Practical Wireless

PW

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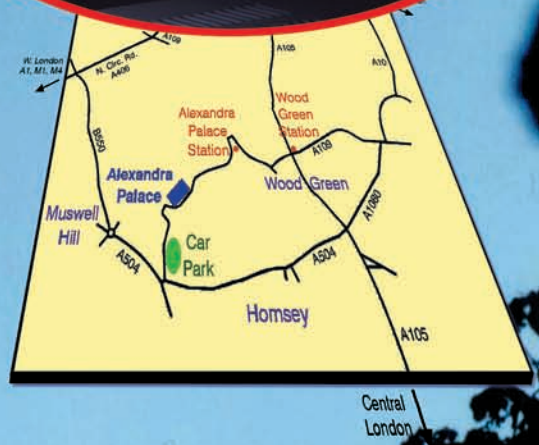

REVIEWED
YAESU FT-817
KENWOOD TS-2000

May 2001 £2.75

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SSTV - BEGINNER'S GUIDE

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FT-817

- 1.8MHz - 440MHz
- SSB CW FM AM
- 5 Watts output
- Vox & SWR Meter
- Electronic keyer
- 1 Amp ni-cad
- AC charger

This radio has really captured everybody's imagination. A complete station in one very portable package. Includes shoulder strap, microphone and 6m, 2m and 70cm tri-band whip.

Only from W & S

As from 1st April, on selected radios we are now offering :
FREE 3-YEAR WARRANTY.
This offer is for a limited period. When you shop at Waters and Stanton, we don't turn our back on you the moment your purchase is completed. That's why so many customers buy from us. And now, you get even better after-sales service.

Buying from us makes sense!

TS-2000

"When I switched this radio on I knew it was something special - what a receiver! Being able to QSY to the DX cluster frequency with a button press was pure magic. Fabulous." *Peter Waters G3OJV.*

- 1.8MHz - 440MHz
- SSB CW FM AM
- 100W (1.8 - 146MHz)
- DX Cluster
- 23cms option
- Internal HF & 6m ATU
- Satellite ready

Waters & Stanton PLC open day 13th May !

YAESU FT-1000MP Mk-V 200W HF All Mode Transceiver

£2899 Plus £7.50 Carr.

The New Industry Standard ..... Would a Serious DXer accept anything else ?

In choosing the FT-1000MP Mk V, you will be proud to own a rig with an impressive specification, reputation and lineage. Its outstanding performance and attention to detail, makes this the premier HF transciever for the 21st Century. This radio is a class leader.

19.4% APR: Deposit £299 and 36 months at £90.27.

YAESU FT-1000MP AC

160 - 10m All Mode

£1799 Plus £7.50 Carr.

19.4% APR Available

SAVE

If you are looking for the rig with every feature including dual receive - then look no further!

It has stood the test of time and used by the worlds top DXers and DXepeditions. Its excellent receiver combined with its superior transmitted signal makes this a natural choice for the HF enthusiasts.

19.4% APR: Deposit £199 and 36 months at £57.77.

ICOM IC-756PRO 1.8 - 52MHz 100W

£1895 Plus £7.50 Carr.

Free desk mic

You've read the rave reviews, and you have seen our recommendation on the web site. This radio with its amazing receiver and digital filtering, also includes auto ATU and real-time spectrum scope. A great DX rig.

19.4% APR: Deposit £190 and 36 months at £61.57

YAESU FT-847

160m - 70cm All Mode

£1329 with switch mode power supply

SAVE

SCOOP!

£1199 Plus £7.50 Carr.

The FT-847 has firmly established itself as a true all-band, all-mode transceiver. Loved by the VHF & UHF operators, and superb for satellite operation, it also offers great HF performance. We have sold more than any other dealer, which says a lot about our reputation and our price. Phone for free leaflet today. And remember, our stock is genuine UK, not modified overseas models!!

19.4% APR: Deposit £129 and 36 months at £38.63.

ICOM IC-746

160m - 2m All-mode

£1395 Plus £7.50 Carr.

Your chance to purchase one of the most popular "all-band, all-mode" transceivers at a very competitive price. The IC-746 offers 100 Watts output on all bands and has a receiver performance to match. Limited stock at this price.

19.4% APR: Deposit £145 and 36 months at £45.13.

YAESU FT- 920AF

HF 160m-6m-100w

SAVE

£1099 Plus £7.50 Carr.

Includes full DSP and internal ATU. High tech receiver with dual tuning controls. Uses many of the FT1000 MP features but at a more attractive price. Full break-in on CW and includes a data port for TNC.

19.4% APR: Deposit £129 and 36 months at £35.02.

KENWOOD TS-570DG

160 - 10m All Mode

£849 Plus £7.50 Carr.

19.4% APR Available

Probably the most underestimated transceiver on the market. Don't be fooled by the low price, the TS-570 has one of the best receivers around. One of the best buys if you want top HF performance on a budget.

19.4% APR: Deposit £89 and 36 months at £27.43.

WATERS & STANTON @ LOWE

GREAT news for customers in the Midlands and North of England!

KH-WSI World Space Digital Receiver

This radio has its own mini satellite dish and receives digital WorldSpace broadcast signals via the AfriStar satellite. As well as all the normal VHF FM programmes, you can switch to satellite broadcast signals from CNN, BBC, Bloomberg (multi language), World Radio networks 1 & 2, and lots more. High quality mono via the internal speaker and stereo via the headphone socket. Runs from AC, 4 x D cells (not supplied), or external 6V.

£99.95

SPS-8400 Switching Mode Power Supply

Variable 3 - 15V rated at 40 Amps continuous. Fully protected and very low noise. Ideal for a wide variety of ham applications. Light weight of 3.5kg and measuring 220 x 110 x 300mm Fixed 13.8V switch.

£99.95

ATX-Walkabout 80-6m (WARC)

Designed for FT-817 it is the ideal portable antenna

£69.95

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KENWOOD

TM-241E
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ICOM IC-706IIG 160 - 70cm All Mode

£1099 Plus £7.50 Carr.

Still a firm favorite with mobile operators and those who want a compact all-mode, all-band station. Phone for latest leaflet.

19.4% APR: Deposit £129 and 36 months at £35.02.

TS-2000 Multi Band/Mode Transceiver

IN STOCK!

Kenwood promise a top performance 160m - 23cms transceiver. Full details are in our latest catalogue and web site.

£1695 Plus £6.00 Carr.

KENWOOD TM-D700E 2m / 70cm Data Mobile

£449 Plus £7.50 Carr.

SAVE

Just arriving, this new model has built-in TNC, port for GPS, Data connector for SSTV, RTTY etc., CTCSS/DCS, Switchable TX/RX deviation, Dual receive, Wide receive option, Detachable head unit, 50 Watts on 2m, 35 Watts on 70cm, 200 memories, Alpha tag memo capability and a lot more. And who has the best price? - look no further!

WMM-3 Data Modes

£69.95 Plus £6.00 Carr.

If you want to receive data, then connect the audio output of your receiver to the WMM-3 and the output of the modem to your PC serial socket. A CD-ROM is provided with lots of software, this will get you started.

YAESU VX-5R

£269 Plus £6.00 Carr.

- 6m / 2m / 70cm Handheld
- 5W Output on 13.8V DC
- CTCSS Encode / Decode
- 25 / 12.5kHz Steps
- Auto Repeater Shift
- AM Airband Receive
- Lithium Cells & Charger

YAESU FT-50R

- 2m / 70cm Handheld
- 5W Output on 13.8V DC
- CTCSS Encode / 1750Hz tone
- 25 / 12.5kHz Steps
- 30 Memory Channels
- AM Airband Receive
- Ni-cad Cells & Charger

£169 Plus £6.00 Carr.

IC-910 VHF/UHF Transceiver - Coming Soon

£1299 Plus £7.50 Carr.

IC-910 VHF/UHF Transceiver - Coming Soon The new IC-910 from Icom will shortly be available. 100W on 2m and 75W on 70cms, plus the option of 1.2GHz. Well placed to take advantage of satellite operation, you can simultaneously operate 2 bands at once. Phone For Details

Optional 23cms + £400

YAESU FT-11R 2-Metre Handheld

SCOOP!

Another find in a warehouse! Brand new, boxed with AC chargers and ni-cad packs. 75 Alphanumeric memories, AM airband rx mod possible. Last selling price £249! Very limited stocks.

£119 Plus £6.00 Carr.

ICOM IC-2800H In Full Colour!

- 2m & 70cm Mobile
- Colour TV Screen
- Full CTCSS and 1750Hz Tone
- 50W 2m 35W 70cm

Includes FREE Remote head cable.

£419 Plus £7.50 Carr.

KENWOOD TH-D7E

- 2m & 70cm Handheld
- 6W Output on 13.8V DC
- CTCSS & 1750Hz Tone
- Built-in Packet Modem
- 200 Alphanumeric Memories
- DTMF Keypad & AM Airband
- Ni-cads & AC charger

£259 Plus £6.00 Carr.

YAESU

FT-90R Can you believe the size? 2m/70cm Dual Band

SAVE £309 Plus £7.50 Carr.

The tiny dimensions of the FT-90R from Yaesu, are hard to believe. Yet it produces 50W on 2m and 35W on 70cm. Auto repeater shift on UK channels and switched 12.5 / 25kHz deviation, make this a number one choice.

ADI AR-147

AM Airband Receive

£199 Plus £6.00 Carr.

- 2m 50 Watt Mobile Airband Receive
- Full CTCSS Encode / Decode
- 81 Memories 25 / 12.5kHz Steps
- Keypad microphone & Mounting Kit

ICOM IC-R3

PICTURE THE DIFFERENCE

NEW

- Full UK TV coverage
- 0.495-2450 MHz
- Advanced Lithium battery
- ALL DAY battery life
- 450 Memories
- FM / WFM & AM
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- Bandscope & automatic squelch
- 8 background colour choices
- Size 61 x 120 x 33mm

Phone Plus £7.50 Carr.

also receives 23 & 13cm amateur FM-TV 900-1300MHz 2250-2450MHz

ICOM IC-207H

£279 Plus £7.50 Carr.

- 2m / 70cm
- 50W / 35W
- 180 Memories and 7 Tuning Steps
- Detachable Head Unit / Clear Display
- Microphone, Mounting Bracket etc.

KENWOOD TM-G707E

£289 Plus £7.50 Carr.

- 2m and 70cm
- 50W and 35W
- Full CTCSS
- 180 Alphanumeric Memories
- Detachable Head with Amber Display

YAESU FT-8100R

£369 Plus £7.50 Carr.

- 2m and 70cm
- 50W and 35W
- Wideband RX AM & FM 208 Memories
- 7 Tuning Steps DTMF Remote Front panel
- Very compact, supplied with all hardware.

KENWOOD TM-V7E

£359 Plus £7.50 Carr.

- 2m / 70cm Mobile
- 50W 2m, 35W 70cm
- Clear LCD Readout
- CTCSS & DTMF
- 8 Frequency Steps & 280 Memories
- Includes Microphone & Mounting Bracket

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Please pay the Radio Society of Great Britain Direct Debits from the account detailed on this instruction subject to the safe guards assured by The Direct Debit Guarantee.

Signature(s)
Date

PW

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(ON SALE APRIL 12)
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EDITORIAL OFFICES
Practical Wireless
Arrowsmith Court, Station Approach
Broadstone, Dorset BH18 8PW

☎ (01202) 659910
(Out-of-hours service by answering machine)
FAX: (01202) 659950

Editor
Rob Mannion G3XFD
Technical Projects Sub-Editor
NG ("Tex") Swann G1TEX
News & Production Editor
Donna Vincent G7TZB

ADVERTISEMENT DEPARTMENT
ADVERT SALES & PRODUCTION
(General Enquiries to Broadstone Office)
Chris Steadman MBIM (Sales)
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ADVERTISING MANAGER
Roger Hall G4TNT
PO Box 948, London SW6 2DS

☎ 020-7731 6222
FAX: 020-7384 1031
Mobile: (07885) 851385

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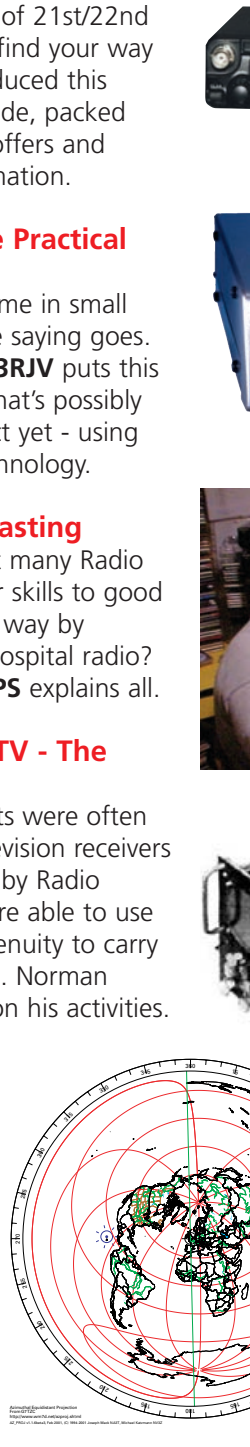
e.g. rob@pwpublishing.ltd.uk

Cover Subject
The combination photo shows the Yaesu FT-817 and Kenwood TS-2000 in the foreground with a very topical background - the Alexandra Palace transmitting tower.

Overlooking London from its hilltop site this internationally famous pioneering mast has served the nation in both peacetime and during the Second World War. On air from 1936, the television service closed down - with a Mickey Mouse cartoon! - in September 1939. During hostilities the powerful Band I v.h.f. transmitter helped to jam enemy navigational beams. A proud reminder of British TV engineering history.

Transceiver photographs by: **Tex Swann G1TEX**
Background photo courtesy of: **Radio Sport**
Design by: **John Kitching**

May features

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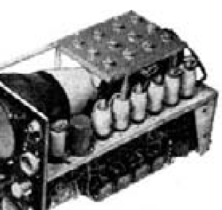
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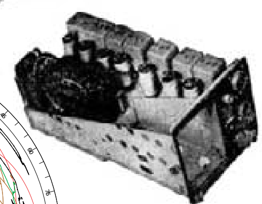

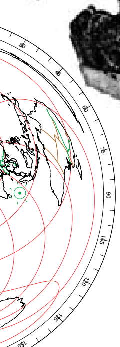
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May regulars


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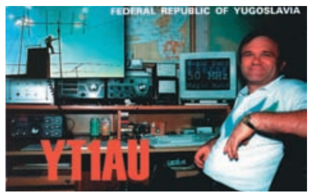

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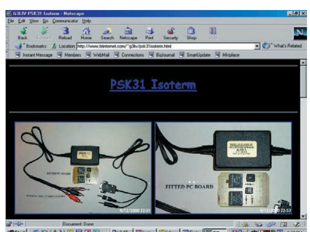

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author info

Our Radio Scene reporters' contact details in one easy reference point.

VHF DXer
David Butler G4ASR
Yew Tree Cottage
Lower Maescoed
Herefordshire
HR2 0HP
Tel: (01873) 860679
E-mail: g4asr@btinternet.com

HF Highlights
Carl Mason GW0VSW
12 Llwyn-y-Bryn
Crymlyn Parc
Skewen
West Galmorgan
SA10 6DX
Tel: (01792) 817321
E-mail: carl@gw0vsw.freeserve.co.uk

Keyboard Comms
Roger Cooke G3LDI
Tel: (01508) 570278
E-mail: rcooke@g3ldi.freeserve.co.uk
Packet: G3LDI@GB7LDI

Tune-in
Tom Walters
PO Box 4440
Walton
Essex
CO14 8BX
E-mail: tom.walters@aib.org.uk

In Vision
Graham Hankins G8EMX
17 Cottesbrook Road
Acocks Green
Birmingham
B27 6LE
E-mail:graham@ghank.demon.co.uk

DX Destination
Ed Taylor G3SQX
C/o PW Editorial Offices
Arrowsmith Court
Station Approach
Broadstone
Dorset
BH18 8PW
E-mail: g3sqx@email.com

Down Under
Chris Edmondson VK3CE
Box 123
Eagle Heights
Queensland 4271
Australia
E-mail:editor@radiomag.com

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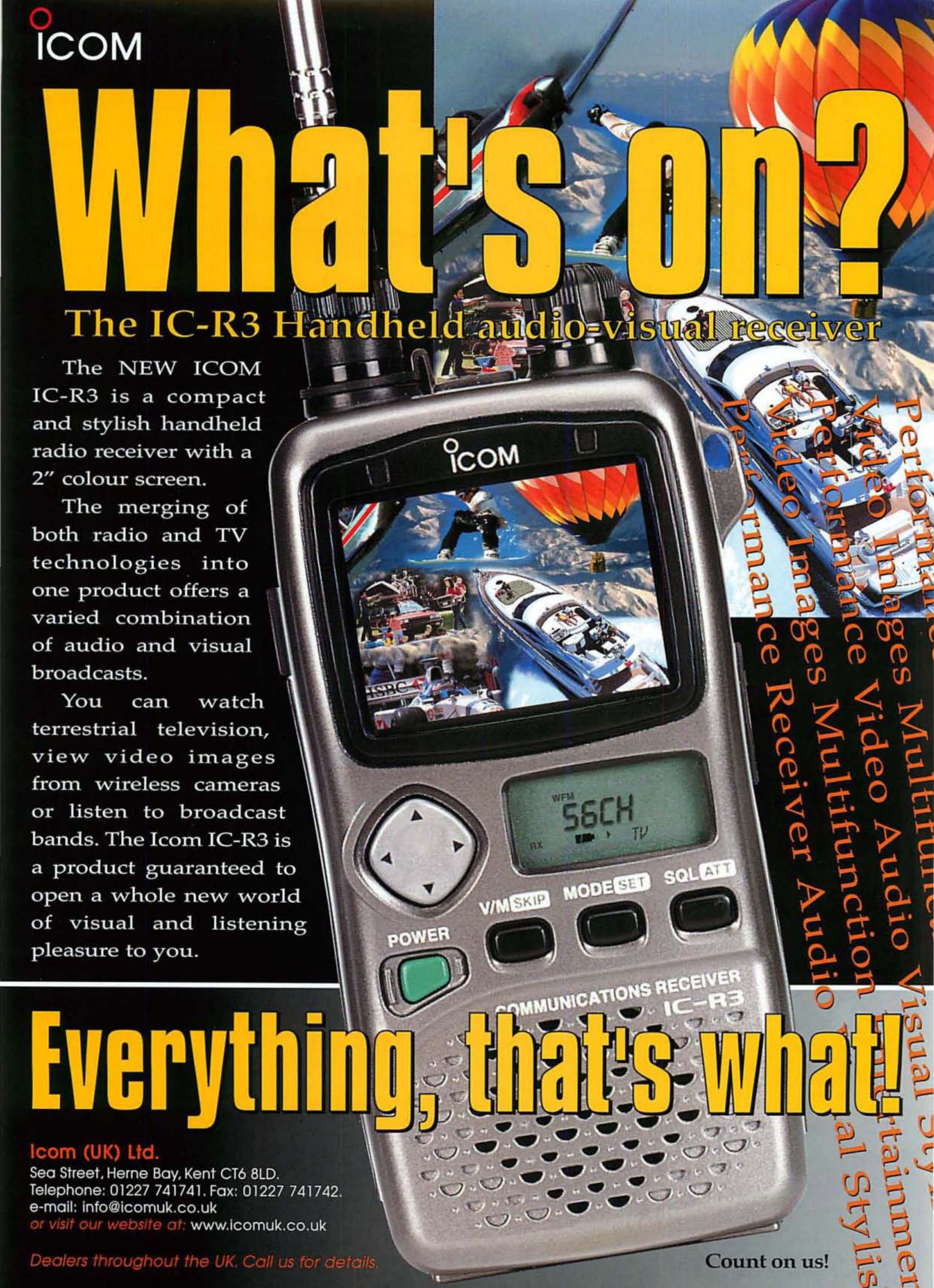
ICOM
What's on?
The IC-R3 Handheld audio-visual receiver
The NEW ICOM IC-R3 is a compact and stylish handheld radio receiver with a 2" colour screen.
The merging of both radio and TV technologies into one product offers a varied combination of audio and visual broadcasts.
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ROB IS BACK IN THE CHAIR WITH HIS MONTHLY CHAT

rob mannion's keylines

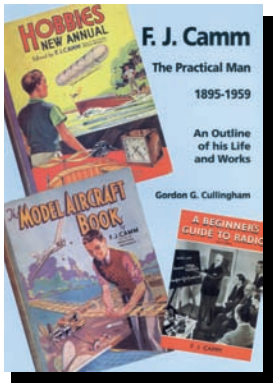
Welcome to 'Keylines'! Each month we introduce topics of interest and comments on current news.

Well...I'm back in the 'Editor's' chair once again! And what a chair it is now, everyone here in the *PW* office has had a go in my new Desperate Dan seat designed to cope with my size, weight and arthritic problems. It's excellent and only lacks an emergency ejection control!

Thank you to News & Production Editor **Donna G7TZB** for all the extra hard work she and the rest of the team dealt with while I was in dry dock. I say this, because despite the fact I completed all my work, there's always something unexpected that can suddenly appear!

Thanks also for the cards, letters and E-mails which arrived wishing me a good refit in dry dock. Thanks also to the anonymous readers who sent baskets of fruit. I enjoyed sharing these with other patients, especially those suffering from paralysis due to Multiple Schlerosis (MS) who were in for treatment too. Assisting them to eat the fruit led me to discover other keen short wave radio listeners and one ended up borrowing my World Space Radio digital receiver which provided superb 24-hour classical music from the AfriStar Satellite!

I'll be having regular short sessions in hospital in the future, but you can be assured that we'll arrange it so that *PW* production is not affected. Although in future my club visit schedule will be reduced, I look forward to meeting you at the major shows.



New Workshop

I'm delighted to say that a new workshop has now arrived at my home here in Dorset. Since I moved home the year before last I've been working under very cramped and difficult circumstances - literally on the kitchen table, much to my wife Carol's displeasure at times! She's been very patient, and with her encouragement and full support I now have a wooden workshop built from a modified summer house design.

With extra height and especially widened for my bulky body, the workshop is fully insulated and will eventually be moved to my permanent adapted home when one becomes available. As time goes by I'll share with you some of the ideas, techniques and systems which we can all use to advantage in our respective workshops.

I look forward to sharing some photographs of the new workshop with you very soon. But in the meantime I'll be underway with some more projects for the Radio Basics column. It really will be therapeutic for me to be able to write about Amateur Radio all day and then go into my workshop to develop ideas for use in *PW* - the more active you can be - the less chance there is to seize up altogether!

Harry Hardisty G0HDL

Readers may well remember the delightful story I shared via Keylines last year - to accompany his letter on page eight - in the May issue of *PW* describing how I met retired City of Salford Policeman **Harry Hardisty G0HDL** (**H**arry **D**oesn't **L**inger he called himself!). Unfortunately, I've been told that Harry died in February aged 84, leaving many friends missing his wonderful humour.

Whenever I visit a club to provide a *PW* talk in future I'll always think of G0HDL when I describe how I first saw TV (on a green phosphored VCR97 indicator CRT) and how he surprised us all - at the Central Lancashire ARC in February 2000 - by saying that he was one of the 'Green & White' policeman I mention I'd seen on TV during the Coronation of our present Queen in 1953.

A great character who'll be sadly missed. My warmest sympathies go to Harry's family.

Camm Copy

Can you help me find a replacement copy of the *F. J. Camm - The Practical Man* book please? These books - published by the late **Gordon Cullingham** are no longer obtainable and both my copies which I took to club visits have now been mislaid on my travels.

F. J. Camm

Describing the life and work of Fred Camm (founding Editor of *PW*) I would very much like to buy another copy of the book for my own collection and to share with readers when I visit clubs. This is especially important I feel as we approach the 70th anniversary year of *PW*. So, can you help? If so I'd be delighted to hear from you.

Canadian Reader

Can the Canadian reader, orginally from Chesterfield here in England, who recently sent me a letter - with a cutting of an article from another magazine and many handwritten ideas for possible *PW* articles (on several sheets) please contact me again? You forgot to put your address and despite the fact there was a name on the letter I cannot quite make it (possibly Ron Metcalf?) out.

I want to reply to you and hope that you'll see this plea for help. Please write again.

Correspondence Problems Eased!

I'm very pleased to share with you that as from early March my correspondence problems will ease somewhat because of the help now available from **Jean Webber** who now does audio typing for me. And apart from me having to learn to dictate rather than chat to corespondents (so Jean tells me!) the system is already working well.

I'll try and reply to your letters as quickly as possible - but you can help by referring to the topics covered **with a reference sentence at the top of the letter**. This will enable me to sum up the contents accurately. In the meantime the E-mails still pour in and if you're E-mailing me I ask you to ensure you provide your full name and postal address and to let me know what country you are writing from. Thanks for your help.

Rob G3XFD

practical wireless services

Just some of the services *Practical Wireless* offers to readers...

Subscriptions

Subscriptions are available at £30 per annum to UK addresses, £38 in Europe and £42 (Airsaver), £49 (Airmail) overseas. Subscription copies are despatched by accelerated Surface Post outside Europe. Airmail rates for overseas subscriptions can be quoted on request. Joint subscriptions to both *Practical Wireless* and *Short Wave Magazine* are available at £60 (UK) £73 (Europe) and £81 (rest of world), £93 (airmail).

Components For *PW* Projects

In general all components used in constructing *PW* projects are available from a variety of component suppliers. Where special, or difficult to obtain, components are specified, a supplier will be quoted in the article. The printed circuit boards for *PW* projects are available from the *PW* PCB Service, **Kanga Products, Sandford Works, Cobden Street, Long Eaton, Nottingham NG10 1BL. Tel: 0115 - 967 0918. Fax: 0870 - 056 8608.**

Photocopies & Back Issues

We have a selection of back issues, covering the past three years of *PW*. If you are looking for an article or review that you missed first time around, we can help. If we don't have the whole issue we can always supply a photocopy of the article. Back issues for *PW* are £2.75 each and photocopies are £2.75 per article.

Binders are also available (each binder takes one volume) for £6.50 plus £1 P&P for one binder, £2 P&P for two or more, UK or overseas. Prices include VAT where appropriate.

A complete review listing for *PW*/*SWM* is also available from the Editorial Offices for £1 inc P&P.

Placing An Order

Orders for back numbers, binders and items from our Book Store should be sent to: **PW Publishing Ltd., FREEPOST, Post Sales Department, Arrowsmith Court, Station Approach, Broadstone Dorset BH18 8PW**, with details of your credit card or a cheque or postal order payable to PW Publishing Ltd. Cheques with overseas orders must be drawn on a London Clearing Bank and in Sterling. Credit card orders (Access, Mastercard, Eurocard, AMEX or Visa) are also welcome by telephone to Broadstone **(01202) 659930**. An answering machine will accept your order out of office hours and during busy periods in the office. You can also FAX an order, giving full details to Broadstone **(01202) 659950**.

The E-mail address is **bookstore@pwpublishing.ltd.uk**

Technical Help

We regret that due to Editorial time scales, replies to technical queries cannot be given over the telephone. Any technical queries by E-mail are very unlikely to receive immediate attention either. So, if you require help with problems relating to topics covered by *PW*, then please write to the Editorial Offices, we will do our best to help and reply by mail.

amateur radio waves

Make your own 'waves' by writing into *PW* with your comments, ideas, opinions and general 'feedback'.

The Star Letter will receive a voucher worth £10 to spend on items from our Book or other services offered by *Practical Wireless*.

All other letters will receive a £5 voucher.

National Museums Day Event!

Dear Sir

After a couple of years of supporting the Mills (watermills and windmills) Days special event stations, I was looking for some much more public places to hold a series of similar special event stations, around the UK. I think I may have found a solution which may well fit the bill, in the National Museums spread around the UK. I have been in preliminary discussions, with the directors of several of the National Museums local to me.

The idea was quite well received by the museums to which I spoke, subject to further discussion and setting a mutually acceptable date for the event to take place. I have spoken so far with (their response in brackets). The National Royal Armouries at Leeds (very keen). The National Railway Museum at York (may need further convincing). The National Photographic Museum, Bradford (sounds like a jolly good idea!). The National Mining Museum, Wakefield (terrifically keen).

I have started the ball rolling and I now need some help to take this further, so we can hopefully get an event organised for May or June of this year. First of all I need a list of addresses, contact names, and phone numbers of national museums, and radio clubs willing to negotiate, put on and support such an event over a two day weekend. Suggestions for possible venues would also be very acceptable, providing the venue has claim to the word 'National' in it's title. Obviously, the more National museums we can persuade to allow the event to take place, the easier it will be to persuade others to join in.

The dates for the special event to take place, has now been set for the 2nd and 3rd of June 2001. Just to remind those of you considering perhaps taking part in, what should prove to be a very enjoyable weekend.

The intention is to set up special event stations, at as many of the larger museums as possible, throughout the whole of the UK. I would hope for an h.f., v.h.f., and hopefully a Ui-View station to be set up, at each museum site.

Between us, we would seem to have the major museums here in central Yorkshire, already set up for the event. Several other clubs in the UK, have already agreed to take part in the event, as have some of the military museum sites, with a permanent shack on site. More are joining and offering support, by the day.

Of course very many more amateur radio clubs and museums will be required to join the weekend, to make it into a successful event. The museums would seem to be particularly easy venues, to get permission for the event to take place at, so please don't be put off from asking.

With such a large variety of museums as venues, it is impossible to have an overall set theme for this event, which would suit each individual museum. I therefore propose it be left to each and every group, to decide their own theme. As it will be the start of the 'D-Day' week, the military museums could possibly use this as their particular common theme, and this is the one we shall be taking at the Royal Armouries.

At the moment, this is being organised solely by myself at Garforth, West. Yorkshire with some co-operation of local clubs. If readers wish to contact me for more information please ring me on **0113-286 6897**, or E-mail me at: **harry_m1byt@ntlworld.com**

Harry M1BYT
Garforth, West Yorkshire

Editor's support: Good luck Harry, everyone on the *PW* team wishes you well. But I wonder why the Science Museum in London isn't (nudge, nudge! - remember the GB2SM saga?) on your list?

History of Radar

Dear Sir

The lack of information about the part played by Radar in the Second World War and in particular, the absence of much of the equipment used from museums devoted to the war years was brought home to me when I visited my old station, RAF Neatishead, recently. I served there in 1948 and 1949 when the Cold War was at its height and some of the equipment we used was clearly that which Ken Jones refers to in his letter in the March *PW* Radio Waves.

I can remember the arrival of sand coloured 10cm gear following its reconditioning by a company in Newcastle. It was then taken off trailers hauled by Scammel prime movers and mounted on concrete plinths. From memory the equipment was Naval Type 277 powered by 180V 500Hz a.c. and a rotary transformer in the transmitter cabin converted the station mains supply to run it.

I was surprised to find that the museum staff were building replicas of the display units we operated in the control cabins as none of the original equipment has survived. Whilst there are photographic records of the operations rooms most of the photos of the antennas seem to be from manufacturers brochures and it seems that the original gear has been lost forever.

Perhaps the official secrecy referred to in the Editor's comment at the end of Ken's letter ensured that all traces of this vital equipment was removed (or was it shipped to Lisle Street?). If you visit my web site at: **www.g0wjx.warc.org.uk** and go to the National Service page there are photographs of operational CHL and 10cm arrays and there is also a link to the museum at Neatishead.

Ron Davies G0WJX
Culcheth
Cheshire

Missing The Point?

Dear Sir

Whilst reading the article on Packet Radio - Bringing Packet Alive - APRS, in the March issue of *PW*, I feel as though I am missing the point here somehow, to précis the article, by using the mode and with the aid of computers and if a car is fitted with GPS you can plot their progress. A bonus point can be had by fitting UI-View to the system and then the computer will transfer the text to sound and play it through the speakers on the computer.

Nowadays there are programmes in the public domain which will transfer via a microphone, sound to data on the computer which can be sent via packet and radio to another radio which will be interfaced with another computer which in turn will transfer the data into sound. To coin a phrase - is it me - or is this **technology for the sake of technology**? Why not cut out the middle man and have a good old fashioned QSO?

David Thomas G6VAZ
Mildenhall
Suffolk

Human Interest & Rigs

Dear Sir

I welcome the inclusion of human interest stories such as the article by **Graeme Wormald G3GGL**, One Radio Amateur's National Service, February *PW* and the piece, From The Irish Sea To The Yellow Sea by **Dr Peadar Slattery** on the early De Forest transmitters also in the February edition. Technical stuff is very interesting and acceptable up to a point, but variety is the spice of life and articles such as the aforementioned provide a very enjoyable diversion.

Now a word on a radio I purchased recently, this being the Alinco DX-70TH. I have found this transmitter to be excellent value for money, fully comparable and even better in some respects than radios costing much more.

Although I am 72 years of age and not the sharpest in coming to terms with modern technology! I found the set very

easy to operate. All the functions are very intuitive. The ease with which one can get from memory to v.f.o. operation and back being a prime example. Working split frequency on this radio is simple and a pleasure.

Although DSP filtering is not included in the set the combination of the narrow 1kHz filter and i.f. shift are extremely effective in the elimination of QRM from nearby stations.

It's perhaps no coincidence that one of the few VK stations I have heard recently on 28MHz was using an Alinco DX-70. The only improvements I would wish for, which would make the radio more costly are a data line out and a reduction in the tuning increments from 25 to 10Hz. Those changes would make the radio more acceptable to many as a home base rig.

William Tait MM0BHY
Loanhead
Midlothian

Politically Correct?

● **Dear Sir**

It was a pleasure to read **Graeme Wormald G3GGL**'s description of his experiences as a National Service member of the Royal Air Force in the 1950s. However, I must take issue with you regarding the obvious political correctness editing of his article. Graeme is obviously around 70 years old and would not use the metric system in everyday speech, even more so in his service life. His plane would have flown miles, its fuel would be measured in gallons and its weight would be given in Imperial, (you forgot to convert the aircraft details!).

Please as a large proportion of your readers will be over 50, leave the measurements in Imperial and if needed put the metric in brackets. I have not noticed that our road signs are metric yet or our speedometers. I am sorry for the younger members of our country who do not realise the benefits of the Imperial system and probably do not realise that Hertz means cycles-per-second, a much more sensible system.

Ron Drew G8URU
Carlisle
Cumbria

Editor's comments: As *PW* circulates around the world - the decision was taken long before I joined the Editorial staff to place metric first, followed if appropriate, by Imperial measurements. As Radio Science has been metric (160, 80, 40 metres, etc.) from the beginning this seems appropriate. However, there'll always be exceptions, particularly with historic subjects but as this was a special interest feature I took the decision to present distances in metric so it would make sense to a wider range of readers.

Antics For Antex

● **Dear Sir**

When my daughter **Carol** and my husband **Wyn GW8AWT** tackled roof repairs to our goat house, they found the shiny corrugated pvc too slippery to cut or drill.

They were then inspired by recent features in *PW* on Antex Soldering irons and ended up using a pointed soldering bit to melt 11 holes, exactly where needed to register with the metal sheets either side and trimming one end by pushing gently with an old wooden rule. The goats will appreciate the electronic work when the rain returns!

Eileen Mainwaring
2W1BPS
Manordeilo
South Wales

Radio Constructor Magazine

● **Dear Sir**

I'm writing with reference **Mike Mills G3TEV's** article **In Your Workshop**, *PW* Feb 2001, last para: I well remember the *Radio Amateur*. It started as *Short Wave News & Radio Amateur* in April 1952 it became *Radio Amateur* incorporating *Short Wave News* and became plain *Radio Amateur*, finally closing in Dec 1953.

I was particularly familiar with it as *Short Wave News* in 1948-1950 when I was a keen s.w.l. using home-brew 1 and 2 valve receivers. It was a rival to *Short Wave Listener,* from the old *SWM* stable. It was not as well written as *Short Wave Listener* and not so authoritative but was, perhaps. more enterprising. I have almost all copies of both magazines.

John St. Leger G3VDL
Okehampton
Devon

Editor's comment: Mike G3TEV's article brought a tremendous response from readers. More on this subject next month.

● Keep your letters coming to fill *PW*'s postbag

Letters Received Via E-mail

A great deal of correspondence intended for 'letters' now arrives via E-mail, and although there's no problem in general, many correspondents are forgetting to provide their postal address. I have to remind readers that although we will not publish a full postal address (unless we are asked to do so), we require it if the letter is to be considered. So, please include your full postal address and callsign with your E-Mail. All letters intended for publication must be clearly marked 'For Publication'.

Editor

amateur radio rallies

Radio rallies are held throughout the UK. They're hard work to organise so visit one soon and support your clubs and organisations.

April 21/22
The London Amateur Radio & Computer Show
Tel: (01923) 893929
This year's London show will take place at a new venue. The show will take place at Alexandra Palace, Wood Green, London N22. There promises to be the usual mix of traders, specialist interest groups and bargains too. Look out for *PW, SWM* and *Radio Active* representatives at the show.

April 22
The 17th Yeovil QRP Convention
Contact: D. Bowden M1WOB
Telephone: (01935) 414452
Traders, construction challenge contest, talks, QRP forum, Morse tests, catering, free parking and invalid facilities are all apart of this year's yeovil QRP Convention taking place at the Digby Hall, Sherborne, Dorset. Doors open at 1000. Talk-in on S22.

April 29
The Lough Erne Amateur Radio Club Rally
Contact: Frank GI3ZMX
Telephone: 028-6632 9507
Taking place at the Killyhevlin Hotel, Dublin Road, Enniskillen, Co. Fermanagh from 1200 The Lough Erne ARC rally promises a wealth of features. **Please note the change of date.**

April 29
The Cambridgeshire Repeater Group
Contact: Paul Dyke G0LUC
Telephone: (01462) 683574.
The Cambridgeshire Repeater Group's annual rally at Bottisham Village College, Bottisham, six miles east of Cambridge, access is via A14 and A1303 will feature a large hall, car boot sale, Bring & Buy and their renowned auction of radio and electronic equipment. Doors open at 1030 and admission is £1.50. Refreshments will be available, talk-in on S22.

May 7
The Dartmoor Radio Rally
Contact: Ron G7LLG
Telephone: (01822) 852586
Taking place at Pannier Market, Tavistock, Devon traders will be displaying their wares and inviting visitors to see them and talk to old friends. There is access for disabled visitors and plenty of free public car parking within five minutes walking distance. There will be trade stands, a Bring & Buy and refreshments, etc. Doors open 1030 (1015 for disabled visitors). Talk-in on S22. Why not bring the family, there are some lovely views of Dartmoor - ideal for picnics.

May 13
The Dunstable Downs Radio Club 18th Annual National Radio Car Boot Sale
FAX: (01525) 383898
E-mail: ddrc@magstripe.demon.co.uk
Website: www.ddrcbootsale.freeserve.co.uk
Write to: DDRC, PO Box 4053, Dunstable, Beds LU5 5ZJ enclosing an s.a.e. Doors open 0900 'till 1500. at Stockwood Country Park, Luton, Bedfordshire, leave M1 at junction J10 and follow signs for 'The Mossman Collection', for the DDRCs annual rally. Talk-in on S22.

If you're travelling a long distance to a rally, it could be worth 'phoning the contact number to check all is well, before setting off. For the full rally picture visit our website at www.pwpublishing.ltd.uk

amateur radio news

A comprehensive look at what's new in our hobby this month.

Club Spotlight 2001

It's that time of year again!

It's time to turn the Club Spotlight on again as we invite you to enter your club magazines into the Practical Wireless & Kenwood Club Spotlight Magazine Competition.

Local clubs entering will be competing for the magnificent original trophy - kindly donated by Kenwood - and **national clubs** will be competing for the Bert's Bell award, which was instituted in 1997 in tribute to the late **Bert Newman G2FIX**.

It's very simple to enter the Club Spotlight magazine competition and all you need to do is to send us the **three most recent copies** of your magazine along with a covering letter. The covering letter should make it clear **which category of club you would like to enter your magazines into**. For example, the **British Amateur Television Club**, winner of the 2000 national award - can only enter in the national club section, whereas the **Oldham Amateur Radio Club** - last year's winners, have to specify that they are a local club.

National Or Local?

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

The judging panel comprises of **Jim Bacon G3YLA**, **David Barlow G3PLE**, **Tex Swann G1TEX (*PW* Technical Projects Sub Editor)**, **David Wilkins G5HY** and **Rob Mannion G3XFD**. Additionally for entries in the **national category only - Jamie Donaghy M0CLI** of the now closed Salisbury Club will help judge to decide the winner of the 'Bert's Bell' Trophy (Salisbury was of course Bert's Club).

Entry to the competition is open now and all entries should be at the *PW* offices in Broadstone no later than Monday 2 July 2001. This is so the presentations can be made at the Leicester Show in September and members of the judging panel live in places as far apart as Cornwall, East Anglia and Greater London, so it will not be possible to consider late entries! So, make sure your club's entry reaches us in good time!

The Editor's decision (as head of the adjudication panel) is final and no correspondence will be entered into. **Good luck** and we look forward to reading **your** magazine!

Entries to:
Donna Vincent G7TZB,
Club Spotlight Magazine Competition,
Arrowsmith Court,
Station Approach,
Broadstone,
Dorset BH18 8PW

Stop Press!

QRP Contest Cancelled

Foot & Mouth is now affecting radio! - well the PW QRP Contest at least. Read on to find out more...

The Editor of *PW* - **Rob Mannion G3XFD** writes: "It is with great regret that following close consultation with **Dr. Neill Taylor G4HLX**, the *PW* 144MHz QRP Contest organiser and adjudicator, we have very reluctantly decided there's no choice but to cancel the 2001 event. We had hoped that the Foot & Mouth Disease situation would have been clarified by the time the May issue of *PW* went to press. Unfortunately however, as the situation seems to be getting worse and as many stations operate from farmland, etc., it would be irresponsible to go ahead this year. More details can be found on the contest website at **www.contest.org.uk**

"All the alternatives, including a QRP contest from operator's homes- had been discussed but Neill G4HLX and myself decided that this idea, along with postponing the contest until later in 2001 were not viable. However, on a brighter note, next year's contest coincides with *PW*'s 70th anniversary year and fully supported by the 2000 sponsor- **Chris Rees G3TUX** of the QRP Components Co., we are planning a very special event on **Sunday 16 June 2002**. Mark that in your diary now!

Another item of good news is that the special commemorative 2000 Millenium Contest Certificates, printed on silver effect card, are now in the process of being prepared by *PW*'s own Calligrapher - **Cyril Hutchings** - in Somerset. So, on behalf of the *PW* team and Neil G4HLX, I wish you good luck for next year's contest everyone"!

Rob G3XFD.

Licence Free

Powerful PMR Hand-held

Are you a rally organiser, arranging to puchase PMR radios for your business or just want an easy way to stay in touch with your family on days out then this could be the answer.

The Alinco DJ-446 is a new PMR hand-held transceiver recently launched and is aimed at business, professional and leisure users. With eight frequencies, 312 channel modes, 30 memories, channel and memory scan and an output power of 500mW the DJ-446 offers good performance and reliability.

