32K, price 99p NV) and a constructors guide. A fairly high level of skill is essential in construction, however, the only test gear needed is a multimeter, and no setting-up is required.

Order code 51275,
**Super Scan Kit, £29.99**

ORDER NOW ON
0800 136156

or phone 01702 552911 for details of your local Maplin or Mondo Store.

All prices include VAT, except those marked NV which are zero-rated. All items are subject to availability. Handling charge £1.55 per mail order. All prices include VAT, €BOE.