

THE UK'S BEST SELLING MAGAZINE FOR AMATEUR RADIO ENTHUSIASTS

MARCH 1994 £1.90

# practical Wireless

**FREE**  
WITH THIS ISSUE  
128-Page  
**MAIN**  
**LINE**  
Electronics Catalogue

**Themed Issue -**  
**Amateur Radio On The Move**

The Lizard Meets G4ATA

In-Car Insurance And Amateur Radio Equipment

**Build**

The PW Jubilee 14MHz SSB Mobile Transceiver

The GOPIP Pip Tone

A Hands Free Mobile Microphone



**Reviewed**  
The Yaesu FT-840 HF Transceiver

The Kenwood TH-22E 144MHz  
Hand-Held Transceiver

**Plus**

Specifications, The Mysteries Explained  
Novice Natter - Valve & Vintage  
Bits & Bytes, The Computer In Your Shack  
Plus Spot The Difference Competition & Much More!

ISSN 0141-0857  
9 770141 085020

THE THREE POINTS OF THE KENWOOD TRIANGLE REPRESENT ADVANCED TECHNOLOGY, QUALITY AND STYLE

# HATS OFF!

## TH-22E/42E FM HANDHELD TRANSCEIVERS



The news is out. And it's too exciting to keep under your hat.

Kenwood's new TH-22E (144MHz) and TH-42E (430 MHz) redefine handheld communications, with a palm-size format and impressive performance.

They're small and light enough to carry anywhere, but offer over 5 watts

output (with a 9.6V battery) and long hours between charges. The secret's in the FET power module, a world first in this class for sophisticated power management.

Other features? From the user friendly menu system to the 40 EEPROM memory channels, Kenwood's new

handheld FM transceivers offer numerous category-leading features and first-class performance. So it's hats off to Kenwood – the transceivers that cap the rest.

**KENWOOD**

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Elaine Richards G4LFM has some more advice on radio rallies and takes a look at the Allinco DJ-480 u.h.f. f.m. transceiver.



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## In-Car Insurance And Amateur Radio Equipment

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COVER PHOTOGRAPHY  
Craig Dyball

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Published on the second Thursday of each month by PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: (0202) 659910. Printed in England by Southernprint (Web Offset) Ltd. Distributed by Seymour, Windsor House, 1270 London Road, Norbury, London SW16 4DH. Tel: 081-679 1899, Fax: 081-679 8907, Telex: 8812945. Sole Agents for Australia and New Zealand - Gordon and Gotch (Asia) Ltd., South Africa - Central News Agency, Subscriptions INLAND £22, EUROPE £25, OVERSEAS (by ASP1 £27, payable to PRACTICAL WIRELESS, Subscription Department, PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: (0202) 659930. PRACTICAL WIRELESS is sold subject to the following conditions, namely that it shall not, without written consent of the publishers first having been given, be lent, re-sold, hired out or otherwise disposed of by way of trade at more than the recommended selling price shown on the cover, and that it shall not be lent, re-sold, hired out or otherwise disposed of in a mutilated condition or in any unauthorised cover by way of Trade, or affixed to or as part of any publication or advertising, literary or pictorial matter whatsoever. Practical Wireless is published monthly for \$45 per year by PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW, UK. Second Class postage paid at Middlesex, N.J. Postmaster, Send USA address changes to Practical Wireless, c/o Permit to post at Hackensack pending. The USPS (United States Postal Service) number for Practical Wireless is: 007075.

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<b>DJ-180EB</b> 2m FM Ext Rx £229 <b>£209</b>	<b>FT-416</b> 2m FM with keypad £319 <b>£249</b>	<b>TH-28E</b> 2m Tx + 70cms + AIR Phone £

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<b>FT-5200</b> 2m/70cm +Ext Rx £649 <b>£549</b>	<b>TM-732E</b> 2m/70cms Mobile £PHONE	<b>DR-130</b> 2m FM <b>£309</b> <b>TM-441E</b> 70cms (35W) COMPACT £PHONE

## HF SPECIALS

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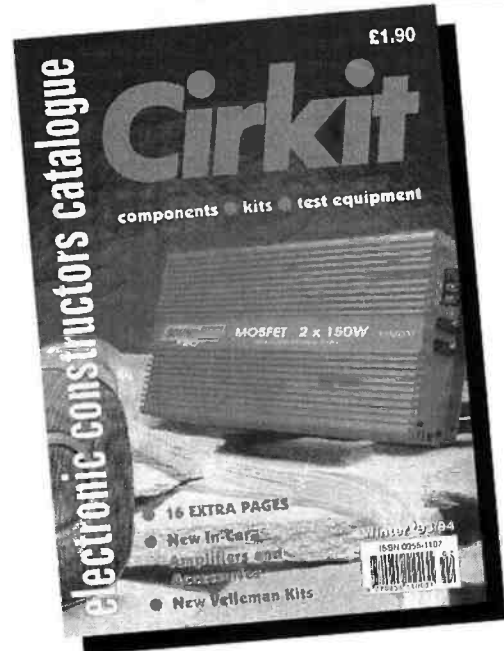
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- 40 memory channels
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- Multi-frequency steps
- 5.5 to 16 VDC operating voltage

New low price **£199** with cell case  
or **£239** with CNB 160 nicad and wall charger

## THE NEW STANDARD C408

The latest in the "standard" range is probably the smallest set yet produced.



It has 230 MW R.F. output from 2 x AA cells – ideal for local Q.S.O's and repeater working. An idea that comes to mind for those of you with dual banders that will act as a repeater, is that you will have a portable microphone anywhere around the house!  
**£229**

## STANDARD C528

Dual band simultaneous transmit/receive 20 channels. Now includes nicad and wall charger  
**£399**



## STANDARD C188-2M C488-70CMS



Special Offer  
**£279** inc nicads and charger



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## Standard C558

- 144 – 147.995MHz
- Simultaneous reception
- 3-way frequency selection
- Dual band with AM
- 20 channels

**£429** with cell case  
**£449** with nicad and wall charger

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LONDON AMATEUR RADIO & COMPUTER SHOW

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# WATERS & STANTON

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#### SSB/CW 1.8MHz-30MHz Capability!

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- ★ Variable Xtal Filter 500Hz-2.4kHz
- ★ VSWR, Power & S-meter
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- ★ 100Hz resolution 12 Volt operation

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25MHz - 550MHz  
800MHz - 1300MHz  
AM - FM

We've managed to purchase the last production run of this receiver at a special price. Full coverage of all the popular channels including the full aircraft, marine and ham bands etc. Compare the cost of its competitors! This is a fully specified scanner that comes from the most respected name, Yupiteru. 100 memories and a highly sensitive receiver.

Includes ni-cads  
AC charger

12v Cigar lead, softcase,  
Antenna, Earpiece



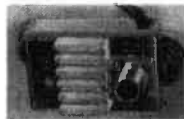
#### 2m 30W Mobile for £59!

##### P335

This amplifier converts your 2m FM handheld into a 30W output mobile or base system.

- ★ RF sensing
- ★ 1.6W Input
- ★ Ideal for FM
- ★ 12dB power gain
- ★ SO-239/BNC plug
- ★ 12-14V DC
- ★ 74 x 50 x 24mm

This is a well made unit which we have purchased at a silly price. We have limited stocks at this price and you have a full 12 months UK warranty. Ask us nicely and we'll send it post free!

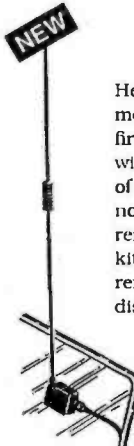


### On Glass Antennas

Models for:  
2 metres  
Dual Band  
Scanners 30-1300MHz

Here's just what you want for the modern car. These antennas mount firmly on the glass surface and come with internal matching box and 17ft of coax cable. You get low VSWR and no scratches on the car. Want to remove it? Just purchase the optional kit that enables the aerial to be safely removed and re-mounted with new disposable parts.

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TGSP Scanner	£32.95



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30kHz-30MHz



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### W9GR DSP Audio Filter

£299

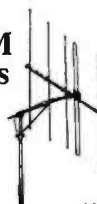


Cuts out almost all noise including power lines, static, ignition, hetrodynes, etc. Pass bands down to 30Hz and bands to suit. Packet RTTY and Amort etc. Brings the wanted audio up and reduces the noise by several S-points! It can make an SSB signal with band noise sound just like a local FM signal! Amazing device that has rocked the USA. It's not cheap at £299 but when you hear it you'll realise how much it can cut down listening fatigue.

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Practical Wireless, March 1994

# ELECTRONICS

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2m Tx Dual-Band Rx  
With Spectrum Display



80 memories, 2 Watts on nicads, 5 Watts on 12V. But the unique feature is the Spectrum Display. The bargraph shows the strength of the signal you are receiving plus the strength of signals on the 3 channels either side. Watch a Spectrum Display of the activity as you tune the band. It's the most amazing handheld we have seen!

**DJ-580E**  
2M/70cms  
Wide-Band Rx  
42 Memories  
Full Duplex



The DJ-580E is the latest feature-packed handheld from ALINCO. You get ALINCO tough engineering and excellent reliability. You even get AM airband receive. No corners have been cut with the DJ-580E and to add to its pedigree, it has been selected by many groups for RAYNET operation. No doubt because of its auto repeater mode. Get the facts today and find out more about this lovely rig.

**NEW MFJ-203 Dip Meter**  
£119.95

- ★ 1.8-30MHz
- ★ No coil sets
- ★ No spurious responses
- ★ No frequency pulling

The '203' is a brand new idea in dip meters. It uses a single probe for complete coverage of 1.8-30MHz. None of the old vices of dip meters! Handbook tells you how to measure resonance, velocity factors, capacitance, inductance, circuit Q and other parameters.

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ABS-10, 15, 20, 40 & 80 5 bander.....	£79.95

**DJ-180EB**  
£229  
2m Budget Class Rig  
10 memories (Expandable)  
Auto Power Off  
Scanning & wide-band Rx  
Rotary Control  
Ni-cads & Charger



You won't purchase a better quality rig at this price. Derived from their commercial design, this rig is tough and reliable. Ideal as a second rig or/and appealing to those who don't want all the frills (and the expense). Get the adaptor and you can make it into a 5 Watt mobile! And if 2 metres gets boring or goes quiet, you can always listen between 130MHz and 174MHz to pass the time. Get the full details now.

**DR-130E 2m Mobile**



50 Watts Output  
20 Memories  
CTCSS Encoder  
Time Out Feature  
Channel or Freq. Display  
Compact size  
This is the newest mobile rig to come from ALINCO and with 50 Watts output it really does pack a punch. Its simple front panel belies its many features yet making operation safer. You can switch between frequency display or channel numbers; nice for "on the move" operation. Frequency control is by rotary control or up/down buttons on the mic. Repeater access is taken care of by the 1750Hz tone with reverse repeater in an instant. And if you get tired of 2 metres you can always listen to the segment 130MHz-174MHz. Everything you need to mount and operate the rig is supplied. Just connect 13.8V.

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1MHz-2.8GHz  
£169.95

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- ★ 6 gate times
- ★ Hold switch
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- ★ 50 Ohm BNC
- ★ Highly sensitive
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- ★ Serial etc.

COMES WITH NICADS + CHARGER

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**ICOM W-21E**  
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\* 5W Max  
\* 70 memories  
\* Auto Power Off  
\* Very Compact  
\* Scanning Modes  
\* Illuminated Display

£439  
£369

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£309 £259

Same basic features as DJ-S1E but with quick keypad entry and fast access to features.

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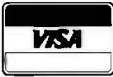
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(PW MARCHWOOD PSU)

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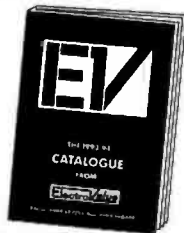
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IC-2SRE 2m FM Hand Portable + Wideband Rx	P.O.A.	D
IC-P2E 2m FM Hand Portable Inc Nicad/Charger	P.O.A.	D
IC-P2ET 2m FM Hand Portable Inc Nicad/Charger	P.O.A.	D
IC-2GE 2m FM Hand Portable inc Nicad/Charger	P.O.A.	D
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IC-229H 2m FM Mobile, 50W, 20 Memo, 12v	P.O.A.	D
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### 430MHz

IC-41E 70cm FM Hand Portable Inc Nicad/Charger	P.O.A.	D
IC-4SRE 70cm FM Hand Portable + Wideband Rx	P.O.A.	D
IC-P4E 70cm FM Hand Portable inc Nicad/Charger	P.O.A.	D
IC-P4ET 70cm FM Hand Portable inc Nicad/Charger	P.O.A.	D
IC-449E 70cm FM Mobile, 35W, 20 Memo, 12v	P.O.A.	D
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### DUAL-BAND

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IC-W21ET 2m/70cm FM Hand Portable Inc Nicad/Charger	P.O.A.	D
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IC-R71E General Coverage Receiver	P.O.A.	D
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IC-UX98 2.4GHz Band Unit	P.O.A.	B
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IC-UX59 50 MHz Band Unit, 10W	P.O.A.	B
IC-UXS92 144 MHz SSB Band Unit	P.O.A.	B
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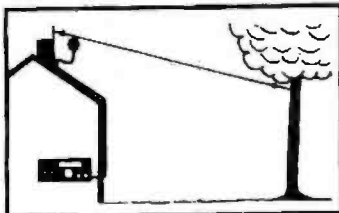
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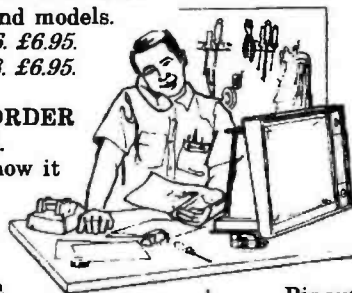
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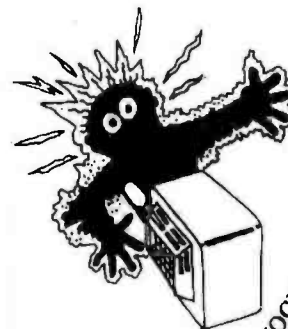
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## Specifications - The Mystery Explained

**Dear Sir**

I found Part One of your 'Specifications - The Mysteries Explained' by Ian Poole G3YWX most interesting. I hope that Ian will go through the full specifications list sheet, i.e., r.f. intercept point, r.f. intermodulation, reciprocal mixing, SINAD, and de-emphasis, pre-emphasis, etc.

To comprise the issue we have adjacent channel selectivity, image rejection, intermodulation rejection, a.g.c. hang time, r.f. sensing and hold times and roofing filters.

The terms I've mentioned must be very bewildering for the novice and the newly licensed, when trying to determine which rig to purchase.

**F. A. Blake G8FYD**  
Oxfordshire

**Editor's reply: The editorial team were pleased to read your comments Mr Blake. Ian Poole intends to make his series as comprehensive as possible and he will be pleased to consider any requests and ideas passed on to him via the Broadstone office.**

## Packet And More Packet

**Dear Sir**

What is happening to 144MHz? Packet, packet and more packet. The 144MHz all-mode section is now all data communication all by three Raynet 'channels'. Local f.m. nets, F2A practice, DX f.m. and various other activities have been swept aside by the dictatorial v.h.f. committee to accommodate packet.

Over 50% of the all-mode (SIC) section has now been going over to packet with much of the rest of this part of the band, also in the bands of various other data modes. Consideration or planning to accommodate the existing traffic on these frequencies is non-existent.

Can anybody tell me where I can now chase 144MHz f.m. DX. Notes to the bandplan state (*Radcom* March 1991) that those wanting to use 144MHz for f.m. DX should use the all-mode section.

I have not heard or read of new frequencies allocated for the existing traffic in this part of the band. I, for one, will continue to use them till new frequencies are found.

Long live real radio!

**M. Austin G1RGL**  
London

## Ten-Tec Scout Review

**Dear Sir**

The review of the Ten-Tec *Scout* 555 (Jan 1994) referred to the high price in Britain compared to the USA. The retailer seemed to think his price satisfactory, but nevertheless, has now reduced it from £589 to £499. With £1 being approximately equal to \$1.50, even £499 looks expensive compared with \$495, and the plug-in band modules particularly so at £39.95, more than double the US price of \$25 each.

The retailer stated that the dollar price is not relevant, but of course it is - it shows how we are being ripped off!!! *The 1994 ARRL Handbook* has a cover price of \$25. You are advertising it at £18.95, which is reasonable, so those plug-in modules for the Ten-Tec Scout should be similarly priced.

I have just seen a letter in a computer magazine referring to the prices of a couple of Microsoft items in the USA and in Britain, where the \$1-£1 rate has been used. In reply, Microsoft explain why costs may be a bit higher here than in the USA, but consider the \$1-\$1 rate is unfair. Elsewhere I have learned that CDs cost considerably more here than in the USA.

Many years ago I worked a G station where the operator was using a FT-250 transceiver, which at the time was available in Britain for £250. He told me that he had bought his in Tokyo for the equivalent of £100, brought it back by ship as personal luggage and paid £11 import duty (no purchase tax then payable on amateur radio gear). If he could buy one and legally import it for £111, why were the UK dealers charging £250?

It might be revealing if you could find the retail prices, including VAT e.t.c., of popular amateur radio items and list them in £sterling, Yen, Deutschmarks and US Dollars (the latter three with their £ equivalents) and then we could see what the extent of the rip-off is, and, one hopes, persuade the dealers to apply fair prices.

Meanwhile, I will try to find out what it would cost me to do a personal import of a Ten-Tec Scout 555, with all

band modules from 3.5 to 28MHz.

**Walter Farrar G3ESP**  
Pontefract

**Editor's comment: To answer G3ESP's questions, we asked Waters & Stanton to comment.**

**Dear Sir**

Thanks for faxing a copy of Mr Farrar's interesting letter about the UK pricing of amateur radio equipment and the Ten-Tec Scout in particular. Waters & Stanton are the UK distributors of the Ten-Tec range but unfortunately the manufacturers can only allow us a minimal trade discount for their American retail price. We then have the expense of buying in quantity, paying in advance bank charges etc., paying for freight, insurance, import duty and finally our old friend VAT.

This would give us a 'landed' price which of course we could use when selling to UK customers. However, of course, we must advertise the fact that we have the goods. We must also finance a year's guarantee, carry spares and accessories, undertake service work and still produce a profit from each sale as I have the responsibility of maintaining 20 jobs here.

My trade newspaper tells me that electrical outlets as a whole reduced by 10% last year alone as firms went bust. We have all seen several amateur radio outfits go to the wall. Without exception they were all firms who gave it away and what do their customers now do for service, spares and parts?

I hope Mr Farrar was pleased to see that we managed to reduce our price from £589 to £499 but the old chestnut of expecting UK prices to be two thirds of the US price just does not work in practice.

Thanks for letting me see the letter. I think it is better to get the reply in the same issue as the complaint.

**Jeff Stanton G6XYU**  
Waters & Stanton Electronics

## Rewinding Transformers

Dear Sir

The article on re-winding transformers in *PW* December 1993 by Paul Essery GW3KFE, shows the writer to be of much experience. I have myself re-wound dozens and a lot of know-how has been built up over many years.

Old valve type radios were excellent sources of transformers. Large and small, and they were really well made and very suitable for re-winding as they were almost never varnished.

The layers of windings were usually interleaved with fine waxed paper. So the wire was readily re-usable so that you could wind a transformer for your own needs with a little effort. Full power efficiency need not be a problem as most re-winds are operated well below full capacity for small pieces of equipment.

It is practically impossible to re-wind a bobbin by holding it in your hand. You need some kind of winding device, best clamped in a vice.

Long fully threaded bolts with nuts and very large washers with a handle of some sort at one end in a home made frame, or a hand drill, will take care of

different sized bobbins. Small cubes of wood with a hole through the middle will fit into the bobbin will keep it centred, and a screw through the hole on the end washer will stop it slipping during winding. Meccano parts are very useful.

To avoid losing count (very easy) of the number of turns of wire when you are winding, use pen and paper, and every 100 turns **STOP** without fail and subtract them from the total, as in a game of darts, or devise a counter of some sort, until all are done.

It is impossible for an amateur to lay the thin wire so that the turns lie side by side. But the thicker wires for i.t. secondaries are easier for this.

Pile winding is easier layer by layer across the bobbin and just as effective, and a layer of fine waxed paper can be added after each traverse across if desired. The only problem being that you may fill up the bobbin before all the turns are on.

Suitable waxed paper can be found in old large paper type smoothing capacitors as in old valve radios or junk shops. Electrolytics types are useless for this of

## ★ ★ STAR LETTER ★ ★

course.

Colour coded flex can be used for the lead-outs from the ends of the windings, e.g., red for primary windings, yellow for centre taps etc., coming out from holes in the bobbin cheeks (but **NOT** on lamination sides).

Where they join to the winding the wires should be hooked over like a walking stick handle. This is so that a tug will not put a direct strain on the soldered joint where the winding wire is attached and covered with insulation tape.

The final leads can be put firmly in place before the last layer or two are wound on, but leave both ends free for one to be attached after the winding is finished. Insulation tape between windings is essential, but too much can stop you getting all the wire on.

For mains transformers about seven to eight turns per volt, per square inch of core area is about right, for different sizes you must calculate the turns ratio accordingly. The main thing is to have a go and learn by your experience.

**H. Wilkes**  
**Mid Glamorgan**

## Letter From G3BIK On RAE

Dear Sir

Looking at the December *PW* I glanced at 'Receiving You' and noticed a letter from Mr Ed Chicken G3BIK.

Normally I would not take much notice, but his letter, to me at least, seemed very valid. I agreed on his points of view regarding question matter and content. In fact, last year I had quite a lengthy debate with City & Guilds over much of the same ground (and lost, it seems).

But having said all of this I was totally astounded by his opinion on recommended changes. It is my considered view that after the Morse test fiasco, anyone with a modicum of intelligence would not allow the RSGB to get their inefficient hands upon the RAE.

Many of my friends and colleagues who are RSGB members were not consulted about the Novice licence, although all members were balloted.

It's about time that the RSGB got its act together and looked after the real interests of its members and kept its nose out of things that it cannot possibly manage to run efficiently.

**Peter Crowley G0GPF**  
**West Midlands**

**Editor's comment: We hope to have other readers' comments on this topic next month, including those of the RSGB. Something has to be done to make the task of finding an examination centre, and the sitting of the RAE, easier and cheaper. What's YOUR suggestion?**

## British Library Charges

Dear Sir

In reply to Brian Pethers' letters on British Library charges in the December issue of *PW*, I would like to explain briefly how the system works.

Each library authority buys, in advance, a supply of vouchers from the British Library, which costs approximately £4 each. Then, when visiting to borrow a book from the British Library, a voucher is filled in and sent off to them. If the book in question is in stock in a foreign library, then three vouchers are required.

Obviously, each libraries policy is different. Here in Rochdale, the library bears the full cost of borrowing books, which is paid for from the book-purchase fund. The reader pays only the normal 50p reservation fee. Therefore, someone doing a lengthy course of study or research will have virtually free access to the information he needs.

It is unfortunate that in these times of cutbacks, libraries must pass on some of the cost of various services. It therefore appears that in this instance, Kent libraries are having to recoup the whole cost of inter-library loans.

**Ann Murray G0SYM**  
**Rochdale Central Library**  
**Manchester**

**Editor's comment: Thank you for the explanation Ann. You are the first librarian radio amateur I've come across. I always direct newcomers to the hobby to their local library for books and information. In fact, I think all libraries should have a radio amateur in stock, or at least the full information where the local club can be contacted. That's how I first made contact with the Southampton RSGB Group over 40 years ago!**

## Callsign Confusion

Dear Sir

While attending the local rally, I glanced at the new edition of the *RSGB Callbook* and found, to my amazement, my callsign G7REF was listed as being allocated to Raynet Epping Forest. A misprint perhaps or an identity crisis?

Upon phoning Subscription Services Ltd. in Bristol, it became clear that my newly issued callsign G7REF was not really mine, for it had previously been issued to Raynet Epping Forest.

With apologies from SSL, who did not try and blame 'the computer', I was informed I would become G7RMG. Who knows, maybe in a month it might be different yet again?

PS: 'RMG' could stand for a Real Mean Gun (given that my other hobby is shooting).

**Geoff Chapman G7RMG, late G7REF**  
**Dorset**

Send in your news, photographs and product information to Donna Vincent at the editorial offices in Broadstone.

# NEWS 1994



## Amateur Radio Delivers

On the evening of January 6 1994 at 9.30pm Chris Cooper G7MNH was driving his wife Angela to Hillingdon Hospital, West London, where she was due to give birth to their latest child (they already have three sons, a dog and a cat). Unfortunately on the drive to the hospital, in heavy snow, their minibus broke down.

Chris immediately put out an SOS call on GB3HL using his Yaesu FT-2700RH which was supplied by Martin Lynch. Within minutes they were rescued by George G7IJR

George rushed Angela and Chris to the hospital where three hours later Angela gave birth to a daughter, Vicky to add to the Cooper Clan. Chris insists that all his family are going on the Novice course as soon as they are old enough!

## Eastern Communications Timely Deal

The Norfolk based company Eastern Communications have recently been appointed sole UK agents for Mosley Electronics Inc. beam antennas. Mosley Electronics Inc. are world famous for their full range of beam antennas, manufactured in St. Louis, Missouri, USA.

The Mosley range of beams feature 5-element h.f. monobanders, 9-element multibanders, h.f. verticals as well as v.h.f. and u.h.f. Yagis. The latest model to be manufactured is the TA-53M 4-element lightweight five band beam antenna. The TA-53M gives a 3-element performance on all five bands, this means you only need to buy the one beam antenna instead of two, to get the required results.

For more information on the Mosley range of antennas or a copy of their catalogue contact **Tim Thirst G4CTT at Eastern Communications, Cavendish House, Happisburgh, Norfolk NR12 ORU. Tel: (0692) 650077.**

Eastern Communications are also the manufacturers of an amateur radio world clock. The clock is of the quartz variety and is nine inches in diameter making it easy to see across the radio shack.

The time on the clock is given in both 12 and 24 hour format and the center of the clock displays a three colour global map showing countries with their true bearing in degrees from London. The clock operates from a single 1.5V AA sized battery (not supplied).

**Further details on the clock are available from Eastern Communications, Cavendish House, Happisburgh, Norfolk NR12 ORU who can supply the clocks for £24.95 including P&P and VAT (UK).**



**Martin Lynch G4HKS (left) pictured with new arrival Vicky, Angela and Chris G7MNH at the Lynch Superstore in West London.**

## Last Chance Software

Technical Software the Welsh based software company, have decided to close down the radio software side of their business so that they can concentrate on other things.

The radio software and associated hardware sales will end on March 4 1994. This will be the last chance to buy any of the radio software products so you are advised to get your orders in quickly while stocks are still available.

**For details of last minute bargains send an s.a.e. to Technical Software, Fron, Upper Llandwrog, Caernarfon, Gwynedd LL54 7RF or telephone on (0286) 881886.**

## RSGB Presidential Installation 1994

On January 15 1994 at the Forte Crest Hotel in Glasgow the installation ceremony of the 1994 President of the Radio Society of Great Britain, Ian Suart GM4AUP took place.

Ian GM4AUP is the youngest ever RSGB President at the age of 39. He has been involved with the Radio Society of Great Britain since 1969 and has been a member on various committees. These have included Chairman of both the Data Communications and Administrative Body Committees.

And although Ian's not Scottish, hailing from Cumbria, he's married to a Scot Linda and works as a broadcasting engineer for National Transcommunications Limited (NTL), formerly the transmission side of the Independent Broadcasting Authority. Ian leads the RSGB into 1994 as the 60th President in the society's 80th year.

**Ian Suart GM4AUP 1994 President of the Radio Society of Great Britain** (photo courtesy of the RSGB)



## Aberystwyth Bring & Buy

The Aberystwyth & District Amateur Radio Society are holding a Bring & Buy Sale at the Aberaeron Youth Club on Saturday March 12 1994

Other clubs and individuals are invited to take part and should contact **Katy GWOSFO on (0545) 580675 before March 7** for more details.



## New Audio Filter

Waters & Stanton have recently added a new audio filter to their range. The W9GR DSP audio filter uses an LMS algorithm which works on correlation or repetitiveness and samples the audio signal at regular intervals. The manufacturers claim that the W9GR can transform difficult s.s.b. and c.w. reception.

Any signals which are correlated from one sample to the next are regarded as being speech and are then passed to the audio output. Noise, static and other forms of interference which cannot be correlated are classed by the filter as being unwanted and are

therefore rejected by the filter. For c.w. operation the filter uses narrow band-pass filtering with bandwidths of 200, 100 and 30Hz. There are also filter positions for use with h.f., Packet, RTTY and SSTV.

The W9GR DSP audio filter operates from a 12V supply at 250mA and gives an audio output of 2W/ into 8Ω.

**For more information on the W9GR DSP audio filter contact Waters & Stanton Electronics, 22 Main Road, Hockley, Essex SS5 4QS. Tel: (0702) 206835 who can supply the filter for £299.**

## Phase Indicator

Alpha Electronics, based in, Greater Manchester have added a new hand-held Phase Sequence Indicator to their range of products.

The Phasetek 800 is powered by a single 9V battery and is housed in a rugged yellow plastics case. The test leads are fused and are colour coded red, yellow and blue. The indicator operates with an a.c. voltage range of 90 to 660V and has a bandwidth of 40 to 100Hz.

The connection and phase sequence are indicated by a series of four l.e.d.s, when all three green l.e.d.s are lit the sequence is correct. If the red l.e.d. lights this means that there is a phase or connection error.

**The Phasetek 800 is available for £69.95 including VAT from Alpha Electronics Plc., Units 5 & 6, Linstock Trading Estate, Wigan Road, Atherton, Greater Manchester M29 0QA. Tel: (0942) 873434.**



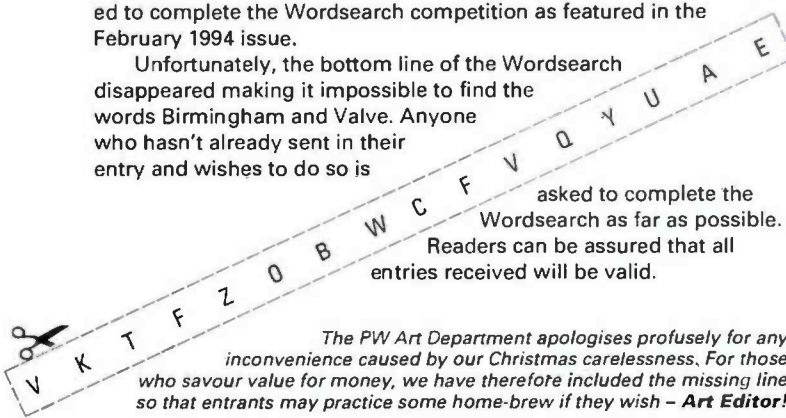
## Oops!

*Practical Wireless* would like to apologise to all readers who attempted to complete the Wordsearch competition as featured in the February 1994 issue.

Unfortunately, the bottom line of the Wordsearch disappeared making it impossible to find the words Birmingham and Valve. Anyone who hasn't already sent in their entry and wishes to do so is

asked to complete the Wordsearch as far as possible. Readers can be assured that all entries received will be valid.

The PW Art Department apologises profusely for any inconvenience caused by our Christmas carelessness. For those who savour value for money, we have therefore included the missing line so that entrants may practice some home-brew if they wish - **Art Editor!**



## Acorn Applications

Steve Hunt G3TXQ of Northampton has recently developed a number of software applications for the Acorn RISCOS range of computers. Applications include a filter designer, a receiver noise figure/intercept point analysis tool, an inductance ready reckoner and a Smith Chart design aid.

**More information on the Acorn RISCOS software applications can be obtained by contacting Steve Hunt, 21 Green Street, Milton Malsor, Northampton NN7 3AT. Tel: (0604) 858090 after 7pm.**

## Price Increase

Chas Miller Editor of *The Radiophile* has recently notified *Practical Wireless* of a price increase to *The Radiophile* subscription charges. With effect from January 1 1994 the prices have increased to £18 (UK) and £23 (overseas) for six issues.

**All enquiries regarding *The Radiophile* should be made to Larkhill, Newport Road, Woodseaves, Stafford, ST20 0NP.**

## Club Callsign

The International Short Wave League (ISWL) would like *PW* to remind readers that their club callsign GX4BJC/GX4BJC/P will be active throughout 1994 using a variety of modes and bands.

The club callsign is allocated to a different ISWL member each month and that member uses the call as much as possible during that time. The ISWL hope that this approach will increase the awareness of ISWL to the radio community.

Anyone who works the

ISWL club callsign is entitled to receive a Club Callsign QSL card. The QSL cards will be dispatched on receipt of an incoming QSL or reception report. The QSL manager is Dave Beale G0DBX and all QSLs and reception reports should be sent to him direct or via the bureau.

**To receive your Club Callsign QSL card send an s.a.e. to Dave Beale G0DBX/G-10618, 'Kenwood', London Road, Louth, Lincolnshire LN11 8QH.**

## Timewave Technology

Just as this issue of *Practical Wireless* was going to press we received an announcement from Nevada Communications of Portsmouth of their appointment as UK distributors for Timewave Technology Inc.