Retailing at **£139.95** this radio is possibly aimed at the business/professional end of the market particularly as it boasts a heavy duty design and a high quality of construction. However, it would be equally suitable for occasional use too.

For the full spec on the DJ-446 look out for the review in the June issue of *Radio Active* magazine on sale 18 May or contact Nevada for more information.

Nevada,
Unit 1 Fitzherbert Spur,
Farlington,
Portsmouth PO6 1TT
Tel: 02392 313090
Website: www.nevada.co.uk

A Flavour of the 1920s

Novice Crystal Set

Alan Lake's newest addition to his kit range will appeal to youngsters and nostalgics alike.

The Novice Crystal Set is designed with the younger members of our hobby as well as those nostalgics in mind, as it brings back a flavour of the 1920s. Unfortunately, original style components can no longer be obtained except as relatively high priced, and rare, vintage items. So Alan is obliged to use their modern counterparts.

Nevertheless, there is no need for soldering. All connections are made to screw terminals and the 3.5mm jack socket has flying leads already fitted, the tuning capacitor (condenser) has a small terminal board attached.

Instead of a pair of high resistance headphones a crystal earpiece is used. The lump of shiny Galena, with its famous cat's whisker, has been replaced by a germanium diode, less romantic but more efficient!

A1l the parts are supplied with the kit, including the smart front panel. The only thing you will have to supply is a small piece of wood for the baseboard.

You won't be able to listen to the world on this receiver but you will have great fun in building it and it you will be able to tune into several strong stations given a reasonable antenna and earth.

So go on allow yourself to experience some of the fascination of those early days of radio even though 2LO is no longer with us! Treat yourself to a little piece of nostalgia for just **£8 plus £1 P&P.**

Lake Electronics,
7 Middleton Close,
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NG16 1BX
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Website: www.lake-electronics.co.uk

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- 50 standard CTCSS tone frequencies

Designed for professional, commercial and leisure users the IC-R3 has a wealth of uses. The unit is powered is from either three AA alkaline cells or a lithium-ion battery pack and comes complete with a telescopic antenna, belt clip and wall charger, lithium-ion battery pack and spacer for the optional operation of batteries. The price is £449 inc. VAT and a range of accessories is of course available.

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FAX: (01227) 741742
E-mail:info@icomuk.co.uk
Website: www.icomuk.co.uk

Repeater news

Yeovil & Wessex Join Forces

Yeovil repeater group merge with The Wessex repeater group.

With effect from Sunday 11 March 2001 the Yeovil repeater group and their repeater GB3YS formally merged with the Wessex repeater group. For all of you with internet access there is a new style site to check out for the Wessex group. point your browser at **www.twxrg.org.uk**

Not all the pages on the site are live yet but the following pages are available:

- Home page
- GB3WA + coverage + technical nfo
- GB3WX + coverage + technical info
- GB3YS + coverage + technical Info
- Amateur Radio links

If you wish to contact The Wessex repeater group, then please use the group e-mail address, **gb3wx@twxrg.org.uk**

Don't Forget!

Yeovil ARC QRP Convention

Calling all QRP enthusiasts - don't forget to visit this year's Yeovil Convention.

The 17th QRP Convention takes place on Sunday 22 April at the Digby Hall, Sherborne., Dorset.

This is an important event for the Yeovil Club as it helps to keep the club going.

The Convention will feature trade stands, Bring & Buy, Talk-in on S22, Three lectures by notable speakers, Construction Challenge and Morse tests on demand.

The Yeovil Amateur Radio Club meets at the Red Cross Centre, Grove Ave, Yeovil, Somerset every Thursday from 1900 to 2200. For more details contact **M1WOB on (01935) 414452** or look at **www.yarc.freeserve.co.uk**

amateur radio clubs

Keep up-to-date with your local club's activities and meet new friends by joining in!

MIDDLESEX

Radio Society of Harrow

Contact: Jim Ballard G0AOT
Tel: (01895) 476933 (home), (02072) 786421 (eve)
E-mail: G0aot@thersgb.net

The Harrow club meet every Friday at 2000 hours at the Harrow Arts Centre, Uxbridge Road, Hatch End, Mddlesex. Forthcoming meetings include: **20 April:** Club Meeting: Special Event Station to mark St George's Day; **27 April:** Debate on the proposed future structure of Amateur Radio Licensing; **6 May:** GB2DHH Operating Day; **11 May:** Club Meeting/social: A history of herbal medicines and **18 May**: Club Dinner at Vine Taverna, Victoria Road, South Ruislip.

HERTFORDSHIRE

Welwyn Hatfield Amateur Radio Club

Contact: Dean Jackson
Tel: (01582) 752065
E-mail: dean_jackson@ntlworld.com

The Welwyn club meet on the first and third Monday of each month at the Royal Naval Association, Black Fan Road, Welwyn Garden City Hertfordshire. They also hold construction evenings on the last Monday of each month (venue to be advised).

Hoddesdon Radio Club

Contact: Don Platt G3JNJ
Tel: 0208 223678
Website: www. hoddesdonradioclub.com

The Hoddesdon club meet on alternate Tuesdays at the Rye Park Conservative Club, Rye Road, Hoddesdon, Herts. Meetings for May include: **8 May**: Open forum and 5w.p.m Morse practice; **22 May**: Visit to Hertford Fire and Rescue HQ from 1930 hours. Why not go along?

NORTHERN IRELAND

Bangor & District Amateur Radio Society

Contact: Mike GI4XSF
Tel: (02842) 772383
Website: http://welcome.to/bdars

Meetings are held on the first Wednesday of every month in The Stables, Groomsport, County Down at 1900 hours. Please note that this is a **new** venue, the club no longer meet at the Clandeboye Lodge.

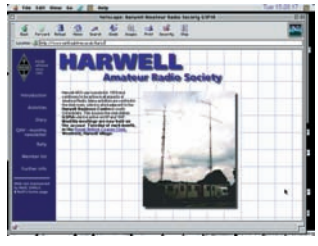
On Wednesday **2 May**, the club are hosting a talk by Peter GI7JYK on "6 metres - the magic band". This is should be an interesting evening and as always, visitors and new members are all very welcome.

OXFORDSHIRE

Harwell Amateur Radio Society

Contact: John Durban G6LNU
Tel: (01235) 223250 or 041-100 9086
Website: www.hamradio.harwell.com

The Harwell club meets at 2000 on the second Tuesday of the month in the Royal British Legion Social Club, Westfield, Harwell, Oxfordshire. For details of the forthcoming programme look at their website.



Keep those details coming in!

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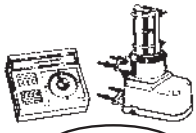

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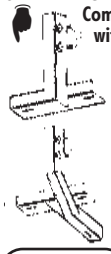

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N TYPE for RF213	2.50 each
SO239 to BNC	1.50 each
PL259 to BNC	2.00 each
N TYPE to SO239	3.00 each
Amalgam tape 10 metres	£7.50

CABLE

RG213 MILITARY 0.85 per mtr.
MINI RF8 ..... 0.85 per mtr.
RG58 STANDARD 0.35 per mtr.
RG58 MILITARY 0.60 per mtr.

£29.95

SUPER SCANAIR BASE (Airband)

(Stainless Steel)
Freq. Range Recieve 117-140MHz Transmit 117-140MHz Length 825mm Connector-N TYPE

This is a transmitting & receiving antenna designed for the aircraft frequency range. *(For the control tower & aircraft listener).*

£29.95

SUPER SCAN STICK

Freq. Range 0-2000MHz Length 1000mm

It will receive all frequencies at all levels unlike a mono band antenna. It has 4 capacitor loaded coils inside the vertical element to give maximum sensitivity to even the weakest of signals. *(Ideal for the New Beginner and the Experienced Listener alike.)*

£39.95

SUPER SCAN STICK II

Freq. Range 0-2000 MHz. Length 1500mm.

This is designed for external use. It will receive all frequencies. at all levels unlike a mono band antenna. It has 8 capacitor loaded coils inside the vertical element to give maximum sensitivity to even the weakest of signals plus there is an extra 3db gain over the standard super scan stick. *(For the expert who wants that extra sensitivity)*

£39.95

MULTISCAN STICK

Freq. Range Receive - 0-2000 MHz. Transmit 144 - 146 MHz gain 2.5 DBd 420 - 430 MHz gain 4.5 DBd Length 1000 mm.

Although marginally compromising sensitivity the multi scan stick has within its transmitting capabilities plus gain makes it an excellent antenna for the amateur and expert alike. Comes complete with mounting hardware and brackets. *(Ideal for the amateurs ham radio - user).*

£89.95

IVX 2000

Freq. Range Receive - 0-2000 MHz. Transmit 50 - 52 MHz gain 2.00DBd 144 - 146 MHz gain 4.00 DBh 420 - 430 MHz gain 6.00 DBd Length 2.5 m.

For external use, but at a pinch can be used in the loft. It has been finely tuned to make this Antenna the best there is. It has stainless steel radials and hardware. *(THE BEST)*

£49.95

MULTI SCAN STICK II

Freq. Range Receive (0-2000MHz) Transmit (144-146 MHz) Gain 4.00Dbd (420-430 MHz) Gain 6.00Dbd Length 1500mm

Same as Super Scan Stick but with extra gain, makes it an even better antenna for the amateur and expert alike. *(Ideal for the Ham Radio user)*

MWA HF Wire Antenna Mk11

£59.95

Freq 0.05Mhz-40Mhz Adjustable comes with 25 metres of H/Grade flexweave antenna wire,10 metres of military spec RG58 coax cable feeder,insulated guy rope,dog bone & choke balun. All Mods No A.T.U. required. Super Short Wave Antenna.

SWP 2000 FREQ. 25 - 2000 MHz. Length 515mm.

£29.95

Multiband good sensitivity for its small size. Fitted with two suction cups for ease of fitting to any smooth surface (i.e. inside of car window) comes with 5 metres of mini coax and BNC connector. *(Good for the car user who doesn't want an external antenna.)*

SWP HF30

£39.95

Freq. Range 0.05-30MHz Length 770mm

Although small, surprisingly sensitive for the H.F. user. Fitted with two suction cups for ease of fitting to any smooth surface (i.e. inside of car window) comes with 5 metres of mini coax and BNC connector. *(Good for the car user who doesn't want an external antenna.)*

£49.95

HF DISCONE

Freq. Range 0.05-2000MHz Length 1840mm

Internal or External use (A Tri-Plane Antenna). Same as the Super Discone but with enhanced HF capabilities, comes complete with mounting hardware and brackets. *(Ideal for the Short Wave H.F. Listener.)*

TRI SCAN III

Freq. Range 25-2000MHz Length 720mm

Desk Top Antenna for indoor use with triple vertical loaded coils. The tri-pod legs are helically wound so as to give it its own unique ground plane. Complete with 5mts of low loss coax and BNC plug. *(Ideal for Desk Top Use.)*

£39.95

ROYAL DISCONE 2000

£49.95

(Stainless Steel) Freq. Range Receive 25-2000MHz Transmit 50-52MHz 144-146MHz 430-440MHz 900-986MHz 1240-1325MHz Length 1540mm Connector-N TYPE

The Ultimate Discone Design. 4.5DB GAIN OVER STANDARD DISCONE! Highly sensitive, with an amazing range of transmitting frequences, comes complete with mounting hardware & brackets *(The Best There is).*

SUPER DISCONE

Freq. Range 25-2000MHz Length 1380mm

£39.95

Internal or External use (A Tri-Plane Antenna). The angle of the ground planes are specially designed to give maximum receiving performance within the discone design. The Super Discone gives up to 3Db Gain over a standard conventional discone. Comes complete with mounting hardware andbrackets. (Ideal for the Experienced Enthusiast.)

MRW-100

£19.95

(Super Gainer) (Rubber Duck) Wideband extra sensitive Dedicated VHF/UHF all mode Length 400mm. P.P £2.00

MRW-40 (Rubber Duck)

Dedicated for Civil & Military Airband VHF/UHF RX & TX Capabilities Length 215mm. P.P £2.00

£19.95

MRP-2000 (Preamplifier)

Freq Range 25-2000 Mhz 9-15v input (Battery not included) 14 db Gain. Complete with lead and BNC connectors.

£49.95

MRP-125 (Preamplifier)

Freq Range 118-137 Mhz 9-15v input (Battery not included) 14 db Gain Complete with lead and BNC connectors.

£44.95

G. SCAN II

Freq. Range 25-2000 MHz.Length 620 mm.

Magnetic mount Mobile Scanner Antenna. 2 vertical loaded coils for good sensitivity complete with magnetic mount and 4mts of coax, terminated with BNC plug. *(Good for when you are driving about)*

£24.95

WEATHER SATELLITE ANTENNA

TURNSTILE 137

Freq. 137.5 MHz Length 1000mm

This Antenna is designed for external use to receive weather satellite signals.

Complete with mounting hardware.

(Simple and easy to install a must for the enthusiast who has it all.)

£39.95

UK SCANNING DIRECTORY

7th edition

£19.50

CIVIL AND MILITARY RECEIVING ANTENNAS

AR30 (Length 1000mm GAIN 3.6 & 6.5) .....Price £39.95
AR50 (Length 1500mm GAIN 5.0 & 7.5) .....Price £64.95

MasterCard VISA SWITCH

ADD £6 P&P PER ORDER

Radio Basics

This month Rob Mannion G3XFD describes the next stage of the Spatula r.f. sniffer project. This time he describes how you can add to its versatility by adding a simple amplifier.

I have no doubt whatsoever that most Radio Basics (RB) readers regarded the Spatula project I presented last month as being crude and simple in the extreme. If that's the case - I have to agree!

Despite the fact that the RB Spatula i**s crude**, it's also innovative and capable of being developed to suit your needs. It is a basic project ideal for the beginner and more advanced constructor to experiment with to their heart's content.

In its simplest form the Spatula, as shown in Fig. 1 (left side) in the April issue is really only suitable for relatively strong r.f. signals. Over the years I've used it the idea has proved most effective for low power transmitter lining-up and tuning-up purposes.

However, with the little amplifier circuit shown in **Fig. 1** this month, the little device will become more sensitive, thus providing useful indication of r.f. activity in simpler receivers, etc. In this way it's possible to take full advantage of the exceptionally slim line pick-up coil provided by the etched printed circuit board (p.c.b.).

Amplifier Circuit

The amplifier circuit uses the MPF102 which I've consistently used in RB projected. Why? - it's cheap, reliable, easy to obtain and rugged. Another reason is that I - like many other constructors - tend to stick with what they know and why not?

There are very few components and the meter used, thanks to the circuitry involved - can be a good quality 200µA full scale deflection (f.s.d.) type. Alternatively one of the really cheap moving coil units often on sale at rallies at around £1 or so could be used.

In my experiments over the years with this and similar circuits I've used the tiny 50µA moving coil units and even right up to 1mA f.s.d. types. In fact most basic meter movements, with adjustment and experimentation of the values for the 10 and 5kΩ trim potentiometers which are used as variable resistors in this circuit, could be used.

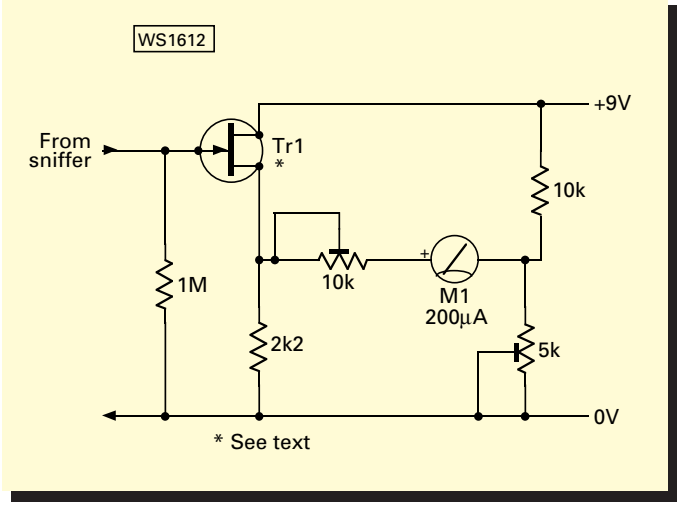
None of the components are critical and to test this circuit I used what came out of my junk box and this included both linear and logarithmic types of potentiometers. Resistor tolerance specifications aren't critical either - so you can confidently use 5% tolerance types.

Constructional Choices

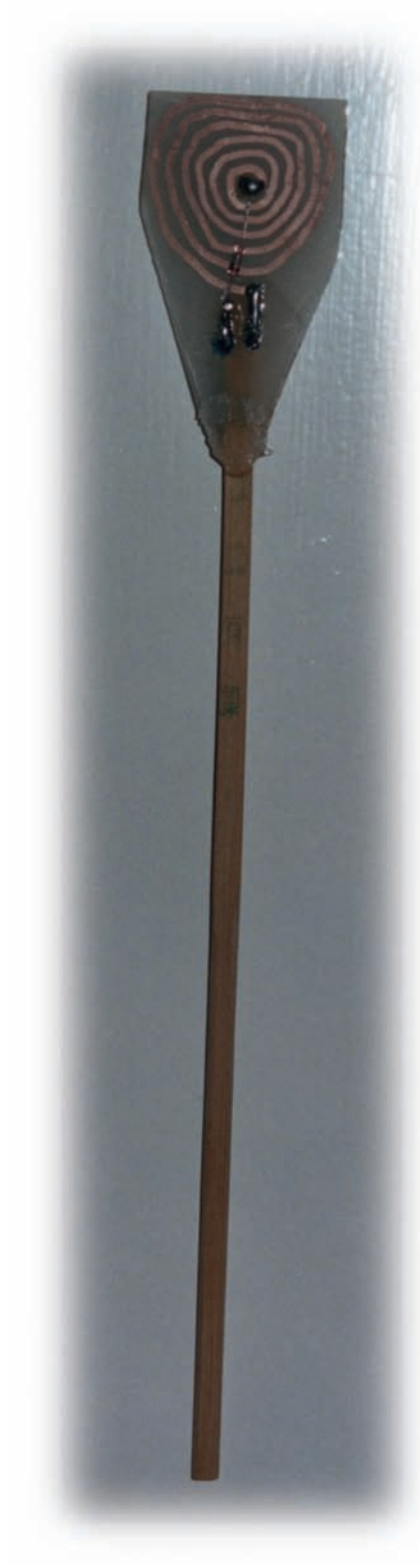
When it comes to building the project there are several construction choices available. Firstly you could mount the little amplifier, meter and power supply directly onto the form of p.c.b. shown in the right of Fig. 2 in last month's RB.

If you adopt the all-on-one board approach it will be convenient in some ways, but inconvenient in others. This is because there'll be a fairly weighty battery on the board together with the meter.

The second choice and the one I prefer is to use the



● Fig. 1: With the amplifier circuit shown, the little RB Spatula device will become more sensitive, thus providing useful indication of r.f. activity in simpler receivers, etc. In this way it's possible to take full advantage of the exceptionally slim line etched printed circuit pick-up coil (see text).



● Using the version of the Radio Basics Spatula project which suits you best - G3XFD explains you can now add a suitable amplifier which increases the sensitivity of the instrument.

Spatula design shown in the heading photo this month. The output from the diode can be conveniently via the centre core of some very thin coaxial cable to the meter, with the braid being employed as the second connection or earth return. Incidentally, although not strictly good practice, if you can't get hold of any miniature coaxial cable (the sort used to feed signals around video recorders and hi-fi radio equipment, you can use a home-brewed twin cored flex or very lightweight twin core cable.

First Warning: Remember that despite the fact that the cathode end of the diode (the meter connection side) is not theoretically on the r.f. side of the circuit, **you can be sure that r.f. can and will** get into the circuitry on the d.c. side. So, to overcome any problems with r.f. getting into an amplifier and causing misleading results on your meter I strongly recommend that you install the 0.1µF decoupling capacitor as close to the diode as possible.

With the suggested decoupling capacitor fitted and the use of very small, lightweight and flexible coaxial cable, the Spatula will prove easy to use. The coaxial cable will reduce the possibilities of r.f. pick-up after the diode and if you decide to build the amplifier circuit in this month's Fig. 1, such precautions will reduce the possibilities of oscillation due to the presence of r.f. signals.

Second Warning: If you decide to use your test meter's low m.a. current reading scales I must remind you to take care - if you make a mistake and overload the meter by having it set on to a low current reading you could really damage the instrument. There's a big difference in damaging a meter movement costing only a £1 or so and destroying the extremely delicate central meter movement in an instrument costing £30 or so.

Take my advice - select a higher current scale until you are sure you're not going to overload the meter movement. Even expensive meters can rely on fuses to protect the central unit from overload, but they still take a finite time to operate, time in which the needle can try to wrap itself around the end stop. I speak from experience!

Sensitivity Increased

Now that the sensitivity of your Spatula has been increased with the use of the simple amplifier you'll be able to check out circuits which generate lower levels of r.f. First on the list for checking is the ever popular regenerative detector.

Placing the Spatula's pick up coil near to the coils used on a regenerative detector will indicate when the circuitry is oscillating very clearly. You should also be able to see (on the meter) when the circuit goes into and out of oscillation. Practice will show you how to place the pick-coil for best transfer of energy.

When you're checking a simple t.r.f. receiver you will instantly be able to realise where extra r.f. screening is necessary if you get an indication of oscillation (for example) in the antenna input stage or r.f. amplifier. You'll also see changes in levels as you adjust the tuning coil and trimmer capacitor, but I suggest you ensure the Spatula is held (at the grip end) so that it doesn't wander around too much and give misleading, varying results on the relative levels of signals it detects. As hand-held video camera operators will already know – it's difficult to hold still for long!

Next Stage

For the moment, this is as far as I'm going with the RB Spatula project...but I'm already working on the next stage and I can promise you it's great fun! The Mark III will provide an audio indication of increasing r.f. voltage in an innovative (but I'm not claiming it as an original idea!) way by producing an increasing frequency tone.

I'd already built and tested a circuit which I had used for many years and was about to present it in RB when I discovered the integrated circuit (i.c.) to be used was last made over 20 years ago! So, I've now sourced some replacements and will be working on the next stage in my newly-acquired workshop very soon indeed.

I've also found a source of suitable surplus moving coil meters on your behalf. Nowadays, with the advent of liquid crystal display (l.c.d.) indicators, along with the ubiquitous light emitting diode (l.e.d.) indicators the moving coil meter is becoming increasingly difficult to find. Personally, I hope such meters will continue to be available because in my opinion they are easier to read for general purposes, particularly when employed on instruments which provide relative, rather than definitive indications of - such as the r.f. field strength meter or traditional dip-meter.

My new shack will soon prove to be a joy to work in. I've very much missed my old workshop in the end of my garage at my previous home although it was always cold! However, my new purpose-built workshop should prove much warmer in winter and cooler in summer as it's efficiently insulated under the floor and within the walls using state-of-the-art materials.

Additionally, I shall install a permanent extractor fan unit to get rid of those flux fumes and of course, I'll describe to readers how I've achieved it! I've already started the process of putting hard wearing carpet tiles on the floor. Yes, that's another trick - because when the carpet is badly soiled or damaged by solder splashes...you just replace the square! Cheerio until next month. *PW*

Information Panel

Small meters are available from: **John Fletcher G4EDD** of **Kanga Products** who tells me that he's got a good quantity of very small edgewise button-sized moving coil meters suitable for the Spatula project. I saw a sample meter at the **Junction 28 QRP Rally at South Normanton** in Derbyshire on Saturday 17 March and they really are small! John is also preparing to make a p.c.b. (complete with etched sensing coil) for the project using the amplifier, ideal for those who cannot make their own p.c.b. Further details from Kanga Products on **0115-967 0918** (Evenings & weekends) and see the advert on Local Dealers page in this issue.

Birketts of Lincon, **John Birkett** has a selection of small moving coil meters and other suitable components. Further details available on **(01522) 520767** or from his advert in this issue.

Sycom supply suitable components, meters and p.c.b. etching materials. Available from **Robin Sykes G3NFV**, Tel: **(01372) 372587**, see their advert in this issue.

CARRIAGE CHARGES A= £2 B= £6 C= £7.50 D= 8.50

WATERS & STANTON

Spring Offers

Heil Microphones & Headsets

GM-4	Goldline desk microphone with Studio & HC-4 inserts	124.95 B
GM-5	Goldline desk microphone with Studio & HC-5 inserts	124.95 B
HM-I	Goldline style desk mic for Icom with studio insert	89.95 B
HM-10-4	Desk mic with HC-4 insert	69.95 B
HM-10-5	Desk mic with HC-5 insert	69.95 B
HM-10-Dual	Desk mic with switchable HC-4 & HC-5 inserts	119.95 B
CC-1-K	Desk mic cable for Kenwood 8-pin	25.95 A
CC-1-I	Desk mic cable for Icom 8-pin	25.95 A
CC-1-Y	Desk mic cable for Yaesu 8 pin	25.95 A
CC-1-KM	Desk mic cable for Kenwood modular	25.95 A
CC-1-IM	Desk mic cable for Icom modular	25.95 A
CC-1-YM	Desk mic cable for Yaesu modular	25.95 A
HMP	Pre-amp for Icom 8 pin	54.95 B
HMP-M	Pre-amp for Icom modular	54.95 B
TB-1	Table base stand for all desk mics	24.95 A
SB-1-H	Small adjustable mic boom for desk mics	37.95 B
LX-1	Balanced studio microphone boom	114.95 B
MA-1	Adjustable microphone boom	54.95 B
SM-1	Shock mount assembly	54.95 B
HMM-IC	Fist mic for Icom with studio & HC-4 inserts 8-pin	54.95 B
HMM-K	Fist mic Kenwood with HC-4 and HC-5 inserts 8-pin	54.95 B
HMM-Y	Fist mic for Yaesu with HC-4 and HC-5 inserts 8-pin	54.95 B
HS-706	Single headphone & boom mic with PTT for IC-706	59.95 B
BM-10-4	Light dual headphone & boom mic with HC-4 insert	89.95 B
BM-10-5	Light dual headphone & boom mic with HC-5 insert	89.95 B
PRO-micro-4	Light dual headphones & boom mic with HC-4	99.95 B
PRO-micro-5	Light dual headphones & boom mic with HC-5	99.95 B
PRO-SET-4	Padded dual headphones & boom mic with HC-4	29.95 B
PRO-SET-5	Padded dual headphones & boom mic with HC-5	129.95 B
EAR-PADS	Replacement ear pads for Pro-Set	6.95 A
PRO-5-4	Single headphone boom mic with HC-4 insert	114.95 B
PRO-5-5	Single headphone boom mic with HC-5 insert	114.95 B
AD-1-K	Headset & boom cable for Kenwood 8-pin	14.95 A
AD-1-I	Headset & boom cable for Icom 8-pin	14.95 A
AD-1-Y	Headset & boom cable Yaesu 8-pin	14.95 A
AD-1-KM	Headset & boom cable for Kenwood modular	14.95 A
AD-1-IM	Headset & boom cable for Icom modular	14.95 A
AD-1-YM	Headset & boom cable for Yaesu modular	14.95 A
FS-1	PTT foot switch for all mics & headsets	29.95 A
HS-1	PTT hand switch for all microphones	27.95 A
HC-4	Spare (extra) mic insert	32.95 A
HC-5	Spare (extra) mic insert	32.95 A
AD-100-8	FT-100 adaptor for 8-pin to modular	19.95 A
HDAT	Headphone attenuator for Yaesu FT-100	9.95 A

Yaesu FT-50R

£149

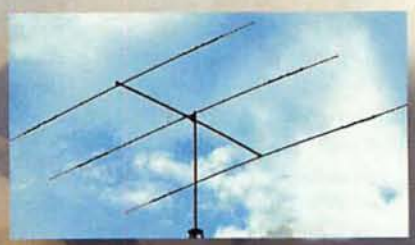
The FT-50R offers dual band coverage of 2m and 70cms and wideband receive, as wide as most scanners. It also offers AM airband reception. What is more, this radio will produce up to 5 Watts from the supplied battery. It is ruggedly constructed, yet very compact. At the special offer price, it has to be an amazing deal. And you also get a FREE 2-year warranty.

ICOM IC-T8

£199

Icom's triple band IC-T8E offers you 6m, 2m and 70cm, in one high performance handheld. It also includes AM airband reception and comes battery pack and AC charger. It has 123 memories and offers 25kHz and 12.5kHz channels.

Cushcaft Antennas



CUSHCRAFT MULTIBAND HF ANTENNAS

MA5B	10/12/15/17/20m 3 element mini beam with balun	299.95 C
X9	10, 15 & 20m 9 element yagi 2KW 8.5m long 13-14db gain	799.95 D
X940	40m add on kit for X9	189.95 C
X7	10, 15 & 20m 7 element yagi 2KW 5.48m long 12.5-13db gain	549.95 D
X740	40m add on kit for X7	219.95 C
A4-S	10, 15, & 20m 4 element yagi 8.9db gain 2KW 5.48m long	469.95 D
A-744	7 MHz/10 MHz add on kit for A4S	129.95 C
A3-S	10, 15, & 20m 3 element yagi 8db gain 2KW 4.27m long	389.95 D
A-743	7 MHz/10 MHz add on kit for A3S	129.95 C
A3-WS	12 & 17m 3 element yagi 8db gain 2KW 4.27m long	299.95 D
A-103	10 MHz add on kit for A3-WS	119.95 C
R-8	40-6m vertical 1.5kW 8.7m long	399.95 C
R-6000	6, 10, 12, 15, 17 & 20m vertical	299.95 C
ASL-2010	13.5-32MHz 8 element log periodic 6.4dbd gain 5.48m long	639.95 C
D-3	14/21/28 MHz 2KW 7.86m long	189.95 C
D-3W	10/18/24 MHz 2KW 10.37m long	199.95 C
D-4	7/14/21/28 MHz 2KW 10.92m long	259.00 C
D-40	40m 2KW 12.88m long	229.00 C
XM-240	40m 2 element beam "Big Thunder"	569.95 C
XM-520	20m 5 element beam	629.95 C
XM-515	15m 5 element beam	359.95 C
XM-510	10m 5 elegnent beam	279.95 C
TEN-3	10m 3 element beam 8dbd gain 2.44m long	159.95 C
AR-10	10m vertical 3.75db gain 5.36m high	66.95 C

CUSHCRAFT VHF/UHF ANTENNAS

A6270-13S	6m/2m & 70cm yagi	229.95 C
A270-10S	2m/70cms 5 element beam 10db gain 1.9m long	79.95 C
A270-6S	2m/70cms 3 element beam 7.8db gain 0.85m long	59.95 C
AR-270B	2m/70cms vertical 5.5/7.5db gain 2.3m high dualband Ringo	99.95 C
AR-270	2m/70cms vertical 3.7/5.5db gain 1.13m high dualband Ringo	69.95 C
13-B2N	2m 13 element beam 15.8db gain 4.57m long	119.95 C
17-B2	2m 17 element beam 18db gain "N" 9.45m long	199.95 C
26-B2	2m 26 element beam 18.8db gain 4.75m long	329.95 D
A148-3S	2m 3 element beam 7.8db gain 0.85m long	39.95 C
A144-10SN	2m 10 element beam 13.2db gain 3.6m long "N" socket	79.95 C
A148-20S	2 x 10 ele beams c/w stacking frame & harness 16.2db 3.6m	189.95 C
A148-20T	2m 10 ele (each) crossed beam 11.1 db gain 3.3m long	105.95 C
AR-X2B	2m vertical 7db gain 4.3m high	59.95 C
AR-X2	2m vertical 5.5db gain 2.8m high	49.95 C
AR-2	2m vertical 3.75db gain 1.2m high the original Ringo	39.95 C
A430-11S	70cms 11 element beam 13.2dB gain 1.35m long	69.95 C
719B	70cms 19 element beam 15.5dB gain 4.1m long	99.95 C
729B	70cms 29 element beam 17.8dB gain 6.7m long	169.95 C
A50-3S	6m 3 element beam 8db gain 1KW 1.8m long	89.95 C
A50-5S	6m 5 element beam 10.5db gain 3.7m long	149.95 C
A50-6S	6m 6 element beam 11.6db gain 6.1m long	249.95 C
617-6B	6m 6 element beam	369.95 C
AR-6	6m vertical 3.75db gain 3.1m high	59.95 C

KENWOOD TM-241E

£149

The TM-241E is a 2m 50W mobile with CTCSS and 1750Hz fitted. It can also be expanded to cover a wider portion of the VHF band. This is an amzing deal from one of Japan's most respected manufacturers.

KH-WS1 World Space

£99

The World Space receiver puts high quality satellite reception into your hands at a fraction of the original price. This radio covers normal broadcast bands, but adds satellite reception with its built-in dish. Just point it toward the satellite and enjoy high quality stereo (headphones only) and mono broadcasts from around the world. Absolute magic!

SG-237 Auto ATU

£319

The SG-237 allows you to use an end-fed wire on all bands from 160m to 6m. Just feed the output to the ATU, connect a low current 12V supply, and everything is automatic via RF sensing. Great value!

RM-838 Radio Controlled

£9.95

This digital clock is locked to MSF Rugby. Ideal for the shack, the time will always be right. Needs 2 x AAA cells.

CS-600 Coax Switch

The CS-600 2-way coax switch is ideal for HF and VHF use. It will easily handle full UK power and the die-cast casing and positive switch underline its quality.

£9.95

For Tel. & Order Details See Inside Front Cover.

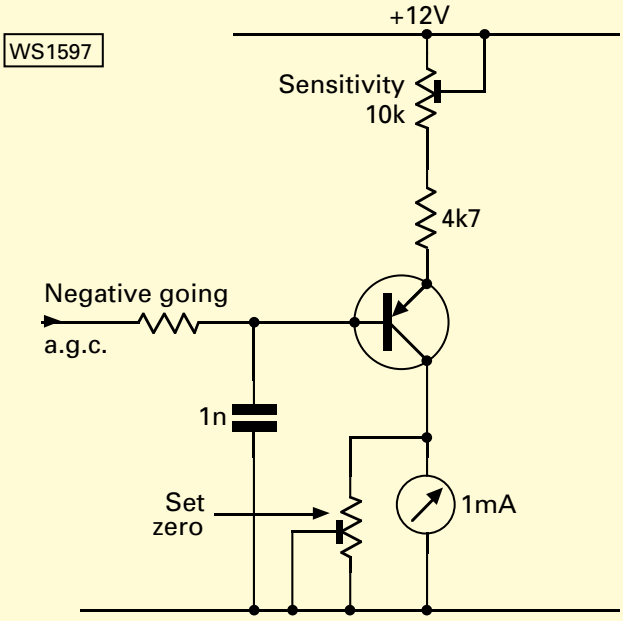
THE SIGNAL STRENGTH METER

Gordon King G4VFV looks at a topic which can cause heated discussion - the signal strength meter.

Nearly all amateur receivers and transceivers, as well as CB rigs and some domestic-type all-wave radios and scanners, boast a signal strength meter, or S-meter as it is usually called, of some kind or other. In many transceivers the function of the meter can be changed by a front panel switch to indicate other than the strength of a tuned signal. In my own Icom transceiver, for instance, the multi-scale meter indicates signal-strength and no fewer than six other functions in the transmit mode.

Position one is for setting the meter prior to measuring the standing-wave ratio (s.w.r.) on position two. The third position changes the meter to power output.

In the fourth position the meter reads the compression level when the speech processor is switched on, while on the fifth and sixth positions the meter reads the automatic level control. (a.l.c) and the I_c (collector current) of the power amplifier (p.a.). The scales of a single moving-coil meter of *circa* 1mA full-scale sensitivity read all these parameters.



● Fig. 1 Simple S-meter circuit which is operated from the a.g.c. voltage.

Less Elaborate

My 144MHz multi-mode transceiver is less elaborate. The indicator on this is a colourful row of light-emitting diodes (l.e.d.s.). These respond to signal strength on receive and r.f. power output on transmit. Although l.e.d. indicators are sometimes affectionately referred as 'fairy lights', they can in practice be virtually as effective as a moving-coil meter movement and easier to see.

Anyway, regardless of the kind of indication adopted, the scaling is always in S-units or S-points, starting from S1 and commonly going up to S9. Beyond S9 the indication changes to decibels (dB), such as +20dB, +40dB and +60dB. The idea is for the S-meter to provide a relative scale of signal strength. Examples are S5 relating to 'fairly good signals', S1 to 'faint, barely perceptible signals' and S9 to 'extremely strong' signals.

The S-point scale, of course, is a part of the readability/signal strength/tone) (RST) system used to assess the overall quality of a transmission. However, on a quiet frequency the indicated signal strength could be way down at S1 or S2, yet the readability could be quite acceptable at R4 (readable with practically no difficulty) or even R5, (perfectly readable).

Conversely, with strong interference (QRM) the readability of a relatively strong signal might not be any better than R1 (unreadable) or R2, (barely readable, occasional words distinguishable). Much of the RST assessment, therefore, relates to the conditions and is strongly subjective!

Relative Strengths

Although readability is the prime parameter, the S-meter is useful for giving comparative reports of signal strength, when antennas or the operating conditions are changed during a contact (QSO), for instance - but it can only show relative strengths of the signals tuned on a particular receiver.

While a given signal tuned on one receiver may read S3, on a different receiver the same signal might read S2 or S4. In fact, almost any reading on any receiver or transceiver could result from a signal of almost any strength! Moreover, the actual sensitivity of the meter can change quite significantly between bands.

Over five decades ago an attempt was made by at least one manufacturer to put some degree of standardisation into the calibration of S-meters. The idea was for S9 to equal an input signal strength of 50μV (-73dBm) across the matched antenna socket, and for each S-unit to have a value of 6dB. This was a good thought, but one which appeared to be too costly to put into general practice.

The topic was again revisited at the 1981 Region 1 Conference of the International Amateur Radio Union (IARU), where recommendations were adopted for S9 to represent an antenna input of 50μV (73dBm) on the h.f. bands and 5μV (-93dBm) above 30MHz (e.g., where h.f. finishes and, broadly speaking, v.h.f. starts). Sadly, such commendable standards are rarely reflected in prevailing equipment.

Using a Marconi signal generator featuring an accurate attenuator, I thought it would be instructive to check the S-meters on a couple of my own rigs. My Yaesu 144MHz multi-mode rig at 145MHz f.m. gave S1 and S9 indications close to 2μV (-101dBm) and 5μV (or -93dBm) respectively, with 'over' indications of 15μV (-83dBm), 50μV (-73dBm) and 150μV (or -63dBm).

My Icom rig on the 7MHz c.w. mode band gave S1 and S9 indications of 1μV (-107dBm) and 11μV. (-86dBm) respectively, with +20dB and +60dB deflections around 50μV (-73dBm) and 40μV (-55dBm) respectively.

The Icom uses a moving-coil meter and the Yaesu a row of coloured l.e.ds. The S-points one to nine and +20 and +60 dB are marked on the Icom meter, and S-points one, three, five and nine are marked on the Yaesu scale, along with upper-reading red l.e.ds. marked 'over'. Neither transceiver gave results which came anywhere near to the early recommendations!

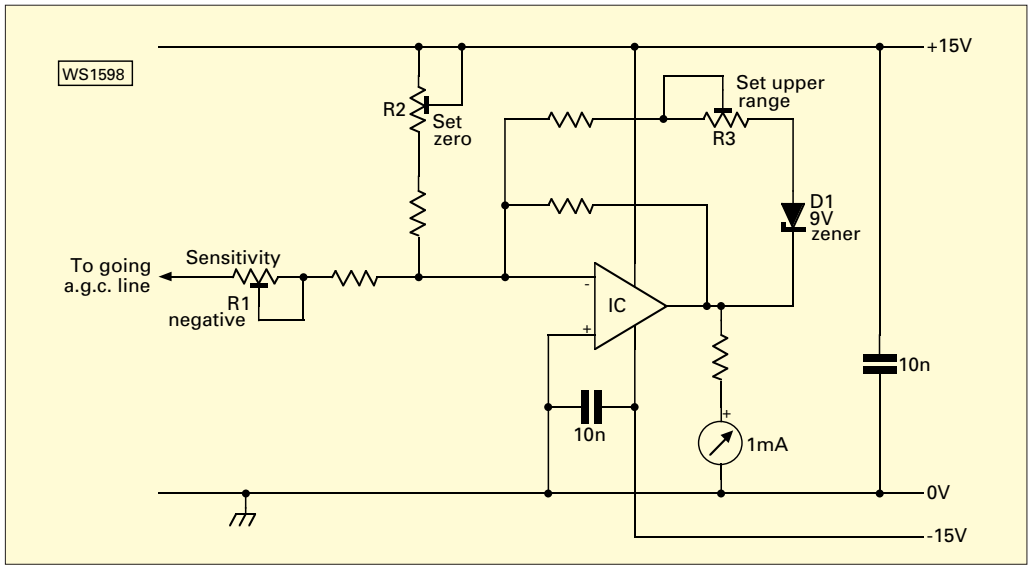
Signal Power

The dBm values that I have shown in brackets against the foregoing signal voltages refer to signal power (e.g., V^2/R) as a dB ratio relative to a milliwatt (mW). Signal input in this form may nowadays be specified rather than signal voltage. For instance, 50μV across 50Ω corresponds to $5x10^{-11}$W or $5x10^{-8}$ mW, which works out to 73dB **below** 1mW, or -73dBm.

The S-meter circuits are commonly driven from the a.g.c. line. An example of a simple S-meter circuit is given in **Fig. 1**, where the two preset controls allow the meter to be set to zero and the read-out sensitivity adjusted. Pre-solidstate age S-meter amplification was handled by valves.

The circuit in **Fig. 2** is based on an integrated circuit op-amp which, in addition to the set-zero and sensitivity controls, has a control which works in conjunction with the 9V Zener diode to provide a degree of quasi-logarithmic compression at the top end of the scale for dynamic range enhancement.

Well, that's all for this month. See you next time. *PW*



● Fig. 2 A more complicated S-meter circuit using an op-amp integrated circuit.

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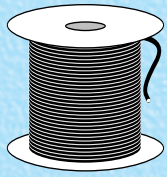

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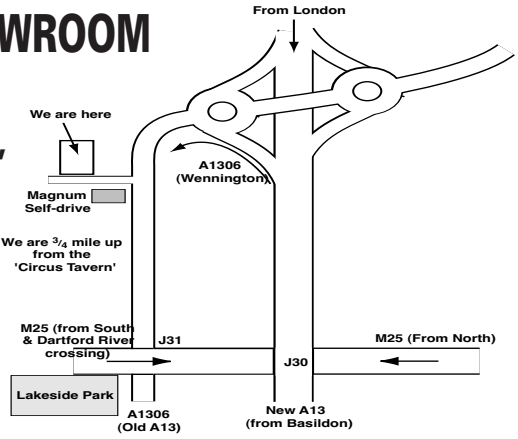

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Yaesu FT-817 Adventure Radio

Richard Newton G0RSN says "Occasionally a radio comes onto the market that everyone is talking about, it captures peoples' attention. I think it fair to say that the Yaesu FT-817 is one such radio". Read on to find out why he's so impressed!

