It’s Arrived!
Icom’s IC-706 ‘Mobile Dream Machine’
Reviewed By GORSN

FREE INSIDE
Pull-Out PW
Amateur Radio Year Planner

BUILD
A TABLE TOP LOOP ANTENNA
A TRANSISTOR CHECKER
READY FOR CTCSS? - G6JVE
HELPS YOU PREPARE

FEATURES
FAREWELL TO FERRANTI
HEBRIDEAN HOLIDAY
THREE-LEGGED WINNERS
PLUS ALL YOUR REGULAR FAVOURITES
Ultra Compact Handhelds FT-10/40R

Top Notch
Multi-function knob controls programming and volume.

PTT Thumb Switch
Ergonomically designed, conveniently located, insures maximum comfort.

Alphanumeric Display
Allows 4-character alphanumeric labeling of frequencies.

Super Loud Audio
State of art miniaturization gives greatest RX volume.

Rubber Gaskets
Protects against corrosion from dust, rain or spray.

12 V DC Jack
Use optional E-DC-5B 12 V DC jack.

Specifications
- Frequency Coverage
  FT-10R
  2m: RX: 140-174 MHz
  TX: 144-146 MHz
  FT-40R
  70cm: RX: 420-470 MHz
  TX: 430-440 MHz
- Choice of 4 keypad options
  (6, 16 or Deluxe and DRS16 Keypads)
- Auto Range Transpond System™ (ARTS®)
- MIL-STD 810
- High Audio Output
- 12 V DC Direct Input
- Alphanumeric Display
- RX/TX Battery Savers
- Digital Coded Squelch (DCS)
- Digital Voice Recording System (DPRS)
- Digital Voice Recording System (DPRS) w/FT-10/AIDS
- True FM for better voice clarity
- High Speed Scanning System
- 2.5 and 5 W available
- Full line of accessories

The FT-10/40R is a totally new HT concept! Built to rugged, tough military spec, commercial radio standards inside and out, it's small, powerful, feature-packed and ready to roll out in four versions!!

Four different keypads -- count 'em, FOUR! First true user-choice customized HT on the market, offers a 6, and three 16 keypad selections plus 2.5 and 5 W battery choices, too! Easy for Yaesu, the electronics are in the keypad. Easy for you, they're already installed. Just pick the one that suits your HT "style"!

New technology high-efficiency speaker design provides super loud audio. No small surprise -- after all it is Yaesu!

Dual Watch -- see two frequencies displayed simultaneously in the display. No other single band HT has this feature. Another Yaesu exclusive, the Auto Range Transpond System™ (ARTS®) alerts you visually and audibly when a companion HT is out of simplex range. Most radio functions, are controlled of the "Top Notch", the neatly placed knob on the keypad.

First true user-choice customized HT on the market, offers a 6, and three 16 keypad selections plus 2.5 and 5 W battery choices, too! Easy for Yaesu, the electronics are in the keypad. Easy for you, they're already installed. Just pick the one that suits your HT "style"!

Military spec commercial grade HTs loaded with new features and a choice of keypad, too.

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EDITOR'S KEYLINES
Rob G3XFD reflects on the amateur radio scene.

COMPETITION CORNER
Why not try your hand at our wordsearch competition?

RECEIVING YOU
Readers' letters and opinions.

NOVICE NATTER
Elaine Richards G4FM rounds up the 'natterings' she's received this month.

CLUB SPOTLIGHT
Is your club 'spotlighted' this month?

SUBS CLUB
why not subscribe to your favourite radio magazine? - then you can take advantage of offers like this month's.

REVIEW - THE IC-706 HF & VHF MOBILE TRANSCEIVER
Richard Newton GORSN shares his experiences of using the latest all-in-one mobile package from the Icom stable.

ARE YOU READY FOR CTCSS?
Mike Rowe G4IVE has just the thing to get you going with Continuous Tone Coded Squelch operation.

NEWS 1996
A round-up of what's new in amateur radio.

SIMPLE TRANSISTOR CHECKER
John Thornton Lawrence G2LJGA shares his design for a useful piece of test gear.

RADIO DIARY
Radio rally dates.

FAREWELL TO FERRANTI
Ian Poole G3YWX acknowledges a great British company that now lives on in name only.

DAYTON HAMVENTION HOLIDAY '96
Hurry ... the Dayton Hamvention flight calling at New York & Dayton is 'boarding' soon.

PW PULL-OUT WALL PLANNER
A must for your shack wall.

PRACTICAL WIRELESS BACK ISSUES
Order your missing issues now! to ensure your collection is complete.

ANTENNA WORKSHOP
Cedric Stanley G5MCK provides a non-mathematical look at v.s.w.r.

THE PW HELTA
Richard Marris G2RZO shows you how to build a Helical Loop Transmitting Antenna.

HEBRIDEAN HOLIDAY
Peter Walker G4HHH says his love of both islands and radio gave him the perfect excuse for a Hebridean holiday.

THREE LEGGED WINNERS
Ron Ham looks back at the early days of the transistorised radio.
Introducing the Lowe Electronics HF Starter Kit

Just about to take your first steps on to the HF bands? Worried about getting all the right bits and pieces together? Worry no more because we've done it all for you. Yaesu's magnificent FT-840 is an ideal transceiver for the beginner. Easy to operate packed with features and performance. It comes with fist mic but we’re throwing in a Morse key too.

Okay, now you need something to power it with – Mansons EP-925. 25A at 13.8 volts and we’ve sold thousands of them – the UK ham's favourite power supply. That takes care of all the inputs and for the output we've got an ATU and an antenna. MFJ's 941E ATU. This accepts a wide variety of antennas and is rated at 300W. It's also got a built-in SWR meter. For an antenna, we’ve chosen the G5RV. A tried and tested design with thousands sold every year. We’re throwing in a half-size Chelcom Aerials G5RV, so you’re getting great quality (if you’ve got the room, you can have a full-size one instead!)

You’ll need a patch lead as well from the FT-840 to the ATU and then out to the antenna so we’re also giving you 10m of coax and a four PL-259s and, oh yes, you’ll also need a logbook to enter all your new contacts into. All that is part of our superb package deal. The numbers are strictly limited so if you want to take advantage, you better call us today!

Buy that lot as separate items and you will spend a little under £1300. Get it all together for just £999

Kenwood TM-733E
Their finest dual band mobile to date. Packed full of features, like wideband receive, cross band repeat, duplex operation and of course 9600 baud operation for fast packet radio.
Normally £729 but just £629 from Lowe Electronics.

ADI AT-200
ADI AT-400
The dynamic duo! Two great hand helds offering great value for money. One for 2m and one for 70cm – choose one or both!
AT-200 – just £164.95
AT-400 – just £189.95

Kenwood TH-79E
Our most popular handheld, full of hidden features but they are all explained in our “Secret World of the TH-79E” booklet. Great radio – great price.
RRP is £479 but pay only £399 from Lowe.

Yaesu FT-51R
The only dual band handheld featuring “Windows” – the manual is built in so all the commands are at your fingertips. If you want real Windows control, ask about the ADMSI control software and interface available as an option.
FT-51R normally £529 but just £429 from Lowe Electronics.

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http://www.lowe.co.uk/
Can there be such a thing as a professional amateur? We think so. We’ve sold a number now to respected people in the business of amateur radio – manufacturers, suppliers, respected authors to name but a few. We’ve also sold the TS-870S to a bunch of ordinary amateurs – but are they ordinary? We don’t think so. By and large these are people with several years experience at the sharp edge of DX-ing. They are contest winners, trophy hunters, DXCC chasers and some that just like a good natter with close friends in far away places. They are people who know a good thing when they see it. They know what they want from their setup and are probably already using some of the best equipment available but to keep ahead, they need every advantage that modern technology can provide. The TS-870S certainly delivers in that respect. Can you afford to buy anything less than the best? If you want to get ahead in this game you’ve got to do what the very best of them do.

There are two other very good reasons the professionals come to Lowe for top-flight equipment. The first is that they know we NEVER compromise on service and back-up. No one else in this business has four fully-trained, highly experienced engineers who have specialised in Kenwood for nearly all their working lives plus a dedicated spares department to keep the work flowing smoothly. If you don’t believe that, come in and see it for yourself. This radio isn’t cheap. It is also quite complicated inside. If you are going to spend this much money, it probably represents a considerable investment, you’ve had to work hard to EARN this radio. You need to know it is going to be looked after – not just shipped out to a third-party service company who don’t know you.

Secondly, there is value. Our regular customers ALWAYS get the best deals, very often better deals than are offered in anyone’s advertising. You just need to call in to take advantage.
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THE KENT MORSE TRAINED
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Now in stock

IC-706 NOW IN STOCK
• 100W on HF • 100W on 6m
• 10W on 2m • Gen conv.
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This is going to be the top seller of 1995! It is the best value for money on the market.
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+ 12 months @ £33

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IC-765 + SP-20 ................. £1695
FT-706 + 6m ex. cond. .......... £1695
TS-120 + VFO100/PS-30/VC-300/DUP .... £499
FT-717DS ......................... £450
FT-77 + FT-706/SG-700 ........ £675
FTV-109R Transverter 2m/6m .... £225
TS-50 + FT-902 ................. £599
FT290R + Morse .............. £275
TM-741E transmitter .......... £675
TR-6130 ......................... £325
FT-1012D ....................... £375
TR-7800 ......................... £140
R-6000 ................. £250
R-1500 .................. £275
Lowc SReX-30 .................... £199
NRD-525 ..................... £875
KR-500 ................... £95
ERA Micrometer & Synoptic decoder .... £175
IC-81 .................. £250
FRG-9600 HF ................. £350
IC-3E + Accessories ........ £76
IC-4E + Accessories .......... £161
FTV-107R Transvertor 2m/6m .... £225
TM-741E Transverter .......... £675
TR-6130 ......................... £325
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IC-4E + Accessories .......... £161

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Practical Wireless, February 1996
### THIS MONTHS SPECIALS

**Yaesu FT-650/PS**
24-54MHz all mode transceiver. The "King" with the 6m DX'ers

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
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<tr>
<td>FT-650A</td>
<td>As New</td>
<td>£950.00</td>
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<td>FT-650B</td>
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<td>£1075.00</td>
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<tr>
<td>FT-650C</td>
<td>As New</td>
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<tr>
<td>FT-650D</td>
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### EX-DEMO AND USED EQUIPMENT

**VHF/UHF TRANSCEIVERS**

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<td>IC-751C</td>
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<tr>
<td>IC-751D</td>
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**HX Transceivers**

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<tr>
<td>HX-210</td>
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<td>RX-1000D</td>
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**Receive**

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<tr>
<td>ADR</td>
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**HX/DX Transceivers**

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<tr>
<td>HX-210</td>
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<td>£950.00</td>
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<tr>
<td>HX-215</td>
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<td>HX-220</td>
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<td>£1125.00</td>
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<tr>
<td>HX-225</td>
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### DATA/COMPUTER

**PK Model**

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<td>PK-100D</td>
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**Miscellaneous**

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<tr>
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<td>Good</td>
<td>£950.00</td>
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<td>SM-300B</td>
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<tr>
<td>SM-300C</td>
<td>Good</td>
<td>£1125.00</td>
</tr>
<tr>
<td>SM-300D</td>
<td>Good</td>
<td>£1150.00</td>
</tr>
</tbody>
</table>

### FOR TRANSCEIVER OFFERS SEE LAST MONTHS EDITION

**HQ & Mail Order Southampton:** 01703 251549/255111 9.30am-5pm Weekdays 9am-1pm Saturday

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Practical Wireless, February 1996
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PC Track - Review of this Satellite Tracking Software
Smoke Signals - A look at Fire Brigade Comms.
More Radio Secrets of the War - David White is back with more on the war.
The Radio Inspector and the BBC World Service
Radio By Numbers - The Enigma that is Numbers Stations
The Calibration Lab - Keeping test equipment tickity boo

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The finest dual band mobile. Includes remote head. Extremely compact and very easy to use.

Includes a host of exciting features. You get CTCSS built-in, 200 memories as standard and a wide-band receiver covering 108-174 / 400-470 / 800-950MHz. You’ll love its compact size and its electronic volume control. Send today for full details of tomorrow’s technology.

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The Lowest Price Ever!
GET ON AIR FOR UNDER £200!

The AKD Ocms, celer has arr edl
Switch channels full band coverage. I
all for
base
station, mobile, packet and Rayne
activities. Simple to operate and great value!
£193.74 Inc VAT (add £5 p&p)

<table>
<thead>
<tr>
<th>Model</th>
<th>Channels</th>
<th>Power Output</th>
<th>Features</th>
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</thead>
<tbody>
<tr>
<td>4M</td>
<td>20</td>
<td>3 watts</td>
<td>Full coverage, 20 switched channels from 70.250 to 7.500MHz (21AkHz spacing)</td>
</tr>
<tr>
<td>2M</td>
<td>Full</td>
<td>2 watts</td>
<td>Full coverage 144-146MHz, PTT Repeater tone burst, Listen on input facility</td>
</tr>
<tr>
<td>6M</td>
<td>Full</td>
<td>25/5 watts</td>
<td>Full coverage, 2 watts audio</td>
</tr>
</tbody>
</table>

£193.74 Inc VAT (add £5 p&p)

RANGE 432.500MHz to 435MHz

- 100 channels
- 25kHz steps
- Power output 3 watts (ideal for novice)
- PTT repeater tone burst
- RX sensitivity better than 0.25μV
- Audio output 2 watts
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- 13.8V power supply required
- ALL AKD manufactured products are GUARANTEED 2 YEARS! All models are supplied with a circuit diagram and are available through all leading dealers.

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(Fax 01438 357591)

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Top Value RECEIVING ATU

CTU8 Kit: £29.90
CTU9 Kit: £39.90

NEW! EASY ANTENNA SWITCHING

Switch between up to three SW receiving antennas, and gain extra control over signal levels with the 0, 5, 10, 15, 20 & 25dB step RF attenuator. Matches CTU8 & CTU9 styling. Smart, convenient, easy to build with all parts! ASU8 Kit: £27.90.

NEW! HOWES CTU9 ATU

By popular demand! All the features of the CTU8 (500kHz to 30MHz, T-Match, 50Ω39 sockets etc.) plus additional built-in balun, bypass switching and extra screw terminals for connecting balanced feeders, single wires, and a separate earth connection. A fully featured ATU that should suit almost every listener's needs. Real value, kit or ready built!

CTU9 Factory Built: £69.90
CTU9 Kit: £39.90

WIDE-BAND PRE-AMP, 4 – 1300MHz.

Boost those signals with the HOWES SPA4! Low noise IC amp with 10dB switched attenuator. Over 15dB gain. Good dynamic range, IP3 +15dBm. 50 Ohm. Coax powered for shack or masthead use. Just the job for use with discones etc. in weak signal areas!

SPA4 Kit: £15.90
Assembled PCBs: £22.90

MULTI-BAND SSB/CW RECEIVER

The DXR20 covers 20, 40 & 80M bands with optional extra band modules for 160M, 10M, 15M or 10M amateurs or 5.45MHz HF air. Many high performance features in this excellent direct conversion design!

DXR20 Kit: £39.90, DCS2 "S meter" Kit £10.90. HA2OR hardware pack: £28.90

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 and hardware. Complete kits contain 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.
Popular Section

'Receiving You' always seems to be a popular section of PW. Readers' letters reflect the modern amateur radio scene in an effective way. And this month, I'm actually taking the opportunity to reply to a letter in 'RY' from the Radiocommunications Agency where their spokesman considers that my recent 'Keylines' on 27MHz CB to amateur bands conversions was "unfair".

In his letter Colin Richards of the RA's Radio Investigation Service (RIS) says that my editorial was "Unfair on us on a number of counts". Colin then goes on to detail the RIS point of view in detail.

The final part of Colin's letter then (as far as I'm concerned) goes on to fully justify my reasons for allowing radio amateurs to convert multi-mode CB equipment for 28MHz operation! And in my opinion the argument "these sets are easily converted back again for illegal CB use" does not hold water!

From my point of view, once a converted CB multimode transceiver is converted to amateur radio use, it's unlikely to be released by the amateur fraternity. Our (very healthy) second-hand equipment market would snap up equipment like this...once everyone knew that they were not likely to be breaking the law.

The vast majority of radio amateurs are honest, decent and trustworthy. I'm certain that we could be trusted to ensure that converted equipment did not fall into the wrong hands. We would be helping the RA by removing the transceivers from the 'black market', enabling the RIS to concentrate their limited resources on illegal equipment entering the country and being used by the people we can all hear on 27MHz s.s.b.

I'm pleased that PW is read carefully by the various Government departments. Our readers' opinions, thoughts and ideas are often commented on and personally I'm pleased that we're not a 'voice in the wilderness' with nobody listening!

I should also remind readers that Amateur radio in the UK has many friends and a lot of support from the RA. And of course there are many radio amateurs working within the Agency itself.

Personally, I have tremendous respect for Colin and his colleagues. They often fight a corner for us, but I know that by not allowing licensed amateurs to continue buying and converting illegal multi-mode CB radio equipment for 28MHz use - the RA have got it wrong this time!

What's your view?

Write to 'Receiving You', you may win a prize!

Wordsearch

Words To Find:
Antenna
Electronics
Focal
Icon
Point
Transistor

Antenna
Electronics
Focal
Icon
Point
Transistor

Dayton
Ferranti
Helta
Planner
Servicing
Wall

L DC I D Z U A G M R Y P C K
J G M F E R R A N T I D U Q Q S
L A C O F A N N E T N A W S E K
F R O T S I S N A R T O E P O P
S R N P I M R K E I K R O B N H
F P W H S P P K L K V I R A M P
K V L L A W P O E I N Q N A R T
D P E T P L E L C T W P O L J B
P E G G A P S I T Q R U T F Y W
N L P N B Q N W R R K I Y Q L L
B F N X X G M S O G I F A Z I U
L E O S B X A X N F T X D C P G
R S X Z A P T A I E I G O K B Y
Y E B R D Y L Q C I J M U C O O
L H W T J G E Y S I P Q O X L L
D Q I P B I H Q H V O N K M G

Words to find: Antenna, Electronics, Focal, Icon, Point, Transistor.

Wordsearch rules: Twelve different words have been hidden in the letter grid. They have been printed across (forwards or backwards), up and down, diagonally, but they are always in a straight line without odd letters between. You can use the letters in the grid more than once for different words. You can use the letters in the grid more than once for different words. You can use the letters in the grid more than once for different words. You can use the letters in the grid more than once for different words. You can use the letters in the grid more than once for different words. You can use the letters in the grid more than once for different words.

Name:__________________________________________

Callsign:________________________________________

Address:________________________________________

Postcode:________________________________________

Send your entry (photocopies acceptable with corner flash) to: Wordsearch Competition, February 1996, 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.

FIRST PRIZE: A year's subscription to Practical Wireless or a £20 book voucher. SECOND PRIZE: A six month subscription to Practical Wireless or a £10 book voucher.

Entries to reach us by Friday 23 February 1996.

Practical Wireless, February 1996
Unfair To The Radiocommunications Agency

Dear Sir
Reference Illegal CB Transceivers: Your 'Keylines' editorial for October was rather unfair on us for a number of counts. Even with unlimited resources, we would be unlikely to catch every sale of an illegal CB set in the country. Nevertheless, the introduction of the restriction Order in 1988, which made sale, advertisement, importation, possession, etc. of illegal CBs an offence, had a dramatic effect on the numbers in circulation.

In 1994/5 we applied for forfeiture on 15 occasions, a figure that has steadily dropped from the 102 applications for forfeiture for use of illegal CB in 1987/88 immediately before the Order came in and 406 in 1985/6. Sometimes, the possessors of illegal CB sets decide to voluntarily disclaim ownership which spares the need for forfeiture proceedings. We continue to be vigilant against illegal CB as part of the RIS's annual work programme and we do act when we find illegal sets.

The Agency did allow the conversion of illegal CB sets to the 28MHz (10m) band for two years after the Order came in. We still get honest amateurs who tell us when they have obtained one of these sets and who ask us to transfer the specific permission to possess it from the previous owner. We willingly grant this. However, having been converted to amateur band use, these sets are easily converted back again for illegal CB use.

We are concerned that if we were to allow a relaxation, the sets would get into the wrong hands and we would quickly see a return to the old days of widespread, illegal, high power CB, particularly on s.s.b. That would bring with it a resurgence of the high levels of interference to the emergency services and to domestic broadcast reception, which we have largely eradicated and which the current legislation allows us to control.

Colin Richards
Radio Investigation Service
Radiocommunications Agency
London

Editorial note: Please see 'Keylines' for comments on this letter.

Comparisons & Reviews

Dear Sir
Ref: 'Keylines' and PW reviews. Comparisons are odious, at least that has been my axiom over the years. So that when it comes to rig reviews, I think these should be strictly objective, without even any opinion of the reviewer.

With hand-helds and such, an observation of all the salient qualities could be made. How powered, are all connectors standard, how controls are placed and usable. In fact, all the things that are observed with a hands-on approach. Larger items can be treated, with colour, case, etc., all coming under review. Performance figures are already supplied by the manufacturer, and if a set does not perform to these figures, then we know the remedy! In short, I would like more of a visual review with the makers supplying performance specs. Just let us be objective!

J. G. Openshaw G2AYG
Lancashire

Top Band Transverter

Dear Sir
In the March 1995 issue of PW, I saw an interesting article by Ben Nock G4BXD - a Top Band Transverter. As 'Top Band' has been a favourite band of mine for many years (using home-brew, both for mobile and fixed station operations) I thought (this looked an interesting one to build. I should also add that I'm a keen PW reader and project builder.

After 'badgering' John for the boards (pun intended!), I found that no artwork was available, even as late as October. At the bottom of the transverter article was a note from your good self which said that in future issues, this article would be continued, but having read every issue since, I find no mention.

