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YAESU Choice of the World's top DX'ers

You can't Ignore The Price

FT-100 160 - 70cm All Mode

It's the small things that count and set it apart.

The only design of it's size that provides linear amplifier keying and ALC input. For digital modes there's a data socket. Bandwidths of 6kHz, 2.4kHz, 500Hz and 300Hz included as standard. Built-in keyer and CW reverse mode, plus DSP filtering down to 60Hz and audio peaking filter keeps the CW operator happy. And DSP also adds notch filtering and programmable microphone equaliser, whilst even more punch is achieved by the switch-able speech processor. Other features include Time-out, CW Ident, VSWR meter, ARTS, CTCSS, 1750Hz tone, 9600BPS, 300 Memories and Spectrum Scope. Finally, you also get a FREE 24-month warranty.

You could spend this amount on a HF only transceiver. With the FT-100 deal you also get a powerful 100W all-mode on 6m, a full 50W all-mode on 2m and a useful 20W all-mode on 70cm.

You could of course wait around for next year's model and pay twice the price!

But you only get one chance at this price.

Modes:	SSB CW FM AM	Head Unit:	Remote option
Receive Range:	100kHz - 970MHz	Bandwidths:	6kHz to 60Hz
Power HF & 6m :	100 Watts	Output 1:	HF - 6m
Power:	2m 50 Watts	Output 2:	2m -70cms
Power:	70cm: 20 Watts	Size:	160 x 54 x 205mm
Memories:	300	Weight::	3kg.

YAESU FT-840 160- 10m All Mode

A firm favourite, this 100W radio is an ideal rig for those on a budget. Impossible to fault, it just goes on and on!

24-Month FREE Warranty on Yaesu

YAESU FT-1000MP DC 160- 10m All Mode

SAVE

19.4% APR Available

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

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ICOM IC-746 Plus IC-2100H

160m - 2m All-mode
with IC-706IIG 2m FM Mobile
£1099 without IC-2100H
subject to availability

Your chance to purchase one of the most popular "all-band, all-mode" transceivers at a very competitive price and also get, the lovely IC-2100H mobile transceiver which has switched 12.5 & 25kHz filters. The IC-746 offers 100 Watts output on all bands and has a receiver per-formance to match.

ICOM IC-756PRO 1.8 - 52MHz 100W

19.4% APR

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.

YAESU FT- 920AF

HF 160m-6m-100w

SAVE

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

ICOM IC-706IIG Plus IC-T8E

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* 29 Programmable Functions
* DTMF Keypad & AM Airband
* Ni-cads & AC charger

KENWOOD TM-700DE
2m / 70cm Data Mobile

£459

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!

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We are now the UK distributors. As used by governments, it can decode just about any form of data transmission on HF and VHF. Simply connect between PC and RX audio. Can be loaded on any number of PCS. This is a very advanced programme.

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* 2m Handhelld
* 5W Output on 13.8V DC
* 1750Hz Tone Included
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* 20 Memory Channels
* Wideband Receive
* Uses 6 x AA cells (not inc.)

YAESU VX-5R

£269

* 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

£199

* 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

SAVE

C-408 70cms Handy

£69.95

Previously £89.95

CTCSS
Repeater Shift
Digital Display
12.5 / 25kHz Step
20 Memories
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* DTMF Keypad & AM Airband
* Ni-cads & AC charger

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2m/70cm Dual Band

SAVE

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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.

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Connect between ladder feeder and coax and enjoy very low loss and all-band operation (when used with manual atu).

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- 1.3 - 35MHz 500W
- 50 - 225MHz 300W
- 350 - 540MHz 300W
- Insertion loss 0.2dB
- VSWR <1.2
- SO-239 Sockets
- Wall or mast mounting
- Mast size 58mm
- 98 x 35 x 70mm

This duplexer may be used both indoors or outdoors. It is supplied with mast mounting clamps and weatherproof shrouds for the coaxial plugs. The mast bracket can easily be removed, allowing the unit to be used for indoor use.

FB1 - 9 Skin Earpiece
£9.95

A brand new design that is skin coloured. Its curly lead means it is much easier to wear neatly. And it is very tough indeed. The cable exits will take a strain of 12kg so it won't break in commercial applications. And finally, it is exactly the same unit as supplied to the FBI, hence its code!

Diamond SMA Antennas

From the tiny SRH - 805 upwards, there's an antenna to enhance the performance of your handheld radio.

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MFJ-1704 4-way Switch.
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2 -way coax switch ideal for use in antenna system and service departments. Provides a very positive method of switching between two coax systems and offers very low loss.

MFJ-259B Antenna Analyzer
£199.95

This battery powered analyzer will check the resonance and impedance of your antenna system in seconds. Make adjustments and watch the changes. Saves hours of work.

MFJ-1026 Noise Phaser
£129.95

Reduces local electrical noise by up to 3 S points

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PacComm TNCs from USA

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MAY 2000
(ON SALE APRIL 13)
VOL. 76 NO 5 ISSUE 1118
NEXT ISSUE (JUNE)
ON SALE MAY 11 2000

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Broadstone, Dorset BH18 8PW

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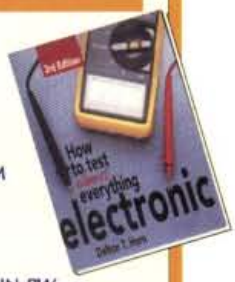

Testing Icom's latest rig – the IC-756PRO... Page 23

A 28 MHz Pre-Amplifier 'Boosting' Project. Page 40

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More of your regular reports from our reporters around the UK and, unfortunately, it's goodbye to Leighton Smart GW0LBI this month!

Published on the second Thursday of each month by PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: (01202) 659910. Printed in England by Southernprint (Web Offset) Ltd. Distributed by Seymour, 86 Newman Street, London , W1P 3LD, Tel: 0171-396 8000, Fax: 0171-306 8002, Web: http://www.seymour.co.uk. Sole Agents for Australia and New Zealand - Gordon and Gotch (Asia) Ltd.; South Africa - Central News Agency. Subscriptions INLAND £25. EUROPE £30, REST OF WORLD £32 (Airsaver), REST OF WORLD £37 (Airmail), payable to PRACTICAL WIRELESS, Subscription Department, PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: (01202) 659930.

Practical Wireless is Published monthly for $50 per year by PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW, Royal Mail International, c/o Yellowstone International, 87 Burlews Court, Hackensack, NJ 07601. UK Second Class Postage paid at South Hackensack. Send USA address changes to Royal Mail International, c/oYellowstone International, 2375 Pratt Boulevard, Elk Grove Village, IL 60007-5937. The USPS (United States Postal Service) number for Practical Wireless is: 007075.

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SP-950 station loudspeaker for TS-950SDX £96

Yaesu FT-847 options

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Are you finding it increasingly more difficult to put your hands on a copy of *Practical Wireless* every month?

Do you make a special journey to your local newsagents every month just to be told that they have no copies left or that they no longer stock your favourite Amateur Radio magazine?

Well, if the answer to the above questions is 'Yes', then you need to tell us about it. But don't be dismayed ... did you know that you can **buy a single issue of *PW* by post, from us to your door, for just the cost of the cover price?**

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KEYLINES

THE PW OFFICES RECEIVED A VISIT FROM THE RA — READ ON TO FIND OUT WHAT WE DISCOVERED

As you may have already read in the news pages this month - we've had a very welcome visitor to the *PW & Short Wave Magazine* offices - in the form of the Director of the Customer Services Executive of the **Radiocommunications Agency (RA)**, **Barry Maxwell**. Barry is an old friend of the radio hobby and of *PW* itself ... but this time he was joined (for her first trip to the Editorial offices) by **Karen Scott**, Head of the Amateur Radio section of the Agency. Karen is someone who we consult on a regular basis and has gained the respect of everyone she comes into contact with.

The occasion of the RA visit led to a rare occurrence on the Editorial (top) floor here in Broadstone - when our colleagues on *SWM*: **Kevin Nice G7TZC** (Editor) and **Zoë Shortland** (News & Production Editor) joined **Joanna Williams** and **Tex Swann G1TEX** for the meeting. This meant that the hum of hot word-processing Apple Macintosh computers was silenced for several hours.

Incidentally, at this point you may wonder why there were no photographs of Tex G1TEX in the news story of the joint RA, *PW & SWM* meeting - well the answer's simple. Tex is behind the camera and never missing the chance of 'being out of shot' he took advantage of what all large people would like to be at times ... invisible (wish I could do it!). Thanks for the photographic work Tex!

Working lunch

Over a working lunch with Barry and Karen, many topics of mutual interest were discussed, not the least the constant interest in the possible changes to the Radio Amateurs Examination twice year schedules. And although the RA, the RSGB and the City & Guilds are working towards making changes to the frequency of the RAE inadequate twice-a-year sittings, help is needed from those in the hobby to make it possible.

Karen Scott made it clear that, although it's going to be made possible for more clubs to become Examination Centres for the RAE - this aspect is relatively simple compared to the next stage of increasing the frequency of exams. This will make extra demands on the City & Guilds' RAE papers because of the obvious much heavier demands on the existing 'Question Bank' which makes sense doesn't it? More frequent exams mean more questions ... and that's where the Amateur Radio hobby needs **YOUR** help!

Karen explained that the City & Guilds are very much in need of more questions. And (this was certainly news to me ... I'd not realised that the C&G welcomes questions to be provided from anyone other than their own Examiners and specialised staff) as I was so impressed with the idea ... I thought it best to publicise it via 'Keylines'.

Please **do not** send your question ideas immediately off to C&G after reading the above news! Instead, you're invited to write to **Roger Bone** at **Assessment Services of the City & Guilds of London Institute, 1 Giltspur Street, London EC1A 9DD. Tel: 0171-294 2468** and he'll be pleased to send you a comprehensive 'Question Preparation Pack' which contains all you need to know.

Green Policeman

Over the ten years or so that I've been providing the *PW* 'Origins, Past, Present & Future' talk to clubs throughout our beautiful group of Islands (and occasionally beyond), some surprises have come my way. These have included a copy of the May 1945 *PW* (dropped by miniature parachute by a Lancaster bomber over Holland along with food, sweets and other hard-to-get items).

The vintage magazine was presented to me in Holland when I was visiting friends of *PW* - by the young boy who'd received it and passed it on to his father. With the help of his father - and because of the kind action of the unknown RAF aircrew - the young man developed a passing interest into a lifetime's hobby.

However, nothing prepared me for the surprise at the Central Lancashire Club on 7th February when I mentioned seeing a 'Green & White' State Coach and green & white horses, passing similarly coloured policemen' during my first experience of television in 1953 during the Queen's Coronation. **Harry Hardisty G0HDL** (universally known in Lancashire as 'Harry Doesn't Linger'!) was one of those policeman. He literally jumped out of his seat and shouted out "I was one of those green policemen" - and effectively stopped the talk (we were all absolutely fascinated!) to tell us the story. What a delight it was too!

The green and white picture I saw was produced on a VCR97 radar tube. It was tiny - and the superegenerative sound receiver had to be placed at the other end of the room. All my school friends saw brief moments of the landmark outside broadcast 'two by two' and joined up later to discuss and re-assemble the fragments to a complete story later. And just imagine ... Harry was there! What a marvellous story to be sure!

Single Issues By Post

Specialist magazines are becoming difficult to find on newsagents' shelves nowadays. And to help ... **Kathy Moore**, our Book Service & Subscription Manager, has mentioned a facility that many of you could take advantage of in a crisis ... **buying a single issue of *PW* by post from us to your door for just the cover price!**

On the occasions when it's not been possible to get *PW* (or *SWM* for that matter) 'over the counter' please remember that you can always order a single issue over the telephone from our Book Service/Subscription number by speaking to **Shelagh** or **Jean** on **Tel: (01202) 659930** by using your credit or debit card (full details on the order form p74). An issue will then be sent to you by the next available post for just the cost of the cover price (i.e. **no extra charge for postage**). So, you'll never need to be without your favourite magazine!

Welcome Old Friend!

For very many years I've found the service manuals (particularly for my collection of older hi-fi equipment and tape recorders) from Technical Information Services in Scotland to be very useful. And in this respect I'm delighted to say that TIS are back in *PW*!

Yes, you'll find their panel advert on p76 ... and if they've got it ... you'll get it! I recently ordered a Sony manual for a tuner, expecting a photocopy I was delighted to get a genuine Sony manual by return of post. I've been using the TIS service for over 30 years ... that's recommendation enough I feel!

April Fooled!

The reaction from some readers at the London Show on Saturday and Sunday 11/12th March clearly told me that they enjoyed my 'Electronic Typing Gadget' April Fool spoof! Some of the adjectives used to describe my actions can't be repeated here!

Several readers even offered to help pay for the gadget (very kind) but the offering of Monopoly money by one cheeky chappy told me he'd not been fooled. But my joke at least explained to readers (who E-mail me) my typing problems. Maybe one day I will get a gadget ... you never know!

Finally, my thanks go to those of you (over 50 people ... much to my surprise at it was so late on the Sunday afternoon) who attended the first '*PW* into the future' talk and 'Question & Answer' session at Picketts Lock. It was very enjoyable and I was glad to have the use of the 'battery buggy' this year ... it was a long way to the lecture room and Tex G1TEX and I were so pleased that so many of you made the effort.

Rob G3XFD

LETTERS

COMPILED BY ROB MANNION

STAR LETTER

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.