The Yaesu FT-817 is a compact, multi-band, multi-mode portable transceiver. It transmits on all Amateur Radio bands from 1.8 to 50MHz and also on the 144 and 430MHz bands as well. Its receive coverage is just as impressive including general coverage on h.f. and the Band II v.h.f. f.m. broadcast radio frequencies and the Airband on v.h.f.

The Yaesu FT-817 is primarily designed for portable use. It operates using either a rechargeable battery pack or eight AA type alkaline batteries and it's also possible to connect the radio to a 13.8V d.c. power supply.

On the air, the radio transmits at the desired QRP power settings. The high power setting is 5W and it's possible to select 2.5, 1W or 500mW.

I've always enjoyed taking radio out and about, particularly enjoying h.f. mobile working. However, although I've often taken a 144MHz station portable I've rarely gone /P on h.f.

Keen To Try!

As soon as I heard about the Yaesu FT-817 I was keen to try one out. I know that the transceiver's low power worries some people but what can you expect from a tiny box with it's own batteries that offers what the Yaesu FT-817 has? In any case any low power (QRP) operator will tell you that power is not everything by any means, a sentiment that I completely agree with!

First impressions are important as far as the look of a radio is concerned and I don't think you'll be disappointed when you see a Yaesu FT-817 for the first time. The radio oozes quality and professionalism.

The '817 is well-made and finished in grey and charcoal. It's wonderfully compact at only 135 x 38 x 165mm and about 1.17kg. It is reassuringly weighty but light enough so that it could be carried anywhere.

I think that most radio enthusiasts would marvel at the ability to take a h.f./v.h.f./u.h.f. station anywhere. If you had large enough pockets you could take your whole station with you in a coat!

What Do You Get?

So what do you get for your money? In answering I can say you get the Yaesu FT-817 of course and a good quality, sturdy carry strap but alas, no case. You also get a d.c. cable and a whip antenna that can either be shortened to cover 144 and 430MHz or lengthened to cover those two bands and 50MHz.

The Yaesu FT-817 is also supplied with a comprehensive book

- Ideal for adventure back-packing Amateur Radio - the FT-817 really is tiny but as Richard G0RSN proved during his evaluation, it's capable of providing excellent performance on the DX bands.

Yaesu's Mighty Midget! The FT-817 is dwarfed by the seemingly gigantic microphone - but don't be fooled....this transceiver packs many facilities into a very small space.

of words which is well illustrated and easy to follow. This is a plus point as the Yaesu FT-817 is not the easiest radio to get to grips with straight out of the box.

The manual lists the '817 as being supplied with a battery case to hold eight AA cells (not supplied). However, within the UK the rig is supplied with a 9.6V 1Ah battery pack and charger.

Finally, there's the fist microphone, the MH-31A8J. This is about a third of the size of the rig itself! A well tried and tested microphone but it did seem to be a little large for the Yaesu FT-817!

I think that Yaesu have done a reasonable job in designing the transceiver. It must have been a real headache trying to fit everything in or on such a small rig.

The front of the FT-817 houses the main controls, power **On/Off**, **Volume**, main dial and the like and the designers have had to rely on menus for a lot of the functions. The display is small, **but considering the size of the radio** it's clear and offers a choice of orange or blue backlight.

Operating the Yaesu FT-817 is an acquired art. However, if you are familiar with other similar menu driven radios such as the Yaesu FT-100 then it won't take you long to get to grips with the FT-817.

Operation Quite Simple

Once you get used to the menus, operation is quite simple. This is where the manual really comes into its own. It has easy to read, easy to understand tables showing the different menus and functions and how to access them. Using the book I quickly found that the band and mode of operation are easily changed by using the buttons located on the top panel.

The Yaesu FT-817 has two antenna connections. An SO-239 on the rear of the radio for use with h.f. and or 50MHz and a BNC fitting on the front panel to take a 50, 144 and 430MHz antenna. The other plus point to this is that using the menu set-up you can enable either antenna connection for any band.

The rear panel houses the external power connector, the ground terminal and the c.w. key jack. It also has a 6-pin mini din data connector accepting AFSK input from a Terminal Node Controller (TNC).

Also provided are fixed level receiver audio output, press to talk (p.t.t.), squelch status and ground lines. It also has the 8-pin mini DIN type ACC connector which has several functions from connection to a linear amplifier to cloning or computer control.

The Yaesu FT-817 supports CAT computer control. To support this facility there's a dedicated chapter provided in the manual.

Another pleasant little touch is the fact that Yaesu have extended the heat sink in all four corners of the rear panel. This idea effectively makes a stand, so that the radio can be stood up on end during operation.

The side panel takes the modular microphone plug and has a 3.5mm jack for a speaker or headphones. There's a switch next to this jack where you can switch the audio levels for headphones or loudspeaker.

Myriads Of Functions

The Yaesu FT-817 seems to offer myriads of standard and advanced functions and together with the normal n.b.f.m., a.m. and s.s.b. modes of operating, it has a fully functional c.w. electronic keyer. It supports digital modes such as AFSK, PSK31, RTTY, SSTV, FAX and Pactor. It also supports 1200 and 9600bps packet on n.b.f.m.

The 144 and 430MHz aspects are also well catered for with full CTCSS and DCS functions, together with an easily accessible 1750Hz tone burst and automatic repeater shift capability. There's also a spectrum 'scope, and compatibility with the Yaesu Auto Range Transpond System (ARTS) whereby Yaesu radios fitted with this facility can poll each other and let the operator know when others are in operating range.

Yaesu have also included the **Smart Search** facility on the FT-817, where the radio sweeps a chunk of spectrum and saves any busy frequency to a temporary memory slot. Useful for sweeping the repeater slots in a new area to see where the activity is!

The FT-817 offers a very versatile memory system with 200 memories that can be given alphanumeric designations. They may be organised into ten groups if desired and can be scanned using several methods.

Additional **Home** memories can be utilised giving you instant access

Product

The Yaesu FT-817 h.f., v.h.f. & u.h.f. portable transceiver

Pros & Cons

Pros: Reasonably sensitive and selective, excellent received audio, easy to get 'bitten' by the adventure radio bug using this small radio that's packed full of goodies!

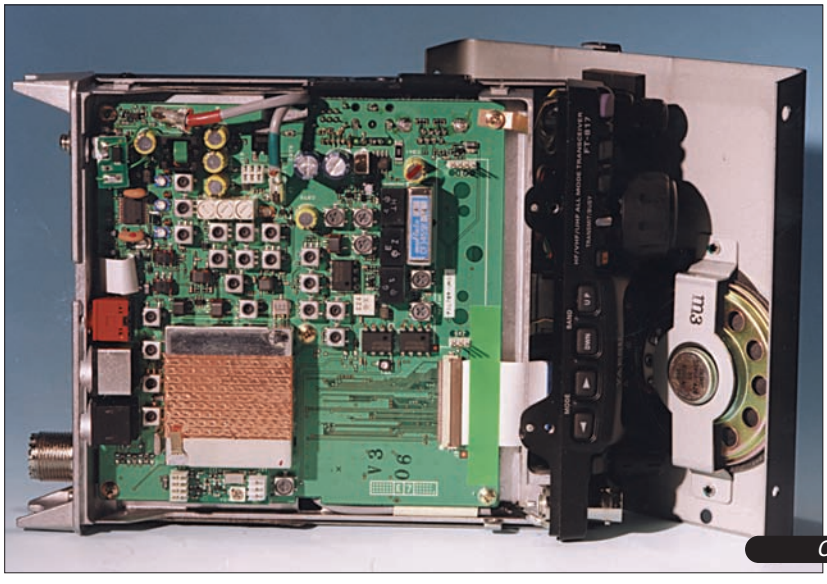
Cons: The current drain is a little high, but you can carry spare batteries, display and controls are quite small but are in proportion to the size of the rig.

Accessories

Collins s.s.b. filter (YF-122S), Collins c.w. filter (YF-122C), Packet cable (CT-39A), DTMF microphone (MH-36E8J), TCXO unit (TCXO-9) and **new** carrying case (CSC-83).

Summary

The FT-817 does what it is designed to do and it does so, in my opinion, very well indeed. I had great fun operating it and made some very enjoyable contacts. If nothing else it has re-kindled my interest in going out and about on h.f. I suppose the next step is a multi-band, multi-mode hand-held covering h.f. v.h.f. and u.h.f! Well done Yaesu!



Okay, so where do they hide all the facilities? Surprisingly, when the *PW* staff looked inside the FT-817 during the photography they found it's so neat and deceptively empty-looking for such a remarkable little performer!

Continued on page 26

THANKS TO YAESU UK FOR LOANING PW THE FT-817 TO REVIEW. THE FT-817 IS AVAILABLE FROM ALL YAESU APPROVED DEALERS WITH AN RRP OF £799.

to your favourite frequencies on different bands. There is one for h.f, one for 50MHz, one for 144MHz and one for 430MHz.

On The Air

On the air, the FT-817 seemed to be reasonably sensitive and selective, coping well with strong and weak stations alike. The received audio was of excellent quality.

I decided to listen to airband and as was to be expected with a broadband radio, the FT-817 did suffer a bit when next to my computer using just the helical antenna. However, on an external antenna there were very few break-through problems and even the local pagers made little impact.

Airband reception was very good and to receive I plugged the rig into my WX-1 antenna on the side of my bungalow in the suburbs of Bournemouth where I could get a 5 and 9 signal from London Volmet South. Using the supplied helical antenna I could hear the low power local information service from Bournemouth Airport. Receiving this service is always a good yardstick for me.

Unfortunately the receive coverage on the Yaesu FT-817 did not include my other favourite, the Marine Band.

Out & About

So let's get down to business, and what the Yaesu FT-817 is all about - getting out and about! To this end I again asked for the help of my Father-in-Law, **Terry G7VJJ** and we sat down to plan our first exploration into the world of h.f. adventure radio.

Unfortunately the foot and mouth disease outbreak ruined our plans. Every car park, picnic area, public footpath and hilltop in Dorset seemed to be shut, so to plan B!

Plan B involved the beach, so it was decided, my wife **Diane**, our sons **Thomas** and **Oliver**, Terry and his wife **Barbara** were off to the beach at Mudeford near to Christchurch.

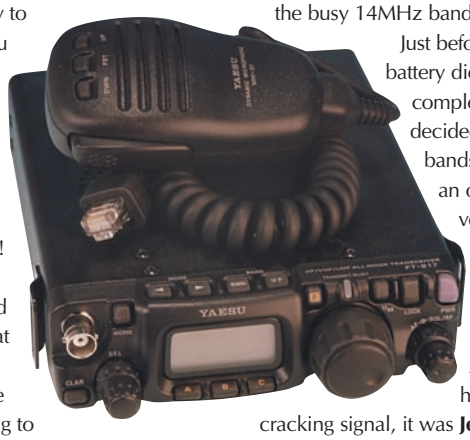
Terry and I roughly worked out a length required for a dipole for 14MHz. We spent an hour at my house searching through my junk and found an old centrepiece including a 50W balun and some coaxial cable and some multi-stranded wire. We were relieved to see the s.w.r. bridge read 1.2:1 with the resulting dipole!

So on a dark, dismal rainy day in March Terry and I dragged our family to the beach. You may think us mad, but it must be a British thing because Mudeford beach was quite busy!

We made tea first and the next thing was the 14MHz dipole. Using Terry's ball of string we slung it up between two trees on a ridge overlooking the rather dismal looking English channel.

Much to the puzzlement of the now enthralled crowd of on lookers we rolled the coaxial cable down the bank and perched on a camping stool was the Yaesu FT-817 with Terry and I perched on our own camping stools next to it. Fortunately the rain had given way to a rather damp sea mist.

I had decided to make it as real an experiment as possible and had decided only to use the Yaesu FT-817 on its own batteries. I had remembered to fully charge them!



The 14MHz band was alive that Sunday morning. We were listening to several long contacts and then, tuning about I heard a Hungarian station calling "CQ". I grabbed the microphone and using all my 5W I returned his call and his reply to me was instant.

Tomi HA3KHK from Marcali in western Hungary near the Croatian Border, gave us a 5 and 9 report. "Gosh", I thought, ..."our home-brew 14MHz dipole is doing well, the Yaesu FT-817 isn't bad either I suppose"!

We had another tune of the bands and found **Peggy OE6YRG/1** in Vienna, Austria. Peggy gave us a 4 and 2 report and a very enjoyable chat.

The next contact was a very interesting one with **Uli DF4JG/M** in Germany, we were so excited about talking to him while he was mobile with his IC-706 that I forgot to ask him where he was! Uli was fascinated that were running about 3W, I say this because the battery had depleted considerably by now.

Uli decided to do a test of his own and he reduced his transmit power from 100 to 5W. We were still able to give him a 5 and 6 report and he gave us a 5 and 9. Not bad for a two-way low power contact!

Finally, we had another two-way low power contact with **Ray OE8ANK** from Ochsendorf in Austria. Ray was running 4W from a Yaesu FT-1000, he did however have a rather impressive beam pointed at us. He gave us 5 and 7, he was 5 and 9 with us.

Excellent Audio Reports

Everyone gave the FT-817 excellent reports as far as the transmitted audio was concerned. I had no problems at all resolving stations on the busy 14MHz band.

Just before the battery died completely we decided to change bands and used an old CB vertical on a magnetic mount on the car to tune around 28MHz. We heard a cracking signal, it was **Jesus LU5FL** from Argentina, he was well over 5 and 9, one could say it was an end-stopping signal, but alas our failing battery was no match for the ensuing pile-up and we had to be content with reverting to being licensed listeners!

Terry and I had a good few hours of real fun with the Yaesu FT-817. I can completely understand why people get bitten by the adventure radio bug!

The Higher Bands

I was conscious that I should try the FT-817 on the higher frequency bands. Being unable to get out and about on high ground due to the F&M problems, I decided to try the rig out from the relative comfort of my kitchen!

I plugged the transceiver into my WX-1 dual band co-linear antenna on the back of my bungalow and put out a call on the local 430MHz repeaters. I successfully accessed the repeaters in Bournemouth, Blandford and Weymouth, not bad at all, the trouble is no one answered me!

I then tried my luck on 145.500MHz. After getting no reply I decided to call out on the local repeater, GB3SC on 145.625MHz. Thankfully **Les G0FAJ** replied.

Les was mobile about 10km away in Christchurch. We went to a simplex frequency and had a very enjoyable chat. Les told me that the Yaesu FT-817 sounded "Very nice indeed", he also said that it the audio was "Very nice quality".

The next contact was with **Bob G4HFQ** in New Milton about 16km away. Bob told me that the Yaesu FT-817 sounded "perfect". Another **Bob - G0HPO** - a friend of mine that I had not spoken to for a long while, happened to join G4HFQ in his shack while we were chatting away. So we had a good old chin wag.

Well & Truly Bitten!

Well, I have to say that I'm well and truly bitten by the adventure radio bug. The Yaesu FT-817 was great fun. It has low power output, it is small and takes a while to get to grips with running it. The display is also small and the controls are, on occasion, fiddly to use - but what do you expect in a rig of this size?

If I was to voice concern it would be on one point, the current drain. In the specifications Yaesu show the current drain at unquenched receive as being 450mA and on transmit it's 2A. However, the radio can be attached to another power source or you can carry spare batteries.

The Yaesu FT-817 is a small radio packed full of goodies. It proves that power is not everything and is small because it has been designed to fulfil a rather specific task...to be a self-contained portable Amateur radio station giving a reasonable account of itself across a wide spectrum. If you enjoy taking the hobby with you wherever you go **this is the radio for you**.

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THE WINDFALL AN

Tony Harwood G4HHZ has designs on showing you how to make your own dual-band antenna. So, here's a 14/21MHz one he made earlier, the Windfall Antenna

This article can be blamed directly on a recent financial windfall, which enabled me to buy a new transceiver. I chose one with an automatch antenna tuning unit (a.a.t.u.) that is capable of matching into a loading with a standing wave ratio (s.w.r.) of 3:1. The system has worked well with my 3.5/7MHz trapped dipole, but I still needed an additional a.t.u. to cover other bands.

As I enjoy working on 14 and 21MHz too, I decided to build a suitable antenna for these bands. I also thought, that on the way I could learn a little about more about trapped dipoles in the process. I am fortunate in that I have a large garden endowed with tall trees, both in the front and the rear so, space and height presented no problems.

My aim was to create a 21MHz dipole antenna, then to extend it to work on 14MHz, and follow this by inserting a trap to find out how the antenna was affected. I began by carrying out the analysis of the antenna, by the measurements at the end of a carefully calibrated 75Ω balanced twin feeder.

All the antenna feed-point impedances were determined by solving the transmission line equations on the impedance reflected at the bottom of the feed line. Rather than do everything by hand, I used a computer running a spreadsheet program to do the hard mathematical work. The feed-point impedance of the dipole could then be plotted as measurements were made.

For my measurements, I used a Wayne Kerr Admittance bridge, which gives parallel equivalent component values in millimhos and picofarads. Inductance is given as negative picofarads. All conversions were carried out within the spreadsheet calculations.

● Fig. 1: A commercial dipole antenna centre. Note that the 75Ω twin feeder loops over the top to reduce moisture ingress.

● Fig. 3: The construction of the traps, with the beehive trimmer inside the coils.

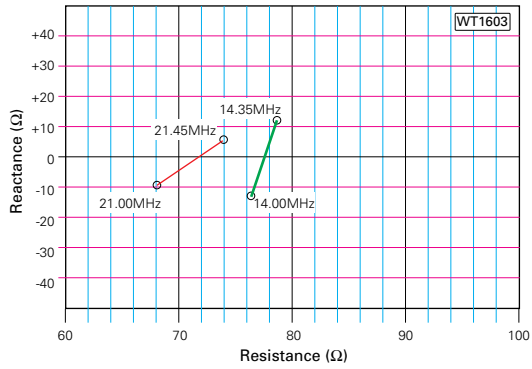
Basic Dipoles

The basic dipoles were constructed from three strands of bare copper wire (recovered from old cable obtained from a local recycling centre). The wires were tightly twisted together giving an overall diameter of some 3mm. To allow adjustment of length, the overlong wires were passed through a dogbone insulator and folded back to be secured by a line tap.

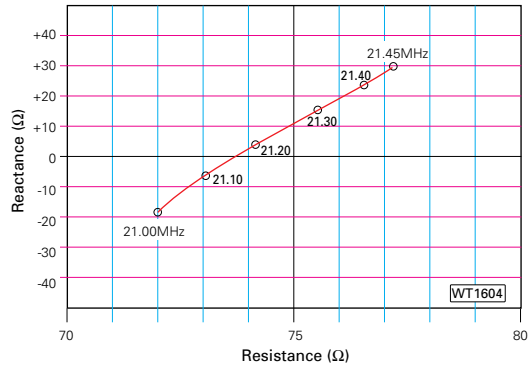
A balanced twin feeder of 15m with the characteristic impedance of 75Ω, and with a velocity factor of 0.67 gave an electrical length of 22.4m . This was coupled to the antenna elements using a commercial antenna centre (**Fig. 1**). All feeder parameters were carefully checked beforehand.

Initially the design aimed for a non-reactive dipole at the arithmetic mean frequency of each band ie. 14.174 and 21.225MHz. The calculated lengths being 10.05 (5.025 for each leg) and 6.87m (3.435m for each leg) for the two bands of 14 and 21MHz. Calculation of the characteristic impedance gave values of (890±j15)Ω on 21MHz and (940±j18)Ω on 14MHz, impedance values that give calculated s.w.r. values of 1.2:1 and 1.36:1, respectively, on 75Ω feeder.

To enable measurements on both bands, a composite dipole was built with a dogbone insulator separating the 21 and 14MHz portions, bridged by a wire when making 14MHz measurements. I did make attempts to adjust the dipole lengths to give equal, but opposite reactances, at the band edges, but absolute accuracy extremely difficult to achieve.



● Fig. 2: The feed-point impedances of the individual dipole antennas. See text for details.



● Fig. 5: The impedance and frequency plot for the 21MHz antenna. Although the trap is in place the 14MHz extensions elements have not been added at this stage.

I arrived at the final overall lengths of 6.86m for the 21MHz band and 10.07m for the 14MHz band, which is quite close to the calculated values. The worst case band edge s.w.r. figures (with respect to 75Ω) were 1.18 on 21MHz and 1.19 on the 14MHz band. These values are somewhat better than the design figures. The results are shown in **Fig. 2**.

Trap Designing

Now onto designing the traps! These were wound, as may be seen in **Fig. 3**, on 37mm (1.5in) plastic water pipe, which had passed the microwave test[§]. The inductance was wound with nine close-wound turns of 0.9mm enamelled copper wire. A 25pF beehive trimmer capacitor provided resonance adjustment.

Connections to the wire elements were provided by means of 2BA screws set some 40mm apart, with an overall trap trap length of 60mm. Weatherproofing was by means of a 50mm plastic container with a tight fitting lid, which was slid over the whole assembly.

The terminal screws passed through appropriately spaced holes and were secured with nuts which also took the wire terminating lugs. The traps have been in use during both dry and wet weather without appreciable change of performance for some time. But a better waterproof seal may be needed, if the antenna is to be in use over a long period.

The next task was to tune the traps, which I did again with the admittance bridge. I connected a calibrated resistor

ITENNA

● Fig. 4: The trap inserted into the dipole. Make sure all connections are of good quality.

(76.3Ω or 13.1mmhos) and adjusted the bridge, at 21.2MHz, for balance. Then I placed the trap across the resistor and adjusted the trimmer capacitor to give balance again. This proved to be an accurate and repeatable method of tuning.

§ *The microwave test: A method of checking the suitability of apparently insulating items for suitability at r.f. Place a small jug of water and a sample of the insulating material in a microwave oven and cook on full power for a short time (usually 30-60 seconds). Open the oven and carefully check, by hand, the temperature of the insulator. If it's cold - or at least cool, it's suitable for most r.f. work. If it's warm, reject it and find some other material.* **Editor**.

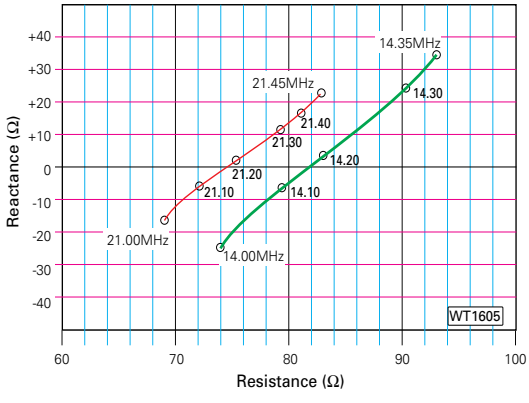
Traps & Antenna

Now to add the traps and the antenna wires together (**Fig. 4**). Replace the separating insulators with the finished traps, but leave off the 14MHz extensions for the time being. I made measurements across the 21MHz band and the results are shown in the graph of **Fig. 5**.

Over the whole 21MHz band there is only a small change in the resistive value of the impedance (72 - 77.2Ω), but there's quite a change in the reactive component of the impedance. The reactive part changes from -j18Ω at 21MHz, to +j28Ω at 21.45MHz. These higher reactive values give s.w.r. readings of around 1.5:1 at band edges.

Thinking about these changes of s.w.r. shows that above resonance the trap has a capacitive effect, and below resonance an inductive one. As the antenna behaves like a near quarter wavelength long transmission line, it converts the capacitive impedance (21.45MHz) at its end to an inductive impedance at the feed-point.

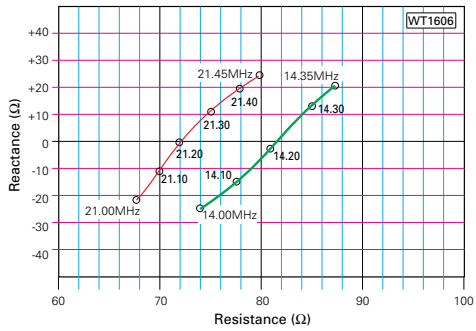
And, of course, at the lower band edge, the antenna converts the trap's effective inductance value to a capacitive impedance at the feed-point. Both these large reactive impedances alter the effective feed-point impedance causing the greater s.w.r. figures when the traps are fitted.



● Fig. 6: Adding the 14MHz extensions (0.77m both sides) gives these impedance plots on the bands.

The 14MHz Extension

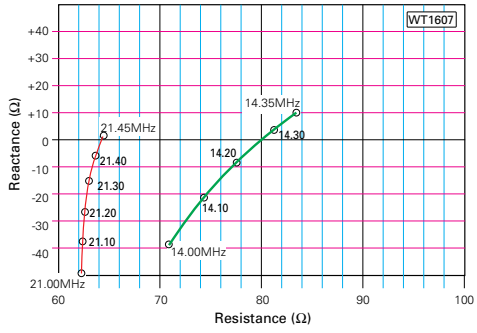
The next step was to attach the 14MHz extension to the outer end of the trap. At 14MHz the trap tuned for 21MHz still has quite a large value of inductance and acts as a centre mounted loading inductor. The effect of the loading inductor is to make the effective electrical length, longer than the physical length of the antenna wire. So, now the antenna is effectively too long, and needs to be shortened.



● Fig. 7: After adding the compensating capacitor, and increasing the extensions to 1.43m each side, these are the new impedance plots.

To cut a long story (and antenna), short the figures I arrived at after many tiny changes and re-measuring are as follows: For each wire leg of the 21MHz part I ended up with 3.37m each side, which when adding the dipole centre width into the size, gave a figure of 6.86m between the inner connections of the traps for the 21MHz section.

The additional lengths of wire needed to be added to the outer contacts of the traps, to work on 14MHz were 0.77m each side. This gives an overall width of the antenna of only 8.4m, which is a considerable change on the original 10.07m of the dipole. The range of reactances over the two bands was now -j17Ω to +j22Ω for the 21MHz band and -j24Ω to +j32Ω for the 14MHz band. These are shown diagrammatically in the chart of **Fig. 6**.

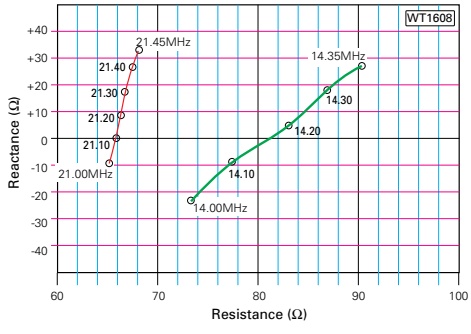


● Fig. 8: With the traps tuned to 21.45MHz, but the dimensions remained the same, the impedance plots changed to these shown here.

The residual reactance of the trap at 14MHz, meant that the antenna extension needed to bring the antenna to resonance on 14MHz were very much shorter than the original λ/2 antenna overall. Due to the very short lengths of these extensions, balancing the reactance at band edges was proving very difficult.

Reactance Removal

I decided to find some method of reactance removal to allow me to use the full length of the antenna again. Since a series reactance of the longer extensions would be inductive, I needed a series capacitor to compensate. And since the series capacitance value needed to compensate, is the same as that needed to bring the trap into resonance at 14.2MHz.

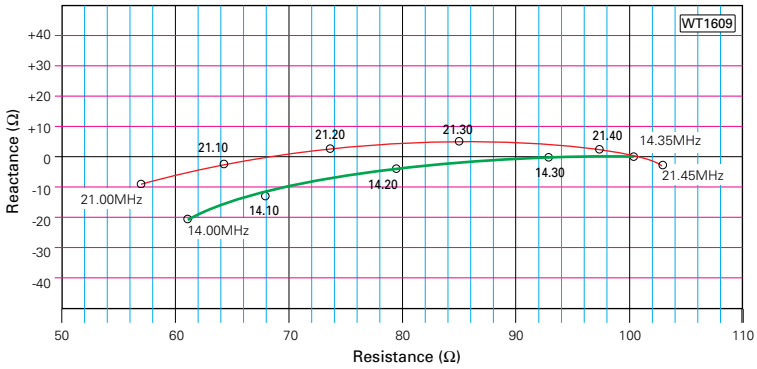


● Fig. 9: Now tuning the traps to 21MHz moves the impedance plots more capacitive, though the general trend remains similar to that of Fig. 8.

I put a second beehive trimmer in parallel with the trap and new trimmer of the combination was adjusted for resonance on the bridge as before. This new capacitor is placed in series with the outer end of the trap, but for weatherproofing purposes, within the body of the trap.

I reinstalled the traps and started the measurements again. With this new combination, the extension needed to bring the 14MHz antenna to resonance was now 1.43m, giving an overall length of 9.72m. Although this is still somewhat short of the original, I was able to adjust the length to equalise the s.w.r. readings at the upper and lower band edges.

The graphs of **Fig. 7** shows the ranges of impedances that I found with this new combination of elements. There's a slight degradation on the 21MHz band, with a reactance spread of 45Ω, and a worst s.w.r. of 1.38:1. However, on the 14MHz band there's an improvement with a small reduction



● Fig. 10: With the trap tuned to 21.2MHz and at the transceiver end of the twin feeder the impedance presented are well within the capabilities of the built-in a.a.t.u.

in the spread of reactance to 48Ω and a worst case s.w.r. of 1.45:1.

I felt that my results provided an acceptable performance and on-air tests showed that, when connected via a 1:1 balun, the transceiver was able to match the antenna system across both bands. To me this was confirmation of the design for my trapped dipole.

Final Experiment

My final experiment was to look at the effect that detuning the traps had on the dipole impedance. I made new measurements with the traps tuned, first to the high end (**Fig. 8**), then to the low end band edges (**Fig. 9**). I found that tuning the traps to 21.45MHz made the traps inductive across the whole band. This made the antenna impedance more capacitive due to the transmission line effect.

I also found an increased antenna capacitance on 14MHz, although to a lesser extent. As you may deduce, the opposite effect was both expected, and found when I tuned the traps to 21.0MHz. I also found that there was a considerable reduction in the resistive portion of the antenna's 21MHz band impedance.

● Table 1: The impedances of Fig. 10 and calculated standing wave ratios for 50 or 75Ω feed impedances are shown in this table. See text for more detail.

Frequency (MHz)	Zin (Ω)	Feeder 75Ω (s.w.r)	Feeder 50Ω (s.w.r)
14.00	(61.2-j21)	1.45:1	1.53:1
14.20	(78.4-j5.5)	1.09:1	1.58:1
14.35	(100.5+j0)	1.34:1	2.01:1
21.00	(57.1-j8.8)	1.35:1	1.24:1
21.20	(73.7+j2.5)	1.04:1	1.48:1
21.45	(103.5-j1.4)	1.38:1	2.07:1

Input Impedance

The input impedance of the balanced twin feeder is shown in **Fig. 10**, where you can see a reduced reactance range across both bands with respect to 75Ω. Of course the s.w.r. remains the same at any point along the feeder, but the reflected resistance and reactance will vary along the length (repeating every λ/2 within the feeder).

In **Table 1** I've shown the various readings and calculations I arrived at for the complete system using 75Ω feeder. I've also shown the calculated s.w.r. that would be present with a 50Ω feeder and in most, but not all, cases these figures are worse than for 75Ω. This is due to the fact that, at some frequencies, the impedances are closer to 50Ω than to 75Ω. At any given frequency though, the calculated 50Ω s.w.r. will vary along the length of the 75Ω feeder.

The ideal way to feed this antenna would be with a balun with the balanced output winding to feed the 75Ω twin. It would also have an unbalanced 50Ω input winding for the coaxial feed to the transceiver. The s.w.r. in each segment of the feeder would then be the same. But sadly such a balun transformer does not seem to exist. Nevertheless, the real s.w.r on 50Ω is more than adequate for the original objective of making a trapped dipole which could be used without an a.t.u. between it and the transceiver. *PW*

The Impedance of a dipole

There are two main physical characteristics which affect the impedance of a dipole: It's overall length, and the radius of the element conductors. A mathematical analysis shows that when the ratio of length to radius is infinitely large, the dipole length is exactly λ/2.

Also if the dipole is mounted well above the ground, then the feed-point impedance is 73.2Ω in series with an inductive reactance of 42.5Ω expressed as (73.2+j42.5)Ω.

When the length of a thin dipole is close to an odd number of quarter wavelengths in length, then it can be treated in a manner similar to a transmission line with a characteristic impedance Z_0 given by:

$$Z_0 = 120 \times (\log(\frac{2l}{a}) - 1)$$

Where *l* is the length of each leg and a is the radius of the element

Knowing Z_0, enables the half wavelength impedance to be calculated more accurately from:

$$Z_{(\lambda/2)} = (72.3 + \frac{1540}{Z_0}) + j(42.5 + \frac{890}{Z_0})\Omega$$

For thin antennas, where the length is very much greater than the radius of the conductors (Z_0 is also large) then the nominal value of impedance of (73.2+j42.5)Ω. is usually sufficiently accurate.

Shortening the dipole eventually results in the impedance becoming purely resistive (R_0) with a value of 73.2Ω. But the value of R_0 depend on the height (h) above ground. For values of h between 0.2λ and λ R_0 varies between 58 and 98Ω.

For a purely resistive feed-point impedance, the length of a dipole at a frequency f_0 is given very closely by:

$$2l_0 = \frac{l_0}{2} \times (1 - \frac{27}{Z_0})$$

In practice, when building a dipole with zero reactance, a value of 0.97 the free space wavelength is a good start point for the overall length. A frequencies not too far removed from f_0 the impedance of the dipole is given by:

$$z = R_0 - \frac{\pi Z_0 (f_0 - f)}{2f_0}$$

Calculations show that the antenna has a series capacitive reactance below f_0 and series inductive above f_0. The calculated values agreed fairly closely with my measured results.

Tuned Trap

The trap on a dual-band antenna should be a parallel tuned circuit that's resonant within the higher of the two frequency bands. The parallel circuit provides a high impedance point that isolates the outer section of the antenna. So, the inner section is effective on the higher band, and the complete unit on the lower frequency band.

The *Q* of the trap, and thus its impedance, is determined by the capacitor C (assumed to be loss-less), the inductance L and the effective series resistance R. At any frequency f, the inductive arm may be resolved into its parallel components R_p and X_p by use of the formula:

$$R_p = R(1 + \frac{(\omega L)^2}{R}) = R(1 + Q^2)$$

$$X_p = \omega L(1 + (\frac{R}{\omega L})^2 = \omega L(1 + \frac{1}{Q^2})$$

As the *Q* of a trap is usually quite high, the impedance of a trap at resonance may be considered as R_p. Below f_0 the overall impedance is the combination of Rp and a parallel inductive component. And of course above f_0 it has a capacitive parallel component.

I don't have the space here to expand this topic further, but if you would like to see more of the mathematics involved in my calculations, please send an A5 sized s.s.a.e. to the editorial address marked "Expanded Antenna Maths". For those of you with web access, it will be available as a '.PDF' file from the *PW* web site. Follow the links to Tex's pages **http://www.pwpublishing.ltd.uk/pw/tex/** to find out how to get hold of the file. *PW*

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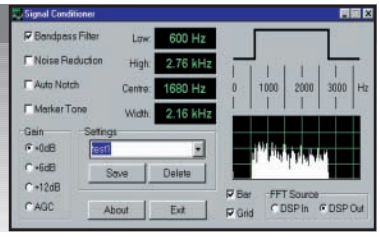

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Modes	AM,LSB,USB,CW,FM-N,FM-W	AM,LSB,USB,CW,FM-N,FM-W	AM,LSB,USB,CW,FM-N,FM-W
Tuning step size	100 Hz (1 Hz for SSB and CW)	100 Hz (1 Hz for SSB and CW)	100 Hz (1 Hz for SSB and CW)
IF bandwidths	2.5 kHz(SSB/CW), 9 kHz (AM) 17 kHz (FM-N), 230 kHz (W)	2.5 kHz(SSB/CW), 9 kHz (AM) 17 kHz (FM-N), 230 kHz (W)	2.5 kHz(SSB/CW), 9 kHz (AM) 17 kHz (FM-N), 230 kHz (W)
Receiver type	PLL-based triple-conv. superhet		
Scanning speed	10 ch/sec (AM), 50 ch/sec (FM)		
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Max on one motherboard	8 cards	8 cards	3-8 cards (pse ask)
Dynamic range	65 dB	65 dB	85dB
IF shift (passband tuning)	±2 kHz	±2 kHz	±2 kHz
DSP in hardware	no - use optional DS software	YES (ISA card ONLY)	YES (ISA card ONLY)
IRQ required	no	no	yes (for ISA card)
Spectrum Scope	yes	yes	yes
Visitune	yes	yes	yes
Published software API	yes	yes	yes (also DSP)
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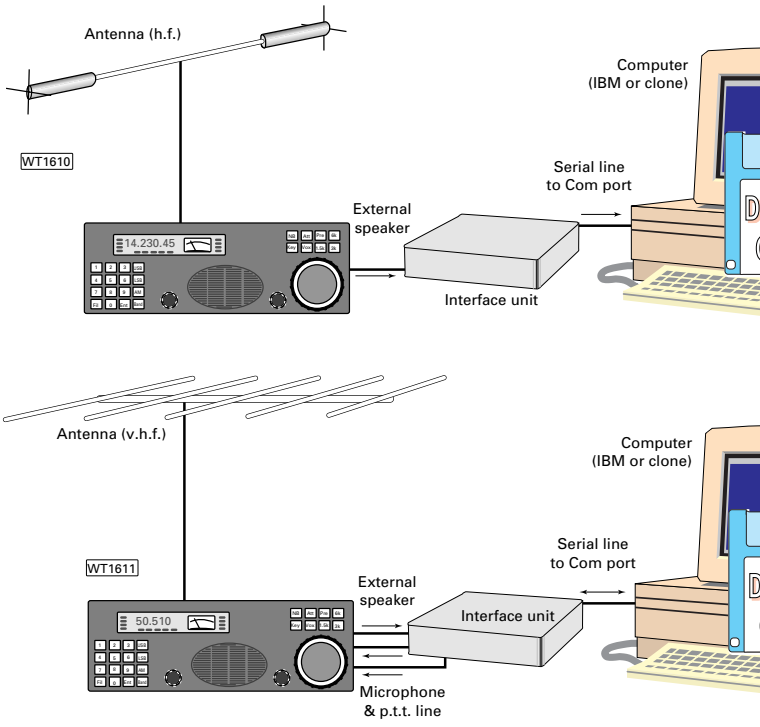
SLOW SCAN TELEVISION - FOR T

Keen SSTV enthusiast Colin Redwood G6MXL is keen to encourage you 'in vision' on the air. So, read on and find out just what you're missing

Slow scan television (SSTV) is a means of sending still pictures over the air using audio tones, taking from a few seconds up to a couple of minutes or so to send a single frame. Until recently it has been the domain of a relatively small number of dedicated enthusiasts, but the arrival of reasonably powerful computers in many shacks has changed that - so there's no reason not to join in!

In the early days long persistence phosphor cathode ray tubes (c.r.t.s) were used to display the picture as it built up at the receiving station. Whilst producing remarkably good results, there was no way of storing the pictures, except by audio recordings, or by taking photographs directly off the screen.



● Fig. 1: Block diagrams of typical SSTV set-ups used in Amateur Radio operation (see text).

Home Computer

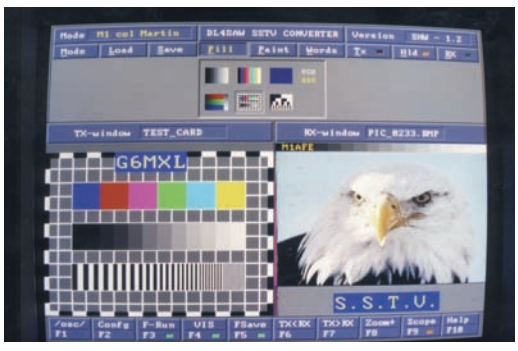
The advent of the home computer having built-in, relatively cheap, semi-conductor memories, has revolutionised SSTV. With an outlay of under £25 or even cheaper if you are prepared to solder less than 20 readily available components into a printed circuit board (p.c.b.) or a piece of Veroboard, with a receiver and reasonably powerful PC you can get started and receive colour SSTV pictures.

Although it's remarkably easy to start receiving pictures, many amateurs who have bought or made an interface and obtained an SSTV program have experienced some difficulties in getting it all to work as it should. This article is aimed at helping you start, but it should not be taken as the final word on any aspect of this fascinating mode.

Computer Requirements

Most of the more modern IBM compatible PCs can be used for SSTV, see **Fig. 1** for a typical receiving and transmitting station. Most computers with a fast 386DX processor or better, a video card with 1Mb of video memory, and a few megabytes of hard disk space free should be suitable. If your PC has a colour monitor, then so much the better, as most SSTV these days is in colour.

Second-hand PCs with 486 or first generation Pentium processors are readily available for under £100. In practice most PCs purchased new in the last seven years or so are likely to be suitable. Anyone who has set up their packet radio station should not have any difficulties with SSTV.



● Colin G6MXL says that you too could be on air with SSTV using your PC. This picture was rceived on 144MHz (n.b.f.m.) from M1AFE. Colin was using the DL4 GSHPC shareware version 1.2. The test card is loaded and ready to be transmitted from G6MXL.

Software On Market

There are number of SSTV programs on the market these days. Most are available as shareware for you to try-before-you-buy. Having tried a number, I would recommend DL4SAW's GSHPC program (release 1.2 is available as shareware), particularly if you are going receive s.s.b. signals.

Unlike some other programs, the GSHPC is designed specifically for SSTV and does **not support** other data modes such as FAX, RTTY, etc. Additionally, it does not require a sound card in the PC.

I'm particularly impressed with the ease with which the DL4SAW software can be set up and used. The 1.2 version overcomes a number of problems encountered with certain video cards in previous versions.

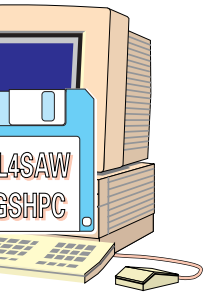
If you like the program, then send off your registration fee as the later 2.3 version supplied on registration has a number of additional facilities and is even easier to use! **Pervisell Ltd., tel: (01494) 448236** now provide registration facilities in the UK saving the cost and hassle of sending registration fees to Germany and they also sell interface units.

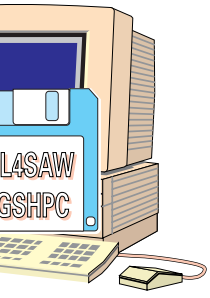
Different Standards

Don't let the multitude of SSTV standards put you off! The DL4SAW GSHPC software seems to cater for most of the popular standards and defaults to what seems to be used most frequently used on air, namely Martin Colour 1 (often termed Martin Mode 1 after Martin Emmerson G3OQD).

Furthermore, GSHPC can even automatically detect many of the other standards, using Vertical Interval Signalling. If you try other software, make

THE BEGINNER





sure it can handle and ideally default to Martin Mode 1.

Interface unit

The interface unit can be thought of as the SSTV equivalent of the TNC of packet radio. It connects to the computer through a serial port, and leads connect to an external speaker output from your receiver, and to the microphone input and PTT line of your transmitter in a similar manner to a packet TNC unit.