Timewave Technology are an American company who produce two audio digital signal processors. They are designed to dramatically reduce noise, interference and to eliminate heterodynes.

The first of these digital signal processors is the DSP-9 which the manufacturers claim to be an easy to operate filter for use on c.w. and s.s.b. The DSP-9 is available for £169. The second is the DSP-59 multi-mode filter which has over 320 filter variations and is designed for use on RTTY, SSTV, AMTOR, FACTOR, h.f., s.s.b., c.w., a.m. and v.h.f. Nevada can supply the DSP-9 for £299.

**More information on the Timewave Technology audio digital signal processors can be obtained from Nevada Communications, 189 London Road, North End, Portsmouth, Hants PO2 9AE. Tel: (0705) 662145.**

I'll start this month by continuing the story of how to get the best from your rally visit. **Mike Stott G0NEE** had so much good advice that I couldn't fit it all into the last column! So, here's Part 2.

7: Hagglng on second-hand or used equipment means a whole new ball game, but you need to get three things straight in your mind first.

A: Will it do the job? - by that Mike means is it the correct part, will it fit and has it the same specifications as the part it has to replace.

B: Look at the general condition, do you think it will work (there is a lot of good looking junk around, so be careful). If you have someone with more experience with you, then use your hand-held CB or amateur radio and call them up, get them to take a look at it. But don't expect them to give you a guarantee, they'll probably advise you on a maximum price to pay.

C: Is it in the right price range, remember you could have to fix it when you get home. Mike thinks that this is part of the fun of buying junk, but remember with junk and second-hand equipment you most probably won't get any form of guarantee from the seller.

Some of the longer established and more reliable dealers (you can usually recognise them as they are the older ones with grey hair and end up having to sit down about half way through the rally!) will often say if it will not work bring it back at the next rally and they will exchange it. They are the ones you can 'haggle' with as they come from an age when amateur radio was 'true Ham radio' and they bought junk by the ton to resell to amateurs.

8: Don't act too keen! This is a signal to the dealer that you want it at any cost and that's what it will be. If he sees this, back off and say it's OK, then go and look at another stand. Don't leave it too long as the bargain that you have found could be spotted and picked up by someone else. So, if you have it in your hand when asking the price, put it down at the back of the pile and maybe look at something else and put this on the top to protect your find. Then you can move away and have a think about it or get advice.

# NOVICE

## matter

*Elaine Richards G4LFM, PO Box 1863, Ringwood, Hants BH24 3XD.*

9: Getting it home! Now you have made your purchase, did you think how to get it home? A 100kg old valved receiver will take a bit of getting to the car park or train station three miles down the road! And what happens when you get it home? In the past Mike has left equipment out in the garden until it could be brought in under the cover of darkness. But just spare a thought for what Mum, Dad, wife, girlfriend, etc., is going to say when they see it!

Many thanks to Mike for his advice, I hope you can see that rallies can be a lot of fun and are well worth taking the time to attend. I'll be taking a light-hearted look at some other aspects of amateur radio with Mike as the month's go by.

### Money And Books

As you are reading this after the chaos of Christmas, money will probably not be in plentiful supply - most of the bills from December seem to come home to roost about now. I recently received a helpful letter from **J. C. James** in Cheshire with some advice on how to obtain technical books from unusual sources.

Mr James gave me an impressive list of the books he has bought in the last year from collector's markets for as little as 10p! A couple of the eleven titles he mentions are *Principles of Electronics* by H. Buckingham and E. M. Price (1964) and *Wireless for Beginners* by C. L. Boltz (1964) and both are well worth reading. I used these way back in my college days.

Some of the technical books you find in second-hand shops aren't very new, but the basics and principles of electronics haven't changed much, technology has just moved on a bit farther that's all. You could also try your local book shop, I know my local one has a very good second-hand section that can pro-

duce some interesting titles.

I would be interested to hear from readers who have been able to find interesting radio and electronic books cheaply, perhaps car boot sales and jumble sales are worth trying. Drop me a line and let me know.

### Packet Expensive

Last month I mentioned **Stephen Clayton 2E1CFC**, who said he'd like to try packet but it's too expensive to get a Terminal Node Controller (TNC) at the moment.

Is there anyone out there who's got a TNC surplus to requirements that they'd be willing to donate or sell very cheaply to get a youngster like Stephen started?

In fact, have any of our experienced amateurs got equipment that they don't use anymore that could be given or sold cheaply to a youngster just starting out. If you fit into either of the categories, drop me a line and let's see if we can put people together.

It would be interesting to see what the youngsters think of the new modes or bands as they try them out. I'm having a turn-out of the shack to see what I can unearth to start the ball rolling.

### The Alinco DJ-480 430MHz Hand-Held Transceiver

Also this month, the Editor very kindly has given me an extra page. This is so I can try out the Alinco DJ-480 430MHz band hand-held transceiver and give you a quick user's point-of-view.

If you're looking for a new transceiver you'd do well to take a close look at this set from Waters and Stanton. The DJ-480 is a really neat and easy-to-use unit that's designed with the newcomer in mind. Despite this, it has top quality performance and will no doubt appeal to all.

The first thing that impressed me was the brilliant styling. The finish is a sort of semi-matt dark grey

**Fig. 1: The Alinco DJ-480 430MHz hand-held transceiver.**



that was very comfortable to the touch and was not as slippery as some of the rigs I've seen recently. Because this model doesn't include a keypad, the main panel layout was very straightforward and that's why I thought it was easy-to-use.

As you can see from **Fig. 1**, the DJ-480 is very nicely sculptured and I found that it fitted very comfortably into my hand. The only snag with this sophisticated design is that it is designed to be held in the left-hand leaving the right-hand free to operate the controls. While this is fine for most of us, left-handed people may find operation not quite so comfortable. This is not a problem exclusive to the DJ-480 as most modern hand-helds follow this, so I suppose that left-handed people just get clever at using a radio the wrong way round!

The manual for the DJ-480 is also well worth a mention as it was all in English. So you won't have to wade through half a dozen other languages to find the right section!





**Fig. 2: With the antenna and battery pack removed you get a good idea of just how small the DJ-480 really is.**

## Full Features

As you may have guessed from the model number, the DJ-480 is designed for use on the 430MHz amateur band. So it has a full set of features to give simplex and repeater operation.

When in use, the operating frequency is shown on the very clear liquid crystal display on the front panel. This display was used to show all sorts of things from transmitter power through to the memory channel.

Without a key-pad, setting the frequency is done using a knob on the top panel. This has about twenty click stops per turn with each click changing the frequency up or down by a pre-set step. These steps can be set to 5, 10, 12.5, 20 or 25kHz so you can tune through the band either slowly or quickly depending on what you feel like.

Although the DJ-480 is designed to cover the 430-440MHz amateur band the frequency range can be extended to 410-465MHz by pressing the **FUNCTION** and **LAMP** buttons at switch-on. Actually, the review model's coverage extended from 400 to 520MHz!

For rapid tuning across such a wide band it's best to change the tuning steps to 1MHz by pressing and holding the **FUNCTION** button. There was also a useful **SCAN** button that set the receiver automatically scanning up or down through the frequency range. This will appeal to those who like to scan around the u.h.f. bands looking for interesting transmissions!

To help you remember all those favourite frequencies, the DJ-480 has 10 channel programmable memories. As well as the operating frequency, these memories hold the transmit off-set that's needed when working through repeaters.

As I mentioned earlier, the transmitter section includes all the features required by a modern transceiver. These include a high/low power setting, variable off-set for repeaters and tone burst.

When buying a new

transceiver it's always important to check just how much you're getting for your money. With the DJ-480 you get a 700mA/h NiCad battery pack complete with a complimentary 240V a.c. charger plus a belt clip, wrist strap and compact helical antenna. In simple terms you have all you need to get on the air but you will have to wait for the NiCad to charge-up! - which didn't take long once I'd found my two-pin adaptor.

## Range Of Accessories

As the DJ-480 is part of a much larger range of transceivers, you have access to a wide range of accessories. You can buy additional battery packs if you're keen on portable operation. These accessories include a high power 12V unit and a long life 7.2V battery.

If you prefer to use dry batteries or use your own AA size NiCads you can buy the EDH-11 battery pack. You can even get a quick charger if you get fed up with the 14 hours needed for the standard charger. For those wanting mobile operation there's a separate mobile mount available.

Now to the important bit, the cost. Waters and Stanton tell me that you can buy this little radio complete for £259. The prices of radio has certainly changed since I bought my IC-2E when I was first licensed, you can't imagine how expensive a 430MHz rig was in those days!

I haven't bothered with all the technical specifications. As if you're really interested, a glossy brochure from the dealer can give you all you can want to know without wasting valuable space here.

I liked the look and feel of this little hand-held and that's a big part of the decision when you're trying to choose a rig to suit. Probably if you have very large hands you won't like the smallness of the set, but many Novices will either be ladies or youngsters and we're not con-

demed with that problem!

**My thanks go to Waters & Stanton Electronics, 22 Main Road, Hockley, Essex SS5 4QS. Tel: (0702) 206835 for the loan of the DJ-480.**

## Don't Forget

Finally don't forget to keep sending me your letters with your questions, together with any hints and tips you'd like to pass on to other keen Novices. Cheerio for now.

**Novice Ned says "Don't forget to take notes and compare prices at rallies"!**



# Practical Wireless Dealers

All the radio dealers listed here stock current copies of *Practical Wireless Magazine*.

### Alyntronics

129 Chillingham Road  
Newcastle-Upon-Tyne  
NE6 5X1

### Amdat

4 Northville Road  
Northville  
Bristol BS7 0RG

### Amateur Electronics Holdings

45 Johnston Street  
Blackburn BB2 1EF

### Amateur Radio Communications

38 Bridge Street  
Newton Le Willows  
Merseyside WA12 9BA

### Arrow Electronics

Unit 17  
6 Harmony Row  
Govan Cross  
Glasgow GH1 3BA

### BBC Bush House

World Service Shop  
The Strand  
London WC2 4PH

### Bredhurst Electronics

High Street  
Haywards Heath  
West Sussex RH17 6BH

### Circuit Holdings

Park Lane  
Broxbourne  
Herts EN10 7NQ

### Electronics Equipment Bank

323 Mill Street  
Vienna  
VA 22180 USA

### Haydon Communications

132 High Street  
Edgware  
Middlesex HA8 7EJ

### Martin Lynch

140/42 Northfield Avenue  
Ealing  
London W13 9SB

### PMR

Industrial Estate  
Gwaelod-y-Garth  
Cardiff CF4 8JN

### Radio Place

5675a Power Inn Road  
Sacramento  
CA95824 USA

### Skywave Marine

Slades Road  
St Austell  
Cornwall PL25 4HG

### The Short Wave Centre

95 Colindeep Lane  
Sprowston  
Norwich NR7 8EQ

### J Townsend

PO Box 415  
Piercetown  
IN 46562 USA

### Ward Electronics

422 Bromford Road  
Ward End  
Birmingham B8 2EX

### Waters & Stanton

22 Main Road  
Hockley  
Essex SS5 4QS

# CLUB news

## Antrim

**Carrickfergus AG.** Tuesdays, 7pm. Downshire Secondary School, Downshire Road, Carrickfergus. **GI0JOF** on (0960) 351807.

## Avon

**Shirehampton ARC.** Fridays. February 11 - Neural Networks, March 4 - Wonderful World Of Weather Satellites. **Ron Ford** on (0272) 770504.

## Bedfordshire

**Shefford & DARS.** Thursdays, 8pm. Church Hall, Amphill Road, Shefford, Bedfordshire. February 10 - Top Band DF by Stewart G3RXQ, 17th - Members Activity Night, 24th - AGM, March 3 - Members Activity Night. **Paul G1GSN** on (0462) 700618.

## Berkshire

**Maidenhead & DARC.** The Red Cross Hall, The Crescent, Maidenhead, 7.45pm. February 15 - Space The Risk Business by Geoff Hall, March 3 - Quiz with Reading DARC. **Neil G8XYN** on (0628) 25952.

**Newbury & DARS.** 4th Wednesdays, 7.30pm. Bucklebury Memorial Hall. February 23 - Junk Sale. **Norman** on (0635) 863310.

## Buckinghamshire

**Aylesbury Vale RS.** 1st & 3rd Wednesdays, 8pm. Village Hall at Hardwick. February 16 - Talk by Richard Biltcliffe, March 2 - Quiz with Chesham & DARS at Chesham. **Martyn G4XZJ** on (0296) 81097.

## Cheshire

**Mid-Cheshire ARS.** Wednesdays, Morse & RAE classes held. Cotebrook Village Hall, Cotebrook, nr. Northwich, Cheshire. February 16 - Pancake Night, 23rd - Video Night, March 2 - On Air/Construction Night, 9th - Talk by Bob G4UJS of the Northern Lights Contest Group. **Mike Baguley G7LQD** on (0606) 331210.

**Stockport RS.** 2nd & 4th Wednesdays, 7.45pm. Room 14, Dialstone Centre, Lisburne Lane, Offerton, Stockport, Cheshire. February 11 - Packet Radio by G3SHF, 25th - Computer Hardware/Software by Fisteq Ltd, March 4 - Q & A On Radio & Computers, 9th - Amateur Satellites by Neville Paul G3AUB. **Jim France G3KAF** on 061-439 4952.

## Derbyshire

**Buxton Radio Amateurs.** Lee Wood Hotel, Buxton, 8pm. February 22 - QSL Card Night, March 8 - Construction Night. **Derek Carson G4IHO** on (0298) 25506.

## Devon

**Appledore & DARC (Devon).** 3rd Mondays, 7.30pm. Appledore Football Clubroom. February 21 - Satellite Communication by Dennis Kitchen G0FCL. **Reg Lyndon G4ETJ, QTHR** on (0237) 477301.

**Exeter ARS.** 2nd Mondays, 8pm. The Moose International Centre, Blackboy Road, Exeter. February 14 - Skittles Evening. **Ray Donno** on (0392) 78710.

**Plymouth RC.** Tuesdays, 6.30pm RAE class, 7.30pm Morse class, 8pm club activities. (As from June for the summer, meetings will be fortnightly). The Basement, The Royal Fleet Club, Davonport. **F. P. Russell G7LUL, G3 Fleet Street, Keyham, Plymouth PL2 2BU** on (0752) 563222.

**Torbay ARS.** Fridays, 7.30pm. ECC Social Club, Highweek, Newton Abbot. February 18 - AGM. **W. Hipwell G3HTX** on (0803) 526762.

## Dorset

**Bournemouth RS.** 1st & 3rd Fridays, 8pm. Kinson Community Centre, Pelhams Park, Millhams Lane, Kinson, Bournemouth. February 18 - G3TDZ Phasing Transceiver Construction by Malcolm G0UCX, March 1 - Committee Meeting, 3rd - 7th Annual Sale Planning. **Ian G2BDV** on (0202) 886887.

**Poole RAS.** 2nd Fridays, 7pm. Lady Russell-Coates House, Lower Constitution Hill Site, Bournemouth & Poole College of FE. February 11 - Owen On Oil, A talk about the oil industry by Owen G0SDH, March 11 - Final Steps In A Simple Transceiver by G1TEX. **Vernon Cotton G3BCI** on (0202) 760231.

**South Dorset RS.** 1st Tuesdays, 7.30pm. Wessex Lounge of Weymouth Football Club. March 1 - Annual Members Bring, Buy & Barter. **Mike Lenzi G7HNY** on (0305) 773860.

## Down

**Bangor & DARS.** 1st Fridays, 8pm. Bangor Technical College, Room A13, March 4 - Basic Computing by Gordon McBriar G1GFZ1. **Keith GIOSSA** on (0247) 883315.

## Durham

**Bishop Auckland RAC.** Thursdays. Novice classes & City & Guilds classes for RAE A & B examinations. Village Hall, rear of 1 High Road, Stanley, Crook, Co. Durham DL15 9SN. **Mike Shield G0PRQ** on (0388) 766264.

## East Sussex

**Crowborough & DARS.** Thursdays, 8pm. Plough & Horses, Crowborough. February 24 - Antenna Design in Miniature by Eric G1XZ. **Michael Smith G6UUU** on (0892) 661807.

## East Yorkshire

**North Ferriby United ARS.** Fridays, 8pm. North Ferriby Utd., FC Social Club, Church Road, North Ferriby, East Yorkshire. February 11 - On The Air Night, 18th - Members Problems And Tips, 25th - AGM. **Frank Lee G3YCC** on (0482) 650410.

## Essex

**Braintree & DARS.** 1st & 3rd Mondays, 8pm. The Clubhouse, Braintree Hockey Club, Church Street, Bocking. February 14 - Club Net, 21st - Sausage & Mash Dinner, 28th - Club Net. **J. F. Button G1WQQ, c/o G4JXG, 88 Coldnailhurst Avenue, Braintree, Essex CM7 5PY** or Publicity Secretary on (0376) 327431.

**Colchester RA.** Colchester Institute, Sheepen Road, Colchester. HF Construction by Peter G0DZB, 24th - Rallies And Practical Wireless by Rob Mannion G3XFD, March 10 - HF Construction by Peter G0DZB. **Trevor Bradbeer G7OWC** on (0206) 764034.

**Venge ARS.** Thursdays, 8pm. Barnstaple Community Centre, Long Riding, Basildon, Essex. February 10 - Aerials-Noise Phasing by Robin G3JWO, 17th - Home Brew Hints & Tips, 24th - AGM, March 3 - Junk Sale. **Doris** on (0268) 552606.

## Fife

**Dunfermline & DARC.** Thursdays, 7.30pm. Former RAF Station, Outh Muir located by the A823 Dunfermline to Crief Road. February 10 - HF Operating Evening, 17th - Moonbounce by David Anderson G4JJJ, 24th - Construction Evening, March 3 - Ten-Tec Night.

## Greater London

**Acton, Brentford & Chiswick ARC.** 3rd Tuesdays, 7.30pm. Chiswick Town Hall, Heathfield Terrace, London W4. February 15 - Kit Building For Beginners. **Colm Mulvany G0JRY** on 081-749 9972.

**Clifton ARS.** Kidbrooke House Community Centre, Room 9, 90 Mycenae Road, Blackheath SE3 7SE. February 11 - What's In A Computer?, 25th - Film Evening. **Keith Lewis** on 081-859 7630.

**Cray Valley RS.** 1st & 3rd Thursdays, 8pm. Progress Hall, Admiral Seymour Road, Eltham SE9. February 17 - Penguin Night VP8SSI by Bob Treacher, March 3 - Annual Construction Contest. **Bob Treacher** on 081-850 1386.

**Crystal Palace & DRC.** 3rd Saturdays, 7.30pm. All Saints Parish Rooms, Beulah Hill, London SE19 (opposite junc. Grange Road). February 19 - AGM and Construction Contest. **Wilf Taylor G3DSC** on 081-699 5732 or **Bob Burns G30OU** on (0737) 552170.

**Edgware & DRS.** Watling Community Centre, 145 Orange Hill Road, Burnt Oak, 8pm. February 10 - WAB by Rob Snar G40BE, 24th - Morse Training Evening/On The Air, March 10 - AMTOR by Hank Kay G0FAB. **Rod Bishop G0SQL** on 081-204 1868.

**Loughton & DARS.** Room 12 of Loughton Hall, 7.45pm. February 18 - Meccano - Its History And Present Popularity by Alan Curtis, March 4 - Packet Radio Update by John Ray G8DZH. **John Ray G8DZH** on 081-508 3434.

**Silverthorn RC.** Fridays, 7.30pm. The Chingford Community & Adult Education Centre, Friday Hill House, Simmons Lane, Chingford, London E4 6JH. February 11 - Night On The Air/Social, 18th - Preparation For Thinking Day On The Air, 25th - Night On The Air, March 4 - Preparation For RSGB London Amateur Radio & Computer Exhibition. **Andrew Mowbray G0LWS** on 081-529 4489 between 5.30 & 6.30pm weekdays only.

**Southgate ARC.** 2nd & 4th Thursdays, 8pm. Winchmore Hill Cricket Club Pavilion, Firs Lane, Winchmore Hill, London N21. February 10 - Introduction Into 24cms ATC by Adrian Hurt G00JY, 24th - Radio On The Air. **Brian Shelton G0MEE** on 081-360 2453.

## Greater Manchester

**Rochdale & DARS.** Mondays, 8pm. The Cemetery Hotel, 470 Bury Road, Rochdale, Lancs. February 21 - Talk by Rev. George Dobbs G3RJV. **Brian** on 061-653 8316 or **Dave** (0706) 32502.

## Gwynedd

**Dragon ARC.** 1st & 3rd Mondays, 7.30pm. Four Crosses Hotel, Menai Bridge. February 21 - Talk by Bob Williams GW3CGN, March 7 - Technical Demonstration by Geoff Spencer G4WADR. **Tony Rees GW0FMQ** on (0248) 600963.

## Hampshire

**Itchen Valley RC.** 2nd & 4th Fridays, 7.30pm. Scout Hut, Brickfield Lane, Chandlers Ford. February 12 - Open Meeting & Natter Night, 25th - Visit from Rob Mannion G3XFD Editor of *Practical Wireless*. **Les Kennard G3ABA** on (0703) 732997.

**The Three Counties ARC.** Every other Wednesday, 8pm. Railway Hotel, Liphook Hampshire. February 16 - History Of Dunsfold Aerodrome by Paul McCue, March 2 - RAYNET by Bob Bloodworth G4WVP. **Tom Milne** on (0428) 606298.

## Hereford & Worcester

**Bromsgrove ARS.** 2nd & 4th Tuesdays, 8pm. Lickey End Social Club, Alcester Road, Burcot, Bromsgrove. February 22 - RSGB Night, March 8 - RA Relief Expeditions by G Dellbridge G0PMF. **Mr B. Taylor G0TPG** on (0527) 542266.

## Hertfordshire

**Dacorum AR & TS.** 1st (informal) & 3rd (formal) Tuesdays, 8pm. The Heath Park, Cotterells, Hemel Hempstead. February 15 - Amateur Radio Licensing by Stephen Harding G4JGS. **Nicholas Camp G7KFO, 48 Northfield Road, Harpenden, Herts AL5 5HZ.**

**Hoddesdon RC.** Alternate Thursdays, 8pm. Conservative Club, Rye Road, Hoddesdon, Herts. March 3 - Preparation for London Amateur Radio Show. **Roy G4UNL** on 081-804 5643.

**Stevenage & DARS.** Tuesdays, 7.30pm. Stevenage Day Centre, Chells Way, Stevenage. February 15 - Video Evening, 22nd - The 1993 Coast To Coast Walk by Ralph G7HFD. **Neil Ravillious Z2IASZ** on (0438) 350882.

## Humberside

**Goole R & ES.** Fridays, 7.30pm. West Park Pavilion, West Park, Goole, last Fridays at the 'Old George Inn', Market Place, Goole. February 11 - HF Listening by Richard Sugden G0GLZ, 18th - Quiz 'Who's Hobby Is It Anyway?', 25th - Social Evening. **Steve Price G8VHL** on (0405) 769130.

## Isle Of Wight

**Isle of Wight RS.** Unity Hall, Mill Square, Wootton, Isle of Wight PO33 4HS. February 19 - Thinking Day On The Air, 20th - VHF Convention at Sandown Park (0983) 872620.

## Kent

**Bromley & DARS.** 3rd Tuesdays, 7.30pm. The Victory Social Club, Kechill Gardens, Hayes, Kent. February 15 - RAYNET by Phil Williams G6AQP. **Alan G7GBH** on 081-777 0420

**Medway AR & TS.** Fridays. Tunbury Hall, Catkin Close, Tunbury Avenue, Walderslade, Chatham, Kent. Visitors & new members welcome. February 11 - Construction Contest, 25th - AGM, March 5 - Boxing Contest by Gloria G7DVI. **Mrs Gloria Ackerley G7DVI, 40 Linwood Avenue, Strood, Rochester, Kent ME2 3TR.** Tel: (0634) 710023.

## Lancashire

**Fylde ARS.** 2nd & 4th Tuesdays, 7.45pm. Blackpool South Shore Lawn Tennis Club, Midgeland Road, South Shore, Blackpool. February 22 - Informal, March 8 - Preparations for NARSA Rally. **Eric Fielding G4IHF** on (0253) 726685.

## Leicestershire

**Charnwood AR Contest C.** 1st & 3rd Sundays. The Albion, Loughborough. February 20 - Contest Planning, 25th-27th CQWW 160 Contest. **Phil** on (0509) 232927.

## Lincolnshire

**Grantham RC.** 1st & 3rd Tuesdays, 8pm. Kontak Sports & Social Club, Barrowby Road, Grantham. February 15 - Overcoming EMC Problems by G4DUB, March 1 - Club Quiz. **John Kirton G8WVJ** on (0476) 65743.

## Merseyside

**Liverpool & DARS.** Tuesdays, 8pm. Churchill Club, Church Road, Wavertree, Liverpool. February 15 - Debate-The Place Of The Computer In Amateur Radio, 22nd - Surplus Sale, March 1 - Astronomy by G0MSO, 8th - Club On The Air. Ian Mant G4WVX on 051-722 1178. Norfolk

**Fakenham ARC.** 1st Tuesdays, 7.30pm. Trinity Church Room, Hempton. March 1 - ATV Demonstration by Mark G0LGJ. Dave G4DCJ on (0485) 528633.

**Norfolk ARC.** Wednesdays, 7.30pm. University Arms, South Park Avenue, Norwich. February 16 - Science For All by Arnold G3PTB, 23rd - On The Air Night/Construction. Dale Simkin on (0603) 37393.

## Nottinghamshire

**Mansfield ARS.** 2nd Mondays, 7.30pm. Polish Catholic Club, off Windmill Lane, Woodhouse Road, Mansfield. February 14 - Are We Being Conned? by Charles G4ZZG. Mary G0NZA on (0623) 755288.

**Nottingham ARC.** Thursdays, 7.30pm. Sherwood Community Centre, Mansfield Road, Nottingham. February 10 - 144MHz DF Foxhunt Talk by Ed G0INA, 17th - Surplus Equipment Sale, 24th - Construction/Activity Night, March 3 - Forum/On The Air Night, 10th - Tuning The Club's HF Rig & Amplifier by Trevor G0IXR. Simon G0IEG on (0602) 501733.

## Shropshire

**Salop ARS.** Thursdays, 8pm. Oak Hotel, Shrewsbury. February 10 - Quiz between SARS & Powys RC, 24th - Demo on FAX/SSTV by Clem G0ALV, March 10 - Construction Project Discussions by Terry G8DIQ & Paul G7LRB. Sheila Blumfield G0SST on (0743) 361935.

## Somerset

**Wincanton ARC.** 1st & 3rd Mondays (except Bank Holidays - 2nd & 4th), 7.30pm. The Community Lounge, King Arthur's Community School, Wincanton, Somerset. February 21 - Open Evening, March 7 - CR100 & CR150 Receivers & Transmitters by George Grisdale G5GZ. Dave G3ZOX on (0963) 34360 or Andy G1FPW on (0747) 51381.

**Yeovil ARC.** Thursdays. Red Cross HQ, Grove Avenue, Yeovil, Somerset. February 10 - Development Of A Ballistic Missile by G5JJ, 17th - Original Semi-Conductor Transmitter by G3MYM, 24th - Club Station On The Air/Committee Meeting. Cedric White G4JBL on (0258) 73845.

## South Yorkshire

**Sheffield ARC.** Mondays 7.30pm. Firth Park Pavilion, Firth Park Road, Sheffield. February 14th - Talk on JOTA, 21st - Operation Of Clubs HF Equipment, 22nd - Ten Pin Bowling, 28th - Packet Station, March 1 - RAYNET, 7th - Inter Club Quiz Round 2. (0742) 446282.

## Suffolk

**Ipswich RC.** February 16 - Antennas by Frank Howe G3FIJ, 23rd - CW Evening, March 2 - Construction Contest, 9th - Social. Mrs S. Elden G8HYE, 124 Larchcroft Road, Ipswich IP1 6PQ.

**Sudbury & DRA.** 1st Tuesdays, 8pm. Wells Hall Old School, Great Conrad, Sudbury, Suffolk. 3rd Tuesdays, 8pm. Five Bells Public House, Bures Road, Great Conrad, Sudbury, Suffolk. February 15 - Natter & Noggin, March 1 - PCB Computer Aided Design by Colin G0PAO. Tony Harman G8LTY on (0787) 313212 or G8LTY @ GB7NNA.

Please send in all of your 'Club News' items to Donna Vincent at the editorial offices in Broadstone.

## Surrey

**Dorking & DRS.** The Friends Meeting House, South Street, Dorking, 7.45pm. February 22 - Crime Prevention, March 8 - Informal Evening. John Greenwell G3AEZ on (0306) 631236.

**Horsham ARC.** Guide Hall, Denne Road, Horsham, West Sussex, 8pm. March 3 - Surplus Equipment Sale. Peter Stevens G8SUI on (0737) 842150.

**Surrey RCC.** Terra Nova' The Waldrons, Waddon, Croyden, Surrey. February 21 - Natter Night, March 7 - Surplus Sale. Berni G8TB on 081-660 7517.

**Sutton & Cheam RS.** 3rd Thursdays, 7.30pm. Sutton United Football Club, The Borough Sports Ground, Gander Green Lane, Sutton, Surrey. Natter Nights - 1st Thursdays. February 17 - Construction Contest, March 3 - Natter Night. John Puttock G0BWW, 53 Alexandra Avenue, Sutton SM1 2PA.

**Wimbledon & DARS.** 2nd & last Fridays. St. Andrews Church Hall, Herbert Road, Wimbledon SW19. February 25 - Desert Island Radio. George Cripps G3DWW on 081-540 2120.

## Tayside

**Dundee ARC.** Tuesdays, 7pm. College of Further Education, Graham Street, Dundee. March 8 - Construction Night, 15th - Lecture, 22nd - Construction Night, 29th - Lecture. George Millar G4MFSB, 30 Albert Crescent, Newport-on-Tay, Fife DD6 8DT.

## Warwickshire

**Stratford-Upon-Avon & DRS.** 2nd & 4th Mondays, 7.30pm. Home Guard Club, Main Road, Tiddington, Stratford-Upon-Avon, Warwickshire. February 14 - Test Equipment Evening, 28th - Junk Sale. Alan Beasley G0CXJ on (0608) 82495.

## West Sussex

**Worthing & DARC.** Wednesdays 7.30pm. Parish Hall, South Street, Lancing, Worthing, West Sussex. February 16 - Phase Lock Loops by G0SWH, 23rd - Discussion Evening, March 2 - Computers, 9th - Club Dinner. G4GPX on (0903) 753893.

## West Yorkshire

**Halifax & DARS.** 1st & 3rd Tuesdays, 7.30pm. February 15 - Junk Sale. David Moss G0DLM on (0422) 202306.

**Keighley ARS.** The Ingrow Cricket Club, Ingrow, Keighley, 8pm. February 10 - Navigation by G0BWW, 17th - Natter Night, 24th - Practical Fractals-A Hands On Electronics Experience by Lance Keal, March 3 - Natter Night, 10th - Local Life Between The Wars by Ian Dewhurst. Kathy Conlon G0RLO on (0274) 496222.

## Wiltshire

**Salisbury R & ES.** Tuesdays, 7.30pm. 3rd Salisbury Sea Sout Hut, St Marks Avenue, Salisbury. David Kennedy G7GWF on (0722) 330971.

**Trowbridge & DARC.** 1st & 3rd Wednesdays, 8pm. Southwick Village Hall, 8pm. February 16 - Natter Night, March 2 - Worked All Britain Awards Group by Ivan G3GKC. Ian G0GRI on (0225) 864698.

# Radio Diary

**February 13:** 3rd Northern Cross Rally is being held at the Roddill School on the A61 between Leeds and Wakefield (near junction M1/M62). Doors open at 11am, 10.30am for disabled visitors and Bring & Buy. Usual dealers, ample parking, bar & refreshments, Morse test and talk-in on S22. Dave Gray on (0532) 827883.

**\*February 20:** The Great Northern Rally, G-MEX, City Centre, Manchester. All the usual attractions, including free tea and coffee until 10am, cafeteria for hot and cold refreshments, licensed bar, Bring & Buy, Talk-in on 144MHz via GB1GMEX. Admission £1.50, doors open at 10.30, close at 5pm with priority for the disabled. Further information on 061-748 9804.

**February 26:** Tyneside Amateur Radio society are holding their eighth annual rally at the Temple Park Centre, South Shields. 18,000 sq. feet of floor space, all one level, direct access to the exhibition floor, ample car parking for exhibitors and visitors, comprehensive catering and leisure facilities. Jack G0DZG on 091-265 1718.

**February 26:** The 9th Rainham Radio Rally is being held at a new and larger venue at the Rainham School for Girls, Derwent Way, Rainham, Gillingham, Kent. Junction 4 M42, well signposted. Traders, ample parking, Bring & Buy, refreshments. Admission £1, children under 16 Free, Talk-in on S22. G7JBO on (0634) 365980.

**\*March 12/13:** The London Amateur Radio & Computer Show will be held at the Picketts Lock Centre, Picketts Lock Lane, Edmonton, London N9. Large trade presence, free parking, lectures and disabled facilities. Bring & Buy, special interest groups, talk-in on S22. (0923) 893929.