This project would be nice on say, two boards. Is there any chance of it appearing as a whole article? Finally, as a reader and home-brewer for over 50 years, it was nice to see you and chat at Leicester.

Ron Roberts G3TAR
Rugley

Editor's reply: Ron has a good point, and I'm sorry that we've not yet produced the final part of the project mentioned. The difficulties were caused by the original designer - Derek Pearson G3ZOM of 'Jandek'.

Scanners - The Last Words!

Dear Sir
Ref: The letter from Walter Farrar in the November issue. He asks why shops are allowed to sell radio equipment such as 'scanners' that cannot be licensed and therefore legally used. One possible answer is that its because we are not yet a police state.

As M. Langford points out in the same issue, there are many radio amateurs who use such receivers on the amateur bands perfectly legally. Those using them to listen on aircraft frequencies, whilst offending against the Wireless Telegraphy Act, are officially tolerated, they are pretty harmless.

Mr Farrar's comparison of buying and owning radio equipment with buying and owning firearms, ie. both should require production of a licence before being sold, is frankly laughable. The possession of firearms in the UK is strictly controlled for one very simple reason, in the wrong hands they can kill. Short of physically striking someone with a radio scanner?

A more realistic comparison would be with a dog licence. I know that dog licences are no more. They were done away with because (a) they were too expensive to administer and (b) the system was widely abused. The excessive bureaucracy to 'police' such a system as Mr Farrar advocates would lead to an unrealistically high licence fee being imposed upon legitimate users of such equipment, after all, who else would pay? I doubt it would stop what would become unlicensed possession.

I agree with Mr Farrar that it is useless having laws that are not enforced, and I agree with a recent Home Secretary who said that unenforceable laws are bad laws and bad laws should be swept aside.

As for the lamented visits of Post Office officials to inspect radio amateurs stations. Could it be that these are only made these days as the result of a complaint, TVL or similar. There are many more amateurs now than in years gone by. Mostly using 'commercial' equipment. Perhaps, as a ratio to these greatly expanded numbers, they cause less problems to others.

Maybe the DTI take a view that if nobody is complaining there is probably nothing wrong. To reintroduce random visits would require an increased bureaucracy and a consequent increased licence fee.

Anybody want to pay £30-40 a year for their licence?

W. G. Jones GW4KJW
Gwent

Editor's reply: Because of lack of space this letter was held over from a previous issue and is POSITIVELY the last on the subject of scanners. I thank readers for their tremendous interest.

Practical Wireless, February 1996
Is c.w. dying out?
Absolutely not! It will live as long as people love the bow, sailing, and crafting with their hands - c.w. will live as long as people remain human.
(With acknowledgement to WB5ZNJ)
E. Longden

Editor's comment: This letter came in via the 'Internet' and like many others only had the E-mail address. Please remember that to accept your letter for publication we need your full name and postal address, although the full address will not appear in the magazine.
Additionally, anyone not equipped with Internet facilities does not have to worry about E-mail 'jumping the queue'. All incoming mail (electronic or not, and this includes FAXes) is dealt with equally and as soon as possible.

Pricey RAE
Dear Sir,
I have always writing to you for some time, but having just read December 1995 "Keylines," I feel that I must finally put pen to paper. In September of this year, having held my Novice license for about two years, I decided to try and do the RAE in May 1996. I felt this was the natural thing to do as I was progressing along the route to a full licence.
Thankfully, finding someone to teach me was no problem. There are many kind amateurs in my club who were willing to and ready to help and soon a small group studying for the RAE were set up within the local radio club.
Nevertheless, I was more than shocked when I rang the college (where I was to sit the exam) to find out about the prices. As you know, the two papers to the RAE, plus an extremely moderate centre fee, totalled over £40. Then I added £10 for the RAE book, which is pretty much a necessity. This is a lot to pay in one go, added to the fact that there are no guarantees that I would pass first time.
I am not saying that it is unfair that I cannot afford it, whereas others can. However, I find it unjust that I will be paying the same amount as an adult amateur who will be earning a full wage, particularly as I am under 16.
Radio amateurs do their best to encourage young blood into the hobby via the Novice Licence. Once they have obtained this, they are told that they should get a 'proper licence' (whatever one of them is?) and do the RAE. However, nobody seems to take account of the fact that being young they are obviously not earning a full wage.
Why don't those responsible for administering the RAE organise some kind of discount scheme for young novices (or indeed those who cannot afford it, such as the unemployed, etc)?
This would result in Novices being able to afford the full licence to realise that not all Novices can afford the RAE and stop all this 'when are you getting your full licence?'.
You may say that my parents could afford this. But when you were young, did you ever try to get £50 out of your parents?!

Comparative Reviews
Dear Sir,
I read with interest the comments of G7PRD in his 'RY' letter and also your views in 'Editors Keylines' and couldn't help rising to the bait! I believe that Russell has a point in suggesting comparative reviews; between similar types of equipment in an effort to assist those either contemplating an initial purchase or up-dating at a later time.

Your comment that the 'reviews can only be the opinion of the reviewer' is really only a part truth as it depends on whether the reviewer is being subjective or truly objective. The feel of the reviewer" is really only a part truth as it depends on the opinion of the reviewer. It is unfair that I cannot afford it.
You may say that my parents could afford this. But when you were young, did you ever try to get £50 out of your parents?!

Tom Girdler 2E1
Leicestershire

Send your letters to the PW Offices, marking it clearly for 'Receiving You.'
Happy New Year! I hope Santa brought you all the goodies you hoped for, if not then perhaps you’ll have to drop a few heavier hints next year!

A nice addition to the shack wall for the New Year could be a very commendable resolution. The Yeovil Amateur Radio Club have an award on offer that’s available to all transmitting amateurs and s.w.l.s.

It’s nice to see an award that doesn’t rely on you contacting hearing club members to achieve success. You have to work or hear 22 British stations where the last letter of their callsigns finally spells out Yeovil Amateur Radio Club. So, G4LFM is OK, as is G3XFD and G77JB, but G1TEX isn’t (sorry Tex!).

The breakdown of the 22 callsigns you need to qualify for the award are: 3 ending in A; 1 ending in B; 1 ending in C; 1 ending in D; 2 ending in E; 2 ending in F; 2 ending in L; 1 ending in M; 2 ending in N; 2 ending in R; 1 ending in T; 2 ending in U; 1 ending in V and 1 ending in Y.

The callsigns you log can include: 2 ending in I; 1 ending in K; 2 ending in L; 1 ending in M; 2 ending in N; 1 ending in O; 2 ending in R; 1 ending in S; 1 ending in T; 1 ending in U; 1 ending in V; 1 ending in W.

The award costs just £2 (or 54 or 6IRCs) and you should send your certified list and money to: A.C. Dening G1JBH, Awards Manager, 19 The Park, Yeovil, Somerset BA20 1DN.

Thanks to Monitor, the International Short Wave League’s (ISWL) Newsletter for the information on this award.

Learning Morse

Another useful tip I picked up from a recent copy of Monitor is about learning Morse, from Walter NSSN. Basically, one problem with practicing receiving plain language text is that you start guessing what comes next in the sentence. This is all very well at slow speeds, but can be a very bad habit to break once you start speeding up.

Walter suggests you have practice tapes (or whatever) in plain language sent backwards. So you start with a full stop and they have each word spell backwards.

For example ‘tum eht no tas tac eht’ is much harder to ‘read’ than the ‘cat sat on the mat’. If you can’t anticipate what’s coming next it stops you guessing and you never know how many letters are going to be in the next group of letters.

It was after reading the article that I remembered that this was the way I was often given a Morse test when I was learning. Morse tutors would often give us foreign language text or things sent backwards just to make sure we didn’t start reading and guessing.

Another favourite trick was to put a ‘rogue’ word into a sentence. If the sentence made sense then you had guessed and anticipated the word because they had actually send a similar one that didn’t make sense.

When you are trying to learn Morse it seems a daunting task. But once you can stop thinking so hard about what you are hearing and start reacting automatically, that’s when it starts getting easier. Honest!

Old Radios

When you first start telling people that you are taking up the hobby of radio, especially short wave listening, often someone offers you the use of an old radio to ‘get you started’. These ‘old’ radios have a habit of being the really old 19in rack mounted sorts or ones that takes three people to lift!

If they are working well then these old receivers can be a real asset and shouldn’t be snubbed. But, where do you find out more about how they work (‘the manual was around but I can’t find it at the moment, I’m sure you’ll work it out!’)?

If you’ve been loaned an Edystone, then your luck is in. There is a very active Edystone User Group (EUG) judging by their latest Newsletter.

Apart from sending out six newsletters per subscription year, the EUG can help with supplying copies of manuals (sometimes an original) with prices ranging between £3 and £10. They can even help with queries, although you may need to be patient as Eddystone Radio Ltd help with the administration of the group, they don’t have the resources for unlimited time on technical queries or ‘phone answering.

The subscription year 1995/6 costs £10 for the UK and £11 overseas. You’ll receive back issues of No. 31 and 32 Newsletters. The one I looked through (No. 32) was packed with information, not all of it really technical either.

There was also ‘For Sale and Wanted’ adverts, hints on operating, sources of components and stories of members and their radios.

If you are interested in finding out more, contact: The Eddystone User Group, c/o Eddystone Radio, Alvechurch Road, Birmingham B31 3PP.

Radio At School

Is your school/college (or your children’s/grandchildren’s school/college) into amateur radio? Well they could be. Over 120 schools, from primary through to universities are actively running an amateur radio station. One group dedicated to getting amateur radio into education is STELAR, it stands for Science & Technology Through Educational Links With
First Steps

Watts a dBW?

The use of the Watt as a measurement of power is understood by many people. So why should we have to put up with dBW for transmitter powers?

Despite initial reluctance to use an unfamiliar measure, there are a number of advantages from using a dB based power measurement. A simple example is when you look at the way your valuable r.f. is transported in the ether.

A look through the adverts will show that everyone quotes coaxial cable losses and antenna gains in dBs. So what’s the big deal?

The answer is that the use of dBs actually makes life easier. This is because, once converted to dBs, you can simply add and subtract to find the result of interconnecting amplifiers, cables, etc.

As an example, if we consider a transmitter with an output power of 200W connected to the antenna with a feeder having a loss of 1.8 dB, the power at the antenna would be 182 dBW - just some simple subtraction (200W - 1.8).

Using Watts for the transmitter power you would have to first convert the 1.8 dB feeder loss to a power ratio by dividing by 10 and taking the antilog of the result which is 1.51. You can then divide the 100W transmitter power by this number to give the result which is 66.23 W (I think it’s clear which is easier).

The chart in Fig. 1 (taken from the BARTG) provides a useful guide if you want to convert back to Watts. It’s also worth remembering a few useful benchmarks such as: 3 dB changes the power by a factor of 2. So a 3 dB increase doubles the power and vice versa. A second useful point is 10 dB, which represents a ten times change in power.

That’s all for another month, so keep writing to me with all your useful ‘netterings’.

Elaine G4LFM

Send your letters to Elaine Richards G4LFM, PO Box 1863, Ringwood, Hants BH24 3XD.

Practical Wireless, February 1996
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  - INCLUDES FREE P-2512 POWER SUPPLY

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  - AM airband 50W, £499
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**Yaesu FT-23R**
- 2M FM handheld.
  - (inc Nicad pack & charger) £99.95

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  - £99.95 Sale price £479.95

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- VHF/UHF all mode transceiver.
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**Icom IC-738**
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- 2m + 70cm handheld transceiver.
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- 144-440MHz (60W) pocket PWR/SWR meter
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- 4 way (SO-239)...... £39.95
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£9.99
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30 DAY SPECIAL

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HIGH QUALITY NISSEI MOBILE ANTENNAS

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As new.

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- VHF converter...

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- FOR ONE MONTH ONLY

- Buy the AR-8000 & Opto Scout together including modification & connecting cable

RRP £999
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Plus VAT on the following

AKT-2602
Flexible telescopic antenna. 8 inches long wideband receive (14" long BNC)

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2m mobile 50W

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- TOP MONEY PAYED

- NOW AVAILABLE

- NEW DB-32
A Miniature Wideband Antenna. Receives 30 - 1200 MHz. Transmits 2m/70cm, BNC fitting only 1.5" long its support

RRP £29.95
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NEW OPTO-SCOUT SEE BEFORE YOU BUY!!! We have a VHS Video demo tape showing the Opto-Scout being used to its full potential. This video is available on FREE LOAN, all we require is £10 deposit (refundable) + £2 P&P and we'll send you a copy. You return the tape when you've watched it and we'll refund your £10. (Provided the tape is returned undamaged). Alternatively - order a Scout from us and we will deduct the £10 and you can have the video on us. NB: it is an offence to copy this tape for any reason.

NEW OPTO-CUB
The Cub is ideal for communication, surveillance and recreational monitoring applications. From 10MHz-2GHz. The Cub utilises enhanced sensitivity for detecting RF in the near field and displaying the frequency detected. The Cub features a digital filter that reduces false counts and random noise, digital auto capture that acts like an intelligent hold button allowing any frequency captured to remain displayed as long as needed.

RRP £139 (includes nicad charger antenna)

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No Interest Your Joking!

Latest Mini Frequency Finder from Optoelectronics. It will capture and memorise up to 400 frequencies it can be recalled directly into the AR8000. Supplied with AR/ V/UHF, Nissers and Charoppe.

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FOR ONE MONTH ONLY

Buy the AR-8000 & Opto Scout together including modification & connecting cable

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One month only

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EP-300
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Sony SW-100E
Award winning miniature SW receiver. RRP £219.95

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OUR PRICE

- For one month only

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£129.99

As new...

- £339.95

30 DAY SPECIAL

£369.95

AR-8000
The ultimate handheld receiver covers 500kHz-1900MHz. All modes. For one only we are selling this reciver at a crazy price.

£499

- 30 DAY SPECIAL

£369.95

30 DAY SPECIAL

Practical Wireless, February 1996
Canadian Amateurs

Jim Hatch G300L, also ex VE2BEV & VE3CIJ is looking to form a loose Net of amateurs who have been connected with the Canadian Radio Amateur fraternity. The connection could either be by being born in Canada and now holding a European licence, or holding a Canadian licence and working under reciprocal agreement.

The Net would be held on 3.5MHz at the outset, or 1.8MHz if the need should arise. Anyone who is interested in joining such a Net, please write to Jim Hatch at 42 Bowden Road, Templecombe, Somerset BA8 0LF.

Long Association With Radio

Elaine Hicks-Arnold GOCDZ tells of her husband Frank G6MB's long association with radio.

Frank G6MB was first licensed in 1920, "authorised to transmit not more than 500 yards, the apparatus to be attached to no aerial or each other than short rods with or without vanes". This was an authorisation to use a garage's 1913 spark and coherer transmitter and receiver.

On Sunday September 25 1955 at 1000UTC, the first news broadcast was made by the RSVG with the call GB2RS and Frank was the original newreader from his station in Walton-on-Thames on 3.6MHz. He continued to read it without a break for three years.

Frank was a council member of the RSVG from 1949-55.

Frank had held other radio callsigns, in Malaya, between 1927-31 he held the call 2HQ, which was a Singapore area marine call as there were no amateur calls there. He was issued with G6MB in 1931 on his return to the UK. He also held VK4AKD from 1980-86.

Elaine says "I was first licensed in 1984 and have no claim to fame at all!"

Live Radio Link-Up With German Astronaut

'Club Spotlight' has recently received a FAX from Noel Moore G7MC, Head of Technology Department, Belfast Royal Academy. It described the recent live radio link-up by the Belfast Royal Academy Amateur Radio Club with German Astronaut Thomas Reiter DPMIR during his 135 day mission on board the soviet MIR space station.

The space station had been tracked by computer and its transmissions monitored since Thomas returned the greeting to the busy astronaut. The club became involved when Jonathan Sherlock G10YGQ noticed a packet message inviting schools to become involved in the EUROMIR Project. The school replied and nothing was heard again until a FAX was received from Jorg Hahn of Ham Radio Group in the Deutschen Forschungsanstalt, indicating that the school had been given a schedule with the MIR crew three days later.

The 144MHz equipment was thoroughly checked out in preparation for the Fm. semiduplex contact. No guarantee was given of Thomas' availability, but there was a full turn-out of club members to witness the attempted schedule. A sigh of relief was observed as Thomas returned the school's call.

Thomas described the greetings that the visitors, their first human contacts since saying farewell to the previous MIR crew in September, would receive on their arrival. He went onto describe the work planned during the docking.

Thomas and his Russian crewmates Yuri Gidzenko and Sergei Avdeev sent their greetings to the school and to the city of Belfast.

Meetings AT MAXPAK

Edward Loach from MAXPAK (The Midlands AX25 Packet Radio Users Group) has recently sent in a programme of events for the coming months. Meetings are held on the first Monday of every month, except when there are bank holidays, meetings are then held on the second Monday.

Meetings begin at 8pm, ending at 10pm, at the Pertson Community Centre, which is next to Sainsbury's in Pertson, near Wolverhampton. A licensed bar is on the premises! Pertson is on the A1, approximately five miles west of Wolverhampton.

All non-members and visitors please note - there is a charge of 50p when attending any evening where there is a talk or practical demonstration. This is made to help recover the cost of hiring the room.

Well, what's happening soon? - well, on February 5, there is an evening using a PC computer and packet radio, followed by a practical demonstration of black and white and colour ink jet printers, re-inking of the cartridges will also be demonstrated. The February/March Digicom (the bi-monthly newsletter) will be available at this meeting.

To obtain more information, contact Edward Loach on (01902) 741877 (evenings).

Zoe says:

"keep that News and those Club magazines coming!"
Members of the Salop Amateur Radio Society meet every Thursday evening, commencing at 8pm at The Oak Hotel, Shelton. Membership now totals over 60 members from the surrounding area.

On January 18th they will be discussing contesting, a chance to suggest what contests the club should enter, all suggestions are welcome. Then on February 1 there's a surplus equipment sale. Don't forget your wallet!

More information is available from Ian Davies G7SBH, 56 Roselyn, Shrewsbury SY1 4LP.

The Derby & District Amateur Radio Society meet on Wednesdays at 7.30pm at 119 Green Lane, Derby. Just a few of the up and coming events are: January 24 - Amateur Astronomy - illustrated talk by Trevor Smith, February 5 - Amateur TV group meeting.

Further information about the Society is available from the Chairman, Richard Bucky G3VY, 20 Eden Bank, Antrim, Belper, Derbyshire DE5 2GG or by telephoning him on (01773) 852475.

Club members meet at the regular meeting hall, 'Terra Nova', The Waldrons, Waddow, Clitheroe, for the Surrey Radio Contact Club. Find out about Propagation on February 7 when Raymond Everall GULP gives a talk on the subject. Bernie G5STB is on hand if you want to find out more. You can telephone him on 0181-660 7517.

The Liverpool & District Amateur Radio Society meet at 8pm every Tuesday evening at the Churchill Club, Church Road, Wavertree, Liverpool. The Society also runs courses for the RAE, NRAE and Morse.

A few of the Society's up and coming events are: January 16 - Club night on the air, 2nd - Talk by G7PGE, 30th - Surplus sale and on February 6 - Contest planning. More details can be obtained from Ian G4WXY, QTHR.

The Dunbee Amateur Radio Club meet on Tuesdays at 7pm in the Dunbee College, Graham Street, Dunbeak. Morde, Morse is taught every Tuesday evening.

The radio club shack and technical library are available to club members. A club newsletter is published bi-monthly and a club Net is on 7.070 at 1400hrs daily.

Find out more from Allan Martin GMTON1, 11 Langlee Place, Broughty Ferry, Dundee, Tayside DD5 3RD.

Members of the South Manchester Radio Club meet every Friday at the Community Centre, Norris Road, Sale from 8pm onwards. The club caters for the many interests of its members and also runs Novice courses.

For further inquiries about the club, contact Edward G7FPQ on 0161-969 1964. All are welcome to attend.

Meetings are held on the 2nd and 4th Tuesday of each month at the Lickey End Social Club, Alesser Road, Burslem, Burslem Grove for the Burslem Grove Amateur Radio Society. Catch a talk on January 23 by Len York on 'Manhattan Experience'.

For further details/information, contact Barry Taylor G0FPC on (01527) 542816.

Informal and formal evenings for the Norfolk Amateur Radio Club are held at the Normom Centre, Bognor Road, off Drayton Road, between Asda and the Mile Cross Roundabout, Norwich. Just a few of the events happening soon are: January 17th - Night on the airconstruction QRP/Morse practice, 23rd - 'Science for all' by Arnold G3PBY, 31st - Night on the airconstruction QRP/Morse practice, February 7 - Surplus PMR conversion by Steve G0UYA.

More information from Mike Conn G4FOL on (01603) 789792.

Members of the Dunfermline Radio Society meet at Outh Muir, five miles north of Dunfermline on the A823 (near Knockhill Race Circuit) on Thursday evenings at 8.30pm. A few up and coming events are: January 11 - HF operating evening, 18th - A talk by James GM0LZP on 'Offshore Pirates of the 1960s and 1970s', 25th - Natter night, February 1 - HF operating evening, 11th - Natter night.

For more details, contact Adrian Donaldson GM0RJ Dixon, Secretary, on (01383) 735967.

The Manchester & District Amateur Radio Society meet at the Simpson Memorial Civic Centre, Mossion Lane, Manchester every Tuesday evening at 7pm. RAE and NRAE courses together with Morse lessons are given free of charge and the Society is also registered as a City & Guilds examination centre.

On February 6 there is a DX night. Further information and details of the Society's forthcoming activities are available from Barrie GM0JA on 0161-681 5406 or Harold G0VZ on 0161-338 4112.

Send your club information to Zoë Shortland at the PW Offices.

Practical Wireless, February 1996
In addition to the small selection above, we have at least 400 other used items available from stock. All offered with a minimum of 30 days money back guarantee.