A couple of alternative circuits for the interface unit are described as part of the documentation on the DL4SAW disc (see the README.DOC file), and most other SSTV software. These can easily be built by any one who can build/breadboard a simple circuit.

The interface unit is powered from the PC. So make sure you don't have any solder bridges shorting out the supply (mistakes here could prove a little expensive!).

For those who prefer pre-built commercial interface units, these are available from a number of sources, including several shareware disk suppliers. Prices seem to vary from around £15 to about £50.

A few interface designs on the market are for receive only. Given the handful of extra components required for transmit and PTT control, this seems to me to be very short sighted. Think carefully before buying if it's ever likely you may want to transmit!

Installing Software

Installing the GSHPC software is easy to do if you follow the instructions on the disk. In use the GSHPC operates under DOS, not Windows, so you'll need to boot your PC for DOS **not Windows**.

Having installed my software, I started by making a new folder/directory on my hard disk. After changing to the new folder/directory I copied the entire floppy disk into it. I then typed UNPACK and the software self-extracted ready for me to run.

I suggest you print out the manual, which is supplied on the disc in German, English and Spanish. I used the DOS PRINT command to print out the English version (PRINT GSHPC_E.DOC), although you could load the file into your favourite word processor and print from there if you prefer.

While you have your printer on-line, I would also suggest that you print the NORMS_E.DOC file which will tell you about the different SSTV standards, and the NEWS.DOC file which will tell you about any recently available enhancements to the software, several of which I found to be particularly useful to me.

● Using the DL4SAW GSHPC software this picture was received on 144MHz n.b.f.m. (slightly noisy) from G2HCG - zoomed to full screen.

Configuring Software

Fortnuately, there's little that needs to be done to configure the software. Transmitting stations will probably want to edit the start-up batch file (START.BAT) to include their callsign. The program can then be started by typing START.

Once running, press F2 to enter the configuration menu. This is quite important as it's here that you tell the program which serial (COM) port you are using.

If you have your mouse connected to COM1, you will want to change the default setting in the GSHPC software from COM1 to COM2. I spent an anxious hour or two wondering why nothing seemed to work until I did this!

I seem to recall having the same problems when starting out with a number of packet programs - most of the other SSTV programs will also need similar configuration. Then press Ctrl + Enter to save your settings.

Finding Pictures

In practice SSTV can be found on just about every Amateur Radio band from 1.8MHz to the microwaves. The most popular bands seem to the 3.5MHz band (l.s.b. from 3.730 to 3.740MHz), 14MHz (u.s.b. from 14.225 to 14.235MHz), 50MHz (50.51MHz mainly n.b.f.m.) and 144MHz (144.500MHz mainly n.b.f.m.). Most Amateurs (including Novices) and short wave listeners will have the capability to listen on one of these frequencies.

● Picture received on 144MHz n.b.f.m. from M1AFE zoomed to full screen to illustrate the quality of reproduction possible, software used was DL4SAW GSHPC (see text).

When the band is open, 14MHz is probably the most active, with 3.5MHz a close second. Between them they provide the greatest variety of pictures and operating techniques.

There are so many signals on the bands these days, so just how do you know when you have found an SSTV signal? If you load one of the pictures or test-cards on the DL4SAW GSHPC disk and press T (transmit) on your keyboard, you will hear a noise coming from your computer's internal speaker, with a distinct clicking pulse every half second or so.

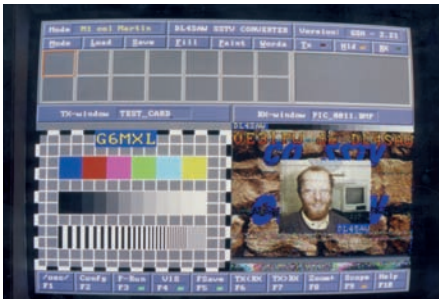
When you hear this sort of noise coming from your receiver, you have found an SSTV signal! Incidentally, the configuration allows you to turn off the noise from your PC's internal speaker when transmitting if you wish.

Interface To Radio

To receive pictures the interface unit needs to be connected to a loudspeaker output from your receiver. I found that on several rigs, plugging in headphones

● On 3.5MHz this time - using the EZSSTV Shareware which produces a larger picture than GSHPC.

● Using the DL4SAW GSHPC software, registered version 2.21 with picture of DL4SAW himself on receive window, and test card in the transmit window.



muted both the internal speaker **and** the external speaker socket the other reason I didn't receive pictures immediately!

If you intend to transmit you will also need additional connections from the interface unit to your microphone socket and PTT.

Receiving First Pictures

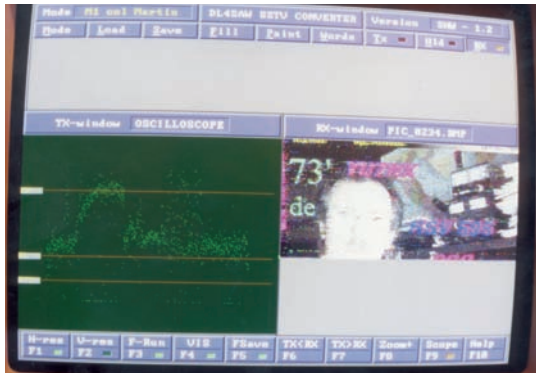
As with any mode, it can pay to spend a little time listening and watching before trying to transmit. If you can't hear any SSTV signals on your chosen band, try a voice CQ call requesting SSTV pictures.

My own call on 50.51MHz was answered immediately by a couple of locals, who were only too happy to provide some signals. Then all I had to do was to run the DL4SAW GSHPC software (enter START).

Once it has loaded, press R (Receive). The first time should cause the RX button to change from grey to green on the screen. It's then ready for the picture to appear on the right-hand side of the screen.

Careful tuning will get the best results with s.s.b. signals and getting the synchronising pulse at about the correct audio frequency is important. The GSHPC program includes a couple of graphical tuning aids to help.

The correct synchronisation pulse, black and white levels can be



● Picture received on. h.f. with oscilloscope tuning aid on the left, using the DL4SAW GSHPC version 1.2 shareware.

shown on an oscilloscope-like display on part of the computer screen during receive. I found this particularly useful, not only in tuning, but also to get a better understanding of the slow scan television signal itself.

Whilst the other programs that I tried had some tuning aids, the GSHPC program really excelled here. For this reason the software is my preferred choice for s.s.b. SSTV signals.

Even weak SSTV signals with some QRM (a 14MHz s.s.b. 'phone contests!). I also found that setting the volume control slightly higher than for normal listening reduced the noise on pictures I received even from fully quieting local n.b.f.m. signals on the v.h.f. bands.

Once you have received a picture you can save it to disk by pressing S. Options to save as a .TIF or .BMP file are available in the shareware version, with JPEG available in the registered version. Once I had saved

Other Software

If you want to try some different software you may like to try some of those listed below. Unless stated they all require the same basic interface unit.

EZSSTV: I am most impressed with picture quality from EZSSTV version 3. It's available as a demo version of Pasokon TV. In its free demo version EZSSTV is limited to just a few of the popular SSTV modes including Martin Mode 1 and a new high resolution standard. The main advantages over the GSHPC program are a bigger picture and more sophisticated facilities for handling images. Additional file formats are available in the full version. Like the GSHPC program it is also designed specifically for SSTV, and requires a 386 processor or better. I found a few annoying quirks, although I could live with them all. Incidentally - EZSSTV requires the use of a mouse. I found myself using EZSSTV to enjoy the bigger pictures from signals that I had tuned in using the GSHPC oscilloscope facility. I also found that EZSSTV was better than GSHPC on noisy f.m. signals.

JVFAX by DK8JV: As its name implies, JVFAX can be used for FAX reception as well as SSTV. However, it's more complex to set up and operate than some of the other programs I have tried. I suggest starting off with one of the others software packages I've mentioned as they are so much easier to set up and use.

ChromaPix: For those with more powerful PCs (Pentium 90 or better) with a soundcard, ChromaPix is likely to be of interest. Unlike the other software mentioned here it does *not* need an interface unit. Instead it uses the computer's sound card and digital signal processing (DSP) techniques. It runs under *Windows 95/98/NT* etc.
My initial impressions of this software were very favourable. It's very much a mouse driven Windows GUI application. By using two windows, it is possible to prepare a picture to send in one window whilst receiving a picture in the other. It supports TWAIN interfaces to scanners and digital still cameras, and video capture, assuming you have the appropriate hardware.
For receiving, I found that all I needed was an audio lead to go between the external loudspeaker socket of my receiver and the input socket on my soundcard and a few clicks of the mouse. I doubt if it could be made any easier! I found it helpful to change the default receive mode to Martin Mode 1.
The program is available as shareware to try. Registration costs US$120, which makes it an expensive option in comparison with the other software, although you don't need to budget for an interface unit. It is equipped with some useful graphics manipulation capabilities. I downloaded my copy from their Website **www.siliconpixels.com.** Don't forget to download the excellent User Guide.
In use, although ChromaPix has tuning aids, I found it much harder to tune in SSTV signals in the middle of a 14MHz 'phone contest than I did with the DL4SAW GSHPC software.

Colin G6MXL

Shopping List Summary

Assuming you have a suitable PC, then all you need is listed below:

- One or more of the following software packages available from shareware suppliers or by downloading off the Internet for evaluation:- DL4SAW GSHPC (often know as DL4SAW) EZSSTV, ChromaPix.
- For DL4SAW GSHPC and EZSSTV: Interface Unit - built or kit (obtainable from many shareware suppliers) or print details from the floppy disk and build your own.
- Two-way serial switch box (optional see text).
- Screened leads to connect interface unit to receiver (single core screened), transmitter (2 core screened) and PC (multicore screened), 9 or 25 'D' connector to suit your PCs serial port. Note that the pin numbers used to connect to the interface unit will depend on whether you are using 9 or 25 pin connectors - see the circuits on the discs. Plug to suit your receiver's external speaker/headphone socket. Plug to suit your transmitter's microphone socket (depending on your rig, you may also need a separate plug for a PTT socket).(If you have any problems getting the appropriate plugs, try a main dealer/ importer of your equipment. You may be able to use some of your existing packet radio leads).
- For Chromapix and other sound-card software: Sound Card, screened leads and connectors to suit your soundcard and transceiver.

● Picture received on h.f. using EZSSTV shareware. Note that some modes do not operate in the shareware version of the software.

about 150 pictures, I came across a slight problem with the GSHPC shareware version, namely that it didn't seem to acknowledge the existence on disc of some pictures that I had already saved. However, the registered version removes this limitation.

Leaning Verticals

Having received a picture, don't worry if the verticals appear to be leaning to one side or the other. This is due to the GSHPC software not being calibrated to your PCs clock frequency.

By pressing F1, a red line will appear. Using the cursor control arrow keys it is possible to get this vertical line to lean by the same amount as the picture. Save the setting using Control + Enter and you'll be ready to receive subsequent pictures without leaning verticals.

Some of the other programs have automatic calibration facilities, although I found that this really was not difficult to do manually with the DL4SAW program - it's a lot easier to do than describe. I would suggest using signals from a number of stations on 3.5 or 14MHz to get a good setting.

Sending Pictures

One of the problems that I found initially was that I didn't have any pictures to send! Well, DL4SAW has even thought of this by including a handful of pictures on the shareware disc, together with some test cards, and a facility to generate your own text.

The Paint utility that comes as part of Microsoft Windows is quite adequate to 'edit' .BMP files. Those with more sophisticated graphics packages can use their artistic talents to the full. The GSHPC program in common with many other SSTV programs, is **NOT** a Windows program and should not be run under Windows.

If you have access to a PC scanner, a video frame grabber or one of the new digital still cameras you can easily produce your own pictures. Alternatively you can pay a visit to your local photographic shop with your favourite photos (prints, slides or negatives) and arrange for them to scan your pictures onto a CDROM.

● The ChromaPix control screen as displayed...ready to go (see text).

Make sure you specify that the pictures are for PC and not MAC, and that they are stored in .BMP or other format suitable for the SSTV software you are using. Don't forget copyright conditions, etc.

To send a picture, it has first to be loaded from disk into memory using the GSHPC software, which will display it on the left-hand side of the computer screen. When you're ready to transmit on a clear frequency, just press 'T' and the GSHPC software will switch your transceiver to transmit via the interface, and send the picture.

You can monitor the progress of your transmission by a horizontal line that slowly drops down the picture as each line is transmitted. Unlike s.s.b. phone signals, an SSTV transmission consists of long periods of sustained tones at unusually full modulation, so you may wish to reduce your power, to keep your transmitter's output stages within their recommended operating limits.

Excellent Club Project

I think it's always useful to compare notes with local stations when starting out in a new aspect of the hobby and SSTV can make an excellent club project. It can be a great way to attract visitors to a club exhibition stand. I hope you have been encouraged to try SSTV. It certainly has never been easier to get started!

Have a 'look' yourself , it's great fun and could breathe new life into the hobby for you. Good luck! *PW*

Suggested Reading

Slow Scan Television by **Mike Wooding G6IQM**, published by the British Amateur Television Club (BATC) 1992. This book includes details of how some SSTV standards can be run on a variety of non-IBM compatible computers and provides useful background to SSTV principles.

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ALINCO	DR-590 DUAL BAND MOBILE	£175.00
ALINCO	DR-605 DUAL BAND MOBILE TRANSCEIVER	£230.00
ALINCO	DX-70T 100W MOBILE / HF	£399.00
ALINCO	DX-70TH TRANSCEIVER	£475.00
ALPHA	87A FULLY AUTOMATIC AMP	£3,350.00
AMERITRON	QSK-5 2.5kw QSK SWITCH	£199.00
AOR	AR-2002 BASE SCANNER	£199.00
AOR	AR-3000A RECEIVER	£495.00
AOR	AR-5000 RECEIVER	£1,199.00
AOR	AR-7030 REMOTE CONTROL RECEIVER	£595.00
AOR	AR-8000 HANDY RECIEVER	£199.00
AOR	AR-8200 MK1 HANDY RECEIVER	£260.00
DAIWA	PS-120MK11 10amp PSU	£50.00
DAIWA	PS-304M11 20amp POWER SUPPLY	£85.00
DATONG	FL2 FILTER	£60.00
DIAMOND	GSV-3000 PSU	£100.00
DIAWA	CNW-518 2KW CROSS METER ATU	£199.00
DIAWA	ROTATOR MR-750U HEAVY DUTY	£250.00
DRAKE	DRAKE 2700 ATU 2.5KW (MINT CONDITION!)	£295.00
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ICOM	IC-207 DUAL BAND MOBILE	£210.00
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ICOM	IC-251E AC 2M Mulit-mode	£325.00
ICOM	IC-275H 2M 100W BASE TRANSCEIVER	£550.00
ICOM	IC-3J UHF MINI HANDY	£89.00
ICOM	IC-475E AC 25W MULTIMODE 70CM BASE	£525.00
ICOM	IC-706MK1 TRANSCEIVER	£499.00
ICOM	IC-706MK11 DSP TRANSCEIVER	£599.00
ICOM	IC-706MK11G (AS NEW!)	£799.00
ICOM	IC-725 HF MOBILE 100w	£400.00
ICOM	IC-728 HF MOBILE 100w	£425.00
ICOM	IC-729 TRANSCEIVER HF/ 50MHz	£425.00
ICOM	IC-735 HF 100W	£450.00
ICOM	IC-746 HF/50/2M 100w	£999.00
ICOM	IC-756 HF/6M BASE TRANSCEIVER	£1,050.00
ICOM	IC-W31E DUAL BAND HANDY	£175.00
ICOM	PCR-1000 PC RECEIVER SSB/FM/AM	£200.00
ICOM	PS-15 POWER SUPPLY	£100.00
ICOM	PS-55 PSU 20 amp	£120.00
ICOM	PS-85 POWER SUPPLY	£175.00
ICOM	R10 HANDY SCANNER	£199.00
ICOM	R2 HANDY RECEIVER	£110.00
ICOM	R-7000 25-2000MHz ALL MODE RECEIVER	£575.00
ICOM	R-72 RECEIVER AC	£450.00
ICOM	R-72 RECEIVER DC	£400.00
ICOM	R-75 RECEIVER	£450.00
ICOM	SP-21 EXTENTION SPEAKER FOR IC-706 etc	£45.00
ICOM	T8E HANDY 2/70/6m	£195.00
ICOM	W-21E DUAL BAND HANDY	£199.00
JRC	JR-535 RECEIVER	£675.00
JRC	JR-545 DSP RECEIVER	£999.00
KANTRONICS	KAM PLUS TNC	£220.00
KENWOOD	AT-200 ATU	£125.00
KENWOOD	AT-230 ATU	£140.00
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KENWOOD	TL-922 LAST SERIAL No. (MINT!)	£999.00
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KENWOOD	TS-140S HF 100W BASE/MOBILE	£399.00
KENWOOD	TS-680 HF 6M BASE/MOBILE	£395.00
KENWOOD	TS-690 SAT TRANSCEIVER HF/6M	£695.00
KENWOOD	TS-811E 70cm MULTI MODE TRANSCEIVER	£400.00
KENWOOD	TS-850 SAT 100w HF BASE TRANSCEIVER	£850.00
KENWOOD	TS-870 DSP HF/BASE TRANSCEIVER	£999.00
KENWOOD	TS-940SAT HF BUILT IN ATU BASE	£750.00
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KENWOOD	VFO-180 VFO	£60.00
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LOWE	HF-225 RECEIVER	£225.00
MAYCOM	AR-108 AIRBAND HANDY	£50.00
MFJ	1278 TNC Incl SSTV	£225.00
MFJ	MFJ-259B ANTENNA ANALIZER	£175.00
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MFJ	MFJ-962 1.5KW ATU	£175.00
MFJ	MFJ-989 ATU 3KW INPUT	£220.00
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YAESU	FT-690MK11 6M MULTI-MODE TRANSCEIVER	£295.00
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The TS-2000 HF, VHF and UHF Transceiver

So much technology is packed into the new Kenwood TS-2000 that two *PW* staff have had to share this review! Tex Swann G1TEX looks at the v.h.f, u.h.f. and computer aspects while Rob Mannion G3XFD leads off with his h.f. evaluation.

I've waited for a very long time to try out the recently introduced Kenwood TS-2000 but this is understandable when you consider just how much design work has to be put into modern transceivers. The results of Kenwood's endeavours is such that to be fair to the transceiver and to keep readers as fully informed as possible, this equipment evaluation is being presented by two *PW* Staff.

Tex Swann G1TEX, *PW's* Technical Projects Sub-editor will be presenting his opinions on the v.h.f. and u.h.f. aspects of the transceiver together with comments on the accompanying computer software, etc. I on the other hand, will concentrate on my h.f. work with this very interesting transceiver.

What's On Offer?

So, to start off my evaluation of the latest transceiver to come from Kenwood TS-2000 I'll describe just what's on offer. However, I'll try to avoid the list-all-the-details and specifications approach (intending purchasers can read those at a dealer's) and try to present you as much information in a concise form before passing on my opinions on the TS-2000. I say this because reviews are all about opinions aren't they?

The Kenwood TS-2000 is an all-mode transceiver covering - as supplied - all the Amateur Radio bands from 1.8 to 430MHz and includes an automatic antenna tuning unit (a.a.t.u.) as standard for h.f. and 50MHz. Further coverage can be added, using an operational module to enable the transceiver to operate on the 1.3GHz (23cm) band.

The main transceiver receiver circuitry is a quadruple conversion superhet on a.m., c.w. s.s.b. and frequency shift keying (f.s.k.) modes and uses a triple conversion on narrow band f.m. (n.b.f.m.). The sub receiver is based on a double conversion superhet for the a.m. and n.b.f.m. modes.

General coverage reception is quoted as starting from 30kHz.

Kenwood UK's user-friendly TS-2000 which Rob G3XFD considers to be a worthy stablemate for the TS-870.

However the receiver I had tuned to below 30kHz and Kenwood confirm that this will normally be the case

Intermediate frequencies (i.f.s) for the quadruple conversion superhet main receiver are as follows: The first i.f. on the general coverage range (300kHz to 60MHz) is 69.085MHz or 75.925MHz (the i.f. is selected automatically when satellite mode operation is in use). For 144 and 430MHz the first i.f. is 41.894MHz and for the 1.2GHz band it's 135.495MHz.

The second i.f. is 10.695MHz, the third is 455kHz and the fourth is 12kHz. On the sub-receiver (dual conversion) the first i.f. is 58.525MHz and the second is 455kHz.

The transceiver is provided with dual high speed digital signal processing (DSP) facilities. These provide high speed automatic gain control (a.g.c.) and fully adjustable filters down to 50Hz for c.w.

Maximum transmitter output is 100W on c.w., s.s.b. f.s.k. and n.b.f.m. on all bands from 1.8 to 144MHz. Maximum output is quoted as 50W on 430MHz and 10W on the 23cm (1.2GHz) band. Minimum quoted power output on h.f., 50 and 144MHz is 5W, and 1W on 1.2GHz.

The maximum quoted power output on amplitude modulation (a.m.) 25W on 1.8 to 144MHz and 12.5W on 430MHz and 1W on 1.2GHz. The minimum on h.f., v.h.f. and u.h.f. is 5W and the lowest output available on 1.2GHz is 1W.

Other important features include: a built-in 9600/1200bps TNC for DX packet cluster tune (PCT). There's also an Instant Satellite communications key.

Switching On

In my opinion the **acid test** for the ever increasingly complex equipment arriving on the Amateur Radio market is switching on the unit for the first time. In my experience this can be a process fraught with difficulty, but it wasn't so with the FT-2000 because it only took a moment and was achieved

Fig. 1: Close up view of the very clear, simple and straightforward l.c.d. main display, showing the multi-function meter. The selected DSP filter parameters are displayed under the Filter logo in the form of bargraph segments (see text).

without referring to the manual - quite remarkable when you bear in mind the complex nature of modern equipment! However, the supplied manual **is really excellent** and to get the best out of the transceiver many features **it really is required reading!**

Once the transceiver was on I was greeted by the synthesised voice from the (optional) built-in unit which told me the frequencies. Normally I'm not happy with these annoying voices but this one was very friendly, and did not seem to have an accent.

And (unlike Tex who told me he switched it off!) I found the facility very helpful when tuning around as I worked. Undoubtedly, I feel that operators who have no sight at all, or more commonly have failing sight, will find the facility very helpful.

The TS-2000's large l.c.d. main panel and display is excellent. It's extremely clear, with a light yellow-buff coloured background, and due to its size I think that the digital frequency display is ideal for anyone with visual problems. The multi-function l.c.d. meter is also very useful, clear and has many functions.

In use I found that the front panel display showing the settings on the DSP filtering to be excellent. Tailoring the filter to your own satisfaction is made so much easier because you can see just what configuration has been selected.

At first I wasn't too sure about the front panel ergonomics and the general lay-out of the controls - bearing in mind that I'm an enforced left-hander of course! However, despite this I was soon feeling very much at home when operating the transceiver at home and to a very limited extent - when operating from my car in the portable mode.

Incidentally, although I feel that Kenwood have thought of this transceiver generally as a main station rig...it's my opinion that it will prove very useful for portable operation. It's just the right size for either option as far as I'm concerned.

Kenwood have obviously put a great deal of effort into designing a good front panel. I'm very impressed and felt very much at ease during the hours I had the transceiver on the air. So, with that reminder it's time to recount just how much I enjoyed using the '2000 on the bands.

Fig. 2: Inside top chassis view. Note the relatively large loudspeaker which provides excellent audio quality on Amateur transmissions and broadcast stations (see text).

On The Air

It was my intention to carry out some of the on-air testing from home and enjoy longer spells from my preferred h.f. portable site at Holt Heath near Wimborne. However, the spreading tragedy of the Foot and Mouth disease put paid to any ideas of extended h.f. portable operations. Despite this, I managed one afternoon and several evenings on the way home from the office.

With the facility of running at reduced power I found that the '2000 did very well indeed from my car. In fact it's small enough to place above the instrument panel, directly on the driver's side of the windscreen. What a delight it proved to be!

Using the TS-2000 from the car proved to be a great idea and I had QSOs with stations all over the UK and into Ireland and far beyond on both c.w. and s.s.b. Incidentally, the built in electronic keyer meant I didn't need to take my own keyer unit, all I needed was my paddle (I'm finding a straight Morse key difficult at the moment due to my arthritis). I've no adverse comment whatsoever about the built-in keyer, it was ideal for me and the menu control, like all the menus on the transceiver seemed exceptionally easy to use even for this dinosaur of a Radio Amateur!

Operating mostly on 7, 14 and 18MHz - with short excursions to 3.5 and 28MHz, I quickly found that the receiver was excellent, with the added support of the very efficient DSP facilities for difficult conditions. However, on my favourite band of 7MHz I found that the DSP really came into its own - proving to be superbly effective.

And up on 14MHz the annoying QRM from packet stations operating almost directly on the 14.1MHz cw. beacon frequencies was dramatically reduced. Even under the worst QRM I found it possible to copy the fairly low power beacons - despite the best efforts of the h.f. packet transmission to drown them out!

Operating from my home I found that conditions on 7MHz were difficult enough to put a strain on my own base-station transceiver which is used with a W9GR DPS -II unit. Normally, I find that this little add-on unit works extremely well with any of my own transceivers which range from two to over 20 years old, but conditions were so difficult that the W9GR unit did not have the flexibility of the DSP provided on the TS-2000.

On c.w. I soon found that the claim of brick-wall selectivity provided by DSP filtering was again proved right. I'm sure that once they've tried it out, even the most experienced c.w. operator will be most impressed with the flexibility and effects of the DSP filtering on c.w.

Despite my praise for the effect of DSP on the c.w. mode, I feel that the most spectacular effect for the operator has got to be the improvement if offers on s.s.b. QSOs - especially on 7MHz, and particularly 3.5MHz during the evenings. This was clearly demonstrated on several weekends when I either listened into, or joined in with, the Worked All Ireland net

Fig. 3: Under chassis inside view.

Fig. 4: Rear panel view of the TS-2000 (see Tex Swann G1TEX's review comments).

Fig. 5: Starting the installation process for the ARCP-2000 software, standard with the TS-B2000 'black-box' version of the rig, but a useful optional extra with the TS-2000E.

on 7.068MHz - here the help of the DSP was remarkable, reducing noise, splatter from nearby channels and generally assisting in the reception of the relatively low level signals from mobile stations very effectively indeed.

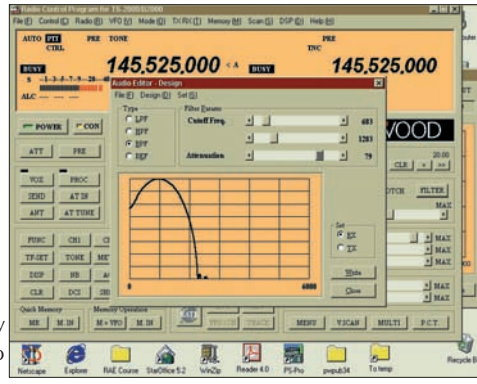
Listening for long periods, whether it be Amateur transmissions or h.f. broadcast stations, was made much easier by the DSP. A far cry from the switchy-sounding audio effects I first reported on a few years ago when reviewing DSP equipped transceivers.

The audio quality reports I was able to provide pleased me and the stations I worked. Additionally (a very important test I think) a number of stations commented that my voice was very recognisable. An excellent compliment to communications quality radiotelephone s.s.b. speech I feel!

Tex Swann's Opinion

So, now it's Tex Swann G1TEX turn to give his opinion on the TS-2000. To begin he provides his own quick overview of the complete transceiver package.

"I was asked to have a look at the v.h.f. and computer control side of the TS-2000 and to voice my opinions and comment. So, what did I find? Well, I found a rather pleasing rig, that is not only a very capable radio, but can also receive from v.l.f. through the short wave bands, and includes the 144 and 430MHz bands.



Design your own audio filter. This one, G1TEX designed earlier is suitable for a c.w. session.

Anyone who would like to try the new v.l.f. band might need to look no further. The receive side starts at 300kHz and goes right through to 60MHz without a break. But that's the receiver side, the transmit capabilities are almost as good. covering, with the exception of 70MHz, all the amateur bands from 1.8 - 430MHz.

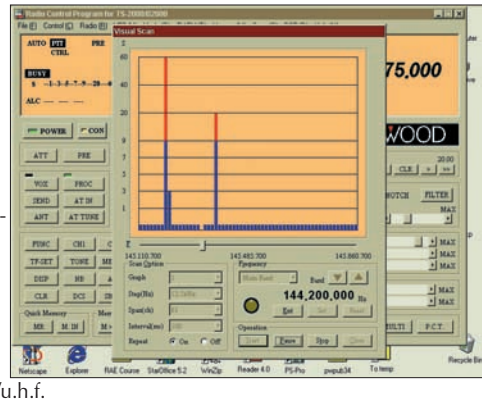
The TS-2000 seems to break the Amateur Radio bands into two main areas. There's the h.f. band (which on the TS-2000E includes 50MHz) and the v.h.f./u.h.f. bands, cover 144 and 430MHz.

The 1.2GHz (23cm) band will drop neatly into this latter section if the optional 1.2GHz module is fitted. But sadly there doesn't look as if there will be a 70MHz option, falling as it does, between the two major area of Amateur activity.

The antenna sockets on the back panel seem to reflect the band layout. Socket labelled Ant 1 and Ant 2 cover the h.f. bands, both cover 0-60MHz - operator choice. Though they seem to be interchangeable, in reality one of the outlets would be for the real h.f. bands of 1.8-28MHz bands and the other could feed a 50MHz specific antenna.

Both the 144 and 430MHz bands have their own non-selectable dedicated antenna output sockets. This would also apply to the optional 1.296GHz unit, for which there is a space for its antenna outlet marked on the back panel.

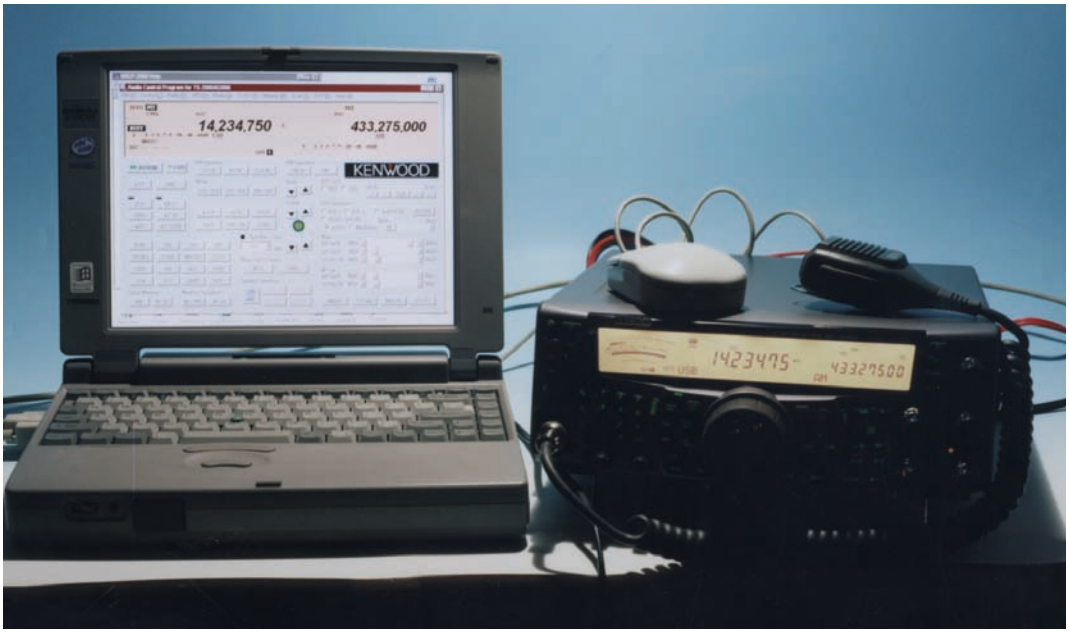
While trying out the TS-2000, I spent a little time just using it as a receiver, where I found it to be a creditable one at that tuning continuously from l.f. to 60MHz, rolling round at either end. But the v.h.f. and u.h.f. bands started and ended with Amateur frequencies



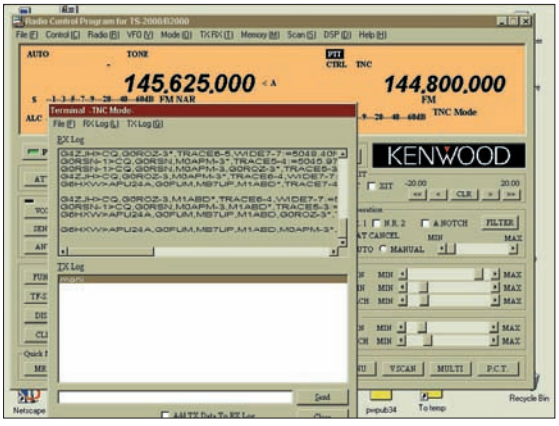
The virtual scan facility in use showing signals and their levels. This display is to be treated with caution, the strong signal was only present momentarily though, looking like a single signal, but in reality it could be heard almost anywhere in the band.

only. Again rolling round at both ends of the bands.

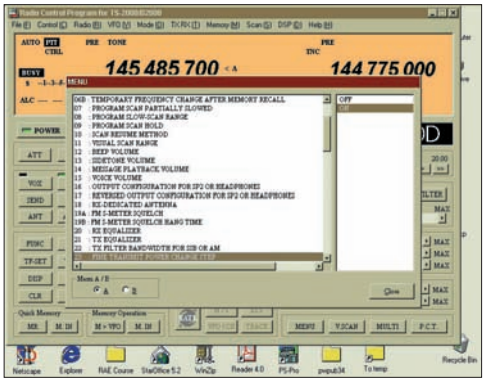
I found little to complain about while listening on h.f., but I found the v.h.f. reception a little prone to a rather powerful data mode



● Using the built-in T.N.C. to monitor what is being sent over local APRS transmissions.



● Access to the TS-2000's menus is made very much easier using the ARCP-2000 software.



transmitter not too far away from my QTH (it's not the first rig that's had problems at my location). I suffered no problems on u.h.f. and I was impressed with the clean 100W output from h.f. to 144MHz and with the 50W available on u.h.f. I am unable to comment on 1.2GHz as the module was not available.

Wide band reception is also available as a dealer modification. The modifiction provides airband (a.m.) and marine band.

Conversation With Locals

In conversation with a group of amateurs local to myself (10-30km) I had favourable comments from **Roger M0AUI**, **Steve G0TOT** and **Mark 2E1CEQ** using both 144 and 430MHz.

So, with the minor niggle of the data transmission breakthrough, I found that the TS-2000 is a pleasant to operate rig that both implies and delivers quality in all things.

Computer Software

I also had the optional ARCP-2000 computer software to fully control all the functions of the TS-2000 from a nearby computer. The ARCP-2000 software package can, as you would expect, replicate all the function buttons of the front panel. The ARCP-2000 software is an option with the standard TS-2000, but is part of the remote control head version, the TS-B2000.

I found the programs ran quite smoothly on my P90 laptop computer, talking to the rig at up to 56Kb to control it. The software also allows you to do clever things like create your own parameter DSP filters, and to apply them to particular modes and bands on both transmit or receive. It also make tuning very much simpler and quicker.

● Fig. 6: In use the screen image mirrors much of what may be seen on the TS-2000's screen, but allows easier access to the workings so the rig.

Another trick, is that the software can drive the TS-2000's on-board packet TNC. Although I've been a supportive member of my local packet radio group for many years, it's almost that long since I've used the mode!

So, I had to try and remember how to drive the TNC from the keyboard. Packet operation was otherwise faultless (apart from my own memory) though I'd like to see text wrap in the window on the next version.

I found the virtual scan function very useful to get an insight in to what frequencies were in use on the spectrum plot display. Though the step-rate was, I felt, rather slow when a wide band of frequencies was being scanned, but very useful nonetheless!

An additional piece of software that is currently in Beta test and should be freely available soon, is MCP a memory control panel, which allows you to read, write and upload the 300+ memory locations of the radio. So, that's it from me and now it's back to him" (The Editor!).

In Rob's Shack?

So, in rounding off this review it's time for my opinions. Will the TS-2000 be found in my shack? The short answer is yes, this transceiver appeals to me very much indeed in looks, facilities, performance and general user-friendliness. This is helped by an excellent easy-to-understand manual.

I still think that in its class the Kenwood TS-870 main station transceiver is a hard act to follow - but the TS-2000 is an excellent stablemate as it's more portable and much easier to use (the '870 offers superb results but can take some getting used to). In my opinion I think that the '2000 will become very popular because it also performs extremely well on the bands, is extremely easy to use and falls into the **I-can-take-it-anywhere category**. PW

Product

The Kenwood TS-2000 all-mode multi-bander

Pros & Cons

Pros: *Extremely easy-to-use and fits the can-take-anywhere category.*

Cons: *At first G3XFD found styling took a bit of "getting used to".*

Summary

Well done again Kenwood! I thoroughly enjoyed using the TS-2000 and I thank Dave Wilkins G5HY of Kenwood UK, Kenwood House, Dwight Road, Watford, Hertfordshire, for the loan of the review transceiver.

Accessories

Voice synthesiser unit (VS-3), DSP-compatible desktop microphone(MC-90)

Price

The TS-2000 recommended price within the UK is £1699.95

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Supplied with microphone & DC Lead *optional FM board required

YAESU FT-817

• HF/6/2/70
• Transportable - Batteries
• 5W
• Wide Band RX
• All mode

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ZERO DEPOSIT!
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• HF/6/2/70
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• 100W HF/6 50/40 2/70
• All mode
• Remote Head

RRP £1299
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ZERO DEPOSIT!
36 * £31.55

YAESU FT-90

• 2/70
• Handie
• 50/35W
• Remote Head
• Micro size

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• 2.5W
• Wide RX

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- 100W
- All mode
- DSP

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ML&S £1399
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KENWOOD TS-570DGE

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- Mobile/Base – 13.8V
- 100W
- All mode
- DSP

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ML&S £849
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36 * £31.55

KENWOOD TMD-700E

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- Mobile – 13.8V
- FM + APRS + Packet
- Remote Head

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ML&S £439
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- 100W
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- 100W
- All mode
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- HF/6/2/70
- Mobile – 13.8V
- 100/100/50/50
- All mode
- DSP
- Remote Head

RRP £1299
ML&S £1099
ZERO DEPOSIT!
36 * £40.84

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- Base – 13.8V
- 100/75/10
- All mode
- DSP

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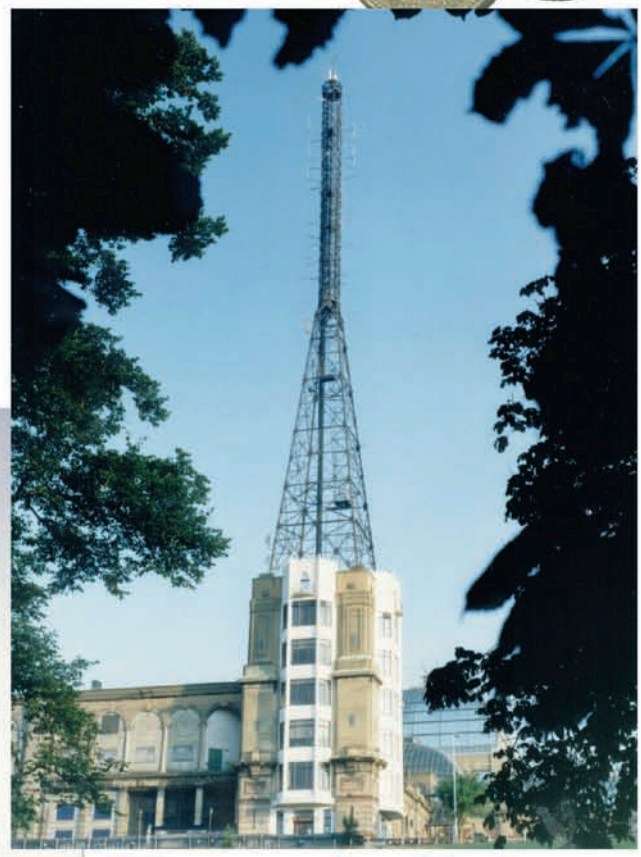

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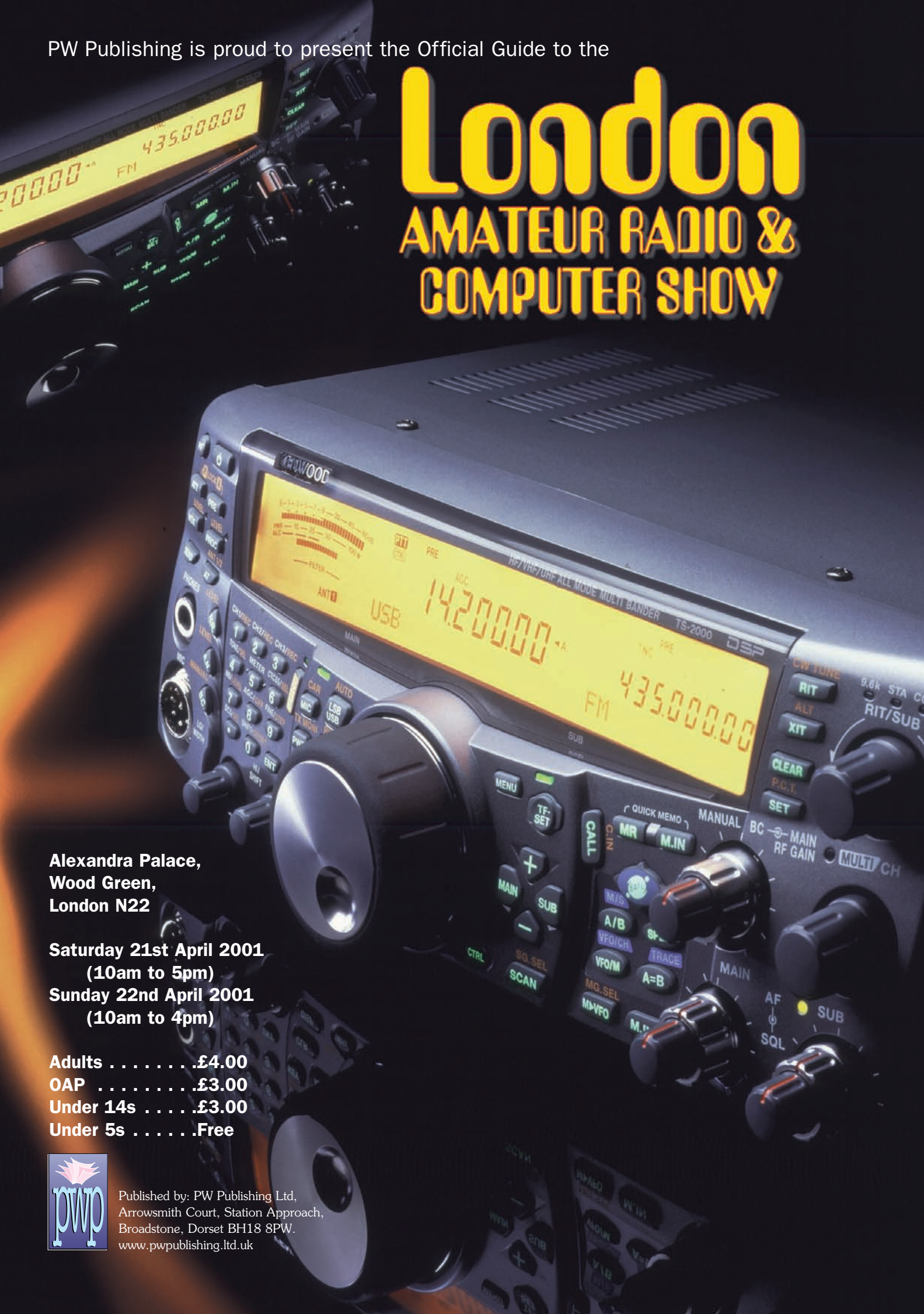

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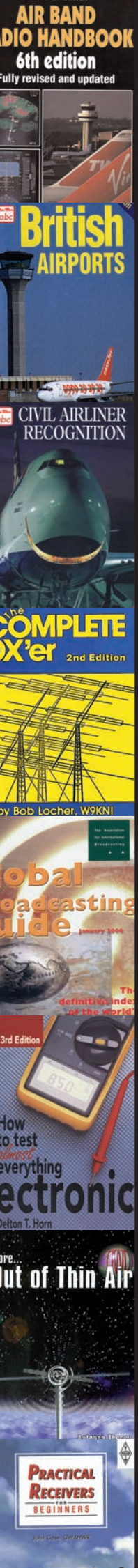

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Behind the Scenes

London Radio & Computer Show
Saturday 21st & Sunday 22nd April 2001

In 1990, when RadioSport created the London Radio & Computer Show at Picketts Lock, enthusiasts came from all over Britain and the Continent. This year it has moved venue, the original venue is soon to be closed down to make way for sporting facilities. Alexandra Palace has modern facilities, well-illuminated halls, easy access for the traders unloading for the show, extensive free parking and courtesy buses to take you from the car park to the door. For in depth travel information, see the Travel Information Section.