**March 20:** Tiverton South West Radio Club are holding their 1994 Mid Devon Rally at the Pannier Market, Tiverton. Doors open at 10am. Easy access, only minutes from junction 27 on the M5. Excellent free parking, two halls of trade stands, Bring & Buy stall and mobile snack bar. Further displays and full refreshment facilities in the club room bar which is open throughout the day. Talk-in on S22. G4TSW, Mid Devon Rally, PO Box 3, Tiverton, Devon.

**\*March 20:** Norbreck Amateur Radio, Computing & Electronics Exhibition, Norbreck Castle Hotel, Queens Promenade, Blackpool, Lancashire. Extended free car parking with free shuttle service, novice licence details and demonstrations, Bring & Buy, competitions, refreshments, talk-in on S22. Doors open 11am (disabled entry with ramp from 10:45am) close 5pm. Admission £1.50, over-65s £1.00, under-14s free. Peter Denton G6CGF. Tel: 051-630 6790.

**March 27:** Bournemouth Radio Society are holding their 7th Annual Sale at Kinson Community Centre, Pelhams Park, Milhams Road, Kinson, Bournemouth. Doors open at 10am. Talk-in from G1BRS on S22. Amateur Radio and Computer Traders, clubs and specialised groups. Admission £1 including free raffle ticket. Ian G2BDV QTHR on (0202) 886887.

**March 27:** Pontefract & DARS are holding their 14th Annual Components Fair & Spring Rally at the Carleton Community Centre, Carleton, Pontefract. Doors open at 11am, 10.30 for disabled. Bring & Buy, traders, bookstall, licensed car and refreshments, Morse tests, tombola, traders, car boot sales available, admission by prize programme, 3 prizes plus special draw for the ladies. G0NQE, QTHR on (0977) 677006.

**April 3:** Launceston Amateur Radio Club will be holding its 8th amateur radio rally at Launceston College. Doors open at 10.30am, well known traders, ample parking, RSGB Morse tests on demand (bring two passport photographs). Roy G0IKC on (0409) 221624 or Rodney & Joy on (0566) 775167.

**April 4:** Centre of England Easter Radio, Satellite, Computer & Electronics Show are holding their show at the Sports Connexion Centre, Leamington Road, Ryton on Dunsmore, Coventry A45/A423. Doors open at 10.30am, admission £1.50, senior citizens, £1.00. Held in two large halls, over 80 traders, Bring & Buy, talk-in on S22, bar and hot food all day, ample parking. Frank Martin G4UMF on (0952) 598173.

**April 16:** The Spring All Micro Show Radio Rally and Electronics Fair is being held at Bingley Hall, Staffordshire Showground, Weston Road, Stafford (A518 Stafford-Uttoxeter Road) AA signposted from Junction 14 on M6. Doors open 10am, adults £2 on day (advance tickets £1.50), children under 14 free. As usual we are supporting local charity stalls, free parking, licensed bar from 11am, refreshments, meals and a cafeteria. (0473) 272002

**April 17:** Bury Radio Society will be holding a rally at the Castle Leisure Centre, Bolton St. Bury. Doors open at 11am, 10.30am for disabled visitors. Bring & Buy, talk-in on S22, refreshments and bar available. Laurence on 061-762 9308 evenings.

**May 1:** The BATC Rally, Sports Connexion, Coventry will be among the largest indoor radio events of 1994 - around 320 trading tables, flea market, outside TV displays etc. Mike Wooding G6IQM.

**May 2:** Dartmouth Radio Rally will be held at Yelverton Memorial Village Hall, Meavy Lane, Yelverton, Devon. Trade stands, Bring & Buy, refreshments etc. Parking, access for disabled, doors open 10.30, talk-in on S22. Ron on (0822) 852586.

**May 2:** Mid-Cheshire ARS Rally will be held at Civic Hall, Winsford, Cheshire. Doors open at 11am, (10.30am for disabled visitors). £1 entry and free car parking. Dave G4XUV on (0606) 77787.

**May 8:** Midland Amateur Radio Society/Drayton Mobile Radio Rally is being held at Drayton Manor Park, Tamworth, Staffs (A4091). Doors open at 10.30am, usual traders, flea market, car boot and club stands. Peter G6DRN on 021-443 1189.

**May 8:** The 10th Yeovil QRP Convention will be held at the Preston Centre, Yeovil, Somerset. Doors open 9am - 5pm, free car parking. Traders, QRP kits and components plus club Bring & Buy and QRP club stand. Natter area and refreshments. Peter G3CQR, QTHR on (0935) 813054.

**May 22:** The 37th Northern Mobile Rally will take place at the Flower Show Hall on the Great Yorkshire Show Ground, Harrogate, North Yorkshire. Mike G0MKK (0423) 507653 evenings or G0MKK @ GB7CYM.

\*Practical Wireless and Short Wave Magazine in attendance.

If you're travelling long distances to rallies, it could be worth phoning the contact number to check all is well, before setting off.

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Practical Wireless, March 1994

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# The Yaesu FT-840 HF Transceiver

Clive Hardy G4SLU takes a look at one of the latest products from the Yaesu range, the FT-840 transceiver, its associated power supply and automatic antenna tuning unit.



Review

**T**he FT-840 is one of the latest h.f. transceivers from Yaesu. It is the baby brother of the Yaesu FT family of h.f. transceivers.

The FT-840 is a compact unit with two v.f.o.s and 100 memories that has general coverage receive and 100W p.e.p. output on the amateur bands.

In standard form the FT-840 operates in c.w., s.s.b. and a.m. modes with f.m., including repeater shift, as an optional extra. It has a speech processor as standard. Narrow band filters for a.m. and c.w. can be added.

The FT-840 is supplied with a power lead, spare fuse, 40-page operating manual, and the MH-1B8 fist microphone. Supplied with the manual is a separate circuit diagram and a colourful world prefix map.

Power requirement of the FT-840 is 13.8V d.c. at a maximum of 20A. For the review I was supplied with the matching Yaesu FP-800 power supply.

## Same Size

The FP-800 power supply unit is the same size as the FT-840 itself, and has a forward facing extension speaker. The p.s.u. is fitted with the lead to power the FT-840, and the supplied extension speaker connecting lead.

The 13.8V output from the p.s.u. is also available via two screw terminals on the rear panel. The mains voltage input to the FP-800 unit is through an IEC connector.

The mains lead on the unit supplied to me had moulded on plugs fitted at both ends. Unfortunately, the lead is fitted with a European Schuko plug, not the standard UK 13A three-pin plug.

Rather than chop the supplied connecting lead about, I used a redundant kettle lead with UK 13A plug fitted. Surely Yaesu know what type of plugs are used in the UK? I wondered briefly about the warranty implications of using the wrong or modified lead.

Audio quality from the forward facing extension speaker is obviously better than from the transceiver's small internal top facing speaker, but not by a wide

margin. Sometimes the clarity of communications quality speech is improved by the greater treble response of the internal speaker.

## Automatic Antenna Tuning

The FC-10 fully automatic antenna tuning unit is the same depth and height as the FT-840 transceiver, but half the width. The automatic a.t.u. is controlled from the FT-840, and it was connected for most of the time to my trapped dipole antenna.

With the FP-800, FT-840, and FC-10 combination connected together the first task was to set up the FC-10. There are 10 memories which store the FC-10 setting for each band, with two memories allocated to the 28MHz band.

Two buttons on the FT-840 control the FC-10. The TUNER button switches the FC-10 in and out of circuit with the status indicated on the display.

Pressing the START button initiates the FC-10 automatic a.t.u. to start matching the antenna system to the transceiver's output. Unless the mismatch is greater than the FC-10 can cope with, it takes only a few seconds for the automatic a.t.u. to select its settings and store them in the memory.

If the FC-10 fails to match the antenna system after 30 seconds it gives up and the display shows HI-SWR. Once the FC-10 has been set up on a band it returns to those settings each time the band is selected, and then makes minor adjustments to its settings for the actual frequency selected.

Whilst the FC-10 automatic a.t.u. is setting itself WAIT is shown on the display. During band and frequency changes the setting takes only a fraction of a second. You would have to be very fast on the p.t.t. to transmit before it had set itself!

During the review period the FC-10 managed with ease to match my five band non WARC trap dipole to all 10 amateur bands. The unit had similar success matching my 40m long wire antenna with its associated central heating piping counterpoise.

To prevent heat build up inside the FC-10 there's an internal side ventilation fan which cuts in automatically. The fan is apparently triggered by particular FC-10 settings, rather than any actual rise in temperature.

## The Transceiver

Now it's time to look at the transceiver itself. On taking it out of the box the FT-840 appeared to be a radio that could be driven without reference to the manual. Despite this, it's obviously always a good idea to read the manual.

I did read all the manual eventually. It's all in English and includes helpful step-by-step guides to explain several of the operating procedures.

However, operating amateur radio equipment for the first time without reading the manual, seems to have become an accepted way of assessing a radio's user friendliness. And in this respect the FT-840 scores well.

A transceiver that's easy to use doesn't distract the operator from the main purpose. That of course, is sending and receiving information!

## Well Laid Out

The front panel on the FT-840 is well laid out and the basic function of each control is clearly marked. The large liquid crystal display (l.c.d.) is back lit orange and is very clear.

As well as frequency the l.c.d. display also shows mode, memory channel, and other status information. Next to it on the left is the moving coil combined S, power, and ALC (automatic level control) meter.

To the left of the tuning knob are found the main receiver and all the transmitter controls. To the right are the band and v.f.o. switching buttons, plus the i.f. shift and receiver incremental tune controls (r.i.t.).

On the FT-840 the receiver incremental tune is labelled **CLAR**, for clarifier. The memory select, scan, and FC-10 control buttons are to the right of the display.

One revolution of the main tuning knob produces 500 tuning steps. In s.s.b. mode the rate is 10, or 100Hz per step.

The **FAST** button selects the rate. In a.m. and f.m. modes both rates are increased ten fold.

The rear panel has a total of 16 controls or connections. Apart from the usual antenna, d.c., key, earth, and p.t.t. connections there are also four mini DIN sockets.

The DIN sockets comprise one each for two of the models of automatic a.t.u. usable with the FT-840, one to control the FL-7000 linear or FC-1000 ATU, and a CAT socket.

The controls adjust the side tone level, semi break-in timing, and speech processor compression. Other sockets are for p.t.t., external ALC input, constant level a.f. output, and a 200mA output 13.8V d.c. supply.

## Ordinary Memories

There are 90 ordinary memories which store frequency, mode, split frequency if required, etc. And it is very simple to transfer data to and from these memories.

Programming the ten band search memories is a little more difficult. This was the only area of operating the FT-840 that caused me to dive for the manual.

It's not that the process of programming the band search memories was particularly complex. But it took a couple of readings and several attempts to crack the system.

The suggested use of the band search memories is to scan each amateur band, as each memory can be programmed with an lower and upper limit, e.g. 7.000 and 7.100MHz. Other than storing one or two net frequencies perhaps, I don't think the memory functions are that useful.

Serious contest operators may disagree. But I feel that the FT-840 is a 'bread and butter' radio which they probably wouldn't use.

I suspect that 10 ordinary memories alone would suffice most FT-840 owners. After a couple of days I found I wasn't using any of the memory functions.

## Scan Facility

The scan facility on the Yaesu FT-840 permits scanning of either the memories or the v.f.o. frequency. Operated from the front panel the **VFO SCAN** is only in one direction - upwards.

The scan rate on the FT-840 is adjustable from 1 to 200 tuning steps a second, but it defaults to 10. Personally, I would trade the **VFO SCAN** for non locking Up/Down tuning buttons on the front panel. It would save a lot of twiddling of the main tuning knob to get around the band.

There are **Up/Down** buttons on the microphone which act as scan buttons in **VFO** mode if pressed other than momentarily. In memory mode they are duplication of the memory **Up/Down** buttons on the front panel.

Various operating settings can be selected by holding down one or other of the front panel buttons when switching the radio on. The list is too long to include here, but examples are beeper enable/disable and last digit (10 Hertz) display/hide.

## Extras Available

Apart from the FP-800 p.s.u. and FC-10 automatic a.t.u., several other extras are available. These include the FC-800 remote automatic a.t.u., recommended for mobile installations. There's also an external loudspeaker with audio filtering, and a more stable ( $\pm 2$ ppm against  $\pm 10$ ppm) master oscillator.

The higher stability master oscillator v.f.o. is probably necessary for some data modes. However, I only used the FT-840 for speech modes and no stability problems were encountered.

An interface is available to facilitate operation of the FT-840 by external computer. But the manual points out that Yaesu are unable to supply any suitable software, and half a page is devoted to the RFI problems likely to be encountered when a computer and h.f. radio are in close proximity.

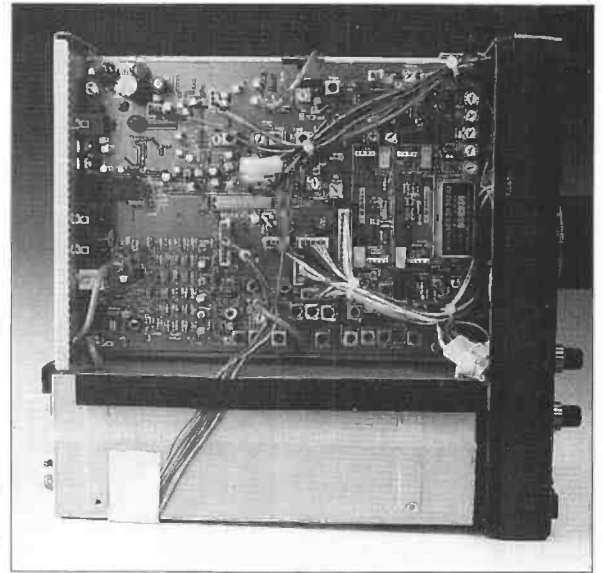
## Equipment Assessment

Unless a piece of equipment is thoroughly examined on the test bench, any assessment of performance is purely subjective. I have no doubt that the FT-840 conforms fully to its technical specification.

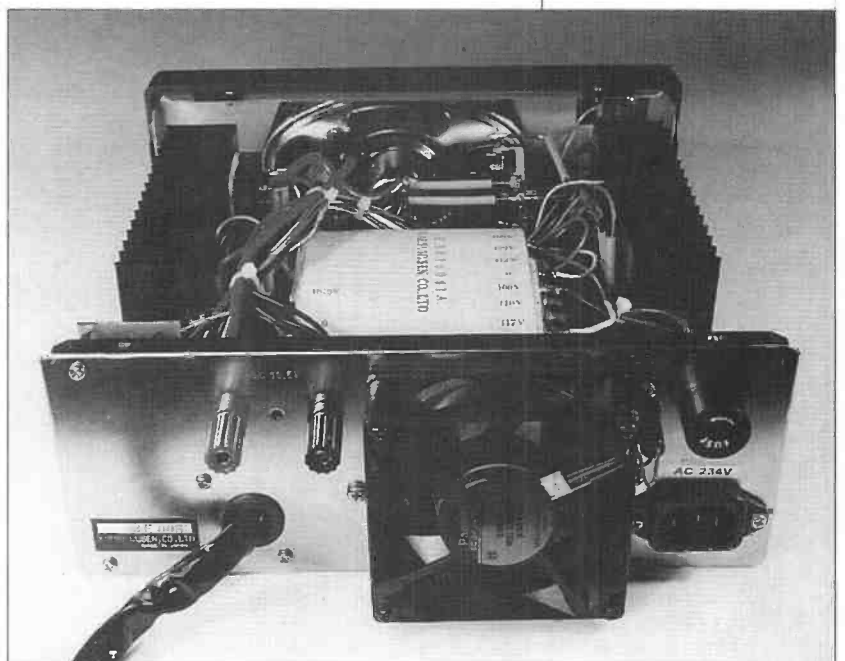
The FT-840's receiver did all that I expected it to, and travelled the globe via the antenna socket. Simply put, it does the job!

Don't take my comments as a lack of enthusiasm for the FT-840. I like the transceiver. Although not bristling with controls the FT-840 has all the essentials.

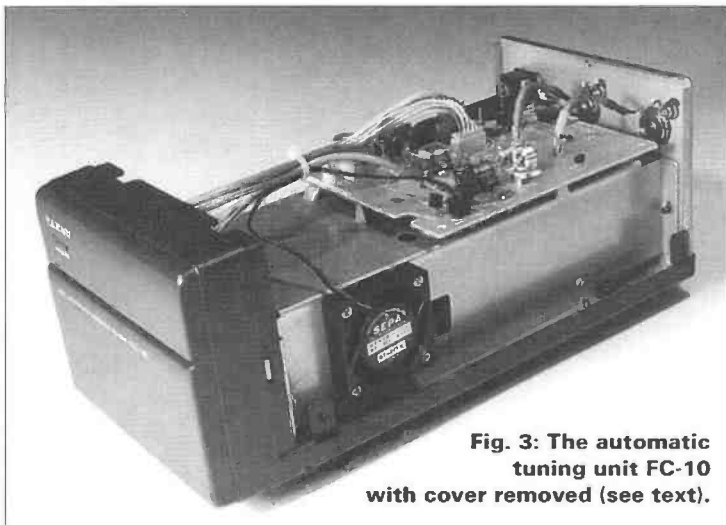
On receive, the 12dB attenuator and **IF SHIFT** controls make life easier when the bands get crowded. The squelch only really becomes necessary if f.m. is fitted, which it wasn't on the review model. A pity, as



**Fig. 1: Internal view of the Yaesu FT-840 transceiver**



**Fig. 2: Internal view of the Yaesu FP-800 power supply unit.**



**Fig. 3: The automatic tuning unit FC-10 with cover removed (see text).**

## Specifications

### General

Frequency ranges	
Receiver	100kHz - 30MHz (✓)
Transmitter	1.8 - 29.7MHz (No transmit outside amateur band edges) (✓)
Frequency stability	±10ppm (±2ppm 0 - 40°C)
Modes	Sideband J3E (u.s.b./l.s.b.) , c.w. (A1A), a.m. (A3E), Optional f.m. (F3E)
Tuning Steps	s.s.b./c.w. 10/100Hz (✓) a.m./f.m. 100Hz/1kHz (✓)
Antenna impedance	50Ω (SO239 socket)
Operating temperature	-10 to +50°C
Power supply	13.5V (±10%) 1.2A (max) on receive (✓) 20A (max) on transmit
Dimensions	238x93x243mm (WHD)
Weight	Approx 4.5kg (✓)

### Transmitter

Power output	100W (p.e.p.) adjustable (25W Carrier on a.m.) (✓)
Spurious radiation	>50dB below peak output (✓) >45dB on 10/18MHz bands (✓) >50dB (unwanted sideband) (4)
FM deviation	±2.5kHz (not checked)

### Receiver

IF conversion	superheterodyne
IF Frequencies	47,055 (1st) , 8.215MHz (2nd) (455kHz f.m. only)
IF shift	±1.2kHz
Clarifier	±2.5kHz
Sensitivity	s.s.b./a.m., see table f.m. 0.2μV (1.8-30MHz)
Squelch sensitivity	<2μV or better (✓)
IF rejection	>60dB (1.8-30MHz) (✓)
Image rejection	>70dB (1.8-30MHz) (✓)
Audio output	1.5W (4Ω load) @<10% distortion (✓) 4 - 8Ω loudspeakers

### What the (✓) means!

When we have a rig in for review in *PW*, we check the rig on our test equipment to see how well it measures up to the manufacturer's quoted specification. The specification figures we feel are important to you, the reader, we checkout and highlight with our *PW* (✓).

We use a (✓) sign after a measurement figure, to mean that the reviewed rig matched (within measurement limits) the quoted specification. We use a (✓+) sign to mean the rig bettered the specification by a good margin. The ultimate accolade is a (✓++) sign, meaning the margin was excellent.

**G1TEX**

Frequency Mode (b.w.)	150 to 250kHz	250 to 500kHz	500kHz to 1.8MHz	1.8 to 30MHz
s.s.b./c.w. (2.4kHz)	<5μV	<2μV	<1μV	<0.25μV
Measured	<2μV	<1μV	<.25μV	<0.12μV
a.m. (6kHz)	<40μV	<16μV	<8μV	<1μV
Measured	<10μV	<2μV	<2μV	<1μV
f.m. (8kHz)				<0.25μV

28MHz f.m. can be interesting.

No adverse comments were passed on the transmitted audio quality by other stations, so all was well there. Incidentally, the characteristics of the transmitted audio can be varied slightly to suit the operator's voice.

The variation of transmitted audio characteristics can be achieved by a switch on the rear of the microphone. This reduces its response to frequencies below 1500Hz. Additionally, the speech processor does give that little extra 'bite' which can be useful.

I found that the FT-840 is straight forward to operate, particularly with the automatic a.t.u. It would make an ideal first h.f. radio for someone wanting a new, but less expensive transceiver. Its price and performance should put it into quite a few shacks.

### Summing Up

In summing up, at the end of the day I'll 'put it in a nutshell' so to speak. I think the FT-840 is a neat box of tricks that performs all the usual repertoire of gymnastic feats I've come to expect from a modern transceiver.

Get me my cheque book, I want one! Any discount for cash....?

My thanks go to Yaesu UK Ltd., Unit 2 Maple Grove Business Centre, Lawrence Road, Hounslow, Middlesex TW4 6DR. Tel: 081-569 4282 for the loan of the FT-840. Yaesu UK Ltd. can supply the FT-840 for £879, the FP-800 for £299 and the FC-10 for £299.



# Review



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73 from Dave G4KQH, Technical Manager.

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## The PW Jubilee 14MHz SSB Mobile Transceiver Part 1

*I pass like night,  
from land to land;  
I have strange power of speech*

Samuel Taylor Coleridge  
From *The Ancient Mariner*.

It's a sad fact that there are few home made single sideband transmissions heard on the amateur bands. I guess it's because most amateurs think it's beyond their skill and means to generate an s.s.b. signal.

Perhaps it's because most constructors have images of complex circuits and expensive test equipment. They may also be concerned about having to lay out a lot of money which might not bear fruit.

The PW Jubilee is aimed at encouraging you to have a go! It's an attempt to offer a relatively inexpensive and easy to build s.s.b. transceiver for the 14MHz band.

The Jubilee transceiver, although not a

beginner's project can be built by anyone who can read a diagram, identify parts and make good solder joints. It requires no specialist test equipment.

You'll need a good multimeter (preferably of analogue type) and a simple diode probe. The only other item needed is a short wave receiver, to do all the required checks.

The Jubilee could make a base station transceiver. It's also ideal for portable or mobile use.

### Describing The Transceiver

I'll begin by describing the make-up of the transceiver. And the best starting point is the i.f. board.

The i.f. board forms the heart of the Jubilee. It provides an i.f. amplifier at 9MHz, the b.f.o., product detector and audio stages on receive. It also provides the microphone audio stages, balanced mixer and filtering to provide a single sideband output at 9MHz.

The i.f. board does all the hard work in a single sideband transceiver. It could be used for any single band, or multiple bands with appropriate mixing and amplification.

The r.f. mixer board contains mixers for both the receiver and transmitter. A band-pass input filter selects the required 14MHz signals.

In the Jubilee, the r.f. board has a simple driver amplifier. The amplifier allows the board to drive a ready-built Cirkit power amplifier to some 12 to 15W of r.f. output.

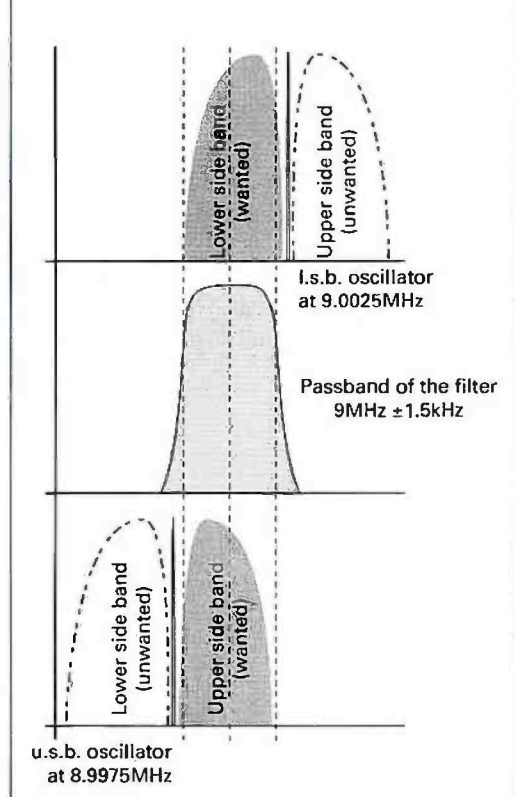
With this project, the mixers are driven by the same variable frequency oscillator (v.f.o.). This provides a signal at 5MHz, which with the 9MHz of the i.f. stages and s.s.b. generator, places the transceiver output on the 14MHz band.

The v.f.o. board includes extra components. These components allow receiver incremental tuning (r.i.t.).

The mixer board drives the previously mentioned Cirkit power amplifier. This is a well known broad band r.f. amplifier kit. It has a small modification to allow it to be switched on in the

The Reverend George Dobbs G3RJV describes a useful QRP mobile h.f. transceiver. It started life on his workbench during PW's 60th anniversary year - hence the name 'Jubilee'. And, as usual, George starts off with a suitable quotation!

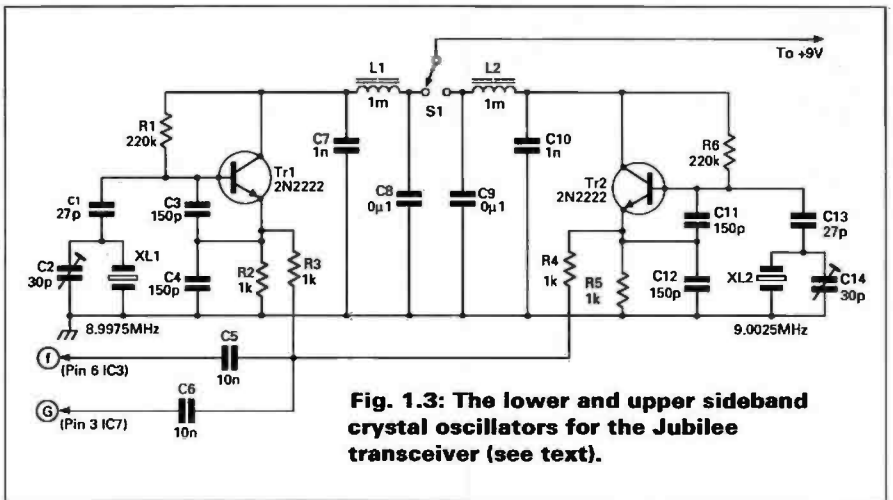
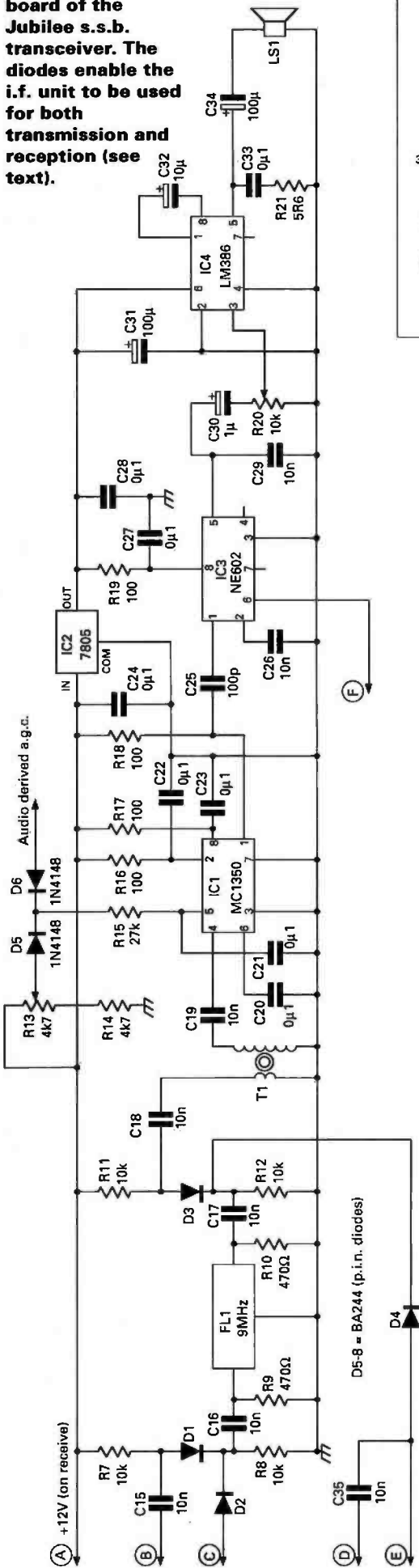
**Fig. 1.1: An illustration of the techniques behind the generation of a single sideband suppressed carrier transmission. In effect, the three diagrams would be superimposed, forming one illustration, but for clarity we have separated them (see text).**



**The prototype PW Jubilee 14MHz h.f. s.s.b. transceiver, designed and built by Rev. George Dobbs G3RJV.**



**Fig. 1.2: The main i.f. and audio board of the Jubilee s.s.b. transceiver. The diodes enable the i.f. unit to be used for both transmission and reception (see text).**



**Fig. 1.3: The lower and upper sideband crystal oscillators for the Jubilee transceiver (see text).**

transmit mode.

Mounted alongside the power amplifier is an s.w.r. bridge, which in effect is a through-line bi-directional wattmeter. There's also a 7-element low pass filter.

The boards I've described form a complete single sideband transceiver, but two extra optional boards can be added to the Jubilee.

As described, the Jubilee i.f. amplifier has no system of automatic gain control (a.g.c.). But a simple external board can provide an audio derived a.g.c. facility.

The basic modules work only on single sideband. However, by adding an extra board with a c.w. oscillator and key operated change-over system, the transceiver will operate on Morse.

The i.f. bandwidth on its own, is a little too wide for comfortable sessions on c.w. However, I've produced a small passive filter to improve the situation.

The modular system of construction I've adopted, makes the Jubilee easy to build. It also makes it possible to test as construction proceeds.

A more inventive constructor could opt to use some of the Jubilee modules with other favourite circuits. For example, you could use the i.f. board with a variety of mixer circuits for transmit or receive.

If the Jubilee is the first s.s.b. project you're attempting, the illustration, Fig. 1, should help. The diagram illustrates the principles behind the operation of the i.f. filter (in the case of the Jubilee it's 9MHz).

Putting it very simply, to generate a single sideband suppressed carrier signal (this is the correct term, although most of us just refer to it as 's.s.b.') we first have to generate a signal (the 'carrier'). The audio signal from the microphone is 'mixed' (modulated) onto the carrier. The result is an amplitude modulated signal.

Because the a.m. signal produced in a balanced modulator, the carrier frequency (9.0025 on l.s.b., 8.997MHz on u.s.b.) is balanced out and is very much reduced in the signal fed to the crystal filter FL1. Then, either the upper or lower sideband signal frequency only is allowed through the filter, amplified and transmitted.

The i.f. filter has the effect of greatly attenuating the unwanted

sideband. And, much to our advantage, this process can be 'two way' and can be used on receive or transmit, as in the Jubilee.

### The Circuit

The circuit of the main transceiver i.f. board is shown in Fig. 2. As previously mentioned, the board forms the basis of a whole 9MHz transceiver i.f. system.

The filtering on the i.f. board, at 9MHz, is performed by a Showa 2.4kHz crystal filter, FL1. This filter is available at a special price from the G-QRP Club, although any comparable narrow band crystal filter would work with the board.

The diodes, D1, 2, 3 and 4 switch the r.f. input and output through the filter. This enables the same filter to serve as the i.f. filter and s.s.b. generator filter.

On receive, the i.f. input from the receiver mixer is selected by D1 and 3 through the filter. The resistors R9 and 10 provide impedance matching for the filter. The capacitors C16 and 17 isolate the filter at d.c. from the switching diodes.

A transformer, T1, matches the filtered intermediate frequency signal into the i.f. amplifier. The i.f. amplification is provided by an MC1350P integrated circuit.

The MC1350P i.c. has become popular in recent years for providing simple i.f. amplifiers. It has a gain control pin (pin 6) which can be part of an a.g.c. circuit.

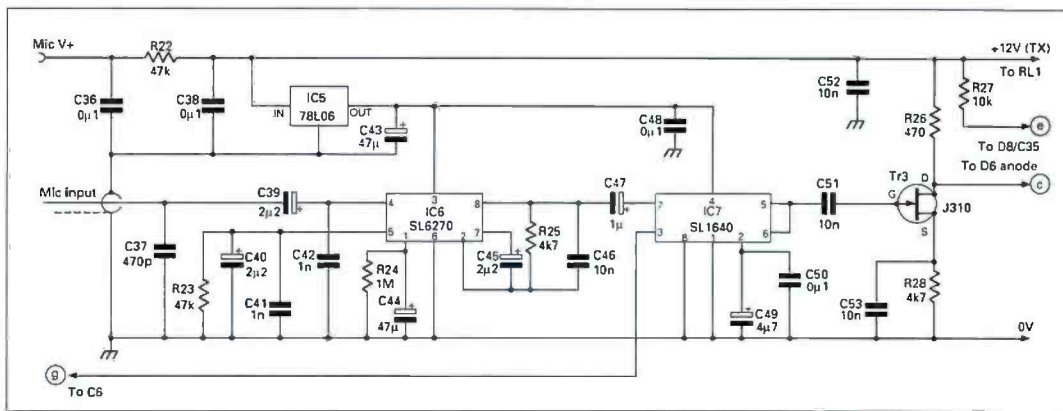
In its most basic form, the Jubilee front panel control, R13, provides a variable control voltage to vary the i.f. gain. This can be upgraded with the add-on a.g.c. amplifier option.