**Special Offer**

**Kenwood TS-450SAT**

Bulk purchase of your favourite "muli" sized HF transmitter has enabled us to offer them on a spectacular saving.

**The TS-450SAT is supplied with 100W all mode HF transmitter, including a built-in AUTO ATU, SWP and much more.**

The list price is £1600.00. We are offering 10 pieces at only £1435.00 including FREE FINANCE, saving a massive £165.00.

Furthermore, it is available on FREE FINANCE at £196.00 deposit and 12 payments of £53.25.

**Save a Massive £165.00**

**NEW DSP-232 DSP based data controller RRP £499.95**

**FREE FINANCE**

**JRC JST-135 150W HF Base. Loaded with hundreds of pounds of extras.**

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parts & labour, (most 3 months), and a chance of FIFTEEN months at minimal cost.

**ALINCO CORNER**

**DX-70**

100W on HF
10W on 6M

Alinco's answer to the IC-706.

A mini HF transceiver with all modes from 160M - 6M. General Coverage, RX, remote front panel. Compare the receive audio on both. The Alinco RX is remote and should have a higher price. Old RRP: £199.

**NEW LOW PRICE: £995** with FREE 3 YEAR WARRANTY

**INTEREST FREE APR**

Available on our 50/50 purchase plan. INTEREST FREE APR

**DJ-G5**

The best selling Dual Band Handle.

Better still, each has been the sales success, it comes with the original box, instructions and microphone. £199.

**NEW LOW PRICE: £995** with 3 YEAR WARRANTY

**INTEREST FREE APR**

Available on our 50/50 purchase plan.

**DJ-191**

AS REVIEWED IN PW DEC

Stylishly updated and the popular "Follow the leader" in the range, the trend is to save money with the new 2M, which is a matching very well. RRP: £249. Deposit £25, 12 payments of only £18.33, interest free Zero APR.

**OPENING HOURS**

MON-SAT
9.30 - 6.00

Due to the enormous success during the OPEN DAY of Morse Tests being taken without the requirement of "pre-booking", for a limited period, the facility for sitting the test will be available for three months at the London Showroom, starting in February 1996 through to April, the tests will take place on the first and second Saturday of each month, between 10.00 and 14.00 hrs. For those wishing to take the ICOM Morse test, please ensure that you arrive with two passport photographs and the £18 admin fee.

FOR FURTHER DETAILS, CALL STEVE JELLY ON 0181-566 0072

MORSE TESTS ON DEMAND

Due to the enormous success during the OPEN DAY of Morse Tests being taken without the requirement of "pre-booking", for a limited period, the facility for sitting the test will be available for three months at the London Showroom, starting in February 1996 through to April, the tests will take place on the first and second Saturday of each month, between 10.00 and 14.00 hrs. For those wishing to take the ICOM Morse test, please ensure that you arrive with two passport photographs and the £18 admin fee.
The Icom-706
HF & VHF Mobile Transceiver

By Richard Newton G0RSN

There are many avenues leading to being a licensed Radio Amateur. Mine was short wave listening encouraged by my Dad, John G0EAM. I have therefore always been interested in the h.f. bands.

However, I'm not going to bore you with my whole life story, although the reason for mentioning my 'early radio life' will become apparent.

I now have children of my own, two in fact. And, I found (as many before me have) that time in the 'shack' takes a firm back seat to the role of father to two babies.

So, I decided that the only way around the lack of 'shack time' was to take my radio with me when I was out of the house. That's how my 'love affair' with h.f. mobile was born.

When I saw that Icom had brought out the IC-706 I was very excited. Here was a radio that would give me all my h.f. bands mobile with the added bonus of 144MHz SSB (something I had to give up in order to get h.f. mobile in the first place).

Something Impressive

I was expecting something impressive and was not disappointed. The first impression this unit gives you is robust professionalism. It looks really good in my opinion.

So, out it came, along with the supplied accessories. A fist microphone, d.c. power cable, spare fuses, RTTY connection plug, electronic keyer plug, and the accessory cable.

When I had laid out all the contents of the box I was somewhat perplexed. There was no mobile bracket!

After some 'phone calls and reading the handbook (always the last thing I do in crisis!) I discovered that the mobile bracket was an optional extra! Well I will not labour this point, but suffice to say, this did not impress me one bit. You would have thought a mobile radio would have been supplied with a mobile bracket!

While I was awaiting the arrival of my optional extra mobile bracket I set the IC-706 up in my shack at home. I operated it into a home-brew doublet of random length, (approx. 15m in each leg) fed by 300Ω ribbon and connected by a balanced a.r.o.

Switching On

When first switching on the IC-706 it looked rather daunting. But I didn't let this put me off and the rig has the normal controls that I would want and expect to see as primary hardware on a front panel including the On/Off switch, AF (volume) control, made tuning an easy, effortless task.

I get the distinct impression the Icom IC-706 was designed by a mobile radio operator. The large rotary knob is just that. Large but well proportioned. The soft rubber collar and hard plastic free moving finger hole greatly assist in accurate fast and slow tuning. These factors, coupled with the variable tension control, made tuning an easy, effortless task.

Finding your way around the IC-706 is really quite simple. I would say it took me a few hours to get to grips with the basics. After a couple of days operating and reading the manual I experienced no trouble at all.

Menu Banks

The IC-706 has different menu banks. Icom have obviously chosen what they consider to be the more often used settings. The more used features are situated in menus that are more easily accessible. The less used ones are placed in menus taking a few more key presses to get to.

It's most important for the mobile operator to operate the equipment easily. For the h.f. operator it may well be switching between the two v.f.o.s or perhaps switching in the voice compressor to grab that bit of rare DX.

For the v.h.f. operator it will perhaps be moving through the simplex frequencies on 145MHz or being able to monitor the local repeater. I also like to be able to monitor the reverse frequency of the repeater as well. It seems that Icom have been very mindful of these requirements.

On the whole I would agree with their choices. However, I would have like to have seen the output power more easily adjustable. But considering just how much this little radio will do for you I think that Icom should be very pleased with the way the designers structured the menus.

However, the actual power settings on the Icom IC-706 are very versatile indeed. On the h.f. bands the c.f. power is adjustable from 5 to 100W with a total of 11 separate levels. The same is true of 50MHz. The power settings for the 144MHz band are also variable between 1 and 10W and again with 11 setting levels.
All The Facilities

The IC-706 has all the facilities that one would expect in a modern transceiver. It has two v.f.o.s and 59 memory channels. In addition to these are two other memory locations for programmed scan limits and a Call memory for the 144MHz band only.

Configuring the memories is very simple and extremely straightforward. And when in memory mode the operator is still free to tune away from the frequency set in the memory channel, with the memory remaining unchanged. I found the method of tuning away from the frequency stored in memory very useful when operating mobile.

The IC-706 has many ways in which to move through its vast v.f.o. range at different rates. But all of these methods require several key presses and the use of the main tuning dial or Up/Down keys on the microphone.

However, if you programme each amateur band in a memory, you can then select each band by pressing the Up/Down key on the transceiver. You are then free to fine tune from there. This feature I found to be the best for my mobile requirements.

For those interested in data modes the IC-706 seems to be well equipped to handle them. It has selectable menus dealing with RTTY settings and details are supplied on both this mode and ASCII outputs.

Treat For Morse

There is an absolutely wonderful treat in store on the IC-706 for the Morse enthusiast. I was absolutely overwhelmed when I found that this wonderful little transceiver was supplied with a built-in electronic keyer!

From the menu, the operator can select the type of key being used and set the parameters of the electronic keyer. This feature impressed me a great deal.

Unfortunately I'm a straight key operator myself so I was resigned to writing about the facility and not experiencing it. Until I read the handbook that is! It would appear that Icom had thought of that and I was not going to get away so easily!

You can configure the keyer so that the Up/Down keys on the fast Microphone become a Morse key! Up becomes 'Dah' and Down provides the 'Die'. It was great fun, I put out some CQ calls but had no reply. No reflection on the radio here, it was more likely my sending. (More practice with a 'microphone key' required I feel!).

I was also extremely pleased to see the IC-706 is provided with an r.f. gain control and an i.f. shift. These features, along with the 20dB attenuator and the preamplifier were to prove their worth when I went on the air.

The transceiver’s front panel display is really something to behold. It’s clear and well set out. Important information is extremely well represented.

The display’s excellent green back lighting has three settings, Off, Low and High. The High setting is so good, I found that I could not drive it with high gain at night as it dazzled me! It had to go on Low.

Other Facilities

Just before I tell you of my ‘on the air’ adventures, with the IC-706 I’d like to briefly mention some other operating facilities that caught my eye. And I’ll start with the S-meter.

The S-meter can be set to be many things. On receive it’s always an S-meter. However, it can also be set to show you relative r.f. power out, or s.w.r. across the h.f. and 50MHz transmission line and also provide an automatic level control (a.l.c.) meter on transmit. (A ‘must’ for adjusting the microphone gain and compressor).

I found the meter’s s.w.r. facility to be extremely useful in the car, so much so that I removed the separate s.w.r. More space, what luxury?

Another must for me as a mobile operator had to be the VOX control. I was a little disappointed with the use of the telephone style modular plug on the microphone though. This inhibits home-brew hands free microphones for the car. (Unless you purchase a conversion cable of course...another optional extra!).

Continuous Coverage

The IC-706 provides continuous receiving coverage from 300kHz to 200MHz! It offers s.s.b., c.w., a.m., w.b.f.m. (wideband f.m.) and RTTY as modes, (w.b.f.m. is available on receive only). The specifications are guaranteed on the Amateur bands only.

I was able to receive my local Band 11 f.m. broadcast station on 102.3MHz with ease. Goodbye car radio! More space reclaimed. I was beginning to like the IC-706 a lot.

Setting Up

When I was setting up the first thing I noted was that the 50MHz output was on the h.f. output and not with the 144MHz output.

I’ve no doubt that there are extremely good reasons for Icom’s decision to place the 50MHz output on the h.f. output side of the transceiver. But it would seem that all those antenna manufacturers who appear to be desperately flooding the market with dual band 144/50MHz mobile whips will be forced to have a re-think!

So, the time had come to put the transceiver through its paces. I put a call out on the 145.500MHz f.m. calling frequency. I could just hear a station down in the noise. We moved to a simplex frequency and I had the pleasure of chatting to Chris GD8DFN in Hythe, Hampshire.

Chris gave the ‘706 a very favourable report. I however could not hear him very well at all. I connected my Kenwood TH-205E 144MHz hand-held to the WX1. He was then a very good 5 and 7 signal.

I then went back to the IC-706, and Chris was still only just breaking the squelch. I then went back to the IC-706, showing h.f./50MHz antenna sockets (see text for comments) and separate 144MHz antenna socket.
Icom 1C706

Continued from page 21

The Icom 1C706 as fitted in GORSN’s car for mobile evaluation.

I briefly explained to Chris what I was doing. He confirmed a good report on the transmitted audio. Then came “Break”. This was a call from Gerry GOWHE in Bulford, Wiltshire. Gerry had joined in so that I could hear the transmitted audio on the IC-706, because he was actually using one! Because of Gerry’s call I can confirm the IC-706 transmitted audio is good quality. Perhaps it’s a little on the ‘trebly’ side but it’s nevertheless an excellent QRM cutting audio.

We then changed modes to s.s.b. and had a very enjoyable chat. Gerry agreed that it appeared that with the IC-706 you had to employ the preamplifier on v.h.f. to get a decent receive capability. (The fact that Icom have listed all the sensitivity specifications with the preamplifier on seems to support this theory).

**Very Low Noise**

The preamplifier is a very low noise type and works extremely well on f.m. and s.s.b. But, on h.f. the performance of the preamplifier in the v.h.f. band made it worthwhile.

---

### Manufacturer’s Specifications

#### General

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antenna Impedance</td>
<td>50Ω</td>
</tr>
<tr>
<td>Usable Temperature range</td>
<td>-10°C to +60°C.</td>
</tr>
<tr>
<td>Frequency stability</td>
<td>Less than ±7 p.p.m. from 1 to 60 minutes after power ON. After that, less than ±1 p.p.m./hr at 25°C.</td>
</tr>
<tr>
<td>Power supply</td>
<td>13.8 v d.c. ± 15%</td>
</tr>
<tr>
<td>Current Drain at 13.8V</td>
<td>Transmit = 20A</td>
</tr>
<tr>
<td></td>
<td>Receive squelched = 1.5A</td>
</tr>
<tr>
<td>Dimensions</td>
<td>167 x 58 x 200mm (projections not included)</td>
</tr>
<tr>
<td>Weight</td>
<td>2.5 kg</td>
</tr>
</tbody>
</table>

#### Transmitter

**Output Power**

- **1.8-30MHz**: SSB, CW, FM, RTTY 5-100W, AM = 2-40W
- **50MHz**: SSB, CW, FM, RTTY = 5-100W, AM = 2-40W
- **144MHz**: SSB, CW, FM, RTTY = 1-10W, AM = 1-4W

**Sporious emissions**

- **1.8-30MHz**: Better than -50dB
- **50MHz**: Better than -60dB
- **144MHz**: Better than -60dB

**Carrier suppression**

Better than -40dB

**Unwanted sideband**

Better than -50dB

**Microphone impedance**

600Ω

#### Receiver

**Receive system**

Double or triple conversion superhet

**Intermediate Frequencies**

**MODE 1st 2nd 3rd**

<table>
<thead>
<tr>
<th>Mode</th>
<th>(MHz)</th>
<th>(MHz)</th>
<th>(kHz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSB</td>
<td>69.015</td>
<td>9.015</td>
<td></td>
</tr>
<tr>
<td>AM</td>
<td>69.010</td>
<td>9.010</td>
<td></td>
</tr>
<tr>
<td>CW/RTTY</td>
<td>69.0106</td>
<td>9.0106</td>
<td>455</td>
</tr>
<tr>
<td>FM</td>
<td>69.0115</td>
<td>9.0115</td>
<td>70700</td>
</tr>
<tr>
<td>WFM</td>
<td>70.700</td>
<td>10.700</td>
<td></td>
</tr>
</tbody>
</table>

**Squetch sensitivity**

- **SSB and CW**: <0.16μV (for 10dB S/N)
- **AM**: <0.16μV (for 10dB S/N)
- **FM**: <0.16μV (for 10dB S/N)
- **SSB and CW**: <13.0μV (for 10dB S/N)
- **AM**: <2.0μV (for 10dB S/N)
- **FM**: <2.0μV (for 10dB S/N)
- **SSB and CW**: <0.5μV (for 12dB SINAD)
- **AM**: <0.3μV (for 12dB SINAD)
- **FM**: <0.3μV (for 12dB SINAD)
- **SSB and CW**: <10.0μV (for 12dB SINAD)

**Selectivity**

- **SSB and CW**: >2.3 kHz @ -6dB, <4.0 kHz @ -60dB
- **AM**: >6.0 kHz @ -6dB, <20.0 kHz @ -40dB
- **FM(W)**: >12.0 kHz @ -6dB, <30.0 kHz @ -50dB
- **FM(N)**: >8.0 kHz @ -6dB

**Sporious and image rejection ratio**

Better than -70dB (HF bands only)

**Audio output power**

>2W at 10% distortion with an 8Ω load

**RIT variable ranges**

±1.0 kHz max
the IC-706 is so good anyway that I hardly used the preamplifier even when mobile.

On a radio of such a wide specification as the IC-706 there has to be compromise. And I'm sure that Icom have gone the way they did instead of opening it up to all the awful breakthrough from which other wide-band transceivers seem to suffer.

To further discuss the IC-706 Gerry and I made a sked. The following evening we tied up on 145MHz and then went to 3.740MHz. There we had a very enjoyable contact and having to surrender eventually to the QRM and finished the contact back on 145MHz.

Using the attenuator and the i.f. shift I managed to fend of the increasing QRM and QRN on 3.5MHz for some considerable time. The IC-706 coped very well and it was very interesting to be able to review the radio from both ends of the QSO.

**Hardest Band**

The following day (still operating from the shack) I decided to test the IC-706 on what I consider to be the hardest band... 7MHz. If a radio copes on this cluttered busy band then it can cope with most things!

It did extremely well, and the 706 swathed through the horde to get a very favourable report from Blain G14XJA in Coleraine County Londonderry in Northern Ireland. Later the same day, again on 7MHz, I had a brief but again very favourable report from Uri RX3ZB in Staroskol near Moscow.

I also went onto 50MHz where Rob G6DUN and Gerry G7JEZ were kind enough to help. Again it seemed that the preamplifier was a 'must' but apart from that, all seemed very well indeed.

I did receive a mobile bracket eventually and enjoyed operating from the car on h.f. and v.h.f. The radio suits mobile operation very well and I found it very easy to operate indeed. I consistently had good reports on the audio both h.f. and v.h.f., f.m. and s.s.b. (Most of the reports were unsolicited).

Perhaps the most interesting mobile QSO I had was with the IC-706 on 7.062MHz with Chris, operating G8JILU, the United Nations station in Geneva. I heard Chris calling CQ, I was a terrific signal. I returned his call with no response. Perseverance paid off and I got the response of "the G0 station try again" which I did. Still no solid contact, until I put the compressor on 145MHz.

After seeing a copy of G0RSN's review Dennis Goodwin G4SOT of Icom UK Ltd., sent us the following comments:

Just a few lines in answer to Richard's review of the IC-706.

Icom have been besieged with orders for this exciting new model, since its initial announcement in June this year. However, customers have been very patient waiting, our supplies are just catching up with the many orders we received.

The IC-706 is a mobile transceiver, but I wonder how many are actually used mobile. Like many similar sized models, many of these are purchased and used as a main base station, (probably more than mobile).

Icom could easily supply a mobile bracket, c.w. filter, etc. as standard. The catch being that the retail price would increase to cover the cost. With options, the customer has the choice, why pay for something that you do not want or use?

Like Richard, I was also able to operate the IC-706 easily without the handbook, the sample we received earlier this year did not have one as it had not been printed at the time. Later I discovered the CTCSS encode and 1750Hz tone facility, memory naming, c.w. sidetone frequency adjustment when a handbook was available in English.

The 50MHz output to the h.f. antenna socket is quite simply because the main final p.a. section ranges from 180m to 6m with a separate section for 2m. Already antennas such as the Outbacker (available from Nevada Comms) are available for h.f. and 6m and I would expect more to follow.

Two new products available in the new year to add increased operational features are the IC-FL232 RTTY filter 350Hz bandwidth and the IC-MB-65 multi-position bracket for controller heads used with the IC-706 and IC-2700H.

**Dennis Goodwin G4SOT**

My thanks for the loan of the review model go to Icom (UK) Ltd., Sea Street, Herne Bay, Kent CT6 8LD. Tel: (01227) 743000, FAX: (01227) 741742. The recommended retail price for the IC-706 is £1195 and is available from Icom dealers.

The detachable main control panel on the IC-706 shows demounted. An accessory cable is required to remotely operate the transceiver from the front panel unit (see text).
Are You Ready For CTCSS?

Mike Rowe GB1VE says that if you’re not ready for Continuous Tone Coded Squelch System (CTCSS) operation, he’s got just the thing for you in the form of a simple CTCSS add-on tone and filter conversion project.

Traditionally, repeater access has been by a 1750kHz tone burst, but now more and more repeaters are following the p.m.r. method of CTCSS access. In effect CTCSS (Continuous Tone Coded Squelch System) is a method of control by means of a low level low frequency tone.

The Electronic Industries Association (the relevant standards body) has defined a series of 38 tones in the sector between 67 and 250.3Hz, although in the UK, only nine are used. The lowest of these is 67Hz and the highest 118.8Hz, each area has allocated its unique tone for use on all repeaters. One tone should therefore suffice.

During transmission, a sub-audible tone is superimposed on the speech information at a very low level (approximately 10% amplitude). This is detected by the repeater and only if the correct tone is present will the speech be passed through to the output.

You’ll realise that in the p.m.r. field, CTCSS would allow several users on the same channel. But each one would only be able to hear their own base or mobile.

The simple CTCSS add-on I’m describing does not limit the speech path (i.e. no decoder). But it does supply an encode signal and a high pass filter for receive to eliminate the low level hum associated with repeaters using CTCSS.

Construction And Installation

Construction and installation of the unit is not difficult. If you make your own board, the p.c.b. should be checked for any errors and the components fitted where shown.

Don’t forget the one link under the i.e. on the p.c.b. design I’ve provided. Make sure that the r.c. and the tantalum capacitors are fitted the correct way round.

Connect a supply of approximately 9V and a frequency counter to the output. Then adjust R1 for the correct tone for your local repeater.

The 200mV output should be connected across the existing deviation control in the host transmitter. Ideally, it should not be connected to the microphone input as this is usually filtered to pass only the audio frequencies in the range 300-3000Hz.

In the unlikely event of there being insufficient modulation, either decrease the value of R4 or increase the value of R5. (The supply should be switched so that a tone is only transmitted when required).

The receive amplifier is a simple high pass filter. It’s based around a 741 op-amp with a cut off frequency of 100Hz. In effect, the filter allows the speech to be passed, but not the low frequency CTCSS tone.

Setting Up

There is no adjustment needed when setting the unit up. To test, apply a 9V (approximate) supply and connect to an audio source (earphone socket or audio oscillator) and check with an oscilloscope if available that the audio is passed through. The filter should be connected as shown to a prior point to the volume control should be connected in the host receiver. This may involve either cutting a wire to the volume control or inserting a coupling capacitor to the volume control and removing it, fitting the filter in its place.

Once you’ve built the project, you’re ready for CTCSS. And you built it yourself!