Bring & Buy

The Bring & Buy is run by the Southgate Amateur Radio Club. The Club makes a commission charge of 10% of the final sale price for each item sold. The minimum charge is £1.

Each unsold item will be subject to a handling charge of £1. Unsold items of equipment must be collected by 3.45pm on Sunday 22nd. Any items not collected will be auctioned with all proceeds going to the Club.

If a minimum sale price is stated on the registration form, the Club may negotiate a sale price with a potential customer. This price will be as close as possible to the asking price for the item, gradually reducing as time passes.

What's around

Alexandra Palace Garden Centre: If someone in the family is into gardening why not drop them off at the Garden Centre in Alexandra Palace Way. Having just finished a major re-fit, the garden centre has a wide range of plants, garden accessories and furniture. Open 9am to 6pm on Saturday and 10.30-4.30pm on Sunday. Tel: 0208 444 255 for more details.

The beautiful 196 acres of parkland surrounding Alexandra Palace offers entertainment for the rest of the family too.

Boating Lake and Café: Rowing boats & pedal boats. At the north-east corner of the park. For further information call: 020 8889 9089.

Pitch and Putt Golf Course: 18 hole course plus 9 hole children's crazy golf course on the south slopes of the park. Open 10am to dusk. Last tee-off 2 hours before dusk. (closed during winter) Tel: 0771 429 6095.

Conservation Area: Located in the south-east corner of the park, near the Wood Green entrance. The conservation area is managed by the conservation officer who is available to lead guided tours and open the information centre. For further information Tel: 020 8444 7696.

Animal Area and Enclosure: Situated to the right of the boating lake - with donkeys and deer.

Children's Playground: Swings, sand pit and slide - supervised during school holidays. Open all day. Situated to the left of the boating lake.

Northern Section of Parkland Walk: Starts close to the Grove (in Muswell Hill) through to the northern edge of Highgate Wood. For further information call: 020 8348 6005.

Travel Information

The North: Take A1 towards London. Join A406 (North Circular Rd) eastbound for 2 miles. Take exit slip road for B550. Read Approach A.

The North West: Take M1 towards London. Leave at junct 2, joining A1 southbound for a short distance. Join A406 (North Circular Rd) eastbound for 2 miles. Take exit slip road for B550. Read Approach A.

Oxford: Take M40, then A40 towards London. Join A406 (North Circular Rd) clockwise, 9 miles to run. Take exit slip road for B550. Read Approach A.

The West: Take M4 towards London. Join M25 clockwise, leave at junct 16, joining M40 towards London. At end of the M40 continue straight on A40. Join A406 (North Circular Rd) clockwise, 9 miles to run. Take exit slip road for B550. Read Approach A.

The South West: Take M3 towards London. Join M25 clockwise at junct 12, leave at junct 16, joining M40 towards London. At end of M40, continue straight on A40. Join A406 (North Circular Rd) clockwise, 9 miles to run. Take exit slip road for B550. Read Approach A.

Guildford: Take A3 towards London. Join the M25 clockwise at junct 10, leave at junct 16, joining the M40 towards London. At end of M40 continue straight on A40. Join A406 (North Circular Rd) clockwise, you have 9 miles to run. Take exit slip road for B550. Read Approach A.

Surrey/Sussex: Join M25 clockwise. Leave M25 at junct 16, joining M40 towards London. At end of M40 continue straight on A40. Join A406 (North Circular Rd) clockwise, you have 9 miles to run. Take exit slip road for B550. Read Approach A.

Approach A: Turn right onto B550 (Colney Hatch Lane) towards Muswell Hill. After 1.2 miles you will come to the roundabout at Muswell Hill (buses park in the middle). Take second exit, where you join A504 (the road called Muswell Hill). Turn left at traffic lights at foot of the hill, into the car park of Alexandra Palace.

South & Central London: Proceed via Waterloo Bridge and underpass. Take A1 through Euston, Camden Town, Kentish Town, Archway and Highgate. Turn right into Shepherds Hill (marked to Hornsey). At end of Shepherds Hill, turn left onto A1201 (Park Rd). At end of Park Rd, go straight on at traffic lights (complex junction) into car park of Alexandra Palace.

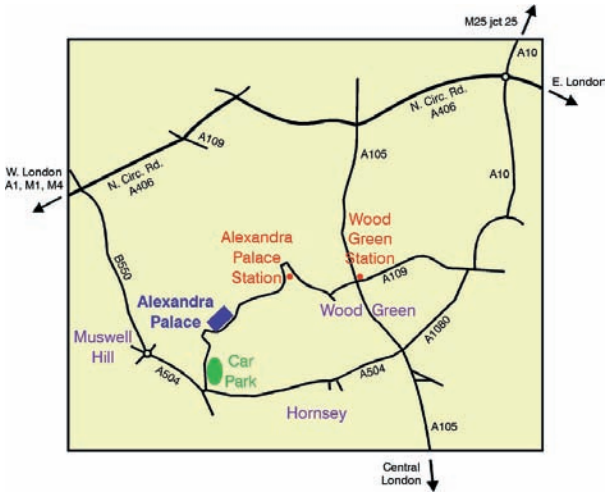
The South East: If approaching from M20 or M2, proceed via Blackwall Tunnel. Follow A12 and join A406 (North Circular Rd) anti-clockwise. Take exit slip road at A10 interchange. Read Approach B.

The East, North East & Cambridge: Join A406 (North Circular Rd) anti-clockwise. Take exit slip road at A10 interchange. Now read Approach B.

Approach B: Join A10 (Great Cambridge Rd) southbound. Turn right onto A1080 (The Roundway), towards Muswell Hill. At end of The Roundway, turn right onto A104 (Lordship Lane), then almost immediately left onto A1080 (Westbury Ave). Proceed along Westbury Ave, crossing A105 (Green Lanes) at Turnpike Lane station. You are on becomes Turnpike Lane, then High Street Hornsey, then Priory Rd. Turn right into the car park of Alexandra Palace (complex junction) at the traffic lights which are at the foot of Muswell Hill.

A courtesy bus will be available for those unable to take the short (but steep) walk from the car park up to the Palace entrance.

By public transport: The nearest underground station is Wood Green (Piccadilly Line). The nearest overground station is Alexandra Palace (trains start at Moorgate on Saturday and Kings Cross on Sunday). In each case, a W3 bus will take you from the station to the door.



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RSGB	WH	BF
Sandpiper	WH	WG
Satellite City	WH	WB
SGS	WH	BD
Strikalite	WH	AH
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Sycom	WH	AD
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Waters & Stanton	WH	WJ
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WH Westlake	WH	BD
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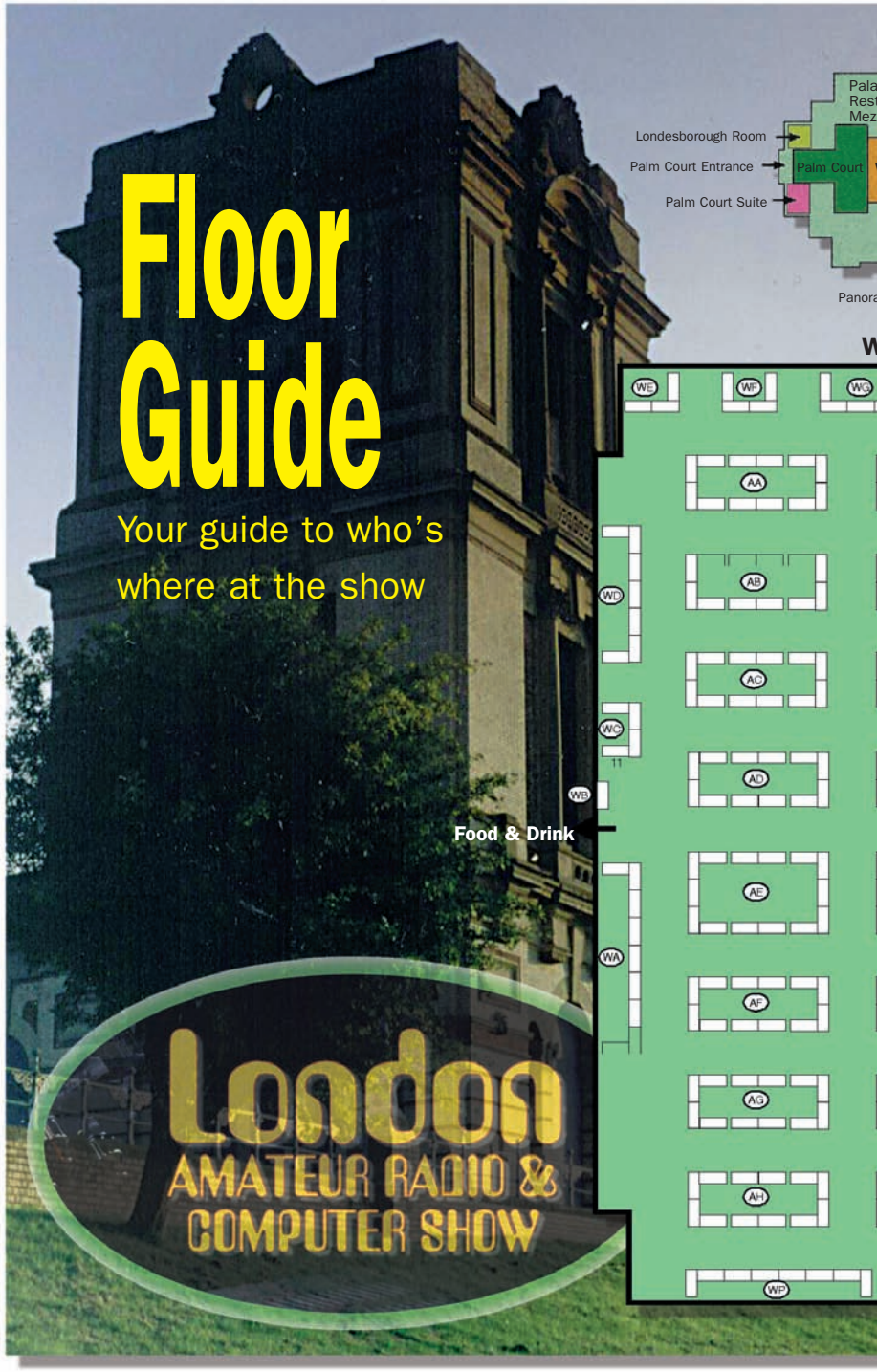

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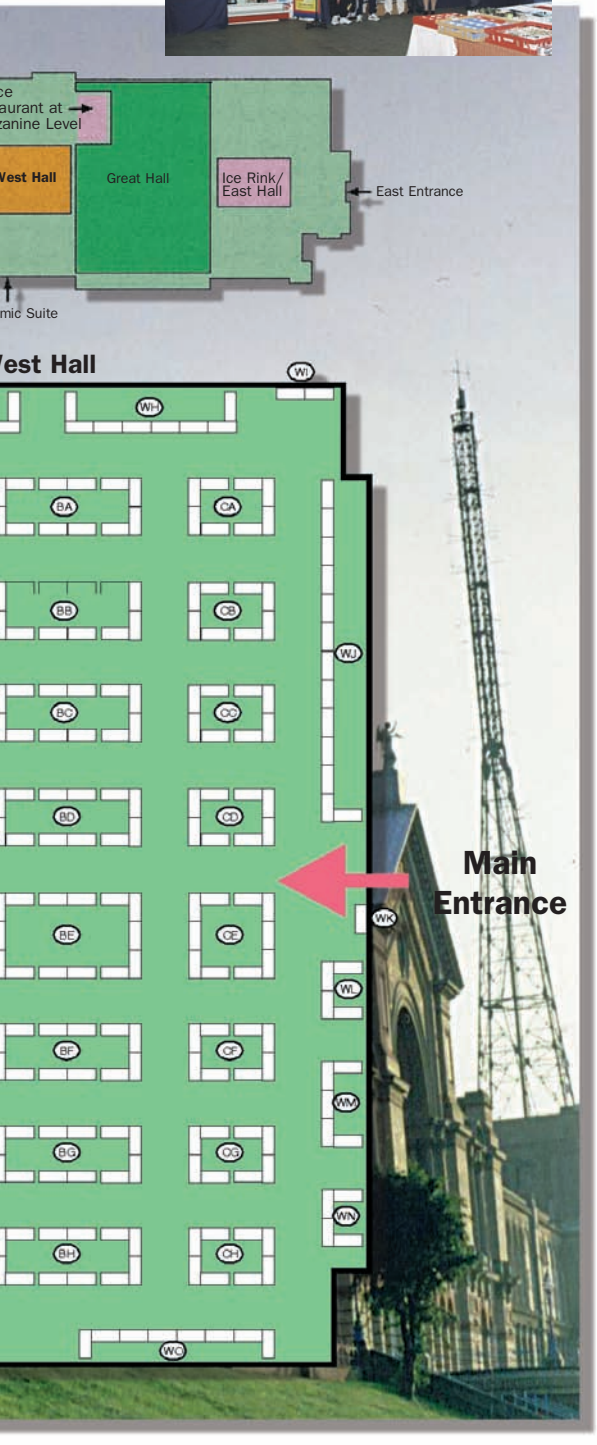


More About the People's Palace

Alexandra Palace first opened in 1873 as 'The People's Palace' to provide the Victorians with a great environment and recreation centre. Situated in 196 acres of parkland, with spectacular views over the Capital, the Palace, joined by a branch line of the Great Northern Railway to Highgate, attracted thousands of people who came by train, carriage or on foot.

Sixteen days after it opened, when 124,000 people had visited the Palace, it burned down as the result of a fire in the dome which could not be extinguished. On 1st May 1875, less than 2 years after the destruction of the original building, a new Palace opened. Covering 7 acres, it was centred on the Great Hall, which seated 12,000 people in addition to the 2000 in the orchestra stalls, beneath the mighty Willis Organ which was driven by two steam engines and vast bellows.

In other parts of the Palace, there were displays of painting and sculpture, exhibitions, a museum, lecture hall and library, banqueting rooms, a 3500 seater concert room which was subsequently turned into a roller skating rink and a theatre capable of seating 3000.

The cost of the Palace including materials, building and grounds amounted to £417,128. The Park had a popular race track, a trotting ring, cricket ground, ornamental lakes and a permanent funfair.

Its popularity continued unabated until the end of the Century. After certain financial difficulties, an Act of Parliament in 1900 created the Alexandra Palace and Park Trust, which was administrated by the local authorities in the area. The Act required the Trustees to maintain the Palace and Park and make them, subject to several provisions, "*available for the free use and recreation of the public forever*". From this point, the Palace continued to develop its organ concerts, shows, exhibitions and other events.

First television broadcasts

In 1935, the BBC leased the eastern part of the building from which the first public television transmissions were made in 1936. Alexandra Palace was the main transmitting centre for the BBC but after 1956 was used exclusively for the news broadcasts.

On 10th July 1980 some 6 months after the transfer of trusteeship to Haringey Council, the Palace caught fire for the second time. An area comprising the Great Hall, Banqueting Suite, and former roller rink together with the theatre dressing rooms was completely destroyed. This represented just under half the total building (143,00ft sq of a total 329,00ft sq). The area occupied by the BBC was not damaged nor was Palm Court. It was immediately decided to proceed with rebuilding, with funding partly from the GLC dowry and partly from the anticipated insurance settlement.

Restoration work

There was much public interest in the proposed development and the planning application for the revised scheme was called in by the Secretary of State. A Public Inquiry was held at the Palace in February - May 1982. There was then considerable delay in receiving the outcome of the Inquiry which was not released until August 1983. Development and restoration work began soon after phase one of the Palace was re-opened on 17th March 1988. It continues as a Charitable Trust administered by the London Borough of Haringey.

The Palace has built a reputation as one of London's premier venues. With its unique qualities it offers stylish and versatile facilities. With its beautiful setting with panoramic views of London, stunning architectural features and well proportioned halls, the Palace is now a very popular choice for both corporate and private events including a regular choice of public and trade exhibitions.

The additional leisure facilities which include the Ice Rink, Phoenix Pub, Boating Lake, Children's Playground and many other areas of interest provide year round entertainment for everyone. **(Thanks to the Alexandra Palace website for the information - www.alexandrapalace.com)**

Book your historic tour

Tours of the historic television studios are available and can be pre-booked if you want. Telephone 020 8365 2121 during office hours to book a tour of the original BBC television studios and the site of the first television broadcast. Please note that children must be accompanied and that no children under 12 years are permitted.

show news

Ink spot

Office 21 International will be taking their full range of inkjet cartridges for most Epson, Canon and HP printers. Prices start at just £5.95 for a black Epson cartridge.

They will also be stocking a range of refill kits, and other printing accessories.

Office 21 International, Tel: 01202 687191.

Components galore

Sycom will have a bigger than ever display of components available for visitors at the London Radio & Computer Show. If you're still searching for that vital components to finish your projects, drop by and check out the range on display.

A Mail Order service is offered and there will be some catalogues at the show. If you're looking for components you can always telephone to see what's in stock.

Sycom, Tel: 01372 372587.

TECH SUPPORT

A friend had a brilliant idea for saving disk space. He thought if he put all the Word documents into a tiny font they'd take up less room. When he told me I was with another friend, she thought it was a good idea too!

Agile Tools

Agile Tools will be showing some of their large range of small hand tools for the electronics enthusiast. Other things to look out for are taps and dies, some small screws and fixings, quartz crystals, thermal sensors and switches.

They also hope to have a demonstration model of a variable speed screw cutting lathe that will retail at £399 plus VAT.

Long masonry drills, SDS drills, lathe tools, HSS drills, inspection mirrors, surgical scissors, scalpels, etc., are all available from the company. So if you enjoy electronics and need somewhere to find all those elusive tools and accessories, drop by the Agile Tools Stand.

Agile Tools, e-mail: AgileTools@aol.com or Tel: 07956 440480 (between 10am and 7.30pm).

Back for a 3rd time

Ronal Computers are attending the London Radio & Computer Show for the 3rd successive year. Look out for their stand with the distinctive red logo, where you will find a wide range of computer systems, components and peripherals at competitive prices. Both Alex and Stephanie Rugen, who usually man the stand, are hoping the new venue will be as successful as Picketts Lock.

Since last year, the two Southport shops have amalgamated into the new-look Bispham Road Branch with a large showroom and increased parking facilites. A new shop has been opened in Maghull, Merseyside.

Ronal Computers are certified AMD Resellers and registered Intel Product Integrators and, as such, are able to offer helpful advice on system building.

Ronal Computers Ltd., Unit 1, 161-163 Bispham Road, Southport, Merseyside PR9 7BL. Tel: 01704 507808. www.ronal.co.uk

Plenty to see

Jeff Stanton and the crew from W&S are looking forward to returning to Alexandra palace where they last exhibited many years ago before the venue burnt down. They will be bringing their full exhibition display so they can promote many new products die this Spring. In particular from Yaesu the new FT-817 portable rig and the VR-5000 scanner.

From Kenwood the new TS-2000 multiband transceiver and from Icom the new IC-910 VHF/UHF base radio. AORs AR-8600 scanner will be on show with the latest hand-held scanner from Yupiteru, the MVT-7300.

New products from Radio Works, MFJ and HyGain and their new 2001 catalogue will give visitors plenty to see on the W&S stand.

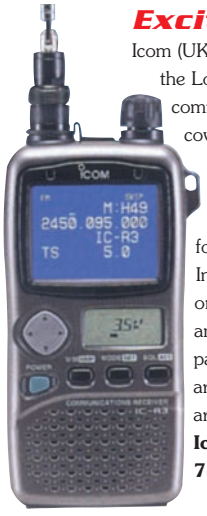
Waters & Stanton PLC, 22 Main Road, Spa House, Hockley, Essex SS5 4QS. Tel: 01702 206835. www.wsplc.com

All Your Antenna Requirements

Whether you're looking for a ready-built antenna or connectors and the components to build your own, Sandpiper Communications have a wide range available. From beams to whips and from VHF down to HF, whether you're looking for a base antenna or a mobile complete with the mag mount Sandpiper will be able to advise on the best option for you.

Sandpiper Communications, Unit 5/6 Enterprise House, Canal Road, Aberdare, Mid-Glam CF44 0AE. Tel: 01685 870425.

Exciting new products



Icom (UK) Ltd will have the UK version of the long-awaited R3 available for visitors at the London Radio & Computer Show to see. The R3 is a hand-held communications receiver with a 2in TFT colour LCD built-in. With a frequency coverage of 0.495 to 2450.095MHz there's not much that this can't see or hear! It also has 450 memories yet weighs just 300g. The display doesn't just show TV pictures, it also acts as the signal strength level indicator, a bandscope and shows the operating status. Icom expect the receiver to retail for approximately £450.

In addition they will have the IC-910H VHF/UHF all mode amateur transceiver on display. The radio has 100 watts of output power on 2m (75W on 430MHz and 10W on 1200MHz). There are two data sockets for simultaneous two-band packet communications and, in the satellite mode, the down/up link frequencies are displayed on the MAIN and SUB band respectively. Expected to retail at around £1300 it's sure to be a talking point at the show.

Icom (UK) Ltd., Sea Street, Herne Bay, Kent CT6 8LD. Tel: 01227 741741. www.icomuk.co.uk

S

Practical Wireless News
Arrowsmith Court, Station Approach,
Broadstone, Dorset BH18 8PW
e-mail: donna@pwpublishing.ltd.uk

Kenwood's All-mode multibander on display

Readers interested in amateur radio will be pleased to hear that the TS-2000 will be on show on the Kenwood Electronics UK stand, and available from several Kenwood approved dealers at the show too!

This all-mode multibander is packed with features, yet compact enough to use at home, in your car or on a DXpedition of field trip. It has a contoured front panel and large amber display for easy reading. Covering the HF bands, 50, 144, 430 and 1200MHz and offering up to 50W depending upon the band the TS-2000 can also receive two frequencies simultaneously.

As you would expect with a receiver of this type, it has many additional features such as satellite mode, a built-in antenna tuner, DX cluster tune and an antenna terminal dedicated to HF low band reception. Optional extras include a mobile controller and radio control software.

The unit is also available as a 'black box' version so it can be carried in the boot of the car or set up on the desk with your PC.

To find out more about the TS-2000 contact Kenwood or visit their stand at the London Radio and Computer Show.

Kenwood Electronics UK Ltd, Kenwood House, Dwight Road, Watford, Herts WD1 8EB. Tel: 01923 655284. www.kenwood-electronics.co.uk

Buying the right cable

We all know how important it is that you buy the right cable for the job. Henry from W H Westlake's says they will be exhibiting their usual range pf cables and connectors and will continue to be able to offer advice to both the amateur, CBer or listener on the best cable or connector for their set-up. The range available is always changing so drop by their stand and check out what's on offer.

W H Westlake. Tel: 01409 253758.

Slippery fun

If you've got other members of the family with you when you visit the London Radio & Computer Show, how about a trip to the Alexandra Palace Ice Rink.

For opening times, costs and other information, give them a call or check out the Alexandra Palace website.

Tel: 020 8362 2121. website: www.alexandrapalace.com/ice.htm

Feeling batteried

AA batteries from just £1, batteries of just about every shape, size and colour and battery packs will all be available from the Strikalite stand at the London Radio & Computer Show. They will also custom-build battery packs to your requirements. Battery packs from items such as cordless drills etc., can be re-filled to the customers requirements too.

So if you're looking for rechargeable batteries, telephone batteries or chargers to go with them, drop by the Strikalite stand.

Strikalite. Tel: 01543 683122. www.strikalite.co.uk

New scanners

Yaesu UK Ltd have told *Radio Active* they hope to have the new VR-120 entry level scanner on display at the London Radio & Computer Show. This will be alongside the new Yaesu PMR 446 hand-held, aimed at the professional user (see the review on page 12 of this Show Guide) and the VR5000 scanner.

Also on display will be the FT-817 portable rig, the world's first self-contained complete battery powered multi-mode transceiver covering all the amateur bands from Top Band to 70cm, providing up to 5 watts of power output, the FT-817 is designed for anyone operating at home, in the field, camping or hiking.

Yaesu UK Ltd., Unit 12, Sun Valley Business Park, Winnall Close, Winchester, Hants SO23 0LB. Tel: 01962 866667. www.yaesu.co.uk

CDs, DVD & more

If you're looking for recordable media then stop by the CD ROM Cellar. They've got recordable CDs from just 18p!

They also told *Radio Active* that they will have lots of DVD players and the latest DVD releases available at the Alexandra Palace Show.

They've got an interesting website at: www.poundsoftware.com where you can find all kinds of software for £1. Drop in and see what's available.

They also told us that they will have chipped Playstation 2 available.

CD ROM Cellar. Tel: 0870 741 0427. www.cdromcellar.com

Lecture Programme

Saturday 21 April, 12pm

Sir Jules Thorn, the Forgotten Man of Television by Dr Jim Lewis

At one time Sir Jules Thorn's empire, which was the last indigenous TV manufacturer in the UK, employed over 80,000 people, many of them in the Lee Valley in North London. The talk will concentrate on the production of TV receivers from component to finished item, including the world's first fully solid-state colour TV. Subject to availability, it will be followed by a trip around the Alexandra Palace Studio A, the world's first television studio.

Saturday 21 April, 2pm

ME or 2000? by Bob Fuller G6PWS

How does Windows® ME system hold up to the Windows® 2000 working environment for the personal user? Come and ask the expert!

Sunday 22 April, 12pm

Tesla Coils: Artificial Lightening by Steve Rodway

Beginning with a brief biography of the inventor, Nikola Tesla, the history of the Tesla coil will be covered from the original Colorado Springs experiments to the largest Tesla Coil in the world (in New Zealand). The physics and electronic engineering of the various types of Tesla coil will be discussed in some detail and the uses of Tesla Coils will be discussed. The talk will end with a series of demonstrations.

Sunday 22 April, 2pm

Instant Morse by Steve White G3ZVW

This highly interactive talk is intended to demonstrate how, by using psychologically proven techniques, it's possible to learn the entire alphabet in Morse code in a period of time that most people consider to be impossible. Aimed primarily at B-class licensees who either don't know any Morse or who have had difficulty learning the basics of the code.

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PW

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ICOM

IC-910H

Destined for Stardom

The IC-910H Sets Even Higher Standards in Amateur Radio Satellite Communications

- *Are you serious about VHF/UHF/SHF operation?*
- *Do you want to take full advantage of the new Phase 3D satellite?*
- *Are you looking for a powerful base-station that has the facility to grow with you and your hobby?*

If you are, then the new IC-910H all-mode transceiver from Icom is just right for you. The IC-910H is ideal for contest or field day operations. This compact multi-band transceiver has been designed with a wide range of impressive functions including tri-band capability, a powerful 100W transmit power and DSP facilities. And there's more! Just look at the following fantastic features:

- *VHF / UHF all mode, high power base-station transceiver*
- *Incredible receive sensitivity (0.11uV)*
- *100W/75W output power*
- *Optional tri-band capability*
- *Simultaneously works 2 bands*
- *Compact , measuring 24x9x24cms*
- *Easy to read 3.5inch LCD display*
- *Easy to use 10 key entry pad*
- *Easy satellite communication mode*
- *9600bps PACKET operation*
- *Optional DSP capability (UT-106)*
- *IF shift for interference rejection*
- *FM-narrow mode as standard*
- *One-touch repeater mode*

Icom (UK) Ltd. Sea Street, Herne Bay, Kent CT6 8LD. Telephone: 01227 741741. Fax: 01227 741742.
or visit our website: www.icomuk.co.uk e-mail: info@icomuk.co.uk

Count on us!

"Most people would succeed in small things if they were not troubled with great ambitions".

Henry Wadsworth Longfellow

Driftwood; Table Talk, 1857

With his magnifying glass in hand the Rev. George Dobbs G3RJV says that he's presenting "Our smallest project yet" as he gets to grips with surface mount technology and two quotations!

I'll begin this month's offering with an extra quotation. I think it was W. C. Fields who said: "I've seen a lot of change in my time and I've been against them all"!

Certainly the world of electronics has changed a great deal since I made my first projects. Valves have given way to solid state devices, digital techniques have replaced many analogue techniques and methods of construction are now very different.

I recall someone saying: "Once electronic construction was a work of art, now it looks like robot's vomit". The reference was to a densely populated surface mount technology board!

Readers will know surface mount technology well if they have looked into recently produced consumer electronics, including most Amateur Radio equipment. Surface Mount Technology (SMT) is a method of making printed circuit boards (p.c.b.s) by soldering special chip style components on to the surface of a p.c.b. These parts are called Surface Mount Devices (SMD).

Through-hole components, or leaded components have been used for many years in the production of printed circuit boards. These are placed on one side of the board and soldered on the other but SMD parts are placed and soldered on the same side of the board.

Innocent Constructors Concerned?

Why should we innocent Amateur Radio constructors be concerned about SMD techniques? Well, in answer I remind readers that we are moving towards a time when SMD components **may be the only types** we can obtain.

The majority of commercial electronic construction is now done in SMT. As this SMT is faster for automatic machines to place and solder, it uses less space for the same function and the cost of the parts is less. Yet amateur constructors have been reluctant to try SMT.

Some ten years ago **Bill Mooney G3VZU**, formed a company, Blue Rose Electronics, to produce SMT kits for the Radio Amateur but the take up was very small although his projects and articles appeared in *PW*. However, time has marched on, SMD parts are becoming the norm so let us have a look at the practicalities of SMT construction for the amateur builder.

I realise of course that there are problems. Firstly SMD parts are very small to handle, some special equipment is required and most amateurs do not have a stock of SMD parts. However all these problems are all solvable.

Equipment such as this - courtesy of *PW*'s staff photographer G1TEX - will help you get to grips with surface mount techniques.

Many of us will need optical help, despite this a surprising amount of SMD construction can be done with existing or makeshift equipment and the parts are cheap. So to get us going I'm going to describe the smallest, and probably the simplest, project we have ever tackled in this column in the hope that some readers will get their SMD feet wet!

In many SMD projects, construction is the same as conventional leaded device construction but there's often significant differences. To indicate the differences the diagram, **Fig. 1**, shows three common types of SMD component.

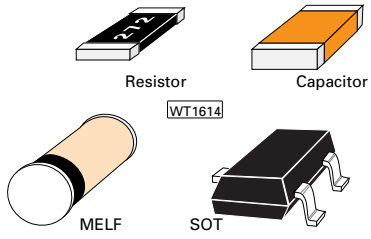

Fig. 1: Typical surface mount components (see text).

The flat components are chip resistors and chip capacitors. These come in three common sizes 0603 (60 thousands of an inch long by 30 thousands of an inch wide), 0805 (80 thou' by 50 thou') and 1206 (120 thou' by 60 thou'). Thankfully we will be using 1206 types!

The MELF (sometimes called SOD-80) package is used for some diodes and resistors. Most active components (transistors, diodes and ICs) use the SOT package. The three-legged SOT23 version is shown in the drawing. We will be trying 1206 and MELF packages in our first SMD project. I think that the easiest way to learn is to build a simple SMD board, so off we go!

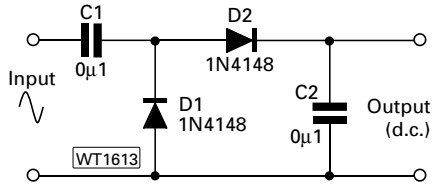

Fig. 2: Surface mount device diode probe project (see text).

Familiar Circuit

The diagram, **Fig. 2**, shows a familiar circuit – a simple diode probe. It uses only four

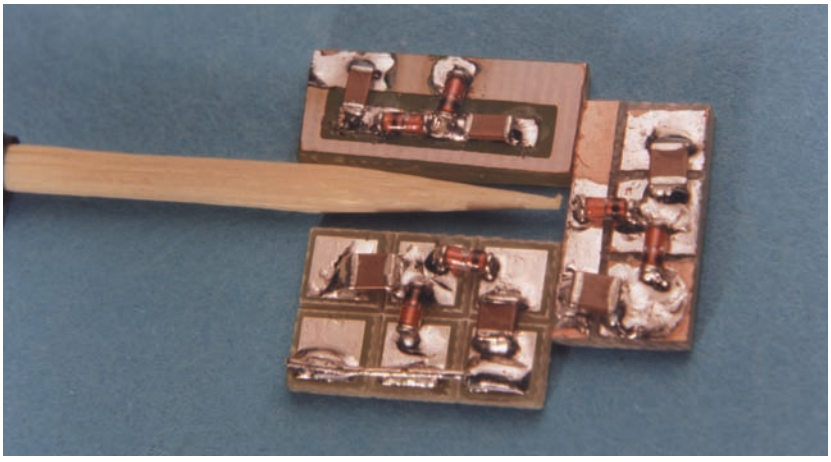

Fig. 3: Projects built onto landed p.c.b.s as suggested by G3RJV - construction was aided by a bamboo implement bought in Tesco! (See text).

parts and makes an ideal **learn-to-work SMD** project.

Our project uses two 1206 100nF capacitors and two MELF equivalents of the 2N4148 diode. Any similar diode would do the job including SOT23 types like the BAS16.

Having gathered the parts (see below for possible suppliers) the next task is to make a suitable circuit board. To help I'll show four examples: Veroboard, a matrix board, a cut board and an etched p.c.b.

The simple layout for the project is shown in **Fig. 3**. The board only requires three pads above larger ground strip. Veroboard is hardly ideal for SMD working but it can be used by cutting away areas around holes using a spot cutter (or a small drill bit) to obtain solder pads.

In my example each of the three pads is two-holes wide and the adjacent strip makes the ground. Work

Fig. 4: A probe built into a jack plug - a good indication of the small size of the project!

with a larger piece of board than required and cut it to size at the end. After the holes have been cut to form the pads the surface must be rubbed flat to allow for the parts to lay flush to the board.

I have shown the use of matrix boards in previous *PW* projects. The type I used here are called Kanga Lands and made by **Kanga Products**. The board has a matrix of tinned copper squares each being 5mm wide.

It's also possible to make a matrix board yourself on un-etched pieces of scrap p.c.b. material by carefully drawing a junior hacksaw across the surface. This surface must be rubbed flat before the parts and solder are applied.

George's Favourite

The cut board is my favourite prototyping method. I was introduced to this by **G3PDL**. This method uses a sharp tool to gouge tracks in plain p.c.b. material. The best tool I know for this is a small (quarter inch I think) wood turner's gouge.

By applying the point of the tool to the board at about 30° and pushing down, it's possible to gouge tracks through the copper to make the required pads. This method **needs practice and safety precautions**.

Always direct the sharp point away from your hand and hold the board against a stop (a screw in a block of soft wood is ideal) and not your other hand. Working with a larger than required piece of p.c.b. material, which is trimmed to size later, I made several very acceptable boards for this project. An alternative tool is a Lino-cutter sold in craft shops.

My etched printed circuit board was made using a Computer Aided Design (CAD) programme on a computer to print a positive transparency which was used with an ultra-violet light box and photo-sensitised board to produce the final p.c.b.

With some care the pads could be drawn by hand with an etch-resist pen or using rub-down transfers. Once a board has been made, smoothed and cleaned the first SMD soldering can begin.

Soldering SMDs is not as difficult as you may imagine. I did my first SMD project over ten years ago using a conventional soldering iron, a pair of tweezers and a wooden toothpick and my naked eyes.

However, my eyes have aged since that time and I am now joined the large band variable-focal spectacles wearers. Some extra magnification may be required. Special lenses are available for close work but I simply use a pair off-the-self reading glasses more powerful than the bottom section of my own spectacles. **Remember that good daylight is better than any artificial lighting**.

A small soldering iron bit is required. I use the excellent Weller Temperature Controlled soldering iron for all my construction and replaced my usual bit with a number 6 needle pointed bit.

It's even possible to file down the end of a used bit to the desired shape. I've also seen people use a copper nail in place of a bit. For the solder I used conventional 0.7mm cored 60/40 solder wire although purists would use Low Melting Point (LMP) silver solder wire for SMD work.

Other Essentials

The other essentials are a pair of curved, pointed tweezers to handle the small parts and something to hold the part in place during soldering. The curse of SMD soldering is the **tomb-stoning** effect.

The tomb-stoning effect occurs when the surface tension of the solder causes the small component to stand up as the solder cools thus taking it away from contact with the adjacent pad. They really do look like miniature tomb-stones!

The art is to place the SMD part into place with the

Fig. 5: Probe detector mounted onto a (small) moving coil meter unit.

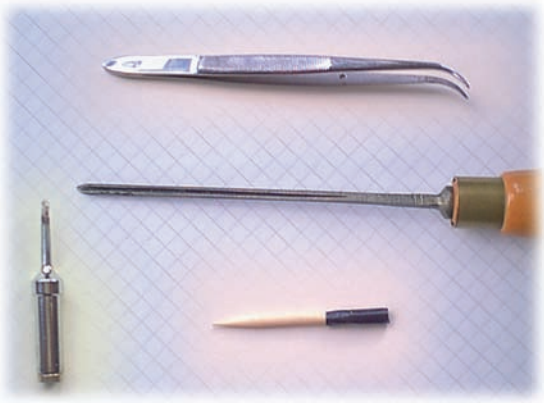

Fig. 6: Some of the tools used by G3RJV (see text).

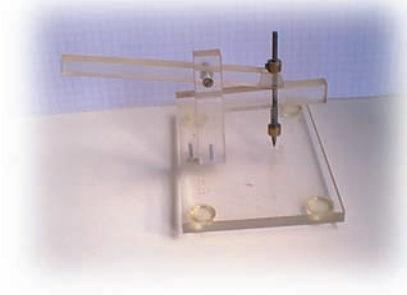

Fig. 7: The Blue Rose Electronics jig which G3RJV finds very useful for SMD work (see text).

tweezers, hold it down and solder one end to get it flush with the board. There are a variety of special jigs to hold the parts down to the board.

I have an excellent jig which was once made by Blue Rose Electronics and have also used a novel three legged **bird type** device suggested by **N4EEE** made from a bamboo skewer and stiff wire. However, my most frequently used holding-down tool is three inches cut off the end of a barbecue bamboo skewer from Tesco's!.

My procedure is to tin the pads with solder if they are not already tinned. Use as little solder as possible. Pick up the SMD part with the tweezers and lightly tin each end.

Then place the part with the tweezers. Hold the part down with a jig (or piece of bamboo skewer) and apply the iron to one end of the part. After a clean solder flow and solder set, solder the other end of the part.

Next, you should inspect the joint with an eyeglass. It takes a little practice but it's not really very difficult. I work on a small wooden tea tray because SMD parts are notorious for getting lost and they're impossible to find in a carpet!

This page shows some versions of my SMD Diode Probe. I put one Veroboard version into a 3.5mm jack plug to make a compact probe and mounted another on a back of a miniature meter to make a simple r.f. sniffer. So, there it is! Have a try at SMD working, things are moving that way and I will return to it from time to time in this column. Good luck. *PW*

Suggested Reading

A Practical Guide to Surface Mount Devices
Bill Mooney
Babani Electronics Books BP411

Suppliers of SMD Parts

JAB Electronic Components
PO Box 5774
Birmingham
B44 8PJ
E-mail: Peter@jab.demon.co.uk

Farnell Ltd
Canal Road
Leeds
LS12 2TU
Tel: 0870 1200 1200
Website: www.farnell.com/uk
E-mail: sales@farnell.com

BEDSIDE BROADC

Many Radio Amateurs use their radio skills in their everday lives and this is certainly true of Dick Pascoe GOBPS. Dick explains how he and many Amateurs like him are involved in hospital radio broadcasting.

While listening to a local radio station, Neptune Radio I heard a request for volunteers to help out at the nearby hospital's broadcast station - **Radio Victoria**. A phone number was given and much to my amazement I ended up talking to another Amateur that I knew, **Matt M1CMN** who turned out to be the station manager and invited me down to the hospital to have a look and a chat.

Perhaps unwisely, I expected to spend some time helping behind the scenes cataloging records and even making the tea. I did **not** expect to be shown the studio and allocated a broadcast time just two weeks away. I was then put under the wing of **Stan G6ZNW** who taught me the basics of a studio and how it all worked.

Dick Pascoe G0BPS live on air as Richard Anthony.

A sharp learning curve started and I joined the team of Radio Victoria. Although our broadcasts can only be heard by patients in the hospital where the studio is based, they have a choice of three stations that they can tune into.

The other stations available are a national station, a BBC Radio Kent station. Surprisingly, we are quite popular, it must be the type of music we play.

Radio Victoria is based at the Royal Victoria Hospital, Folkestone. The hospital caters for stroke victims and the elderly so our music choice is very wide.

Requests vary from Vera Lynn to Queen, keeping us on our toes as we try to make the music flow from one type to another. We are based in rather a small hospital so are allocated a small room for our record collection and the studio. We have several thousands of LPs and our CD collection is growing too.

Radio Victoria has been on air since 1972 when a few volunteers offered to provide the service. Moving several times around the hospital in the 1970s and 1980s it now has a permanent home on the top floor right next to the maternity pre-natal training unit. I am not sure if there is a message in that!