The output from the i.f. amplifier is coupled via C25 to an NE602 integrated circuit, IC3. This provides the function of a product detector.

The NE602 has become the radio constructors delight of recent years. It combines a double balanced mixer, internal oscillator and voltage regulator all in a single 8-pin DIL package.

In this application the NE602 is (shamefully!) under-used. I've used it as a single ended mixer to form a product detector with switched oscillators. The oscillators also serve as the signal source for the s.s.b. generator and the correct b.f.o.

**Fig. 1.4: Circuit of the microphone amplifier/limiter and balanced modulator board used in the transceiver (see text).**



frequency signal is fed in on pin 6 of IC3.

Yet another radio constructor's favourite, the LM386, is used as the audio amplifier. In this circuit it's run in the high gain mode, although I cannot recall seeing any circuit where it's used in the low gain mode!

The variable resistor, R20, is the audio gain control and C33 and R21 form a Zobel filter to stabilise the output. The board is capable of driving a loudspeaker in quiet locations. For mobile use a headphone and a boom microphone arrangement is preferred.

Later, I'll describe a very simple audio filter which can be added to the audio gain control. This is simply a tuned circuit at about 800Hz, made from a 83mH inductor and a 0.47µF capacitor.

### Single Sideband Simple

In the Jubilee project, the single sideband generator section is very simple. The VOGAD chip, IC6, is the Plessey SL6270 device that provides up to a 60dB a.g.c. range which can be preset by the value of R25.

The microphone input has been designed for use with a polarised electret microphone. This has two advantages: the use of a boom microphone headset for mobile or portable use and the possible use of cheap microphone elements.

The resistor, R22, decoupled by C36 and 38 provides the polarising voltage for the microphone. Some types of electret microphone elements have a

separate polarising connection which should be connected to Mic V+.

Most boom microphones send the polarising voltage down the microphone input wire. If this is so, Mic V+ is joined to 'MIC' on the printed circuit board. The capacitor, C39, isolates the input of IC7.

Another Plessey device, the SL1640 is used as the balanced modulator. This mixes the audio input at pin 7 with an upper or lower sideband crystal oscillator on pin 3.

The resulting double sideband signal from the SL1640 is coupled via C51 to a J310 f.e.t. transistor to amplify the signal. The diode, D4, switches the double sideband (d.s.b.) signal to the crystal filter which removes the unwanted sideband. The diode, D2, then routes the signal to the 'TX OUT' pins on the printed circuit board.

The board has two separate beat frequency oscillators (b.f.o.s). These are selected by switching a 9V line to the required oscillator via S1.

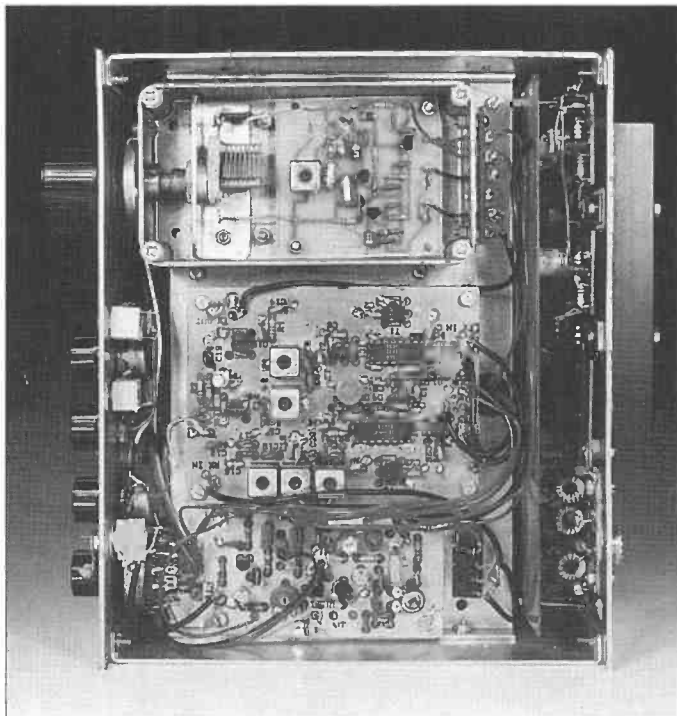
The oscillators are 2N2222 bipolar transistors run at low level to avoid carrier leakage. The board provides space to add a screen around the oscillators.

In practice I had no problems without a screen. But as a precaution I grounded the cases of the b.f.o. crystals.

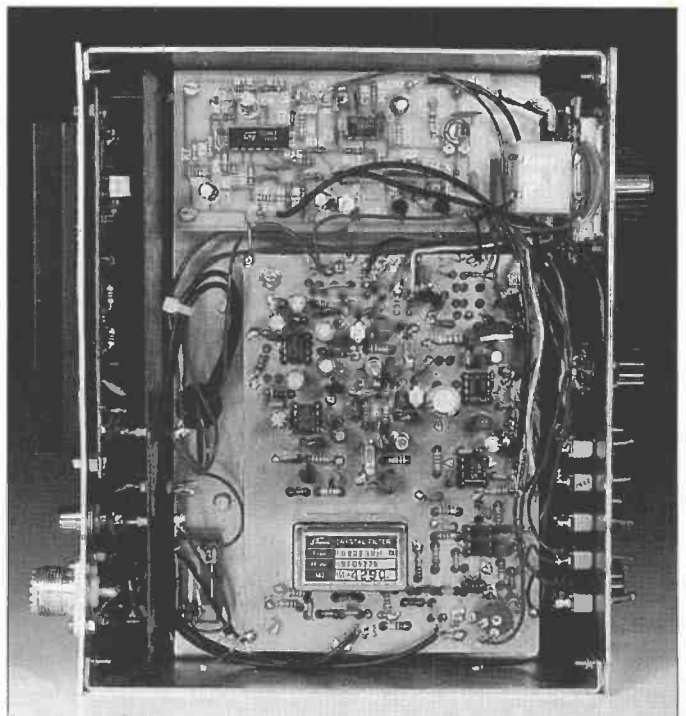
That's about it for now. Next time, I'll describe the assembly, the testing stages, provide the shopping list and give you some ideas for add-on units.

PW

**Fig. 1.5: A view of the underside of the Jubilee transceiver, with the main v.f.o. (mounted in the die-cast aluminium box) at the top of the photograph.**



**Fig. 1.6: Looking down into the completed transceiver project, with the main 9MHz crystal filter visible at the bottom (see text).**



## The Lizard Meets G4ATA!

Keen 'square' collector John Hotching G4ATA tells the story of how he mounted a v.h.f. DXpedition to the Lizard peninsula in Cornwall, and raised money for the BBC's Children In Need Appeal at the same time.

The idea of taking part in a DXpedition to a rare square appealed to me. So, when my wife said that I could go away for a week on my own with the radio gear, I jumped at the chance!

It was around the end of May 1990 the idea was agreed. I immediately set to work on organising things as quickly as possible.

I eventually decided on the week August 10-17 to cover the peak of the Perseids meteor shower. I would also be reasonably sure of decent weather even in this country!

### Lizard Location

I eventually decided on The Lizard Peninsula in Cornwall as the best location. It seemed to be the most easily accessible 'rare' square.

I had already got in touch with the Clerk of the Parish Council of the Lizard. This resulted in a telephone call from Jim G4WSH, who's a resident in the Lizard.

Jim put me in touch with the owner of Trethvas Farm, located just to the north of the village. I then received permission to use one of the farmer's fields.

I decided on raising money for the BBC's Children In Need Appeal. This is because I believe it's a very worthy cause and I have two of the monsters myself!

Sponsorship forms were then printed and distributed around work associates, friends and neighbours. This was done along with a covering letter trying to explain my intentions.

I decided to activate 50, 144 and 430MHz. Then I set about the task of persuading friends to loan equipment to supplement my own.

I should at this point say that a big 'thank you' must go to Dave G4IAU and Steve G7CCL, who loaned me their mobile tower for the week. Also to the North Wakefield Radio Club G4NOK who loaned the rotator, 144 and 430MHz antennas. And last but not least, Dave G8GXP for the loan of the 430MHz p.a.

About two weeks before my departure, I gathered everything together for assembly and testing. I didn't want to travel over 400 miles and then find that I was short of something!

Someone wanted to join me! Jason Russell (soon to become G7IDR) asked to come along. A branch manager from one of my sponsors, had also promised to give me a hand if necessary. After seeing how much gear we had, he was rapidly contacted so we would have an extra vehicle.

### Loading The Equipment

On Thursday August 1990, the job of loading up the equipment was started. After a final check, we set off for Cornwall at about 10.30pm.

We eventually arrived at our destination at 8.15am. I had a choice of three fields in which to camp and set up the station.

After a couple of hours we met John G4ZTR, Dave G4VIX and Mark G6CMS. They came to set up their 50 and 70MHz station in the same field (it's a small world isn't it). Our neighbours introduced themselves as three members of the Windbreakers Contest Group.

It was then time to say 'goodbye until next Friday' to our helper who headed home. We then wound up the tower, guyed it off, and went on the air.

The first contact and QSO was made on 144MHz at 14.00UTC with G4YGT/P in IO82 square. The only areas of note worked on 144MHz were IN85 and IN73. There was also one of only two GD stations worked - GD4IOM in 1074.

After a break to keep a sked on 3.5MHz with G4HKY in West Yorkshire, near my home QTH, activity on 144MHz was resumed. This brought EA1TA in IN53 to the log-book.

From the Principality, GW4LXO requested me to QSY to 50MHz to give him a new square on the band. And, after a couple of brief QSOs on 50MHz, my return to 144MHz brought the first QSO with my home locator square in the shape of Dave G8GXP (IO93).

The following three hours resulted in contacts in IOs 70, 71, 80, 81, 82, 90, 91, 92, 93, JOs 01, 02, 10, 21 & 22. There were also a smattering of EAs.

On the morning of the 11th the rig was not turned on until half an hour before my first meteor scatter (m.s.) sked. A QSO with EA1NV in IN73 was the result of a call to the east!

The following m.s. sked with I1TXD was not completed. The activity for the rest of the afternoon was all on 144MHz apart from a QSO on 50 and one on 430MHz. The squares worked included IOs 70, 72, 80, 81, 90 & 92, INs 78, 88, 98, 53, 73 and JO01.

We then went on to the 430MHz Activity Contest. The first 20 minutes was quite promising, as we had QSOs on 430MHz in JOs 00, 01 and 02 and IOs 90 and 82.

After working Malcom G4MKF on 144MHz, he asked if I was QRV on 430MHz. This provided another seven QSOs on 430MHz in IOs 71, 81, 82, 83 and 91.

Working on my past experience of 430MHz contests, I thought that 16 contacts in two hours was good. I felt quite hopeful for the activity periods for the rest of the week.

### Improving My French

I decided to relax for a while on 144MHz and start improving my French! A CQ call to the south east brought F6HRE in IN93GK. My thanks go to him for persevering with my poor French!

Listening to the GB2RS news on the Sunday morning, I heard my expedition featured. After this I set about the task of working 144MHz with a little more heart.

With the beam to the east, a string of Dutch stations were worked. Quite a few of the PA stations promise to listen out for me on 430MHz

Fig. 1: The antennas at the G4ATA DXpedition at Trethvas Farm.



later on in the day.

A couple of German stations were worked in JOs 31 and 32. There was also ON2ABC in JO11VB who informed me that he was only running 750mW!

Later, I had a sked with Roger G0LVH at 12.00UTC. I heard G0LVH calling me via tropo and sent him a report of 51. But he obviously didn't hear anything from me. I was quite surprised not to get any meteor bursts during the sked, especially on 50MHz.

Jason, who had in the previous 24 hours become G7IDR, was idly tuning around 144MHz when we heard TM1BRE in IM88MU calling. We exchanged 59+ reports both ways, and the beams were still pointing to the north after the previous sked!

After the promises of the Dutch stations to listen out for me on 430MHz at 19.00 hours. I started calling, feeling quite confident of having a busy time. How wrong I was!

After working G8LPY in IO90, the only stations heard were G4AGE, and G4YQP who is located in Mullion, five miles away! I then had a m.s. sked which was completed after 40 minutes and JO90 was added to the list of squares, and Poland to the list of countries worked.

My next sked was with HG3DXC in JN96 at 23.00. I heard YU2CV at about S8. I completed with HG3DXC in 15 minutes, sending him 37 and receiving R27. Then I completed with YU2CV in JN95WK. I then rounded off the day by completing a sked with IW1AZJ (JO35) in 24 minutes.

### Monday Activities

Monday 13th's activities started with FC1KHN/P in J000 on 144MHz and also on 430MHz at just after 09.00UTC. I then joined the v.h.f. net on 14.345MHz to arrange skeds.

Next on the agenda was a sked with G0JHC in IO83 on 50MHz. This was to be my first attempt at meteor scatter on 50MHz and I completed with G0JHC in nine minutes.

The 144MHz band was fairly quiet until my sked with Y22IC (JO63SP) at 13.00. It was successfully completed in 44 minutes.

I had two skeds that evening with Stewart GM4AFF. I received a short burst from Stewart almost immediately. I was sending him a 27 report when, at 19.40, he appeared via tropo at 52.

We were both very surprised to make the QSO via the tropo mode. Our exchanges of information were made very quickly before the propagation disappeared. He was to be my one and only QSO with GM from The Lizard.

After that QSO with GM4AFF I had several stations waiting to call me. I worked GD4XTT (IO74), GW3JXN (IO72), G4HGT (IO93) and G4ASR (IO81) who also requested that I QSY to 50MHz. I then returned to 144MHz and worked G6EBH (IO93) and Adrian G0LBY also in IO93.

### Marconi Memorial

Jason and I decided to drive into Helston to use a bank and have a look around. On the way back to the Lizard we decided to call and pay homage to the man himself, and visited the Marconi Memorial at Poldhu Point.

Back at camp, at 16.30 a call on 144MHz resulted in me working G0CUZ (IO82), G1NCZ (IO93) and GW1PDN (IO81) who also requested a QSO on 50MHz. He was a nice 59 signal on 50MHz and was one of the very few tropo QSOs to be had on the band.

Just at this time, when I wanted to turn the beam to the north east from the south east, the rotator failed. After about ten minutes I managed

to work OH3MF off the side of the beam and received a 56 report from him at 19.16 hours.

The rotator controller appeared to be all right, so I decided to bring the tower down to check the rotator. That appeared to be in order, and the fault corrected itself!

During the following 45 minutes on 50MHz from 20.00 to 20.45, I worked SM0CVHH (JO89), SM6HYG (JO58), SM0NI (JO99), SM6KXN (JO67), SM6PU (JO67), SM6FHZ (JO67), LA3BO (JO59), LA1QCA (JO59), OZ4VV (JO46), OZ1JX (JO46), OZ6QX (JO56), OZ1OF (JO46), OZ1HRA (JO46) and OH5NQ in KP30ER..

On 430MHz I constantly received better reports than I sent on the band. I found stations that were obviously copying me satisfactorily were very difficult to work.

On the morning of Wednesday 15th, calls on 50, 144 and 430MHz went unanswered. In desperation I tuned up the FT-707 on 7MHz and worked a few G stations.

After lunch, calls on 144MHz brought QSOs with F1ANH (IN98) and FC1NQ (IN87) at around 15.00 hours. I then called CQ on c.w. and my call was answered by FD1PCV in JO0VJ!

On Thursday 16th I was hoping that 50MHz would open with some decent propagation. So a fairly close ear was kept on the band.

The first QSO of the day was on 144MHz with Peter G4YPC. I also had a brief QSO with him on 430MHz (so the receiver was working after all!).

For the remainder of the day contacts on 144MHz were few and far between. The only one of any note for us was with G0DVY in JO03CI a new square.

A couple of times it seemed that something might occur on 50MHz when the band became quite noisy with television transmissions and such. Around 13.30 hours I copied ZB2VHF at 599 for about five minutes.

On 50MHz at about 19.25 my calls were rewarded at 19.31 when I worked DL7ZL in JO62NK, followed by OEs 1LWA/8 (JN76), 6DGG (JN87) and 8HIK (JN76). Italians then appeared on the band at about 19.45 hours.

The early DL and OEs were joined by Italians in JNs 61, 71, 54, 70, 55, 64, 63, 53 and 52 along with DK2EG (JN59), OE5OLL (JN68), DL7QY (JN59), SV1OE (KM17), F6BNX (JN33) and EA3EHQ/M (JN01). To finish off I worked 9H5AA, 9H1PA (JM75), IT9JLU (JM78) and 9H5EX (JM75).

### The Last QSO

The last QSO on 50MHz was at 22.05 hours. I went to bed with a smile, feeling quite pleased with the last evening's contacts.

Rising with the lark on Friday morning I had one last spell on 144MHz. The last three QSOs on the band were made just before 07.00 hours.

We finally left Trethvas Farm after thanking the owner and his wife for their hospitality, at around 16.00UTC. Apart from the rainy weather, the journey home was uneventful. We finally arrived back in West Yorkshire at about 1am local time, tired but pleased. I enjoyed the trip, raised around £800, and I'd do it again if my wife would let me!

PW



**John G4ATA on air during the DXpedition to the Lizard peninsula in Cornwall where he was assisted by Jason G7IDR.**

### A summary of the expedition

50MHz	60 QSOs	14 countries	36 squares	SV1OE
144MHz	185 QSOs	17 countries	42 squares	YU2CV
432MHz	24 QSOs	4 countries	14 squares	ON5NY

## In-Car Insurance and Amateur Radio Equipment

Jim Stroud is a professional when it comes to advising on insurance matters. In his short article Jim takes a look at what's involved with insuring our valuable mobile amateur radio equipment.

**The subject of insurance is complicated, but the general guidelines I've provided should help make matters easier to understand. However, if you would like further information contact me, Jim Stroud, on 034-284 4000.**

30

**A** great deal of interesting editorial comment and correspondence has appeared in recent issues of *Practical Wireless* regarding the thorny problem of mobile equipment insurance. As many readers will have discovered, the attitude taken by insurers in both the Company and Lloyd's motor insurance markets, varies considerably.

If owners of amateur radio and ancillary equipment are relying on insurance cover under their motor policies, then they need to check the position very carefully with their respective insurers.

### Equipment Covered

The type of equipment covered under a motor policy may be variously described as 'audio and/or communication equipment, citizens band radio equipment, sound reproduction equipment', etc. Some definitions being more restrictive than others.

For nearly every motor insurer a pre-requisite to cover is that this equipment is fitted permanently within the car. In some cases it's a requirement that the fitting has been carried out by the manufacturer. Under some policies cover extends to include equipment kept within a private garage.

Where cover is provided, a claim limit is normally included within the policy and can be between £250 and £750. Under most motor policies these days there's a £100 theft excess, although some companies waive this excess if the theft takes place from a car within a locked garage.

The cover available under a motor policy can also vary according to the type of vehicle and policyholder. No cover, for example, may be provided for policies effected in the name of a company, rather than an individual.

Furthermore, while some insurers will provide a measure of cover under a comprehensive policy, they will not provide any cover under a Third Party Fire and Theft contract. The insurance is not normally provided at all under a Commercial Vehicle policy.

Claims, where payable, are based upon the market value of the equipment and are not settled on a replacement 'new for old' basis.

### Important Consideration

Another important consideration concerning the limited cover available under a motor policy, is the effect a claim for mobile equipment will have on the no claim discount. In most cases, one claim will affect the bonus by reducing it by two stages.

For example, a 60% 'no claims bonus' would reduce to 40%, or a 50% bonus to 30%. In the event of two such claims, the bonus could be lost entirely.

Even where a bonus has been protected, it may not be wise to make small claims. Under most policies only two claims can be made in any three or five year period, without the bonus being affected.

In cases where the equipment has been damaged in an accident under a comprehensive policy, there may possibly be the chance of a

recovery from a third party insurer. This may be done without the bonus being affected, but losses of equipment in the main will, of course, arise from thefts.

There is a specialist insurance cover available for amateur radio equipment available through Amateur Radio Insurance Services (ARIS). This will provide cover on all mobile and portable radio equipment. Cover is effective on a replacement 'new for old' basis, or covering the full cost of repair where applicable.

Under the ARIS scheme, where loss or damage to the insured equipment results from theft from a motor vehicle, the policyholder is required to pay the first 25% of each claim. The insurers limit of liability will be £1000 for each separate occurrence, less the 25% mentioned above. This limit however, may be increased to £2,500 (less the excess) on payment of an additional premium.

The £1000 and £2500 limits do not apply while the insured amateur radio equipment is at, or in transit to, or from any rally, field day or other meeting held under the auspices of the RSGB or any affiliated club or organisation. The ARIS policy is, however, only available to RSGB members or members of an RSGB affiliated club or society.

More recently the cover in respect of mobile equipment has been extended to include portable telephones. This is subject to the payment of an additional premium.

### Policy Restrictive

From what I've already mentioned, you'll realise that the cover available under a motor insurance policy is very restrictive in most cases and non-existent in others. However, the specialist insurance provides a large measure of cover in most cases.

Let's consider a typical case. I'll use a theft of equipment valued £2,500 from a car for the example.

Under a motor policy, provided the equipment has been permanently fitted, many policies would cover up to a maximum of £250. However, the claim would be reduced to £150 after deduction of the policy excess. And, any claim would be paid on the basis of the market value, with a possible affect on the no claim discount.

With the specialist insurance, assuming the higher limit of £2,500, there would be a 25% deduction. There would also be an amount of up to £1,875 payable on replacement 'new for old' basis.

In the event of damage to equipment rather than theft, there will be no cover under a third party fire and theft motor policy. Under a comprehensive policy, in many cases cover would be restricted to £250 less any voluntary or compulsory policy excess, again with claims payable on a market value basis and possibly affecting the bonus.

Under the specialist insurance, accidental damage cover would be payable in full up to an amount of £2,500 on a replacement new for old basis.

PW



# Will You Be Practising 'Safe DX' At The London Show?

## Yaesu Musen

### FT1000

Awarded the best of everything, the Yaesu FT1000 is their flagship, why not make it yours too? I know it retails at three & a half grand, but I can do wonders to the price and give you options on paying the balance. If you want to make a serious investment on the very best transceiver in the world, then come and see me!

### FT990

If you don't feel the necessity on having the FT1000, then why not choose the FT990? It's built along side it's big brother and still offers most of the main features - including "digital" filtering that no other radio has! The price has already been slashed by Yaesu U.K. and I'm offering even better tempters to relieve you of your cash!

### FT890

The worlds smallest 100w HF transceiver with auto-atu, it's true, (the TS-505 has a tuner the same size as the radio), but if you want a compact HF station with features only found on bigger machines, then take a closer look at the FT890. The auto-atu actually fits inside the radio, making it a truly portable HF system.

### FT840

Launched at the Leicester show last year, this NEW HF transceiver costs less than many receivers available on the market and offers stunning performance. The RadCom team loved it and so do I - you can have one from only £13.50 a week!

### FRG100

Now the price is back to what it was twelve months ago, this excellent 50KHz-30MHz receiver is an absolute winner. Yaesu have improved the AM filtering and for the price of a dual-band handle you can have one today!

### FT736R

The only VHF/UHF base station to offer EVERYTHING in one box, the FT736R has proved to be the DXers choice for 2m/70 or 23cm. Yaesu tell they have a permanent waiting list for this one, despite it being several years old. For complete flexibility on all the upper bands, including a built in PSU, full satellite operation and much more, if you want one today, give me a call!

### FT260R mk11

Once again, Yaesu have the market to themselves, the FT290/690/790R series are the only multimodes operating on 2, 6 or 70cm offering full portability. If required, clip on the optional linear amplifier and you turn it into a full blown base/mobile installation!

### FT5200

The only DualBand mobile 2/70 FM transceiver with a "quick release" front panel, the new LOWER price for this model makes it a must! Full duplex, optional CTCSS and remote cable kit make this the most versatile of all the "funny mode" talk boxes!

### FT2200/7200

The latest in a long line of FM transceivers, these two are the most compact and easy to

use yet. A full 35 watts on seventy, or 50 watts on two, these two new "super models" are the ones to go for.

### FT530R

Think you've seen a good deal elsewhere? Think again! When Yaesu introduced their new DualBand handle to replace the FT470R, customers couldn't believe the build quality and features contained in such a neat package. No, it's not the smallest, but then unless you're a ballena with dainty little fingers, who cares? Unlike all the competitors, the FT530R has CTCSS fitted and comes supplied with NiCads & Charger. The price? You won't believe it!

### FT11R/41R

I know you probably think the Japanese have gone bonkers building VHF portables, but you've just got to see what Yaesu have done with these two. No larger than a packet of cigarettes, the NEW FT11R/41R handles are full feature machines with all the "trick" facilities built in. The volume & squelch are controlled by up & down buttons, leaving the top panels with only one knob - the channel change knob. See one today!



## Icom

### THE NEW ICOM IC-736

#### 100 watts on HF + 100 watts on SIX!

Due in March 1994, the IC-736 is a worlds first all mode all band 100w transceiver including the brilliant SIX METRE BAND. No other manufacturer has given you so much in one package. Based on the already best selling IC-737 introduced last year, just look at the additional features:

- ★ 100 watts from 160m - 6m inclusive
- ★ YES! 100 watts on Six!
- ★ Built In Mains PSU
- ★ Dual Antenna ports
- ★ Now with R.F Gain control!
- ★ Dual display
- ★ See & check second VFO instantly
- ★ Mid-size package



No other radio offers you so much - for so less. Have Icom got it right? I should say so! The price is right and so is our special opening offer. Call now.

### Icom IC737

If you're not enthused about the NEW IC736, or simply don't want 6M or possibly a power supply, then take a special look at the IC737. It's been a favourite of mine since it's introduction last year. Voted one of Peter Hart's favourite rigs, his comment "amongst the best receivers I've ever tested" is absolutely true. They're in stock at a special price to suit you.

### Icom IC728/9

Sub E1K will bring you a neat 100w HF station called an IC728. If you want 6m then add £300 or so pounds and buy the fabulous IC729. Both have digital synthesizers going unparalleled "smoothness" and real VFO like tuning.

### IC275H/475H

Still the trend setters amongst the "BIG BOYS" on VHF, 100w on either 2m or 70cm is the way to go. When I first took the pair home I thought there was something wrong with the receivers - they're that quiet! Throw out your old FT25RD, even with mixET, believe me, it doesn't compare.

### ICW21E/ET

The alternative Icom Dual Bandster is available with or without keypad. They are great value and still offer all the extended receive features that is so important today. Why I don't know, but there it is. What ever happened to AM on 2 and Tuning "low to high"?

## Trio-Kenwood

### TS950SDX

The only HF base station to feature proper digital signal processing, 150 watts, all mode, general coverage, dual receive and lots more. If you listen to 14.295 and hear Eddy, GOBBD, he'll tell you how good it is. You will be able to HEAR how good it is on transmit yourself!



### TS850S

Recently reviewed in PW, the TS850 set the standard for sub E2K radio's and judging by how many we get through



every month, you obviously appreciate the machine as well! Rather like a popular cat, you either know someone with one, had one and wish you never sold it, or haven't yet got round to investing in the best HF base station since Trio launched their TS530 all those years ago. I'm here and I'm ready to take your money!

### TS450/690S

For those of you that like things a little more compact in HF operation, but don't want to lose the bigger radio features, try the TS450 or TS690 for size. You can specify auto ATU with either. (Yes the TS690 will give you 100w on HF, 50w on 6 metres & contain an auto atu) and the price worth bust the bank.

### TS50S

Apparently there are people out there that still think the ever so small TS50S is an April Fools play from last year! To put the record straight, the radio really is the size of a 2m multimode,

does produce a clean 100w output, does possess a multimode receiver with general coverage and is just about the most amazing piece of kit I've ever seen out of Japan. Don't continue being a mushroom sitting in the dark, ask about one today.



### R5000

Still the favourite shortwave receiver and built to Kenwood's high quality of construction. You can add an internal VHF option to cover 108-174 MHz for a minimal cost and additional filters throughout the modes.



### TR751E/851E

Take it from me, these two 25 watt multimodes for 2 & 70 are still unmatched by any other manufacture. No fills no gimmicks,

just good RF performance. (they must be, "multiTek" hasn't touched them since they were introduced). These two winners continue to sell despite any recession.

### TS790E

For those of you that like TS850 style looks but want it on VHF, then take a look at the new TS790E. Comes fitted with 45 watts on 2 & 70, you can add a 10w 23cm module and have a triple band base all in one box! They are good. I used one at home for a while, until Chris, G1FMH sold my own machine to a customer. What ever next.



### TM241E/441E

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### TH78E

The TH78E still has the most features per pound offered on a dual bander. It's the

smallest shape with the most buttons on it, I haven't counted them all, but the first person who does and tells me face to face, gets a free case for it worth £16!

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The latest in slim-line single band FM handles. If you're fed up with the bits you'll never use, but just want a good 2 or 70 radio then look no further. They are sensibly priced too!

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# Wouldn't You Rather Buy From Martin Lynch?

# A Hands-Free Mobile Microphone

Steve Farrow G8IWX shows you how to keep your hands on the steering wheel, while still enjoying amateur radio on the move.

Mobile operation has been popular for many years. Surplus p.m.r. transceivers can be bought very cheaply and even the latest Japanese mobile black box doesn't cost more than an arm and half a leg.

It's safety first these days. Drivers, such as the amateur radio operator, with one hand on the wheel and the other clamped tightly around a microphone, or the mobile telephone user, are now looked upon as a hazard by the police.

Having once been the cause of a particularly frightening near miss, I resolved that such a situation **must not** occur again. I, like many others, am a Yaesu FT-290R owner, and there is a hands-free microphone and control box available for that rig

But I found the price demanded for the genuine microphone and control unit outside my pocket. So I set out to design my own.

Factors I considered important were, that there

had to be no modifications to the vehicle - so boom mikes were out.

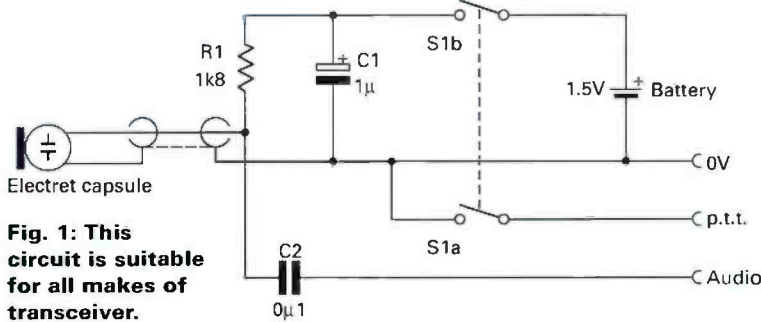
Secondly, the microphone had to be self contained with the p.t.t. switch and microphone insert in one unit and instantly transferable from car to car. Finally and most importantly, the unit had to be **safe** in use.

Balancing the three factors, led to a halter style microphone that hangs around the neck and positions the insert only an inch or so from the lips. However, it is at the same time safe in the event of an accident.

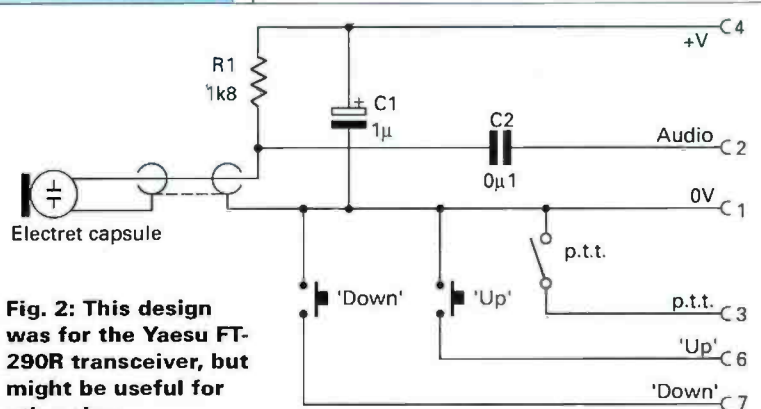
I've used a readily available electret insert that is compatible with the vast majority of transceivers in common use. The insert does however require a d.c. power source, which is why there are two variants of the microphone.

Look at the circuit of the 'universal' model **Fig. 1**, containing a small battery as a power source. This unit, microphone and p.t.t. switch only, can be used with any transceiver. Construction instructions apply to either variant of the unit.