PW
**Shopping List**

**Resistors**
- Metal Film 0.6W 5%
  - 330Ω 1 R2
  - 6.8kΩ 2 R6, 7
  - 10kΩ 1 R14
  - 22kΩ 5 R4, 9, 10, 15, 16
  - 39kΩ 1 R13
  - 330kΩ 3 R3, 11, 12
  - 470kΩ 1 R9

  Miniature rotary horizontal mount
  - 2kΩ 1 R5
  - Cermet (18Ω) horizontal mount.
  - 2kΩ 1 R1

**Capacitors**
- Polyester film (miniature)
  - 4.7nF C6, 7
  - 0.1μF C1, 2, 3, 9
- Tantalum bead (16V working)
  - 10μF 2 C5, 8

**Semiconductors**
- 1458 1 IC1 (or any pin compatible dual op-amp)
- 741 1 IC2 (or any pin compatible single op-amp)

**Miscellaneous**
- Hook-up wire to suit the transceiver, insulating tape to cover the two boards.

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**Fig. 2a:** The filter circuit (see text).

**Fig. 2b:** Diagram illustrating how the filter unit can be inserted in the audio pathway of an existing transceiver (see text).

**Fig. 3:** The oscillator p.c.b. track design and associated component overlay.

**Fig. 4:** The filter p.c.b. track design and associated component overlay.
Valve & Vintage At Pickett’s Lock

RadioSport, promoters of the London Amateur Radio & Computer Show, have announced that this year’s show on March 9 and 10, will have one complete hall set aside for vintage equipment. The hall, dedicated to the technology of yesteryear, is to be known as the Vintage Sound & Vision Fair. The new exhibition will include radio, TV, hi-fi, electronic telecommunication, mechanical equipment and memorabilia. Along with seeing vintage wooden and Bakelite-cased wireless receivers, the many PW readers who revel in nostalgia will have the opportunity to meet specialists dealing in rare spare parts and hard-to-get valves for domestic and military equipment.

RadioSport also announce that the entry price to Picketts Lock remains the same as 1995. Valve & Vintage enthusiasts can also wallow in nostalgia for free as one ticket will cover admission to both events.

Further information from Steve White of RadioSport. Tel: 0181-882 5125.

Morse Course

A Morse code course commences on January 12 1996 at Newbury College in preparation for the RSGB 12w.p.m. test. The course will run on Friday evenings from 6 - 7.30pm. More information can be obtained by telephoning (01635) 37000/35353 or quoting course 99208B or direct from Ray Oliver G3NDS on (01672) 870892.

Satellite Donation

At the Annual General Meeting of the Radio Society of Great Britain (RSGB) held on December 2 1995 a cheque for £25,000 was presented to Ron Broadbent G3AAJ by the RSGB President Clive Trotman GW4YKL, for the AMSAT Phase3d satellite project. It was also announced that the RSGB’s Council has agreed to make a further donation of £25,000 providing that AMSAT-UK raises a similar amount from other sources.

Selective Tuning From Howes

Daventry based C.M. Howes Communications have just added the CTU9 antenna tuning unit (a.t.u.) and ASU8 antenna selector to their range of kits.

The CTU9 is a ‘T’ match design a.t.u. with two tuning capacitors and eight switched inductance ranges which cover 500kHz to 30MHz. It also features a bypass switch, balun transformer and additional terminal posts for the connection of balanced and unbalanced wire antennas. The CTU7 is available as a kit complete with case with printed and punched panels and all the necessary parts. The price for the kit is £39.90 or £69.90 for a ready built unit.

The new ASU8 antenna selector enables a shortwave receiver’s input to be switched between three antennas using a rotary switch. It also has a switched attenuator with 0-25dB attenuation selected in 5dB steps, which has been designed to give more control over signal levels compared with the standard 20dB attenuator offered by many general coverage receivers. Stylised to compliment the CTU8 and CTU9 a.t.u.s the ASU8 comes complete with case, printed and punched panels and is available for £27.90 as a kit or £49.50 ready built.

Both the CTU9 and the ASU8 are available from C.M. Howes Communications, Eydon, Daventry.

Transmitting Tube

Svetlana Electron Devices Inc., who are based in the USA have introduced the 572B a high power triode valve (tube) designed for use in class AB, class B, class C r.f. and audio amplifiers. The Svetlana 572B can be used as direct drop-in replacement in equipment using the 811A.

The new Svetlana power valve features a massive graphite anode for high peak overload capability and high average plate dissipation of 160W. It also has a low-loss white ceramic base together with a bonded white ceramic anode (plate) cap thermal insulator for high power r.f. transmitting valve capability.

Svetlana say that the temperature initiated ‘getter’ material which is embedded in the surface of the graphite anode, gives superior gas absorption and is more effective than flash ‘getters’ silvered on the glass envelopes of valves made with receiving valve techniques. There is also a matching ceramic socket, the SK4A and anode cap, the PCAA available.

Free technical data on the 572B together with a full list of Svetlana tubes is available from either Svetlana Electron Devices Inc., Headquarters, 8200 South Memorial Parkway, Huntsville, AL 35802, USA. Tel: 00 415 233 0439, FAX: 00 415 233 0439.

Compiled by Donna Vincent G7TZB

Practical Wireless, February 1996
New From Procom

Procom are a Danish company who are known for their involvement with the communications field in both the professional and amateur sense and especially for their manufacture of antennas, duplexer and filters. They have just released news of two new products which are available in the UK from Communication Technical Services Ltd.

Firstly the DANMIKE DSP-NIR is a Digital Signal Processing Noise and Interference Reduction unit which is microprocessor controlled and has been designed to improve short wave reception and remove noise. Features include s.s.b., c.w., p.b., Packet, SSTV, RTTY, notch and peak filters, automatic multi-tone notch, a.g.e., passband tuning and an integrated i.f. amplifier with 32dB @ 40. The price of the DSP-NIR is £260.

Secondly, the MCW-3000 is a microwave watt meter which covers a frequency range of 10MHz to 18GHz when used with the FRO-18G probe, supplied as standard or up to 5GHz when used with an optional probe. It is described as being extremely broadbanded with a dynamic range of 70dB and hypersensitive as it is capable of measuring down to minus 50dBm (10 nanowatts). Powered from a 9-12V d.c. power supply the MCW-3000 is applicable for most diode probe types and costs £665.

For more information on the DSP-NIR or the MCW-3000 you should contact Communication Technical Services Ltd., Unit 15, The Gatwick Metro Centre, Balcombe Road, Horley, Surrey RH6 9GA. Tel: (01293) 822602 or FAX: (01293) 822612.

FaxBak Service

Martin Lynch & Son, The Amateur Radio Exchange Centre, have recently introduced a new 'interactive' service known as FaxBak. The FaxBak system allows the caller to have his number re-dialed in the UK (overseas callers have to stay on the line) and request (using the telephone's keypad) any amateur radio equipment brochure.

For example if you require a brochure on the FT-990, once connected to the FaxBak system you would dial '990' and the brochure would then be faxed to you by return. Martin is also able to offer equipment reviews, a used equipment list, his newsletter and many other things via FaxBak.

Why not call the Martin Lynch & Son FaxBak service today? Just dial 0181-566-007 (note the last three digits!) and follow the voice prompts given by Martin.

New Council Elected

Following the International Short Wave League’s (ISWL) biannual Council Elections, with effect from January 1 1996 the ISWL council is:

President
Mrs Evelyn May GIOZL/G-17197

Honorary Secretary
Mrs Maggie Carrington GOWDM/G-20542

Honorary Treasurer
Mr David Beale G0DBX/G-10618

Editor-in-Chief
Mr Ray Miller G8JGH/G-12537

QSL Bureau Manager
Mr Tony Gale G7NUR/G-13287

Publicity Officer
Mr Chris Carrington G01YZZ/G-20365

Council Members
Mr Herbert Yeldham G6XOU/G-20006
Mr Peter Rayer G13006
Mr Bill Mackie G3/4G/1-7197

The most significant change to this year’s council is the election of Maggie Carrington GOWDM to the position of Honorary Secretary. This means that the address of the ISWL Headquarters has changed to 3 Bromyard Drive, Chellaston, Derby DE73 1PF and all correspondence should now be addressed as such.

Silent Key - G2VF

Long time PW advertiser F. G. 'Bob' Rylands G2VF passed away on November 9 1995. Bob, first licensed in 1935, was well known in Southampton area and although he was 82, still kept busy producing the antenna loop project designs and kits which he advertised in PW for many years.

The Editorial team extend their sympathies to Bob’s widow Dorian and family.

Rob Mannion G3XFD.

Picture Cards

The three QSL cards pictured here are just a small sample of the cards which are available from Jean-Michel Gueugnot F1IXQ of Magic Work in France. Jean-Michel’s cards are already successful in France and he feels they would also appeal to the keen DXer elsewhere in Europe.

The price of F1IXQ’s cards are 1500 French Francs for 1500 cards or 2750 Francs for 3000 cards (including postage). Special prices are available for producing DXpedition and Special Event Station cards.

If you would like samples of the various card designs which are available, you are invited to send an s.a.e. to Jean-Michel Gueugnot F1IXQ of Magic Work, 11 Avenue Leonard De Vinci, Pat la Pardieu, 6900 Clermont-Ferrand, France.

Tel: (33) 7328 9100/9200 or FAX: (33) 7328 9110.

Illuminating Display

On Friday November 3 1995 Waters & Stanton Electronics played host to representatives from the three major amateur radio manufacturers in the UK. This was to mark the opening of their refined and enlarged radio department.

As the photograph shows (L-R) David Wilkins G5HY from Kenwood, Dennis Goodwin G4SOT from Icom and Barry Cooper G4KRO from Yaesu attended the event to view the new purpose-made illuminated display cabinets which have been installed. Also shown in the photo is Mark Francis G0GBY who co-ordinated the refit.

The new display houses the full range of amateur radio equipment from Kenwood, Icom, Yaesu and also the Alinco display which is thought to be unique in the UK.

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practical wireless, February 1996 27
John Thornton Lawrence GW3JGA shows you how to build a useful piece of test gear.

Basically, transistors come in two types, npn and pnp. Each has three connections, emitter, base and collector. A small current applied to the base-emitter connection produces an amplified current from the emitter to the collector.

The current amplification (the ratio of the collector current to the base current) is called the ‘beta’ or gain of the transistor. For small transistors, the gain may be around 50-500.

In circuits which use an npn transistor, the collector is taken to a positive supply and for a pnp type, the collector is taken to a negative supply. In my transistor tester, a meter is connected in the collector circuit and a small known current is fed to the base.

The meter then indicates the gain (beta) of the transistor. Two ranges are provided, 0-100 and 0-500. An npn-pnp switch provides a positive voltage for npn transistors and reverses it for pnp types.

An insulation check switch is provided to increase the sensitivity of the meter in the collector circuit from 2 to 0.25mA to check for leakage current. The circuit is shown in Fig. 1. The transistor tester is built on the inside of the lid of a small plastic case using point-to-point wiring. No circuit board is used.

Marking Out

Marking out information is given in Fig. 2. The reference point is the right hand end of the lid when held horizontally. Other dimensions are from a centre line along the lid.

A small electric drill may be used to drill 1.5mm diameter pilot holes. But use a hand drill to enlarge the holes to the required size.

An electric drill is usually too fast and unless the lid is securely clamped down, it may be drawn up the drill as the tip breaks through (from first hand experience). The following drills are required:

- 1.5mm for drilling pilot holes and for the transistor socket
- 2.5mm for the switch washer locating pegs
- 6.35mm (1/4in) for the toggle switches and for starting the meter hole.

For the meter cut-out, first drill two or three 1/4in holes within the 18 x 18mm marked area and then use a file to join up the holes, then keep filing carefully until the hole is the correct size to take the body of the meter.

Label Lettering

When all the holes are drilled, label the control position using rub-down lettering. The lettering must then be fixed using a spray lacquer or by carefully painting over the letters using a small brush and thin clear lacquer.

Warning: some lacquers may dissolve the lettering, so do a test first. You must do the lettering before you fit the switches as it’s almost impossible to do a neat job after the switches have been fitted.

Check which type of switch goes where on the lid. The switches come with two nuts, a washer with a location peg and a shakeproof washer. Remove one nut and the two washers. Screw the remaining nut down as far as it will go. Fit the shakeproof washer.

Insert the switch into the correct hole from the back of the lid. Now fit the washer with the location peg on the front of the switch and rotate the switch until the peg drops into the location hole. Fit the remaining nut and tighten.

Repeat for all switches. Check that they are in the correct position before writing.

When fitting the transistor socket in place you can use instant adhesive. Make sure that the socket is fully seated against the lid.

Instant adhesive can also be used for fixing the meter. But just in case you need to remove it at some time, I suggest that you use double-sided sticky tape between the back of the meter and the panel.

Wiring Diagram

The wiring diagram is shown in Fig. 3. Check off each wire and component on the diagram as you fit it. Start by putting in the wires followed by the resistors.

Where there are two wires or components going to the same tag, only solder when both are in position. It’s easy to poke both wires through the tag and they will usually hold themselves in position while you solder. Check and (double check) each item against the diagram before soldering.

If everything appears to be correct, fit the battery and using a known good npn transistor and a known good pnp transistor, check that the tester is functional. Stick the battery to the bottom of the box with double-sided sticky tape, and fit the lid and secure in position.

Congratulations! You now have a useful piece of test gear.

Using The Tester

Cont. on p.30

Practical Wireless, February 1996
Join the Radio Society of Great Britain by Direct Debit and we will give you a **FREE book**!*

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simple as building it. Just follow this routine:

1. Set the npn-pnp switch to suit the transistor to be tested.
2. Insert the transistor in the socket correctly and check that there is no reading on the meter. If there is, it may be wrong for the npn-pnp switch setting, incorrectly inserted in the socket or faulty.
3. Press the 100-500 switch to 500 and note the meter reading. If the reading is less than 1 (the gain is less than 1000) press the switch to 100 and note the meter reading. 5 now represents a gain of 10.
4. Leave the 100-500 switch in the centre ‘off’ position and press the ins switch to check for leakage current. A reading of 5 represents 0.25mA. For silicon transistors, the leakage current is negligible. For germanium transistors, some small leakage current may be detected. A high leakage current would indicate a faulty transistor.

PW

1996

January 20: Computer Fair’s (Northern) computer fair is to be held at the G. H. Camell Leisure Centre, Lostock Road, Davyhulme, Manchester, immediately at 10 of the M63 motorway. Doors open 10am to 3pm. The show is open to disabled visitors and a massive free car park, cafe and bar. Admission is £1.50 for adults, free for OAPs and under 14s. Free 00 0161-647 3702.

January 21: Oldham ABC Mobile Rally is being held at Queen Elizabeth Hall, Civic Centre, West Street, Oldham, Lancs. Doors open at 11am (10.30am for disabled visitors). Entry features the usual traders and a Bring & Buy stall. More info available on demand. Tel: 0275-521 6482 (to GIMOCR), commencing at 7.30am. Mobile contact prior to 3pm. More details can be obtained by telephoning (0161) 8991340 or 0161-652 3164.

February 4: The 11th South Essex Amateur Radio Society Radio Rally is to be held at the Paddocks, Long Road, Canvey Island, Essex. The paddocks is situated at the end of the A130. Doors open at 10.30am - features amateur radio, computer and electronic component exhibitions, Bring & Buy, RSGB Morse testing on demand (two passport photos required), horse trade refreshments, free car parking with space outside main doors for disabled visitors. Admission is £1. Further details from David G4EVJ at 01260 697976.

February 11: The Northern Cross Rally is to be held at a new and better venue, the Thomsen Park, Athletics Stadium, Wakefield, just out of town on the Holbury Road. Entry access off M1 junct. 36 and 40 - well signposted and with a talk in on 2m and 70cm. Doors open at 11am (10.30am for disabled visitors and Bring & Buy). Details from Dave G0FLX at 0113-238 3622.

February 17: Computer Fair’s (Northern) computer fair is to be held at the G. H. Camell Leisure Centre, Lostock Road, Davyhulme, Manchester, immediately at 10 of the M63 motorway. Doors open 10am to 3pm. The show is open to disabled visitors and a massive free car park, cafe and bar. Admission is £1.50 for adults, free for OAPs and under 14s. Free 00 0161-647 3702.

February 24: The Rainbow Radio Rally is to be held at the Rainbow School for Girls, Dewern Way, Rainham, Gillingham, Kent. Talk: on 022 by GB0TRR. Doors open at 10am to 5pm.

Shopping List

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Overall cost approximately £1.2

Compiled by Zoe Shortland

9:00am. Disabled and wheelchair users from 9.30am. Admission is £1.50 under 14s, free. There will be the usual mix of trade stands, Bring & Buy, many special interest groups, etc. There's plenty of off road parking, a licensed bar, food and refreshments available with an area to sit and eat and watch the world go by. Further details from Martin G7JBO on (0161) 8369890.

February 25: The Barry Amateur Radio Society are holding their annual Radio and Computer Rally at the Barry Leisure Centre, Barry. Doors open at 10.30am (10am for disabled visitors). More information can be obtained from Brian Brown G0OPE on (01322) 832153.


March 9/10: The London Amateur Radio & Computer Show is to be held at the Lee Leisure Centre, Potters Lock Lane, Edmonton, London N9. Doors open at 10am to 5pm each day. There will be trade stalls, lectures, a Bring & Buy, on-demand Morse tests (two passport photos), talk-in on 2m and 70cm, disabled facilities, priority admission for disabled visitors, bars, restaurants and ample free parking. Steve White G2LZW on 0181-892 1125.

March 10: Wythall Radio Club will be holding their annual radio rally at Wythall Park, Silver Street, Wythall (near Birmingham on the A435, two miles from junction 3 on the M42). Doors open 10.30am to 4pm. There will be all the usual traders in three halls and a marquee. Bar and refreshment facilities will be available. In addition there will be a Bring & Buy stall run by the club. Talk-in on 522. Admission only £1. Chris GOEYO on 0121-430 7267.

March 17: The largest single day amateur radio rally in the UK - the Norbreck Amateur Radio Societies Association at the Norbreck Castle Exhibition Centre, Queen Promenade, North Shore, Blackpool. Doors open at 11am (10.45am for disabled visitors). Over 100 trade stands, Bring & Buy stand, RSGB stand and book stall, cafe stands, amateur computer stands, construction competition, free car parking, free shuttle bus from car park, wheelchair access in all stands. Radio talk-in on 522. Admission is £2. OAPs £1 and under 14s free. More information obtained from Peter Dexton G3CGP on 0151-480 5799.

March 24: Bournemouth Radio Society's 9th Annual Sale will be held at Kinson Community Centre, Pelhams Park, Millbarns Road, Kinson, Bournemouth. Doors open at 10.30am until 4.30pm. Talk-in from G0HRS on 2m 522. Amateur radio, computer traders, clubs and specialised groups. Excellent refreshments. Admission £1. Details from Malcolm G0UIC at 01202 847900.


April 14: Barry Radio Society Annual Rally will be held at the Clacton Leisure Centre, Bredon St, Bury. Doors open at 11am and 6.30am for disabled visitors. The Bring & Buy will be run by members of the Rockcliffe ARC. Refreshments and a licensed bar will be available. Facilities for the disabled. The licensed bar is next to East Lanes Railway (steam preservation line), so why not bring all the family and have an enjoyable day out. Laurence GA9TL on 0161-762 9308.

April 14: Leighbridge AAM 16 - Computer & Electronics Show. Springfield Exhibition Centre, Springfield Gardens, Cramlington, Co. Durham. Admission price includes free entry to 25 acres show gardens. Shawward Promotions, Upland Centre, 2 Upland Road, Ipwich, Suffolk, IP6 1BY. Tel: (01673) 272002.

April 14: The Launceston 10th Amateur Radio Rally is being held at the Launceston College. There will be well-known traders, Bring & Buy, Morse test on demand (two passport photos) and hot snacks. Talk-in on 522. Ample parking. Roy G0IKC on (01409) 221624 or Paul G0USFV on (01566) 776108.

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

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

* Practical Wireless & SWM in attendance

Editor
Ferranti, one of Britain’s oldest and most innovative electronic companies took its final bow at the end of 1993.
The receivers were called in at the end of a struggle lasting several years which started after Ferranti took over a company called ISC and a massive fraud was discovered. This was a sad end for a company which was formed over a 100 years ago.
Since its founding, Ferranti had been at the leading edge of technology in areas as wide as electrical machines and power distribution, radio, computers and semiconductor manufacture. In fact, during its life, Ferranti made a wide range of contributions to technology of which it could be justifiably proud.

Founding Ferranti

Sebastian Ziani de Ferranti was the founder of the firm named after him.
He formed the company in London in 1882, when he was just 17 years old.
Ferranti was a great innovator and he turned his talents towards the new and growing electrical industry. It didn’t take long for Ferranti to start making alternators of his own design.
This was very successful and enabled him to make a significant impression in this particular field.
In the 1880s many developments were taking place in the distribution of electrical power. Initially, many people favoured d.c. supplies.
However, Ferranti had other ideas of his own, as direct current (d.c.) supplies had many drawbacks which could not easily be overcome.
The d.c. supplies could not be transformed from one voltage to another and the whole distribution network had to run on the same voltage. This meant that close to the generator, extremely large currents would arise and even small levels of resistance in the wires would introduce significant losses.

Alternating Current

Ferranti saw the advantages of using alternating current (a.c.) By using a high voltage a.c. generator and distribution system, the currents would be much smaller and resistive losses would be reduced.
A transformer close to the point of use could reduce the voltage to the values needed for its use. By following these ideas Ferranti effectively fashioned the power distribution system we use today.
One of Ferranti’s first major successes was achieved in 1885 when he was appointed to refit a small power station at the Grosvenor Gallery in London. He successfully completed the job and with the experience he gained here, he proposed a scheme for building the largest electrical system of the time.
In his scheme, Ferranti outlined the generating station at Deptford, where land was cheap and there was easy access from the river for coal. Power from the station at a voltage of 10kV would be routed to the Grosvenor Gallery where there would be a transformer sub-station. The plan was that the system would supply enough power for approximately 1,000,000 light bulbs.