Royal Victoria's hospital broadcasting studio.

Equipment Used

The equipment used for the station is similar to that used by a DJ at a disco but without all the lights. A mixer deck (hopefully) ensures that the correct audio line is fed to the listeners. We have a choice of two CD players, two mini-disk players, two tape decks and two microphones.

We also have a link to a telephone for live interviews and if needed a link to another hospital radio station, a couple of jingle machines and an outside broadcast facility. We currently use a total of 13 controls on the control deck. These controls are used to ease in and out (fade) the music and audio tracks we play. The mixer equipment we are using is over 20 years old and showing its age hence the live broadcast station to try to generate funds to rebuild the studio.

The choice of music apart from any requests is our own and after the initial training we are left to make up our own shows. Often I will be alone in the studio right through my two hour show.

Hospital radio is all about helping to make the stay of the patients a little easier. It provides a direct link between us the presenters and the often bed-ridden patient.

It always saddens us to see an empty bed where we usually collect a request. One of our listeners, **Ken Ellis G5KW,** is well known in the Amateur field and loved to listen to Gilbert and Sullivan's operettas.

Silver 2000

I was away on holiday when an application for a Restricted Service Licence (RSL) was made to put our station on air live to the people of Shepway in the South East of England. This would be for a period of five days in a bid to raise money to revamp Radio Victoria's studio. So I returned to be told that we were 'going live' on air as Silver 2000 on 1 January 2000.

The announcement came as a total shock to my system as I knew nothing about it. Remember, I had only been with the hospital broadcasters for three months at this time and been away for seven weeks of that!

The rush of chasing advertisers and sponsors just before Christmas became a nightmare, all everyone else was thinking about was the Christmas holiday and the New Year Millennium celebrations. However, we did get sponsors who were apparently delighted with what they received from us.

After much haggling we were allocated the 95.1MHz Band II v.h.f. as our transmitted frequency for the f.m. service. As I live right on top of the hills surrounding Folkestone and with the hospital being down in the centre of Folkestone a link was arranged

ASTING

between the studio and my house with the broadcast antenna at the top of my tower.

The link was just above 50MHz on 52.925MHz with two peaked 3-element beams using just 1W from the transmitter. The final transmitter on 95.1MHz. peaking 15W at best.

With the frequency allocated it was time to sort out the programme scheduling. I was eventually allocated the afternoon show from 1-4pm and as I had never done anything like this before and immediately decided to use an alias. The alias was so that when I blew it big time no one would know it was me! So; 'Richard Anthony in the afternoon' was born.

We started at 7am with Andy doing the Breakfast Show until 9am. Stan then took over for the Mystery Year getting listeners to 'phone in and guess the year.

Eamonn our resident Irish presenter covered the 10 until 1 spot when I took over. We eventually agreed that a three-hour slot was far too much for us novices. The remainder of the day saw a Jazz hour with Rob and a country hour with Tony. Matt did the 8-10 section with the final two hours covered by Gerry B (The Groove Rider!). The overnight coverage was automated from the computer.

● Situated in the home shack of GOBPS. The final transmitter in the alloy box, the p.a. is shown above with the temperature sensor (see text).

As the final minutes of 1999 ticked away and Big Ben struck midnight the transmitter switched on and Silver 2000 was on the air with the computer based music and jingles. The voice of **Stan G6ZNW** provided the links between tracks, yes, it **was** all recorded earlier!

The five days passed very quickly with two of us clocking up a total of 16 hours each on the air. The remainder only managing a total of 10 hours each.

What the others failed to tell me until after the whole event was that I went 'off air' for about 20 minutes in the middle of my first show! The link transmitter failed so Stan assisted Dan to complete a rapid repair whilst I carried on oblivious to it all.

Objective Achieved

We achieved our objective of raising money for the new studio, but not as much as we would have liked but for something done at very short notice it worked very well, if nothing else it helped us learn a great deal and improve our own skills.

A quick check later found showed that six of the ten helpers were Radio Amateurs, without doubt this helped those that presented a show as most of these had used a microphone 'for real' before. Mind you, the technical background of our engineer **Danny G7SUH** helped enormously. One of the presenters, **Andy Cadier**, is also a columnist on our sister publication *Short Wave Magazine.*

Doing a live show increases the perception of what is good and not so good. I have become very aware of the errors that creep in on even major stations.

As I mentioned previously the learning curve was steep and staying on the way up is a challenge. Keeping the good bits going when you are alone is difficult.

Many presenters are told that you play two tracks and talk for two minutes Not us, we keep the music playing and talk over it. Except for interviews of course.

● Running repairs - 20 minutes into the show and Stan and Dan have to repair the link transmitter.

Digital technology in the form of mini disks have been a boon. I picked up a small Walkman sized player in the USA last year and found a full sized one at a local auction at silly money. For those who are not familiar with this technology the audio is stored digitally and you can name each track, read it and then select the track you wish to play. Much, much better than the old tape technology.

Most hospitals now have a broadcast station and are often short of helpers. People are often needed to go around the wards collecting requests from patients and then sorting them out with the relevant track ready for the presenter to play. Often there are piles of records waiting to be catalogued and filed away.

Presenters are always needed too but it should be remembered that the music played should be that requested by the patients. There is no point playing heavy metal music to a geriatric ward!

Even if this type of volunteer work doesn't appeal to you, there is still plenty you can do to help. Why not donate all those LPs and singles that you haven't played for years?

Even better have a sort out of your CDs. Do you still play them all? Even those old CD singles still have a use with hospital radio.

So, if this article has whetted your appetite for using your Amateur Radio skills in a different way why not pop down to your local hospital and ask to see the volunteer co-ordinator today? *PW*

Helping Out

If your local hospital doesn't have a broadcast station then why not set one up? Alternatively you can send your unwanted records and CDs or donations to Dick Pascoe for Radio Victoria. Please make cheques payable to Radio Victoria and send to **Dick Pascoe, Radio Victoria, Royal Victoria Hospital, Folkestone, Kent.**

● The Silver team - Pictured l-r (back row) Andy, Rob, Gerry, Stuart, Dick, Nick & Stan, (front row) Dan, Eamonn and Matt.

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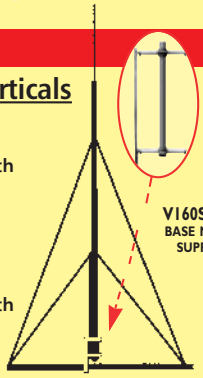

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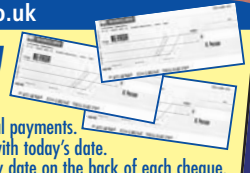
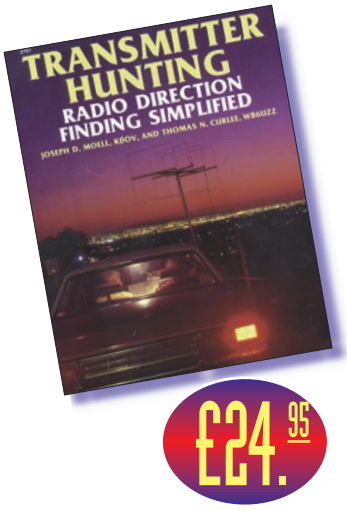


Book Profiles

Always on the look-out for new and old favourites to recommend to readers, Rob Mannion G3XFD presents a selection that's come his way this month which he thinks you'll enjoy as much as he does. Read on to find out more ...



£24.95

Transmitter Hunting

Joseph Moell KOOV and Thomas Curlee WB6UZZ

Without any doubt this book is one of the most fascinating I've seen on Direction Finding (DFing) for the Radio Amateur. The straightforward sub-title *Radio Direction Finding Simplified* sums up the publication very well indeed.

Although American in origin, everything within the book is of interest for the European Amateur. Complete with some fascinating historical details on the origins of DFing, it's also packed with very many circuits, projects and ideas and I consider it to be ideal for *PW* readers. Anyone like to join me in a DF hunt?

With 23 or so chapters the book covers: getting started, v.h.f. techniques, directional antennas, all about S-meters, hunting below 50MHz, dealing with mischief and malice, hunting with a computer. There's also a 144MHz synthesised transmitter project.

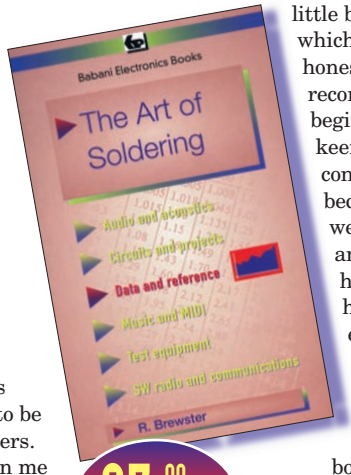
Altogether this is a superb book - more of a manual really - which I can recommended to anyone. Perhaps it will help re-kindle an upsurge of interest in DF hunting in G and EI too?

A fascinating read and very highly recommend.

The Art Of Soldering

R. Brewster

Soldering is without doubt one of the most difficult but misunderstood techniques used in our hobby. My statement is backed up by correspondence with many Radio Basics readers who rate soldering second only in the difficulty stakes to coil winding!



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So, this little book is one which I can honestly recommend to beginners and keen experienced constructors to because it is so well written by an author who has obviously had much experience. Presented in typical Babani style, the book is a no frills paperback published in a newsprint style paperback but despite this it's a little gem of a book, packed with information and the simple line drawings and illustrations are easy to understand.

Highly recommended for Radio Basics readers.

The RSGB Guide To EMC

Robin Page-Jones G3JWI

£18.50

This book is not a book...it's a miniature manual. It's one of the very best EMC publications I've come across and - unusually in my opinion - it deals very well with interference we receive, something which is often neglected!

With superbly presented diagrams, charts, circuits and easy-to-read text you'll be tempted to sit and read, rather than just having it to hand when problems occur. Covering everything from radiation - wanted and unwanted to the social side of EMC problems, I consider it to be a real **must** for the radio enthusiast.

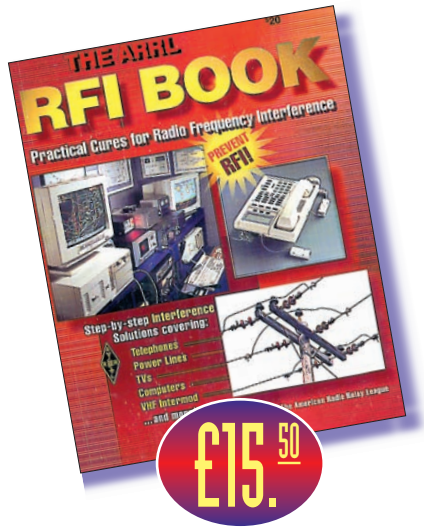
I found the chapter covering Protective Multiple Earthing to be very helpful indeed. Particularly useful also is the comprehensive chapter entitled The EMC Detective - this proved very helpful and I have no doubt it will assist many to overcome problems.

Very highly recommended

The ARRL RFI Book

ARRL

Although the Americans have a different approach to solving RFI problems in general - bearing in mind how valued Radio Amateurs are in the USA - this book would make an ideal companion for anyone who buys a copy of the *RSGB Guide to EMC*. There's much international interest in this book and in particular if you live in a location where the electricity mains are provided



£15.50

by overhead wires (prevalent in the USA) it could prove very useful.

Recommended.

QRP Power

ARRL

I've recommended this book before and if you're a keen home-brewer and enjoy working at the bench, this book is for you. In essence it's a workshop manual aimed specifically at the keen builder who is particular interested in QRP projects. Packed with circuits and

£11.50

ideas and although some of the photographs have not reproduced very well (they're on the dark side) the circuits and text is superb.

Recommended for the keen constructor.

HOME BREWED TV - THE

Norman Smith, formerly ZC4NS during his Army service in Cyprus, recalls the days when Radio Amateurs used skill and ingenuity to convert wartime radar units into television receivers.

There must be many older *PW* readers like me who remember the growing enthusiasm for the then novel idea of television which was making its impact in the early 1950s. However, the 1953 Coronation of our present Queen led to a veritable explosion and that's when the impressive R1355 IF/Video unit, part of one the pioneering airborne radar systems, came into its own.

The R1355, **Fig. 1**, was just as popular as its stablemate Indicator Unit Type 62, **Fig. 2**, as a source of extremely valuable valves and components. In fact, many constructors used the Mazda-Octal based VR65 (SP61) pentodes for general projects because together with the world renowned EF50 valves (62 Unit) they were ideal for amateur radio v.h.f. use.

Plug In Units

The 1355 with the plug-in RF units (RF26*, 27, etc.) was easy to convert for television service. The eight valve unit consisted of five stages of intermediate frequency amplification centred on 7.5MHz using the SP61 an EA50 video detector, SP61 video amplifier and a cathode follower output stage (removed for television adaptation).

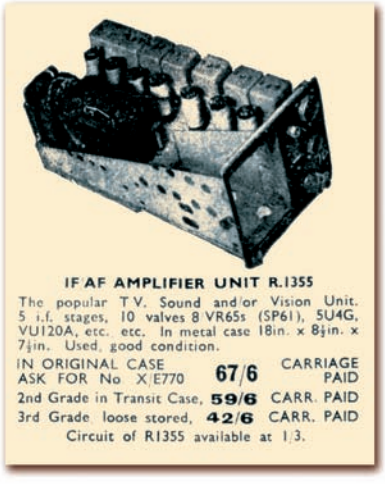
As purchased the R1355, with an appropriate RF unit front end was almost ready for the (now defunct) Band I v.h.f. 405 line BBC television broadcasts. Despite being ready-to-go the unit's performance could be enhanced by adding extra filters to improve the band-pass and sound rejection of the i.f. stages. A second unit could be used for the sound reception, or alternatively an external sound i.f. strip could be wired into the video unit.

* Part of an article from the April 1949 issue of *PW* detailing the conversion of an RF26 unit for coverage of the old 5 metre band is shown in Fig. 3.

Switching & Jamming

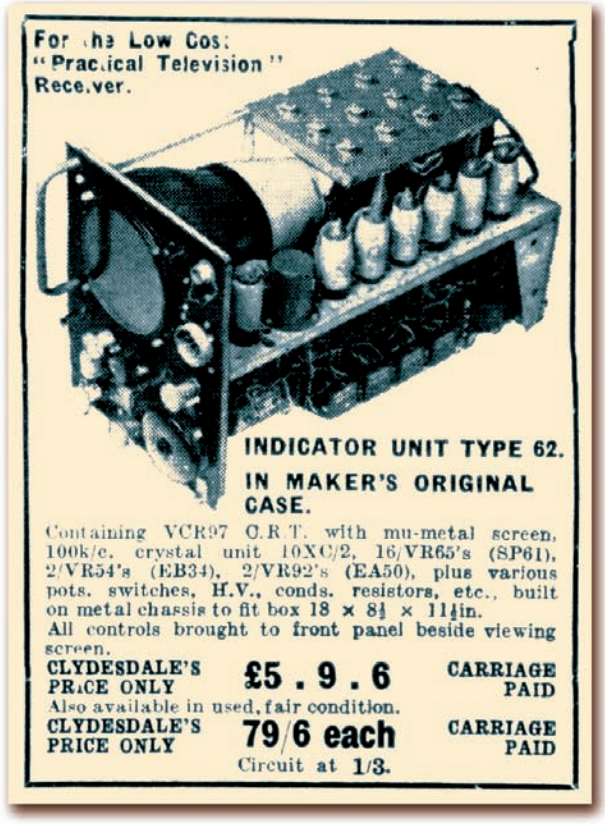
Contained in the unit was special clever switching which progressively changed the screen voltages and bias conditions to the valves to combat the overloading caused by the Germans. The enemy did this because the airborne radar units were also helpful navigational aids.

The special circuits were switched by a multi-bank Yaxley type rotary switch, but were often replaced by wiring so that the switch could be removed from circuit in order to replace the switch with another control. However, examination of the circuits, often provided evidence of the lengths the Second World War scientists went to, producing the most effective units under difficult wartime conditions.



● Fig. 1: The R1355 unit - which had played such an important part in airborne radar defences during the Second World - was extensively advertised in the 1950s in PW and Practical Television magazines. Many constructors saw their first television thanks to this superbly constructed equipment. The empty housing - with rectangular opening - visible in the unit continued the appropriate RF Unit (RF26, 27, etc.) during service (see text).

Advertisement reproduced with kind permission from the collection of Charles Miller, Editor of *The Radiophile* magazine.



● Fig. 2: The Indicator Unit Type 62 - complete with the famous VCR97 cathode ray display - was much sought after by constructors wishing to build their own television receivers in the 1950s. This airborne radar display unit was superbly built and many also ended up converted into oscillates.

Illustration courtesy of Charles Miller, Editor of *The Radiophile* magazine.

Broadband Problems

The use of 7.5MHz for the i.f. presented problems, even during the Second World War. Even in those days the frequencies were very busy.

Because of the choice of the 7.5MHz i.f., extra precautions had to be taken as minimum external signal breakthrough could be tolerated. This was achieved in a most effective manner - by the way the units were constructed, and although the 1355 shown in Fig. 2 is minus the appropriate RF unit, it also clearly shows where the slide-in screened package is placed.

The modular RF units used a substantial 6-pin Jones plug and socket arrangement to connect to the

1355 WAY!

R1355. When the appropriate RF unit was slid into place it automatically connected the power supplies and the i.f. feed via a coaxial cable. When in place the RF unit was in effect double-screened - due to its own substantial casing and that of the R1355 itself.

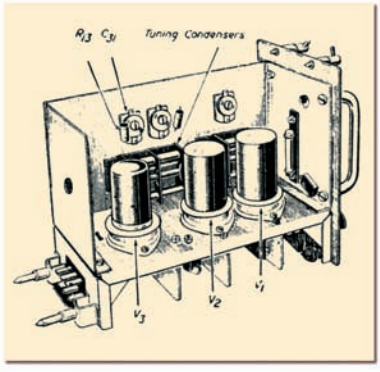
Anyone who has ever handled the RF units - even now they appear at radio rallies - will have noticed the high grade, heavy duty steel chassis. They were a source of high quality v.h.f. components for many years and I wonder just how many constructors obtained their first Muirhead illuminated slow motion drive in this way?

Complete Modules

The plug in RF units, 24 and 25, were in fact complete modules employing the SP61 (VR65 military reference number) consisting of banks of coils in the r.f., mixer and oscillator circuits. They were selected by a multi-bank Yaxley switch and covered the 30 to 50MHz band.

Another wartime favourite valve - the EF54 (as r.f. and mixer) together with the EC52 triode (as oscillator) were used on the RF26 and 27 Units. These units were tuned by the much sought after three gang (beautifully constructed) variable capacitors and those delightful Muirhead slow-mentioned drives I've already mentioned.

In all cases, the antenna input was provided by a front panel Pye plug. Everything, of course, was finished to a very high standard, commendable when you remember just how difficult production must have been in the Second World War.

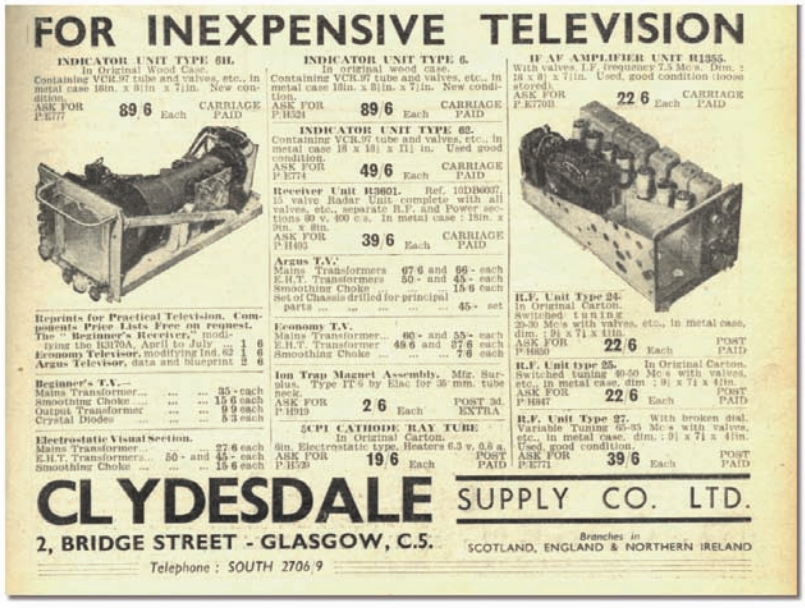


● Fig. 3: The RF units from the R1355 IF/Video units were extremely versatile in the hands of radio constructors. Projects such as this - from the April 1949 issue of *PW* - featuring the RF26 under modification to become a converter for the old 5 metre band, meant that they were always in demand.

Memories Of 405 Lines

I was one of those keen constructors who used a 1355 and RF Unit for my early television work. Again, like many other constructors I've also got fond memories of the pioneering v.h.f. Band II transmissions from both Alexandra Palace in London and the Sutton Coldfield transmitter near Birmingham.

Both Alexandra Palace and Sutton Coldfield 405 line services have closed (the 405 lines service closed completely in 1985) of course, but I'll always remember my first television experiments in the late 1940s and early 1950s. The closure itself is one that many will remember and regret.



● Fig. 4: Adverts such as this - from the October 1953 issue of *PW* - often featured the R1355 and other units, ready for conversion to television receivers. In those days the magazine was full of wartime surplus advertisements. Don't they seem cheap nowadays?

Unique Tuner?

Despite the passing of the old 405 line v.h.f. television service, I've retained one tangible memory of those days in that I've still got an example of the RF31B plug-in RF Units. And it may well be a unique survivor.

The RF31B has exactly the same style and plug-in format as the other units. However, although it uses SP61 valves in the r.f., mixer and oscillator in the same configuration as the RF24 and 25, the coils appear to be wound for higher frequencies. Additionally, each stage is individually tuned by its own front panel controlled variable capacitor.

Incidentally, the use of the SP61 valve in higher frequency circuits was not unusual. These extremely widely used valves were used in some equipment operating up around 100MHz, but they may have been especially selected and individually tested for use on these frequencies.

I've not been able to establish whether or not my RF31B was a special prototype for the RF26 and 27...but perhaps you know something about it? If you do, I'm sure you'll write to the *PW* Editorial team, who will pass the information on to me.

Chatting with the staff manning the stands exhibiting the four stand RF Units has drawn a blank. I'd be very pleased to learn something. So, next time you go to a radio rally and see a R1355, perhaps you'll pause and take a longer look at a wartime pioneer that found new life in a civilian role. *PW*

● Fig. 5: An up-market surplus advert featuring 1355 receivers for three guineas from the December 1949 issue of *PW*. Younger readers may not realise that the guinea was £1-5p (One pound and one shilling in old money) and seemed to be yet another way of extracting a little more money from the customer!

The four

earth.

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Wide-band Reception	Main	30 KHz~60 MHz, 142~152 MHz, 420~450 MHz, 1240~1300 MHz
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or the

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KENWOOD

WEB DIRECTORY

Antenna Workshop

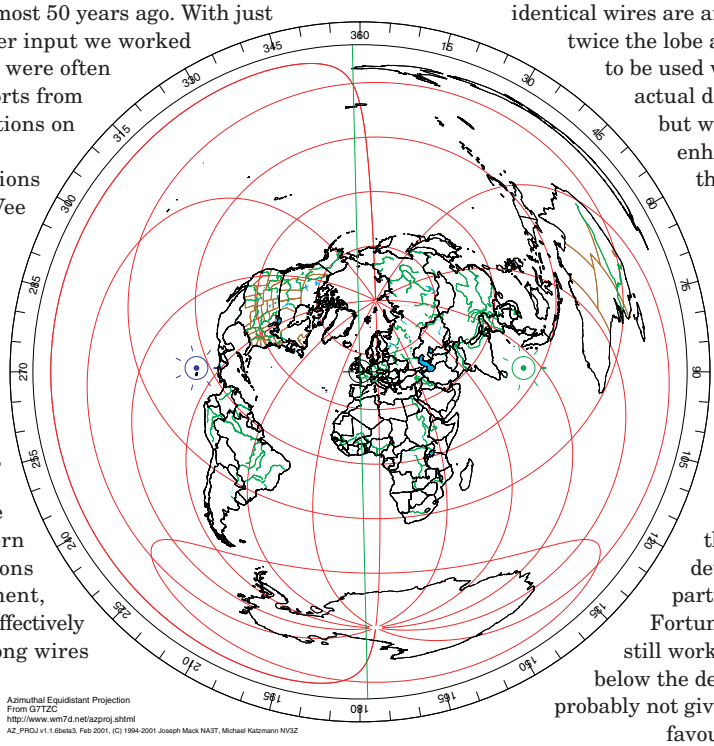
A DOUBLE VEE BEAM

John Heys G3BDQ describes a wire antenna with high gain and versatility and which can have six switched horizontal radiation patterns.

Today many of the amateur antenna designs that are described in books or articles seem to be tailored to suit the owner of backyard or postage stamp garden. There are however many operators who live in the countryside who have access to considerable open ground that's suitable for antenna farming.

The antenna described here was the arrangement I devised for my local club's entry in the National Field Day of almost 50 years ago. With just 10W transmitter input we worked a lot of DX and were often getting S8 reports from VK and ZL stations on 14MHz.

Smaller versions of the Double Vee will remain effective radiators but, of course they will not have the gain or versatility of the antenna described here, which can give 8dBd gain. The radiation pattern has two directions for each V element, plus there will effectively also be three long wires each of which will provide 4dB gain to other points of the compass not covered by the main pattern.



● Fig. 2: A great circle map is an invaluable aid to setting up the directions of the antenna wires. This one was created over the internet by G7TZC, using the web site address **http://www.wm7d.net/azproj.shtml**

Horizontal Lobes

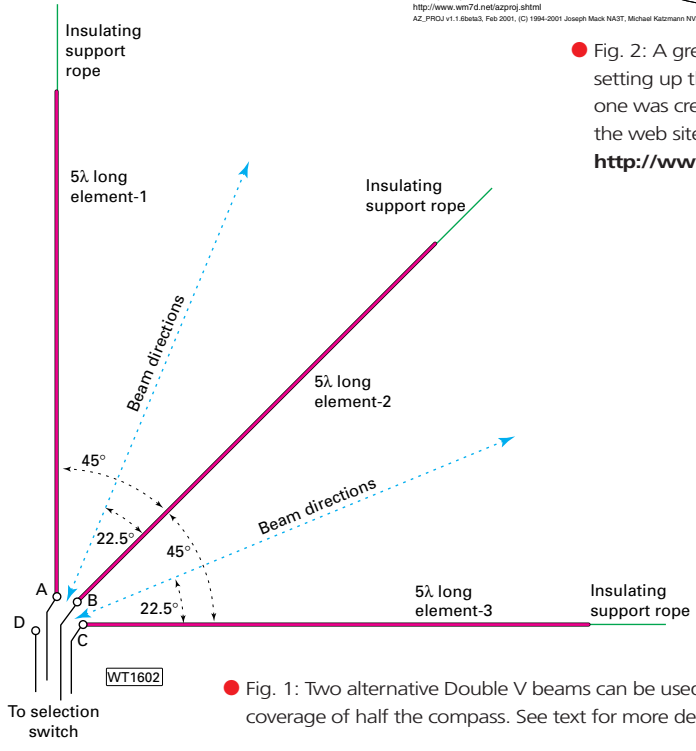
A single end-fed long wire has four main horizontal lobes. The angles of the main lobes are defined with reference to the direction of the wire, and are directly related to the wire length (in wavelengths). For instance, the simplest one wavelength long wire has angles of 54° to the wire. Such an arrangement was described in the March 2000 issue of *PW,* by **Edward Rule G3TEW**.

An end-fed wire antenna with legs 5λ long will have its four horizontal (main) lobes angled at 22.5° from the run of the wire and when the legs are 10λ the angles have become just 16°. To create a V design, two identical wires are arranged, angled apart at twice the lobe angle. The correct angle to be used will depend on the actual design in wavelengths, but will then give just two enhanced lobes which bisect the angle between wires.

The interaction of the two combined radiation patterns, causes the other lobes to be more or less eliminated and become of minor importance. To achieve the maximum gain on this design, the leg lengths of the wires and the angle between the legs must be determined for a particular band.

Fortunately the V beam will still work on bands above and below the design frequency, but will probably not give so much gain in the favoured directions.

For instance, a V beam designed with legs 5λ long at 14MHz, will still give about 8dBd gain on 21 and 18MHz as well as a useful 5-6dBd gain on 7MHz. Used well under frequency, the antenna will also probably still outperform most dipoles and single wires on 3.5MHz. At the design frequency the vertical radiation angles will be under 15° which is excellent for long distance working.



● Fig. 1: Two alternative Double V beams can be used to give coverage of half the compass. See text for more details.

Dimensions

Now to consider a few dimensions for this antenna design. A simplified plan drawing of the double Vee system is shown in **Fig. 1**. When 14MHz is chosen as the highest gain design frequency the 5λ long wire elements must each be approximately 100m long.

The actual length of the legs is not critical and it can range from 95-105m, though the three wires must be of equal length. Four supports will be needed which can be as short as the ubiquitous 20ft (approx 6m) scaffold pole. Duraluminium scaffold poles are no longer used by the building industry

and are available on the surplus market.

If you can manage to mount the wires at a greater height it will help, reducing the radiation angle in the vertical plane. But V antennas and their big brothers, the Rhombic antenna seem to work well when they are a little below half a wavelength in height. Each V (there are actually three separate Vs in this arrangement) must be fed in anti-phase from an open wire feed-line.

A special home-brew four wire feeder is needed which will connect to the points marked A, B, C and D in Fig.1. A + B and B + C are the main V elements and A + C makes a 90° V antenna. The feed-point D does not connect to the antenna wires but is left unconnected at the top of the feeder. It is used as the dummy feed-point for three single wire Zepp antennas: A + D, B + D and C + D.

The Zepp-style fed long wires will have their main radiation lobes in directions that are not covered by the lobes of the main antenna. This means there will be six different radiation patterns available, all selectable by a switch at the operating position.

When the legs are 5λ long the mounting angle is twice the 22.5° lobe angle, or 45°. But if the beam legs are only three wavelengths long the mounting angle becomes 60°. In the event you can field a monster with legs ten wavelengths long, the mounting angle reduces to 32°. Such an antenna will then give a massive and consistent 10dBd of gain.

A good military or orienteering style magnetic compass is needed when positioning the masts for a double V antenna, for their layout must be arranged to provide the optimum gain in the directions where the searched for DX is located. The illustration of **Fig. 2** is a simplified great circle map to work out the radiation directions from a 5λ per leg beam. Ours was sited with the centre leg B running from the compass points of 275° and 95°.

It may not be possible in some locations to manage an accurate and complete orientation so, alternative best direction siting must be calculated. The gaps in the radiation patterns are filled in to some degree when the wires A, B and C are used as single long wire Zepps.

The Feeders

As this is a high impedance feed-point antenna, commercially made 300 or 450Ω impedance feeder is unsuitable. So, a special four wire feeder, **Fig. 3**, must be fabricated using squares (say 80mm squares) of a good insulating material such as Perspex or a similar plastic. The insulator used should ideally be able to shed any water falling on it easily.

The antenna design allows the feeder to descend almost vertically to the operating position. This will reduce the length of feeder required. Single conductor copper wire of some 2mm diameter (16-18s.w.g.) will be suitable for the feed-line and the use of enamelled wire will stop corrosion on the wire surface. It's amazing how quickly bare copper develops a green coating in wet weather or in locations close to the sea. \

Metal masts will not influence the antenna, for the system is horizontally polarised. The actual feeder length should be arranged to avoid exact quarter or half wavelengths on the bands to be used. Such lengths can present difficult impedances to a matching unit.

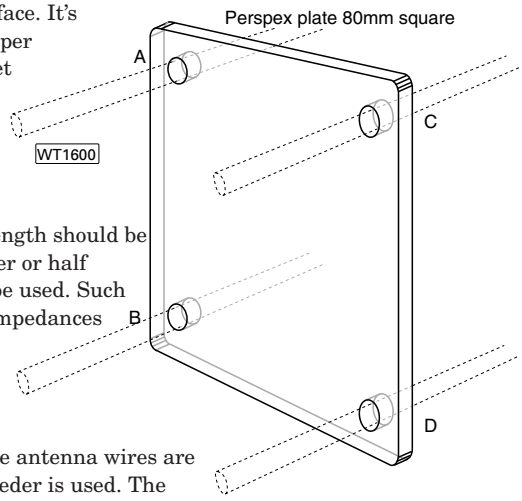


Fig. 3: As four wires are needed to feed the Double Vee antenna, it's better to create the special feeder spacers as shown here.

Switching

Six different connections to the antenna wires are possible when the four wire feeder is used. The switch connections are shown in **Fig. 4** and each connection provides a different radiation pattern. These options can be quickly selected by having a two bank six way rotary ceramic switch. When listening to a DX signal the six switch positions may be tried in turn to discover which position gives the strongest signal.

Up to 100W output power from the transmitter can be handled by the small rotary wave-change switches from old receivers, so long as no transmitting takes place when the switches are operated. The surplus market, although now depleted compared to several years ago, can still provide suitable ceramic switches, but don't resort to crocodile clip connections rather than a switch. Confusion will soon reign!

From the transceiver to the switch, a good quality a.t.u. must be used, as the antenna is a balanced system. One of the older style Z match (i.e. KW E-Zee match or similar) or a parallel tuned matcher should be used. You should avoid the widely used toroidal 4:1 baluns in this and similar setups. When connected between single ended a.t.u.s and balance antennas, toroidal baluns often become very lossy. In fact under some loading conditions, they can get hot.

The antenna would also be effective on the 1.8MHz band when used as a doublet, or again, tuned against ground. Although this is designed for the h.f. bands, this antenna could also be quite effective on the 136kHz v.l.f. band. On this band, strap together all the feeder wires together as the antenna and tune this against ground.

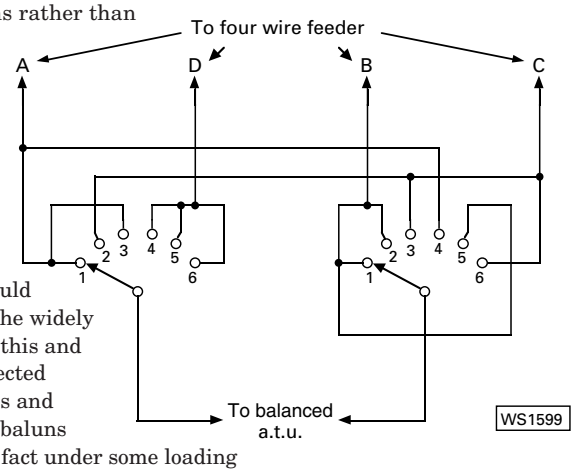


Fig. 4: Using a simple double-pole six-way switch allows several radiation patterns to be selected. Note line D is used, with just one of the element wires (A, B or C) as a Zepp antenna.

Safety First

Finally, safety must be a first though with any antenna of this size and some provision must be made to earth the antenna when it's not in use. The build up of static voltages on an antenna with so much wire up in the air could be a real danger to the operator and his property. This build up will occur, even when no actual electrical storm is in your area. PW

Valve&Vintage

Stand to attention! It's Ben Nock G4BXD on duty in the vintage shop this month and amongst other things he's looking at an interesting Racal manpack set and a vintage receiver awarded to heavy smokers!

Hello once again and I hope the year so far has been as interesting for you as it has for me, I've visited several rallies and renewed numerous old acquaintances. I'll press on with news that a recent addition to the more modern side of my collection here in Kidderminster is a Racal mini manpack fully synthesised h.f. transceiver, the PRM4031.

The Racal set covers 1.6 to 30MHz in 100Hz steps, runs 10W in high power, and 6dB less in low power. On offer are the a.m., c.w. and l.s.b. and u.s.b. modes.

There's an built-in antenna tuner and the transceiver weighs about 3kg without the battery, 7kg with the battery, handset and rucksack. My 1990 copy of *Jane's Military Communications* lists the PRM4031 as the smallest of its type in the world.

Test On 3.5MHz

A quick test on 3.5MHz with my 41m (135 ft) long wire resulted in very good reports of between 5/6 and 5/9 from **G3JJJ**, **G4PXR** and **G3UZB** whose QSO I cheekily broke into (Thank you gentlemen). I also had a good report of 5 and 9 from Jersey on 1.8MHz.

The PRM4031 set is very easy to operate: All you do is dial up the frequency required, switch to **Tune** and adjust the antenna tuner for maximum smoke. Two little light emitting diodes (l.ed.s) on the tuning meter even tell you which way to rotate the tuning control to get maximum output.

As well as l.s.b. and u.s.b. the set has what sounds like a narrow audio filter for c.w. use. However, the a.m. mode sounds like it's using the u.s.b. position on receive while transmitting reinserted carrier with modulation on the upper sideband only. This is a common system for producing a form of a.m. from s.s.b. equipment.

Followed Home Again!

Recently, an unusual radio followed me home (yet again!). This time it was an old marine set, the Ajax Electronics Leader transmitter-receiver This is a three band receiver tuning 160kHz to 4MHz, although it also has facilities to be crystal controlled.

The unit is all solid state (although using older generation OC35s, etc) with the exception of a pair of power amplifier (p.a.) valves - missing - which may be 6L6 or similar. The transmitter is crystal controlled, selection being made by a large front panel mounted switch.

In practice, the Leader appears to be capable of either simplex or duplex working. Duplex operation was required when the used as a radio telephone on board ships.

The whole set is powered from 24V d.c. and there are various power transistors and transformers inside which are obviously inverters for the p.a. valve's high tension and transistor modulation stages. The set also has a loudhailer option and a **horn** option, though I'm not quite sure what that means (no doubt some kind soul will tell me).

Finally, although the receiver has a beat frequency oscillator (b.f.o.) I can find nowhere to connect a key to the transmitter. So it might be for a.m. use only.

Then it was time to switch the Leader on! When I applied power there was a general hiss out of the speaker but no signals, and I soon discovered that the receiver's tuned circuits were all off alignment.

● Fig. 2: The Ajax Leader transmitter-receiver set. The receiver tuning is on the left. he transmitter tuning control is for p.a. tuning adjustment (see text).

A few moments later, after a bit of twiddling with my magic tuning stick a I was soon receiving BBC Radio 4 on long wave. I also heard various stations on the medium wave band.

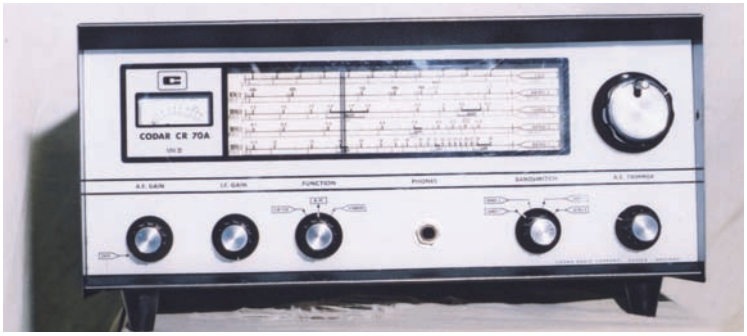
However, when I tried to adjust the 1.8/3.5MHz band coverage I found a stuck tuning slug in the r.f. mixer coil. It would not budge and in the attempt to break it up and extract it...the coil came loose inside the can.

I then had to remove the screening can and found the wires to the coil has broken. Unfortunately, there are five connections to the coil but without a circuit or layout it will be a hard task to replace it in the correct position. So, if anyone out there has a circuit - I could do with some help! Thanks.

The Codar Receiver

Another old favourite that reappeared recently is the Codar CR-70A receiver. This four valved, four band set is quite a nice little unit. True, it's very basic, with

● Fig. 1: The miniature h.f. Manpack, PRM4031. The size can be judged from the BNC sockets on the right hand edge (see text).



● Fig. 3: The Codar CR-70A receiver, simple clean lines make this a very nice set to play with (see text).

only the four valves, simple b.f.o. with no adjustment, no fine tuning and limited controls **but it does have all that is required for a basic general coverage set**.

The 70A's main tuning scale is long enough to still be usable at the top end of 28MHz, and it also has separate i.f. and a.f gain controls which in conjunction with the antenna trimmer and a decent S-meter make it quite nice to play with. Indeed, while using it recently I was very surprised to be able to hear so much. Short wave broadcasting stations up around 16MHz or so were good strength, and the set exhibited little drift and the selectivity was adequate.

Codar produced a whole range of sets and accessories the most famous I suppose was the AT5 transmitter and T28 receiver. These formed a very compact 1.8 and 3.5MHz a.m./c.w. station and were very popular in the 1960s being very popular in the mobile role. The company also produced add on Q-Multipliers and a range of aerial pre selectors, valve driven at first then transistorised.

The PR-40A Pre Selector was a later example, was designed for 12V d.c. operation and could be used in front of any receiver to increase sensitivity. The unit tunes 1.5 to 35MHz in three ranges and has an adjustable gain control to prevent overloading the receiver.

Domestic Bliss

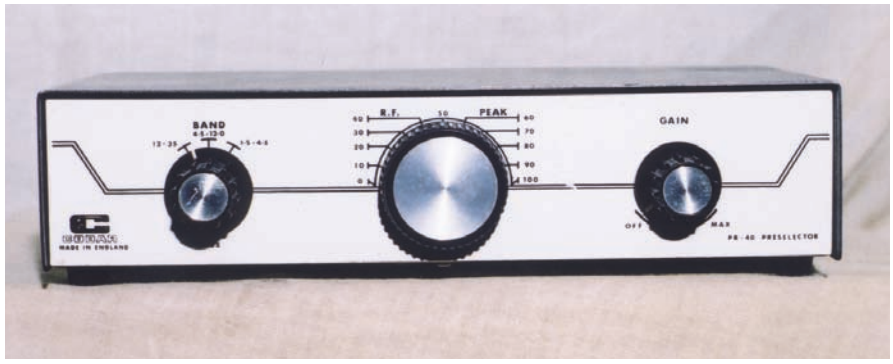
Something of a drastic turn in direction now, at least for me, as I'm now looking at a domestic set and an old one at that! As readers will know by now I'm not really into domestic sets but this little item was too interesting to ignore. It's a Kolster Brandes **Masterpiece** dating from 1930. It's a two valve set, 2V heater Fotos type valves made in France. The set tunes medium and long wave and is of a tuned radio frequency (t.r.f.) design.

The cabinet is made from Bakelite and the lid, which houses the loudspeaker, lifts up and swivels to sit on top of the lower section. Two controls for tuning and reaction are available and the speaker has an adjuster control to obtain best quality audio. This example has a few cracks etc but a little tender loving care should work wonders.

The interesting thing about KB set is the fact that the entire production run was purchased by the cigarette manufacturer Godfrey Phillips Ltd., and given away to smokers on receipt of 500 coupons which where inside packs of Best Dark Virginian cigarettes. I hope the volume is loud enough to be heard over the smokers cough!