A Green & White Policeman!

Dear Sir

I'm writing about the Editor's visit to the Central Lancashire Amateur Radio Club on 7th February when, during his talk he remembered seeing TV for the first time during the Coronation in 1953. Rob G3XFD mentioned seeing (on a tiny radar tube used for the TV "Green and white horses, pulling a green and white State Coach passing green and white policemen". **And I'd like to mention I was one of the policemen on duty along the route of the procession!**

I am 85 years of age so I do remember the home-made TVs of 1952 using ex-war department parts - including the Radar Green Cathode Ray Tubes. Everything was green - in varying shades - including the policemen of which, as I've mentioned already ... I was one!

The Metropolitan Police was virtually doubled in strength on the day of Her Majesty's Coronation by contingents from every police force in the country. I attended as a member of the then Salford City Police (which has since been swallowed up by Greater Manchester Police). We slept for four days in tents in Kensington Gardens and on the day we were woken at 0100 and marched away to be on our points by 0400. A short distance from Marble Arch on what was then East Carriage Drive. This drive has since been obliterated to make way for the widening of the adjacent outside road.

As I said, we were positioned at 0400 then marched back to our tents at 0600, totally knackered! My nickname - because of my callsign - is 'Harry Doesn't Linger' and I certainly didn't linger from my bed that night!

Harry Hardisty G0HDL
Lancashire

Editor's comment: For the full (delightful) story behind this letter - please see 'Keylines'.

Memories of The EF50

Dear Sir

The red-cased EF50 pictured on page 16 of the April issue brought on instant nostalgia. In 1951 I built our first TV receiver based on sound and vision strips from "Electronic Engineering" designs using a string of EF50s on a tinplate chassis.

The power pack was from a *PW* design and the picture was watched on a VCR 97 CRT nine inch diameter and a very green picture it was, too! Apart from a few minor replacements, that set ran for over four years.

In the end, the CRT packed up and I couldn't find a replacement so it ran for a couple of weeks on a three inch oscilloscope tube until I could afford a commercial TV. Metal bashing - some time after our fifth child was born my wife made the observation that whenever I started doing any radio metal work she became pregnant and it was time I gave up that !!!!!! hobby!

In the interest of marital harmony and five "harmonics" I did as requested and gave up my licence for nearly 22 years. After retiring in 1979 I set about getting back my licence and my first experience of a multiple choice wasn't difficult - the 12 wpm Morse test was a doddle for a one-time RAF W/Op and in due course my original call of G2AXU came back.

I bought the very first two issues of *PW* in the early 1930s but after that it became just random purchases. That was until about 12 years ago when I decided that it was a much better journal than it had ever been before and I took out a subscription which I continue to renew each year.

Now in my late 70s, with an even older wife to care for, it's now a case of more 'domestic' engineering than playing radios and there's the distraction of E-mails from four daughters - one in Virginia USA and one in Italy - and a selection of ten grandchildren. Great fun though! Well, that's more than enough, so 73 de G2AXU

Ken Mallett
Dorset

Editor's comment: We're privileged to have you as a reader Ken. Any more EF50 stories readers?

Topping's Valve Topic

Dear Sir

I've just read 'Valve & Vintage' by Charles Miller in this month's *PW*. After reading it I had to get the keyboard out and relate a similar story concerning one of my early adventures with steam radio and please feel free to include it in the letters page.

As is the norm, I picked up my copy of *PW* along with my newspaper from the Newsagent next door to the bus station I manage this morning. My usual routine on returning to the office is to have a quick squint through my newspaper and leave *PW* until about 1000 when I have a tea break.

Due to my interest in 'steam radio' one of the first articles I turn to is the 'Valve & Vintage' column. Charles Miller's story of retro-fitting a new feeder for a band three TV aerial had me in stitches and it brought back fond memories of some of my early experiments with electricity and radio.

With little technical knowledge, a close friend (who I won't name) and I proceeded to build a three-valve radio from an article we'd seen in an early copy of *PW*. We were fortunate that St. Andrews had a shop owned by an eccentric old gentleman.

The shop stocked radios, TV, electronic components and a host of other items such as shooting equipment and radio controlled powered models. In fact, it was a real Aladdin's cave for teenage boys. Many Saturday mornings were spent gazing longingly through the windows at the marvels within.

We sought out the necessary bits that we couldn't find from scrapped radios and bought the other bits from the owner of the shop. (Who, incidentally, had his old GM2 licence withdrawn by the Post Office for using 'nautical' language over the air after failing to heed several warnings!).

With some help from a teacher in the school metal-work class, we soon manufactured a chassis which was taken back to my bedroom for assembly of the components. Carefully following the instructions, all went well until we came to the multi-tap mains transformer.

We didn't have sufficient knowledge or foresight to test and identify the various windings that came from the transformer. Using guesswork and trying to recall which tapping had gone to where on the radio and from which it had been taken, we duly wired the bits together.

Not realising the consequences of what could go wrong when the tappings are mixed up; we accordingly plugged the radio into the mains and switched on. In short, all hell broke loose. As the switch dropped there was one all mighty explosion synchronised with a powerful blue flash as condensers and valves blew up!

After a moment's pause, we quickly realised that something had gone wrong and removed the plug from the supply. What we didn't realise was that we'd also blown the fuse for the ring main and therefore my mother, who had been watching TV, had also come to the conclusion that something was amiss.

Rushing into my bedroom, my mother discovered my friend and I cowering and momentarily rendered speechless when asked what had happened. Not a care for either of us - just concerns for the smoke, fragments of burnt paper floating about and the acrid smell of burning and, of course, that she was missing her favourite programme, Emergency Ward 10, which my friend and I were definitely in need of.

My Uncle Drew, who had served in the war years as a Merchant Navy Radio Officer, diagnosed, from the burnt out remnants of the radio, that we'd wired the mains supply to the 6.3V heater circuit, resulting in goodness knows how many volts on the valve heaters and associated other components.

Thankfully, this didn't dampen my enthusiasm for radio, especially steam radio. However, my mother soon had me banished to the garden shed, which eventually became my shack once I received my amateur licence some years later.

Colin Topping GM6HGW/ZD9HGW
Fife

Dealer Apathy In The North?

Dear Sir

A lot of Amateurs think that our hobby is going the wrong way at present with a general lack of interest in the hobby. It would appear, however, that apathy is not only confined to users but also applies to some dealerships especially in the North.

I received today a reply from what used to be considered a large dealership which shocked and saddened me. I had asked if I could come and compare an FT-1000MP

against the new Icom IC-756PRO. I received a very polite reply, but the answer was "no, sorry we don't stock them anymore, we just order them up when required".

Am I alone in wanting to have a 'play' before I part with £2000 plus of my money? Even if you're buying a second-hand car at that price you can go for a test drive so why don't we get the same sort of service?

Could I suggest that the three big manufacturers get together and open a joint venture in the Leeds area, for instance, to serve a very large part of the country including the NE and even the Scottish Borders? I live 25 miles from Leeds and it now means if I want to hear either of these two radios on the same antenna I've got a round trip of minimum 300 miles to the Midlands to do so.

It also goes to emphasise how important good subjective reviews are in publications such as *PW*, both now and even more so in the future, it would seem.

Roger Shellard M0ADQ
Pontefract

Editor's comment: We now look forward to a response from a dealer as it would be interesting to hear their side of the argument to the suggestion.

Practical Wireless Reviews

Dear Sir

I'm writing regarding the topic of *PW* reviews in the April issue. As an occasional contributor of articles, including a couple of reviews to the magazine, I thought it might be useful to offer my comments on reviews. Firstly though, I should point out that I've never worked for any company involved in radio and consider myself a typical Radio Amateur.

In both cases where I have reviewed equipment for *PW*, I have received no pressure or guidance from *PW* staff, apart from the general house style sheet (144MHz not 2m, for example) and an approximate length and date for submission. In the case of a transceiver kit, I did ask whether *PW* were looking for just a review of the finished article or the process of building it, or both.

With the exception of minor (cosmetic) changes to correct grammar, spelling, etc., all the articles have been published almost character-for-character, as I submitted them. I've never experienced any change to the sense or spirit of what I have written in any of the articles that I have written for *PW* over the years. Personally, I think that the Amateur Radio grapevine is such that any magazine editor doing so would soon be in an untenable position.

From my own experience, I certainly don't believe the reviews in *PW* are biased. If I thought they were, I certainly wouldn't have been buying the magazine for the last 30 years, let alone occasionally writing for it!

In the long term it is in everyone's interest that reviews are un-biased, otherwise the reputations of the reviewer, magazine and supplier would all suffer. Radio Amateurs have long memories!

Colin Redwood G6MXL
Dorset

Satellite TV System Interference

Dear Sir

I was intrigued by your request for experiences regarding interference generated by home satellite TV systems in my latest copy of *PW*, March 2000. So I thought I'd write and tell you about mine.

I'm not an 'Ham' operator, to use the North American vernacular, though I am an avid DXer. The m.w. band is my band of choice with emphasis on foreign signals but once in a while I do venture to the h.f. bands, including the 'Ham' bands.

The most frequent 'Ham' band I visit is 160m because of the similarity to m.w. signals. I've had a C-band satellite system since 1982, long before the K-band systems appeared in the UK.

My first system was a very simple set-up. A 10 foot solid spun aluminium dish, LNA, single frequency down converter (90MHz I think) and a manually operated receiver, I forget the make as it was so long ago now. This system generated zero noise and one of my long wires even passed over the dish on it's way to the top of a tree situated behind it.

About three years later I traded up for a fully automated system with all the 'bells and whistles' - the receiver was an Electrohome manufactured here in Canada. Instead of a single frequency down converter, it used a stand alone block converter (950-1450 MHz), as well as the original dish, LNA and feedhorn.

The system generated a tremendous amount of noise all over the spectrum and I never managed to reduce it in any way. As most of my DXing was done when my wife was out, it was easy to get around it by turning all the satellite equipment off.

Around 1995 I replaced the feedhorn, LNA and block converter with one of Chaparrals MicroPak combined LNB/feed horn units and, magically, all my noise disappeared! In 1997 I replaced the ageing Electrohome with a new General Instruments 550i receiver and when I moved last year I replaced the dish with a 10in mesh one (easier to transport and set up!).

Today I'm still without noise from this system. How I will fare when I eventually replace my analogue system with a digital one is anyone's guess.

Thanks for making *PW* such an interesting magazine. I've been taking it for more years than I care to remember and I have past issues going back to the early 1960s.

Though it has a greatly reduced number of construction articles these days, I still find it most enjoyable, along with its sister magazine *SWM*. I've been interested in all things radio since I built my first one valve set when I was a kid living in SE Kent.

Though I have no problems with radio theory I never became a 'Ham' because I just couldn't be bothered to learn Morse. I have nothing against it, just no desire to learn it.

Mike Stonebridge
Canada

Editor's comment: Nice to hear from you in Canada Mike. I look forward to another visit to your beautiful country again one day! Any more comments on this source of interference readers?

March Mix & Quality

Dear Sir

I wish to congratulate you on the March issue, which achieved a very high standard with its wide mix of high quality articles. Although I'm not a Radio Amateur (I was reared on *PW* in the 1950s - F. J. Camm days - when radio construction was a major hobby), I found so much to please in the last issue.

On the practical side, I always enjoy **Rev. George Dobbs G3RJV's** contribution for an endless flow of useful circuit 'blocks' and unusual but highly effective circuit assembly techniques. My i.f. and r.f. home-brewed assemblies aren't only built much quicker with the 'ugly' technique, they are actually more stable!

Also, the 'Radio Basics' series isn't only an excellent practical introduction for beginners (what a super way to learn to build a radio!), but also useful revision for 'Old Timers'. The update on the ZN414 replacement (the MK484) has been particularly useful and I'm now planning to use it for a miniature superhet project.

Regarding applied theory, **Gordon King G4VFV's** article on i.f. filters really touched the spot. I have an Eddystone 830/9 to overhaul and need to design a standard crystal filter block to replace the missing Piccolo section. I now feel more confident to try out a few ideas.

So it goes on and on ... 'Valve & Vintage' is always eagerly awaited as I have my own 'hollow state' collection of receivers to keep in good working order, h.f., broadcast band activity also to catch up with new DX tips, GPS - how useful is it to practically carry around? Now I've read Ian G4EAN's article ... I know.

Finally, the icing on an incredible cake, 'Cigarette Cards & Wireless' was a wonderfully nostalgic and informative gem. The reproduction of these artistic miniatures was worth the cost of the cover alone!

Just two more words ... thanks! What a lot of pleasure it gave and finally, please keep it up! Yours sincerely

James Duckworth
Hertfordshire

Editor's comment: Our pleasure James, we really try to pack each issue with interesting items. Feedback from readers on what's wanted is always welcome. Just after the March issue was published Carol, my wife, presented me with a gift of a complete set of Railway cigarette cards. Wonderful things ... even though I've always detested all forms of tobacco (but steam engines smoke naturally don't they!).