Bespoke With Problems

Like many revolutionary design ideas, the project was beset with problems. The Grosvenor Gallery sub-station burned down and the original alternators were never finished, being replaced with several smaller ones. In addition to this, the project was almost a financial disaster, and only started to supply power in 1891.
Nevertheless, Ferranti’s project was a major technical achievement which was years ahead of its time. Over 25 years later, there were still only two other power stations in operation in Britain, which equalled the size of Deptford.

Radio Field

The Ferranti company did not enter the radio field until the 1920s. However, about this time it was a natural development for them. Their experience in the manufacture of transformers was invaluable in the development of mains and inter-stage coupling transformers in radios.
Initially, the company just manufactured components. But even here they did not restrict themselves to transformer manufacture as they also made capacitors (condensers) and loudspeakers as well as a variety of other components.
In the mid 1930s, they even started to manufacture valves. Some of these were of their own design, while others were Ferranti versions of existing British or American types.
In 1929, Ferranti decided to manufacture complete radios and a year later their first set was seen on the market. This was a four valve tuned radio frequency (t.r.f.) set. At this time, t.r.f. receivers were still very popular.
Using less valves than a superhet, the t.r.f. designs were much cheaper. But they still gave sufficient selectivity as there were comparatively few stations broadcasting.
A year later, the company launched two new radios. The first was another t.r.f., but seeing the increase in the number of broadcast stations, Ferranti launched a superhet. And for its time, this set was a very advanced design, having six valves plus a rectifier in the line-up.

Business Booming

With its radio business booming.

Ian Poole G3YWX acknowledges a famous name in electrical, electronic and radio engineering as another era in British technological history ended with the closure of Ferranti.

Heading Photo: A great name did business from here. Some of the dissolved Ferranti offices in Bracknell, Berkshire.
Ferranti set up a new factory in 1935. It was located at Motson outside Manchester, and all the manufacture was undertaken there. The sets were also designed at the Manchester site. This was carried out under the leadership of their chief engineer who went by the memorable name of Albert Hall!

The expertise which Ferranti gained in designing radio sets meant that the company could make a valuable contribution to the war effort between 1939 and 1945. As a result, the company was soon producing radios and also equipment for the new radar systems, which were just beginning to be employed.

Friend Or Foe?

Amongst the other equipment the company made during the Second World War was a system called IFF (Identification Friend or Foe?). For this system a ground station transmitted a pulsed signal which was picked up by the aircraft and a series of coded pulses transmitted back to the ground.

If the correct pulsed IFF 'reply' was received, then the aircraft would be British. Otherwise it could be assumed to be an enemy.

In one of the Ferranti transmitters used in the IFF system, a pair of 807s was used. They generated peak powers of about 1kW, proving again how robust these valves were!

Resumed Production

After the Second World War, Ferranti resumed its production of domestic radio sets. And in line with its innovative approach to radio design, many new types of set started to be produced. These included car radios and later some television sets.

By the late 1950s, Ferranti had developed its main core businesses in other directions and domestic radio production did not fall in line with the main thrust of the company’s business. As a result, the radio business was sold to E. K. Cole Ltd., who produced radios under the Ekco name. For a while Ekco sold radios under the Ferranti label until they themselves were taken over by Pye.

Military Market

During the Second World War, Ferranti entered the military electronics market. Having achieved a considerable amount of success here, Ferranti devoted many of its efforts towards manufacturing equipment for the defence market.

The company built up a radar business of considerable renown, becoming a world leader in the field.

One of its early successes was the ‘Bloodhound’ guided missile programme which was a joint venture with the Bristol Aeroplane Company.

The Computer

Surprisingly, Ferranti also entered the computer market. They started work in this field as early as 1946 and soon became a world leader. As proof of this, in 1960 Sebastian de Ferranti (a descendant of the founder) proudly announced that over 200 of his company’s computers were in use world-wide.

Ferranti’s announcement marked a significant achievement as very few computers were in use at this time. Unfortunately, the lack of Government support slowed its growth very considerably allowing IBM, which was receiving assistance from the American Government, to overtake it. Nevertheless, some of its offshoots formed the foundations of what is ICL today.

Ferranti also entered the semiconductor market, and in typical fashion they were well up with the front runners. In the late 1950s, they were well ahead with the development of commercially viable f.e.t.s.

Then after the first i.c.s had been made in the USA, Ferranti was one of the first in the UK to start manufacturing them. Later on, they were one of the very few companies outside the USA and Japan to design and manufacture their own microprocessor.

Radio Chip

However, most radio amateurs will remember Ferranti Semiconductors for their ZTX range of transistors and theirZN414 radio on a chip i.e. This elegant little device contained ten transistors and with a few external components, it made a high performance t.r.f. radio suitable for a.m. reception.

Using it, excellent audio quality could be obtained from theZN414 and the operating current was very low. (And as theZN414 is still available...it can still do the same for you).

Continued To Crow

Ferranti continued to grow, through the 1960s, 70s and 80s. However, in 1987, the company took a step which was to bring its downfall some years later.

In wanting to grow and enter new markets, they took over an American firm called International Signal & Control for £400m. Only in 1990 was it discovered that massive frauds had left ISC with debts of millions of dollars. Six months earlier the ISC boss, James Guerin left the firm before the losses were discovered.

Ferranti tried valiantly to stay afloat. They sold off some of their businesses to make up the shortfall. However, they were left too small and insecure to be awarded any of the major contracts they needed to remain in business.

Major Trouble

By late 1993 it was obvious that Ferranti was in major trouble. An offer came from GEC for 1p per share, but after careful consideration of their situation, GEC decided not to proceed.

The only option left to Ferranti management was to call in the receivers. This was a tragic end for a company which gave so much to British electrical and electronic technology.

So, when you look at a vintage Ferranti interstage valve transformer and use one of the Ferranti designerZN414s...you too can pay tribute.

You can appreciate a once great British company that now lives on in name only.

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The PW Dayton HamVention holidays have established themselves on the amateur radio travel calendar. In 1996 you can join us on a two-centre trip and have the option to extend the holiday and 'Flexi-Fly' wherever you wish in the USA. And like the passengers who travel aboard the Cunard Line's Queen Elizabeth II, you too can enjoy the sights of New York!

Following many years of Ohio's late April variable weather, the organisers have moved the Dayton HamVention date to mid-May when it should be warmer and drier! Unfortunately, the change brings the return airline flights into the summer season, with the inevitable increase in cost. To get over the increased flight and accommodation costs our professional tour organisers - Gullivers Groups & Incentives Ltd. - have come up with an interesting two-centre package based on New York and Dayton.

London To New York

The 1996 PW HamVention Holiday departs from London (Gatwick) on May 13, when we'll fly direct to New York with Continental Airlines. On arrival, the party will be transferred by bus to the Edison Hotel in Manhattan for a three night stay.

Following the opportunities to explore and enjoy the sights of New York, the party will fly to Dayton on Thursday where we'll be staying in the Englewood Holiday Inn for four nights. The Holiday Inn has a good sized indoor heated swimming pool, a bar and restaurant, and there are a good selection of reasonably priced 'diners' nearby, together with the excellent 24-hour opening Meijer's department store only a short walk away.

The HamVention opens Friday lunchtime (‘Flea' market open from 6am) and runs until Sunday afternoon and there's plenty of good shopping in the nearby shopping malls (public transport is frequent and is good value in Dayton). The HamVention bus service departs from the Hotel car park and although a small charge was made in 1995, we understand that the service will be free this year (subject to confirmation).

The party then departs from Dayton on the Monday lunchtime May 20. We then fly on to New York to join our connecting flight, arriving in London (Gatwick) on Tuesday morning May 21.

You can join the 1996 HamVention Holiday for £785* per person. The £785* cost is based on two people sharing a twin-bedded room but single rooms are available for a supplement.

The price includes: economy class flights London to New York, New York to Dayton and return to UK. Also included are three nights accommodation in New York, four nights in Dayton, return airport/Hotel transfers, entrance fees to HamVention, UK and US Airport taxes, US State and City Taxes and VAT.

Extend Your Holiday

You also have the option to extend your stay in the USA after the HamVention by either 'going it alone' or by taking advantage of a special Air Pass available from Gullivers, which allows you to Flexi-Fly anywhere within the USA. For example, a £160 Air Pass would provide you with three additional flights to anywhere in the USA. Further details on this and other options are available on request.

* Prices correct at time of going to press and may be subject to change due to currency fluctuations.

To receive your information pack and obtain other details, telephone Donna Vincent G7TZB at the Practical Wireless Editorial offices on (01202) 659910. Alternatively, write to Donna, marking your letter: ‘Dayton HamVention 96’, providing your name, address (and if possible) a daytime telephone number.

Hurry! Places on the HamVention Holiday are limited, so send for your information pack today. Don't miss the flight to the holiday of the year with PW!
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**January**

- **29 January**: London Amateur Radio Show (E1086)

**February**

- **10-12 February**: Amateur TV Conference on Amateur TV

**March**

- **10-12 March**: London Amateur Radio Show (E1086)

**April**

- **1-3 April**: Amateur TV Conference on Amateur TV

**May**

- **1-3 May**: London Amateur Radio Show (E1086)

**June**

- **1-3 June**: Amateur TV Conference on Amateur TV

**July**

- **1-3 July**: London Amateur Radio Show (E1086)

**August**

- **1-3 August**: Amateur TV Conference on Amateur TV

**September**

- **1-3 September**: London Amateur Radio Show (E1086)

**October**

- **1-3 October**: Amateur TV Conference on Amateur TV

**November**

- **1-3 November**: London Amateur Radio Show (E1086)

**December**

- **1-3 December**: Amateur TV Conference on Amateur TV
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**International Sheet Wave League**

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**Radio Amateurs' Scout & Guide Club (RASG)**

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**Practical Wireless, PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW**

**Editor**

**News & Production**

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**Editorial Assistant**

On internet E-mail put the persons name in front of:-

@pwpub.demon.co.uk

So, to E-mail Rob G3XF D use: rob@pwpub.demon.co.uk

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The objective of this article is to give an overall explanation of a subject that is shrouded in mystery and confusion. And it does not have to be!

Let’s start by giving the subject its full title of Voltage Standing Wave Ratio (v.s.w.r.). Although in practice this is usually shortened to just s.w.r.

I’ll be taking a common-sense approach and will not be using much mathematics. In this spirit we will not be finding out the basic formulae for v.s.w.r. as these are dealt with in the standard text books.

The difference between power and energy is not within the context of this column. So, for the purposes of this article, I’m going to treat power and energy as being the same thing. We can consider power flowing over unit time, and I think it is helpful to make this simplification.

What Is SWR?

We must first ask the question, what is s.w.r.? And the answer is that the simplest definition is: that v.s.w.r. is a measure of the mismatch that occurs when a transmission line is terminated with a load that is not resistive and equal to the impedance of the line (pause for breath!).

The higher the s.w.r., the greater the mismatch. But before getting too involved, let’s consider a simple loss-less system which consists of a transmitter, a line and a load, see Fig 1. From this it’s obvious that if the load is dissipating W watts of power, then the output of the transmitter is also W watts.

Badly Terminated

When a line is badly terminated, the load can’t absorb all the power coming down the line from the transmitter. This means that the ‘excess’ power, with nowhere else to go, is reflected back towards the transmitter.

Exactly where the reflection takes place is an interesting question. Where does the line end and the load begin?

Fig. 1: The ideal situation - all the power from the transmitter gets to the load without loss.

Fig. 2: Power balance at the load with forward power P and reverse power R (both measured in watts). Here the load (not matched to the line impedance) reflects some power back down the line towards the transmitter.

Fig. 3: Power balances at both ends of the (mismatched) line. Powers P and R are as in Fig. 2.

Fig. 4: Assume loss-less lines. Sections A-B and C-D have characteristic impedances (Z₀) of 50Ω and section B-C has a characteristic impedance of 150Ω (but is mismatched to the 50Ω impedances of the A-B and C-D sections).

Fig. 5: The power balance in the real situation shown in Fig. 4: The transmitter produces W watts, and the load absorbs W watts. Due to real line losses ΔP and ΔR are the losses in the forward and reverse directions.

The half wave length of 50Ω coaxial cable is, by the way we define s.w.r., suffering with an s.w.r. of 3:1. But here is the strange thing, by being exactly half a wave length long, it shows an impedance of 50Ω at the transmitter end.

Time to Consider

Having looked at what causes s.w.r. it is now time to consider what it means to us. The answers are: increased line loss and an impedance at the input to the line which differs from the impedance of the line.

The first is the easiest to consider but we now have to move into the real world of lossy systems. Any real line has a loss which depends on: the length of the line, the
frequency of operation and the construction of the line.

If the diagram Fig. 3, is redrawn to show these losses, it appears as in Fig. 5. It is now clear that the losses on a mismatched line will be greater than on a line that is correctly terminated. However, these extra losses due to s.w.r. are not usually too great. Table 1 puts them into context.

From what I’ve mentioned, it appears that it’s true that any effort to reduce the s.w.r. to lower than 2:1 is wasted. However, this is not the full story!

Until now I’ve ignored the fact that (at the transmitter end) the forward power reacts with the reflected power from the load. The effect of this interaction is to change the impedance of the line at the transmitter end, from its nominal (say 50Ω) to some other value. Invariably this new interaction impedance will almost certainly contain a reactive element.

If your transmitter is designed to load into a 50Ω resistive load it may not be happy if you try to load it into another impedance. It may show its displeasure by not giving full power. (The drop in power may be due to s.w.r. protection circuit reducing power or simply that the transmitter is unable to deliver its full power output into the load).

The problem can be solved by one or more of the following options:

- By directly reducing the s.w.r. on the line (altering the loading).
- Changing the line length so that the impedance seen by the transmitter is more resistive and lower than 50Ω.
- Putting a matching circuit between the transmitter and the line to ensure that the transmitter sees a only a resistive 50Ω.

Note that putting an a.t.u. in circuit does not alter the s.w.r. on the line. However, if the transmitter has a self contained a.t.u. or uses a valued power amplifier stage with a Pi-tank output circuit, you may find that s.w.r. reading as high as 2:1 or 3:1 can be handled by the set itself without operator action.

**Correcting Readings**

How do you know what is a correct reading and how do we find it? The normal reflectometer (or s.w.r. meter) works by measuring the magnitude of the forward and reflected voltages. From these two voltages, the s.w.r. can be calculated by using the formula:

\[
\text{v.s.w.r.} = \frac{V_f + V_r}{V_f - V_r}
\]

Where \(V_f\) and \(V_r\) are the forward and reflected voltages respectively.

On a lossy line the value of \(V_f\) at the generator end of the line is higher than its value at the load. The reverse is true for \(V_r\). Hence the measured value of the s.w.r. will vary along the line, the only true s.w.r. being that value measured (or calculated) at the load.

The table, Table 2, shows what happens when a lossy line is used to feed an antenna. In practice, it is reasonable to ignore this correction at h.f., when the line loss is small and if the line is operating at a moderate s.w.r. However, at v.h.f., where the line losses are greater, the extra losses due to a high s.w.r. is something of which you should be aware.

**Summary**

In this article I’ve presented a non-mathematical overview of the effects of s.w.r. From the point of view of the average amateur we can usually say that for an s.w.r. of 2:1 or less, the following generalities may be applied:

- The extra transmission line loss due to the s.w.r. can be ignored.
- It may be necessary to use an a.t.u. to ensure that the transmitter is presented with the correct load.
- The s.w.r. as measured in the shack will be better than the s.w.r. measured at the load. But usually the difference will be small, and can be ignored.

So, now you know if you have a problem to deal with, or if you can ignore it.

**Further Reading**

The subject of voltage standing wave ratio (v.s.w.r.) is improperly understood by many radio amateurs. When looking at the way it is sometimes handled in articles and book available, it’s not surprising!

In many books the subject of s.w.r. is dealt with in a very mathematical way and can leave the average amateur completely baffled. So I’ve looked at the various books I think may be around in the average shack and tried to grade them as to how they deal with the matter.

The simplest way of dealing with s.w.r. is to ignore the mathematics of s.w.r. In Doug DeMaw W1FB’s book WIFB’s Antenna Notebook it’s merely said that for maximum efficiency you should just tune for minimum s.w.r. But he does provide a wonderful practical s.w.r. bridge you can build for yourself.

John Heys G3BDQ, in his book Practical Wire Antennas treats s.w.r. in the same way as Doug DeMaw. In John’s book he shows an s.w.r. indicator using two small bulbs that’s suitable for parallel wire (or 300Ω twin) feeder. John also includes, under the label of ‘Old-time’ antenna matching, some methods for matching without using an a.t.u.

In the Antenna Impedance Matching and Antenna Compendium (Vol. 1) both also from the ARRL, s.w.r. is treated a little more technically. The book Antenna Impedance Matching treats the subject in greater depth and with more mathematics.

In the new Radio Communications Handbook from the RSGB s.w.r. is given quite an in depth mathematical treatment. Appearing in section 12 (HF Antennas), s.w.r. and its effect on feeders is dealt with in a mathematical, but fairly easy to understand way.

One small observation I would make for anyone reading more than one of the above books. Each book seems to have an individual style of what the formula is to calculate s.w.r. However, when applying first principles they are all the same, merely differing ways of showing forward and reverse energy.

All the above books are available from the PW Book Service. See those pages within the magazine for more details.

'Tex’ Swann G1TEX

More Antenna Workshop next month

Practical Wireless, February 1996
One of the most used antennas is the conventional dipole. But for the 3.5MHz band its length would be around 41m long and around twice that length for 1.8MHz making it difficult to erect in a small space.

I've spent many years experimenting with loop antennas to reduce the space required for my 'antenna farm'. A typical physically small multi-turn loop might consist of one or more turns of wire wound on a box frame configuration. A typical schematic of a box frame loop is shown in Fig. 1.

To be able to use such loops, as in Fig. 1, over a whole band, variable tuning must be incorporated. And as I prefer loops to be located on a table alongside my operating position, the overall dimensions of the loop are dictated by the space available within arm's length.

Finished Loop

My overall finished loop is shown in Fig. 2. This was a first attempt to investigate and construct a viable helically wound loop.

The antenna consists of a tubular plastic frame and the complete frame structure plus base is some 750mm wide by one metre high.

The various parts are helically wound over the tubular frame with a 6A rating pvc covered wire in the form of five coils, L1 to L5. I've found I needed approximately twice the length of wire that a corresponding multi-turn box loop needs.

As built the loop is series tuned by variable capacitor C1 with matching coaxial feedline achieved with a helical 'hairpin' matching device. This device allows 50Ω impedance coaxial cable to connect to the transmitter.

On 1.8MHz, additional capacitors are added in parallel with C1 to bring the loop back into resonance. The simple tuning meter, just sensitive enough to monitor the antenna radiation, is an essential feature to enable easy, quick and accurate resonating and loading of the loop.

In the interests of domestic and personal safety I use a low power (10W) c.w. transmitter. And to be honest (and safe) this power level is to be recommended for inside the home.

The components used should be satisfactory up to about 20W. Though no doubt the components could be upgraded for higher power. It's difficult to accurately plot a radiated polar diagram pattern with the loop located indoors. This is due to interaction with nearby objects, but it has been assessed as approximately egg shaped as shown in Fig. 3.

Simple Format

The loop is constructed in a simple format, which I used for later experimental modifications and improvements as I thought of them. The profile, shows the 760 by 1000mm wide helical loop supported vertically, on the baseboard. The baseboard also has the resonating variable capacitor (C1) and front panel mounted on it.

The loop helical winding frame consists of four lengths of 22mm (7/8in) white extruded pvc water piping. When assembled the loop must be made as rigid as possible by gluing the corner joiners. You will also need plastic stand-off wall clips to fix the tubing tightly.

A word of warning when creating the windings, it is absolutely essential that the specified wire is used. A thinner conductor will result in losses in radiated power, possible heating and loading difficulties.

The top horizontal coil L1 consists of 37 wire turns spaced approximately 6mm apart to cover the whole tubing length. Coils, L2 and L3, are wound to fill the whole of the two vertical limbs. Each coil consists of 75 turns spaced approximately 9-10mm.

Coils L4 and L5 are each 33 closewound turns on the bottom limb. On completion of the coils the loop is mounted onto the baseboard.

Use two of the plastic stand-off wall clips to hold the loop. They are both fixed to the top batten of the mount. Pieces of single sided copper clad board are used for the baseplate and panel, the overall layout is shown in Figs 4 and 5.

The front panel is 100 x 85mm high and is screwed to the baseboard front with the baseplate screwed to the baseboard behind the panel. The edges to the panel and baseplate must be seam soldered together.

I suggest that the variable capacitor C1 is fitted to the front panel with a slow motion drive between panel and knob. I used an older type of metal framed receiving type (Jackson type E 150pF) for C1 which should be soldered to the baseplate). Of course, other types of capacitor can be used providing the plates are wide spaced with ceramic support insulators and rigid construction.

The 'helical hairpin match' is a coil made of 9 turns of 1.6mm (16s.w.g.) tinned copper wire, and is shown in the three views of Fig. 6. This coil is located between the rear of C1 and the loop mounting.

One (50mm) tail is soldered direct to the chassis plate and the other (25mm) is soldered to a 25mm long insulated post as shown. The coaxial feedline is soldered on at 81/2 turns and the cable screen soldered to the baseboard.

The loop frame is now clipped into the stand-off wall clips on the loop mounting. Next L4 is soldered to the...
helical hairpin and L5 to C1. And apart from fitting the tuning meter (the details are shown in Fig. 7) the loop is now complete for 3.5MHz band operation.

For the 1.8MHz band extra capacity is put across C1. For this extra capacitance I used two 50pF 3kV ceramic disc capacitors, in parallel on a small circuit board. (Two short flexible leads with crocodile clips, are used to clip across C1 for 1.8MHz use).