Unknown Indicator Unit

Regarding the unknown Indicator I mentioned last time I was in the vintage shop (February issue) I have to thank **Sean Williams**, **Ray Relf** and especially **Dave Babington** for writing in with their suggestions. It turns out the unit is in fact a Type 162 Indicator and was part of the H2S radar system used in heavy bombers like the Lancaster.



● Fig. 4: The Codar PR-40A Preselector, the audio gain control incorporates the On/Off switch.

● Fig. 5: The KB Masterpiece t.r.f. vintage set, the two valves sit nicely inside the set with loudspeaker above (see text).

Dave has already restored a full system along with other similar units and restoration of my unit is now underway. This will include getting a rotating trace on the screen, and it, along with a Gee Indicator also under restoration, should prove very nice display items when finished.

My thanks also go to **John Bonner G0GKP** and **Bob Grimes G0GVZ** (hope all went well with the operation Bob) and the boys at the Cambridge Rally in February. Another great little rally and its hoped that the event is in the same location next year, so remember to check in *PW* for dates, etc.

Well that's it for now. I can be contacted at: **62 Cobden Street, Kidderminster, Worcestershire DY11 6RP**, or via my web site at **www.qsl.net/g4bxd**, or E-mail to **g4bxd@qsl.net**. *PW*

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REPORTS & INFORMATION BY THE LAST SATURDAY OF EACH MONTH.

For much of the time propagation on the v.h.f. and u.h.f. bands during February was not particularly inspiring. Conditions on the 50MHz band were rather poor with virtually nothing being reported between February 1-18.

There was some very minor auroral activity that occurred on February 13-14 but you needed to be in the far north of the UK to make anything of it. From February 19 to the end of the month however, there was the expected increase in trans-equatorial propagation (t.e.p.) with daily openings into Africa. However, these ionospheric openings which occurred around midday were restricted to stations in the southern half of the UK.

Propagation on the 144MHz band and higher frequencies was dependent on tropospheric conditions. For much of February the weather patterns were very unfavourable but in the period February 13-19 high pressure was located over much of the UK. This enabled many long distance contacts, mainly into Germany and Scandinavia, to be made on the v.h.f., u.h.f. and microwave bands.

Turning first to your reports of activity on the 50MHz band. The station of **Jamie Ashford GW7SMV**, Monmouthshire - IO81 reports hearing 3C5I (Equatorial Guinea) on many occasions during the latter two weeks of February. Unfortunately that station was mostly heard in beacon mode whilst the owner was at work.

Regrettably if you haven't already worked 3C5I then you've missed your chance as he closed down in mid-March and has transferred back to Houston, Texas. Look out for him using his home call KB2WF later in the year.

Jamie also mentioned hearing the South African beacons ZS6DN and ZS6TWB on February 21, the expedition stations C56/DL7CM and C56/DL2OE (Ghana) on February 25 and 28 and an Italian expedition station 5U2K operating from Niger. He thinks that he may have been the first GW station to contact this station at 1430UTC on February 28.

At my QTH, Herefordshire - IO81, I heard 3C5I (JJ43) mostly in beacon mode but on one occasion as a real live operator! The station of 5N9EAM/6 (Nigeria) was putting in a strong s.s.b. signal at 1315UTC on February 24 but he was more intent in working the very strong southern European stations rather than operators in the UK.

On February 25 the expedition team on the Comoros Islands D68C was heard very briefly by mixed-mode propagation. The station of D68C had a t.e.p. opening into southern Europe and I could copy them very occasionally via meteor bursts lasting 10 seconds or less.

A few other UK stations reported similar effects. At 1410UTC on February 28 I bagged C56/DL2OE (IK13) on both c.w. and s.s.b. modes for a new country on the 50MHz band and followed that up with an s.s.b. contact with 5U2K (JK13) at 1425UTC.

Chris Young MW1TYO, South Glamorgan - IO81, was also fortunate to work both expedition stations C56/DL2OE and 5U2K especially as he had to wait until school was over before contacting them. Fortunately he was able to work both stations on s.s.b. within 10 minutes of arriving home around 1600UTC.

Other DX stations reported during the month included TR8CA and TR8XX (Gabon), ZS6AXT, ZS6BTE, ZS6VR and ZS6WB (South Africa). In the main these stations were worked by UK stations situated in locator squares IO81, IO91, JO01 and those further to the south. Hopefully during April there may still be a smattering of African DX and some isolated openings via t.e.p. into South America.

Look for African stations from 1200-1400UTC and South American stations much around the same time. By the end of April you may also experience the first of the intense Sporadic-E (Sp-E) openings into Europe.

ACTIVITY ON 144MHZ

Now I'll turn to your reports of activity on the 144MHz band and higher frequencies. At these frequencies the propagation is largely dictated by the prevailing weather patterns.

Between February 13-19 there was a large high pressure system situated over the UK extending north-east into Scandinavia and northern Germany. According to reports the best propagation occurred on February 14 with contacts being made into Denmark (OZ), Germany (DL), Norway (LA) and Sweden (SM) on the 144, 430 and 1296MHz bands. There was also some very good contacts made into the nearer reaches of the continent on the 5.7 and 10GHz bands during the period.

At the station of **G4LOH**, North Yorkshire - IO94, c.w. and s.s.b. contacts were made on the 144MHz band with Polish operators SP2GCE (JO94), SP2NBH (JO94), SP4MPB (KO03) and LY2IC (KO14) in Lithuania. The station of LY3OD was heard on the following afternoon but the c.w. signals were very weak.

Over in south Wales GW7SMV made many s.s.b. contacts including the stations of LA4YGA (JO48), OZ7ABA (JO57), SK7CY (JO66) and SK7MW (JO65). On February 18 he also contacted LX2DX (JN29) in Luxembourg and reports hearing the HB9HB beacon in Switzerland.

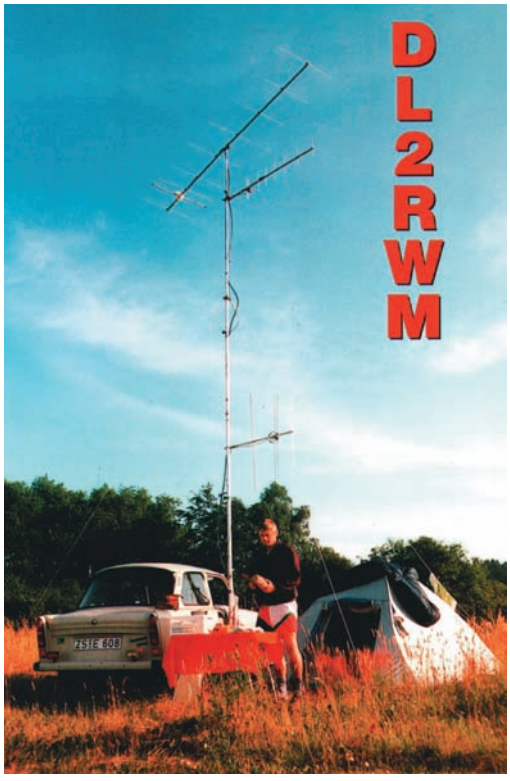
Alan Home G0TPH (Leicestershire - IO92) mentions that following his success during last summer's Sp-E season he is now paying more attention to the 144MHz band. Running 25W to an indoor 4-element Yagi he managed to work down to the Black Sea with s.s.b. contacts in the Bulgaria (LZ) and Romania (YO) area. He reports that he still runs low power but has changed the antenna to a 9-element Yagi at 12M above ground and that he is conveniently located at the top of a hill with good views from the north round through east to the south. This helped enormously during the tropo opening on February 14.

Alan was very pleased to work his first Swedish station SM7ALC (JO65) which was also his first tropo contact over 1000km. The QSO was conducted in c.w. and he mentions that this shows the value of listening at the low end of the band. On the following day he contacted SK7MW on s.s.b. as well as a number of stations in Belgium, Germany and Holland.

Novice Dutch station **Wilfred Jansen PD1ANQ** (JO31) mentions making many s.s.b. contacts with UK stations during the evening of February 14. Most were in the range 500-600km and included contacts with G0NFA, G3KEQ, G7OLZ, G8GEA, G8GXP, G8HGN, G8UWS, M0BTZ, M0TOM, M1CKZ, M5FUN, GW4FRX and GW7SMV.

Peter Frenning OZ1PIF (JO65) reports making 60 contacts on the 144MHz band during the opening on February 14-15.

THIS MONTH DAVID BUTLER G4ASR HAS REPORTS OF EXPEDITION STATIONS ON THE 50 AND 144MHZ BANDS.



● The portable v.h.f. station of DL2RWM.

Running a Yaesu FT-847 transceiver, a Gi7b valve amplifier running 350W and a 13-element Yagi he contacted the UK stations G3JHM and M0BTZ (both at 998km) and G0NFA at 983km.

Stations in the UK were reported to have made s.s.b. QSOs on the 430MHz band with stations such as DG4XD (JO53), DL3YEE (JO42), LX1JX (JN39) and SM1FMT (JO97). On the 1296MHz band c.w. and s.s.b. contacts were also made into Germany and Sweden. Some of the DX included the stations of DK3BU (JO33), DH8AG (JO31), DK6AS (JO52), PA0BAT (JO31) and PA5DD (JO22).

Reg Woolley G8VHI (Warwickshire - IO92) reports making s.s.b. contacts with SM7FMX (JO65) on the 430 and 1296MHz bands. Other contacts on the 1296MHz band included OZ6OL (JO65) and PA5DD. As is often the case the tropo conditions were also exceptional on much higher frequencies.

Ufe PA5DD contacted the station of G4BRK (IO91) on the 5.7GHz band and reported hearing the personal beacon of G4LOJ (JO02) on the same band with 599 signals. Way up on the 10GHz band Ufe reports making a c.w. contact with G4BRK (IO91) over a 445km path and hearing the GB3MHX beacon (10368.830MHz) located near Ipswich, Suffolk.

Don Hayter G3JHM (Hampshire - IO91) reported on the DX cluster working the stations of G0WZV (JO01), G3GNR (IO70), G3LQR (JO02) and PA0WWM at 397km. The station of PA0WWM (JO22) also made contacts on the 10GHz band with G3KEU (IO91) at 434km, G8ACE (IO91) at 415km and heard the beacon GB3SEE (IO91) over a path of 336km. The best DX of this microwave event occurred around midnight on February 14 when the station of G6DER (IO93) made an s.s.b. contact with the German operator DH8AG (JO31) over a 646km path. Really tremendous!

EXPEDITION REPORT

I've received the following expedition report from *QUA - All on 2M*. This is a new newsletter produced by **Derek Gilbert G0NFA** and covers all aspects of operation on the 144MHz band. The good news is that this monthly newsletter is free to anyone with internet access.

Send an E-mail to Derek at **QUA@144mhz.co.uk** for further details. Between February 17-20 Derek G0NFA, Bill M0BTZ and Jon M5FUN operated from a coastal site in locator square JO00 situated near Eastbourne, Sussex. The group used an Icom IC-271A, a Mirage solid-state amplifier running 150W and a 15-element Cue Dee Yagi.

The main callsign used was G0NFA/P but both M0BTZ and M5FUN also used their callsigns on occasions. Derek reports that conditions were very good with a large pile-up of stations from Belgium, France, Germany and the Netherlands calling continuously. He mentions that over 50 stations informed them that JO00 was a new square thus making the expedition a worthwhile effort.

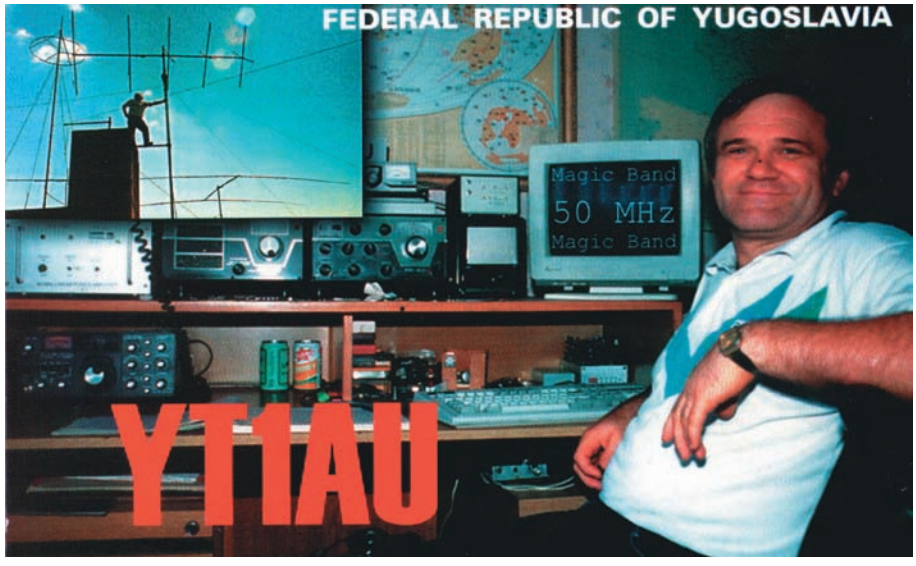
Over 300 stations from 11 countries were contacted during the mini-expedition. Some of the s.s.b. DX worked by G0NFA/P included HB9QQ (732km), OE9NHI (779km), DL2ARD/P (819km), DG5CST (836km) and DK5RQ (870km).

Bill M0BTZ mentions that low mist was visible on the horizon all the time and this helped to create a duct into much of Europe. He was pleased to work OE9NHI (Austria) for a new country whilst using his call sign M0BTZ/P and reports making 130 contacts over paths greater than 500km. His longest distance contacts included the stations of DL3YB/P (681km), F4ARU (682km), DL6AQI/P (687km), HB9PJT (715km), DK1KO (739km) and F5BUU (818km).

Bill also mentions that he was active from home (Hampshire - IO91) on February 15 during the good tropo conditions. He runs an Icom IC-251E transceiver, 100W amplifier and a 17-element F9FT Yagi but has a bad take-off to the east. His best s.s.b. contacts during the evening were DK3XM (JO43) at 792km, DG4XD (JO53) at 826km and OZ1PIF (JO65) at 998km.

WANTED LOCATOR SQUARES

Maybe this month's reports have made you think about carrying out a v.h.f. expedition this summer? If so you may want to know which are the most wanted locator squares on the 144MHz band. Guido DL8EBW has provided details of such rarities and although many are located in eastern Europe some are much nearer to home. Among the top wanted squares in Europe are IO41, IO42, IO43, IO44, IO52, IO55 and IO61 (all in the Irish Republic), IO65 (which encompasses both Northern and Southern Ireland and the Scottish islands of Islay and Jura) and IO67 (Isles of Skye, Lewis, Harris, Benbecula, North Uist and South Uist).



● Well known 50MHz operator, Zika Jovanovic YTIAU.

DEADLINES

That's it again for another month. Forward any news, views, comments or photographs to the address and by the date given at the top of the column.

Thanks for your letters and good luck with the DX. See you again next month.

73 David G4ASR

HF HIGHLIGHTS

BY CARL MASON GW0VSW

12 LLWYN-Y-BRYN
CRYMLYN PARC
SKEWEN
WEST GLAMORGAN
SA10 6DZ

Tel: (01792) 817321 E-MAIL: carl@gw0vsw.freeserve.co.uk

REPORTS, INFORMATION AND PHOTOGRAPHS TO ME PLEASE BY THE 15TH OF EACH MONTH.

I start this month's column with a letter sent in by QRP enthusiast **Peter Barville G3XJS** who has been running an interesting website dedicated to DX QRP operators. Peter say's "I was finding it very fustrating to discover that QRP operations were taking place which I and others would very much like to have worked, but new nothing about. I therefore decided to run a site in the hope that those planning to operate QRP from rare or unusual DXCC countries or locations would let me know in advance, thus giving as many as possible the chance to benefit from their efforts.

Peter continues "By using information supplied by the operators themselves, or information I have read elsewhere, I try and give these operations as much publicity as possible. I know operators have used my simple text based website to look for and work, QRP DXpeditions which might otherwise have been missed. As a rule, the DX QRP opertors are looking for QRP/QRP contacts and do not necessarily welcome attention from QRO operators on the bands which 'spots' on the DX clusters tend to generate. By keeping the publicity in-house I hope we can avoid the QRO QRM".

Peter's website can be found at **http://www.barville.freeserve.co.uk** with a mirror site at **http://www.qsl.net/g3xjs** Look here to find the latest list of future QRP operations and calendar of QRP related events and contests.

NEW QSL CARD

The **Prudential Amateur Radio Society** was formed when an inaugural station **GB3PRU** came on air from the then Prudential Head Office at Holborn Bars in London in 1978. In that year a v.h.f. callsign **G8PRU** was issued followed some years later by G0PRU and **GOPPS** (Prudential Pension Services).

The society celebrated the Prudential's 150th birthday in 1998 using the call **GB150PRU** operating from its Sport & Social Club in Tilehurst near Reading. Secretary **Dennis Egan GW4XKE** said "Our original QSL card needed to be bought up to today's standards, replacing the old design, which has been used for the past twenty years! The Prudential ARS are more than pleased with their new card produced by Geoff Fermor G8RCZ at FDS Graphics".

MOST WANTED DX

The editor of *QRZ DX* **Carl Smith N4AA** has published the results of The DX magazines 100 Most Wanted survey for the year 2000.

A complete breakdown of this has been posted on the website at **http://www.dxpub.com** under DX News and is also included in the January/February issue of the magazine. As it stands the top ten are:

1 P5 (North Korea)
2 VU4 (Andaman)
3 BS7 (Scarborough Reef)
4 3Y/B (Bouvet)
5 VU7 (Lakshadweep)
6 KH5K (Kingman Reef)
7 YA (Afghanistan)
8 VP8/SS (South Sandwich)
9 3Y/P (Peter Island)
10 7O (Yeman).

DX NEWS

For the island chasers amongst you keep an ear open for Jean-Marc F5SGI who will operate from Yeu Island EU-064 as F5SGI/P from April 14-21st. He will be active on all bands 3.5-28MHz c.w. only. Please QSL via the bureau.

Practical Wireless reader **Brian Waddell GM4XQJ** will be operating QRP in Portugal as **CT/GM4XQJ** from May 26 until June 2nd. He then moves on to Spain where he will sign **EA8/GM4XQJ** from June 3-16th. He will use an MFJ-9020 and dipole antenna cut for 14MHz. Please QSL via homecall.

Those of you who fancy a DX holiday might try a visit to the website **http://www.dxholiday.com** DXholiday is a site that lists QTHs around the world where DXpeditions have taken place and includes contact information for the owners. There is also a useful list of amateur friendly hotels and club stations.

CARL GW0VSW HAS A JAM PACKED COLUMN THIS MONTH NOW THAT MORE OF YOU ARE SENDING IN YOUR REPORTS - KEEP THEM COMING!

PROPAGATION REPORT

It looks like the openings on h.f. this month have been much longer according to the propagation report from **Don McLean G3NOF** in Yeovil, Sommerset. Don say's "The long path to Australia and New Zealand has been open most days around 0800-1000UTC. On 14MHz the short path to Alaska, Asia and Australia has been excellent between 1600-1800UTC. West Coast American stations have had very strong signals from 1500-1800UTC.

Don continues "A few Pacific stations have also been heard over the North Pole on the 14 and 21MHz bands. Afternoons have seen activity from African stations on most bands between 1300 and 1600UTC, again with good signal strengths. The **D68C** DXpedition has been heard most days with varying signal strengths and large pile-ups! However, their 10MHz signals have not been so strong here".

YOUR REPORTS

On to your reports now starting with **John Heys G3BDQ** in Guestling near Hastings who operated c.w. for several hours on 1.8MHz and finally worked D68C

● A novel but practical idea - Mike G3SUK with his wardrobe shack which he completely gutted to fit all his Amateur Radio gear inside! The ARRL DXCC Millennium Award above Mike's head was awarded for contacting at least 100 countries on the DXCC list during year 2000!

(Comoros) at 2256UTC. Shortly after that he worked N7JW (USA) in Utah for a new state. With KH6 (Hawaii) and KL7 (Alaska) already 'in the bag'

John only needs three more W7s before he can boast of Worked All States on Top Band. For operation here John uses his 136kHz l.f. antenna with five top loading wires. This makes around 500 feet of copper wire up in the air! Well done John and good luck finding those last few states.

On 3.5MHz Don G3NOF worked just one s.s.b. station, VP5/WB9Z (Turks & Caicos Islands) at 0026UTC.

THE 7 & 14MHZ BANDS

All c.w. operator **Ted Trowell G2HKU** spent a good deal of time on 7MHz during the evening using a Ten-Tec Omni 5 at 70W to a G5RV antenna. Stations worked include DU3/G4ZVY (Philippines), 5B4AGC (Cyprus), CU8/DJ6SI (Azores), P4/K2LE (Aruba), YK1AH (Syria) and PZ5RA (Surinam) between 2230 and 2200UTC.

Using a QRP plus, inverted G5IJ and up to 5W of c.w. on 14MHz was **Roy Walker G0TAK** in Cleveleys near Blackpool. Roy's large QRP log lists contacts with ES4RD (Estonia), OK1AHX (Czech Republic), HA5AJ (Hungary), IK2RGV (Italy) and OZ3AAA (Denmark) between 1400 and 1700UTC. Using s.s.b. Roy made one QSO with K7NWS (USA) in Seattle despite some poor band conditions at 1910UTC. Trying PSK31 and again using QRP, DL5FDP (Germany), LA5AKA (Norway) and 9H4CM (Malta) were all worked around 1500UTC.

THE 18 & 21MHZ BANDS

On to 18MHz now and the log of **William Sampsom M5WNS** who lives in Chudleigh, South Devon. Using his FT-1000MP and 100W of s.s.b. into a G5RV, William worked D68C (Comoros) at 0828 followed later in the day by PY0F/PT7BZ (Fernando De Noronha) at 2031UTC.

A warm welcome now to new reporter **Brian Waddell GM4XQJ** in Laurieston, Falkirk. Brian has been using a newly acquired Ten-Tec Argonaut 2 and up to 3W of c.w. into a Hy-gain TH3 tri-band beam to work some nice DX.

Brian's log lists contacts with 3C0AD (Pagalu), 3W7CW (Vietnam), 4J4K (Azerbaijan), JT1AS (Mongolia) and YK9A (Syria) between 1100 and 1800 UTC. Excellent work with QRP Brian. I look forward to more reports from Scotland in the coming months.

Also busy on 21MHz was **Mike Baker G3SUK** in Stowmarket, Suffolk. Using an IC-746 and 80W of s.s.b. into a Carolina Windom Mike logged T90E (Bosnia-Herzegovina) 1453, 9K2ZZ (Kuwait) 1455, SV1EJC (Greece) 1547, AK1L (USA) on NA-055 1505 and CN8ZL (Morocco) at 1710UTC.

THE 24 & 28MHZ BANDS

Sean Gilbert G4UCJ in Milton Keynes used his IC-746 and 50W of c.w. into his new indoor dipole for 24MHz. The antenna is working very well as Sean's log proves. Contacts include DS5USH (South Korea) 1049, J3/DL7RJ (Grenada) 1154, KL7J (Alaska) 1152, HC2/UA4WAE (Ecuador) 1225, V31SN (Belize) 1446, YI9OM (Iraq) 1453, C6AGS (Bahamas) 1709 and one 5W QRP contact with D68C (Comoros) at 1120UTC.

Sean has now worked the D68 DXpedition on seven bands and goes on to say "The manners shown by some European operators when trying to work DX is appalling, even on c.w. It is amazing what language can be heard in some h.f. pile-ups"! I am sure many readers will agree with you Sean?

Also on the 24MHz band, despite a hectic month, was **Robin Trebilcock GW3ZCF** in Bishopston near Swansea who found time to work LU3DL (Argentina) and SU3AM (Egypt) around 1200UTC. Both contacts using s.s.b. and an IC775 with 100W to a 40 metre horizontal loop.

Finally on to 28MHz and Trelewis in Mid-Glamorgan where **Leighton Smart GW0LBI** has been using his President Lincoln transceiver with 20W of s.s.b. into an 11 metre half-wave vertical. Leighton found the band "In excellent shape" working 9K2ZZ (Kuwait) 1306, VP5/WB8Z (Turks & Caicos Islands) 1322 and SV3FUO (Greece) at 1405UTC.

PW LISTENING & OPERATING WATCH LIST. (ALL TIMES UTC)

Sean Gilbert G4UCJ operates most days around 0700-1100 and 2200-0200 on all bands using an IC746 and 50 watts into a half size G5RV, WARC inverted vee or HF6 vertical.

Rob Mannion G3XFD listens and operates weekdays and weekends, 1800-1830 on 3.7MHz with 50W s.s.b. and 3.530 or 3.560kHz and 18.105KHz QRP c.w. using an Alinco DX-70 transceiver and a long wire or Funkteknik vertical.

Carl Mason GW0VSW listens and operates on 14.060MHz most mornings at 0630 with a Ten-Tec Argonaut 2 and inverted G5RV.

Don McLean G3NOF operates 1030 Saturdays on 3.685kHz on the ISWL Net or 1030 Sundays on the Yeovil ARC Net on 3.665kHz using a Kenwood TS-950 and trapped dipole antenna.

Leighton Smart GW0LBI operates on some weekdays and Sunday mornings on 28.555KHz s.s.b regardless of conditions, at 1030 using a President Lincoln transceiver with 20W to a 11m half-wave vertical.

Brian Williams GW0GHF operates most afternoons on h.f. around 1400. He also simultaneously monitors 70.200kHz s.s.b. and 51.510KHz n.b.f.m at this time and is looking for weekly skeds especially on 70MHz. Contact Brian QTHR.

George Woods G3LPT operates an open net on 29.630KHz n.b.f.m. 0930 Tuesday to Friday.

John Wheeler G0IUE monitors 28.600KHz n.b.f.m. every evening between 1730 and 2230 regardless of conditions using a Yaesu FT-920 transceiver running 100 watts and 2-element tri-band beam.

Brian Parsons GW0KZK listens and operates on 14.250KHz 1000-1200 and 1400-1600 most days using an Yaesu FT-1000MP and 100W into a 4-element Mosely beam.

QSL CORNER

Here is this month's list of QSL information starting with 9G1BJ, 9G1YR and 9G1TM via Paul Godolphin, G4XTA, Pleasant View, Blencarn, Penrith, CA10 1TX. 9H3SWL via PA2SWL, BA4RF via BY4RSA, CO8OTA and CO9OTA via Grupo DX Cuba, POB 6060, Ciudad, Habana 10600, Cuba. D68C via G3SWH, E21CJN via W3PP, EO6F via UX0FF, FM/IV3FHH and FM/IV3JVJ via IV3TDM, LU8XW via EA5BD, PJ2I via ON4CFD, RI3OTA via RW3GW, SO8ZZ via UY5ZZ, T88FO via JR2FOR, UN2E via DF6PB, V26EA, V26ET, V26FM, V26WP, VP2MPA, 8P9JR, 8P9RS, 8P9JT and 8P9JU via PA5ET, YK1AH direct via POB 9597, Damascas.

SIGNING OFF

Well, another month has flown by and a good deal of DX has been worked by all our reporters. I have been very pleased to see an increase in the number of letters and E-mails from you all. So many this month it has been a struggle to fit you all in - keep up the good work!

73 Carl GW0VSW

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TEL: (01508) 570278

E-MAIL: rcooke@g3ldi.freeserve.co.uk

PACKET: G3LDI@GB7LDI

I have just been trying to work The DXpedition station D68C on c.w. on 7MHz. (Yes, c.w. can be classified as a data mode!) I was having a hard time – correction; D68C was having a hard time, from QRM on his own frequency. The usual de + call being sent on top and to the side. Despite numerous 'up' from several policemen, no notice was being taken.

I spent some time sorting out what was going on. Interestingly, D68C was on 7.002MHz working stations up from his frequency and YK9A was on 7.001MHz doing the same thing. This was causing tremendous frustration for both I suspect and several stations calling up 2 or 3kHz were just sending de their call so I would think that both D68C and YK9A were both wondering what was happening.

I also suspect that several stations who thought they had a QSO with one, had a QSO with the other – if you see what I mean! This just demonstrates the hassle that can take place on our crowded bands. Hopefully the situation with MFSK16 will be sorted by the time this is being read.

While on the subject of MFSK16, I have been corrected on something I said in my previous column. When talking about Piccolo I said it was in use by the Foreign Commonwealth Office (FCO). Apparently this is incorrect; the FCO ceased all h.f. communications in 1993 and operators were made redundant, so Piccolo has not been used by the FCO for about eight years.

The Diplomatic Wireless Service (DWS) used the Mark D 32 tone Piccolo that was produced in house until it was replaced by the Mark F 6 tone Piccolo, made by Racal. Both the Mark D and Mark F sent/received Piccolo at 75Bauds.

The 12 tone Piccolo was used by the Army and RAF only. Two receivers were used, both tuned to the same frequency in what is known as diversity reception mode, the outputs from both receivers was fed to the Piccolo unit.

The output of the Piccolo unit was five unit baudot that was fed to the secure radio room and its receive teleprinter. A second teleprinter, used for sending, was fed to the Piccolo unit, the output tones of which were fed to the 500W transmitter.

DIGITAL WACRAL

The World Association of Christian Radio Amateurs and Listeners (WACRAL) are now using the digital modes to communicate. If you are interested in this organisation and wish to keep in touch, then Packet is the place for you. **Victor Brand G3JNB**, kindly sent me the information, together with a copy of the *The WACRAL Annual, 2001*.

In the WACRAL annual you'll find lots of digital information with a resume of each mode and its suitability and so on. There is help available within the organisation too. The Data Co-ordinator is Paul G0MHD, who was on the DCC a few years ago.

Paul is professionally involved and can offer help with Internet related problems too. Your contact for Packet is G3TWS and K3PCS for Pactor. The website to check is: **http://www.wacral.org** as shown in **Fig. 1.** You will probably find several bulletins on the BBS system addressed to WACRAL, so take a look.

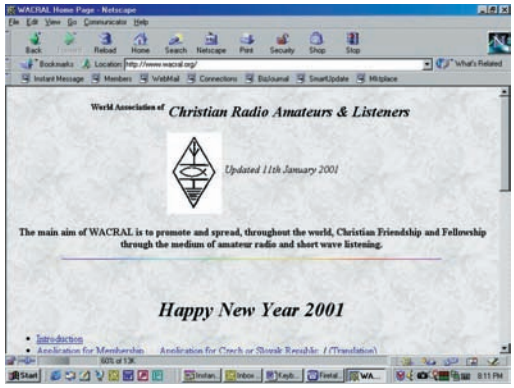

Fig. 1: For updates on WACRAL check out their website (see text).

RON RODEN

Ron G4GKO, is one of the old-timers who do incessant work on behalf of the rest of us, although maintaining a rather low profile! However, you can now see him in all his glory at **www.iarums.cwc.com Fig. 2.**

Take a look and you will find it fascinating to read all the intruders that we have on our bands. Fascinating it might be, but at the same time it's very annoying too. They seem to operate with impunity; commercial stations who should know better, but care less, have the advantage over the Radio Amateur. They can use brute force and assert their presence without a care!

If you feed all the intruders to the Intruder Watch, then something can be done, albeit it might take time. If you have any Intruders to report, you should send them to **Chris Cummings G4BOH, Castle View, Childs Lane, Brownlow, Congleton, Cheshire CW12 4TO.**

Chris is very conscientious and a very firm supporter of the work for Intruder Watch. He also has a close relationship with Radiocommunications Agency's (RA) Baldock Radio Station and on many occasions has got them to place and official complaint against an offending station.

ROGER COOKE G3LDI HAS UPDATES ON MFSK, DIGITAL WACRAL AND NEWS OF AN INCREASE IN PACKET ACTIVITY.

GOOD NEWS!

Despite reporting a decline in Packet activity, it seems that some are succeeding in increasing it! I was very encouraged to read the following bulletin on the BBS recently from **Dave WB4IUY**:

WB4IUY@WB4IUY.#RTP.NC.USA.NOAM
WB4IUY@NCGATE.AA3DN.AMPR.ORG

Packet radio is very much alive here in the central part of North Carolina in the U.S.A. In my local area we have:

#1 The global (this network) Packet Radio BBS system. It is very robust, with lots of options for users to connect ports on 145.01 and 147.54 at 1200baud, 223.70 at 9600baud, and on 441.00MHz 9600baud. Remote nodes in the area provide the distant user a method to connect, and the system works very well. It is maintained by a very dedicated sysop (WA4MJF) who keeps everything running in top condition.

#2 APRS (Automatic Position Reporting System). This provides a graphical interface and allows for real-time keyboard chatting, as well as message delivery/holding, mobile tracking, real-time weather reporting, etc. Our APRS operation on v.h.f. is on 144.390MHz. Lots of fun!

#3 SEDAN (Southeastern Emergency Digital Association Network). This is a system spanning the eastern coastal states (and others) of the USA and is dedicated to keyboard-to-keyboard communications in

real time. No BBS forwarding, DXClusters, etc. Very efficient during emergencies, great for passing emergency traffic in times of need. SEDAN operates on 145.77MHz in our area.

#4 DX Cluster: In my local area, we have a great DXCluster with a local user node for spotting DX contacts and sharing this info with others. The DXCluster also provides the ability to send mail, receive WWV info, DX Bulletins, etc. Lots of fun while DXing! The local DX node is called DXCLAY and operates on 145.67MHz.

#5 Local area BBS system. We have a local area group of small BBS's for local chatter, tossing things around, and message storage. This system also has a 9600baud gateway for local users to jump over to the W4RAL global BBS. Our local area mailbox system is on 145.03MHz.

#6 Packet<=>Internet Gateway: AA3DN has a local packet to Internet gateway on 145.73MHz, 1200baud. This provides a wireless method of sending/receiving email to and from the Internet, as well as providing a message storage area and ports for users to connect out to the global RF Packet BBS system. It can also be reached via telnet, allowing folks to connect from the Internet, and surf out to RF-based users on Packet radio.

All of this activity can be participated in with basic packet radio equipment and has a lot of area activity. I have five packet stations that run in my shack full time, just to keep up with a lot of this fun stuff. I have my logging program to monitor the packet DXCluster for countries I don't have, the packet BBS connects to me and picks up/delivers mail twice per hour from around the world, I have several friends I talk to daily on APRS, etc.

Dave comments at the end of the bulletin as follows:

"Packet radio is not the internet, but the inverse is true as well. I hear some folks mention that the Internet is much faster, but then I send E-mails via the Internet to friends and it's days before they answer, so speed really isn't the issue. I like packet radio because I can do all of this stuff when the power is out of phone lines are down, and it is just another facet of radio that has always intrigued me".

Dave invites comments as to activity in your area. Send him a packet message, just to let him know we still have a network of sorts here in the UK!

LINUX POLARITY

Linux seems to be gaining in popularity and will soon be a competitor for MS as a very viable alternative operating system. Indeed, the proponents of Linux all seem to prefer this to Windows.

Redhat is the most popular version and it's now possible to cut some of the hard work of preparing an individual operating system from components obtained from various sources and then compiling it. A tedious process that puts most people off, but it's now possible to purchase a Linux distribution for about £50. This usually comes as a package that normally includes the software, manuals and a technical back-up by telephone for a limited period. This would be the way for me if I were going to try it.

Have a look at **Fig. 3**, **www.redhat.com** if you are considering changing your operating system, but don't consider it lightly. However, buying a ready-made product is far easier and the installation is quite straightforward. *Redhat* also has a number of training courses, allowing you to familiarise yourself with the operating system, and you can even get a professional certificate once you've completed the training!

Some of the other Linux versions include Debian, Linux Mandrake, Caldera OpenLinux, Skygate Linux Pacific Turbolinux, Suse Linux, and Yellow Dog Linux.

Phil Cadman G4JCP, would be very interested in finding out just how many people are using, or intend using, Linux. Phil is very keen himself. Phil can be contacted at **phil@valveandvintage.co.uk**

Phil is also very interested in APRS and is running this on a Linux operating system. He has a version of <APRSdec> that runs on RedHat 5.2/Perl 5.004 which decodes APRS data directly from the serial port and onto the screen.

READY-BUILT DATA MODEM

Johnny Melvin G3LIV, has a fully isolated interface available for PSK31 and it can also be used for SSTV. With simple wiring and a few plugs and sockets, you could be up and running on that mode in a short time. Two versions are available, one that you can wire up yourself, this costs £30 and the other wired for a specified transceiver, for £37.

If you want more details, take a look at Johnny's website (**Fig. 4**) at **www.btinternet.com/~g3liv/psk31isoterm.html** Cables are also available and there are pictures of the modem on his website, together with full details on how to purchase.

That's all for this instalment, cheerio for now and keep your news, views and photos coming!

Roger G3LDI

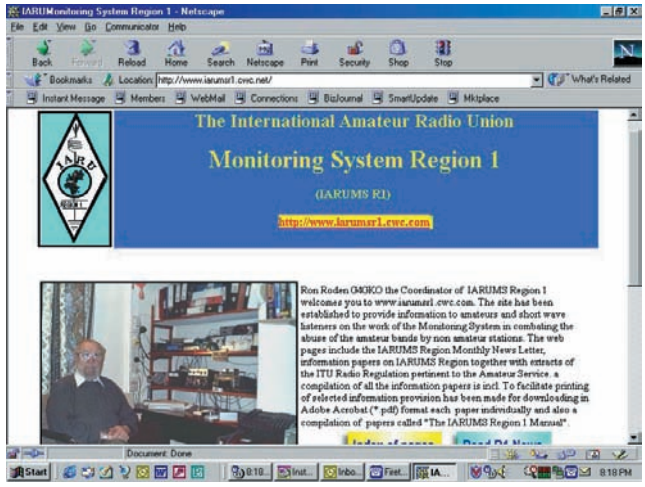

Fig. 2: Check out Ron G4GKo at www.iarums.cwc.com

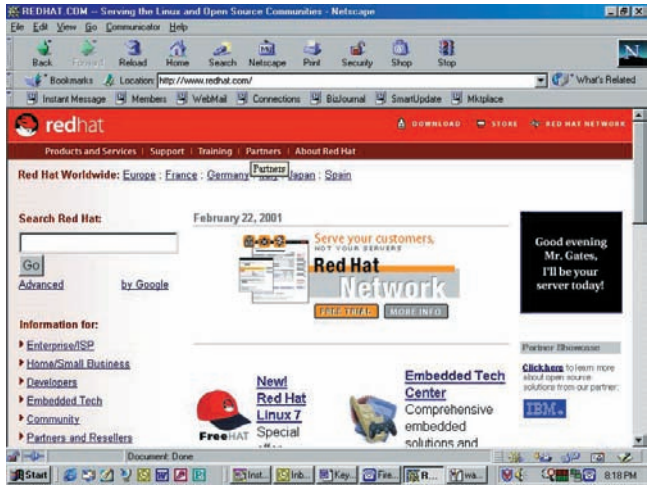

Fig. 3: If you are considering changing your operating system have a look at the redhat site.

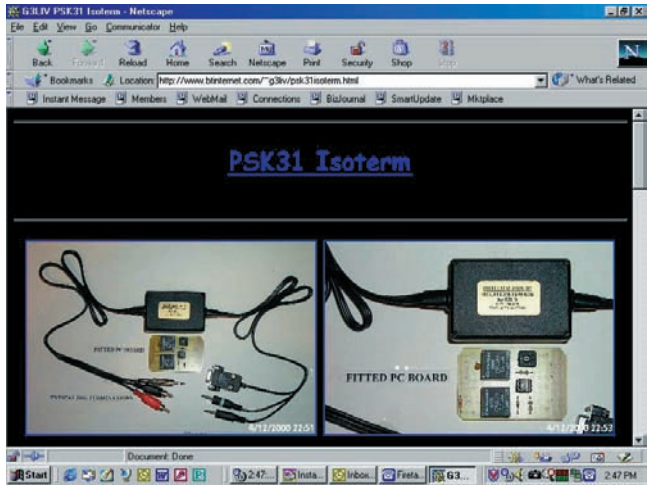

Fig. 4: Johnny Melvin G3LIV's website.

TUNE-IN

BY TOM WALTERS

PO BOX 4440, WALTON, ESSEX CO14 8BX

E-mail: tom.walters@aib.org.uk

TOM WALTERS REPORTS ON HIS FINDINGS THIS MONTH FROM THE HF BROADCASTS BANDS.

There is increasing activity from **Digital Radio Mondiale** (DRM). This is the consortium of broadcasters, manufacturers and other organisations who aim to make digital transmission possible on all a.m. frequencies below 30MHz (i.e. medium and short wave). Several tests have been carried out, as I reported last month. Then back in February tests were conducted from Juelich in Germany.

One of the problems that some engineers have predicted and that DRM may still have to contend with, is that the digital signals on a.m. may create interference with nearby channels. The Juelich tests were on 5900 and a very experienced listener, using high-end equipment, reported that the digital signal on 5900 totally killed 5895 and 5905 and interfered with 5890 and 5910kHz. The listener watched the signal on a 'scope and says that the DRM signal was clearly twice as broad as the normal analogue signal.

Well, that's what tests are for, to find out exactly what are the effects actually created. However, the **International Telecommunication Union** (ITU, **www.itu.int**) has now approved the standard proposed by DRM.

Digital Radio Mondiale are very upbeat about services getting up and running in a year or two, with the special receivers being extremely cheap. What will be the result, though, if adjacent channels get swamped?

When the DRM digital transmissions start to proliferate, this will possibly mean that each station will need fewer channels. All well and good. But in the changeover period you may find a lot of disruption, if the Juelich tests are any guide. Meanwhile, advance announcements of future tests should be available via the DRM web site at **www.drm.org** and via Media Network's site at **www.rnw.nl/realradio /html/medianews.html**

A new member of the DRM is NHK, the Japanese broadcaster. Their overseas station, **Radio Japan**, had trouble with a fire at Montsinery Relay Station in French Guinea. Service has now been fully restored, and Radio Japan apologises for any disruption to service. Radio Japan's schedule is very complex, as they broadcast in 22 languages.

SUMMER SCHEDULES

At the time of going to press, no stations had their A-2001 (summer in Europe) schedules ready. The previous Radio Japan schedule for English to Europe was 0500-0600 on 5.795, 7.230; 0600-0700 on 7.230; 1700-1800 on 11.970 and 2100-2200 on 6.115, 6.180, 11.830MHz. For details of the new schedule, you can write to **2-1, Jinnan 2-chome, Shibuya-ku, tokyo 105-01, Japan**. The NHK web site is **www.nhk.or.jp/rjnet** and their E-mail address is **info@intl.nhk.or.jp**

While in Asia, I understand that **Radio Pyongyang**, the international radio service from North Korea, has changed its name to **Voice of Korea**. The previous schedule for Europe was: 1500-1600 on 4.405, 6.575, 9.335, 11.710, 13.760 and 1900-2000 on 4.405, 6.575, 9.335, 11.710 and 13.760MHz, but there was a very big change between this and the schedule preceding it - transmission times changed as well as frequencies.

So try last year's schedule for the European summer months as well: 0500-0600 on 3.560, 11.710, 13.790; 1800-1900 4.405, 6.575, 9.335 and 2100-2200 on 11710, 13,760MHz. The Voice of Korea does not seem to have a web site or an E-mail address, so try the old fashioned method of writing to **Voice of Korea, Pyongyang, Democratic People's Republic of Korea** or FAX to **+850 2 814418**.