Letters Received Via The 'Internet'

A great deal of correspondence intended for 'letters' now arrives via the 'Internet'. And although there's no problem in general with E-Mail, many correspondents are forgetting to provide their postal address. I have to remind readers that although we will not publish a full postal address (unless we are asked to do so), we require it if the letter is to be considered. So, please don't forget to include your full postal address and callsign along with your E-Mail hieroglyphics! All letters intended for publication on this page must be clearly marked 'For Publication' (on the letter itself). **Letters for possible publication are not normally acknowledged and we ask that wherever possible letters are not sent in by 'FAX'. Editor**

COMPILED BY JOANNA WILLIAMS

Headline News

Callsign Car Registrations

One news release which many Radio Amateurs will be pleased to hear about dropped on to the *PW* news desk this month. The **Driving and Vehicle Licensing Agency (DVLA)** have announced that, **as from the 3rd April**, Radio Amateurs will be able to buy "Select Registrations appropriate to their callsign".

Anyone interested in purchasing their very own **'G' prefix registrations** will be able to do so by just telephoning the DVLA's telesales hotline on **Tel: 0870-600 0142**. This will be arranged on a **first come, first served basis** which, the press release states, is applied in this instance so that all customers will have a fair chance to purchase their registration.

The press release from the DVLA states that there are a **possible 240 000 combinations** available, to check on the availability and price of the registration number that you're interested in, please visit the DVLA Sale Of Marks Web site at:

www.dvla-som.co.uk (The picture here shows their home page).

To "tailor make" your own personal 'G' number, all you'll have to do is choose the 'G' prefix followed by the number of your callsign from 1-20. You will then be able to choose any three letters (except I, Q or Z) and prices will start from **£499** with certain registrations individually priced. (Visa or Mastercard accepted but **not Switch or American Express** and you will receive your certificate within three working days. **Cheques will take up to 14 days to clear before you receive your certificate but a banker's draft will clear straight away**).

The Select Registrations hotline will be operating "extended hours of **8am to 8pm from Monday April 3 to Friday April 7**", but after these dates, telephone lines will return to the normal hours of 9am-5pm, weekdays. For further information please contact the DVLA direct or visit their Web site at the address given.

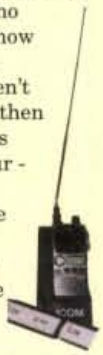
Editorial note: Don't assume your callsign letters will be available at the 'starting price' and prepare yourself for possible disappointment! On telephoning the DVLA to check whether the £499 'starting price' included VAT and the assignment fee (which I confirmed it does) I found that although the configuration I would like for my own vehicle - G3XFD - is available at £499 we discovered Tex Swann G1TEX's letters are available, but at £999! So...make sure you do check availability and price before getting too carried away!

London Show Latest

Well, after all the preparation and build-up to the **London Amateur Radio & Computer Show** this March, the weekend has suddenly come and gone! On behalf of ***Practical Wireless*** and ***Short Wave Magazine***, the editorial team would like to say thank you for all the kind words of support received from very happy readers - we were inundated with them!

The weekend was a success for most of the dealers - at least the ones that I spoke to - and there were a number of items on sale and on show which readers of *PW* who were unable to make the show might like to know about. Firstly though, if you haven't visited a show for a while then you should - there's always something to interest every type of amateur - regardless of speciality or special interest!

On the **Icom (UK) Ltd** stand this March there were a number of interesting items including the **IC-756PRO** (**see review** in this issue, p.23), also on show was the **IC-R3**. You may have heard some speculation regarding this rig, but all Icom say is



'Spotlight' 2000!

It's time to turn the 'Club Spotlight' on again as we invite you to enter your club magazines into the first ***Practical Wireless* & Kenwood Club Spotlight Magazine Competition** of the new Century. **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 **Remote Imaging Group (RIG)**, winner of the 1999 national award - can only enter as a 'national' club section, whereas the **Crowborough & District Amateur Radio Society** - last year's winners, now have to specify that they are a local club.

National Or Local

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

It would also help the judging panel if you could provide some historical details on your club.

The judging panel this year includes **Jim Bacon G3YLA**, **David Barlow G3PLE** (who of course first suggested the competition!), **Tex Swann G1TEX (*PW* Technical Projects Sub Editor)**, **David Wilkins**

that the 'R3 on display at the London Show was a **pre-production model** and, as yet, they will not release any firm details.

Rest assured that as soon as *PW* receive **firm** details from Icom (UK) Ltd regarding the IC-R3 we will let you know - the facts and not the fiction! The **IC-T81E** multi-band transceiver was also on display (**see review** in this issue, p.30) and the Icom stand was a permanent hive of activity!

What did **Kenwood** have to offer the radio enthusiast on the weekend of the 11th and 12th March? There was a twin display of the **TM-D700E data communicator** (**see review** in this issue, p.18) and was a continual crowd puller - along with a stand carrying information on Kenwood's rugby and Formula 1 sponsorships and some of their hand-helds.

The **Nevada** team were also at the show and their stand was always busy. They had a large display of antennas on sale, including the **ZX** range and they also had their extensive range of **Alinco radios** on sale (plus much more). The **Yaesu** stand was another major attraction this year with the MD's car on show fitted with the **FT-100** and **FT-90R** mobile rigs attracting a steady stream of onlookers.

Waters & Stanton's presence was felt again this year with a stand that seems to be growing in size each year. They had a number of interesting pieces of equipment on sale and the stand was also always busy.

Other smaller companies such as **Taurus**, **SRP Trading**, **Sycom** (Robin Sykes said he was extremely busy too!), **Westlake Electronics** and **The QRP Component Company** along with **Moonraker** and **Sandpiper Communications** were also present at the show - congratulations to **RadioSport** (with the help of the **Southgate ARC**) for another well-organised event.

Joanna Williams
- *PW* News & Production Editor

G5HY and **Rob Mannion G3XFD**. Additionally - and for entries in the **national category only** - the Salisbury Club will be providing one extra judge to decide the winner of the 'Bert's Bell' Trophy (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 3rd July 2000. This is because the presentations are to 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 by sending it to **Joanna Williams, Club Spotlight Magazine Competition, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW**.

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

Rob Mannion G3XFD

Nevada's New Location

Mike Devereux G3SED, Managing Director at **Nevada Ltd** sent in an interesting press release regarding their new premises in Farlington, Portsmouth. He says that "after 30 years in their Portsmouth premises" in North End, they have moved to a huge new 11 500 square foot showroom and distribution centre.

The new premises are located on the outskirts of Portsmouth just two minutes from the Farlington exit of the M27/A27 and Mike says that "With so many negative views of the Amateur Radio business just now, we feel quite the opposite. We have made this positive move to provide our customers [with] better facilities, out of town, with spacious showrooms and easy car parking".

Mike Devereux states that Nevada, will be stocking many new products for the short wave, scanning and Amateur Radio enthusiasts "previously unseen in the UK". So, why not pop along to the new showroom at **Unit 1 Fitzherbert Spur, Farlington, Portsmouth PO6 1TT**. Further details on Nevada and what they stock can be obtained from their offices direct on **Tel: 0239-231 3095, FAX: 0239-231 3091**. Alternatively, you can **E-mail them on: info@nevada.co.uk** or visit their **Web site: www.nevada.co.uk**

Editorial comment: I've already visited the new facility ... it's excellent and so convenient. So close to the A27 and the whole of the South Coast!

Rob G3XFD.

Personnel Changes At Icom

It seems that **Icom (UK) Ltd** have been extremely busy over the past couple of months, undergoing changes in personnel as well as being very busy setting up new contracts, They've also come to the aid of the **RNLI** in their attempts to help out with the recent flood crisis in Mozambique.

The *PW* news desk has received **four** press releases from **Ian Lockyer** at Icom in the past month. It seems that Ian, after 18 months as working as Marketing Assistant, has taken over as **Marketing Executive** after the departure of Icom's Marketing Manager, Dale Blackman.

As well as some of his previous tasks, Ian has now been "tasked with co-ordinating the company's other marketing output" - to include advertising, public relations, sponsorship and merchandising. The staff here at *PW* would like to wish Ian all the best with his new responsibilities.

Icom To The Rescue

There won't be many of you who aren't aware of the recent catastrophe in Mozambique, where severe weather and flooding has wreaked havoc in the country. **Icom** have told *PW* that they recently supplied the **Royal National Lifeboat Institution (RNLI)** with "a consignment of eight **IC-A3E v.h.f. hand-held radios** which are going to be used as an important communication link within the relief package that is being organised".

Pictured here, the IC-A3E v.h.f. air band transceiver is simple-to-use, Icom say, it's compact in size and the hand portable has "easy to hear superior audio, even without a headset". **Brian Faulkner**, Communication Support Manager of the RNLI said that "Icom was our first choice for help with COMMS equipment bearing in mind their ability to meet our needs at short notice. We have dealt with Icom in the past and we were aware of their extensive range of products".

In this issue of *Practical Wireless*, **Rob Mannion G3XFD** reviews the

NEWS

COMPILED BY JOANNA WILLIAMS

new h.f. base station from Icom - the **IC-756PRO** and **Ian Lockyer** at Icom sent us news of what he calls the IC-756PRO's "operational debut at the prestigious Amateur Radio station, Project Echo".

Set up to mark the start of the new millennium, Project Echo has been broadcasting from **Rangers House** on London's Blackheath Common. Ian tells us that "one of the very first models of the IC-756PRO in the UK was specially delivered for this event. Since then it has been used as one of the prime operating transceivers and has provided a vital contribution to the operation of the millennium station".

Over the last two months, the IC-756PRO has played an important part in the station's attempt to achieve its target of 50 000 QSL contacts, but it is "just one part of Icom's sponsorship of the station", Ian says. Icom also provided Project Echo with two **IC-746** h.f./v.h.f. all mode transceivers, one **IC-775** DSP h.f. all band transceiver, one **IC-706MkIIG** h.f./v.h.f./u.h.f. all mode transceiver, one **IC-PW1** 1kW linear amplifier and one **IC-PCR1000** computer receiver which was "used as an interactive exhibit".

Owen Cross G4DFI, Project Echo's Station Manager, making good use of the IC-756PRO, thanks to Icom (UK) Ltd.

For more information on the IC-756PRO or the IC-A3E, please **Tel: Icom (UK) Ltd on (01227) 741741 or write to them at Sea Street, Herne Bay, Kent CT6 8LD. Alternatively, you can E-mail them on: info@icomuk.co.uk or visit their Web site: http://www.icomuk.co.uk**

Pat Thom G1NKS - An Appreciation

Rob Mannion G3XFD expresses his thoughts on the loss of a well known Amateur Radio personality, someone who will be especially missed by keen 70MHz band operators.

Although it's an often used cliché, I'm always being reminded (when I'm overcome by aches and pains) that "There's always someone worse off than yourself". And that statement can certainly be said of my great friend **Pat Thom G1NKS** - normally known to everyone who reads *Four Metre News* as just 'Ginks'.

Together with her husband, **Derek G3NKS**, the two keen 70MHz enthusiasts edited, produced and published *Four Metre News* in such a professional way that it was admired by anyone who read it. However, despite the professional approach - *Four Metre News* never lost its friendly approach and 'small club' appeal.

My lasting memory of Pat will be of her busy on their magazine stand at the 'Leicester'

Pat 'Ginks' Thom G1NKS on duty on the Four Metre News stand at the 'Leicester' Show at Donington Park in September 1999.

New & Improved

Some interesting news came in from **Farnell** this month who tell *PW* that from the beginning of April, UK industry will have access to over 100 000 products from the "new, improved and easier to use Farnell Catalogue". Farnell say that they have expanded their two Electronic and Industrial catalogues into "six, lightweight, fully colour-coded books".

Can You Help - Finding An Electronics Construction Kit?

Former Merchant Navy Radio Officer Michael Kearney writes:

"During the 1970s I was a Radio Officer working mainly on Morse. At the moment one of my sons has a keen interest in electrical items, he's 12 years old.

"I am attempting to purchase a type of DIY kit for self assembly with spring loaded contacts or similar. You get a box of loose components and some wiring diagrams and can assemble radios, amplifiers, alarm units, etc. I have had no luck in Ireland. I would appreciate it if you could suggest some UK firms that do these. Thank you".

Michael Kearney, Farran, County Cork, Republic of Ireland.

Editor's comment: The type of kit Michael is looking for were once made by 'Tandy' , Phillips and other manufacturers. They still appear from time to time - particularly in Charity Shops (I bought one for a nephew several years ago for £5 from such a shop close by the *PW* offices). They provide a basic, but interesting introduction to radio and electronics. If anyone can help, please contact Michael direct. (**UK readers please note** - the address published is complete and the Irish Post Office will find him!

Spares for a Russian Tento Selena Model B-215

Terry Aston from Oxfordshire contacted us here at *PW* asking for help: "Dear Editor, I've got a lovely Russian-built Tento Selena, multi-band mains/battery radio, Model B-215. It's developed a fault in the audio stage which I've traced to a defective i.c. This is a power audio-amplifier with the markings K174YH7 8808. It's a 12-pin DIL with a metal heat-sink dissipation tab on each side between pins 3-4 and 9-10.

"I've tried to source a replacement through various specialist suppliers with no luck. Does anybody other there know where I could get a replacement? Any help you or *PW* readers could offer would be much appreciated".

Terry Aston, 2 Priestend, Thame, Oxfordshire OX9 2AE, Tel: (01844) 218969.

Editor: Over to you readers!

Direction Finding Equipment For NZ Coastguard

Steve Holder ZL2IOX sent the *PW* offices an E-mail asking for help in tracking down any manufacturer or kit provider of Direction Finding Equipment. He tells us "Over the past three years, the New Zealand Coastguard have formed several air patrol units to increase the Search & Rescue capabilities of the organisation. To increase our effectiveness, we could do with acquiring Radio Direction Finding equipment suitable for mounting (or semi-portable) in aircraft".