**Tuning Meter**

The tuning meter is a 200µA movement in a simple circuit, fed from rectified signals picked up from the loop. The diode used was a small signal diode mounted with C2 and R1 onto the meter itself. (I used a 1W resistor to give the assembly rigidity). Now look at the drawing of Fig. 7. Here the components on the meter support a 125mm long 6mm diameter coil of 0.7mm (22s.w.g.) wire with spaced turns. This forms a convenient lightweight ‘pick-up’ probe.

The meter is clipped into a suitable plastic coated tool clip, which is itself fitted to a plastic stand-off clip to fit the bottom rail of the loop frame. The tool clip and stand-off clip are bolted together at 90° to each other.

To increase the sensitivity of the tuning meter, the meter assembly is moved. This is achieved by sliding it towards L5.

**Loop Tested**

With the loop connected to the transceiver via a coaxial cable, I tested it on 3.5MHz receive by turning C1 while listening to signals on the band. There is a substantial increase in signal strength at resonance.

To test ‘on transmit’, the transmitter is set on low power into the loop, producing a reading on the tuning meter. At this point the meter should be half way between loop centre and L5.

Minor adjustments to C1 may be needed, depending on the transmitter power being used. The tuning meter should be moved along towards L5 until the meter needle is about 75% full scale and a reference mark made on the meter front. (Maximum radiation occurs when the tuning meter has been peaked to maximum meter reading).

Useable bandwidth is the amount the transmitter v.f.o. can be adjusted without major readjustment of C1. This I found to be approximately 20kHz (+10kHz) on the 3.5MHz band.

On 1.8MHz, with ‘add on’ capacitors I found the useable bandwidth was approximately 9kHz. I found no harmonics could be measured on either band.

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**Fig. 2:** This is what the loop looks like from the front. The circuit diagram in the middle is of the simple power sensing, or tuning meter.

**Fig. 3:** The loop exhibits an ‘egg’ shaped directivity as shown.

**Fig. 4:** Looking down on the baseboard of the assembled loop antenna.

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PW Helta

Continued from p. 40

Now for some of my observations during the experiment. Obviously the extra capacitors could be eliminated by using a 250 or 3/50pF capacitor for C1. Unfortunately, the tuning then becomes far too sharp.

My experimental transmitting loop has gone some way to showing that a very small transmitting loop, using a single helical wire turn is a viable proposition. I think a two-band 7 and 10MHz antenna could be made on a frame of about half the size of the one now used.

There are many interesting possibilities, such as using larger diameter tubing for the frame thus reducing the frame size but keeping the same amount of wire. Reducing the overall size would, at some point, reduce radiation to such an extent that the loop would have little practical use, except for local communication. This point could only be found by experiment.

Ideally, C1 could be replaced by a 100pF capacitor of at least 2kV working to accommodate a much higher power TX. You would need to substantially increasing the loop wire gauge, which will probably mean altering the number of wire turns in the helical windings.

The higher power version could be placed in an attic or loft, well clear of surrounding structures. It would also be necessary to design and fit an external tuning meter.

The ideas resulting from this project opens up the way to many further hours of experimental work for so minded amateurs. I would be interested in hearing about such successful experiments. And to that end my address is in the callbook.

Happy Looping!

PW

Shopping List

Capacitors
56pF 2 extra capacitors for the 1.8MHz band (I used two 3kV working capacitor but it could be single 100pF)

Variable
150pF 1 C1 (Jackson type E or similar - see text

Resistors
1kΩ 1 R1 1W carbon

Semiconductors
1N4148 1 D1 (or any other silicon signal diode)

Miscellaneous:
You will also need a 200μA meter, four lengths of 22mm PVC (water) tubing - plus 4 x 90° elbows plus three PVC standoff wall clips/brackets, a slow motion drive with pointer and 0 to 180° protractor for a tuning scale, copperclad undrilled board for panel and base chassis plate, 25mm standoff insulator, a plastic covered tool clip to fit meter body, and a 300 x 200 piece of 12mm plywood baseboard.
Islands have always fascinated me, although maybe not consciously in my youth. But some 38 years on, I took considerable pleasure in working GB400D, operating from Drake's island in Plymouth Sound to celebrate the 400th anniversary of Drake’s return from circumnavigating the Globe.

The QSO brought back memories. Rubbing sleep from one’s eyes at 0200 hours when the watch was changed, seeing the Australian manned Sunderland flying boats from Mount Batten, silhouetted by moonlight, taking off on patrol.

Even greater pleasure came later when I worked Charles VK4QM in Queensland. That was when I learnt he’d flown in those same Sunderlands when 1 worked Charles VK4QM off on patrol.

Island Connection

The connection between islands and radio didn’t really occur until my late wife Bobbie and I drove our camper van to Oban. And with the assistance of MacBrayne’s Shipping, played ‘Island Hop Scotch’ along the chain of islands forming the Outer Hebrides.

The first hop was to Barra, sailing in bright sunshine across a wind-chopped sea into what seemed a howling gale (Scottish seamen would have put it higher than a fresh breeze!). We landed safely, seemingly halfway to America so distant was the breeze!). We landed safely, seemingly halfway to America so distant was the breeze!).

Barra is small, the circumnavigating road being only 19km long. It has one town, Castlebay and one mountain, Heaval, 378m high with magnificent views from the summit.

My first contact was on May 29 1983 from a location above the golden sands of Traig Mhor, also used as landing ground for the daily flight from Glasgow (Yes, the runway is on the beach, when the tide is out!).

Using 7MHz, I worked Gordon G3LEQ, Charles G4PC, husband and wife Bob G3WWF & Rae G4JMT, Pete E17CC and Jim GM4RSU: (a mini pile-up which operating from Barra invariably provoked!).

Laser, I used 144MHz f.m. to work Barry GM6SAU on South Uist who, with others, provided frequent simplex contacts throughout the holiday. I also used a Kenwood TS-130S transceiver for h.f. with an Australian-made vertical Scalar (SC6M) antenna and a Trio TR-7800 for 144MHz f.m.

The Scalar is a five-band antenna. It’s fed at the bottom of a 1.35m metal rod, screw threaded at the top to take one of five top-loading coils (3.5 to 30MHz) with an adjustable tuning spike protruding from each.

My mobile antenna worked brilliantly when clamped to a metal roof-rack above the cab. Its one drawback was the narrow bandwidth on 3.5MHz, requiring tedious adjustment of the tuning spike to cover the full band.

That same day, I chanced on Paul WA4CCP in Florida, all worked from dry dock) in Miami and Ernie VK6NC in Perth came up on 14MHz, followed by Jim G3TFG/MM (then in dry dock) in Miami and Ernie WA4CCP in Florida, all worked from a small bay, only yards from the Atlantic. But it wasn’t all radio.

Glorious Barra

Barra has glorious sandy beaches, firm for walking and stretching forever. One adjoined a sandbank thick with basking seals, only separated from the shore by a strip of water, in which the seals pupped. (The seals were fascinated by our hound ‘Podger’!).

Other memories are of fields, carpeted bright yellow with primroses, whitewashed crofts, brilliant against a backdrop of mountain, moor and ocean. Then there were the taws, whiter than white, practising aerobatics under a blue heaven, matching the colour of the sea.

Eventually, we took the evening ferry to Loch Boisdale on South Uist, arriving at midnight and finding a site opposite Eriskay. This is famed for the haunting ‘Eriskay Love Lilt’, which I’d heard so often in Scottish Youth Hostels before the Second World War.

Amateur Activity

I worked a number of amateurs on Uist, including Colin GM4HINK, Basil GM6VRT/P, Barry GM6SAU, Jim GM4CFX and also Tony GM6UNJ on Benbecula which is further north. Tony and I had previously met when mobile and both
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we drove to North Uist and a lovely grassy headland above Scalpaig Bay. From Scalpaig Bay, on June 5, I had some of the best DX, meeting Frank DL8FL, (5/9 each way) who helped me contact Tom Christian VR6TC on Pitcairn Island. I'd worked Tom before operating mobile in one of the rarest of island-to-island contacts was an unexpected thrill. 'A bulldozer has just been landed by helicopter' he said, 'and a system for watching video recordings'. Civilisation was catching up!

On June 6, from Clachan Sands, I worked Werner HB9BX. And, next day, old friends Fred VK3ALG at Geelong and Peter VK2RZA at Lake Callay, before our third ferry hop from Loch Maddy to Tarbert, operating from a normally silent island on the IOTA (Islands on the Air) list. For those further afield, I used the Mull Repeater GB3HL, working Alan GM4PVW at Corupach and Alan GM4TRH on Skye, later using GB3IG near Stornoway. Most activity however, came from 14MHz for DX and 7MHz for the UK.

On June 1, at a lovely site on Loch Stilligany, I again worked Neil VK&NC, followed by Brian EABANZ on the Canary Islands. The next morning, from Ardvachar Point, I worked Jean P&GKY, followed by another 14MHz mini pile-up of G stations.

My popularity resulted from operating from a normally silent island on the IOTA list. But my enjoyment included a view of sunlit seas, broken only by the peaks of the St Kilda group, missed and magical, some 50 miles away.

The day ended on a high. Operating from above a small fishing station beside me, I worked Carlos PY2BPE from above a small fishing station on Benbecula, I worked Carlos PY2BPE in Brazil, as clearly as if he were beside me.

On June 3 I spoke to near neighbour Denis G3FYW who told me it was raining at home! Rain was widespread throughout England that morning as reported by the 3.5MHz Net I joined...while I sat in sunshine!

We'd been invited to call on Tony GM6UNJ and dropped by in the afternoon. It was good to meet, but we were hardly prepared for the sumptuous lobster tea his wife provided. Later, Tony and I added a long list of 3.5MHz contacts, using his Yaesu FRDX500 'separates' and 14MHz dipole.

**Uist Causeways**

Benbecula sits between North and South Uist, connected by causeways built during the Second World War. Its flatness lacks the attraction of most Hebridean Islands, so next morning...while I sat in sunshine! We watched, fascinated. Was this a daily event and if so, why? We never found out.

Maybe one day it'll provide the excuse for me to return!

**Weather Fine**

The weather continued fine. We walked by day and I talked on the radio in the early morning, occasionally at night, sometimes 144MHz mobile, but with frequent diversions when a wayward road invited exploration.

We spent a night on the Great Bernera, now linked to Lewis by a bridge. The site was empty, save for ourselves, and a man came to clean an already spotless 'loo'. It had the most stupendous view and, in such splendid isolation, one could sit with the door open. 'A fog with a view' and no peeping-Tom nearer than North America.

And the DX came flooding in. On June 6 I worked Larry VK3S during the Vatican, Lloyd VK3P至 at Niagara Falls on the 9th and had a 14MHz pile-up on the 10th, including some WAB (Worked All Britain) members, delighted with the NA award from which I operated.

On the 12th, using 28MHz, I worked SWAT, a missionary station over 2001m up in South West Kenya, followed by a scattering of 'State Siders'. In between, we marvelled at the standing stones of Callanish, inspected a 'But & Ben' (the traditional Highland home) and finally to Stornoway, parking on the Eye Peninsula whilst waiting for the Ullapool ferry early the next morning. I switched on the 144MHz rig. John GM3JU (John Ilm John) was booming in, as if only a field away. He was! And promptly asked us over. We had a fascinating evening before returning to the quayside, ready for the morning boat. Our Hebridean holiday was over and only happy memories now remain of the 'lone shielings and misty islands'!
Three Legged Winners

Ron Ham looks back at the early days of transistorised radios. Their introduction changed the lives of service engineers...including Ron who tackled overheated transistorised receivers and one that had taken a bath!

Fig. 1: An early GEC portable transistor receiver (chassis removed). It is shown together with one of the low consumption miniature glass-based valves which the transistor ousted in portable receivers.

Fig. 2: A wooden cased GEC transistorised 'table' set.

Fig. 3: An inside view of the GEC portable, note the large good quality loudspeaker, battery connector and 'top hat' transistors (see text).

Only A Fraction

Because the transistor only required a fraction of the power needed by a valve, a new range of battery construction batteries were soon in quantity production. These included the 6V PP1 and the 9V batteries PP3, PP6, PP7 and PP9.

At that time the PP9 was the most expensive at 3/9d (about 18p) and, like the PP1, was often sold in pairs to suit different sets. There were a few specials like the 4.5V AD28 and the double 4.5V PP11.

Prior to the advent of the transistor, our stocks of 'AA' cells were relatively small, mainly for pen torches. However, when the first electronic calculators and the multitude of imported pocket radios began fitting two or four of these types of batteries, sales rapidly increased.

Wooden Cased

In 1958/9, GEC produced a wooden cased set, model BC 501, as in Fig. 2, with push-button on/off and wave-change. The photograph in Fig. 3 shows the '501's six 'top-hat' profile transistors, large loudspeaker and the dedicated four-pin plug for the PP11 battery.

If you service one of these receivers, be very careful when removing the plastic volume and tuning control knobs because these can easily break if levered off incorrectly. I can remember that these were a tight fit when new and the tuning knob, right in Fig. 2, has two sections, an outer for hand control and an inner which carries the scale.

The Roberts R200, Fig. 4, also has a wooden case, two wavebands and a large speaker. The cradle and clip for the PP9 battery, the long ferrite rod antenna and the main chassis can be seen in Fig. 5.

The R200 uses Mullard OC44 and OC45 transistors in the front-end and OC81s in the audio output stage. The OC81D driver is just above the transformer, top right of Fig. 5, and the output pair are between the transformers.

Although care must be exercised at all times with all sets, the R200 chassis is relatively easy to remove. The knobs are secured to the spindles by inset screws, centre knob Fig. 4, and the chassis is held by two wooden wedges at the bottom corners of the cabinet, Fig. 5.

Later Herald

The later Dansette 'Herald' had two chasiss, Fig. 6. It also employs Mullard AF117 transistors in the front-end (left) and the OC81 arrangement in the audio amplifier (right).

The stud and socket connectors for the battery are just below the speaker. It's very important that the battery polarity is correct on all sets. For example the stud and socket on the 'PP' range are opposite to those on the set's battery leads.

Now if you find a set with the connectors missing, make doubly sure that the new ones are put on the right lead. Otherwise, the transistors may suffer when the set is switched on.
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Communication Receivers

Looking back, I remember that the first all-transistor communications receivers to appear were the Eddystone EC10 and the Heathkit Mohican. Zenith, another American firm soon followed theirvalvedrange ofTrans-Oceanicmulti-bandportables with a transistor version.

The Trans-Oceanic transistorised receiver used a turret tuner and a robust rod antenna. This retracted into the carrying handle when not in use.

Now, 40 years later, transistor sets, especially the early ones, are sought after by collectors. Happy hunting second-hand shops and dealer's trade-sale and service in the 1960s/70s portables that I remember seeing for sale and service in the 1960s/70s were Bush, Cossor, Dansette, Decca, Dynatron, Ecko, EverReady, G.E.C., Hacker, Perdio, Philips, Pye, Regentone, Roberts, Stella, Ultra and Vidor. These ranged in size from the personal sets in Fig. 7, to the 'beefy' portables built by Dynatron and Hacker.

Sets Collectable

Each of the sets, displayed in Fig. 7, are collectable because of their age or a special feature. For instance, the 'Signal-601', made in the USSR (left), has a wind-up watch-comet-alarm next to the tuning dial.

The Ecko (bottom of Fig. 7) tunes through the medium-wave band and then 'clicks' into a preset 'Light' programme (now BBC Radio 4) on the long wave. A transparent plastic carrier was made for the GEC and the 'SIGNAL' has its case fitted.

Service Points

Now let's look at some service points. And generally speaking transistor portables were reliable and we had very little trouble with components or semiconductors.

Our main service work was replacing control knobs, battery connectors, telescopic and ferrite rod antennas. We were also kept busy cleaning volume controls and wave-change switches and tracing and resoldering broken joints on printed circuit boards (p.c.b.s.)

Perdio Bath

I remember a Perdio 'Town & Country' that had been dropped in a bath. The hot water had terminated the life of a couple of AF117s and of course written off the batteries.

Other problems were the effect of soapy water on the volume control track, wave-change switch, tuning mechanism and speaker-cone. However, after a thorough dry out, a good lubrication of the moving parts and a couple of new transistors the set was working again.

I asked the delighted customer if I could see it again in a month. This I did and found corrosion building up under the output transistors' heat-sinks and under resistances and capacitors that were tight on the p.c.b. This meant more cleaning, but we won in the end!

Missing Driver

A few sets came in with a low 'hissing' noise which proved to be the OCB1D driver. One Roberts R200 had unstable whistles which we traced to an open circuit ferrite rod coil, bottom left in Fig. 5.

Each time the owner changed the battery the coil winding was rubbed which eventually caused the wire to break. After undoing a few turns, the break was found and the wire resoldered to the coil's terminal post.

Common Complaint

The day after one very hot Bank Holiday Monday we had several good quality portables in with a common complaint. "It's dead". Also our radio battery sales were well above normal.

By midday when we began looking at these particular sets some were working normally. However, a word with the owners revealed that their respective sets had been exposed to the hot sun on a picnic, on a windowsill and on the rear parcel shelf of a car.

I think that most of the battery sales were also due to the heat. This was because when people found their sets not working they automatically purchased new batteries. This got it going again because a good 'pulse' from a new battery switched on the transistors that the excessive heat had turned off.

Lightning Strike

One Philips set was standing unused in a kitchen during a thunder storm and a nearby lighting strike destroyed the front-end transistor. (This used to be quite a problem with car radio receivers with OC44 transistors, as I know to my cost! Editor)

"Thin" sets with large centre tuning knobs can be a problem when they fall forward on their face. I have known such a 'fall' to damage the tuning capacitor's shaft and vanes.

If there is plenty of 'mush' coming from the speaker but the station sensitivity seems poor, touch the ferrite rod coils. An increase in performance means that the position of the coil needs adjusting on the rod.

Move the coil carefully until there is good reception and then secure it with wax or tape in the correct position. Finally, if a set is generally weak, try a new detector diode. I've known this to work wonders.

Have fun repairing any older transistor radio you find. With a little care and attention they'll last you many years.

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It's my turn to look after the 'shop' this month and here I am again with a few items of Valve & Vintage memories. And I'm pleased to say I've received lots of letters from readers which has proved that a real interest in this era of radio sets does exist and it's nice to see this trend increasing.

All too often these days, the rig in use at the other end of the QSO is a nondescript, faceless plastic item, with a serial number as unique as a bag of pegs! As the last 'number' I remember was on a rig in the 1970s I usually have no idea what the rig is the nice gentleman is using when they quote them over the air to me!

Real Radio

A letter from Eddy Swynar VE3CUI, gave me the phrase "Real Radio Still Glows in The Dark". I think it's a lovely sentiment.

Eddy still uses the great AR88LF receiver, along with its predecessor the AR77. They're used in conjunction with an E F Johnson Ranger 1 transmitter. Nearly everyone will know of the AR88, but perhaps a little less well known is the AR77 receiver. I think you can see the family resemblance from the photograph in Fig. 1, the lines of the AR88 closely follow those of the AR77.

The AR77 was produced around 1940 to 1941 at an original price of $139.50 (probably about £35 at that time if my grandma is right). The 10 valved set covers 540kHz to 31MHz, has a crystal filter and bandspread coverage of the amateur bands.

The AR77 is slightly smaller than the AR88 but seems just as heavy! This weight problem is probably the main thing stopping a lot of us from having one of these sets in the shack. Let's face it, with modern building techniques, most bedroom floors wouldn't stand the weight.

The R1155 Receiver

Ken Hutley G0VDP, wrote to ask if there was any interest in the R1155 these days. Again, this is one of the old sets that many people know about.

Many of us, myself included, had the R1155 as their first 'communications' receiver. I had my first one in 1967, complete with p.s.u.

My 1155 took pride of place in my shack and was aptly named the 'BBC' (Ben's Broadcasting Company). This R1155 was in use for many years and gave sterling service.

Today there are still many 1155s in use. As a general receiving set they are quite good. The 14MHz band is a bit crowded but 7MHz is usable, as is 3.5MHz. If you have the L or N versions of the 1155 then you'll also be able to receive 1.8MHz.

In all there were some ten versions of the 1155 receiver, and 13 of the associated transmitter, the T1154. The differences being frequency coverage (as already briefly mentioned) and in the cases which were of steel or aluminium, and the odd radar suppression coils.

As far as modifications go, this is something that is inherently abhorrent to the serious collector. But in reality, the R1155 needs little to make it usable.

A power supply with an a.f. output stage is needed. The R1155, as it is, has no a.f. power output stage, just a low power stage designed to drive headphones.

Practical reminder: One note to remember here, is that the h.t. negative line on the 1155 does not go direct to the chassis, but has a resistor to the chassis to 'hold off' and produce negative biasing voltages (with respect to the chassis).

South Africa

Karl Langer ZRIAAP, wrote to me from South Africa and said how difficult it was to get parts, accessories and circuits for wartime sets out in Cape Town. He has a very nice collection.

With their collection of military callsign ZSIMUS. (I might add plan to enable visiting radio Second World War gear. They shack soon, equipped with of the September 1944 edition hint hint!).

In operating that station myself, that I would be most interested the SCR -300, a development of Particular mention is made of equipment in use at that time. The SCR -300, a development of the UK. Illustrated is the British talkie as such, later copied and the SCR -194, the first walkie-station at Anzio in Italy. Great part in the United State's commencing in spring of 1943. With large scale production model completed in early 1942, better on the crowded 3.5MHz transformers. As the 19 Set was 465kHz this meant a slight readjustment of the oscillator and the remaining i.f. transformers.

The 19's response is now far better on the crowded 3.5MHz band when I'm attempting to have an a.m. QSO. The 'splitter' from nearby s.s.b. stations is now greatly reduced.

With the replacement filter, see Fig. 3, the s.s.b. reception has of course greatly improved. But I'm still deciding whether to use the Vespa crystals for the b.f.o. circuit on the 19 Set. Stabilising Circuits

Further additions were aimed at stabilising the h.t. going to the local oscillator (i.e.) and b.f.o. circuits. Fortunately, there are easy ways to provide stabilisation.