Radio Free Europe/Radio Liberty (RFE/RL), based in Prague, is restructuring its Romanian Service. Romanian is spoken not only in Romania but also in Moldova, a little landlocked state sandwiched between Romania and Ukraine. The RFE/RL station is increasing Romanian-language transmissions for Moldova from 25 minutes to one hour, five days per week. The service will be the only transmission from any broadcaster specifically aimed at Moldova.

The Romanian schedule at present is: Mon-Fri at 0400-0430 on 6.010, 6.030, 9.835; Tue-Sat at 0500-0600 on 6.095, 7.165, 9.725; Mon-Fri at 1700-1800 and 1900-1945 on 6.115, 7.165, 9.725MHz.

Of course you can also hear Radio Moldova International. Try listening at: 0330-0355 on 7.520; 1200-1225 on 11.580, 21.530 and 2100-2125 on 7.520MHz.

NEW STATIONS

Here's details of a couple of new mini-stations I've come across. **Radio Vancouver** is a new weekly service from Canada to Hong Kong. Vancouver has many immigrants from Hong Kong and this private commercial operation aims to bridge the Pacific gap. It has been heard by DXers testing on 9.375 upper sideband 1200-1400UTC on Sundays.

The transmitter is on Taiwan and is an old military unit of 30kW power. All programmes will be in English and will include a segment called Happy Station, named like that on the old Dutch international service.

Also in Asia, another catch both by DXers in Europe and BBC Monitoring is **The Voice of Justice.** It's operated by the opposition party of Cambodia from an unknown location. Very cloak and dagger stuff. The station has been heard on 15.455MHz at 1000. Is it still operating? They may have been flushed out and paid the price by now - let me know if you hear it.

Radio Telefis Eireann (RTE) is popular all over the world, especially with Irish emigrants. You can get programmes direct from the web site: **www.rte.ie** from World Radio Network at **www.wrn.org** or on short wave.

The RTE programmes are radiated on s.w. via Merlin Communications, using sites in the UK, Singapore, Ascension and Sackville. The schedule in early March was: 0130-0200 Central America on 6.155; 1000-1030 Australia on 11.740; 1800-1830 Middle East on 9.865; 1830-1900 North America on 13.640; 1830-1900 Africa on 21.630MHz.

That's all for this month. In my next column I hope to be able to include up-to-date frequencies. Meanwhile the *World Radio TV Handbook, Passport to World Band Radio,* and the Association for International Broadcasting's *Global Broadcasting Guide*, all available from PW Publishing, will keep you going. Bye for now.

Tom

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You should state clearly in your advert whether equipment is professionally built, home-brewed or modified. The Publishers of *Practical Wireless* also wish to point out that it is the responsibility of the buyer to ascertain the suitability of goods offered for purchase.

FOR SALE

2m (144MHz) rig Navico AMR 100s, £130. 2m rig hand-held, no batteries. Kenwood Trio model TR-2400, £49. a.t.u. MFJ Versa Tuner V, £150. MCL 1100 easy reader momentum comms, £150. Mr Brouder G3ZJH, 169 North Road, Stoke, Gifford, Bristol BS34 8PH.

160-80m (1.8-3.5MHz) Codar AT5 TX plus power unit plus T28 RX. Recent overhaul, set of new valves, daytime radius 30 miles, Beautiful condition , £25 o.n.o. Tel: (01634) 379140

Am/f.m. stereo tuner/ amp with speakers, £5. Wharfdale Denton speakers, £6. Sony stereo cassette deck, £10. Pioneer digital tune, £10. Eddystone 830/7 or AOR3030 wanted, good condition please. Tel: 0141-649 2328 anytime.

AT-600D v.h.f., u.h.f. dual-band handie plus airband and wide-band coverage to 900MHz v.g.c., £100. Hewlett Packard Modem 56K Win98 u.s.b. connect, brand, new, boxed, £30. Both plus postage. John G3OAZ. Tel: (01256) 465126 (Hants).

AVO electronic testmeter MkIV, 56 ranges with multipliers, leads, prods, instructions, circuit, original, packing box, immac condition, collectors item. Siemen & Halske lab inst MA30 to .6 steps, MV 1000 to 10, 5 steps. Hartman & Braun A 0 to 1.5, 3 steps, £offers. Keith, Tintagel, Cornwall. Tel: (01840) 770048.

Bush type TR91. Supersonic upper mod PRM149, Thorens record deck, mod TD125MkII, teal tape deck, mod A510 tuner mod. TX930 tuner amp mod 210S (NP) radiogram, Murphy amplifer, vennings DOMSR. Anthony Coleman, Flat 1/3, 61 Keal Avenue, Glasgow G15 6NZ. Tel: Glasgow 944 3865.

Codar T28, AT5 and control unit, £70. HRO-M with 4 coils, p.s.u., £100. High power p.a. coils 160/80, £10. Digital answerphone, £5. Cirkit QRP a.t.u., £25. HP deskjet 660C printer, £50. Tel: Ben on (01562) 743252 (Worcs) or E-mail: 106312.1035@compuserve.com

Collins KWM, £400. 12V p.s.u. for KWM2 (A), £80. Comdel S.proc for Collins, £30. DX-394 receiver, 390. 545B 'scope, £75 all o.n.o. Several early computers some KW TX/RXs - ask. Ed, Suffolk. Tel: (01502) 715537.

Complete h.f. station for sale. Trio TS-520 txcvr. KW E-Zee match KW trap dipole. Top-band transverter, mic, leads, spares, £250 or offers. Mike G4EVZ, Essex. Tel: (01277) 623220 eve, or (01268) 403949.

Cushcraft R7000 7-band vertical antenna, as new, assembled once, never used, £250. Boxed Yaesu FRG-7700 recveiver, £250. Yaesu FAV7700 v.h.f converter, £50. Yaesu FRT-7700 antenna tuner, £40. All excellent condition with manuals. Tel: G3PRO on (01904) 744791.

DX-394 receiver, mint, boxed, £70 PRO2042 25-1300MHz. RX, mint boxed, £100. Sony ICF SW77 l.m.s & v.h.f. RX superb performer, slightly scratched hence £70. Wanted Eddystone 840C or similar. Peter G4IXY, St. Albans. Tel: (01727) 839908.

Ekco car radio type CR195 as fitted to Ford Zodiak 1965? 12V switchable pos or neg. Long, med wave. Valve with transistor o/p £15. Dave G6KIE. Tel: 0208 397 3614.

FR100B 80/10 (3.5-28MHz) amateur bands receiver v.g.c., Watson Wat-2 rcvr, a.t.u. andVectronics tuneable s.s.b./c.w. audio filter both new an unwanted any reasonable offers. Tel: (01246) 566040.

FT-290R NiCads, charger, hand mic and speaker mic, whip antenna and rubber duck, case, carry strap, handbook plus Microwave Modules linear MM145/25 25W all leads, fully working, good condition, £165 o.n.o. David GOICJ, Hollywood, Birmingham. Tel: 0121-430 2929.

HF linear home-brew using 4 PL519s, 400W p.e.p., 80. 40, 20m (3.5, 7, 14MHz), 250W p.e.p., 15m, 15 spare valves, some used, £135. Buyer collects, Wanted UPD 8243C chip I/O expander. John G4ILA, QTHR, Stockport. Tel: 0161 477 6702.

Howes DCRX 80m (3.5MHz) RX works very well, nicely constructed, nice case, DCS2 S-meter, CSL4, audio filter, atten, AA2 active RX, ant, kits, £40+ must be worth £10. George G4XSM, Suffolk. Tel: (01284) 768084.

IC-725 complete working station includes Icom 100W h.f. transceiver, Revox 30A p.s.u. Ventronics VC-300DLP a.t.u. Watson half size G5RV all for £350. Alan G3WNS, Bucks. Tel: (01494) 713770 or E-mail: albawill@btinternet.com

Icom 32E 2/70m (144/430MHz) hand-held, 3 batts, charger, £150. BNOS CLX144-25-180 linear amp, hardly used, £140. Spectrum Communications RP10S 10mtr pre-amp, £25. Malcolm, Rugby. Tel: (01788) 843224 or E-mail: malcolm.hall2@ntlworld.com

Icom 745 h.f. TX/RX gen coverage, f.m., c.w. etc., mic, manual, £425. Also matching Icom AT100 auto with leads, manuals, £125. Both items v.g.c. Tel: (01332) 880633 (Derbyshire).

Icom 746 h.f./v.h.f. transceiver, good condition, boxed, all accessories, manual and RS746 remote control software package, £850. 10 Mega, 250Mb computer, Zip drive, IDE, internal mounting , two disks , £50 carriage extra. Steve, Woodbridge, Suffolk. Tel: (01986) 798524 or E-mail: steve@sboldvic.demon.co.uk

Icom IC-W2E dual-band hand-held for 2m/70cm (144/430MHz), extras, boxed, excellent, £195. Trio R6000 general coverage receiver, v.g.c., £125. Mizuho MX-7 pocket s.s.b./c,w, transceiver for 40m (7MHz), portable antenna, case, manual, v.g.c., £195. ERA Microreader, self contained data decoder and Morse tutor, as new, £15. Palstar KH-6 hand-held for 6m (50MHz), extras, boxed, v.g.c., £95. Opto 3300 counter, 1MHz - 2.8MHz, as new £65.

Inmarsat A Timestep Aerial monitoring system new, £250, sell for £150. Global a.t.u. AT-2000, £60. ERA Microreader, decoder, c.w., RTTY, Navtex, Amtor, ERA Synoptic decoder, ERA RS232 display, ideal starter kit. £195 o.n.o. Tel: (01926) 854556 (Warwick).

JRC NRD525 ???? with manual, boxed, very good condition, £400, Buyer inspects, collects. Tel: (01782) 396453 (Staffs).

Kenwood TS-140S h.f., 0-30MHz, 100W, mic and manual, good condition, £350 o.n.o. Nial G0VOK, Northwich. Tel: (01606) 871413.

Kenwood TS-570D transceiver, fitted automatic a.t.u. and DRU-3A digital recording unit, serial interface for communication with computer. Perfect condition, complete with box and manual, £650, carriage extra. Ken G3RDG, NW London. Tel: 0208 4558 831 or E-mail: kenneth@btinternet.com

Kenwood TS-870 showroom condition, four month use, silent key sale, £950. Icom 706 showroom condition with seperation kit, £450. MFJ-948 Versa Tuner, £70. Eddystone EC10 MkII receiver, £70. John, West Yorkshire. Tel: (01937) 844197.

Kenwood TS-950SDX, boxed, imac, with Heil HC5 boom, brand new, £1450. FT-101ZD with manual and Shure deskmic, g.w.o., £220 o.n.o. 10m (28MHz) 4-element beam as new, £60 o.n.o. Tel: (01772) 783324 or (07931) 607483.

LCR digital test meter, precision, Gold model M195, £45 as new. Kent single paddle key, £30. Starmaster keyer, battery, mains leads, boxed, £30. Starmaster keyer, battery mains, leads, boxed, £30. All plus £1 towards cost of postage. Mr Fielding G4IHF, St. Annes, Lancs. Tel: (01253) 726685.

Marconi TF144G signal generator 85kHz - 25MHz, £15. Wayne-Kerr a.f. signal generator 10Hz-120kHz with Telequip serviscope, £20. General Radio Company USA unit oscillators 500kHz-5MHz, 5-50MHz, 50-250MHz, 180-600MHz, 250-920MHz, £30. Collect only. G3OXV, QTHR, Daventry. Tel: (01327) 702265.

MARS USAF large stock of circuit boards, capacitors, resistors and other old radio/comm equipment, any offer considered. Buyer collects. Tel: (01895) 810617 (Middlesex).

MFJ Multi-Morse reader two months old, used once, immaculate condition cost £149, sell £100. Manual reason for sale, no offers, good Morse RTTY reader, post paid. Geoff, Tamworth. Tel: (01827) 830644 evenings.

MFJ-249 h.f./v.h.f. SWR analyser, counter covers 1.8-170MHz, Boxed with handbook, £110 inc, postage. Tel: (01723) 363982 (Scarborough).

Oscilloscope Hitachi 50MHz o.s.d. with cursors, £250. Thurlby bench power supply, quad mode, dual ouput, l.e.d. displays, £150. Thndar function generator, £50. All items boxed, mint condition. Tel: (01843) 231512.

R & N 2 to 6m (144/50MHz) transverter 25W output, £100 o.n.o. FRDX 400 RX c/w speaker needs some alginment, £30 o.n.o. Tel 0117-908 6947.

R1155 with built-in mains power unit. S-meter and internal speaker, nice condition, excellent results, also CR100, AR88LF, £150 each. Mohican, £95. TF2002AS Marconi generator a.m./f.m., £195. Tel: (01872) 862291.

Racal RA17 MkII, AR88D, AR88LF, HRO-M + 8 coilsets, Eddystone EB35 HICKOK 539C, tube tester, Racal MA716, telescopic 8m mast. Marconi RT353 UK/PRC344 PCR No. 3 MkI/II. Yaesu Marine FTM-2001 (new and boxed), Racal v.h.f. AMU 20-80MHz. Jim, Poole. Tel: (01202) 668446.

Racal RA17L manual and some new valves, good condition, £130 o.n.o. Eddystone 990R 25-240MHz, £50 o.n.o. Tel: Paul on (01242) 520054 evenings.

Realistic PRO 2039 program base scanner, 200 channels, boxed, manual, like new,. Revco Nomad broad-band aerial, *Scanners 3* book, £50. George G4XSM, Suffolk. (01284) 768084.

Revox R/R tape recorder model A77. Revex s.w.r. power meter, WS20 handie CB tester mod, F5117. Grundig Sat1000 (not working), LCR meter, Escort mod elc131D, frequency meter mid M5300, TX/RX output tester mod if 106SA (Marconi), £offers. Anthony Coleman, Flat 1/3, 61 Keal Avenue, Glasgow G15 6NZ. Tel: Glasgow 944 3865.

Silent Key Sale: TS-430S fitted with a.m. & 270Hz c.w. filters complete with PS430D DC pwer supply, £420. FT-990 fitted with 400Hz & 270Hz c.w. filters complete with EP900 d.c. power supply, £650. G3VPG, Leicester area. Tel: (01455) 888201 or E-mail:j.bennett@lboro.ac.uk or G3PVG@GB7AYI.

Sony reel-to-reel video recorder CV2100. Good condition but fault. Some tapes, service and operating manuals, £20. Dave G6KIE. Tel: 0208 397 3614.

Trio HF/TS-830S, 0-30MHz, boxed with manual, £350. Kenwood a.t..u. AT230 manual, £110. Kenwood digital frequency controller DFC 230 manual, £60. Kenwoood mic MC50, £35. Tel: (01302) 859451.

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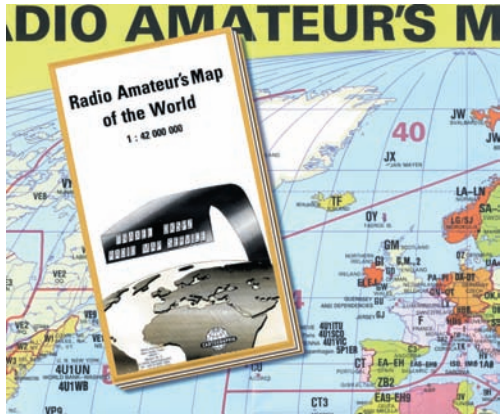

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ELECTRONICS

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CIRCUIT SOURCE BOOK 2 - BP322. R.A. Penfold	214	£4.95
DIGITAL ELECTRONICS (CD-ROM). Mike Tooley	n/a	£45.00
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ENCYCLOPEDIA OF ELECTRONIC CIRCUITS Vol. 7	1128	£32.95
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To advertise on this page see the booking form below.

Classified Ads

Whilst prices of goods shown in advertisements are correct at the time of going to press, readers are advised to check both prices and availability of goods with the advertiser before ordering from non-current issues of the magazine.

For Sale

TECHNICAL MANUALS, AR88, CR100, R210, HR0. £5 each. Circuits £1.50. Hundreds available. SAE list. Bentley, 27 De Vere Gardens, Ilford, Essex IG1 3EB. Tel: 0181-554 6631.

VINTAGE SERVICE DATA. Radio, Audio, Electrical, TV & Cimema - 1900 to 1970s. Complimentary Newsheet. 50 Meddon St, Bideford, Devon, EX39 2EQ. Tel/Fax 01237 424280. E-mail: savoy.hill@virgin.net Web Site: http//freespace.virgin.net/tudor.gwilliam-rees Visa & Mastercard.

THE RF-KIT CATALOGUE. send 2x 2nd class stamps or browse www.rf-kits.demon.co.uk Hands Electronics, Tegryn, Llanfyrnach, Pembs SA35 OBL. Tel 01239 698427.

QUARTZ CRYSTALS 1MHz/£2.95, 1.4MHz/£3.95, 3.2768MHz/£1.95, 3.932160MHz/£3.75, 4.0MHz/£1.00, 4.194304MHz/£0.75, 6.0MHz/£1.54, 7.03MHZ/£3.95, 8.9985MHz/£2.95, 9.0MHz/£2.95, 9.0015MHz/£2.95, 10.0MHz/£1.54,10.106MHz/£3.50, 10.245MHz/£1.54, 10.7MHz/£1.54, 11.155MHz/£3.50, 16MHZ/£1.54, 21.04MHz/£4.75, 21.06MHz/£4.75, 28.060MHz/£3.75, 45MHz/£1.75, 9MHz X-Tal filters for SSB & CW from £30.00/unit. 5MHZ, 6MHz, 10MHz OCXO's £12.50/unit. X-Tal circuits, applications booklet/£5.00. Cermamic resonators, applications booklet/£3.50. Wanted freq. sweep generator to 25MHz. Good price paid. IQ-Electonic Design. Tel: 020-8391 0545. E-mail: japj69@netscapeonline.co.uk

DISCLAIMER

Some of the products offered for sale in advertisements in this magazine may have been obtained from abroad or from unauthorised sources. *Practical Wireless* advises readers contemplating mail order to enquire whether the products are suitable for use in the UK and have full after-sales back-up available. The publishers of *Practical Wireless* wish to point out that it is the responsibility of readers to ascertain the legality or otherwise of items offered for sale by advertisers in this magazine.

Valves

VALVES GALORE Most valves available from stock. Otherwise obtained quickly. Please send SAE stating requirements or telephone. **VALVE & ELECTRONIC SUPPLIES** Chevet Books, 157 Dickson Road, Blackpool FY1 2EU. Tel: (01253) 751858 or Fax: (01253) 302979. E-mail: chevet@globalnet.co.uk

VALVES:- OVER 50000 STOCKED Ham, Vintage, Military, Audio. SAE for FREE list to: Wilson Valves, (Jim Fish G4MH), 28 Banks Ave., Golcar, Huddersfield, West Yorks HD7 4LZ. Tel: 01484 654650/650725. Mobile:- 07733 283084. Fax: 01484 655699. E-mail: wilsonvalves@surflink.co.uk Visa etc. Fast & personal service.

VALVE ENTHUSIASTS: Capacitors and other parts at attractive prices! Ring for free list. Geoff Davies (Radio). Tel: (01788) 574774.

VALVES AND ELECTRONIC COMPONENTS Large stocks. Send for list to: Stuart Scott, 19 Portway, Steying, W. Sussex BN44 3QF. Tel/Fax: 01903 815118. E-mail: triumph.76@btinternet.com

VALVES WANTED NEW AND BOXED!! KT66 GEC £35, KT88 GEC £60, EL34 & EL37 Mullard £27, EL84 £4, DA30, DO30, PS25 all at £120 each. PX4 globe shape £70. DA100 GEC £150, ECC83 Mullard £5, GZ32 & GZ34 Mullard £10, ECC32 & ECC33 Mullard £15. Other types wanted. Colomor (Electronics) Ltd. Tel: 01403 786559. E-mail sales@colomor.demon.co.uk

THE SUPPLY OF VINTAGE COMPONENT PARTS/VALVES Valve communications receiver service. Also vintage radio/audio equipment service. A one year guarantee on service. Write to: Vintage British Radio Components, 132 Lincoln Way, Corby, Norhants NN18 9HW.

TOP PRICES PAID

for all your valves, tubes, semi-conductors and ICs.

Langrex Supplies Ltd.
1 Mayo Road, Croydon Surrey CR0 2QP.
TEL: 0181-684 1166. FAX: 0181-684 3056.

Holidays

NORTH WALES HOLIDAYS – Caravan - bunkhouse - camping. Elevated rural site, two miles from beach, use of shack and antennas, open all year. Tynrhos, Mynytho, Pwllheli. Tel: 01758 740712. Packet address: GW4VAG@GB7BAY#55.GBR.EU

Wanted

WANTED FOR CASH Valve or solid state communication receivers Pre-1980. Preferably working and in good condition. Non working sets considered also domestic valve radios. Items of Government surplus wireless equipment and obsolete test equipment. Pre-1965 wireless and audio components and accessories. Pre-1975 wireless and TV books and magazines. Also, most valves wanted for cash. Must be unused and boxed. CBS, 157 Dickson Road, Blackpool, FY1 2EU. Tel: (01253) 751858 or Fax: (01253) 302979. E-mail: chevet@globalnet.co.uk

EURO
Electronic Services
Wanted: all types of communication and test equipment. Any quantity, any condition. Tektronix, Hewlett Pack, Firebird, B.T., W&G and others.
Euro Electronic Services.
Tel/fax 01782 768848.
E-mail: mbutters@euro.bissnet.co.uk

Miscellaneous

INTERESTED IN VINTAGE TECHNOLOGY? The OTS Vintage Technology Catalogue is packed with lots of interesting items for the vintage wireless, television and telephone enthusiast, collector and restorer. Send 2 x 1st class stamps to: Old Time Supplies, P.O. Box 209, Banbury, Oxon OX16 1GR.

WIRELESS SET FAULTY? I am able to repair any old valve radio, valve Hi-Fi amp, crystal set, communication receiver, etc. Enquires R. B. Kerr. Tel: 01349 852332 (Invergordon).

Don't forget to write in block capitals when filling in the form below!

ORDER FORM FOR CLASSIFIED ADS

Please photocopy this form if you prefer

PLEASE WRITE IN BLOCK CAPITALS

The prepaid rate for classified advertisements is 42 pence per word (minimum 12 words), box number 70p extra. Semi-display setting £13.90 per single column centimetre (minimum 3cm). Please add 17.5% VAT to the total. All cheques, postal orders, etc., to be made payable to PW Publishing Ltd. Advertisements, together with remittance, should be sent to the Classified Advertisement Dept., Practical Wireless, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: (01202) 659920, Fax: (01202) 659950

Please insert this advertisement in the ..... issue of Practical Wireless (if you do not specify an issue we will insert it in the next available issue of PW) for ..... insertion/s. I enclose Cheque/P.O. for £..... (42p per word, 12 minimum, please add 17.5% VAT to total).

Name: .....

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Practical Wireless – 1 year.

❑ £30 (UK)

❑ £38 (Europe Airmail)

❑ £42 (Rest of World Airsaver)

❑ £49 (Rest of World Airmail)

Special joint subscription with

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❑ £60 (UK)

❑ £73 (Europe Airmail)

❑ £81 (Rest of World Airsaver)

❑ £93 (Rest of World Airmail)

Monitoring Times – 1 year (12 issues).

❑ £38 (UK)

❑ £43 (Europe Airmail)

❑ £49 (Rest of World Airmail)

BUY OF THE MONTH

❑ Please send me ..... copy(ies) of the ***Radio Amateur's Map of the World*** at the special price of **£5 inc. P&P (UK), £5 plus £1 P&P (Overseas). Offer closes 9 May 2001.**

£ .....

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CREDIT CARD ORDERS TAKEN ON (01202) 659930
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To: PW Publishing Ltd., FREEPOST, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8ZZ

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Payable to PW Publishing Ltd.) **£**.....

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CREDIT CARD ORDERS TAKEN ON (01202) 659930
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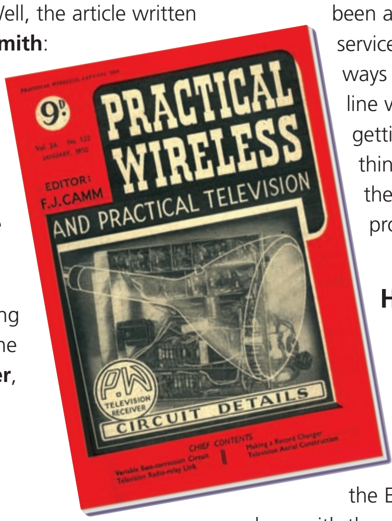
Where we link what's happening now with what happened 'way back when'

topical talk

The PW team bring you topical chat, notable events and take you back in time to radio days gone by.

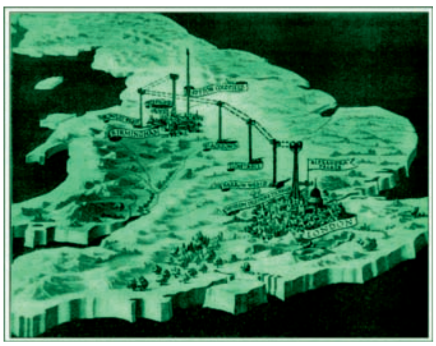
Home brewed TV

Did you build your own television set in the 1950s using surplus airborne radar units? Well, the article written by **Norman Smith**: *Home Brewed TV - The 1355 Way* - published in this issue really got the team busy looking for suitable illustrations. The results are the adverts featuring the 1355 IF/Video Units from archived copies of *PW*, along with similar adverts from the collection of **Charles Miller**, Editor of *The Radiophile* magazine.



Engineering Triumph

The team also discovered a fascinating article from the January 1950 issue of *PW* describing the engineering triumph involved in getting the old 405 line television service to the Midlands. That in itself was a triumph of course, but much more was involved in getting TV to Scotland, Northern Ireland and the far flung Western and Northern Isles of our United Kingdom. To say that the Editorial team was impressed on reading the article is an understatement!



The comments from Norman Smith within his article lamenting the closure of the old Band I and II v.h.f. 405 line television service also struck a topical note because of the debates now being reported in the media regarding the future of the u.h.f. Band IV and V analogue service closure as the digital television service (both terrestrial and satellite) service grows.

From a technical point of view it's interesting for Radio Amateurs and *PW* readers (many of whom are involved professionally in broadcasting) to read and hear the debates going on regarding the merits of the digital television service when compared to the existing 625 line analogue transmissions. However, all the arguments have been aired before, the existing u.h.f. service was claimed to be superior in all ways when compared with the old 405 line v.h.f. service, etc. And without getting too involved the *PW* team think that most readers will agree that the u.h.f. service is not without its problems.

Hotting Up

Now the digital/analogue debate is hotting up. Joining the technical argument (decoding problems, bandwidth problems associated with antennas, etc.) the Editorial team are also aware that along with the veritable explosive expansion of digital television and radio services, the parallel production of enough new programmes doesn't seem to be keeping up. So, along with the argument being repeated the programmes seem to be following suit!

So, did you build your own TV in the 1950s? If so, how did you do it? Later on did you find that the TVI problems lessened with the introduction of u.h.f. only television?

Do you remember the famous VCR97 radar tube which was so popular for home-brewed TV receivers? Did you see TV on a green/grey hue (the VCR97 was available with different colour/persistence phosphors) screen? If so write in and share your memories. **The *PW* team, and other readers, are waiting to hear from you**.

Team Work!

Producing *PW* is, as I strive to convey to readers, the result of closely co-ordinated teamwork. The Art Department plays an incredibly important part in this and therefore we're extremely sorry to be saying farewell to **John Kitching** our Art Editor. John's been with us for the past three years and has introduced a superb level of co-operation between two busy departments. **Thank you John - good luck for the future**...we'll miss you and it's fitting that reproducing both illustrations on this page would not have been possible without your unstinting assistance and guidance. **It's been a very great pleasure working with you John!**

next month

Looking forward to the next issue of *Practical Wireless? Take a look at what's on offer!*

PRACTICAL WIRELESS

THE UK'S BEST AND ONLY INDEPENDENT AMATEUR RADIO MAGAZINE

Next Month in *Practical Wireless*, the magazine that brings you Amateur Radio & So Much More .....

COMPETITION

* **WIN** an **SGC SG-237** automatic antenna tuner in our easy to enter competition.

BUILD

* **David Rowlands G6UEB** shares his design for a traditional regenerative shortwave receiver.

FEATURE

* If you're interested in contesting then **David Dodds GM4WLL**'s article on devloping a contest station from scratch will enlighten you!

SPECIAL OFFER

* Your chance to buy a World Space digital satellite receiver at a very special price!

TIPS & TOPICS

* **Tex Swann G1TEX** presents more topical hints and tips to give you ideas to try.

Plus all your regular favourites including:

Amateur Radio Waves
Bargain Basement
Club News
Keylines
News
Radio Scene
Valve & Vintage

and much, much more!

*Contents subject to change

CAN YOU AFFORD TO MISS IT?
JUNE ISSUE
ON SALE 10 MAY
PLACE YOUR ORDER TODAY!

YOUR LOCAL DEALERS

Index to Advertisers

WiNRADiO®

http://www.broadercasting.com info@broadercasting.com Freephone: 0800 0746 263 Fax: 01245 287057

WR-1550 Specifications		PLL-based triple-conversion superheterodyne				
Frequency range	AM, SSB, FM-N	0.15-1500 MHz				
	FM-W	30-1500 MHz				
Tuning resolution	10 Hz (LSB/USB/CW: 1 Hz)					
Mode	AM, SSB/CW, FM-N, FM-W					
Image/Spurious Rejection	65dB typ.					
Dynamic range	70dB					
Signal noise linearity	± 5dB					
Selectivity	SSB/CW	2.5 kHz @ 6dB				
	AM	6 kHz @ 6dB				
	FM-N	15 kHz @ 6dB				
	FM-W	230 kHz @ 6dB				
Scanning speed	AM,SSB/CW	10 channels/s				
	FM-N, FM-W	50 channels/s				
Sensitivity	Mode	0.5-1.5 MHz	1.5-30 MHz	30-1000 MHz	1-1.5 GHz	
	AM	20µV	1µV	1µV	1.8µV	
	SSB	0.9µV	0.3µV	0.3µV	0.4µV	
	FM-N	0.4µV	0.4µV	0.4µV	0.4µV	
	FM-W	-	-	1.0µV	1.0µV	
Frequency stability	10 ppm (0 to 50° C)					
Antenna input	50 ohm (BNC connector)					
Audio output	0.2W (8 ohm load)					

WR-3150 Specifications		PLL-based triple-conversion superheterodyne				
Frequency range	AM, SSB, FM-N	0.15-1500 MHz				
	FM-W	30-1500 MHz				
Tuning resolution	10 Hz (LSB/USB/CW: 1 Hz)					
Mode	AM, SSB/CW, FM-N, FM-W					
Image/Spurious Rejection	65dB typ.					
Dynamic range	85dB					
Signal noise linearity	± 5dB					
Selectivity	SSB/CW	2.5 kHz @ 6dB				
	AM	6 kHz @ 6dB				
	FM-N	15 kHz @ 6dB				
	FM-W	230 kHz @ 6dB				
Scanning speed	AM,SSB/CW	10 channels/s				
	FM-N, FM-W	50 channels/s				
Sensitivity	Mode	<0.5 MHz	0.5-1.5 MHz	1.5-30 MHz	30-1000 MHz	1-1.5 GHz
	AM	n.sp.	3µV	1µV	1µV	1.8µV
	SSB	n.sp.	0.9µV	0.3µV	0.3µV	0.5µV
	FM-N	n.sp.	0.9µV	0.35µV	0.35µV	0.4µV
	FM-W	n.sp.	-	-	1µV	1µV
Frequency stability	10 ppm (0 to 50° C)					
Antenna input	50 ohm (BNC connector)					
Audio output	0.2W (8 ohm load)					

WR-3500 Specifications		PLL-based triple-conversion superheterodyne				
Frequency range	AM, SSB, FM-N	0.15-2500 MHz				
	FM-W	30-2500 MHz				
Tuning resolution	10 Hz (LSB/USB/CW: 1 Hz)					
Mode	AM, SSB/CW, FM-N (3), FM-W					
Image/Spurious Rejection	65dB typ.					
Dynamic range	85dB					
Signal noise linearity	± 5dB					
Selectivity	SSB/CW	2.5 kHz @ 6dB				
	AM	6 kHz @ 6dB				
	FM-N1	6 kHz @ 6dB				
	FM-N2	15 kHz @ 6dB				
	FM-N3	50 kHz @ 6dB				
	FM-W	230 kHz @ 6dB				
Scanning speed	AM,SSB/CW	10 channels/s				
	FM-N, FM-W*	50 channels/s				
Sensitivity	Mode	0.5-1.5 MHz	1.5-30 MHz	30-1000 MHz	1-1.5 GHz	1.5-2.8 GHz
AM/SSB/CW	AM	5µV	1µV	1µV	1.5µV	3.8µV
10dB S/N	SSB	0.9µV	0.3µV	0.3µV	0.5µV	1.8µV
FM-N/FM-W	FM-N1	0.9µV	0.35µV	0.35µV	0.4µV	3.0µV
12dB SINAD	FM-N2	0.9µV	0.35µV	0.35µV	2.5µV	0.4µV
	FM-N3	-	-	0.35µV	2.5µV	0.4µV
	FM-W	-	-	1µV	2µV	4µV
Frequency stability	10 ppm (0 to 50° C)					
Antenna inputs	2 x 50 ohm (BNC and SMA connectors)					
Audio output	0.2W (8 ohm load)					

WR-3700 Specifications		PLL-based triple-conversion superheterodyne						
Frequency range	AM, SSB, FM-N	0.15-4000 MHz						
	FM-W	30-4000 MHz						
Tuning resolution	10 Hz (LSB/USB/CW: 1 Hz)							
Mode	AM, SSB/CW, FM-N (3), FM-W							
Image/Spurious Rejection	65dB typ.							
Dynamic range	85dB							
Signal noise linearity	± 5dB							
Selectivity	SSB/CW	2.5 kHz @ 6dB						
	AM	6 kHz @ 6dB						
	FM-N1	6 kHz @ 6dB						
	FM-N2	15 kHz @ 6dB						
	FM-N3	50 kHz @ 6dB						
	FM-W	230 kHz @ 6dB						
Scanning speed	AM, SSB/CW	10 channels/s						
	FM-N, FM-W	50 channels/s						
Sensitivity	Mode	0.5-1.5 MHz	1.5-30 MHz	30-1000 MHz	1-1.5 GHz	1.5-2.8 GHz	2.8-4.0 GHz	
AM/SSB/CW	AM	5.0µV	1.0µV	1.0µV	1.5µV	3.8µV	4.0µV	
10dB S/N	SSB	0.9µV	0.3µV	0.3µV	0.5µV	1.8µV	1.8µV	
FM-N/FM-W	FM-N1	0.9µV	0.35µV	0.35µV	0.4µV	2.8µV	3.8µV	
12dB SINAD	FM-N2	0.9µV	0.35µV	0.35µV	0.4µV	2.8µV	4.0µV	
	FM-N3	-	-	0.5µV	1.5µV	3.8µV	4.0µV	
	FM-W	-	-	1.0µV	2.0µV	5.8µV	7.8µV	
Frequency stability	10 ppm (0 to 50° C)							
Antenna inputs	2 x 50 ohm (BNC and SMA connectors)							
Audio output	0.2W (8 ohm load)							

WiNRADiO AX-31B Planar Log-Periodic Antenna

The AX-31B antenna is a compact VHF/UHF directional antenna with an in-built amplifier, which provides a low-cost alternative to conventional VHF/UHF antennas (for example discones), especially for indoor professional and amateur applications.

NEW!!

This log-periodic antenna is constructed on a high-quality fibre-glass substrate, with a 20-dB amplifier directly mounted on the substrate, together with other surface-mount circuitry and a standard 9V PP3 type battery holder. A power switch is provided directly on the antenna.

The antenna is ideally suited for reception of VHF/UHF point-to-point communication where its directional characteristics can significantly improve rejection of interfering signals.
In professional applications, this antenna is ideally suited for EMC pre-testing, surveillance and monitoring.
The antenna covers a frequency range of 230 to 1400 MHz (a much wider frequency range can be received with reduced gain).

The AX-31B antenna package includes a 2 meter (6.5 ft) cable with an SMA connector for the antenna and a BNC connector for the receiver. Battery is not included.
While designed to be entirely general-purpose and performing well with any third-party equipment, the WiNRADiO AX-31B Planar Log-Periodic Antenna is especially suitable for WiNRADiO 1000/1500/3000 Series of receivers.

The antenna is designed for indoor reception. Its small footprint, the size of an A4 sheet of paper (11.5" by 8.5"), conserves space and makes concealed installation possible, if desired. The antenna is lightweight and installation can be achieved within minutes using double-sided adhesive tape.

£90.00 inc vat

Type	Log-periodic Dipole Array with amplifier
Frequency range	230 to 1400 MHz
Antenna Forward Gain	6.0 dBi (free space)
Amplifier Gain	20 dB
Amplifier Noise Figure	3.8 dB
Amplifier IP3	25 dBm
Primary Sensitivity	E-field
Polarization	Horizontal or vertical (depending on mounting)
Impedance	50 ohm (typ.)
Power	9V (PP3 type battery) @ 25mA
Connector	SMA
Front-to-back ratio	18dB min (180 degrees from main lobe)
Size	293 x 213 mm (11.5" x 8.4")

WiNRADiO PC RECEIVERS

Available as either an internal card that fits inside a PC, or as an external (portable) unit. WiNRADiO combines the power of your PC with receiver.

WiNRADiO receivers are suitable for:
[illegible], media monitoring, professional and amateur radio communications, scanning, spot frequency, spectrum monitoring, signal identification for surveillance and recording.
If you are seeking the ultimate receiver-in-a-PC with DSP facilities, check out the new WR3700i-DSP with real-time recording, signal conditioning qualities.

We are now able to offer you a complete range of WiNRADiO receivers:
- **WR1550e/WR1550i - £429 inc vat**
- **WR3150e/WR3150i-DSP - £1169 inc vat**
- **WR3500e/WR3500i-DSP - £1589.78 inc vat**
- **WR3700e/WR3700i-DSP - £1808.33 inc vat**

External stand-alone units connect to a PC either via serial port or an optional PCMCIA adapter.
External units are powered using either the supplied 12v power adapter, or an optional NiMH rechargeable 12v battery pack.

FREE GIFT!!

For your FREE info pack & demo disk visit our website: www.broadercasting.com Place your order over the internet and you'll recieve a FREE copy of Ferrell's 11th Edition 'Confidential Frequency List' (while stocks last)

*TRUNKED RADIO TRANSMISSIONS SHOULD ONLY BE RECEIVED AND DECODED WITH PERMISSION OF THE ORIGINATOR OF THE TRANSMISSION.

"Brick-Wall" Selectivity

Today's Premier class operators demand the best RF weaponry available. Yaesu's exciting new MARK-V FT-1000MP answers the call, with an expanded array of receiver filtering, 200 Watts of power output, and Class-A SSB operation capability for the cleanest signal on the band. Enhanced front-panel ergonomics saves you precious seconds in a DX or contest pile-up. Yaesu HF design and manufacturing know-how ensures that no short-cuts have been taken in our effort to bring you the best HF transceiver money can buy. For more QSOs in your log, and more awards on your wall, there is only one choice: the MARK-V FT-1000MP from Yaesu!

I. IDBT: Interlocked Digital Bandwidth Tracking System

The IDBT feature greatly simplifies operation by matching the bandwidth of the DSP (Digital Signal Processing) system to the net bandwidth of the 8.2 MHz and 455 kHz IF stages. The IDBT system monitors the settings of the SHIFT and WIDTH controls, and automatically sets the DSP bandwidth to match the user settings within the net bandwidth of the Analogue IF Filtering.

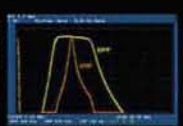

IDBT: A Breakthrough in Selectivity!


10-pole Collins® Mechanical SSB Filter

II. VRF: Variable RF Front-End Filter

Protecting the MARK-V's receiver components from strong out-of-band signals, the VRF system acts as a high-Q "Preselector," located between the antenna and the main bandpass filter networks, providing additional RF selectivity on the 160-20 meter Amateur bands for multi-operator contest teams, DX-peditions, or for operation near MW/SW broadcast stations.


VRF Features Large, High-Q Coils and High-Quality Relays


VRF Typical Bandpass Response (3.5 MHz)

III. 200 Watts of Transmitter Power Output

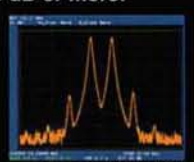
Utilising two Philips® BLF 147 Power MOSFETs in a 30 V push-pull configuration the MARK-V's Transmitter generates up to 200 Watts of the cleanest RF Power output available thanks to the conservative design of the PA Section.


Philips Power MOSFETs


High-Speed Automatic Antenna Tuner

IV. Class-A SSB Operation

Exclusively available on the MARK-V FT-1000MP , a press of a front-panel button engages Class-A SSB operation of the transmitter, at a power output level of 75 Watts. Class-A operation produces incredibly clean signal quality, with 3rd- order IMD suppressed 50 dB or more, and 5th- and higher-order products typically down 80 dB or more!


Class A 75 W PEP IMD

V. Multi-Function Shuttle Jog Tuning/ Control Ring

The immensely-popular Shuttle Jog tuning ring, which is concentric with the Main Tuning Knob, has a new look in the MARK-V: it now includes the activation switches for the VRF (left side) and IDBT (right side) features, so you don't have to move your hand position to activate these important circuits during contest or pile-up situations!

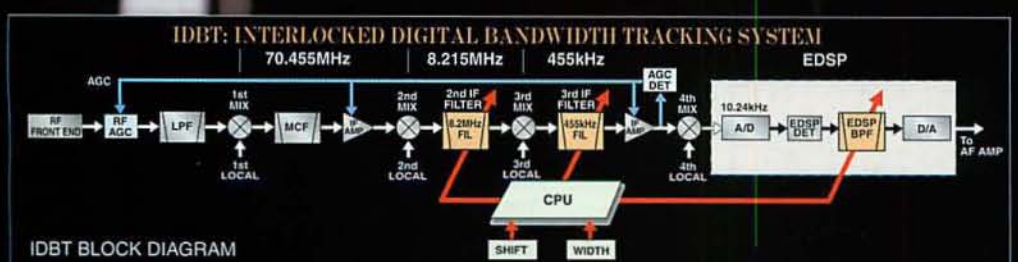

Access VRF and IDBT Features via Shuttle Jog Dial

DC 30 V / 13.8 V Power Supply FP-29

Photo shows optional MD-100A8X Deluxe Desk Microphone

HF 200 W All-Mode Transceiver

MARK-V FT-1000MP



IDBT BLOCK DIAGRAM

YAESU
Choice of the World's top DX'ers

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