Steve goes on to say that most of the equipment available to them in New Zealand is too expensive or too primitive and that they "need to find something that is capable of working 100-250MHz (or even up to 460MHz) with an appropriate receiver, which we currently have".

Any assistance which people can give will be greatly appreciated and if you have any information for Steve, please contact him direct on at 58b Joll Rd, Havelock North, New Zealand. Or E-mail: **steve.holder@clear.net.nz**

Show at Castle Donington in September 1999 - despite the fact that she was extremely ill with terminal ovarian cancer.

Determination In Adversity

Pat, who died on 26th January 2000, was cremated on February 1st and to say that many of her friends attended the service was an understatement! Radio Amateurs and other friends came from all over the UK to pay tribute to a courageous lady.

Born in Bromyard, Herefordshire in 1936 Pat had lived through much adversity, including divorce from her first husband and the tragic loss of her son, Alistair, who was drowned in an accident on holiday in Cornwall in 1992.

Meeting Derek Thom G3NKS through her work at the Government Communications Headquarters (GCHQ) in 1982, they subsequently married in 1984 and through determination and hard work (the same methods she employed in her job in GCHQ finances) Pat ended up with the callsign G1NKS. The 'complimentary' callsign to G3NKS was no accident!

With her keen and quietly enthusiastic approach to the hobby, Pat became Honorary Secretary to the Cheltenham Amateur Radio Association (CARA). Here her organisational abilities and enthusiasm - coupled with her delightful nature - soon led to CARA's revival as one of the most successful clubs in the south-west.

Pat soon roped G3XFD in to provide a *PW* 'Club Talk' and provided me with delightful sandwiches for my late journey home to Dorset. Another demonstration of her caring nature. I was always made welcome at their home in Cheltenham whenever I passing by on *PW* business ... and Pat helped Derek produce the specialist 70MHz feature which we published in the January 2000 issue of *PW*.

Pat made very many friends all over the world through the hobby she shared with Derek and despite suffering from various debilitating illnesses - together with the terminal cancer ... she thoroughly enjoyed meeting and talking to fellow amateurs. Very 'matter of fact' about her last illness ... she only relinquished her post as with CARA a month before she died.

I'm only sorry that any words I write here are totally inadequate to pay my respects. But Pat has left behind a very proud husband, a loving daughter and very many friends ... of which I'm honoured to consider myself.

G3XFD.

The new, improved catalogue will allow customers to locate, select and order products faster and "more easily than ever before" Farnell state. The catalogue consists of five product books with a separate new product guide and master index.

The press release received from Farnell states that "In response to customer preferences, pricing in the new catalogue will be fixed for each catalogue book's lifetime, giving a long-term guarantee of accurately predictable component costs". They will continue to offer their products with "no minimum order value, 24-hours a day, for free next-day delivery".

The new 'six-pack' format means that there are a further 8000+ products to be added this year, the press release states. Book 1 contains **'New Product Guide & Master Index'**, Book 2 consists of **'Semiconductors & Passives'**, Book 3 is **'Connectors & Cables'**, Book 4 - **'Electrical'**, Book 5 - **'Industrial Control & Factory Automation'** and Book 6 is **'Mechanical & Workplace'**.

For further information, please **Tel: Steve Woodhead at Farnell on 0870-122 7711** or why not take a look at their Web site: **http://www.farnell.com**

Radiocommunications Agency Visit PW & SWM

On Thursday 9th of March the Editorial offices of PW Publishing Ltd., in Broadstone, the Editorial teams of *Practical Wireless* and *Short Wave Magazine* were pleased to welcome **Barry Maxwell, Director of the Radiocommunications Agency** and his colleague **Karen Scott, Head of the RA's Amateur Radio & CB Section**, for an informal discussion meeting.

A cold - but beautiful clear day - following a very successful meeting between Barry Maxwell, Director of the Customer Services Executive of the RA, *Practical Wireless* and *Short Wave Magazine* staff. Pictured (left to right) Rob Mannion G3XFD, Joanna Williams (News & Production Editor *PW*), Karen Scott (Head of the RA's Amateur Radio Section), Barry Maxwell (of the RA), Zoë Shortland (News & Production Editor *SWM*) and Kevin Nice G7TZC (Editor *SWM*). The third member of the *PW* team - Tex Swann G1TEX was behind the camera!

Barry Maxwell is an old friend of *PW* and, together with many of his staff, he takes a great deal of interest in what's published in the magazine. Although Barry is no stranger to our part of Dorset ... the *PW & SWM* teams were delighted to greet Karen Scott on her first visit to Arrowsmith Court.

A working lunch had been arranged and many topics were discussed - ranging from the RA's support of the Amateur Radio hobby (and their support on this aspect was made very clear by both Barry and Karen), the future of the RAE (please see 'Keylines' for further comments) and extension of facilities - including the ongoing 'connections with the Internet' story.

Many suggestions, ideas and comments were discussed and, as time passes, I hope to present these to readers. However, I have to stress just how much of the RA's attention is paid to *PW*'s 'Letters' pages each month. Reader's letters **are read by RA staff** - and via this most important 'free speech' facility - your ideas, comments and suggestions are noted.

So ... don't miss your chance ... write to *PW* and 'air' your opinion and it could help the hobby. Despite what some pessimists suggest - the meeting emphasised that **the hobby does have a future, it can live alongside other methods of communication and will continue to do so.**

Barry Maxwell and Karen Scott are confident of the hobby's future in the same way everyone on *PW* and *SWM* are! The 'return match' will take place when the Editorial teams visit the RA's Headquarters in London ... and, in the meantime, if you have any questions or 'Open Letters' for the RA to answer ... write in to me and I'll be pleased to either publish them or pass them on to Barry or Karen to deal with on your behalf.

Rob Mannion G3XFD

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Design: Spiral Communications, Leeds

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RADIO BASICS

This month in the second of a series intended to introduce valve techniques, Rob Mannion G3XFD describes projects which are ideal for low voltage working. So, with this in mind you can join in ... knowing it's quite safe!

Having discussed the various techniques we can use to build valved radio equipment last month - this time I'm going to describe some suitable projects. And to help, I've decided to use some ready-made valved projects, previously published in *PW*. To coin a phrase from the often-imitated (but never equalled) 'Blue Peter' programme from BBC1 television - "Here's one I prepared earlier" (in other words ... to save time!).

Looking back through the various valved projects that have appeared in *PW* in the past decade or so I thought the ideal receiver to use is the *PW* 'Millennium' project from 1992. It's a sheer coincidence that it's called the 'Millennium' - the 1000th 'anniversary' being celebrated on that particular occasion was in fact *PW*'s own '1000th' issue. Hence the name.

The project uses very easy-to-get valves and is not difficult to build. It can also work on very low voltages. I even managed to get the prototype to work on two 12V car batteries in series to provide 24V!

So, before you consider tackling the project (which could be your initial valved project of the first one in recent years) let's look at the circuit in detail. Hopefully you'll quickly realise that it's not going to be difficult and will soon be 'raring to go'!

The Circuit

In essence the receiver is a simple tuned radio frequency (t.r.f.) receiver with a simple audio stage. It uses the same valves for r.f., detector and audio stages. They're easy to buy and use and remarkably rugged ... they can often survive being dropped but I don't recommend you try the test!

Incidentally, all the diagrams, shopping list and the coil winding table for the 'Millennium' receiver are reproduced from the original 1992 magazine. Hence the difference in reproduction quality, although I think it's worthwhile reproducing the project because it's absolutely ideal for 'Radio Basics'.

The input signal is fed into the receiver via L1, which 'couples' the signal into the 'control grid' (Pin 6) of V1. The valve is a Pentode - which will be described in 'Basics Board' later in the series. Pin 3 is the 'screen grid' and the other 'grid' (all indicated by a series of dashes) is the 'suppressor grid'. Again, more of this later.

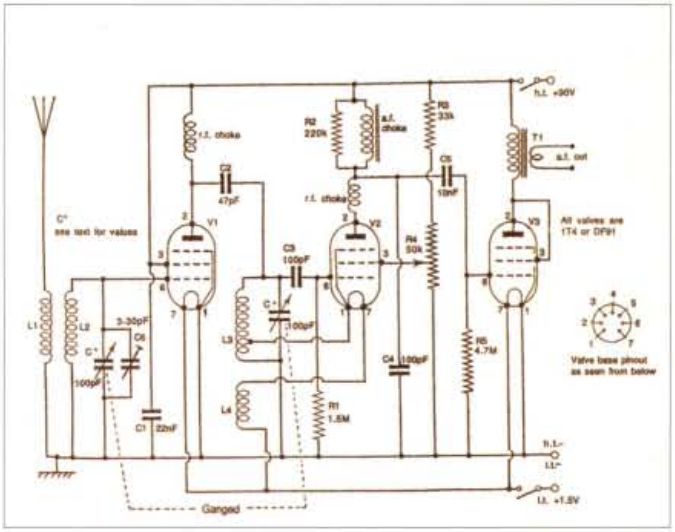


Fig. 1: Circuit of the PW 'Millennium' B7G valved receiver, originally published in 1992 (see text). In this circuit V1 and V2 are used as pentodes and V3 is connected as a triode, with the anode and screen grid 'strapped' together.

Tuning is carried out with a twin-ganged variable capacitor of 100pF per section. If you don't have a 100pF variable - don't worry - because a larger (150+150 or 250+250pF) value will do ... it just means tuning coverage will be different from the coils wound from the details provided in **Table 1**.

All the coil winding details in Table 1 are based on the use of a 100pF variable capacitor, **but this should not cause any problems** because if you have to use what's available or have to buy one (***See information panel at end of text**) you can use your 'Radio Basics' - very useful - 'Tinny Dipper' dip meter to check the tuning

Basics Board

Each month I'll endeavour to include topical summaries and 'snippets' of information, jargon, terms and hints and tips relevant to the subject under discussion in the main article. As well as being informative it's also designed to get you looking through your reference library. So, I'll do my bit while you do your 'homework' so to speak!

Basic Elements Of A Triode

Heater/Filament/Cathode: When used in reference to a radio valve the 'heater' or 'filament' (the latter is usually employed to describe a battery powered valve) is a section of the valve which provides a source of copious particles/electrons from a special coating. These are 'liberated' by heating (hence 'heater') the filament - which in the case of battery powered valves - is itself also the cathode. In other words the special chemical coating is applied directly to the filament itself. In a mains operated often 6.3V a.c. 'heater' type valve, the cathode is usually separate from the heater. In fact, the cathode is often a specially coated tube which the heater (placed inside) heats to a suitable temperature. (There are also some valves which use special active chemically coated 'cold cathodes' - these are very rare nowadays and it's unlikely you'll be using these).

Control Grid: This element of the valve - as the name suggests - is where the main control of the valve is applied. Basically speaking, by using relatively small amounts of energy (the control voltage) it's possible to effect large changes within the valve – including amplification. More about this later!

Anode: This is normally the most visible (looking through the glass of a glass-enveloped valved) part of a valve. It's normally a much higher voltage potential with respect to the cathode/heater and grid so as to 'attract' the electrons. Once attracted on their way by the anode's potential, the electron flow through the valve can be controlled by the control grid. More about this aspect later!

Next month I'll take a look at the screen grid and suppressor grid and other types of valves.

Shopping list

How much? £20
How difficult? Intermediate

Note: This list, the original from 1992, is reprinted as a guide only. (see panel below).

Resistors
5% 0.4W Carbon film

33kΩ	1	R3
220kΩ	1	R2
1.5MΩ	1	R1
4.7MΩ	1	R5

Potentiometer (panel mounting)

50kΩ	1	R4

Capacitors
Ceramic

47pF	1	C2
100pF	2	C3, C4
10nF	1	C5
22nF	1	C1

Variable Capacitor
Recommended 100pF with built-in trimmers

Inductors
See table 1 and text.

Miscellaneous

3 B7G valve holders (J. Birkett Lincoln) 3 type 1T4 valves (Birkett of Lincoln and Colomor Electronics of London). Coil former material (plastics preferred), audio-output transformer (Maplin YN12N suitable, see text) audio choke (Maplin YN12N suitable, see text) p.c.b. material for chassis, switches, headphones, connecting wire.

J. Birkett, 25 The Strait, Lincoln, LN2 1JF
Colomor (Electronics) Ltd 170 Goldhawk Road, London, W12 8HJ.
Maplin Electronics, PO Box 3 Rayleigh, Essex, SS6 8LR.

Specialised Components

Various *PW* advertisers stock the 1T4/DF91 valves and various values of traditional 'air spaced' variable capacitors are available from **John Birkett at 25 The Strait, Lincoln LN2 1JF. Tel: (01522) 520767**. (For a detailed selection of variable capacitors and tuning methods see 'Radio Basics' - pages 14 and 15 May 1999). Also available from John are the necessary B7G valve bases but not the valves. (See advert in this issue). **Robin Sykes** of **Syon Trading** stocks a variety of r.f. chokes and other inductors. See advert in this issue or contact him on **(01372) 372587**. **Isoplethics**, based in Norfolk can supply many parts for valved radios and amplifiers. Contact them at: **13 Greenway Close, North Walsham, Norfolk NR28 0DE. Telephone (01692) 403230**.

ranges of the coil/capacitor combination you're to use.