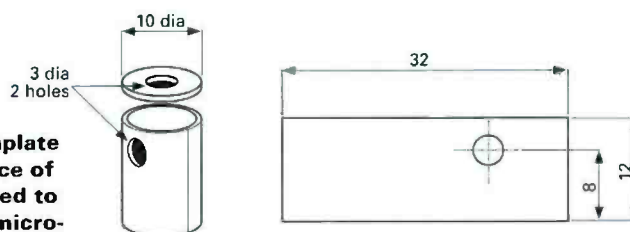
The second unit **Fig. 2**, receives its power from the transceiver and has been built for, and tested with the Yaesu FT-290R. However, it should be usable with any transceiver with a positive d.c. voltage, of between 1.5 and 9V, available at the microphone socket.



**Fig. 1: This circuit is suitable for all makes of transceiver.**



**Fig. 2: This design was for the Yaesu FT-290R transceiver, but might be useful for other rigs.**



**Fig. 3: Template for the piece of tinplate used to make the microphone insert holder.**

## Construction

The microphone is easy to construct without using difficult to obtain parts. The basic mechanical components are a wire coat hanger, a short length of net curtain spring, a die-cast box and a small piece of tinplate.

Referring to **Fig. 3**, cut the two pieces of the microphone insert mount from a piece of tinplate and solder together as shown to form a cylinder with one open end.

Take the coat hanger and cut both arms immediately below the twisted section. Discard the hook and the twisted section. Straighten the wire and file one end to a point.

Cut a 100mm length of net curtain spring and using a small self tapping screw, secure the mount to one end of the spring. With a twisting motion, and taking care not to skewer your hands in the process, secure the other end of the spring to the pointed end of the coat hanger.

Based on the type of unit you wish to build, drill the box and lid in accordance with **Fig. 4**. Thoroughly de-burr and de-grease the box, the lid and microphone insert mount. Spray these and the spring with paint of your choice.

After waiting 24 hours for the paint to dry thoroughly, apply instant lettering. Spray the lid and box with a clear varnish to protect the lettering against abrasion.

Carefully solder a 1m length of miniature screened cable to the microphone insert, with the screen going to the negative side of the microphone, **Fig. 5**. Fit a cable tie tightly to the

CONTINUED ON PAGE 37

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2pm - 4pm "Don't Panic (dealing with EMC problems)", by *Robin Page-Jones, G3JWI, and Dave Lauder, G0SNO.*

#### Sunday 13 March

12 noon - 2pm "LONNY - the London to New York Packet Radio Wormhole", by *Julian Pricoe.*

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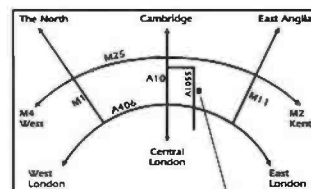
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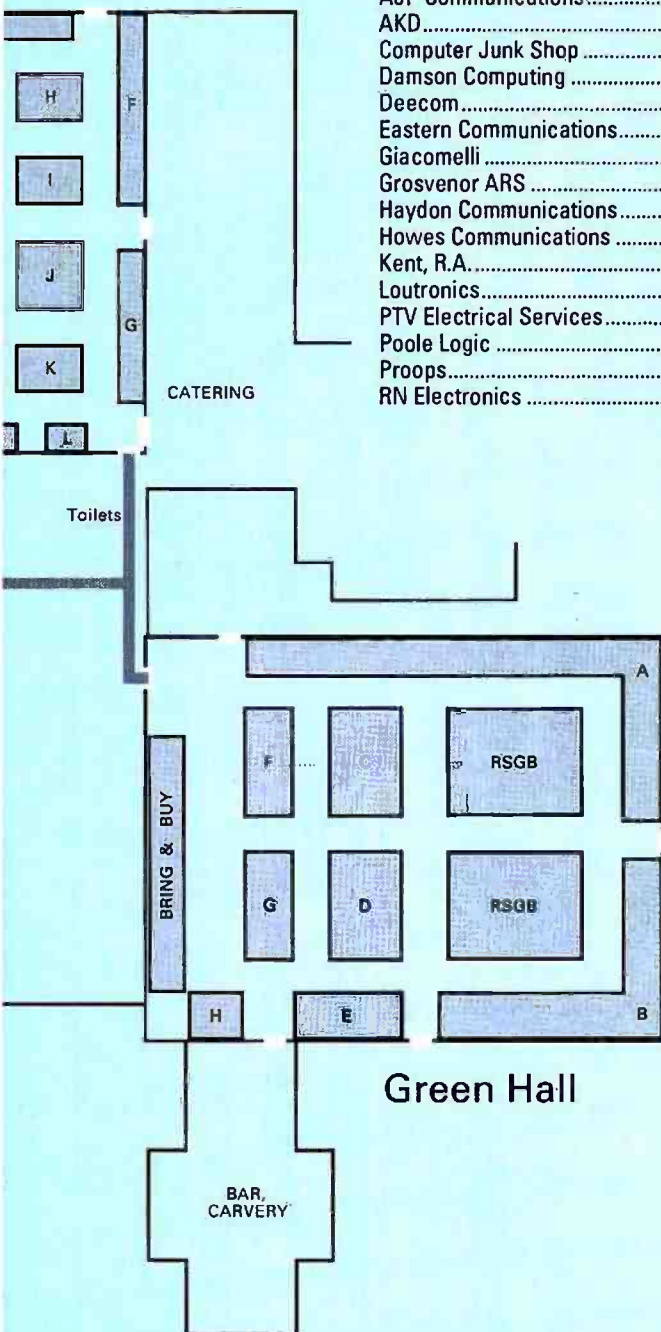
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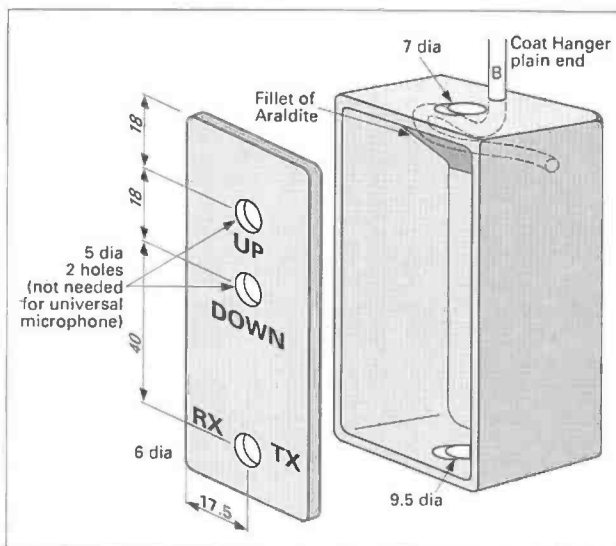
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cable about 10-15mm from the insert as strain relieve.

Feed the end of the cable through the hole in the mount, and pull the microphone insert into position in the mount. Secure the insert in the mount with a little epoxy resin glue.

Next cut a 15x30mm piece of p.c.b. material. Using a small hacksaw, make three saw cuts through the copper where shown in Fig. 6.

Now fit the two wire links and the three components to the copper side of the board where shown. Trim the screened cable from the microphone to length and solder the outer to the 0V pad of the p.c.b. and the inner to the pad linking C2 and R1.



# Amateur Radio On The Move

**Fig. 4: An exploded view of the control box before assembly**

**Fig. 6: The 'p.c.b.' is simplicity itself.**

## Suitable Sleeving

Slide a length of suitable heatshrink sleeving over the cable and coat hanger, but don't shrink it just yet. Fit the box onto the free end of the coat hanger, bend the wire and secure it with a fillet of epoxy resin as shown in Fig. 4.

Wait for 24 hours for the resin to fully harden, then fit grommets into the two remaining holes in the ends of the box. Feed the cable through the grommet adjacent to the coat hanger. Fit another cable tie tightly to the microphone cable within the box to secure the cable.

Now you can set to and shrink the heatshrink sleeving covering the coat hanger and cable. Starting from the shape specified in Fig. 7 adjust the wire shape to your personal preference.

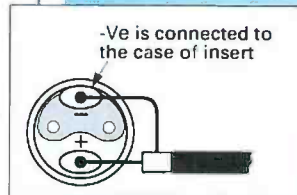
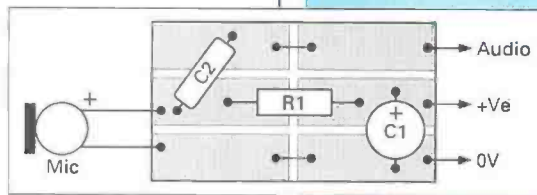
Fit the p.t.t. switch, and if building the FT-290 version, the **Up** and **Down** push buttons on the lid of the box. After checking that the components won't foul on the switches, secure the p.c.b. and, if appropriate, a battery holder for a single AA size cell to the inside of the box using epoxy resin.

Use a suitable length of multi-stranded miniature coaxial cable and 7/0.2 equipment wire, connect up the box as shown in the relevant circuit diagram. If you're using separate wires, the leads to the transceiver should be loomed together with a length of heatshrink sleeving and trimmed to the

required length before fitting the microphone plug.

Cables inside of the box should have strain relieving cable ties applied tightly to the cable loom inside the box adjacent to the grommet. Check the wiring again, and if appropriate, insert an AA size battery in the battery holder. Screw the lid of the box on and paint over the joins to seal the box.

On the microphone, as a finishing touch, glue a spare foam earpad from a personal cassette player over the end of the microphone insert mount.



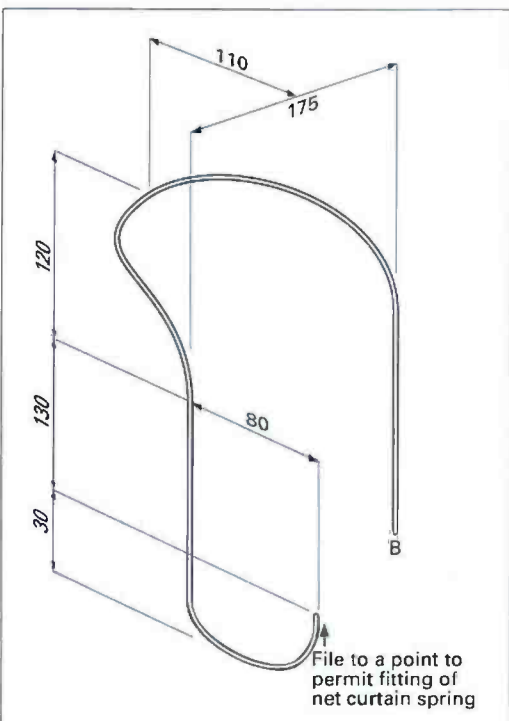
**Fig. 5: Base view of an electret microphone insert.**

## Setting Up

Good news! No adjustments, or setting up were found to be necessary to modulation levels when the microphone was used with an FT-290R. On-air reports have reported no 'woolliness' or problems with excess vehicle noise pick-up. Indeed, comments have been made about the 'clean', 'crisp' signal.

Happy, and most importantly, **SAFE** motoring!

PW



**Fig. 7: Bend the wire to this general shape before adjusting to suit yourself. The control box is fitted at the end marked B.**

## Shopping List

### Resistor 0.25W

1.8kΩ 1 R1

### Capacitors

0.1μF 1 C2 (polyester or monolithic ceramic)  
4.7μF 1 C1 (radial lead miniature electrolytic)

### Miscellaneous

An electret microphone insert (FS34W), a miniature DPDT toggle switch (FH04E), two sub-miniature push buttons (JM47B), a wire coat hanger, a 100mm length of net curtain spring and small self tapping screw to fit one end, a small piece of tinfoil 45x20mm, a small piece of p.c.b. material 30x15mm. 2.5m of 6mm heatshrink sleeving (PB25C), miniature screened cable, 7/0.2 equipment wire, three small cable ties, epoxy resin, paint, clear varnish, instant lettering, a microphone plug to fit the transceiver, a suitable die-cast box, (an AA battery holder (YR59P) if building the 'universal' version). **(Codes in brackets after items are the Maplin electronics order codes).**

## Building The Piptone

With a name like Pip and a callsign like GOPIP, what better project to cover than a piptone! So, Pip Brain GOPIP describes his interesting idea which he uses on 144MHz.

I've used this piptone design on 144MHz s.s.b. for a number of years without any problem. My design evolved because many published designs appeared to be over-complicated.

The other designs I'd seen invariably required a p.c.b. In addition to this, they generally used a CMOS mixed hexadecimal i.c., which can be hard to get hold of. And they tend to be expensive.

Other designs used two or more i.c.s. In contrast, this design uses a single 4001B, quad NOR gate which is very common, and at around the 20p mark it is also one of the cheapest.

The project shouldn't take too long to construct. In my opinion it is an ideal project for the beginner or expert alike.

### The Circuit

Basically, the two main parts of the circuit consists of a simple ring of two types of oscillator. These are made up of R3 and 4, C3 and gates c and d of IC1.

The oscillator is set to produce a 1kHz tone and is coupled to the transmitter's microphone input by C4 (see my note under 'Capacitor Selected' regarding the choice of this component).

The timing circuitry consists of gates a and b of IC1, with C2, R2 and D1. The transistor, Tr1, is used to switch the rig between receive and transmit, this assumes the p.t.t. line needs to be grounded for transmission.

I used a germanium transistor to keep the voltage drop across the transistor to a minimum. A silicon transistor in this application may not switch the transceiver properly.

If this switching system is not suitable for

your equipment, use Tr1 to drive a micro-miniature relay.

The switch S1 is the new p.t.t. or microphone switch. And the switch, S2, turns the pip tone off when its use would be inappropriate, such as for local or f.m. contacts.

The optional 100Ω current limit is for those who add a 13.8V line to an unused pin on the microphone socket. I put this inside my IC-202 transceiver. It adds a little protection in case of accidental short circuits.

### New Switch

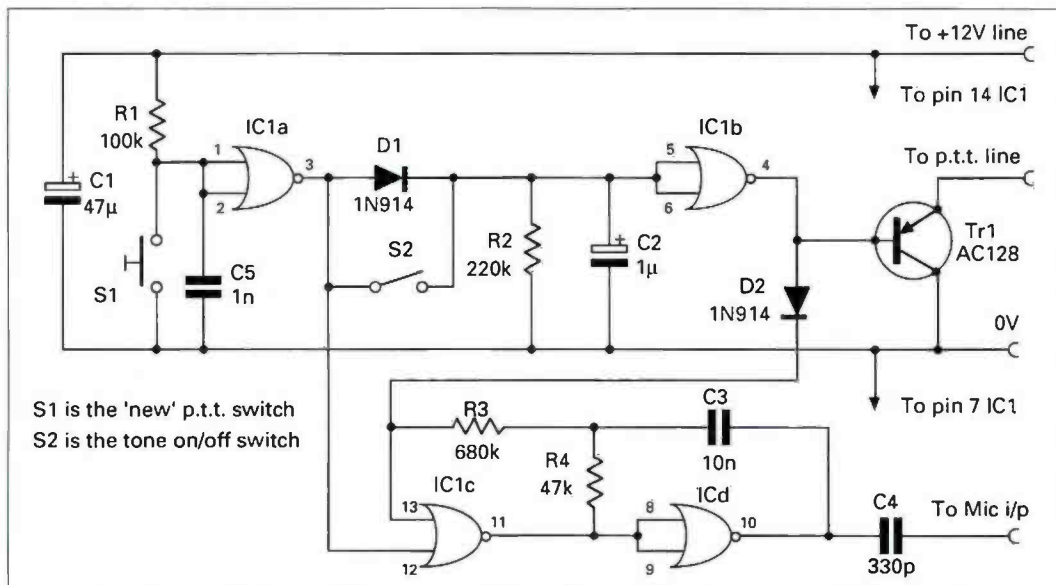
When the new p.t.t. switch is closed, pin 3 of IC1a goes high. This instantly charges the timing capacitor C2 via D1, at the same time the oscillator is inhibited by a high on pin 12 on IC1c.

The rig is put into transmit by a low being applied to the base of Tr1 from pin 9 on IC1b. When the p.t.t. is released, the transceiver is held in the transmit position until C2 discharges via R2 (if S2 is closed, C2 is discharged rapidly via pin 3 IC1a).

However, because pin 3 on IC1a is now low, the oscillator is enabled and the tone is output. When C2 is discharged, the rig is put back into receive by pin 9 on IC1b going high and switching Tr1 off.

At the same time, the oscillator is again inhibited by applying a high to pin 13 via D2, acting as an auxiliary input to this gate. The duration of the tone is governed by C2 and R2, increasing their values, increasing the length of the tone.

The pitch of the tone is governed by C3 and R4. Increasing these values, decreases the pitch. The values I've shown provide the recommended 0.5 second duration with a 1kHz tone.



**Fig. 1: Circuit of the piptone designed and built by Pip Brain GOPIP.**



## Capacitor Selected

The capacitor, C4, should be selected to produce the correct input on to the microphone line. Another way of doing this is to use a larger value capacitor and to adjust the level with a variable resistor.

To set the tone output level make sure S1 and 2 are open. Then short the C2 side of S2 to the R1 side of S1. This forces the rig into transmit with the tone running continuously.

I recommend the level is set to that the transceiver's r.f. indicator in s.s.b. mode (with the tone running) shows a transmitted output slightly less than that of an f.m. or c.w. carrier. This helps avoid over driving or distortion.

Incidentally, the capacitor, C4, on a Yaesu FT-290R Mk1 was found to be 100pF. On an Icom IC-202S it was 330pF. You should experiment with values in this range to get the best results for your

transceiver.

Finally, although the CMOS chip is a buffered type, it's still good practice to observe the usual anti-static handling precautions. I hope you enjoy the project - go on and have a 'GOPIP' for yourself!

PW

# Amateur Radio

*On The Move*

## Shopping List

### Resistors

Carbon film 0.4W 5%

100Ω	1	Optional limiting resistor in +12V line
47kΩ	1	R4
100kΩ	1	R1
220kΩ	1	R2
680kΩ	1	R3

### Capacitors

Polyester 5% miniature

330pF	1	C4
1nF	1	C5
10nF	1	C3

Electrolytic radial leads 16V working

1μF	1	C2 (preferably a bead tantalum type)
47μF	1	C1

### Semiconductors

4001B	1	IC1
1N914	2	D1, 2 (or 1N4148)
AC128	1	Tr1 (any pnp transistor type may be suitable)

### Miscellaneous

A small piece of Veroboard or perfboard, a small push-button switch (to become the new p.t.t. switch), a sub-miniature s.p. switch (tone on/off), interconnecting wire.

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	CD 120	1.8-200MHz 200W SUR/PWR	£117.95 (B)
	CD 160H	1.8-60MHz 2kW SWR/Power	£104.50 (B)
	CD 270D	140/5.25MHz 200W SWR/PWR	£91.50 (B)
Daiwa	CN101L	1.8-150MHz 1.5kW SWR/PWR	£69.95 (B)
	CN103L	150-525MHz 200W SWR/PWR	£79.95 (B)
Tokyo Hypower	HC400L	160-10m 350W A.T.U.	£235.00 (C)
	HX240	2M-HF Transverter	£329.00 (B)
Daiwa	CS201	2 way aerial SW 50239 skts	£17.50 (A)
	CS 201G2	2 way aerial SW 'N' skts	£27.50 (A)
	CS401	4 way aerial SW 50239	£79.00 (B)
Comet	CF 30MR	HF Lowpass filter	£38.95 (A)
	CF 50MR	6m Lowpass filter	£38.95 (A)
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Toyo	T 25	3kW Dummy load	£14.50 (A)
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# Specifications

## - The Mysteries Explained

This month Ian Poole G3YWX concentrates on signal to noise ratio in the third part of his series dealing with the mysteries of equipment specifications.

The two major features of any radio, is the performance associated with tuning and sensitivity. Up until now I have looked at various aspects of the radio concerned with tuning in terms of the rejection of unwanted signals. However, this month I am going to start to take a look at the mysteries involved with the specifications of receiver sensitivity.

Obviously, a sensitive receiver is a prime requirement of any amateur radio station. A 'deaf' or insensitive set will severely limit the capability of any station, because the weak and interesting stations will not be heard. To overcome this problem it is possible to add further stages of amplification. However, there is a limit to the number of stages which can be added to hear even weaker signals.

One of the reasons for the limit of stages is that each stage generates a small amount of noise. This has the effect of masking out the weaker signals and as such it is the limiting factor in the sensitivity of the receiver.

It is found that the noise generated by the first stages in the receiver will be amplified by the succeeding stages. As a result it is the noise performance of the first stages that is the most critical.

### Specifying Sensitivity

There are a number of different ways of specifying the sensitivity of a receiver. As noise is the limiting factor, the figure is always related in some way to the noise actually

generated in the receiver.

The most obvious way is to specify the difference between the signal and the noise under given conditions as shown in Fig. 1. Obviously the greater the difference between the signal and the noise, the better the sensitivity and the weaker the signals that can be heard.

Often, the noise performance is expressed as the ratio between the level of the noise and the signal or the signal to noise ratio. However, as the level of the input signal will obviously have an effect on the signal to noise ratio, this also has to be stated. This means that a signal to noise ratio is expressed in decibels (dB) for a given input signal (usually in microvolts  $\mu\text{V}$ ).

### Receiver Bandwidth

Apart from the input signal level, a number of other factors can affect the signal to noise ratio. One of these factors is the receiver bandwidth.

Noise does not consist of a single signal on one frequency. Instead, it is spread out evenly over the whole band. This means that more noise will be picked up if a wide bandwidth is used. As a result of this it is always necessary to specify the bandwidth of the receiver.

Although a.m. is not widely used for amateur communications these days, it is still used for h.f. broadcasting. As such the a.m. performance is important.

When measuring the signal to noise ratio, the final signal which is measured is the audio output. When using a.m. this is not only dependent upon the signal level, but also on the

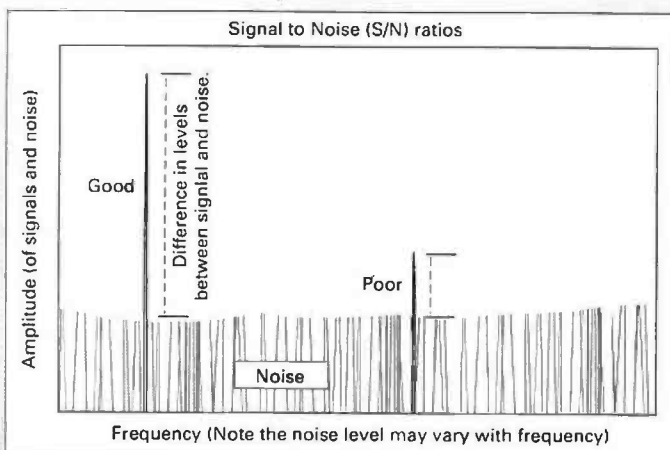


Fig. 1: The difference between signal and noise (see text).

amount of modulation on the carrier. This means that the level of modulation has to be included. Normally a level of 30% is used as standard for this purpose.

Signal to noise figures are normally found in the specification sheets for h.f. communications equipment. Typically a good h.f. receiver will be able to achieve a sensitivity of about  $0.5\mu\text{V}$  for 10dB S/N in a 3kHz bandwidth. For a.m. operation the figure might look something like  $1.5\mu\text{V}$  for 10dB S/N in a 6kHz bandwidth and a sound modulation level of 30%.

It is unlikely that major improvements will be seen on figures like these. Whilst it is possible to achieve a better performance using today's technology, there is little to be gained. The reason is that general atmospheric noise picked up by even

a modest antenna will be much greater than the receiver generated noise. Accordingly any improvements in receiver noise performance will not be detected.

In the next part in this series I will take a look at another method of specifying the noise performance of a receiver.

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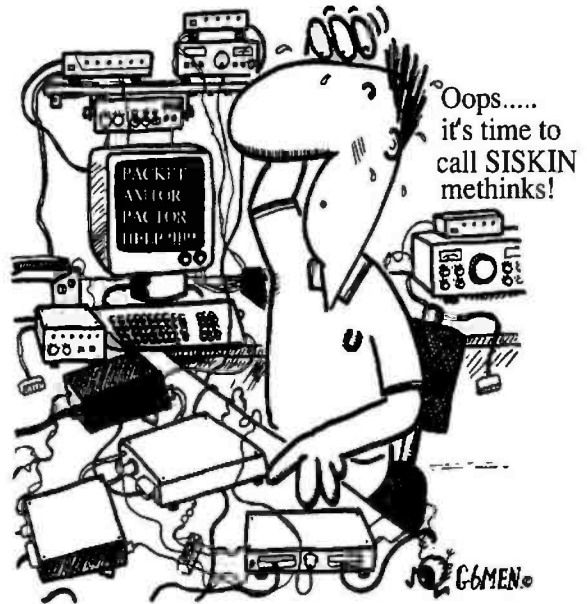
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# The Kenwood TH-22E 144MHz Hand-Held Transceiver

*Richard Newton GORSN takes a look at a very small and interesting hand-held transceiver produced by Kenwood.*

The Kenwood TH-22E is a very small v.h.f. hand-held transceiver. It has a frequency coverage of 144 to 145.995MHz.

As supplied, the transceiver comes with a charger, a 6V 600mAh NiCad battery pack. There's also a helical antenna, belt clip, instruction manual and the normal schematic diagrams.

When I first saw the TH-22E I could not help wondering whether something so small would be practical to use or actually work at all. I would say now, to put your minds at rest, my fears were largely unfounded.

## Idea Of Size

To give you some idea of the radio's size without using dimensions, I compared it to an audio cassette tape holder. The TH-22E is not quite as wide as the cassette case, about the same in length and just a bit deeper.

The comparison I carried out was with the battery pack but without the antenna. The TH-22E is incredibly light. Using my Salta kitchen scales, the radio and battery pack weighed approximately 9oz!

The radio is simple in appearance. Indeed it's marketed as an inexpensive option to the more expensive 'all singing all dancing models'.

The Kenwood marketing approach is an innovation I greet with open arms. There's a distinct lack of new good quality inexpensive equipment these days.

The transceiver's casing is finished in charcoal grey. The front part of the body is made from plastics, the rear is all metal, which presumably forms the heat sink.

The top panel of the radio houses the BNC antenna connector. There's also a red l.e.d. transmit indicator, a rotary ON/OFF/VOLUME control and the multiple purpose rotary control.

The multiple purpose control selects the operating frequency, frequency steps and memory channels. It also selects transmit offsets, tone frequencies, changes the different CPU menu items and also controls the squelch.

## Top Panel Controls

The top panel controls are mounted on a hard rubber base that covers most of the top of the radio. I must confess this concerns me a little as surfaces like this are prone to collect dust, dirt and grime very easily.

The type of hard-rubber base used on the TH-22E also discolours quickly, especially considering this unit can so easily be carried in a pocket or hand bag. However, the cover can be removed quite easily and cleaned separately. It will also withstand more knocks than hard plastics.

The left hand side panel, as the radio faces you, has the press to talk button, lamp button and monitor or squelch defeat button on it. The press to talk has a secondary function when used with the function key, used to toggle the transmitted r.f. power.

With the supplied battery pack the choices are 3W, 500 or 50mW. With a 12V supply the high power changes to 5W.

The lamp button when pressed, will illuminate the l.e.d. display with a green light for five seconds. Used with the function key it will latch the lamp on continuously.

The monitor or squelch defeat button breaks the squelch on the displayed frequency while the button is depressed. To set the squelch threshold the operator has to use the

function key with the monitor key, then adjust it using the second rotary control on the top panel.

If my description of setting the squelch threshold seems cumbersome - it's because it was! However, once I had set the threshold I found that I did not have to re-adjust it again.

The right hand side panel has the speaker/microphone jacks and external power supply socket. These are covered with soft rubber covers.

## Frequency Read-Out

The front panel on the TH-22E has six control buttons on it, along with the l.e.d. display. The display is small, but the frequency read-out is large enough to read adequately.

However, those who have difficulty reading, may have problems seeing smaller function indicators. In fairness this is a criticism that could be levelled at a vast majority of the miniature hand-held transceivers of today.

The six buttons on the front control the v.f.o. to memory switching, key lock and call frequency recovery. They also control tone alert, tone burst, frequency steps (these can be set to 5, 10, 12.5, 15, 20 or 25kHz), repeater shift and reverse frequency monitoring.

The function key is also on the front panel. There's also a removable panel to accommodate an optional DTMF key pad.

## Transceiver Menu

The transceiver also has a menu that can be set up by the user. Don't let this worry you though, as it's an advanced facility that you only need use if you want to!

The TH-22E menu facility will enable you to set such things as a 'time out' alarm. This means that the operator can decide how long the transceiver will transmit before automatically reverting to receive. Although the TH-22E will transmit again straight away, it's a timely reminder for wafflers like me!

Take it from me, to be able to turn off the beep that sounds when a button is pressed is a 'Godsend' to an eager reviewer. Especially a reviewer who is sitting up in bed at 1am trying out the functions of the TH-22E next to his wife who hates radio at the best of times! (*especially when it's his turn to feed the newly-arrived 'junior operator'!* Editor).

The scan facility can be set to stop for approximately five seconds on a busy frequency. Alternatively it can be set to remain until the carrier drops.

The TH-22E menu also enables the operator to control such things as the battery save function and the automatic power-off facility. The menu also has applications if the DTMF keyboard option is fitted.

The TH-22E is also able to transmit CTCSS tones. This facility enables it to access repeaters using CTCSS (these are mostly found in the United States or on the continent at the moment). However, if you wish your TH-22E to decode CTCSS tones and therefore have a CTCSS controlled squelch, you'll have to purchase the optional CTCSS module.

## Simple To Use

My impression of the Kenwood TH-22E is that it's easy and simple to use. The controls are well situated for both



# Review

**Fig. 1: Internal view of the Kenwood TH-22E 144MHz transceiver, clearly showing that the battery pack takes half the available space on this extremely light and very portable hand-held.**



## Specifications

### General

Frequency range	144 to 145.995MHz (✓)
Mode	F2, F3 (f.m.) (✓)
Temperature range	-20° to +60°C
External power supply	5.0 to 16.0V (13.8V nominal)
Battery voltage range	4 to 15V (6V nominal)

### Current Requirements

Receive with no signal	Average 45mA (✓)
Battery saver on	Approx 15mA
Transmit (H,) @13.8V	Approx 1.3A
Transmit (H,) @6.0V	Approx 1.3A
Transmit (L) @6.0V	Approx 0.5A (✓)
Transmit (EL) @6.0V	Approx 250mA (✓)
Microphone impedance	2kΩ
Antenna impedance	50Ω

### Dimensions

Without projections	56 x 116.5 x 24.5mm
With projections	65 x 130.5 x 29.8mm
Weight	Approx 290g

### Transmitter

Power output	
High @13.8V	Approx 5W (✓)
High @6V	Approx 3W (✓)
Low @6V	Approx 0.5W (✓)
Extra Low @6V	Approx 30mW (✓)
Modulation	Reactance
Maximum frequency deviation	±3.5kHz to ±5kHz (4±4kHz)
Spurious emissions	-60dB or less (✓)

### Receiver

Circuitry	Double conversion superheterodyne
1st intermediate frequency	45.05MHz
2nd intermediate frequency	455kHz
Sensitivity 12dB SINAD	-16dBμ (0.16 μV) or better (✓)
Squelch sensitivity	-20dBμ (0.1μV) or better (✓)
Selectivity (-6dB)	12kHz or more (✓++) ‡
Selectivity (-40dB)	28kHz or less (✓++) ‡
Audio output (10% distortion)	200mW or higher (8Ω load). (✓)

### What the ✓ means!

When we have a rig in for review in *PW*, we check the rig on our test equipment to see how well it measures up to the manufacturer's quoted specification. The specification figures we feel are important to you, the reader, we check out and highlight with our *PW* ✓.

We use a ✓ sign after a measurement figure, to mean that the reviewed rig matched (within measurement limits) the quoted specification. We use a ✓+ sign to mean the rig bettered the specification by a good margin. The ultimate accolade is a ✓++ sign, meaning the margin was excellent.

‡ Selectivity on this rig is excellent, and would be suitable for a crowded 12.5kHz channel spacing. For instance, 80μV f.m. (±4kHz) signals 12.5kHz away caused no problems. At ±25kHz no breakthrough was experienced at the limits of the signal generator.

**G1TEX**

left and right-handed operation and all are well labelled.

The buttons on the front panel are situated in individual recesses. They're recessed to prevent accidental use, but not so much as to make them inaccessible.

Functions such as the automatic shift selection are helpful. This is used when you're tuned to a repeater frequency. Another factor is the ease with which the transceiver's 40 memories can be programmed, which all go towards making this a very user friendly piece of equipment.

The hand book that comes with the TH-22E is excellent. It's well thought out and easy to understand.

When I came to look at the battery compartment, however, I'm afraid my enthusiasm wilted a little. The slim battery pack slides up into the case of the radio, which is not unusual these days. But the securing mechanism on this model is one I have not encountered before.

## Securing System

It's difficult to describe the battery holder securing system in words, but it involves a large plastics thumb clip. This is about the size of a penny, and it's an integral part of the battery pack anchoring into slots in the die-cast metal case.

The securing mechanism is not of a standard I would expect from Kenwood. It's certainly not in keeping with the radio as a whole.

In my opinion, the battery securing mechanism is ill-conceived, and quite obviously the cheap option. Above all, it's extremely difficult to operate. I struggled for some time to release the battery!

Not wishing to make a criticism such as this on my observation alone, I enlisted the help of some friends. The verdict was unanimous.