Fortunately, Maplins advertise a range of 200V Zener diodes rated at 5W. And, in conjunction with a 10kΩ 'dropper' resistor (from the h.t. to the original b.f.o. h.t. resistor, the 200V Zener goes between the junction and ground. The l.o. needs about 7.5kΩ from the h.t. to the existing resistor. So, I suggest you use a 4.7kΩ and a 3.3kΩ in series, the zener again going from this new junction to ground. (This modification reduced the chirp on c.w., which was a result of the h.t. dropping when the p.a. stage starts up).

Following the modifications, I now have a 19 Set that can be easily used on 3.5MHz c.w. with quite good results. However, please bear in mind that I would (of course) never consider 'butcherering' a particularly fine specimen.

Finally, I carried out some finishing touches. I sprayed the case and front panel in what can only be called 'desert camouflage' (a dual sandy shade) something it never would have had, which does give it a surprisingly modern appearance, as in Fig. 4.

Bedford QLR Group

The photograph, Fig. 5, shows a group I met at the 1995 Bletchley Park rally. The Bedford QLR Group is an independent group of guys portraying a 1944 unit of the Royal Corps Of Signals as faithfully as possible.

Pictured (left to right) are Phil Webb G0KUE, Jeff Flanagan G7NMO, and Ted Butler G0JJQ in front of their preserved Royal Corps of Signals Bedford truck (see text).

Time To Close

Well, that's it for now. I can hear the fat lady singing, so it's time to close the shop. Don't forget that I would be pleased to hear from any readers on topics of military and amateur vintage equipment. Photographs are always welcome.

I can be contacted on packet via GB7BBS #28.GBR.EU or by post at 62 Cobden Street, Kidderminster, Worcestershire DY11 6RP. And remember "Real Radio Still Glows In The Dark!"

Fig. 2: The British 31 Set, a copy of the American SCR-300.

Fig. 3: New life for a 19 Set. Ben Nock fitted a new narrow filter (marked X on the photograph) when he modernised an otherwise "poor specimen" of the well known British Army transceiver (see text). This transceiver has a built-in power supply.

Fig. 4: Ben's modified 19 set, which he uses for 3.5MHz a.m. operations.

Fig. 5: Keen types! (Left to right) Phil Webb G0KUE, Jeff Flanagan G7NMO, and Ted Butler G0JJQ in front of their preserved Royal Corps of Signals Bedford truck (see text).

Cheerio from Ben, see you next time!
In any single sideband (s.s.b.) transmitter the unwanted sideband and carrier must be reduced in level as much as possible. However, it is never possible to remove them completely, the remaining levels of these unwanted signals need to be known.

In most radio equipment the unwanted signals are specified in terms of carrier and unwanted sideband suppression. (If the levels of the unwanted signals are too high then they can cause interference to people using adjacent channels as shown in Fig. 1).

A single sideband (s.s.b.) signal is derived from an ordinary amplitude modulated (a.m.) signal. The process is carried out by various stages in the transmitter the unwanted sideband is suppressed. To remove the unwanted sideband a crystal filter is used. This also serves to reduce the level of the carrier still further as shown in Fig. 3. Even if another method of generating the single sideband signal is used, then the level of the unwanted sideband and carrier are still of importance.

Once the basic s.s.b. signal has been generated it's mixed with a local oscillator (l.o.) to convert it to the right frequency. Then it's amplified to bring it up to the required level. There are two main reasons for using s.s.b. The first is that the carrier serves no useful purpose apart from transmitting a reference signal for demodulation. The 'reference' can be supplied equally well by the receiver, transmitting it (the 'carrier') just wastes transmitter power which could be better spent transmitting a signal which will convey the audio, i.e. the sideband.

As the 'reference' can be supplied equally well by the receiver, transmitting it (the 'carrier') just wastes transmitter power which could be better spent transmitting a signal which will convey the audio, i.e. the sideband. The second reason for using single sideband is that a.m. signal takes up twice the bandwidth of an s.s.b. signal. The second sideband gives no improvement, and without the carrier being transmitted it actually makes proper demodulation more difficult.

In fact the easiest way to demodulate a proper double sideband suppressed carrier (d.s.s.c) signal is to use the receiver filter to remove one of the sidebands and then demodulate it as ordinary s.s.b. As there is no advantage in transmitting the second sideband it can also be removed, leaving a signal which takes up less bandwidth.

If high levels of the carrier and unwanted sideband are transmitted they can overlap other transmissions and cause interference to other stations. In view of this it's necessary to ensure that levels of these unwanted components are kept to an absolute minimum. To measure the levels of the unwanted components a single audio tone can be applied to the transmitter and its level adjusted to give the full output. Using a spectrum analyser connected to the output through a suitable attenuator the levels of the carrier and unwanted sideband will easily be seen as shown in Fig. 4. The difference between the level of the wanted sideband and the carrier is the amount of suppression. And as it's a ratio it is expressed in decibels.

The specifications for most sets these days will quote figures of at least 35dB suppression. In other words, the unwanted carrier or sideband will be at least 35dB below the wanted sideband. However, in practice most sets will achieve much higher levels of suppression, often reaching 50dB or more.

Before making any measurements of this parameter it's worth bearing in mind that some single sideband transmitters cannot withstand a continuous tone at full power for long. This is particularly true of some of the older sets which used line output valves. Therefore this measurement usually has to be undertaken quickly, or the operator's manual consulted to see how long full power can be applied in this way.

That's all for now, next month I'll be taking a look at speech processing. If you have any queries please write to me c/o the Editorial Offices.

Fig. 1: Unwanted sideband and carrier can cause interference to other stations.

Fig. 3: Action of filter in removing the unwanted sideband and reducing carrier level.

Fig. 4: Measurement of unwanted carrier and sideband levels.

END
L ast month I took a look at tropospheric enhancements and how they effect propagation on all bands from v.h.f. through to s.h.f. However, there’s one detail I forgot to mention related to the chart shown last month, of UK records made via tropospheric propagation.

If you look carefully you’ll see that every distance record was related to the chart, shown last v.h.f. through to s.h.f. However, Wales, the best propagation paths were made in June/July or September/October. That’s well worth noting if you fancy a spot of DXing from a local hill-top this year!

Tropo conditions during the summer months of 1995 were actually very good, possibly due to the elevated temperatures that we all experienced throughout the UK. Because of this there was much DX to be found via this propagation mode during the period June through to early November.

Best Propagation

For stations located in England and Wales, the best propagation paths during June (and the latter part of May) were towards Scandinavia, northern Scotland and islands situated further north. There were also brief openings on various days in the month to stations in EA, HB, I and SP.

Among the callsigns noted on the 144MHz band were EA1MV and EA1YX in IN47, HB9DFP and HB9RDE in JN07, IK2EAD located in JN48. There were also the Polish stations SP8AFT and SP1ELO in J073.

The period between June 23-29 was particularly good with many stations working into LA, OZ and SM on both the 144 and 430MHz bands. Some operators, favourably located in J001 and J002, managed to work the Faroese stations 0Y6FRA and OY5LD on the 144MHz band.

John Quarmby G3XDY (J002) even heard the OY6UHF beacon on the 430MHz band. Propagation also favoured the microwave bands, especially on June 28, when a small number of enthusiasts made contacts deep into Germany on the 2.3 and 5.7GHz bands.

Way up on the 10GHz band Sam Jewell G4DDK (J002) did well. He made an excellent 300km s.s.b. contact with SM6ESS (J067).

Good July

The good tropo conditions to LA, OZ and SM also continued throughout the first week of July. A bonus during this period was the build-up of propagation deep into Europe allowing contacts also to be made with stations in OE, OK and SP on all bands.

Additionally, the v.h.f. field day contest (covering 70MHz to 1.35GHz) coincided with the excellent propagation. This brought with it a chance of propagation, which is workable DX.

One interesting station heard on the 144MHz band was OE9BGWM (JN47). He was being worked by a number of stations in south-east England.

Dave Stones G6QXP (I093) made many contacts during this period with stations in OK and SP on the 144MHz, 430MHz and 1.3GHz bands. These included OK1KIR (J070) and SP6LB/BM (L070) on the 430MHz band and OK1DFC/P (L060) on the 1.3GHz band.

Propagation was excellent during the latter weeks of July. All bands were open to LA, OZ, SM, HB9, OE, OK and SP yet again. A number of SM stations were contacted from the UK on the 1.3GHz band. They included SM7ESTU/S (J078), SM7ECM (J065) and SM7SCJ (J065) and Keith Hewitt G0DER (I093) worked SM6HYG (J056) on the 5.7GHz band.

Openings on the 144MHz band also occurred to Spain, mainly to the north coast region. However, on July 28, around 2200UTC, propagation extended unusually to the IN48 region allowing contacts to be made with EAS0JSJMY, EAS0DL3MGL and EAS0UK/S.

Earlier in the evening, at 1800UTC, the extremely long path to the Canary Islands off the coast of Africa opened up. The station of GW0PZT (I073) reported hearing EB8BTV (L18) on 144.280MHz s.s.b. peaking around 52.

The path length between GW0PZT and EBB8TV is an amazing 2855km! This path, more often than not, exists at some time every year during the period June-August.

The DX pathway generally favours stations on the western side of the UK, from Cornwall up into OW, EI, GI, GD and southern Scotland. Signals are present for an hour or more but are generally very weak, peaking S1-2, with lots of fading.

Into August

Moving on now into the month of August and propagation still remained excellent in most directions. In fact, according to the DX Cluster there was not a single day between August 1-26 when DX over 900km was not reported on the 144MHz band.

Although the best paths were towards Scandinavia, openings also occurred to the east and south of the UK. One particularly good contact on the 144MHz band was between G4CLA (I092) and OHI OF (KPO0) at 0730UTC on August 19.

A few days earlier, on August 15, the station of Andy Cooke G4PIQ (J001) reported hearing 12FWH. Even more unusual was a report from John Regnault G4SWX (J092) who heard the Croatian station 9A2AE (JN86) at 0550UTC on August 6.

The Croatian station was only peaking 41 but was quite audible. Around this time the band was open to Austria with 0E/PA2D/8X, OEE1U/D, OEE50/D, OEE50/K and OEE50/L being worked from eastern UK.

Openings to Spain were also noted during the month, possibly the best occurring on August 12. In Scotland, David Anderson G6MJJ (I066) heard the EA1YHF beacon peaking S3B over a path in excess of 1500km.

The tropo-super path to EA8 also opened up again with Andy Stafford G6VPVM (I086) very nearly working EB8BTV over a 2700km path.

Never mind Andy, there's always next time! Other UK stations reported working EA2ARD/MM (IN93) and ED4CXM (IN81) during the same period.

Club Station Active

The club station 7EAG was also active on the 144MHz band during August, primarily for meteor scatter. But it was also heard and worked in the UK on a number of occasions via tropo.

Another unusual prefix - S7GM was also worked from the UK later in the month. If you don't know where S7 or TSJ are located I suggest you read my previous article about callsigns featured in the December issue!

It appears there was even better DX to be found on the 430MHz band.
During the evening of August 21 the station of G4URF (J001) heard LY2BH (K005), LY2WR (K024) and UX2FL (K034). Why didn’t you hear them? Because they were on c.w. That’s why!

The specialist microwave operators were also having fun during the month. At the QTH of GB9ER, contacts were made with LA8BDT/P (J003) on 2.36GHz, OZ2OE (J045) on 3.4GHz and OZ1IPU on the 5.7GHz band.

During the evening of August 11 G4YDK was busy operating on the 10GHz band. He worked LAR8J (J028), OZ1D0Q (J085) and OZ2OE.

September

Compared to the previous three months, propagation during September was not particularly exceptional. Nevertheless the bands were still open on a few occasions to LA, OZ, SM, DL and HB.

The IARU Region 1 144MHz contest was held at the beginning of the month. It provided an excellent opportunity to work many of those multi-Yagi contest stations that ordinarily would not be available.

October Finest

A two week period during October saw possibly some of the finest tropo DX worked this year. Propagation was excellent and extended well up into the microwave region.

During the period October 8-15 many operators reported contacts with stations in OE, OK and OM on the 144, 430MHz as well as the 1.3GHz band. On some days during this period the best propagation was to the north-east allowing contacts to be made into LA, OZ and SM.

Later in the month, between October 18-20, the best paths were to the south and south-east of the UK. Contacts on the v.h.f. and higher frequency bands could then be made with stations located in EA, F, HB and I.

With such quantities of DX being worked on the 144MHz band I have had to leave out the run-of-the-mill contacts with stations in OK and SP (1) and only highlight a few of the real DX contacts. Some of the more interesting stations included IK1LGV/P, I2FAK, OE3NHW, OE3VHU3, OMSLQ, OMS7S and 9A2AE.

Matt Ceban GW1WPF (J091) is fairly active on the 430MHz band but mentions that owing to planning restrictions he is unable to erect fixed antennas. To get round this he operates from his car parked outside the flat with power provided via a mains extension lead.

Matt uses a 5m portable mast which sticks through the car sun roof. Onto this is attached an antenna for the band in use at the time.

Despite the obvious limitations, Matt reports a large amount of DX worked during the lifts in October. In the contest, on October 7-8, he ran 20W into a pair of 19-element F9FT Yagis.

A total of 69 QSOs were made, many of which were in central Germany. His best contacts were with OE5DCL (JN78) and OZ2KXX (J065). Later in the week, October 12-13, with conditions still extremely good he worked much DX including seven stations in the Czech Republic and OPE3FS/3 (JN78).

At the QTH of G4UF the station of IK2NHL and beacons 12B and 12U. They were all in locator JN45 and were heard on October 19.

The 1.3GHz band was also in fine fettle with John G3KDY making numerous s.s.b. QSOs including HG5AYMP (JN137), HG7B/P, HG5FMV, OESVRU5 (JN78), OZK2J/P and SP4MLK/P (J080).

Record Broken

Interestingly, the 10GHz record (shown in the distance chart last month) made in October 1994 between G4BCH/P and S85BYG was broken yet again. It occurred during the October 1995 IARU s.h.f. contest when the contest group G6VHF (J001) contacted OE4/DMIA/1 (JN87).

The new record increased the UK 10GHz achievement to a distance of 1185km. If the record will be broken again this year? (The 3000km path between GW-F8A is definitely possible if only there was the activity!).

Incidentally, the station of G6VHF worked three OE stations around 1000km and some OK stations over 800 kilometres. And indeed, a contact with OK1OKL on October 8 may have been a ‘first’ on the band.

According to the RSGB Microwave Newsletter, Mark Turner GP4PS was also active during the IARU contest in October. He was one of the operators at the station G4LUPP operating from the Kent coast in locator J001.

Conditions were excellent. There was a high pressure weather system to the south-east and a deep inversion layer clearly visible throughout 360°. Enhanced propagation was observed from 1600UTC on October 7, peaking around 0700UTC on October 8. On the 1.3GHz band G4LUPP/P worked many stations in F, ON, PA, DL, HB9, OE and OK.

Some stations in Hungary were also contacted, including HG5B/P, HG9FM and HASBDJ/7. The latter was at a distance of 1321km.

The excellent propagation also extended to the 10GHz band. The equipment at G4LUPP/P consisted of a G3WDE design transverter, a 7W travelling wave tube (t.w.t.) amplifier and a low noise amplifier using a high electron mobility transistor (h.e.m.t.) device.

All the equipment was mounted at the antenna, a 60cm diameter prime focus dish, to eliminate feeder losses. A total of fourteen DL, HB and OE stations were worked on the 10GHz band, distances ranging from 400-900km. Their best DX was OESVRU5 (JN78) at 973km.

Incidentally, if you’re interested in any aspect of microwave building or operation I would thoroughly recommend that you take out a subscription for The Microwave Newsletter. It’s obtainable from the RSGB, their credit card hotline is (01707) 500998.

November

The first two weeks of November saw a continuance of the excellent tropo conditions. There was a good opening to Spain on November 5-6 with the duct extending into northern England and Scotland.

At the QTH of G4MJJ the stations of EA1BL and EA1DKV were copied very well with EA1BL peaking 57. The EA1VHF beacon (1144.870MHz) was also heard at this time. The station of EA1DKV (INS3) was also heard by David on the 430MHz band for over an hour over the 1500km path.

Paul Tomlinson G7LHI (IO81) reports that he heard the EA6VHF beacon on Ibiza (JM106), peaking 529 during the afternoon of November 5. It faded out after a few hours but returned later in the evening but at much reduced strength. (At 1473km this is not as long as the G4MJJ-EA1DKV contact but even so is still a very interesting reception). Paul mentions that at the time the EA1VHF beacon was 30dB above S9 with him with very little fading.

Paul uses an FTZ25RD with a uTek front-end. This is used in conjunction with a Microwave Modules preamplifier and a 13-element Yagi fed with 10m of RG213 feeder.

Active In Germany

Reg Woolley GW6VHI, previously an operator at the RAF club station G8RAF, is now active in Germany (J031) using his German call sign DA1RG. He will be particularly active on the 144, 430MHz and 1.3GHz bands and expects to be QRV during the contest in March.

Kees v.h.f. operator Reg also mentions that he is often active from the club station DL0CG on Tuesday evenings from 1800UTC. Reg can normally be found on 144.285MHz running a 4CX250B power amplifier and four 9-element Yagis. He reports that it is easy to work into southern G and GW under flat band conditions.

Deadline Time

Deadline time again! And as usual please send any news (to reach me by the end of the month) to: Yew Tree Cottage, Lower Maescoed, Herefordshire HR2 6HP.

You can also contact me via packet radio at GB7QMD, the DX Cluster at GB7XDC or E-mail via davebu@mdlhrr.igw.bt.co.uk. Alternatively you can telephone me on (01873) 860673.

P.S. According to ITU allocations, stations in the block SAA-SMZ and 78A-78Z are located in Sweden and that’s where S7GM and 7S6A were located! See you next month.
Mike Richards G4WNC has news of a personal navigator programme, advice on increasing your hard disk space and starts off with an ideal winter project for your club.

A recent lecture visit to the Bournemouth Radio Club (BRC) reminded me of a fine technique for introducing amateurs to new areas within the hobby. In this particular case they had been systematically working through the digital modes.

One of the great advantages of using BRC’s approach is that the members can work together to support each other and learn more quickly. This technique is particularly suitable for the data modes as, other than Packet, most other modes tend to be few and far between.

To get things moving you can also set up a local Net for the mode in question. In this way those that are unsure of the operating practice and procedures can follow the example set by the others. I generally find that once the ice is broken amateurs quickly gain confidence to work the world using their new found skills.

The Bournemouth Club, having introduced people to packet, their recent efforts have been centred on SSTV using simple computer based systems. Using the popular JVFAX software. Why not try the technique that the Bournemouth Club use at your club? It would make an ideal winter project as you could start by building your own interface.

You could even extend the idea by linking up with other local clubs and even running a local contest. If you would like to publicise your efforts just write or E-mail to the addresses in the column.

Personal Navigator

I tried what is perhaps the ultimate in personal navigation systems. This new system produced by Softwair Ltd. of London combines the positional technology of the NavSat GPS system with PC based digital maps. The result is a system that can show you position on a map to an accuracy of 25m!

You will no doubt have realised the value of the “You are here” maps often found in town centres. Imagine having that at your disposal anywhere in the country. But in addition to just letting you know where you are, the system reports height, speed and progress along a preset journey. Future versions of the software will include full route planning facilities as well.

At around £1000 plus a PC the NavSat system is currently only likely to find its way into the executive and professional markets - and sectors on the drive and what the computer’s BIOS wants to see. It’s a problem with this translation process that limits the size of hard disk to just 504MB.

Even if you add a larger drive, the BIOS will only be able to access 504MB. To overcome this you need to add some new code to the BIOS. Fortunately this is quite easy and can be done in one of three ways. The most drastic solution is to replace the BIOS ROM on your motherboard. However, this is not normally very practical as the BIOS is specific to the chip set used on your board and it’s unlikely a suitable upgrade will be available.

The next best option is to use a replacement disk controller board with an updated hard disk BIOS built-in. This new hard disk BIOS takes advantage of the facility to shadow the original drive. This can save all the system -COMPUTING IN RADIO

High Speed Radio Modem

Matthew Phillips of GMSK Data Products has written with details of their latest packet radio modem kit. The VFast 28.8 modem has been developed specifically for use with radio links and uses the GMSK modulation method that has proved so successful with the digital Cellphone network.

In order to maintain compatibility with existing TNCs, the VFast 28.8 employs the standard 20-way header to connect to the TNC. The data rates supported by the modem range from 3200 to 38400 bps.

However, achievement of the higher data rates demands both an excellent radio link and specially modified transceivers. As an example, to operate at a 13.2k bps data rate, your transceiver will require a channel bandwidth of 50kHz and a flat phase and frequency response down to 20Hz.

You’ll be pleased to hear that the VFast 28.8 will work successfully with transceivers modified to operate with the G3RUH modem standard. For a very high speed specialist modem the VFast 28.8 is very well priced at just £39 for the kit and £80 ready built.

For more details contact GMSK Data Products, 80 Colne Road, Halstead, Essex CO9 2HP. E-mail: matt@nuthatch.dungeon.com If you have Internet access, full technical data on the modem is available from http://www.dungeon.com/~nuthatch/vfast28.html

Microcontroller

If you’re into fairly advanced home construction you may well be interested in a new publication from
"The overall package is a must for anyone thinking of making use of a microcontroller".

G4WNC

Polar Electronics called A Beginners Guide To The Microchip PIC. This provides a complete beginner's introduction to the Microchip PIC microcontroller. The microcontroller has great potential in all manner of projects as all the main elements for programmable control are contained in the one chip. With clock rate support up to 20MHz the microcontrollers have immense potential.

As a topical example, the VFast 28.8 modem mentioned elsewhere in this column sports a PIC device. Getting back to the PIC guide. This is this column sports a PIC device. To support the book, a 3.5in disk (IBM PC format) was included with ready prepared examples. The disk also contained a selection of useful tools such as an editor, assembler and simulator.