Even if you don't have a dip meter ... you'll enjoy finding out where the coils you've made actually take you on the bands. That's the joy of our hobby ... discovery!

Regenerative Detector

Following the single stage of r.f. amplification the signal is coupled via C2 into the regenerative detector stage. Although it's common to use a suitable coupling coil (it would be on the same former as L3 and 4) this circuit - for the sake of simplicity - feeds directly to the point shown. It works well.

The style of regenerative detector used is simple ... and very interesting because it does not use a variable capacitor to control 'regeneration'. Instead, the actual gain of the valve, V2, which is in effect a potential oscillator, is controlled by R4. This control varies the voltage on the screen grid and hence the gain of the circuit.

Eventually, as R4 is adjusted the gain provided by the valve reaches a point where it 'takes off' (oscillates). At this point the oscillating detector which the V2 is designed to be - is very sensitive indeed.

The trick (as I will describe next month in part 2) is to adjust the point of oscillation to be 'on the threshold' of oscillation. Once this is achieved, remarkably good quality reception of amplitude modulated (a.m.) transmissions is possible.

For c.w. (Morse transmissions) and single sideband (s.s.b.) reception R4 is adjusted so that the detector has just entered into oscillation. At this point the detector is again very sensitive and 'sideband' and c.w. signals should be heard on the Amateur Radio bands.

Important note: Although R4 will only be carrying a small current at 90V (less when lower voltages are used) for good results and ease of operation I recommend that you use the best quality variable resistor you can obtain. A 'Scratchy' regeneration control used here will cause you much frustration!

Chokes & Transformers

Nowadays radio frequency chokes (r.f.c.s) and audio frequency (a.f.) chokes can be difficult to locate especially if you're new to the hobby. Again, this shouldn't be a problem because some suppliers (see panel) can still help with r.f. chokes and there are useful alternatives for a.f. chokes and a.f. output transformers.

For example, if you haven't got an a.f. choke to use in the anode circuit of V2, the 'mains' primary side of a small 240V to 12V transformer will do. These are easily obtainable for use in small power supply units (p.s.u.s) for transistorised equipment. In this application the secondary (the 12V output windings) are left 'open circuit' (not connected to anything).

The output transformer in the anode circuit on V3 (connected as a triode) is not a problem either! Here all you have to do is to again use a small mains (in this application a 240V a.c. to 6V a.c. transformer would be the better compromise) transformer. More experienced 'Purists' among our readers won't appreciate my suggestions ... but I can assure you that the idea works well, and although 'hi-fi' reproduction **cannot be expected**, you'll be delighted with the results.

Next month I'll describe how to assemble your receiver and how to use it to get the best results. But in the meantime - remembering the various methods I've described in this series - there's nothing to stop you **starting to build the project now is there?**

And for the transmitting Radio Amateur I've got a nice little 7MHz project which brought superb results the first time that **Tex Swann G1TEX** and I put in on the air (at well past midnight) from our old offices in Poole in 1992. So, cheerio until next time and I hope you enjoy discovering or re-discovering valves! *PW*

Valves In Action!

Tex Swann G1TEX, *PW*'s resident author of 'Electronics-in-Action' says "If you would like a slightly more in-depth look at valves and a simplified description of how they work - have a look at the 'E-i-A' column from October 1998, December 1998 and the description of a two valved a.f. amplifier in April 1999".

Table 1: Coil winding details (see text).

Table 1

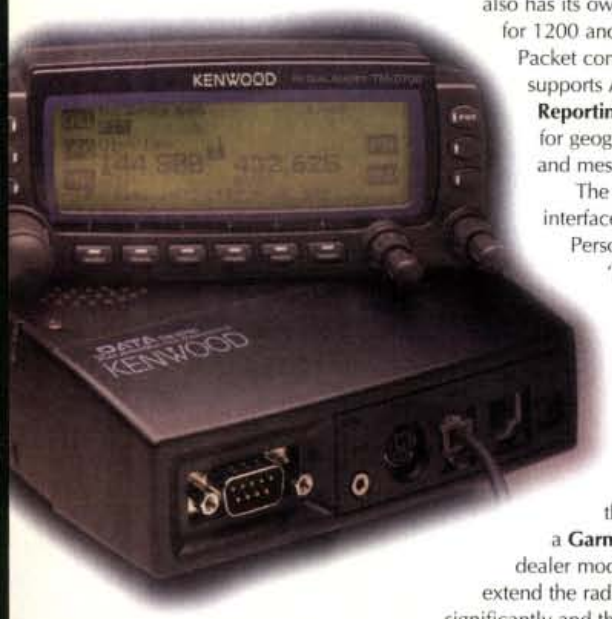
Coils wound with 28 s.w.g. enamelled wire.

3.5-4MHz	L1 = 7 turns	L2 = 60 turns closewound	L3 = 60 turns closewound	tap L3 at 10 turns	L4 = 10 turns.
6.9-7.4MHz	L1 = 5 turns	L2 = 30 turns closewound.	L3 = 30 turns closewound	tap L3 at 5 turns	L4 = 5 turns.
13-14.4MHz	L1 = 3 turns	L2 = 20 turns over 10mm	L3 = 20 turns wound over 10mm	tap L3 at 3.5 turns.	L4 = 3.5 turns.
20.5-22MHz	L1 = 3 turns	L2 = 13 turns over 10mm	L3 = 13 turns over 10mm	tap L3 at 3 turns	L4 = 3 turns.
27-30MHz	L1 = 2 turns	L2 = 10 turns over 5mm	L3 = 10 turns over 5mm	tap L3 at 3 turns	L4 = 3 turns.

Cost:	£519.95 inc. VAT
Company:	Kenwood (UK) Ltd
Contact:	David Wilkins G5HY
Web site:	http://www.kenwood-electronics.co.uk

The Kenwood TM-D700E Data Communicator

Richard Newton G0RSN was 'over the moon' when PW asked him if he would like the chance to review the brand new Kenwood TM-D700E Data Communicator. He couldn't find a bad word to say about it - now that's almost unheard of ...!



● Fig. 1: The TM-D700E comes in two pieces and is designed for use with a detached head only. (See text).

Every so often a radio catches your eye and my interest had been captured by the rumours I'd heard about the **Kenwood TM-D700E dual-band rig**. I was interested in this radio for several reasons. Firstly, it's **a true dual-band radio** with two frequency displays that can work simultaneously. Secondly, there had been some impressive claims made about the radio's additional data capabilities.

Out of the blue I was asked to review the radio for the *PW* team and I was really looking forward to seeing what the new Kenwood transceiver was like. Covering the 145MHz and 430MHz amateur bands, the TM-D700E has **two independent v.f.o. readouts** which are designated BAND A (normally v.h.f.) and BAND B (normally u.h.f.), both bands can be set to the same band or even reversed. (i.e. BAND A could be set to 145.500MHz and BAND B set to 145.625MHz and could just as easily be two u.h.f. frequencies).

The transceiver has a built-in duplexer and is therefore **capable of full or semi-duplex contacts**. I thought that all this was impressive and what you'd expect from a fully dual-band radio, but the TM-D700E also has its own internal TNC for 1200 and 9600bps AX.25 Packet communications and supports **Automatic Packet Reporting System (APRS)** for geographical reporting and messaging.

The radio will interface directly with a Personal Computer or 'palm top' via a 9-pin serial port and is also ready to interface directly with most GPS receivers. (For the purposes of this review I used a **Garmin GPS III+**). A dealer modification will extend the radio's receive range significantly and the review model I used had this modification, allowing reception on a multitude of frequencies including **Air Band**, **Marine Band**, the **private mobile radio (p.m.r.) bands** and the **amateur 1300MHz band**.

In Two Pieces

The first thing you notice about the Kenwood TM-D700E is that it comes in two pieces - the radio is designed for use with a detached head only. The main radio body has an N-type coaxial connector on the rear along with speaker outputs for BAND A and BAND B and the normal power lead connector (see **Fig. 1** and **Fig. 2**).

The main body of the radio also has a 9-pin serial connector, a GPS socket and then the microphone and detached head lead sockets are on the front panel (see Fig. 1). The other socket in the front panel takes the Kenwood **VC-H1** digital camera used for SSTV which is via a mini DIN connector that can also be used to connect the radio to an external TNC.

The head of the radio is a good size, not too small and not too large and is connected to the main body of the radio by means of a supplied three metre length of cable. **A longer lead and separation kit is available as an optional extra**. I thought that the whole set-up was extremely neat, with the head mounted on a very versatile mounting bracket (also supplied) which allows for the head to be easily removed. A good security feature in today's car parks!

If you don't intend to mount the radio in a vehicle, Kenwood are kind enough to supply four rubber feet to attach to the main radio body. This will prevent it being scratched on the surface of say, a shelf or bench. (See **Fig. 3**).

The fact that the rig can only be used with a detached head may put some people off but I hope that it doesn't. It makes perfect sense to me to mount the radio away from the control head and it gives an added flexibility when deciding where to mount the radio, especially in the car.

In my car, my present dual-band radio is mounted in this way with the radio secured under the driver's seat using very heavy-duty 'Velcro' type material and the head sits on the console. Unfortunately, my present unit is an old model and I'm unable to remove the head and the separation kit cost me an arm and a leg - and to have it all supplied is, I think, absolutely wonderful!

Richard Newton G0RSN has been writing reviews for *Practical Wireless* for eight years. He has been interested in Amateur Radio since he was little as his father was an Amateur. He specialises in h.f. mobile rigs.

The head unit of the TM-D700E has a large l.c.d. display (see Fig. 1) which, considering what this radio does, is **very sensibly laid out and uncluttered** and has an **extremely effective back light** that can be faded from off to extremely bright. I also noticed that although this is an l.c.d. display, **the angle at which one could see and read the display was impressive**.

The D700E's head unit has many buttons and the functions are almost exclusively labelled by use of the l.c.d. display which means **each button can be assigned several uses** and it's always very well labelled. Because of the well labelled buttons and the **excellent user manual**, I was programming memories and getting on air very quickly and with absolute ease.

The rig has two separate controls for each band, controlling volume and squelch settings by rotary switches and the band you wish to control and transmit on is simply selected by pushing these switches in. If you wish to tune on BAND A while continuing to transmit on BAND B this can be done very easily with the push of a single button.

Speaking as a keen mobile operator, I can say that, in my opinion, the primary functions given to the controls were very good indeed. For example: **reverse frequency monitoring feature** for when you want to check to see if

you can hear a station simplex while working them through a repeater and the output power were there and call frequency, v.f.o. and memory switching were all features that I found to be easily accessible.

The 'D700E offers 200 memories shared between BAND A and BAND B and each memory can be programmed with an array of information, including odd splits if required. Each memory can then be given an eight-character alphanumeric tag.

Advanced Features

The Kenwood TM-D700E offers a **huge amount of advanced features** and to access these, the radio employs a **three-tier menu system**. This system would be quite difficult to describe in this article but believe me when I say that just a little bit of time spent with the excellent manual and the radio will pay dividends and most people will have mastered it in no time.

After familiarising myself with the radio and getting used to the radio's menus and simple functions, I decided to look at the more advanced features of the radio. This is the first radio I've ever seen with **TWO instruction manuals** - one simply entitled 'Instruction Manual', and the other (just as comprehensive), entitled 'Specialised Communications'.

The first little gem I found was something called **Automatic Simplex Check (ASC)**. I don't work through repeaters very often, as I prefer to work simplex if I can so I'm always looking at a radio to see if it's easy to check the reverse frequency.

When activated, the wonderful little ASC feature will periodically check the strength of a signal that's being received from the other station on the input frequency of the repeater. If the radio considers a simplex contact is possible it will flash a symbol on the radio's display. I liked this - I think someone at Kenwood's design lab is a kindred simplex mobile operator!

Whilst on the subject of repeaters, the TM-D700E has **full CTCSS, DCS and DTMF facilities** offering a range of paging style applications and the radio will also scan an incoming signal to identify the CTCSS tone being used. For 1750Hz tone access, the radio can be set up to activate this tone on the press of the CALL key while in transmit. This feature can also be assigned to one of the four programmable keys on the supplied microphone, the latter was my preferred option.

The Kenwood TM-D700E can itself be set up to be a repeater. This is generally illegal in this country but will be of interest to RAYNET members as RAYNET are able to get the relevant authority to use such a function in certain circumstances.

Versatile Scan Features

The versatility of the Kenwood TM-D700E continues with its scan features as the radio is able to scan a whole v.f.o. range, all of the memories or a designated group of memories. Using a programmable scan, the radio will scan between two frequencies on the selected band as well as scan over a megahertz range. It will also scan between the current v.f.o. frequency and the designated CALL frequency, or the CALL frequency and the displayed Memory channel. I found these last two features particularly useful when wanting to monitor the 145MHz calling frequency and the local 145MHz chat channel.

Another very useful feature is the **'Visual Scan'** which is basically a band scope - while you're receiving, 'Visual Scan' allows you to see a visual representation of adjacent channels in a bar graph format. The really excellent thing about this particular 'band scope' is the fact that it doesn't, under most operating circumstances, cut off the receive audio like other band scopes I've seen and used.