Not one of my friends was able to release the battery without a struggle. Someone with weak fingers, such as a person suffering from Arthritis would struggle a great deal.

It has been pointed out to me that the battery is charged while still in the TH-22E. Therefore the occasions when the battery would have to be removed are few and far between. This is a valid point, but it's always my intention, when writing a review, to be impartial and fair.

## Take It Anywhere

Kenwood advertise the TH-22E as being so small and light that it encourages the owner to take it anywhere. Well, I have to agree!

I thought the wife of a friend of mine summed up the TH-22E quite well. She looked at the transceiver, turned to her husband and said, "I would allow you to take that on holiday, I would even keep it in my handbag for you". Need I say more!

## Summing Up

In summing up I must mention that the true test of the TH-22E took place over the Christmas period at my parent's home in Minehead, Somerset. While there, my father John G8EAM helped me put the radio through its paces.

The TH-22E performed incredibly well. The transceiver's transmitted audio was first class. On receive, how speakers that small, can give such an excellent audio reproduction I will never know!

Several days running Dad took the TH-22E on the daily walk with his dogs. Using the extra low power level of 50mW, we would stay in constant contact for about an hour, hand-held to hand-held.

My Dad was full of praise for the little rig. He found it very easy to use and had no difficulty reading the display.

In conclusion, I found the Kenwood TH-22E to be a very good radio. In fact it was 'a breath of fresh air'. It's reassuring to find a relatively inexpensive transceiver which is well made, easy to use and reliable.

In use the TH-22E is simple. But it has enough advanced functions to easily hold its own in today's 'gimmicks and frills' filled market place.

I would imagine that the 430MHz version will be very popular with Novice licencees. I had a tear in my eye when I had to hand this one back!

My thanks go to Trio-Kenwood, UK Limited, Kenwood House, Dwight Road, Watford, Herts WD1 8EB. Tel: (0923) 816444. The TH-22E is available for £239.95 from any of the Kenwood approved dealers.

**PW**

# Press Any Button For Service.



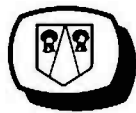
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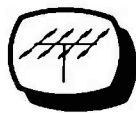
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**Radio Society of Great Britain (PW3)  
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Ron Ham welcomes visitors to the *PW* vintage 'wireless shop' once again. Ron's main topic this month concerns the 50th anniversary of the 1944 'D-Day' invasion of the Second World War, and military equipment.

# Valve &

It's going to be a busy year! I say this because throughout 1994 collectors of all types of military equipment will no doubt be taking part in the multitude of exhibitions and events that are being organised to celebrate the 50th anniversary of D-Day and the Allied advance through occupied Europe.

Last month in the 'Valve & Vintage' special issue of *PW*, I discussed the wireless equipment used by the army at the time. As a result, I feel that readers, inside and outside the vintage wireless fraternity, will want to know more about the sets concerned.

Now readers, please keep in mind that a 'wireless is a wireless'. Whether it was made for domestic use or specifically for the armed forces, it still has capacitors, resistances, transformers and valves. For instance, a VR100 valve, used in an RAF receiver requires the same voltages and similar circuitry as it does in a civilian wireless where it's known as a KTW62.

## Power Source

When you first obtain any ex-service radio gear, check its power source. This is because the power source is the deciding factor on how the valve heaters are wired.

Let's consider valves, like the VR100, using a 6.3V heater supply. If the set has a 6V supply then you can expect to find the heaters wired in parallel. However, if it's used with a 12V source then the heaters may be wired in series-parallel.

With series-parallel working two 6.3V valves in series in effect

become 'one' at 12.6V. And another pair, making 12.6V, can be wired in parallel with the first two across the 12V supply and so on. Obviously, if one heater burns out then its partner, with a good heater, is also out of action.

Watch for series resistances in the low-tension circuits of the 18, 38 and 46 sets. This is because their valves have 2V filaments connected to the 3V section of a combined high tension, low tension and grid bias dry battery.

I was reminded of the 18, 38 and 46 set valves by **Walter Farrar G3ESP** (Pontefract). Walter told me that a number of R109 receivers were modified for special duty and the circuit may not be suitable for the fitted 2V filament valves (the AR8 and ARP12).

So, before you try one of the 18, 38 or 46 sets, check that resistances are fitted in the valve heater circuitry or you may burn them out.

## Army Valves

The 'civvy' equivalents to the AR8 and ARP12 army valves are listed as CV1306 (HL23DD) and CV1331 (VP23) respectively. Be warned though, as both use the Mazda octal bases and NOT the International Octal base.

The two types of octal bases may look the same, but they're not the same! The pin spacing is different and they are not interchangeable.

Both valves types are directly heated. So, in this case, the bit that lights up is called a filament, not a heater. The valves have 2.5V, 50mA

filaments and require up to 120V on their anodes.

The AR8 is a double diode triode (DDT) and it's visible at the bottom right of the receiver chassis in Fig. 5. In this receiver the diodes are used as detectors and the triode section for audio output.

Note the centre contact (slider) on the volume control is connected to the top-cap (the control grid) of the AR8. Before removing that clip, hold down the cap with a pencil and ease the clip upwards. This should prevent damage to the valve.

The power amplifier (p.a.) valve in these sets is an ATP4 (Army Transmitting Pentode). Unlike the others, the filament current drawn by this valve is 300mA and it requires 150V on its anode.

Although it has a Common Valve number (CV1366), a Mazda V248A, I feel sure that the ATP4 was only a military special. Also, I cannot be sure about the filament voltage because one book says 2V and another 2.6V.

## Typical Equipment

The 18 set is typical of Second World War radio equipment used for communications between fighting units. Briefly, the set was designed to be carried on one man's back and operated by another while the troops were on the move.

The casing of the 18 set contains a two valved (AR8 & ATP4) transmitter, Fig. 1, and a four valved receiver, Fig. 2. The power is derived from a dry battery housed beneath the transmitter at the bottom of the case. This is fed to the receiver via the 5-pin socket

at the top centre of the transmitter panel.

All controls are clearly marked and simple to use. The sender frequency is selected on the right hand, master oscillator, control and the output to the antenna is 'peaked' by the left hand tuner in conjunction with the eight-position switch at the top right of the meter.

The receiver is even simpler. This is tuned with the same type of control, Fig. 2 and the audio output to the headset is adjusted by the knob to the right of the two headphone sockets.

Note that each of the three tuning dials, Figs. 1 and 2, have a very positive slow motion drive, plus a dial mechanism lock (top right Fig. 1 and left of dial Fig. 2). The 'small' knobs are all the same with a centre screw fixing to their respective shafts.

Both units illustrated are 50 years old and in original condition. So it's not surprising that those spindle screws are very tight.

If removal is necessary, first get some penetrating oil and ease it in around the screw-heads. Then find a screwdriver that exactly fits the slot and, while turning the screwdriver, grip the shaft.

Other nuts and bolts on the chassis are secured with some form of glue to stop them vibrating loose. Traces of this are visible on the nuts on the rear of the front panel in Fig. 5.

The dominant features on the sender chassis on the 18 set, Fig. 3, are the power amplifier valve (ATP4 centre), the master oscillator unit (left, with AR8 inside) and the transmitter tank coil (right). The under-chassis wiring, valve holders,

Fig. 1: Front panel of the transmitter 'sender' chassis on the 18 set man-pack transmitter receiver (see text).

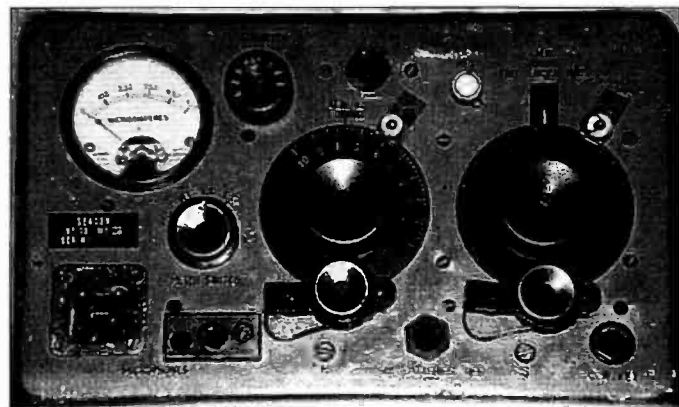


Fig. 2: The receiver chassis of the 18 set showing interconnecting h.t./l.t. connecting lead (see text).





# Vintage

By Ron Ham

potentiometers, jack-sockets and 'small' components are shown in Fig. 4.

Three ARP12s and one AR8 are used on the receiver chassis, Fig. 5, the underside of which can be seen in Fig. 6. Watch out for perished insulation, especially in places where wires pass through the chassis or screening cans (centre, Fig. 5).

If you have to replace any capacitors or resistors when you're renovating vintage equipment, try and get a similar type and put them back in the same position as the original. The careful positioning is very important around trimmers (lower right Fig. 4 and centre left Fig. 6) and tuning coils (inside box and right Fig. 3 and also between the left hand valves in Fig. 5 and almost top left in Fig. 6).

## Famous Transceiver

I've often referred in 'V&V' to the famous 19 transceiver that was used in Allied tanks and armoured cars during the Second World War. At that time most of the South Downs,

above Storrington, were restricted for military training.

After the troops moved on for the invasion a Churchill tank, which had been used for target practice, was left in a field. Obviously the farmer wanted it moved and I am told that it was 'pushed' into a nearby bomb crater and buried.

In 1992, Martin Mace a local military enthusiast and friends began the excavation. Their work was finally rewarded on November 20 1993, when heavy lifting gear and their crews from the 118 Recovery Company REME (Royal Electrical & Mechanical Engineers) of the Territorial Army pulled the tank out and across the field.

Preparations for the final pull on the buried tank can be seen in Fig. 7. Unfortunately the wireless equipment had gone but the turret was dug out later.

## Can Anyone Help?

Now it's time to put out a 'Can anyone help?' call on behalf of readers. I'll start with a request for

a service manual or circuit of a Ferranti 125. This is a 3-band receiver, using the UCH42 series of valves, for Mr. S. Evans, Euonymus, Burton Row, Brent Knoll, Somerset TA9 4BX.

Next, a copy of the *Practical Handbook Of Valve Radio Repair*, by Charles Miller is needed by John McCabe, 121 Garvaghy Road, Portadown, Co. Armagh, N. Ireland BT62 1EH.

Finally, a 2-pin plug for the front panel of an R109 receiver, a manual for a Lafayette HA700 and the dial cord drawings for an Eddystone ECR receiver are needed by Andrew Humphriss (0926) 400876.

I hope someone can help our readers out, but it's time for me to shut up the shop for this month as I've run out of space. However, don't forget the 'V&V' letter box is open all the time and I look forward to reading your letters which can be sent to 'Faraday', Greyfriars, Storrington, West Sussex RH20 2HE.



Fig. 7: Recovering the Second World War Churchill tank from a former bomb crater in West Sussex (see text).

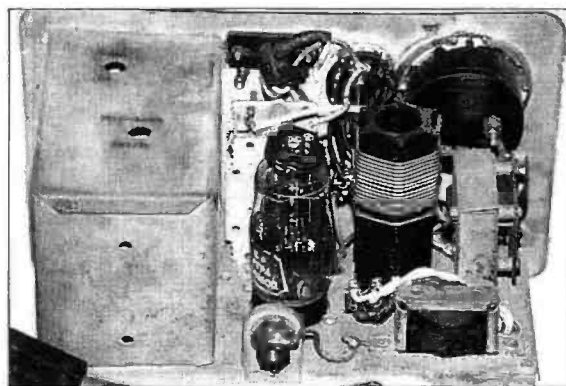


Fig. 3: Inside view of the 18 set transmitter chassis (the v.f.o. is in the screened compartment).

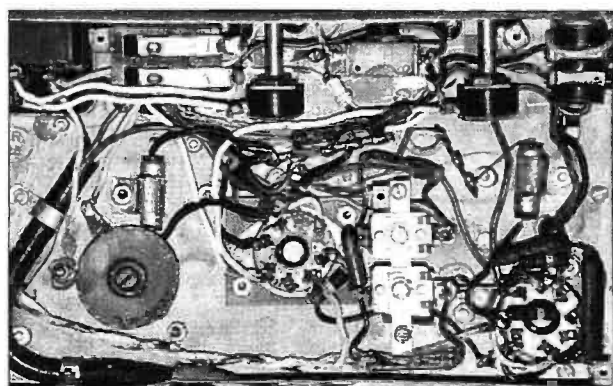


Fig. 4: Under chassis view of the 18 set transmitter section.

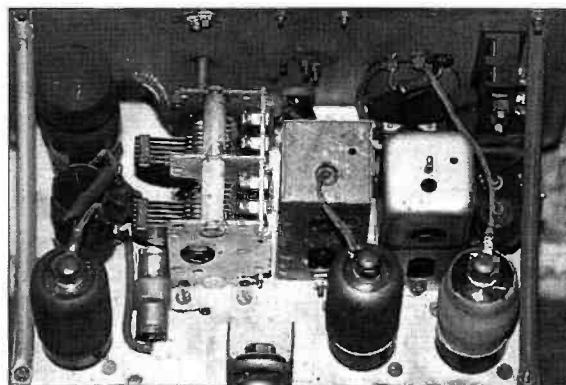


Fig. 5: Receiver section of the 18 set.

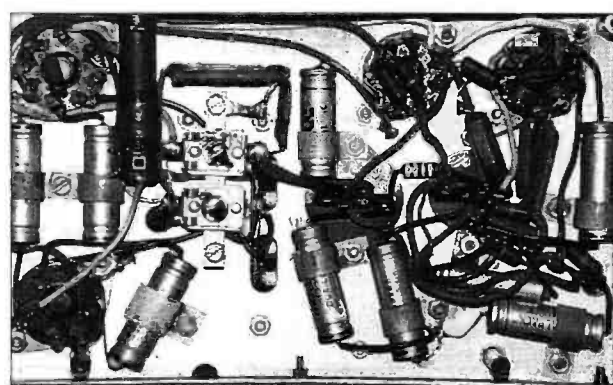
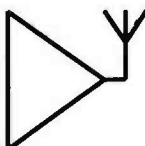


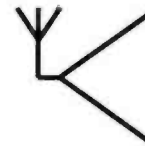
Fig. 6: Underside view of the 18 set receiver.

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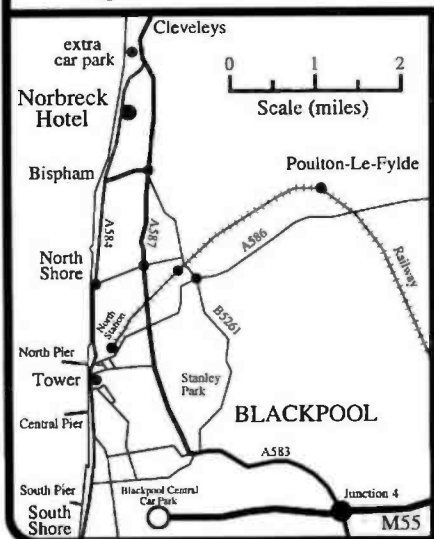
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# The Computer in Your Shack

This time Peter Hunter GOGSZ asks the question what is the most popular use of the computer in the shack?

# BYTES & BITS

I've often been asked the question, 'what is the most popular use of the computer, in the shack?' Whilst I've never really given this a lot of thought in the past, I can honestly answer, without any doubt, that there's no 'clear' leader.

However, packet radio and log keeping are undoubtedly at the top of the list. Almost every operator with a computer in the shack uses one, if not both, of these facilities.

Whilst packet can be operated without a full blown computer (i.e. by using a 'dumb terminal'), the majority of packet systems are connected to a computer of some description. This isn't the case with a logbook of course.

A note pad and pen is all that's needed for logging. But, if you do a lot of logging, and especially if you need to search back through the log, then a computerised log is a must.

## Packet Software

So, is there much software to pick from? Where packet radio is concerned there are a lot of programs for the PC, especially in the 'Shareware' market. Only a handful of these can be considered to be in the 'top league', and of these Lan-link is without a doubt the best that I've seen (if you know of a better one, please send me a copy).

On the commercial side, most of the multi-mode units have 'dedicated' software packages available at extra cost. However, commercial, as well as non-commercial (Shareware, public domain etc.), software for computers other than the IBM compatibles, seems to be extremely rare. These machines are usually limited to one, or maybe two, programs, and these are not up to the standard of the PC programs. Why is this?

With packet being such a popular mode around the world and in spite of many amateurs using computers such as the AMIGA, the ST, and the BBC range (to name

just a few), all good programmers seem to be concentrating their efforts on computers with the *Intel Inside* motive.

This is a great pity really, as all of these machines mentioned have powerful capabilities. The Amiga 1200 for instance is a full 32 bit machine, with built in IDE hard disk drive controller (with space for an internally fitted hard drive). It is capable of driving a multiscan monitor with SVGA graphics, plus a lot more.

So come on you programmers, how about some software? I'll be more than happy to review or publicise it for you, just send it direct to me at the address at the end of this page.

## Logbook Programs

Logbook programs however, are a different matter altogether. These are available for just about every computer on the market. Some are free, some cost a few pounds and some cost a lot. Logbook programs come in different shapes and sizes. From the 'all singing, all dancing', super wonderful do everything, down to the very basic and simple information storage, programs.

One of the better logbook programs is the **G4TYF Log**. This is a program that does everything you could ever want an electronic logbook to do. The G4TYF Log comes on two disks and includes a very easy to read 20 page printed manual.

An **INSTALL** program on disk takes all the work and worry out of getting the files onto your hard disk. Whilst this logbook is easy to use, it is extremely powerful in use. Log entries are saved to a file (LOG 1, LOG 2, LOG 3, etc.), these files, each of which hold 2000 entries, (and there is no limit to the number of these files you can have) are automatically



Fig. 1: A screen grab of the G4TYF Log in action.

created by the program.

The reason for this is so that they can easily be saved to a floppy disk for backup purposes. However, when searching for a call sign (just press the F (for Find) key) and the program will search all the log files that it can find. This also applies when adding a new entry to the log. If the station has been worked before, all relevant information (name, QTH, etc.) will be automatically inserted, as will today's date and the current time (see the screen dump in Fig 1).

A configuration file allows you to pre-enter information about your station, this includes the type of rig and antenna system for h.f., v.h.f., u.h.f., etc, this information is used for automatic entry into appropriate sections of the program. The G4TYF Log also has very powerful printing capabilities for printing QSL and Info labels, as well as log pages. An **ICON (LOG .ICO)** is included on the disk for running the program from Windows.

The good news is that the G4TYF Log is available for the IBM type of PC, and also for the Amiga. Both versions operate in much the same way, so what I have said here applies to both.

The one exception is that the Amiga version can run from floppy or hard disk, whereas the PC version is designed for hard disk use only. However, if you only have a floppy drive machine,

a special version (which has all the power and facilities of the hard disk version) is available on request.

There is also a **demo** version of the G4TYF Log which is available **free of charge!** Just send a formatted floppy and return post and packing. The free demo has all the facilities of the full package, but is limited to just 30 entries.

If you're an individual or club, running a Special event station, a **GB** version (full package) is also available free. Just send a copy of the authorization document from RSGB with your request.

The G4TYF Log costs just £25 (any version). Or £26 Sterling if overseas. This includes the printed manual and free updates for one year, as well as postage etc. Send your money (and don't forget your call sign) to: **G4TYF Log, 64 Gurney Valley, Bishop Auckland DL14 8RW.** A telephone helpline is available, if you need more information telephone (0388) 607500. Many thanks to G4TYF for sending the review copy.

That's it for another month. Keep those fingers on the keyboard. 73 to you all, de Peter Hunter GOGSZ, 2 Mayes Close, Bowthorpe, Norwich NR5 9AR. Tel/Fax: (0603) 748338 Packet: GOGSZ @ GB7LDI.#35.GBR.EU

E N D

*This month Paul Essery GW3KFE takes a look at the use of QSL Managers, conditions on the band and your letters.*

Report

# BANDS HF

Years ago, you made a contact, then sent - and in due course received - the card. Then came the 'Age of the Manager!'

At one time QSL managers were useful. I recall the enormous help given by the then G3NMH to the VP8 gang. At that time a letter to VP8 took months to arrive, so a manager was justified.

Justification for a manager still applies to a few outlying spots - ZD7 and VR6 come to mind. But I think it's not in any way relevant to the majority of today's QSL managers who are in it, (despite their denials) for the money.

If that's the way the modern amateur wants things, so be it. However, the demands for dollar bills, IRCs and so on are totally unjustified where two groups are concerned: the newcomer to the DX hobby, and the pensioner.

It seems to me that the system needs a radical shake-up. If we must go on with silly bits of pasteboard on the shack wall, let it be a requirement that a DX station or manager guarantee that any requests coming via the Bureau system will be honoured in the same way.

## Looking At Conditions

Looking at conditions, these continue like the weather ... essentially awful! Current h.f. conditions, by the way, can always be got from a listen to DK0WCY on 10.144MHz.

The bulletin from DK0WCY has the following form. First comes the relative sunspot number R.

Secondly from DK0WCY comes the flux. Thirdly comes the Boulder (USA) observations for the value for AK.

Next (fourthly) DK0WCY provides the Wingst, Germany, AK. The fifth parameter is the NOAA figure for K.

The sixth parameter from DK0WCY is SUNACT, the forecast for solar activity. The seventh is MAGFIELD giving the state of the earth's

magnetic field.

The eighth parameter is the chance of short wave fadeouts (SWF). Finally, number nine provides an indication of h.f. band conditions.

Even if you've forgotten your Morse, just memorise letter W - on DK0WCY. The Ws are WARNINGS - implying problems!

You might follow this with a ten-minute round of the beacons on 14.100MHz. Each beacon transmits for one minute in ten, with power levels altered every 15 seconds as follows: 100W, 10W, 1W, and 0.1W.

If all this isn't too discouraging, I suggest you go and work some DX!

## Pitcairn Island

There's a population of 59 on Pitcairn Island, VR6. With twelve of the Islanders holding amateur licences at the time of writing, they must be the highest density amateur radio population in the world!

On a different tack, I hear the Pratas Island DXpedition is still a doubtful starter. Personally, I'll be very surprised if this one gets anywhere!

A possible new DXCC country is proposed by DK9KX. It's Huangyan Dao, otherwise known as Scarborough Reef at 15.07N and 117.51E, a possession of the People's Republic of China. A detailed proposal is, I understand, in the hands of the DXAC as this is being prepared.

Increased interest in IOTA has led to a proposal for c.w. spot frequencies. The IOTA Committee therefore proposes 28.040, 21.040, 14.040, 7.020, and 3.520MHz on a non-interference basis.

The CQ WW WPX Contest will as usual run the s.s.b. leg over the last weekend in March. The c.w. leg will be held in the last weekend of May. So, don't say I didn't mention it in good time!

## Your Letters

I've 'gone on a bit' this time and it's time to look at your

letters. So we must be brief on the mail - sorry folks!

First off, there's **Angie G0HGA** in Stevenage. She has been somewhat occupied with sked contacts and v.h.f., much to the detriment of DX. On the other hand, even skeds keep the inside of the rig - and hence the spiders - warm and dry!

Listener **Matt Spencer** runs a Sangean AT803A receiver. Matt uses 30m of wire for his antenna, east-west, at his QTH in Redhill, Surrey. On 3.5MHz he managed some East Coast Ws, VEs, VOs, UA9MA, and X5AE, Banyaluka.

Listening on 7MHz brought Matt Europeans plus V26B. On 14MHz HK1HHX, OA4ANR, PT7CB, P40L, and YV5NCJ show how directive such an antenna can be. Finally Matt's 21MHz report showed where east and central North America were prominent, plus Canadians, and AK1L for IOTA NA55 off the Maine Coast of the USA.

I've also got a first letter from **Mark Trotman G0TYA**, from Barnwood, Gloucestershire. Mark prefers c.w. but will take an s.s.b. contact if it's worth it!

On 28MHz, Mark seems to have done better than most. He worked with ZD9SXW, 3B8FO, JY5FA, plus, in the CQ WW SSB Contest, numerous N. American, Caribbean and S American stations.

On 7MHz Mark worked J6BX, KL7RA, 3A2LU, and on 14MHz FY0LK. The TS-690 at 100W does the electronics, and for 28MHz there is a 3/4L wave vertical, plus a half-sized G5RV at around 12m for the other bands.

Now to G2HKU in Sheppey. Ted says he doesn't recall so prolonged a period of lousy conditions and I agree. However, Ted notes OY9JD on 1.8MHz c.w., plus ON7BW on sideband. On 3.5MHz, Ted only mentions Europeans but all on low power from the IC-721S. While on 7MHz there was T9/PA3DZN.

On 10MHz, the low-power rig snapped up OJ0/OH1VR plus also G5RV himself on 14MHz. As for 18MHz, again

the QRP c.w. but this time ZB2/G3MRC and 9H1AZ. Taking 70W was necessary though to connect with PY0FM on Fernando do Noronha. Another Fernando do Noronha station was PY0F on 21MHz along with YN/SM00IG. Finally, 28MHz brought J6DX.

**Don G3NOF** in Yeovil is optimistic enough to lay most of the blame for the band conditions at the door of short daylight hours. Between 1400-1500, Don noted openings; short path to VR6 and long path to VK9XN

'Clicks' of the month for Don include VK9XO for Christmas Island and VQ9NY on 14MHz, plus T12Cc on 21MHz. On 18MHz Christmas Island had turned into V19XN as well as VK9XO, to complement VR6TA. Finally 24MHz for ZF2ML and 9Y4N although Don doesn't mention antennas, power levels or times.

Finally, **Leighton Smart GW0LBI** in Trelewis who has been otherwise occupied with a community-based scheme. However, Leighton found time to fit an amplified microphone to his FT-747, to the benefit of his sideband results.

On 1.8MHz, GM3YXM in Ullapool was a long sideband chat at the 1W level, plus OY9JD and GI0KOW. Leighton's 3.5MHz QRP provided PA3GEG, SM6JXO IK3LLD, all on c.w. As for 21MHz sideband, Leighton managed YU1AXY, UB5KEI, and SV2BFN.

## Finally

Finally, I must thank all those who were so kind as to send me Christmas cards. **Deadline for next time, as usual, the middle of the month; the address 287 Heoly-Coleg, Vaynor, Newtown, SY16 1RA. If you have any views on the QSL front or any other operating gripe, please let me know!**

**E N D**

Scene

SATELLITES

*This month Pat Gowen G3IOR reports on the up and coming PHASE-III-D satellite with its superior amateur space-communication capabilities.*

The latest details on the coming Phase III-D satellite were given out by the designers and engineers at the recent University of Surrey AMSAT-UK Colloquium. They are passed on to us by Richard Limebear G3RWL of AMSAT-UK.

**New Mode Classification**

The coming Phase-III-D spacecraft won't carry integrated transponders as such. It will carry separate receivers and transmitters that can be interconnected by a matrix to permit any four independent connections.

The original mode classification such as mode 'A', J, etc. will cease. It will be replaced by a designation of interconnection according to band.

**New Terminology**

The new terminology will call the 145MHz band 'V', the 1.2GHz band 'L'. The 5.6GHz band will be called 'C', 435MHz band 'U', the 2.4GHz Band 'S' and the 10GHz Band 'X'.

In the new system the first letter denotes the uplink, e.g. the frequency band that the user transmits on. The second is that which the satellite transmitter downlinks, e.g. that to which users listen.

So, an on board 435MHz receiver connected to a 145MHz transmitter, originally called 'mode B', will in future be called 'mode UV'. And a 1.2GHz receiver connected to a 2.4GHz transmitter will be called 'mode LS', and so on.

A completely new uplink will be present on C band, using approximately 5.654 GHz. The 10GHz band downlink power will be some 40 watts pep. Automatic on board doppler shift correction is planned.

**Passband Very Wide**

Compared to existing satellites the passband of some of the links will be very

wide, up to 500kHz in fact! It's intended that while half of the link will be for voice and c.w., the other half will be allocated for high speed digital use.

The lower frequency bands will have 9600bps digital links but we can expect even more rapid links on the higher bands. There should be no shortage of supply for all these new systems, as on board power generation will make 800W available from the spacecraft's 28V supply.

**Signal Levels**

Both OSCAR-10 and OSCAR-13 were found to be disappointing in the signal user levels provided. But it can now confidently be said that Phase-III-D should give an adequate signal for users without specialised antennas and receiver front ends.

The OSCAR-13 145MHz transmitter runs 50W to a 5.5dB gain antenna, resulting in 180W e.r.p. (effective radiated power). However, PHASE-III-D will have 300W going to a 11.1dB gain antenna. The PHASE-III-D antenna will produce 3.86kW e.r.p. This is a gain of 12.9dB or more than 16 times over.

On 435MHz the gain from PHASE-III-D's antenna over OSCAR-13 is 13.6dB. This is 20 times the strength, as Phase-III-D will produce 300W to a 15.3dB gain antenna.

On 2.4GHz the PHASE-III-D's 160W to a 19.5dB gain antenna will result in 14.26kW e.r.p. This will be an improvement of 32.5dB over OSCAR-13, which satellite has just 1W to a 9dB gain antenna. On 10.5GHz the new spacecraft will have an e.r.p. of 25.3kW!

**Builder Found**

Readers may recall that in my earlier information of the coming PHASE-III-D satellite no mention was made of mode 'B' (now mode 'UV'). This was because at that time no builder could be found to design and construct the 145MHz



**Fig. 1: Decal for the coming Phase-III-DD Spacecraft.**

downlink transmitter. Enquiries by AMSAT-UK to find a specialist were successful. The 145MHz will now be designed and built by Mike Dorsett G6GEJ, a member with considerable expertise in this field.

The on-board RUDAK-3 unit will be compatible with PACSAT protocol use with at least 1200 and 9600 bps and other baud rate speeds.

The DAMA protocol may be implemented as a tool to limit uplink collisions. This protocol polls selected ground stations to transmit rather than the open access method normally used for terrestrial working.

The Rudak computer will also be capable of taking over control of the spacecraft in the event of a failure of the Internal Oscar-13 Housekeeping Unit (IHU).

**Three Cameras**

The pictures from the Japanese SCOPE experiment will be digitised and downlinked via RUDAK-3. The SCOPE will be equipped with three cameras. Two will be earth-pointing, the other will be for celestial imaging.

Spacecraft stabilisation will be initially achieved by magnetorquing the spinning spacecraft until it's placed into the final intended orbit. From then on the spin will be damped and momentum wheels brought in to provide 3-axis stabilisation.

Heat pipes will be used to provide thermal control, otherwise the side of the stable satellite facing the sun would be too hot whilst the opposite side freezes.

The great advantage of this technique is that it will allow the antennas to point earthward at all parts of the orbit.

**Replacement In July**

The new replacement spacecraft will be launched in July 1995. This is just about the time that OSCAR-13 will plunge into earth's atmosphere.

The PHASE-III-D satellite has been designed for a planned 10 to 15 year lifetime. So a timely replacement with dramatically improved function will result. This will allow the continuity of inter-continental satellite DX on the proviso that the needed funding can be found.

**Appeal For Funding**

The AMSAT groups around the world have launched an appeal for funding the new spacecraft, at a cost of some £3.25 million. All users and enthusiasts are invited to contribute.

In Britain, AMSAT-UK, who have already raised £15 000, will gladly receive your contribution. Please send your donation to: **AMSAT-UK, 94 Herongate Road, Wanstead Park, London E12 5EQ, United Kingdom.**

Donations in the form of cheques, Visa, Mastercard and Eurocards are all acceptable. In return you will receive an illuminated scroll acknowledging your support.

**E N D**

*Panorama*

# PACKET

**Fig. 1: Ralph Cooper ZL2AAV, taken in a rare moment when not using packet radio, or award chasing.**



Last month I gave a general view of TPK, the terminal program that's gaining in popularity. I've had several requests to give some more information on it and what it does.

I've found TPK really is quite a versatile program for the user. And although FBB is involved with sending 'unproto beacons', this could be deemed to be it's only disadvantage, if you could call it such. The disadvantage is only to other users on frequency who could see the 'unproto' messages. But then, if all users were using TPK, this wouldn't then be a disadvantage.

The TPK program has full unattended operation with User Mailbox, and remote file upload/download facilities.

The BBS software FBB sends out each message header as a broadcast beacon. This part of the header is captured by TPK and it builds up a list of message headers identical to the BBS. So you never need to connect to the BBS at all.

With LIST mail, you "tag" each message (or file) you want to see, or select Key-Word search, and TPK will acquire the data using FBB style compressed forwarding.

Message data received at your station is checked for presence of '7PLUS' data, and extracted. Completed files are assembled and then

*Roger Cooke G3LDI, continues his look into TPK the terminal program and has news of New Zealand packet radio working, before providing the latest update of his support of Amsat Phase3D.*



**Fig. 2: This is Ralph's station, his packet setup sits on another desk. How about those awards on the wall then?**



**The packet station at ZL2AAV.**

decoded without your intervention.

Full crash recovery of aborted binary downloads using error checking extended protocol YapC.

On-Line, windowing text editor, with fully automated callsign and routing capture facilities. This assembles the outgoing message headers for you. You can include sections of a received message automatically to aid the clarity of your replies.