The overall package is a must for anyone thinking of making use of a microcontroller. The book is available for £19.95 from a number of electronic catalogue outlets, namely: Farnell, Maplin, RS or Rapid. My label (don't forget I provide the disk!). If sending a cheque please make it payable to M. Richards.

For the printed literature just send a self addressed sticky label plus 50p per item (£1.50 for four; £2.50 for 7 and £3.00 for 9). For software send £1.00 per disk (£1.75 for 2, £2.50 for 3 or £3.00 for all 4) and a self addressed sticky label (don't forget I provide the disk!). If sending a cheque please make it payable to M. Richards.

Special Offers

Here's the full list of reader's offers with all the latest software. Please leave up to two weeks for delivery.

IBM PC Software (1.44Mb disks):

Disk 1 (Order Code DK1) - JVFAX 7.0, HAMCOMM 3.0 and WEFAX 3.0
Disk 2 (Order Code DK2) - DSP Starter plus Texas device selection software.
Disk 3 (Order Code DK3) - UltraPak 2.1 and NuMorse
Disk 4 (Order Code DK4) - 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 JVFAX and HAMCOMM Primer (Order Code FP4)
FactPack 5 On the Air with JVFAX 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 7 and £3.00 for 9). For software send £1.00 per disk (£1.75 for 2, £2.50 for 3 or £3.00 for all 4) and a self addressed sticky label (don't forget I provide the disk!). If sending a cheque please make it payable to M. Richards.

Thanks go to Polar for supplying the review copy.

Interference Problems

Simon Gilpin has this month provided some useful commentary on a number of computer/radio interference problems. To provide a degree of isolation between the transceiver and the computer interface he has fitted a Maplin 600R 1:1 isolating transformer at the audio end of the interface lead. This provided a significant reduction in general computer hash.

Simon also tried earthing the case of the transformer, but whilst this gave a further improvement at around 14MHz, the noise was worse at 35MHz. Simon reported the same phenomena when using ferrite rings mounted on interconnecting cables. (This may simply be a question of trying to get more turns around the ring). Overall Simon rates the isolation transformer as the single most effective cure.

The next stage is to experiment with an optical interface between the computer and transceiver. Hopefully this will bring the noise down to the levels experienced when the interface lead is unplugged. If you have succeeded in reducing your interference problems, please write and let me know the details so I can pass on your success.

Switch Box

The plea from Dave Dyngley that appeared in December's 'Bits & Bytes' has raised a number of letters from readers. Firstly Alex Gorden LA6GV/G4TTB reports having tried a number of options over the years and advises that an important factor to consider is the ability to hear the incoming signal. Ideally this means the data signal needs to be taken from a line output point. A line output provides a relatively stable signal level that's independent of the volume control setting. With many rigs this is now available via the multi-pin microphone socket.

In fact, Ray Pamell GT7KS has sent in a diagram for a switch box that links to the microphone socket of a Yaesu FT-211 transceiver. If I can find space next month, I'll include the diagram. An alternative is to go for the ready-built switch box produced by MFJ.

Stop Press - UltraPak 4.0

Just as I completed this month's column I heard that Tim Kearsley has released version 4.0 of the UltraPak powerful Windows based TNC control package. I will be shipping the new version with all orders for my special offers disk 3. More information will follow next month.

That's all from the 'computing in radio' world this month, so until next month 'happy computing' and keep those letters coming to me Mike Richards G4WNC, 'Bits & Bytes', PO Box 1863, Ringwood, Hants BH24 3ZD. CompuServe AH24 3ZD, Compuserve 100411,3444; Internet mike.richards@baccn.org.uk
Leighton Smart GWOLBI provides the latest up-date on the hf. bands in his first column of 1996, which you've helped him to prepare!

Carl Mason GW0VSW has recently lost the shack shown in the photograph due to the arrival of a baby on November 25. It’s now a nursery and Carl now operates from the living room while baby Alastair Lewis Mason enjoys the privacy of the shack!

Better this month. Gordon’s s.s.b. loggings include Canadian special event station VX1XY (celebrating 50 years of the UN) working Paul GV0RL at around 1736, W2YJ (USA) working Jeff G4KKVJ at 2005, G5SUX (Venezuela) in contact with Fred GW0BXX in Cardiff and Dave G4AUL in Liverpool at around 1900, and ZDBZ (Ascension Island) working G46CC and TX2B6K (Germany) at 1800 UTC.

Back to the valleys of south-east Wales now, and to the report from Steve Locke GW0SSL. This intrepid reporter writes from his hospital bed after taking his station logbook to report indicating low power contacts with FS5PL (French St. Martin), YV00IS (Indonesia), 5Z0ID (Pakistan), V58BG (Brunei), and XU6WV (Malaysia) at around 1400 UTC.

The 28MHz Band

The 28MHz band reports round up this month. Firstly there’s a report from Graham Rogers VK8RO in Ferndale, Western Australia, who is a specialist in 24 & 28 MHz DXing.

Graham reports some excellent 28MHz f.m. contacts with BV2NT (Taiwan) at 0921, HK0WV (Italy) at 0729, ZS1JX (South Africa) QSL via WA3HUP, 3V8BB (Tunisia) at 1005, DJ2KX (Germany) at 1005, and ZS6ZD (Thailand) at 1014 from his huge log.

Finally, there’s Don G3DNN who says he hooked up with HS6B (Mayotte Island) at 1246, 7S0A (South Africa) QSL via WA3HUP, 7Z2R (Zambia) at 2.41, and A47RS (Sultanate of Oman) at 2145. Both signing reports indicating that ‘Ten’ is rising from the dead at last!

Signing Off

Well, that’s time to be signing off. Once again, my grateful thanks to our reporters for the vast amount of input received. I’m afraid that due to space limitations I have to be very selective, but always try to feature everyone in the column.

As usual, reports by the 15th of each month to: Leighton Smart GWOLBI, 33 Nant Gwyn, Trelewis, Mid-Glamorgan, Wales CF46 6DB. Tel: (01443) 411459.
The New Year has brought with it some new radio sets. Three models from Grundig have recently arrived on my desk, and I will be looking at them in turn over the next couple of months.

To tempt you now, there is a pocket-size digitally-tuned travel radio from Grundig, the Yacht Boy 320. It has medium wave and f.m., with (stereo through) headphones, and two short wave bands offering between them continuous coverage from 2.30 to 7.40MHz, and from 9.40 to 26.10MHz. The 320 has an easy-to-read liquid crystal digital display that shows clock time when the radio is switched off, and the frequency in Megahertz when the radio is on. This can be illuminated by holding a button on the well laid out keypad. Five memories are available on each of the 320’s four wave bands, and there is an alarm for automatic switch-on with the option of a buzzer instead of radio sound as your wake-up call. Tuning is manual using two buttons either to increase or decrease the frequency. The various meter bands on short wave can be selected in succession by tapping a single button alongside the tuning keys. The radio is powered by three AA-size cells, or by means of an optional 4.5V adapter. A carrying case is also supplied with the Yacht Boy 320.

The YB 320 is adequate in terms of sensitivity and selectivity for travellers who want to keep abreast of news from the world’s major international stations. Its paperback book size means that it is easily accommodated in most people’s luggage. The cost here in Britain will be around the £80 mark and the radio will be available sometime in early spring.

**Broadcast Band Developments**

Now on to developments around the broadcast bands. In November, the US government all but stopped work as a result of the failure of Congress and the President to agree on the Federal budget. A significant proportion of government employees were sent home - or ‘furloughed’, as the Americans describe the process - and that included America’s international broadcasting operations.

The Voice of America (VoA) remained on the air, although 20% or staff directly connected with broadcasting had been suspended, and well over 80% of administrative staff had been told not to attend their workplace. According to an interview with VoA Director, Geoffrey Cowan, on Radio Netherlands’ Media Network programme, there is less antagonism towards US foreign broadcasting than there had been in the early part of 1995 when it looked as though VoA could be drastically cut.

However, VoA’s Munich-based medium wave transmitter on 1197kHz has been silent between 0700 and 1200UTC. Until November 1995, it carried VoA Europe during the day, and a mixture of English and European languages at night.

Now VoA Europe has disappeared completely from the 1197kHz channel, and it transmits VoA English between 0530-0700, 1200-1500, 1500-2000 and 0000-0430UTC, with Czech, Slovak and Polish at other times. Meanwhile, VoA has changed the time - or at least its description of time!

The Voice of America is now, according to Communications World, announcing the hours as ‘Universal Time’ as opposed to UTC, or GMT which it says went out of existence with an international treaty that came into existence in 1979. What do you think about this?

Should this column use UTC or Universal Time instead of GMT? And what should other international broadcasters do? Drop me a line via the PW Editorial Office in Broadstone with your views.

**Schedules**

Let’s look at schedules now. Austrian Radio is on the air in English to Europe at 0530-0600, 0830-0900, 1030-1100 on 13.73, 6.155, 5.945 and 2230-2300 on 9.87, 6.155, 5.945MHz.

Greek language broadcasts to expatriate Cypriots in the UK from the Cyprus Broadcasting Corporation are transmitted from the BBC’s East Mediterranean relay station on Friday, Saturday and Sunday at 2215 for 30 minutes on 9.675, 7.125 and 6.189MHz.

Deutsche Welle in English is on the air at 2000 daily on 5.96 and 7.285MHz.

The Italian Radio Relay Service in Milan is on the air at 0630-0830, 1530-2100 on 3.985, 0830-1530 on 7.125 and 2100-2200 on Friday, Saturday and Sunday on 3.95MHz. They also have a site on the Internet: http://www.nexus.org/

There are two radio services from Moldova, the former Soviet republic, compete for the attention of short wave listeners world-wide.

The state broadcaster, Radio Moldova International, transmits on weekdays only on the frequency of 7.50MHz, beamed to Europe in English in Europe at 2000 and 2300 daily.

The Voice of America (VoA) Europe during the day, and a mixture of English and European languages at night.

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**Terrible Noises**

Some readers may be able to cast their minds back ten years ago when if you switched on a short wave radio set here in Europe, you’d be bombarded with terrible noises across almost every band. This was jamming by the Soviet Union of the US stations Radio Free Europe (RFE) and Radio Liberty.

Time has marched on, and RFE now has its headquarters in one of the countries it used to broadcast to - and which jammed it. And at the end of October, the Spanish transmitter site of Radios Liberty and Free Europe ceased operations after 36 years of work.

Six 250kW short wave transmitters were installed at Playa de Pals, beaming in to Eastern Europe and the former Soviet Union. This site was chosen, along with another in Portugal, as it was just the right distance from the target area to allow ‘first hop’ reception. (The strongest short wave signals are always those which are heard on the first hop or bounce - each subsequent hop renders the signal less strong).

**A Reminder**

A reminder that Danmarks Radio is to reintroduce English language transmissions from January 7. I’ll mail the first reader who sends me a QSL card from Copenhagen for the country’s new English programmes, a small gift from the world of international radio, and he or she will see their name in print. So, keep your radios switched on and your ears open!

**Around The World**

If you want to find out what other English language services there are from around the world, a new guide has just been released by an organisation called the Association for International Broadcasting (AIB). The Guide to World Radio in English costs £5.45 and lists, country-by-country, all the English language transmissions from international radio stations. For more information write to AIB, PO Box 990, London SE3 9XL.

That’s all for this month. Please write to me if you make any interesting discoveries on the broadcast bands that you think other readers would like to know about. Until next time, good listening and 73s.
This month we welcome Graham Hankins G8EMX who is joining regular author Andy Emmerson G8PTH in presenting our bi-monthly ATV column. Graham, who is the British Amateur Television Club's Publicity Officer, starts off with a brief overview of ATV techniques and provides a fascinating news round-up.

I'm pleased to work in partnership with Andy in writing for PW because television is a considerable technical achievement and an enjoyable aspect of amateur radio. Somewhere in the vision chain there will be signal circuits from d.c. to low r.f., analogue and digital processing, switching, high voltage, carrier frequencies at u.h.f. or above. Think switching, high voltage, carrier analogue and digital processing, signal circuits from d.c. to low r.f., in the vision chain there will be achievement and an enjoyable transmission. Think of anything you have known in electronic studies - television uses it somewhere!

Everything I've mentioned makes television a fascinating mode to the keen radio amateur. Fast-Scan TV (FSTV) uses the same system as broadcast - 525 lines, 50 fields per second in the United Kingdom.

For some enthusiasts (like me!), creating watchable pictures and transmitting them to another radio amateur, then receiving their noise-free vision in colour is the ultimate aim. The result is not just a voice, the other station is sending their video tape of that last rally, or showing what their new kit of home-brew kit really looks like. Each of you is producer, director, editor, vision controller, engineer and performer!

Other radio amateurs use fast-scan to investigate propagation phenomena. This is the exchanging of recognizable, even if sometimes weak and noisy, pictures with distant stations (DX) and the further away the better, particularly on 10GHz!

Weak and noisy, pictures with distant strength pictures (locked and resolvable but noisy) at Palmerston North, 27km away. Input will be in the NZ 430MHz amateur band with v.c.r. and, of course, P5!

Slow Scan TV

Slow Scan TV is very different. A still image will be scanned (slowly - several seconds!), or generated in a computer, then encoded to audio frequencies which modulate an h.f. transmitter.

Any news of slow-scan activity will be welcome. If you are a radio amateur who has not tried vision yet but keen to start, or an established ATV enthusiast, membership of the British Amateur Television Club (BATC) is highly recommended.

The BATC produces a quarterly magazine CD- TV, supplies some components, p.c.b.s and books. They are also planning a video for this year.

Your ATV Questions Answered

A new feature for 'Focal Point' will be a section called 'Your ATV Questions Answered'. Post or (preferably) Packet Radio your enquiry to me, I will reply to you directly and your question, with answer, will be in the next available column.

Repeater News

The ATV repeater GB3HV, in High Wycombe, is operated by the Home Counties Television Group. Their Autumn newsletter Line Out has two intriguing pages listing faults, adjustments and modifications that have occurred in or have been made to the repeater during 1995. The power unit, for instance, has suffered from no less than three lightning strikes!

Mike Sanders G8LXS, Technical Officer for GB3HV, has redesigned the switching logic for the receive antennas. The computer now quickly steps round them, looking for line synchronising pulses and measuring inter-field noise. The results are compared and the best antenna used. John Stockley G8MNY reports that this has given a 6dB gain advantage over an unswitched system.

I've received a nice long Packet report from Brian Davies GW4KAZ, chairman of the Arfon Repeater Group administering GB3TM in Anglesey, Brian writes: "GB3TM has been on-air for over 12 months without many problems and has handled contacts from G, GW and EI - yes, even some of the fades in Dublin have come through under good conditions. Activity on 1250MHz has certainly increased since GB3TM came on, as 24cm does not go through 1000 metres of rock easily! There are over a dozen regular users, including John Lawrence GW3JGA, who helped put TM on air and is a regular contributor to the British Amateur Television Club's magazine CD-TV."

Another GB3TM regular, John Crook GW3MEO, writes: "On Saturday September 2, I worked Denis Jones G3OVF (Wirral) via GB3TM, who was able to relay five pictures from a 10GHz link to and from G3SMU (Bolton), who in turn was receiving a 10GHz signal from special event station BB2GM on the Liverpool light-house. The pictures of the cruise liner Queen Mary II leaving Liverpool were excellent. Great fun and a first-rate historic event to watch, thanks to GB3TM".

In the Midlands, Arthur Bunting G5SKS (Oldbury) is a stalwart, active on 1250MHz, 430MHz and slow-scan. Arthur receives the Stoke repeater GB3UD at about P4 and GB3GV (Leicester) weaker at P2.

In November 1995 Arthur became an Honorary Member of the R5GB with more than 60 years membership. Congratulations! If anyone wants a contact or a test, they can ring Arthur on 0121-592 4656 but not before 11am please.

A bit further south now I had a 'phone call from Tony Reynolds G8CEQ (Ashwater). Tony wants to put an ATV repeater into North Devon, so watch out for any developments on this! He is presently active on 430MHz with 2W on transmit and QTHR if you want to support a repeater project.

Much further south now, to New Zealand and for an update on the Manawatu project mentioned in the June 1995 'Focal Point'.

Michael Sheffield ZL1ABS sent an early Christmas card and says: "While on holiday in Palmerston North, Wayne ZL1UJK and I attended the Manawatu Technology Group to put their 615.25MHz (NZ Channel 39 50cm amateur band) ATV transmitter on air for testing. It is running about 2W using a BLV93 in Class A linear mode into a log-periodic 14-element yagi."

"The test card is an 'ATV Compendium' design (BATC) with 16 teletext pages. The transmitter is in Feilding and furthest reports are P2 strength pictures locked and resolvable but noisy! at Palmerston North, 27km away. Input will be in the NZ 430MHz amateur band with v.c.r. recording."

So, that's it for now! Please send reports of simplex activity, repeater news, photo's, Slow Scan, questions on Fast Scan, BATC, to me, Graham Hankins G8EMX at 11 Cottesbrook Road, Acoccks Green, Birmingham, B27 6LJ. If you prefer, as I do, Packet messages, my BBS is GB75OL Soon, maybe, I could have an Internet address as well! Meanwhile, 73s and, of course, PS!
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A collection of old radio.

TV and military equipment, s.a.e. for list, e.g. receiver R1210TR9, R1155A, Bush TV80, Marconi radio 556, aircraft parts, bomb switch SO56, Morse key type D, etc. Paul Brown, 22 Raby Terr, Chilton, Nr. Ferryhill, Co. Durham DL17 0JD.

AOR-2880, 500kHz to 1300MHz, all modes, programmable-scanner with NiCads, charger and manuals, including frequency directory, £240. Can deliver. Tel: Northants (01933) 277946.


Drake 2-CW/2CQSP, extra bands, spare valves, v.g.e., £180. Leader audio. LAC-26, v.g.e., £15. KW Vespa MKII, manual, £65. Bill, Glasgow. Tel: 0141-649 4345.

Icom 735 transeiver, mic., boxed, manuals, mint condition, £600. Icom 240 2m (144MHz) f.m. transeiver, ideal mobile, v.g.e., mic., manuals, £100. PSU Bremi 13.8V 3A.

transceiver, 100W output, £395.00. And Racal RA17L receiver, in excellent condition, with manual, £200. Lex, New Yorks. Tel: (01729) 840513.

Ten-Tec Paragon 100W solid state s.s.b.f.m., twin v.f.o.s, superb filters and memory facilities (displays callsign, etc.) general coverage RX, £400. John G0VGD, Maidstone. Tel: (01732) 846107.

Two 934 NPR Comet rig, £150 each. Tenwood TR 7625 f.m. 2m (144MHz). £150. 12-element ZL special. £40. David GT0EC, Leamington Spa. Tel: (01926) 425220.

Wayne-Kerr direct reading LCR bridge, £65. Marconi signal generator, £45. AVO valve tester, £85. Venner frequency counter, £70. Marconi frequency counter, £75. Usher, 85 Bromham Road, Bedford. Tel: (01234) 354767.


AR88D receiver, must be in working order and reasonable condition. Adrian, North London. Tel: (01582) 833451 anytime (answphone).

Parts for T1154 transmitter restoration, especially case, both meters, yellow master oscillator, tuning knob and dial. R1155 'meter deflec' and 'aural sense' knobs and controls also required. Please write to: P. Brooke, POB, Louth, Linns LN11 9NB.

Transceiver with digital frequency tuning read-out, must cover 560s (1.8MHz) band, looking for US army transceiver PCR47. Selling WWII German military broadcast radio, original markings on dial, Swastika, Eagle, £200. K. Jones GSP32, Devon. Tel: (01837) 53021.

Transistors from the 1950s - the components that is, not radios. Also transistor data books and sheets from that period. Write for details of wanted types and prices offered. Dr. A. Wylie, 21 Brancaster Lane, Purlney, Surrey CR8 1JH.

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WANTED high gain ferrite rod aerials must be half inch in diameter no more or less. Must be six inches or more. Contact Peter Tankard on Sheffield 0114 2343030 any time.

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W riting on the PW team is a busy job and as everyone knows, I'm prone to forgetting things (I even forget to put my artificial arm on once and only realised it when I tried to tie my shoelaces up!). So, a year-planner is a great help in organising my time and making sure I turn up at clubs to do the right talk at the right time! With that in mind the team thought that readers would find a wall mounting year planner useful. I hope you do find your planner helpful. There's only one problem...it graphically shows you how short a time we've got in each year!

This magazine has been an interesting issue to work on, and we think you'll enjoy PW for February. We've provided some interesting projects which can be built over a weekend and there's some fascinating reading too.

I'm pleased to announce that a great favourite of PW readers, the Rev. George Debbs G3RJV, will soon be returning to write a new series. The new series 'Carrying On The Practical Way' will follow in the footsteps of 'Getting Started...The Practical Way', but at a higher level, monthly column again, George will be standing down from his occasional (on the 'rotating author schedule') tenure of 'Antenna Workshop'. His place is to be taken by Dick Pascoe G3HPS of 'Pascoe's Penny Pinchers' fame! And I have no doubt readers will continue to enjoy Dick's simple approach, especially as he will be writing on a regular basis.

So, in hoping you enjoy this issue as much as the team has enjoyed preparing it, I've got to get on with March, (and there's even better to come there!). Cheerio for now.

Rob G3XFD

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**ENDNOTES**

Rob Mannion reflects and looks ahead.

In his new series George will concentrate on providing complete 'weekend' style projects in his own inimitable way. As he's to be writing a monthly column again, George will be standing down from his occasional (on the 'rotating author schedule') tenure of 'Antenna Workshop'. His place is to be taken by Dick Pascoe G3HPS of 'Pascoe's Penny Pinchers' fame! And I have no doubt readers will continue to enjoy Dick's simple approach, especially as he will be writing on a regular basis.

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