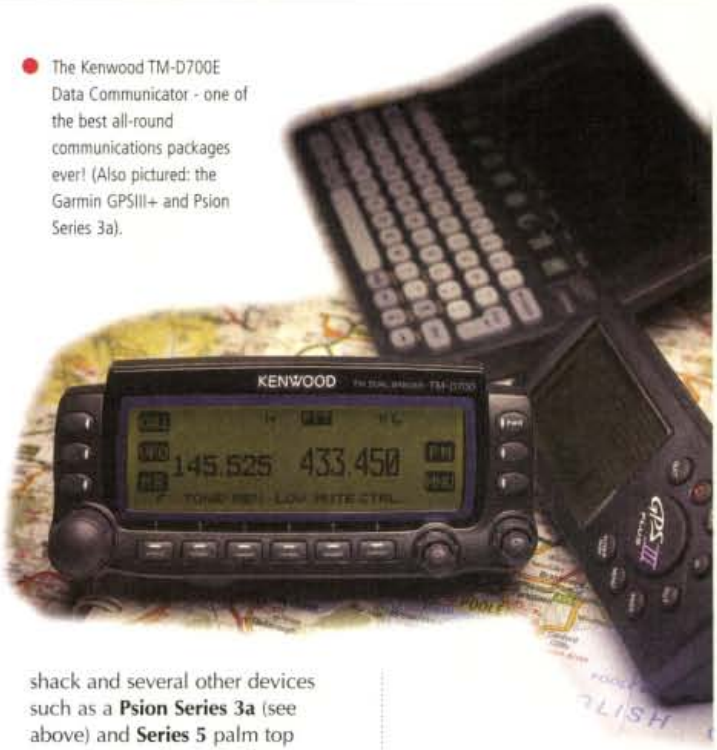
You can monitor the calling channel on 145.500MHz and see the activity around you - if you see a signal, just tune the band scope cursor onto the vertical line and you'll hear what's on the frequency and see what frequency it is in the display.

I decided it was time to get some radio time under my belt and set the Kenwood TM-D700E up in my shack. I connected it to my W2000 Tri-Band antenna and braced myself for the local pager nest. Not a whimper, this was encouraging!

I tuned round the Air Band and got a fantastic signal from the low power departure information at Bournemouth airport. The received audio on a.m. was very good indeed and the sensitivity seemed to be excellent - I've never had quite as good a signal from that departure information before!

Tuning around the Air Band produced some good results and everything worked very well, I was also able to listen to the Marine Band and only good results were to be had. If any radio is going to suffer from pager interference at my place it's normally at its worst on Marine Band so I'm delighted to be able to say that the Kenwood TM-D700E did very well indeed.

I also had a computer on in the shack and several other devices such as a **Psion Series 3a** (see above) and **Series 5** palm top computers and a TNC. There were a couple of spot frequencies that I could hear some noise on, but these were few and far between and the noise was well below a normal squelch setting.



The Kenwood TM-D700E Data Communicator - one of the best all-round communications packages ever! (Also pictured: the Garmin GPSIII+ and Psion Series 3a).

The first contact I had on the TM-D700E was with a friend of mine - **Terry 2E1EJC** from Blandford, who spoke to me on 145MHz and was mobile about 11km away. The **received audio on this radio is really very good** and Terry gave the transmitted audio a very favourable report.

Terry and I got interested in Packet a few years ago though, to be honest I've done little in that mode for some time, just keeping a mail box going in my shack for local messages. However, at the height of our interest, Terry and I spent many frustrated but happy hours trying to get a couple of mobile Packet stations going - you should have seen the mess of cables, sticky tape, cable ties and 'Velcro' that adorned our cars!

We had TNCs and radios hanging all over the place and laptops and Psion palm tops clattering around. It's for this reason that I was particularly interested in the Kenwood TM-D700E built-in TNC.

Dedicated Data Facilities

I have reviewed radios with dedicated data facilities before but never had I seen one with a built-in TNC, which was stand-alone and included a personal mailbox. But wait, there's more - the TM-D700E includes a **fully functional APRS programme** and facility **for receiving DX cluster information without the need to connect to any server**! I will take these features one

Product

The Kenwood TM-D700E Data Communicator

A dual-band APRS mobile transceiver covering the 145MHz and 430MHz amateur bands and complemented by a range of advanced features such as: ASC, full CTCSS, DCS and DTMF facilities.

Accessories

Supplied Accessories: microphone; d.c. power cable; transceiver fuse (15A); front panel mounting bracket (one pair); main unit mounting bracket; screw set for main unit; screw set for front panel; modular plug cable; cable with 2.5mm 3-conductor plug; stick-on feet; warranty card; two instruction manuals (main & specialised communications).

Pros & Cons

Pros: *Easy to use; two frequency displays that can work simultaneously; two independent v.f.o. readouts; capable of full or semi-duplex contacts; internal TNC for 1200 and 9600bps AX.25 Packet communications and supports APRS; excellent user manual; reverse frequency monitoring feature; three-tier menu system; 'Visual Scan' and much, much more.*

Cons: *Some may not like the fact that it comes in two pieces - a detached head and main unit.*

Continued on page 20

Continued from page 19

Kenwood TM-D700E

Fig. 2: View of the back of the head unit of the 'D700E.

Fig. 3: Underside and rear view of TM-D700E - you can clearly see the rubber feet that come supplied with the radio.

Fig. 4: Internal view of the top of the TM-D700E's main unit showing (amongst other things) the heatsink and speaker.

Fig. 5: Internal view of underside of the TM-D700E.

"... enjoying the APRS mode with the Kenwood TM-D700E was one of the easiest and most painfree experiences I've ever had..."

by one, starting with the Packet.

Using Packet with the Kenwood TM-D700E built-in TNC could not be easier. A previous knowledge of the mode and its protocols and operating procedures does undoubtedly help, but Kenwood have done their best to describe what the mode is and the basics of its use in the 'Specialised Communications' handbook.

All you have to do is connect a computer to the 9-pin serial connector on the radio and run **any one of the many Packet terminal programmes available**. For ultimate portability, I used a Psion Series 3a and a Psion Series 5, both running versions of ***PocPac*** - an excellent freeware Packet programme for the Psion palmtops written by **Roger G0HZK**. I was up and running on Packet within minutes on the Kenwood TM-D700E.

Setting up couldn't have been easier - trust me, I'm a man who has sweated blood on many occasions trying to get TNC, computer and radio to talk to one another but with the 'D700E, I had a Packet contact with Terry 2E1EJC in minutes and the best bit of it was that I was communicating with his station on Packet on 145MHz and talking to him on 433MHz - at the same time! Even when the TNC's in use you can tune off the Packet frequency and use the selected data band to send voice - you actually only need the computer to talk to the TNC to set up parameters and retrieve or send messages.

Whilst I had the TM-D700E for review, I would leave it on and when someone left a message in the built-in mailbox, the word 'MAIL' would flash on the display. All you have to do is use the computer to read your messages. The Packet system works well and is **very user friendly**, bearing in mind that is how very unfriendly some Packet systems can be!

Cluster Reception

The next thing I tried was the DX cluster reception which is a side of Packet that I hadn't tried before. Normally you would log onto a DX cluster server and receive regular updates from others on the server about bits of 'yummy' DX about. You'd also be able to send out DX information to all stations on the cluster but using the Kenwood TM-D700E, however, you can only receive information.

The TM-D700E actually receives DX cluster information without having to connect to any other station and displays the information on the screen of the radio itself, so no need for a computer on this one. I tuned to the local DX cluster frequency of 144.8875MHz and set the radio to receive DX information.

After setting the radio up on for DX Cluster, it wasn't long before it was chirping at me at regular intervals and displaying on its screen the callsigns and frequencies of DX stations that other people could hear. The radio will store information on the last ten DX station reports received and you can then select these reports from the radio screen and read more information about them.

"The Packet system works well ..."

For example, you may get a report of F/G0RSN on 50.269MHz. On selecting that particular entry you will see that G7GMZ has reported he can hear that station with a 5 and 7 report in IO90BS.

I used the DX Cluster feature at home in the shack and listened to quite a lot of good stations using my Kenwood TS-850, thanks to the information being displayed on the Kenwood TM-D700E. I was receiving information on all sorts of bands - everything from Japanese stations being reported on 18MHz, to German stations being reported on 433MHz side band - I found this to be an interesting and rather fun facility.

I can imagine the DX Cluster facility would be very useful if you were mobile or portable with the TM-D700E giving you all this wonderful information. Then, using a mobile h.f. station, you would be able to grab all that rare DX!

Automatic Position Reporting

The other data feature that doesn't require any computer is the Automatic Position Reporting System (APRS) feature. I'd heard a lot about this system but had never seen it working, let alone had any experience of it before I had the Kenwood TM-D700E to review, so this was going to be a good test of how a complete beginner would cope.

Reading the 'Specialised Communications' manual, I quickly learned that APRS is not only a common term to generally describe the automatic position reporting of a station by unconnected AX.25 data packets over radio. It's also a registered trademark used by **Bob Bruninga WB4APR** who has written a software package that allows you to track mobile stations and plot static stations on a map.

Before I embark on trying to put in writing the intricacies of APRS I will apologise as trying to describe this in writing is not going to be easy. However, **enjoying the APRS mode with the Kenwood TM-D700E was one of the easiest and most painfree experiences I've ever had** when trying to get to grips with something new. This was largely down to the radio and manual being so user friendly but also, in the true spirit of Amateur Radio, I also got some help from some friendly people on the air.

To use the APRS system you would normally need a computer, TNC and radio as well as a GPS if you're moving. However, to use the TM-D700E on APRS all you need is the rig itself and a GPS if you wanted to let people track you while you were mobile.

The kind of information you're likely to get from other stations on APRS is the distance and bearing and status text (the status text is a small string of text), the 'D700E has several built in that you can choose from or input you own. The status text is designed round RAYNET or similar use - the set ups included text like: 'ON ROUTE'; 'OFF DUTY'; 'EMERGENCY' which also puts out an audible alarm which would be received by all stations.

You can get fixed stations and weather stations and you'd normally expect to see some kind of transmit power, height and antenna information on a fixed station. A weather station transmits the wind speed and direction, temperature and rainfall in the last hour.

I received one such weather station run by **Clive G4EFB** in Portsmouth. Clive's station gives wind speed and direction, rainfall, pressure, humidity and, of course, the temperature amongst other things.

Through a network of digipeaters (like repeaters forwarding the unconnected Packets by re-transmitting them on the same frequency), the information transmitted can reach stations over vast distances. I'm guessing that there are also h.f. gateways or something similar as the results I achieved were really quite interesting as you will see later. (The UK 144MHz frequency given to

APRS and other non-connected Packet communication is 144.800MHz, the frequency on which I did all my APRS research).

You can programme up to five different locations on the Kenwood TM-D700E which can be easily toggled and each location includes a description that you can input such as 'home' or 'work'. In addition, you can choose an icon that's transmitted and decoded by APRS software - when you're at home you can use a house or why not have a tent if you're portable? It goes without saying that a car is also an option!

Being able to select any one of five user pre-programmed locations on the 'D700E gives you some degree of mobility on APRS, even without a GPS fitted. You could set one to be home, one to work or other fixed location and the others to be way points on a well trodden route, i.e. to a friend's house maybe?

After setting some parameters in the Kenwood TM-D700E, including my callsign and position using Latitude and Longitude, I was up and running on APRS. At this particular time I didn't use the GPS but programmed the radio with my home co-ordinates.

As soon as you 'hear' another station's beacon, either direct or via a nearby digipeater, a little bleep goes off and you have the station's callsign and status text appear on the radio display along with Latitude and Longitude.

The TM-D700E will list up to 40 stations and their information on a rolling basis. You can bring up this list and select a station to find out distance and bearing and, in the case of a mobile station, their speed and direction of travel!

The other facility that APRS gives you is the ability to send and receive text messages. The 'D700E will save up to 16 of these messages and you can have a conversation by sending these messages to and fro.

Using the Kenwood TM-D700E for 'real time' chat using the messaging facility isn't easy due to the absence of a keyboard - for those with mobile phones it's rather like trying to have a quick fire chat using SMS messaging - not a good idea! However you can set up the 'D700E with pre-programmed messages; "PSE QSY TO PHONE ON 433.450>>" was one of mine! Obviously only useful if the station was local, but I'm sure you get my drift.

I set the radio to APRS and almost straight away I heard, 'BLEEP' - there was **Mark 2E1CEQ**, who is just down the road from me in the Boscombe part of Bournemouth. I sent Mark a message and found that he was at home and half-way through his dinner! Despite this, Mark got my PSE QSY... message and met me on 433.450MHz for a chat on 'phone.

Mark gave the Kenwood TM-D700E an excellent report on 'phone, saying that it had "Very good modulation" and was kind enough to give me some pointers on APRS operation, even though he was new to the mode as well.

I left the Kenwood TM-D700E on overnight to see what it would receive and got some rather impressive results which made me think that somehow information comes into the UK system via h.f. or some other means. The radio was tracking one of these stations - G4EFB-12 - as it was moving. I saw that G4EFB-12 was 71.1km away from me travelling at 91kmph and the station's direction of travel was 61°. (The -12 is what's called a Secondary Station Identifier or SSID and are used to distinguish between your main station, mailbox or node for example).

I then had an APRS text message QSO with **Alan G0FUM** in Worthing which was a rather stilted conversation as I was trying to send messages using the tuning knob on the Kenwood TM-D700E to select letters one by one! Thanks for sticking with it Alan!