Both TPK and FBB help files are on-line and available at your terminal by use of a Hot-Key, so you never need to request over-the-air HELP.

You can monitor traffic from selected callsign in a separate window whilst connected to another station.

It also has programmable function keys and macro commands, full mouse support, and G8BPQ TheNode interface. The software is so useful, the list goes on...

I've shown you a few things that TPK can do, and

TPK works with most TNC's including TNC-2 and clones, PK-232 and Kantronics. Example set-up files for TPK, and reference set-up files for TNC2's with either 1.1.6, 1.1.7 or 1.1.6+PMS are included.

The author is Gerard Regnard FC1EBN @ F6ABJ.

## New Zealand Packet

Recently during a recent speech(!) QSO with a station in New Zealand, we started discussing packet radio. My contact was **Ralph Cooper ZL2AAV** who sent me the following information and photographs.

Ralph lives in Marton and is very active on the h.f. bands, but he also uses packet. Like so many DXers he uses the packet cluster to keep up to date with the latest DXpeditions and so on.

Packet in New Zealand continues to expand at an explosive rate. And there is a very comprehensive Network linking both North and South Island.

There are many permanent hill-top 'Netrom' sites and a BBS network as well as h.f. gateways linking with Asianet. There are also Satellite gateways sending traffic via UO-22. Most of the Network software uses Thenet with a few oddities, such as 'Rose'. The repeater network for the North Island and the BBS

network are quite comprehensive. However, since my information is now fairly old, it's probably been improved since then.

One of the most popular terminal programs in New Zealand is Lanlink. A test message from Ralph took just under 24 hours from writing to my reading it.

Mail from the UK will go via either GB7LAN, the Satgate, or an h.f. link such as mine to SV1IW or UA6LU, then to 3B8, YB0, and finally ZL.

## Packet Book

Since my Packet BBS Survival for the Beginner is selling well and producing some pennies for the Amsat Phase3D fund, there is now available the OOC file for FBB BBS, spiral bound in the same way, price £9 inclusive postage. Again, profit to the Phase3D fund.

*The BBS Survival Guide* is now on the second printing, with some suggested modifications. My thanks to those who bought one and I hope it is proving helpful.

**That's it for another month. News views as always to G3LDI @ GB7LDI, QTHR or Tel: (0508) 70278. Happy packeting!**

**Fig. 3: What a great registration number on his car.**



**E N D**

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**SUB-MINIATURE AIR SPACED TRIMMERS** 10pf @ 4 for £1.00.

**R.F. POWER TRANSISTOR** by Thompson Type 1224-10 (look like) 20 watt 175MHz no details @ £8.95 matched pair.

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# Antenna Workshop

This month Peter Dodd G3LDO, in response to some of your letters, explains a few terms that are causing difficulties.

From some of the letters I have received from readers it's apparent that there is some confusion with some of the terms used in antenna technology. So in this Antenna Workshop, I'll try and define some of these terms as a glossary.

In Fig. 1, an electromagnetic wave is radiated from the antenna. This (3-dimensional) electromagnetic radio wave (also known as a free space wave) has a wavefront that can best be envisaged as the surface of a rapidly inflating balloon. Imagine this balloon starts to inflate the moment the transmitter was switched on.

An electromagnetic radio wave comprises both electric and magnetic components. The sinusoidal r.f. energy at the antenna generates a sinusoidal magnetic field (also known as the H-field). This fluctuating H-field, in turn generates an electric field (also known as the E-field). An electromagnetic field is said to be polarised, by convention, the plane of polarisation being that of the E-field.

The space around an antenna is broken down into two (distance) zones. These two zones are classified as the near zone\*, and the far zone\* respectively. In the far zone the H and E fields combine to produce the electromagnetic wave.

Because of this combination of E and H fields, antenna field strength measurements are normally made with an E-field meter (a diode field strength meter is an E-field meter †). These measurements must be taken some distance (in wavelengths) from the antenna.

In the far zone the E and H-fields decrease at a rate inversely proportional to the distance squared. A series of signal strength measurements, at a fixed distance in three dimensions, all around the antenna will produce a plot known

as a polar diagram or radiation pattern.

Polar diagrams of some antennas are shown in Fig. 2 and Fig. 3.

(Remember that these are sections through a 3-dimensional plot). A vertical slice through a 3-dimensional plot is known as an elevation plot. A horizontal slice is called an azimuth plot.

## Transmission Lines

A transmission line is an arrangement of conductors used to transfer r.f. energy from one point to another. Radiation loss is prevented by ensuring that the electromagnetic field (E-field) from one conductor is balanced everywhere by an equal and opposite one from another.

There are two types of transmission lines, both types normally comprise of two conductors. Open wire feeders comprise of a pair of parallel wires, with insulators to maintain the spacing.

The second type of transmission line is arranged with one conductor (tube) enclosing the second conductor. Insulation is used to maintain the distance between the conductors. The flexible form of this feeder you'll all know as coaxial cable.

A transmission line has a surge or characteristic impedance that is dependent on the dimensions of the parts. This is the apparent impedance the lines would have if they extended to infinity.

The impedance of many open wire feeders is between 300 and

Near/far zone (not to scale)

$$\text{Actual distance } R = \frac{2L^2}{\lambda}$$

(L = Length of dipole)

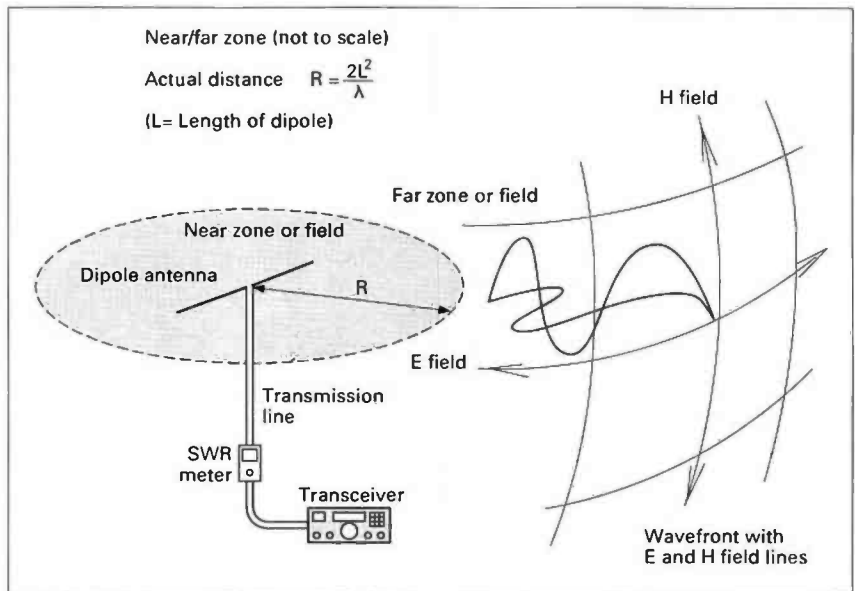


Fig. 1: Radiation of an electromagnetic wave.

600Ω. Coaxial cables used for communications systems, normally have an impedance of 50 or 70/75Ω.

## Tuned Circuit

Connecting an inductor and capacitor together forms a tuned circuit that has a natural resonant frequency. Such a tuned circuit is said to have 'lumped' constants.

An antenna system also has a natural resonant frequency, though in this case the inductance and capacitance are distributed along the conductors. In this case the circuit is said to be a linear or distributed circuit.

Because r.f. energy surges along the conductor twice in one cycle, the shortest conductor to resonate at a given frequency is a half-wave (at one frequency only) dipole. In this antenna, the current is at a maximum at the (centre) feedpoint. In many antennas the radiation and the feed impedances are the same.

On a 'long wire' antenna the current and voltage distribution varies sinusoidally, 90° out of phase with each other, along its length.

The feed impedance can be measured using a receiver noise

bridge, and is the relationship of the applied r.f. voltage and the resultant r.f. current at the feedpoint.

The radiation impedance is a function of the total power radiated by the antenna and the value of the r.f. current (at one point) squared.

## At Resonance

At resonance the capacitive and inductive reactances are equal, so cancelling out. At resonance only, the feed impedance is purely resistive. At frequencies above and below resonance the feedpoint has inductive and capacitive reactance respectively.

When the antenna feed impedance and the transmission line characteristic impedance are the same, all the r.f. power is transferred to the antenna. Any difference between these two impedances causes some of the r.f. energy to be reflected back towards the transmitter. Because both these waves are travelling on the same transmission line in opposite directions, at the same velocity, they will create interference patterns, or standing waves.

Measuring the peaks and troughs of the standing waves,



allows the degree of mismatch to be measured. The standing wave ratio (s.w.r.) is measured using an s.w.r. meter and indicates the ratio of mismatch. If we consider the characteristic impedance of the transmission line to be  $50\Omega$ , then a load of either  $100\Omega$  or  $25\Omega$  will create a mismatch ratio (s.w.r.) of 2:1.

The transmission line connecting the transceiver to the antenna also has resonance at some frequency (or harmonically related frequencies). If the resonant frequency of the feeder is the same as the transmitter, then radiation may occur from the transmission line. This re-radiation can severely distort the antenna pattern.

### Beam Or Array

An antenna system comprising several elements spaced some distance apart is known as a beam or array.

The gain (compared to a reference antenna) is achieved by controlling the amplitude and the phase of the currents in each of the elements. This is achieved in one of two ways:

- 1: By connecting the transmission line to one driven element. All the other parasitic elements, by their proximity, are coupled to the driven element.
- 2: By connecting transmission lines to all of the elements and controlling their currents through one, or more, phasing networks.

An array can have the maximum field of radiation broadside to the elements i.e. perpendicular to the axis of the array (and the plane containing the elements). This type of array is called a **broadside array**.

Beam antennas, such as a Yagi, whose maximum radiation occurs at right angles to the plane of its elements, are known as an **endfire antennas**.

The r.f. current flowing in resonant driven elements is greatest at the resonant frequency. The gain

of a beam or array is also the greatest at one frequency. The frequencies, above and below the optimum frequency, where the power gain has fallen by 3dB, gives the **antenna bandwidth**.

### Directivity Gain

The **directivity gain**, in a given direction, is defined as the ratio of the radiation intensity in that direction to the radiation of a reference antenna.

Radiation from a practical reference antenna can't have equal radiation intensity in all directions. For this reason a hypothetical point source reference antenna, that radiates equally in all directions, has been devised.

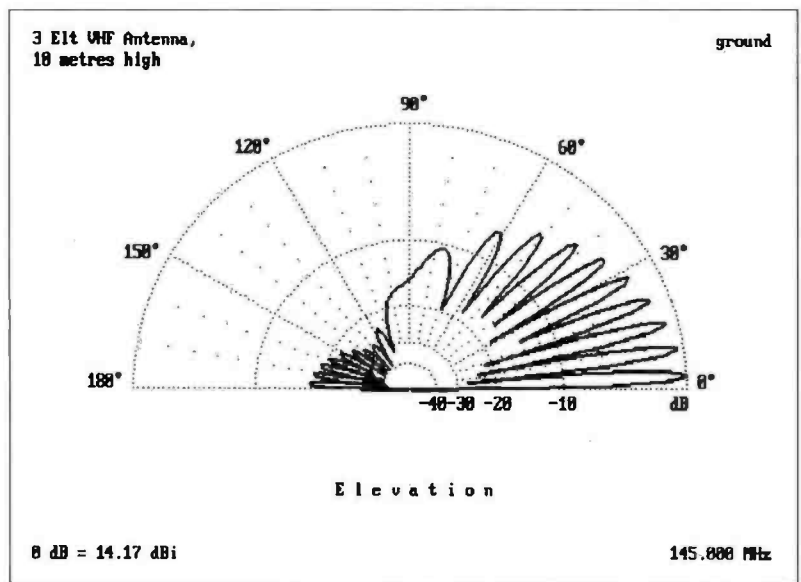
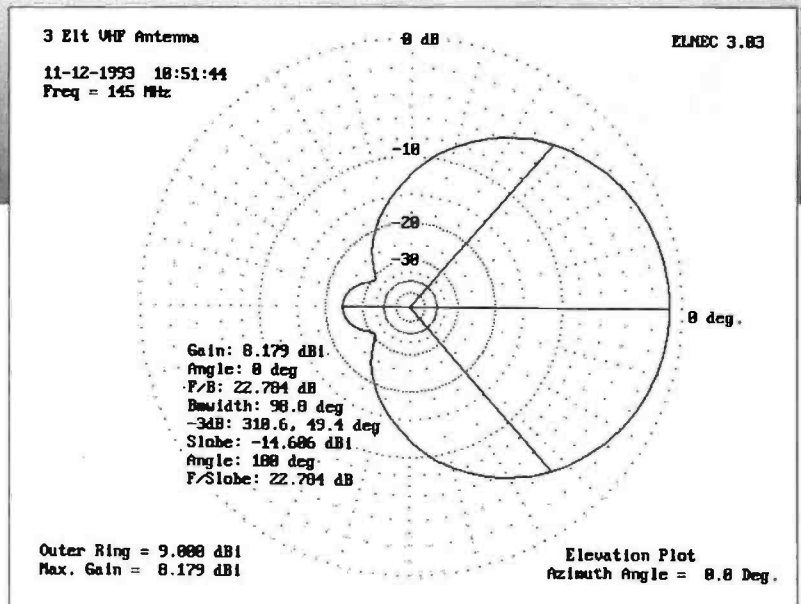
The theoretical antenna is known as an isotropic radiator, and is used as a reference when mathematical modelling an antenna. The term **dBi** is then used (the i signifying an isotropic radiator as reference) when using this reference, see Fig. 2 and 3.

Because it is impossible to construct a point source reference antenna we need something more practical when making antenna measurements. In this case a resonant reference dipole is often used. The term **dBd** (d for dipole) is used in this case

The **front to back ratio** is the ratio of the radiation intensity of the main forward lobe compared with the radiation intensity of the maximum rear lobe see Fig. 2. The half-power point each side of the main forward lobe is termed the **beamwidth**.

**Effective radiated power** (e.r.p.) is the r.f. power at the antenna, multiplied by the gain of the antenna.

The ground under the antenna acts as a reflector. The phases of reflected and directly radiate waves produce lobes, Fig. 3. The angle of the lowest lobe with the greatest



**Fig. 2 (Top): Free space elevation polar diagram, illustrating gain, front-to-back ratio and beamwidth.**

**Fig. 3 (Below): Polar diagram showing ground effect on a 3-element Yagi 5 wavelengths high.**

gain is termed the angle of radiation.

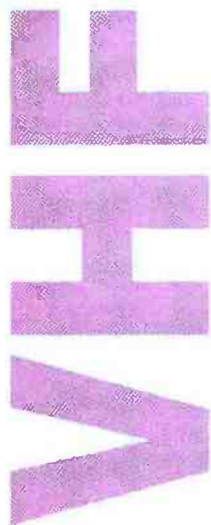
For simplicity this ground effect is often ignored when making a mathematical model of an antenna. Such a model is called a free space model. Fig. 2 shows a free space model of the same antenna shown.

PW

\* I've used the term zone rather than the better known term 'field' (i.e. Far Field). I've chosen to do this so that I can use the term 'field' to describe the electrical and magnetic fields in the same paragraph.

‡ The late D. J. Smillie GM4DJS, described a dipole field strength meter on page 36 of the February 1993 issue of *Practical Wireless*.

# Report



The lack of any decent tropo, the scarcity of auroral propagation and the recent gales all conspired to make conditions during December rather poor. At my QTH, the winds on December 9 were gusting to 100kph at 1600UTC, about 6 hours before the maximum.

The photograph, Fig. 1, shows part of the remains of my 6-element Yagi for the 50MHz band. The stub mast was literally ripped off the top of the rotator with part of the upper bell-housing.

The mast with the 50MHz Yagi (11m long boom) and the 70MHz Yagi lodged on top of a fir tree about 7m up hanging by the feeders. Hopefully, radio conditions (and the weather!) will have improved by the time you read this!

During the period February to April we can look forward to the possibility of some auroral openings. This will be followed by the Sporadic-E season from May through to July. So, get your antennas repaired now!

## Tropo Conditions

There was very little tropo of note during December. But Reg Wooley GW8VHI reports further of the excellent conditions during October and November.

Reg is the driving light behind G6RAF. This callsign belongs to the RAF North Luffenham Club station and it is found in operation mainly on the 144 and 430MHz bands.

On this 144MHz band G6RAF uses an FT-726R transceiver driving an SSB Electronics amplifier giving 110W output. The antenna system consists of 2 x 21-element Yagis at 23m above ground fed with LDF4-50 heliax cable.

In the last week of October a high pressure system sat over northern England. This allowed Reg to work many stations situated in Scandinavia and northern Germany.

During the evening of October 29, propagation was particularly good over large areas of Europe. This enabled contacts to be made by G6RAF into northern Germany (JO43, JO52) through Switzerland (JN37) and down into central France (JN06, JN17).

At 1815UTC Reg was tuning around and heard a station speaking Russian, mentioning the callsign SP2NJI. After a few overs he realised that the station he was listening to was working SP2NJI.

Reg realised that he was actually hearing RB5PA in locator KO21. This sort of propagation is pretty infrequent, and it's one of those fleeting occurrences that really needs getting in the log!

The only problem facing Reg at G6RAF was to break the pile-up of DL stations calling. However, at 1832UTC he eventually got through and a contact was made with RB5PA. A truly remarkable QSO!

On the following days, before the high pressure slipped away, more DX contacts were made by Reg at G6RAF. Included in the list were HB9ACA (JN36), HB9MIN/P (JN37), HB9SNR (JN36), OE5XBL (JN68), OK1AGE/P (JO70), OK1VEI (JO70), SM7CMU (JO57), and SM7LXV (JO65).

The station of I2FHW was heard at G6RAF on October 31 working ON4GG, but he could not be raised. During the middle of November the tropo conditions were 'up' again with the 430MHz band open from Scandinavia through to Spain.

Contacts worked by G6RAF on s.s.b. included EA1DKV (IN53), EA1TA (IN53), LA6VBA (JO48), OZ7IT (JO46), SM4DHN (JP60) and SM4JWI (JP70). Further high pressure on December 3-4 enabled the Swiss beacon HB9F (432.984MHz) to be copied but very little else was reported by Reg at G6RAF.

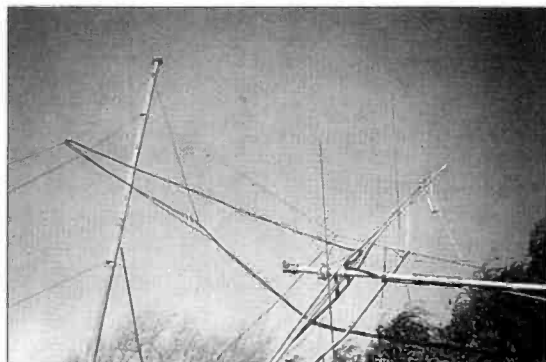


Fig. 1: David Butler G4ASR suffered from a bad case of wind recently and his antenna system suffered badly.

## Monitored Packet

A thought recently occurred to Ben Summers G0SOQ whilst looking at monitored packet radio text. He noticed that during high pressure periods his 'heard' list showed packet bulletin boards and nodes from some distance away.

Ben tells me he doesn't have an amazing site or large antennas but reckoned that this data could be used as a form of propagation indicator. Packet radio, it seems, can be very useful for this purpose.

Packet radio means that there are hundreds of stations operating on one frequency, all giving their locators and working in a computer readable format. All you would need is a computer to listen to a user packet channel on the band you're interested in.

Your computer could then work out the distances between you and the other stations and sound a warning when they exceed a certain threshold. And more than that, the system could also give you an idea in which direction to beam!

Interestingly, and coincidentally I have received information from Dirk Koopman G1TLH. Dirk is sysop of the GB7TLH BBS, who has written a program to do exactly what Ben G0SOQ had in mind. The program allows traffic on multiple ports and frequency bands to be logged

automatically.

Dirk's computer program will then give out lists and scatter charts of distances and bearings on demand to users of the node. The diagram, Fig. 2, shows a typical distance scatter chart. Stations heard are arranged into a matrix of Distance by Time in 30 minute slices, on a rolling 24-hour basis.

The vertical axis on the matrix in Fig. 2, is autoscaling according to the distance away of the best DX station. Each slot in the matrix is either a space (meaning nothing heard) or a digit.

With Dirk's system, the higher the value of the digit the more packets were heard in that 30 minute slot from all stations at that distance. Therefore, when conditions are good further away, slots are filled with higher value digits.

Of course, to get a clear interpretation you need to see the scatter diagrams on a regular basis. In this way you can instantly spot an 'up' day from a typically normal day.

The program developed by Dirk also automatically keeps a log of stations more than 400kms (settable parameter) away. At a glance, this instantly shows when conditions are really good.

The diagram, Fig. 3, shows part of the log for June 11 1993 during two Sp-E events. The first event, between 1556-1601UTC, was

to Spain and Portugal and the second between 1651-1656UTC to Italy. More information on how to access this data can be obtained from G1TLH @ GB7TLH.

## Aurora Events

Only a handful of auroral events were reported in December effecting the 50 and 144MHz bands. They occurred on December 1, 2, 16 and 17.

**Dave Ackrill G0DJA** (I093) reports working E18HZ and SM3EQY on the 50MHz band on December 2. This was during an opening late in the evening between 2130-2345UTC.

On the 144MHz band the only DX of note was SM5BSZ (J089) which was reported by **Richard Gardner G4WKN** (I092). The Swedish station runs 1.5kW into 4 x 14-element Yagis with the ability to alter the antenna polarisation.

## The 50MHz Band

Now let's turn to the 50MHz band. I didn't expect to receive many reports during December, and I wasn't far wrong!

Apart from minor auroral events the only other openings were due to the passing of the Geminids meteor shower. This peaked between December 12-14 and allowed contacts to be made with stations up to 1500kms or so away.

**Neil Carr G0JHC** (I083) operated during the maximum of the shower on December 12. Between 1715-1800UTC Neil made s.s.b. contacts with DL7QY, F1BHB, OK1MAC, OK2TU, OZ1BVV, PA3DYS, SM7FJE and SP6JLW.

## The Red

Do you remember the article 'Communications in the Red Zone' by Adrian Knott G6KSN in the January edition of *PW*? It described an infra-red communication system operating at 319THz.

**David Reynolds G3ZPF** reports that in 1970, the year he was licensed, he built equipment operating at optical wavelengths. It started when David's younger brother received an 'electronic experimenter' kit for his birthday.

David and his brother built an amplifier and used the base/emitter junction of a photo-transistor mounted in a headlight reflector. It was all quite conventional, except that the transmitter consisted of an old radio

with a small mirror glued to the cone of the loudspeaker.

When outside, the speaker was positioned so that the sun's rays were directed onto the receive 'head' across the field. With the radio playing, music could be resolved clearly at the other end.

The range of David's optical project was limited by how accurately the light beam could be directed at the remote receiver. This arrangement gave no inertial slurring of the type that affected systems which used amplifiers modulating light bulbs.

David remembers looking at the transmitter from the opposite end of the field, where it was possible to see the light twinkling. However, he never worked out whether the mirror caused a.m. or f.m. of the sun's rays. Perhaps the weight of the mirror caused the loudspeaker cone to rock in the vertical plane instead of moving sideways David!

The receiver 'died' one day when the sunlight through the shack window caught the headlight reflector. This caused the photo-transistor, mounted at the focus, to be 'cooked'. **Dave Ackrill G0DJA** recalls building a light-beam telephone many years ago. He remembers having difficulty getting the DCP71 photo-transistor specified for the project.

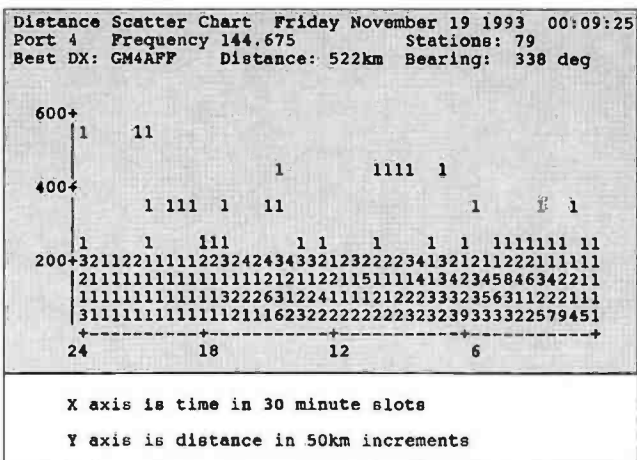
Actually, he found the trick was to use a plastics cased OC71 and scratch off the black paint!

## Specialist Magazines

Readers of 'VHF Report' interested in the more technical aspects of v.h.f. construction and up-to-date operating news may be interested in my personal list of specialist magazines. It's not exhaustive, but it does provide a good selection of quality v.h.f. publications.

I'll start off by mentioning *Dubus* which is the premier European v.h.f., u.h.f. and microwave magazine for the serious DXer. It's written in English and German and is published four times a year.

Each issue of *Dubus* contains about 100 pages with a mix of operating news and state-of-the-art technical and constructional



(15:56 11Jun93):144.675 dx: EA1BAA	distance: 1101	heading: 201
(15:56 11Jun93):144.675 dx: EA2CNT	distance: 1410	heading: 196
(15:56 11Jun93):144.675 dx: CT0SB	distance: 1740	heading: 210
(15:56 11Jun93):144.675 dx: EA1PH	distance: 1410	heading: 196
(16:01 11Jun93):144.675 dx: EA1U	distance: 1410	heading: 196
(16:51 11Jun93):144.675 dx: I4USC	distance: 1479	heading: 139
(16:56 11Jun93):144.675 dx: IW2EKO	distance: 1479	heading: 139

articles. A recent issue, for example, contained details of the G3WDG 10GHz system, a 1kW p.a. for 1.3GHz and open-wire feeds for 430MHz Yagis.

Subscriptions for *Dubus*, start with the March issue, and can be obtained from the UK agent, **Roger Blackwell G4PMK**, 57 Station Road, Scholes, Leeds LS15 4BY.

The magazine *VHF Communications* is the international edition of the German publication *UKW-Berichte*. It's published quarterly and contains about 60 pages of v.h.f., u.h.f. and s.h.f. technology.

*VHF Communications* is a very high quality magazine describing only state-of-the-art equipment. Printed circuit boards, modules and software applicable to the articles are also fully supported. The UK agent is **Mike Wooding G6IQM**, 5 Ware Orchard, Barby, Rugby, Warwickshire CV23 8UF.

The *VHF-UHF DXer* is a monthly UK newsletter for DXers on the bands above 50MHz. Each issue contains about 20 A5 pages covering up-to-date operating news and constructional articles.

The latest copy of *VHF-UHF DXer* gave reports for the 50, 144, 430MHz and microwave bands. Information about the BCC meteor scatter contest, VE30NT e.m.e. contest and the 6th International e.m.e. conference were also included.

Technical articles covered the *VHF-UHF DXer* included a 50MHz transverter (by G4DDK of PW Meon fane) and a 144MHz low noise amplifier by WB3JYO. Subscriptions can be obtained from the Editor, **Dave Hardy G8ROU**,

**Fig. 2: Distance scatter chart produced by computer program written by Dirk Koopman G1TLH (see text).**

**Thorntree House, Wensley, Matlock, Derbyshire DE4 2LL**

Although not obtained on subscription it's well worth joining the UK Six Metre Group just to get the magazine! *Six News* is a 60-page quarterly journal. It aims to provide the best information available on all aspects of the 50MHz band.

*Six News* includes DX-news, DX-reports, beacon news, propagation and technical articles. Equipment reviews, QSL addresses and readable and informative articles by 50MHz experts are also covered.

The UK Six Metre Group has over 800 members in over 50 countries around the world. Subscriptions for the UKSMG can be obtained from **Chris Gare G3WOS**, Old White Lodge, 183 Sycamore Road, Farnborough, Hampshire GU14 6RF.

## VHF Convention

The RSGB will be holding it's 1994 VHF Convention on Sunday February 20 at Sandown Park Exhibition Centre, Esher, Surrey. There will be a comprehensive trade exhibition, specialist groups and equipment test facility.

A full lecture programme and Morse testing facilities have also been arranged. Further details can be obtained from **Geoff Stone G3FZL** on 081-699 6940.

That's the lot for this month as I've run out of space! Please send your reports to me at **Yew Tree Cottage, Lower Maescoed, Herefordshire HR2 0HP** or via packet radio @ GB7MAD or the DX Cluster system.

**E N D**

Round-up

# BROADCAST

Last July, Deutsche Welle (DW) took over responsibility for European language broadcasting from Detuschlandfunk. From the beginning of January, English language programmes have moved from medium wave to short wave. Two frequencies are in use, 5.96 and 7.285MHz at a new time of 2000 to 2050 UTC.

Deutsche Welle's English Service can also be received on Astra, but there is a change to the transponder. The station can now be found on transponder 2 (RTL Plus), and the audio subcarrier at 7.74MHz.

Monitor Radio International, known until November last year as the World Service of the Christian Science Monitor, has been working hard to sell its original North American short wave transmitting station, WCSN.

The WCSNSender was located at Scotts Corner, Maine, on the east coast of the US. The site has a 500kW ABB-built transmitter, feeding to a TCI dual-band curtain antenna, formed of a 4 x 4 dipole array that is horizontally slewable.

The station in Maine is new in broadcasting terms. Construction started in 1985 and the station was on the air by March 1987. Now Monitor Radio is consolidating its North American operation to its newer site in Cypress Creek, South Carolina, with the call sign WSHB. There are two 500kW ABB transmitters and five TCI dual-band antennas.

Ed Evans, the Senior Station Manager, told me on the 'phone from the site that negotiations to sell the Scotts Corner station were well advanced and that a contract was due to be signed in January. Work has also started to install a third transmitter at WSHB to take over WCSN transmissions.

At the present, WSHB carries much more output than the site further north in Maine. The last chance to tune in to Monitor Radio International from WCSN must be coming soon.

The new winter schedule

*Peter Shore takes his regular look at the broadcast bands. Peter has some news of developments to Monitor Radio International and Australia's domestic service.*

lists for WCSN are: 0400-0500 on 9.84MHz to Africa with a 75° bearing; 0500-0600 on 9.84MHz also to Africa but with a 90° bearing; 1800-1900 on 21.64MHz, to Africa with a 90° bearing; 1900-2000 on 21.64MHz, also to Africa but with a 105° bearing; 2000-2100 on 13.77MHz to Africa with a 90° bearing; 2100-2200 on 5.85MHz to Africa and Europe with a 60° bearing.

The WCSN site is reported to have been sold to an organisation called Prophecy Countdown Inc., based in Florida, for US\$5 million. It intended to start broadcasting on January 17, with ownership of the site completed by September.

## Test Transmissions

Look out for test transmissions through until the end of March from Adventist World Radio (AWR), broadcasting from facilities hired from Radio Slovakia. On January 8, an inauguration ceremony took place at Rimavsaka Sobota, one of two short wave sites in Slovakia, with senior members of AWR's staff.

There are two 250kW transmitters that carry Radio Slovakia's programmes to Europe, Africa, the Middle East and parts of Asia. The AWR service will be time-sharing on the existing transmitters.

English language broadcasts from Radio Cairo can be heard beamed to Europe at 2115 to 2245 on 9.90MHz. There is also a chance of catching transmissions to Asia at 1215 to 1330 on 17.595 and to Africa at 1630 to 1830 on 15.255 and 2030-2200 on 15.375MHz.

China Radio International is now relayed by broadcasters in many parts of the world, as well as being carried on its own extensive transmitter network in the People's Republic. English transmissions are heard to Europe at: 2000-2100 on 9.92, 8.26, 4.13MHz; 2100-2200 on 9.92, 8.26, 6.95 4.13MHz; 2200-2300 on 7.17MHz (transmitter in Russia).

English to North America:



0000-0100 on 11.715, 9.78 (both from Mali); 0300-0400 on 11.715, 9.78 (both from Mali), 9.69MHz (Spain); 0400-0500 on 11.84 (Canada), 11.68MHz (French Guyana); 1200-1300 on 15.21MHz; 1300-1400 on 15.44, 11.66, 9.715, 8.425, 7.405MHz (also beamed to Asia).

English to Africa: 1600-1700 on 15.13, 15.11 (both Mali), 11.575, 4.13MHz; 1700-1800 on 11.575, 9.57, 8.26, 7.405, 4.13MHz; 1900-2000 on 9.44, 6.955MHz; 2000-2100 on 15.11, 11.715 (both Mali), 9.44MHz; 2100-2130 on 15.11, 11.715MHz (both Mali).

## Domestic Australia

Radio Netherlands' *Media Network* programme recently carried a report that Australia's domestic short wave service is going to be closed down over the next few years.

There are short wave transmitters in South Australia and Western Australia beaming programmes to listeners in remote areas not served by f.m. or m.w. signals. Nowadays, though, many small communities are being equipped with their own small broadcasting stations, and satellite is changing the way people stay in touch.

Wanneroo based VLW, outside Perth, has been operational since 1939. It transmits on 6.14 and 9.61MHz with 10kW, whilst VLM and VLQ operate on 4.91 and 9.66MHz respectively, also with 10kW. However, as these frequencies are in heavily

used parts of the broadcast band here in Europe, catching them is unlikely.