I had further voice conversations with Mark 2E1CEQ and another local amateur, **Graham G7TCS** on 145MHz. Apart from giving the Kenwood TM-D700E glowing reports on the transmitted audio, they also helped immensely with information about APRS.

Terry 2E1EJC in Blandford got bitten with the APRS bug as well - he downloaded an excellent programme from the Internet called ***UiView*** which is a shareware package written by **Roger Barker G4IDE**. Using this wonderful piece of software, Terry and I did some more APRS tests and I set *UiView*up in my shack and was able to talk to myself on the Kenwood TM-D700E. So, now I'm talking to myself! The things I do for *PW*! You can add maps to *UiView* and I was able to get a map of the Bournemouth area and plot all the local stations.

As a finale I hooked up the GPS Garmin III+ to the TM-D700E and set off, having primed Terry 2E1EJC to do the monitoring. I drove my two boys to school and then drove up to Blandford to see Terry knowing that he would know exactly when to put the kettle on as he could see how close I was on the map! Just in case, I also kept in contact on 433.450MHz by voice and as it happened, we were alse joined by **Bob G6DZM** and **Clive G4SLU**.

You can actually set the Kenwood TM-D700E to only recognise APRS stations in a given area, which would again be a wonderful tool for RAYNET or even groups of friends who want to stay in touch and have a visible representation of where everyone is! With Kenwood's VC-H1 as an option you can even transmit SSTV pictures of what you can see!

"...an excellent report on 'phone ..."

I am mindful of the fact that I may have laboured on about the data options, so please take it from me that, **as a radio, the Kenwood TM-D700E performed extremely well**. Never once did I get a bad report and what pager and spurious interference I suffered was minimal in comparison to other radios which I've owned, used or reviewed.

Summary

So, time to hand back the Kenwood TM-D700E - a truly sad time for me! In conclusion, I have to say that I found it to be a **very professionally manufactured and excellent radio**. It **performed well on voice** and **its ease of use on other modes is a credit to the designers**. The Kenwood TM-D700E is **very easy to use** but it may take a little time to get to grips with some of the more advanced menu-led parameters and programming. **Kenwood have done a lot towards making it as straightforward as possible with good descriptions and flow charts in the handbooks**. The Kenwood TM-D700E's ability to have a **wide choice of receive frequencies** and the **powerful data options** it offers, coupled with what can only be described as a **really great radio** makes it **one of the best all-round communications packages I have ever seen.**

● My thanks go to:
Kenwood (UK) Ltd
Kenwood House
Dwight Rd, Watford
Herts WD1 8EB
Tel: (01923) 655284
FAX: (01923) 655297
E-mail:
comms@kenwood-electronics.co.uk

RRP: £519.95 inc VAT

Manufacturer's Specifications

Transmitter		
Power output:	High	50W (v.h.f.)/35W (u.h.f.)
	Medium	Approx. 10W
	Low	Approx. 5W
Modulation:		Reactance
Spurious emissions:		-60dB or less
Max. frequency deviation:		±5kHz
Audio distortion (at 60% modulation):		3% less
Microphone impedance:		600Ω
Receiver		
Circuitry:		double conversion superheterodyne (v.h.f./u.h.f.)
Intermediate frequency (1st/2nd):		38.85MHz/450kHz (v.h.f.) 45.05MHz/455kHz (u.h.f.)
Sensitivity (12dB SINAD):		0.16µV or less (v.h.f. or u.h.f. band) 0.25µV or less (sub v.h.f. or u.h.f. band)
Selectivity (-6dB):		12kHz or more
Selectivity (-40dB):		28kHz or less
Squelch sensitivity:		0.1µV or less
Audio output (8Ω, 5% distortion):		2W or higher
Audio output impedance:		8Ω
General		
Frequency range (Europe):		144-146MHz (v.h.f.)/430-440MHz (u.h.f.)
Mode:		F3E (f.m.), F1D (GMSK), F2D (FSK)
Antenna impedance:		50Ω
Usable temp. range:		-20°C ~ +60°C
Power supply:		13.8V d.c. ±15% (11.7 ~ 15.8V)
Grounding method:		Negative ground
Current:		Transmit (max.): 11.5A or less (v.h.f.)/10A or less (u.h.f.) Receive (at 2W output: 1A or less (v.h.f. & u.h.f.)
Frequency stability (-10°C ~ +50°C):		within ±3ppm
Dimensions (w x h x d):		Front panel: 140 x 60 x 33mm (projections not included) Main unit: 140 x 40 x 195mm
Weight:		Front panel: Approx. 180g Main unit: Approx. 1.2kg

● Please mention the Practical Wireless review when contacting Kenwood (UK) Ltd. PW

The NEW IC-756PRO

The IC-756PRO contains new and improved features of great interest to serious HF operators and DX enthusiasts.

HF+50MHz, 32bit DSP transceiver

- ***32-bit, Floating-point, IF DSP*** - *this refined level of processing improves noise reduction and provides auto-notch functions.*
- ***5-inch TFT Colour LCD*** - *a first in a HF transceiver! This LCD provides a wider viewing angle and increased level of information, without cluttering the display area. The following information can be displayed:·*
- *Dual frequency display*
- *Memory frequency & memory name*
- *IF filter bandwidth*
- *RTTY tuning indicator and received characters*
- *Real-time spectrum scope*
- *Voice memory/CW memory keyer contents*
- ***Digital Voice Memory*** - *4 channels are assigned for transmit and 4 for receive, with up to 15 seconds recording in each.*
- ***Digital Twin-Pass Band Tuning*** - *digitally narrows the pass-band width at the DSP to efficiently eliminate interfering signals. Operating the PBT within the DSP allows sharper, superior pass-band width characteristics.*
- ***Real-time Spectrum Scope*** - *selectable sweep ranges, ±12.5kHz, ±25kHz, ±50kHz, ±100kHz.*
- ***Dual-watch*** - *receive two signals on the same frequency band simultaneously. Monitor a DX station while operating on another frequency!*
- ***AGC Loop Operation*** - *IF filter and notch circuits are included in the DSP loop, giving a wider dynamic range.*
- ***Digital IF Filter*** - *with 51 selectable bandwidths. To operate in PSK31 and other digital modes, it is possible to set the bandwidth for the SSB filter to 50Hz.*
- ***Low Distortion, RF-type, Speech Compressor*** - *with selectable transmit bandwidths of 2.0kHz, 2.6kHz, and 2.9kHz.*
- ***Built-in RTTY demodulator/dual-peak APF*** - *an RTTY demodulator and decoder circuit is built-in. Two peak frequencies can be selected by setting the shift width for RTTY operation. Received data is shown on the LCD.*

Another Happy ICOM Customer!

Wow!
The new 756 is great. I thought the receiver was faulty, it was so quiet. Until I tuned in to the international beacons, and it blew my headphones off! The speech processor works better than the old 756, I believe. Of course, it helps that the bands have been wide open these last few days. My first contact on the new rig was with New Zealand, so yes, OK, I'm well impressed!

Thanks for your help,
Regards,
Mike Berriman G4JBI

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Listening And Looking In On The Bands

Cost:	RRP £2399, M&S price £2099
Company:	Martin Lynch & Sons
Contact:	Martin Lynch
Web site:	www.hamradio.co.uk

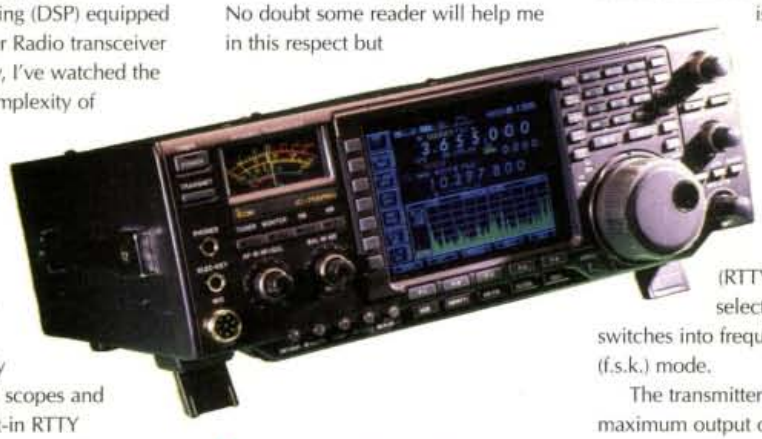
Rob Mannion G3XFD has been enjoying the newly introduced Icom IC-756PRO transceiver. Rob says "I've found it fascinating to be 'Listening & Looking In' on the bands". So, read on to find out what he's discovered!

Ever since I first had the great pleasure of using the first Digital Signal Processing (DSP) equipped Amateur Radio transceiver to come my way, I've watched the growth - and complexity of provided 'extras' - increase at an amazing rate. First came better DSP, followed by the introduction of the first relatively simple spectrum scopes and now there's built-in RTTY decoding. What next I ask?

When I got the opportunity to try the latest h.f. and 50MHz main transceiver from Icom I'd just moved house. My old home had plenty of space for antennas and, although I can have some at my new home, my antenna erecting abilities are now extremely limited. So, I'm now active on the band using very simple wire antennas and my portable 'long wire' and dipole arrangements for use from my car.

I've evaluated the IC-756PRO from my new home on power levels ranging from 5 to 100W on c.w. and s.s.b. and also from my new vehicle at around 25W. Incidentally - the power limitation when working from my car is because I am very concerned that I could trigger the 'air bags' on my VW 'Sharan' diesel automatic MPV estate car at any time and particularly when I'm parked and operating in my favourite /P ('stroke Parked') mode.

The VW handbook for my 'Sharan' clearly states that r.f. levels in excess of 10W **inside the vehicle** can cause problems. So, when using long wires (with the possibility of r.f. in the car) I keep the power well down. What it doesn't say in the handbook is whether or not this level applies when the car is parked with engine and electrics off and without the alarm system activated. No doubt some reader will help me in this respect but in the meantime, when I'm evaluating any portable/mobile transmitting equipment on behalf of readers I'll be very careful!



● A new perspective on the bands - The IC-756PRO provides the operator with a new dimension and many exciting facilities.

Rob Mannion G3XFD has been the Editor of *PW* for nearly 11 years. He's a keen 'portable' operator on both the h.f. and v.h.f. bands.

What's On Offer?

So, what's on offer with the Icom IC-756PRO? Well, to answer the question let's take a look at what I regard to be the most important features and design elements. **However, I will not be 'listing' such things** as the memory functions and other items as they are covered in the manufacturer's specification at the end of this review.

The main receiver provides general coverage from around 30kHz (this will probably vary from receiver to receiver) to 60MHz with separate, dedicated Amateur Radio band coverage. The receiver is described as a triple conversion superhet with, of course, the DSP stage (which now seems to be generally accepted as such) being considered as the last i.f. stage.

The first i.f. is 64.455MHz, the second is 455kHz with the final being 36kHz. The last i.f. stage is, of course, where the all-important DSP is undertaken.

As supplied, the receiver is capable of a.m., c.w., s.s.b. and n.b.f.m. reception. When the Radio Teletype (RTTY) function is selected, the receiver switches into frequency shift keying (f.s.k.) mode.

The transmitter is capable of a maximum output of 100W in the c.w., s.s.b., RTTY and narrow band frequency modulation (n.b.f.m.) mode (5 to 40W a.m.) and is - according to the specifications - continuously variable from 5 to 100W. However, although I found on my power meter that the lowest power output I could select was 5W (give or take any inaccuracy from my thermistor-headed terminated power meter), somewhere in the manual - I definitely read it somewhere - it states that it's actually 8W!

On the facilities side, the IC-756PRO is certainly in the 'impressive' league! On top of a

● Fig. 1: 'Looking in on frequency'. The main display on the Icom IC-756PRO provides a great deal of information plus a built in RTTY screen (see text).

Listening And Looking In On The Bands

Product

The Icom IC-756PRO HF & 50MHz transceiver - containing 32 bit floating point, i.f. DSP and also featuring digital twin pass band tuning, real time spectrum scope, dual-watch, a.g.c. loop operation, digital i.f. filter, low distortion r.f. type, speech compressor, built-in RTTY demodulator/dual-peak APF as well as built-in a.a.t.u. and much more.

Accessories

Supplied accessories: d.c. power cable; hand microphone; spare fuses; c.w. keyer plug.

Pros & Cons

Pros: Excellent DSP facilities, selectivity and ease-of-use receiver and transmitter. Greatly improved three colour l.c.d. main display. Excellent 'real time' 'spectrum scope' (Panoramic adapter' type facility). Very interesting built-in RTTY decoder and screen display.

Cons: Main display could do with slightly increased 'brightness' levels. Viewing angle of small RTTY screen critical for comfort and distance. Some front panel controls 'slightly fiddly'.

Fig. 2: Where have they hidden all the electronics? An inside (top) view of the Icom IC-756PRO where the advanced use of surface-mount technology gives a false impression of what is actually 'under the bonnet'! Note the very substantial inter-compartment screening which is provided by die-cast aluminium sections.

user-friendly DSP 'third i.f.', the transceiver comes fitted with a much improved 'spectrum scope' which many will class as a 'panoramic adapter' type display - you'll see what I think of this 'window to the bands' later in this review.

The layout of the front panel is also well thought out and, even as a left-hander, I found it reasonably easy to use. The only real 'niggle' I have regarding the front panel controls is with the size and positioning of the **MIC GAIN**, **RF POWER**, **COMP** (Compression), **KEY SPEED** and **BK-IN DELAY** (c.w. 'break-in') knobs, which I feel are too small and 'fiddly'. However, the designers obviously consider that these controls are not constantly used - and can be positioned where they are and made smaller. I can understand their reasoning and what they've done, although I would like to have seem them slightly larger.