The Northern Territories transmitters at Alice Springs (2.31 and 4.835MHz), Tennant Creek (2.325 and 4.91MHz) and Katherine (2.485 and 5.025MHz) will all continue for the foreseeable future and are more likely to be heard here in Europe.

## Other Hobbyists

If you are interested in short wave listening and would like to meet other hobbyists, together with some personalities from the other side of the microphone, then you may be interested in taking a short break in Paris during May.

The French DX club Amitie Radio is organising the 1994 European DX Council Conference, the annual meeting of DXers and broadcasters in Europe. The Conference, which is held in English, includes seminars and lectures about all aspects of the short wave listening hobby, as well as time for sightseeing, visits to radio stations in Paris and a good deal of socialising!

Full details are available from **EDXC Conference '94, PO Box 4, St Ives, Huntingdon, Cambs PE17 4FE.**

That is all from the world of international radio for this month. Next month I will be casting my eye over a new radio set, so keep a look out for 'Broadcast Round-Up'.

**E N D**

# ARCADE

## The PW Shopping Arcade

Welcome to the *Practical Wireless* 'Arcade'. In this section of the magazine, you'll be able to find all those important services 'under one roof' - just like the shopping arcades you see in the High Street.

Let your eyes 'stroll through' the Arcade every month and you'll find all departments open for business including: The Book Service, PCB Service, Binders and details of other *PW* Services. Make a regular habit of 'visiting' the Arcade, because in future, you'll have the chance of seeing special book offers and other bargains. And don't forget, this Arcade is open wherever you're reading *PW*!

## Services

### Queries:

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

We will always try to help readers having difficulties with *Practical Wireless* projects, but please note the following simple rules:

- 1: We **cannot** deal with technical queries over the telephone.
- 2: We **cannot** give advice on modifications either to our designs, to commercial radio, TV or electronic equipment.
- 3: All letters asking for advice **must** be accompanied by a stamped self-addressed envelope (or envelope plus IRCs for overseas readers).
- 4: Make sure you describe the problem adequately, with as much detail as you can possibly supply.
- 5: Only one problem per letter please.

## Back Numbers

Limited stocks of many issues of *PW* for past years are available at £2.00 each including post and packing. If the issue you want is not available, we can photocopy a specific article at a cost of 85p per article or part of article. Over the years, *PW* has reviewed many items of radio related equipment. A list of all the available reviews and their cost can be obtained from the Editorial Offices at Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW for a stamped self-addressed envelope.

## Binders

*PW* can provide a choice of binders for readers' use. Plain blue binders are available, each holding 12 issues of any A4 format magazine. Alternatively, blue binders embossed with the *PW* logo in silver can be supplied. The price for either type of binder is £5.50 each (£1 P&P for one, £2 for two or more).

Send all orders to PW Publishing Ltd., FREEPOST, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.

## Constructional Projects

Components for *PW* projects are usually readily available from component suppliers. For unusual or specialised components, a source or sources will be quoted.

Each constructional project is given a rating to guide readers as to the complexity.

**Beginner:** A project that can be tackled by a beginner who is able to identify components and handle a soldering iron.

**Intermediate:** A fair degree of experience of building radio or electronic projects is assumed, but only basic test equipment will be needed to complete any tests and adjustments.

**Advanced:** A project likely to appeal to the experienced constructor. Access to workshop facilities and test equipment will often be required. Definitely not for the beginner to attempt without assistance.

## Mail Order

All items from *PW* are available Mail Order, either by post or using the 24hr Mail Order Hotline (0202) 659930. Payment should be by cheque, postal order, money order or credit card (Mastercard and Visa only). All payments **must** be in sterling and overseas orders **must** be drawn on a London Clearing Bank.

Practical Wireless, March 1994

# Singles Save On Dayton '94!

**Travelling By Yourself? - Don't Miss Out On The *PW* Holiday To The Dayton HamVention 1994 - Singles Are Welcome.**

**Single? You too can enjoy the HamVention holiday - Save on the single room supplement by sharing with a friend. Alternatively, we'll pair up single travellers so they can save money and enjoy the holiday by sharing accommodation in Dayton.**

Many new friendships have grown between *PW* travellers on our previous trips. So, don't lose out because you're travelling alone. Call Rob Mannion G3XFD at the Broadstone Editorial office on (0202) 659910, and he'll give you more details on the single saver idea for Dayton '94.

We fly out from Gatwick to the HamVention on Monday April 25 1994. Our flight goes direct to Cincinnati, and our private coach takes us to the Holiday Inn at Englewood, Dayton for our seven night stay. We'll have two excursions, including one to the world famous United States Airforce Museum and there's plenty of shopping and other attractions for the rest of the family! You can book your seat on the HamVention Holiday for only £630 per person sharing a twin-bedded room. The price includes return flight, meals on the aircraft, coach transfer, seven nights' accommodation, two day excursions by coach and HamVention admission ticket. We return home on Monday May 2, arriving at Gatwick on Tuesday morning.

Seats To Dayton HamVention 1994 are strictly limited - don't miss your chance...book now. We don't want you to miss the flight!

**For further information on the holiday and details on how you can save money by sharing accommodation, contact Rob Mannion G3XFD on (0202) 659910 during office hours, alternatively you can leave a message on our answering machine or write to *Practical Wireless*, Dayton HamVention 1994, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.**

# BOOK SERVICE

The books listed have been selected as being of special interest to our readers. They are supplied direct to your door. Some titles are overseas in origin.

**TO ORDER:**  
PLEASE USE THE ORDER FORM AT THE END OF THIS SECTION.

## LISTENING GUIDES

### AIR BAND RADIO HANDBOOK

**4th Edition**  
**David J. Smith**  
Extensively revised & updated (October 1992). Air band radio listening enables you to listen-in on the conversations between aircraft and those on the ground who control them, and is an increasingly popular and fascinating hobby. A new chapter on military air band has been added. The author, an air traffic controller, explains more about this listening hobby. **190 pages. £7.99**

### THE COMPLETE SHORT WAVE LISTENER'S HANDBOOK 3RD EDITION

**Hank Bennett, Harry Helms & David Hardy**  
This book is a comprehensive guide to the basics of short wave listening. Everything you need to get started as an s.w.l. is explained in a clear and easily understood manner. Receivers, antennas, frequencies, propagation, Q-codes, etc. are all covered. **294 pages. £14.95.**

### DIAL SEARCH 1992/94

**George Wilcox**  
The listener's check list and guide to European radio broadcasting. Covers m.w., l.w., v.h.f. & s.w., including two special off-band maps. Also includes a full list of British stations, a select list of European stations, broadcasts in English and 'Making the Most of Your Portable'. **46 pages. £4.25**

### FLIGHT ROUTINGS 1993

**Compiled by T.T. & S.J. Williams**  
This guide was produced with the sole aim of assisting airband listeners to quickly find details of a flight, once they have identified an aircraft's callsign. Identifies the flights of airlines, schedule, charter, cargo and mail, to and from the UK and Eire and overflights between Europe and America. **122 pages. 0/P**

### FERRELL'S CONFIDENTIAL FREQUENCY LIST 8th Edition

**Compiled by Geoff Halligey**  
Spirally bound, this easy-to-use reference book covers 1.6 - 28MHz in great depth, all modes and utility services, with new reverse frequency listing showing every known frequency against each callsign, who's using what frequency and mode, what's that callsign? These are some of the answers this book will help you find. **544 pages. £17.95**

### GUIDE TO FACSIMILE STATIONS

**13th Edition**  
**Joerg Klingenfuss**  
The new edition of this super reference book covers the world's facsimile stations, their frequencies and methods of working.

There is a section covering the equipment needed to receive FAXes over the radio. To give you an idea of what is available there are many pages of off-air received FAX pictures. **392 pages. £18.00**

### GUIDE TO UTILITY STATIONS

**12th Edition**  
**Joerg Klingenfuss**  
This book covers the complete short wave range from 3 to 30MHz together with the adjacent frequency bands from 0 to 150kHz and from 1.6 to 3MHz. It includes details on all types of utility stations including FAX and RTTY. There are 19549 entries in the frequency list and 3590 in the alphabetical callsign list plus press services and meteorological stations. Included are RTTY & FAX press and meteor schedules. There are 11800 changes since the 10th edition. **534 pages. £24.00**

### HF OCEANIC AIRBAND COMMUNICATIONS 4th Edition

**Bill Laver**  
HF aircraft channels by frequency and band, main ground radio stations, European R/T networks and North Atlantic control frequencies. **31 pages. £3.95**

### INTERNATIONAL RADIO STATIONS GUIDE

**BP255**  
**Peter Shore**  
As in 'Broadcast Roundup', his column in *PW*, Peter Shore has laid this book out in world areas, providing the listener with a reference work designed to guide around the ever-more complex radio bands. There are sections covering English language transmissions, programmes for DXers and s.w.l.s. Along with sections on European medium wave and UK f.m. stations. **266 pages. £5.95**

### INTERNATIONAL VHF FM GUIDE

**7th Edition.**  
**Julian Baldwin G3UHK & Kris Partridge G8AUU**  
This book gives concise details of repeaters & beacons world-wide plus coverage maps & further information on UK repeaters. **70 pages. £2.85**

### MONITORING THE YUGOSLAV CONFLICT

**Langley Pierce**  
A guide to monitoring the Yugoslav radio transmissions of the UN, aircraft and shipping engaged in the civil war in the former Yugoslavia. **28 pages. £4.85**

### NEWBORN SHORT WAVE LISTENING HANDBOOK

**Joe Pritchard G1UQW**  
A technical guide for all short wave listeners. Covers construction and use of sets for the s.w.l. who wants to explore the bands up to 30MHz. Also covers the

technical side of the hobby from simple electrical principles all the way to simple receivers. **276 pages. £15.95**

### POCKET GUIDE TO RTTY AND FAX STATIONS

**Bill Laver**  
A handy reference book listing RTTY and FAX stations, together with modes and other essential information. The listing is in ascending frequency order, from 1.6 to 26.8MHz. **57 pages. £3.95**

### RADIO LISTENERS GUIDE 1994

**Clive Woodyear**  
This is the third edition of this radio listener's guide. Simple-to-use maps and charts show the frequencies for radio stations in the UK. Organised so that the various station types are listed separately, the maps are useful for the travelling listener. Articles included in the guide discuss v.h.f. aerials, RDS, the Radio Authority and developments from Blaupunkt. **68 pages. £3.45**

### SHORT WAVE INTERNATIONAL FREQUENCY HANDBOOK

Formerly the Confidential Frequency List and re-published in April 93, this book covers 500kHz-30MHz. It contains duplex and channel lists, callsigns, times and modes, broadcast listing and times. **192 pages. £9.95**

### UK SCANNING DIRECTORY

**3rd Edition**  
This spiral bound book lists over 12000 UK spot frequencies from 25MHz to 1.213GHz. Articles on scanning in the UK. **250 pages. £16.95**

### VHF/UHF SCANNING FREQUENCY GUIDE

This book gives details of frequencies from 26MHz to 12GHz with no gaps and who uses what. Completely revised and enlarged (February 1993), there are chapters on equipment requirements as well as antennas, the aeronautical bands, as well as the legal aspect of listening using a scanner. **156 pages. 0/P**

### WORLD RADIO TV HANDBOOK 1994

Country-by-country listing of l.w., m.w. & s.w. broadcast and TV stations. Receiver test reports, English language broadcasts. The s.w.l.'s 'bible'. **£15.95.**



## SATELLITES

### NEWNES GUIDE TO SATELLITE TV

**Derek Stephenson**  
This book, the 2nd edition, is a hard bound volume, printed on high quality paper. The author is a satellite repair and installation engineer and the book covers all information needed by the installation engineer, the hobbyist and the service engineer to understand the theoretical and practical aspects of satellite reception with dish installation and how to trouble-shoot when picture quality is not up to anticipated reception. Mathematics has been kept to a minimum. **284 pages. 0/P**

### SATELLITE BOOK - A Complete Guide to Satellite TV Theory and Practice

**John Breeds**  
This book deals almost exclusively with television broadcast satellites and is a comprehensive collection of chapters on topics, each written by an expert in that field. It appears to be aimed at the professional satellite system installer, for whom it is invaluable, but it will be appreciated by a much wider audience - anyone interested in satellite technology. **280 pages. £30.00**

### SATELLITE EXPERIMENTER'S HANDBOOK

**2nd Edition**  
**Martin Davidoff K2UBC**  
The book is divided into four main sections - History, Getting Started, Technical Topics and Appendices. It provides information on spacecraft built by, and for, radio amateurs. In addition, it discusses weather, TV-broadcast and other satellites of interest to amateurs. **313 pages. £14.50**

### SATELLITE TELEVISION

**A layman's guide**  
**Peter Pearson**  
Pictures from space, that's what satellite television is all about. Orbiting satellites, 35000km high, receive TV signals from stations on the earth and re-transmit them back again. This book explains all you need to know to set up your own satellite TV terminal at home, dish and accessories, cable and tuner. **73 pages. £1.00**

### SATELLITE TELEVISION INSTALLATION GUIDE

**2nd Edition**  
**John Breeds**  
A practical guide to satellite television. Detailed guide-lines on installing and aligning dishes based on practical experience. **56 pages. £13.00**



### WEATHER SATELLITE HANDBOOK

**4th edition**  
**Dr Ralph E. Taggart WB8DQT**  
This book explains all about weather satellites, how they work and how you can receive and decode their signals to provide the fascinating pictures of the world's weather. Plenty of circuit diagrams and satellite predicting programs. **192 pages. £14.50**

pictures of the world's weather. Plenty of circuit diagrams and satellite predicting programs. **192 pages. £14.50**

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# AMATEUR RADIO

## ALL ABOUT VHF AMATEUR RADIO

W. I. Orr W6SAI

Written in non-technical language, this book provides information covering important aspects of v.h.f. radio and tells you where you can find additional data. If you have a scanner, you'll find a lot of interesting signals in the huge span of frequencies covered, 100-300MHz & 50, 420, 902 & 1250MHz bands. 163 pages. £9.50.

## AMATEUR RADIO CALL BOOK (RSGB)

Latest Edition

Over 60000 callsigns are listed including EI stations. Now incorporates a 122-page section of useful information for amateur radio enthusiasts and a new novice callsign section. 444 pages. £9.50

## ARRL HANDBOOK FOR RADIO AMATEURS

1994

This is the 70th edition of this handbook and contains the best information from previous issues. Now for this edition is some information on feedback-loop design for power supplies, a new gel-cell charger project, updates on antenna systems and new coverage of baluns, propagation programs are compared and colour SSTV and telephone FAX machines are also covered. Finally there's a new section on 'for the workbench' with new projects for the reader to build. 1214 pages. £18.95

## ARRL OPERATING MANUAL

Another very useful ARRL book. Although written for the American amateur, this book will also be of use and interest to the UK amateur. Topics covered range from short wave listening through operating awards to repeaters, operating and satellites. 684 pages. £12.95

## ARRL SATELLITE ANTHOLOGY

The best from the Amateur Satellite News column and articles out of 31 issues of QST have been gathered together in this book. The latest information on OSCARs 9 through 13

as well as the RS satellites is included. Operation on Phase 3 satellites (DSCAR 10 and 13) is covered in detail. 97 pages. £5.95

## ARRL UHF/MICROWAVE EXPERIMENTER'S MANUAL

Various Authors

A truly excellent manual for the keen microwave enthusiast and for the budding 'microwaver'. With contributions from over 20 specialist authors. Chapters covering techniques, theory, projects, methods and mathematics. 446 pages. £14.50

## COMPLETE DX'ER

Bob Locher

This book covers equipment and operating techniques for the DX chaser, from beginner to advanced. Every significant aspect of DXing is covered, from learning how to really listen, how to snatch the rare ones out of the pile-ups and how to secure that elusive QSL card. 204 pages. £7.95

## HINTS AND KINKS FOR THE RADIO AMATEUR

Edited by Charles L. Hutchinson and David Newkirk

A collection of practical ideas gleaned from the pages of QST magazine. Plenty of projects to build, hints and tips on interference, c.w. and operating and snippets of information from amateurs who've tried and tested the idea. 129 pages. £4.95

## HOW TO PASS THE RADIO AMATEURS' EXAMINATION (RSGB)

Clive Smith G4FZH and George Benbow G3HB

The background to multiple choice exams and how to study for them with sample RAE paper for practice plus maths revision and how to study for the exam. The majority of this book is given to sample examination papers so that candidates can familiarise themselves with the examination and assess their ability. 88 pages. £6.95.

## INTRODUCTION TO AMATEUR COMMUNICATIONS SATELLITES

BP290. A. Pickard

This book describes several currently available systems, their connection to an appropriate computer and how they can be operated with suitable software. The results of decoding signals containing such information as telemetry data and weather pictures are demonstrated. 102 pages. £3.95

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I. D. Poole

This book gives the newcomer a comprehensive and easy to understand guide through amateur radio. Topics include operating procedures, jargon, propagation and setting up a station. 150 pages. £3.50

## INTRODUCTION TO RADIO WAVE PROPAGATION BP293

J.G. Lee

How does the sun and sunspots affect the propagation of the radio waves which are the basis of our hobby? They affect the ionosphere, but differing frequencies are treated differently. Find out how to use charts to predict frequencies that will be the most profitable. What effect will noise have on the signal? Find out with this book. 116 pages. £3.95

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I.D. Poole

An excellent book to go with the new Novice or full callsign. Nine chapters and an appendix deal with all aspects and frequencies from 50 to 1300MHz. Topics

include propagation, descriptions of the bands, antennas, receivers, transmitters and a special chapter on scanners. 102 pages. £3.50

## PASSPORT TO AMATEUR RADIO

Reprinted from PW1981-1982

The famous series by GW3JGA, used by thousands of successful RAE candidates in their studies. Plus other useful articles for RAE students including emission codes, explanations of diodes, s.s.b. and decibels. 87 pages. £1.50

## PRACTICAL GUIDE TO PACKET OPERATION IN THE UK

Mike Mansfield G6AWD

Introduces the concept of packet radio to the beginner. Problem areas are discussed and suggestions made for solutions to minimise them. Deals with the technical aspects of packet taking the reader through setting up and provides a comprehensive guide to essential reference material. 220 pages. £9.95

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Operating QRP is fun. The equipment is generally simple and easy to build, but often performs like more sophisticated commercial equipment. Some QRP Field Day stations operate a full 27 hours on a car battery - it's the perfect equipment for emergency communication when the power fails. Extracts from QST and the ARRL Handbook. 274 pages. £9.95

## RADIO AMATEUR CALLBOOK INTERNATIONAL LISTINGS 1994

72nd Edition

The only publication listing licensed radio amateurs throughout the world. Also includes DXCC Countries list, standard time chart, beacon lists and much more. Over 1400 pages. £19.50

## RADIO AMATEUR CALLBOOK NORTH AMERICAN LISTINGS 1994

72nd Edition

Listings of US amateurs (including Hawaii). Also contains standard time chart, census of amateur licences of the world, world-wide QSL bureau, etc. Over 1400 pages. £19.50

## RADIO AMATEUR'S QUESTIONS & ANSWER REFERENCE MANUAL

4th Edition

R. E. G. Petri G8CCJ  
This book has been compiled especially for students of the City and Guilds of London Institute RAE. It is structured with carefully selected multiple choice questions, to progress with any recognised course of instruction, although it is not intended as a text book. 280 pages. £7.95

## RAE MANUAL RSGB

G.L. Benbow G3HB

The latest edition of the standard aid to studying for the Radio Amateurs' Examination. Updated to cover the latest revisions to the syllabus. Takes the candidate step-by-step through the course. 127 pages. £6.95.

## RAE REVISION NOTES

George Benbow G3HB

If you're studying for the Radio Amateur's Examination, this book could be useful. It's a summary of the salient points of the Radio Amateurs' Examination Manual, the standard textbook for the exam. It's A5 size and therefore can be carried with you wherever you go. Easy-to-read, it's divided into 13 chapters with topics like receivers, power supplies, measurements, operating procedures, licence conditions and a summary of the formulae all dealt with. 92 pages. £4.00



## VHF/UHF DX BOOK

Edited Ian White G3SEK

An all round source of inspiration for the v.h.f./u.h.f. enthusiast. Written by acknowledged experts this book covers just about everything you need to know about the

technicalities of v.h.f./u.h.f. operating.

270 pages. £18.00

## W1FB's DESIGN NOTEBOOK

Ooug DeMaw W1FB

This book is aimed at the non-technical amateur who wants to build simple projects and obtain a basic understanding of amateur electronics. Your workshop does not need to be equipped like an engineering lab to be successful as an experimenter. Don't let a lack of test equipment keep you from enjoying the thrills of experimentation. 195 pages. £8.50

## W1FB'S HELP FOR NEW HAMS

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This book covers everything from getting acquainted with new equipment to constructing antennas, station layout, interference and operating problems to on-the-air conduct and procedures. 155 pages. £6.95

## W1FB's QRP NOTEBOOK

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The new improved and updated 2nd edition of this book, covers the introduction to QRP, construction methods, receivers and transmitters for QRP. This workshop-notebook style publication, which is packed with new designs for the keen QRP operator, also covers techniques, accessories and has a small technical reference section. 175 pages. £7.95

## YOUR GATEWAY TO PACKET RADIO

Stan Horzapa WA1LOU

What is packet radio good for and what uses does it have for the 'average' amateur? What are protocols? where, why, when? Lots of the most asked questions are answered in this useful book. It included details of networking and space communications using packet. 278 pages. £8.95

# FAULT FINDING

## GETTING THE MOST FROM YOUR MULTIMETER BP239

R. A. Penfold

This book is primarily aimed at beginners. It covers both analogue and digital multi-meters and their respective limitations. All kinds of testing is explained too. No previous knowledge is required or assumed. 102 pages. £2.95

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Robert L. Goodman

This book steers you through the various features - old and new - that scope technology provides and is an invaluable guide to getting the best out of your scope. An overview of available scopes will help you choose the one that best suits your needs. Areas covered include spectrum analysis, test applications, multiple-trace displays, waveform analysis, triggering, magnified sweep displays, analogue and digital scopes, etc. 309 pages. £17.50.

## MORE ADVANCED USES OF THE MULTIMETER BP265

R.A. Penfold

This book is primarily intended as a follow-up to BP239, Getting the most from your Multi-meter. By using the techniques

described in this book you can test and analyse the performance of a range of components with just a multi-meter (plus a very few inexpensive components in some cases). The simple add-ons described extend the capabilities of a multi-meter to make it even more useful. 96 pages. £2.95.

## OSCILLOSCOPES, HOW TO USE THEM, HOW THEY WORK

3rd Edition

Ian Hickman

This book describes oscilloscopes ranging from basic to advanced models and the accessories to go with them. Oscilloscopes are essential tools for checking circuit operation and diagnosing faults, and an enormous range of models is available. 248 pages. £15.95

# MORSE

## INTRODUCING MORSE. Collected Articles from PW 1982-1985

Ways of learning the Morse Code, followed by constructional details of a variety of keys including Iambic, Triambic and an Electronic Bug with a 528-bit memory as well as a practice oscillator and Morse tutor. 48 pages. £1.25

## SECRET OF LEARNING MORSE CODE. Mark Francis

Updates for the Novice Licence. Designed to make you proficient in Morse code in the shortest possible time, this book points out many of the pitfalls that beset the student. 84 pages. £4.95

# TELEVISION

## ATV COMPENDIUM

Mike Wooding G6IOM

This book is for those interested in amateur television, particularly the home construction aspect. There isn't a 70cm section as the author felt this was covered in other books. Other fields such as 3cm TV, are covered in depth. A must for the practical ATV enthusiast. 104 pages. £3.00

## GUIDE TO WORLD-WIDE TELEVISION TEST CARDS. Edition 3

Keith Hamer & Gary Smith

Completely revised and expanded, this is a very handy and useful reference book for the DXTV enthusiast. Over 200 photographs of Test Cards, logos, etc., world wide. 60 pages. £4.95

## THEORY

### ARRL ELECTRONICS DATA BOOK

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### AUDIO

**Elements of Electronics - Book 6 BP111**  
**F. A. Wilson**  
This book studies sound and hearing, and examines the operation of microphones, loudspeakers, amplifiers, oscillators, and both disk and magnetic recording. Intended to give the reader a good understanding of the subject without getting involved in the more complicated theory and mathematics. 308 pages. £3.95

### BEGINNERS GUIDE TO MODERN ELECTRONIC COMPONENTS BP285. R.A. Penfold

This book covers a wide range of modern components. The basic functions of the components are described, but this is not a book on electronic theory and does not assume the reader has an in-depth knowledge of electronics. It is concerned with practicalities such as colour codes, deciphering code numbers and suitability. 166 pages. £3.95



**EVERYDAY ELECTRONIC DATA BOOK**  
**Mike Tooley BA**  
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This little book deals effectively with a difficult abstract subject - the invisible electromagnetic wave. Aimed at the beginner, the book with its basic approach to electromagnetics, antennas, waves, propagation and constraints is a good starting point, complete very simple but clear diagrams and the minimum of mathematics. 122 pages. £4.95.

### FROM ATOMS TO AMPERES BP254

**F.A. Wilson**  
Explains in simple terms the absolute fundamentals behind electricity and electronics. Topics include the use of SI units, gravity, magnetism, light, the electron, conduction in solids and electrical generators. 244 pages. £3.50

### NEWNES PRACTICAL RF HANDBOOK

**Ian Hickman**  
This book provides an easy-to-read introduction to modern r.f. circuit design. It's aimed at those learning to design r.f. circuitry and users of r.f. equipment such as signal generators and sweepers, spectrum and network analysers. 320 pages. £16.95

### PRACTICAL ELECTRONICS CALCULATIONS AND FORMULAE

**BP53. F. A. Wilson**  
Written as a workshop manual for the electronics enthusiast, there is a strong practical bias and higher mathematics have been avoided where possible. 249 pages. £3.95

### REFLECTIONS

**Transmission Lines & Antennas**  
**M. Walter Maxwell W2DU**  
This will help dispel the half-truths and outright myths that many people believe are true about transmission lines, standing waves, antenna matching, reflected power and antenna tuners. 323 pages. £14.50

### SOLID STATE DESIGN FOR THE RADIO AMATEUR

**Les Hayward W7ZDI & Doug DeMaw W1FB**  
Back in print by popular demand! A revised and corrected edition of this useful reference book covering all aspects of solid-state design. Topics include transmitter design, power amplifiers and matching networks, receiver design, test equipment and portable gear. 256 pages. £10.95

### TRANSMISSION LINE TRANSFORMERS

**Jerry Sevick W2FMI**  
This is the second edition of this book, which covers a most intriguing and confusing area of the hobby. It should enable anyone with a modicum of skill to make a balun, etc. Topics include analysis, characterisation, transformer parameters, baluns, multimatch transformers and simple test equipment. 270 pages. £13.50

## COMPUTING

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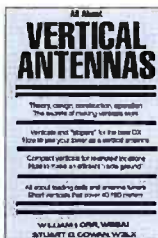
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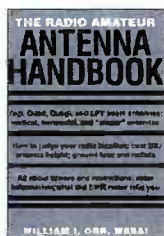
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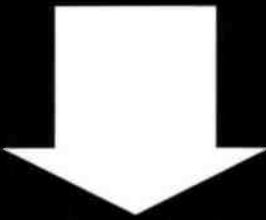
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Board	Article (Project) Title	Issue					
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WR313	10MHz Transmitter	Nov 92		WR255	Meon-4	May 91	
WR312	Receive/Mixer (Getting Started)	Nov 92		WR285	Scope Probe PSU	Apr 91	
WR311	Oscillator BFO (Getting Started)	Sept 92		WR284	Scope Probe	Apr 91	
WR310	1.2GHz Pre-scaler	Aug 92		WR283	Sudden Receiver	Mar 91	
WR309	Volt Reg/Divide by 100	Aug 92		WR282	Repeater Toneburst	Feb 91	
WR308	TTL 1MHz Oscillator (Getting Started)	July 92		WR281	High Voltage PSU	Jan 91	
WR307	Crystal Checker (Getting Started)	June 92		SET	<b>WR263/264 +WR276-80</b>	Jul 90	
SET	<b>WR303/304/305/306</b>	Apr 92			Marland Transmitter	Sep 90	
WR302	Inductance Bridge			WR272	NiCad Recycler	Jun 90	
WR301	GDO (Getting Started)	Apr 92		WR275	Low Voltage Alarm	Jun 90	
WR300a	Challenger Receiver	Feb 92		WR273	Valve PSU	May 90	
WR300	OSCAMPI Oscillator	Mar 92		WR274	RX Attenuator	May 90	
WR300	OSCAMPI Amplifier	Mar 92		WR271	Product Detector	Apr 90	
WR299	Multivibrator (Getting Started)	Jan 92		WR270	Badger Cub	Apr 90	
WR297/298	Additional Beaver boards	Jan 92		WR269	Glynme	Feb 90	
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SET	WR292/293/294 Chatterbox	Aug 91		WR264	Irwell (Relay)	Feb 90	
SET	WR290/291 Robin Freq. Counter	Aug 91		WR263	Irwell (VFO)	Jan 90	
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WR289	Meon-4 (Control)	Jul 91	WR266	Tuned Active Antenna	Jan 90		
WR288	Morse Master	Jun 91	WR265	Tuned Active Antenna (PSU)	Jan 90		
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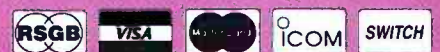
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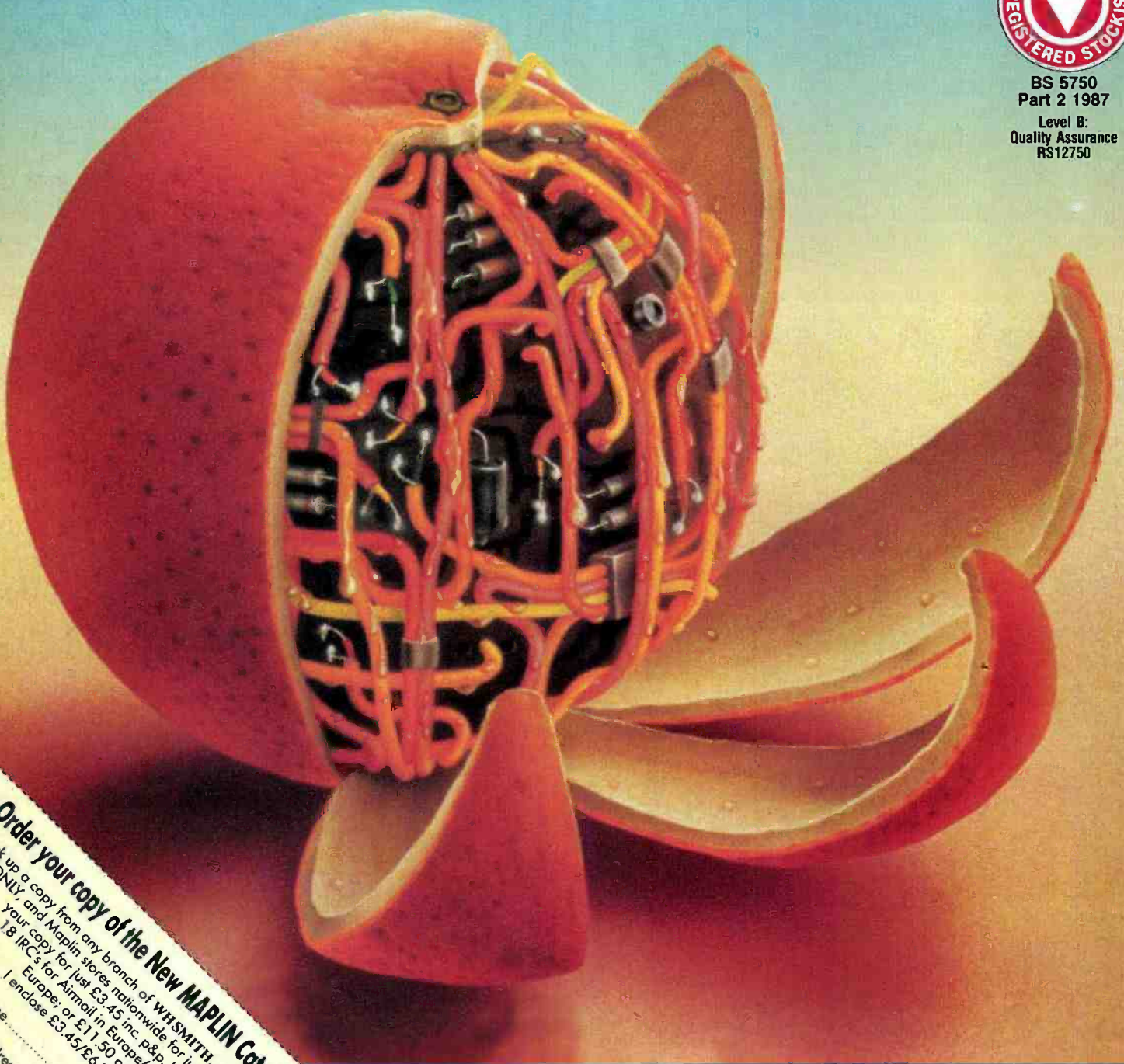
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