The **main three colour l.c.d. type display on the transceiver is excellent and very informative** - but doesn't 'dazzle' you with too much comprehensive information. However, although the display is excellent (it's the clearest I've seen recently), I feel that even with the maximum level of 'brightness' selected, there's not a lot of 'reserve'.

In other words, I feel that the display could be a little brighter. Although provided I kept the rig out of the direct sunlight (especially when operating 'portable' from my car), it wasn't a major problem.

As I've said, the display is one of the clearest that's come my way recently and once Icom have adjusted the 'brightness' levels, I feel sure it will be absolutely perfect. Incidentally, I'm only mentioning this fact because I really do appreciate the excellence of the IC-756PRO's display and that it's a major consideration when you're considering a new rig - it only needs a little 'tweaking' from Icom to get it 'just right'.

Built-In RTTY Decode

As I mentioned at the start of this review, the IC-756PRO comes complete with a built-in RTTY decoder, capable of resolving Baudot (mark frequency 2125Hz, shift frequency 170Hz, at 45bps). A rather limited facility, the 'RTTY Gang' might consider - but I can tell you that after using the facility, I've had my 'appetite whetted' for RTTY again!

I also think that Icom have 'made a rod for their own back' here in that now they've provided the RTTY facility ... just how long can we expect to wait for built-in FAX, Packet and SSTV? All are possible with modern software packages and I really don't think it will be long before 'updates' are available to enable fortunate '756PRO owners to equip their transceivers.

"I've had my 'appetite whetted' for RTTY again"!

I was delighted (and not a little surprised) to see just how much Amateur Radio RTTY there's is to be 'seen' on h.f. nowadays. I was fortunate in this respect because several contests seemed to bring up RTTY operators from all over Europe and, in fact, there seems to be a particular interest in RTTY from the former Soviet Union countries - fortunately, they seem to conduct their QSOs mainly in English. I spent many happy hours working on my main computer with the Apple Macintosh screen to my left and the Icom IC-756PRO's screen directly in front of me.

I was able to sit and work and 'look in' on many QSOs and pick up some tips where the DX was to be found. It was nice to see just how polite the operating practice is on RTTY, perhaps it's time I really got active on the mode myself!

The built-in RTTY decoder and (small - because **it is a small viewing area**) screen built into the main display is clear and relatively easy to read. In fact, at the normal sort of operating distance away from the front panel - at arm's length - the screen was perfectly readable. However, I did get an extra 'crick in the neck' - and here lies my only real criticism of the RTTY facility!

For prolonged RTTY 'watching' (can you be said to be a 'viewer' I wonder?) I think the transceiver should be mounted (or propped up) at around 30° from the horizontal. (This is in addition to the 'lift' provided by the built-in 'legs', which are mounted just behind and underneath the main front panel).

I experimented with the rig and found that, at 40°, the screen was just about at the correct angle for myself. In saying that though, I must admit that the arthritis in my neck causes extra discomfort.

The main display, including frequency display, spectrum scope, etc., isn't really dependent on the angle for viewing - but for comfortable observation of the fairly small RTTY 'print out' display - I consider that a careful choice of viewing angle is essential. However, having said that, I found the facility absolutely fascinating and it again demonstrates the trend to the 'everything in one box' dream of the manufacturer's engineering design team - perhaps?

With RTTY 'threshold' selection and the ability to select 'Reverse' mode, the decoder is capable of providing a useful monitoring facility and good quality, error-free reception is possible for long periods. In fact, most of the errors were obviously being made by the operators, in the same way I have to apologise to readers for my keyboard mistakes on E-mailed letters.

The IC-756PRO's RTTY facility certainly made me remember the old days when, whilst I was in the Royal Navy, I often had to work near clattering mechanical teleprinter machines. What a difference between them and the modern equipment - I await the next development with interest and think that FAX and SSTV

might be welcome!

I was most impressed when the (much slower and nowhere near as sensitive and useful) earlier versions of the 'spectrum screen' appeared on previous Icom equipment. However, as you would expect ... things are getting much better and the spectrum scope's display is now approaching what I would expect from a reasonably priced spectrum analyser screen.

With the new facility on the '756PRO, the spectrum scope's presentation is constantly on the move (unless you 'freeze it' of course) and is obviously 'breathing'. (By 'breathing' I mean that you can see the display constantly responding to the slightest variation on the amplitude of the signals it's receiving).

Gone are the obvious 'digital steps' of previous displays - this one really does seem 'alive'. In other words, the spectrum display on the screen really does seem as responsive to rapid variations in signal levels, etc., in the same way you would expect a spectrum analyser or 'panoramic' adapter display to be.

In use, the display is so quick that you can now very easily see the wide band interference from thermostats, etc., as their high amplitude signals appear across the screen. You can also see the various 'ionosonde' sweep transmissions as they travel quickly across the screen.

You'll also be able to see the spectral display of the many other transmissions in the bands we use and share. Perhaps like me you may also wonder just what we share our bands with!

From observing the regimented internationally agreed frequency channels of the short wave broadcasters, to seeing those annoying 'carrier swishers' in operation on 7MHz (where most of them seem to operate), you'll see much to help you.

On one 14MHz s.s.b. QSO I was getting 'splatter' from an extremely strong southern European station. One glance at the spectrum scope told me where he was relative to my indicated centre frequency on the same display - and it was a moment's work to adjust the DSP to eliminate the problem. Very satisfying indeed!

● Fig. 3: Close-up view of the power amplifier (p.a.) stage board. Note again the substantial die-cast alloy chassis.

On The Air

The transceiver soon proved itself 'On The Air' and **I was able to get it set-up and working very quickly indeed**. The more complicated the rig nowadays, the more likely you'll have to get your nose stuck into the manual (always a good idea anyway) and to this end the 80-page plus **manual is extremely easy-to-use and very well prepared**. However, the '756PRO is 'user friendly' in that respect and after initial switch on I only had to wait for the DSP to calibrate itself, a process which only takes ten seconds.

Operating on 7MHz under very crowded conditions and with a high level of static I found the transceiver proved itself very worthy. The 'whistlers' and 'carrier swishers' that seem to live on this band - usually only bothering s.s.b. QSOs - aren't a problem with the DSP facilities.

One QSO I listened to on 7MHz (a Special Event station was involved) was plagued with one character who was on frequency most of the time. However, I think the Special Event station was equipped with a DSP fitted rig so, like me, they weren't bothered by the nuisance!

Because the IC-756PRO is fitted with many ceramic band-pass filters (there are no 'traditional' quartz crystal filters fitted) and the transceiver relies on the very high frequency first i.f., the (as already mentioned) many band-pass filters and the final 'digital' (DSP) i.f.' - the results are, in my opinion, astounding. For some years now I've thought that the DSP-equipped Kenwood TS-870 was unbeatable - but now I think the performance has at last been overtaken.

The Kenwood TS-870, in my opinion, was the first Amateur Radio DSP-equipped transceiver to treat the digital processing as one of the intermediate frequencies (rather than just an 'add-on' unit on the same chassis). However, I now regard the IC-756PRO to be its worthy challenger in this respect.

Operating on 3.5MHz on c.w. and s.s.b. under very noisy conditions, I found it possible to complete QSOs whereas I'd have no chance with my Alinco DX-70TH, unless I was using an add-on DSP unit. The '756PRO's 'Twin Passband Tuning' (complimented by a helpful 'mimic' diagram on

Manufacturers' Specifications

General

Frequency coverage:	Receive:	0.030-60.000MHz
	Transmit:	1.800-1.999MHz 3.500-3.999MHz 7.000-7.300MHz 10.100-10.150MHz 14.000-14.350MHz 18.068-18.168MHz 21.000-21.450MHz 24.890-24.990MHz 28.000-29.700MHz 50.000-54.000MHz
Mode:		u.s.b./l.s.b./c.w./RTTY/a.m./f.m.
No. of memory channels:		101 (99 regular, 2 scan edges)
Antenna connector:		SO-239 × 2 and phono (RCA; 50Ω)
Temp. range:		-10°C to +50°C
Freq. stability:		less than ±0.5ppm 1 min. after power on (-10 - 50°C)
Freq. resolution:		1Hz
Power supply:		13.8V d.c. ±15%
Power consumption:	Transmit:	Max. power = 23A
	Receive:	Standby = 3.0A (typical.) Max. audio = 3.5A (typical.)
Dimensions:		340(w) × 111(h) × 285(d)mm (projections not included)
Weight:		9.6kg (approx.)
ACC 1 connector:		8-pin DIN connector
ACC 2 connector:		7-pin connector
CI-V connector:		2-conductor 3.5(d)mm
Display:		5inch (diagonal) TFT colour l.c.d.

Transmitter

Output power: continuously		- 50-100W (s.s.b./c.w./RTTY/f.m., adjustable) - 5-40W (a.m., continuously adjustable)
Modulation system:	s.s.b.	PSN modulation
	a.m.	low power modulation
	f.m.	phase modulation
Spurious emission:		50dB (h.f. bands) 60dB (50MHz band)
Carrier suppression:		40dB
Unwanted sideband suppression:		55dB
TX variable range:		±9.999kHz
Microphone connector:		8-pin connector (600Ω)
Electronic key connector:		3-conductor 6.35(d)mm
Key connector:		3-conductor 6.35(d)mm
Send connector:		Phono (RCA)
ALC connector:		Phono (RCA)

Receiver

Receive system:		Triple conversion
Intermediate frequencies:		1st:64.455MHz
	2nd:	455kHz
	3rd:	36kHz
Sensitivity (typical):		s.s.b./c.w./RTTY (10dB S/N) = 0.16μV (1.80-29.99MHz)*1 and 13μV (50.0-54.0MHz)*2 a.m. (10dB S/N) = 13μV (0.5-1.799MHz), 2μV(1.80-29.99MHz) and 1μV (50.0-54.0MHz) f.m. (12dB SINAD) = 0.5μV (28.0-29.99MHz) and 0.32μV (50.0-54.0MHz) *1 Pre-amplifier 1 is ON. *2 Pre-amplifier 2 is ON.
Squelch sensitivity:		s.s.b./c.w./RTTY - less than 5.6μV (Pre-amp OFF) f.m. - Less than 1μV
Selectivity:		s.s.b./RTTY (BW: 2.4kHz): more than 2.4kHz/-6dB less than 2.8kHz/-60dB
		c.w. (BW: 500Hz): more than 500Hz/-6dB less than 700Hz/-60dB
		a.m. (BW 6kHz): more than 6.0Hz/-6dB less than 15.0Hz/-60dB
		f.m. (BW: 15kHz): more than 12.0Hz/-6dB less than 20.0Hz/-60dB
Spurious & image rejection ratio:		more than 70dB (except i.f. through on 50MHz band)
AF output power (at 13.8V d.c.)		more than 2.0W at 10% distor tion with an 8Ω load
RIT variable range:		±9.999kHz
PHONES connector:		2-conductor 6.35(d)mm
External SP connector:		2-conductor 3.5(d)mm/8Ω

Antenna Tuner

Matching impedance range:		
	h.f. bands:	16.7-150Ω unbalanced (less than v.s.w.r. 3:1)
	50MHz band:	20-125Ω unbalanced (less than v.s.w.r. 2.5:1)
Minimum operating input power:		8W
Tuning accuracy:		v.s.w.r. 1.5:1 or less
Insertion loss (after tuning):		less than 1.0dB

Listening And Looking In On The Bands

Summary

I feel sure the IC-756PRO is a model we'll be seeing many facility updates provided for in the future. In fact, like the Kenwood TS-870 became a few years ago - **I feel that the '756PRO will become another 'classic'** and I look forward to having one in my shack to update!

Try as I might, even if I had ten pages in *PW*, I still couldn't do full justice to the achievements of the Icom designers so far. So, all I can do is to suggest that you try the 'hands on' approach by visiting an Icom dealer. I can only give you a short 'taster' of the technology invested in this transceiver - to appreciate it yourself you'll have to see it in action!

My thanks go to:

Martin Lynch & Sons Ltd.
140-142 Northfield Ave
Ealing
London W13 9SB
Tel: 0208-566 1120
FAX: 0208-566 1207
E-mail:
sales@MLandS.co.uk

For the loan of the IC-756PRO.

£2399 (RRP) £2099 (ML&S price)

the main l.c.d. screen which indicated how the filter was configured, also proved very helpful.

Up on 14MHz I experienced the usual problems of QRM on the International Beacon Project's frequency. Here, the various beacons around the world are subject to frequent inteference from adjacent channel h.f. Packet stations.

In fact, the Packet transmissions sometimes drift right down onto the Internationally agreed beacon frequencies themselves. When this happens there's not much you can do, but provided the Packet transmissions **aren't right on top of the relatively low powered beacon frequency** (where, of course, the various beacons 'step down' to milliwatt power levels from their original 100W output), any operator of the IC-756PRO should find reception much easier.

I certainly found reception of the beacons easier with the IC-756PRO and, whereas this was done by carrying out quick comparison tests, under the conditions in question - even with the narrow filters fitted on the DX-70 - I found it very difficult to copy the beacons ... it was usually possible to resolve a signal with the IC-756PRO's DSP filtering.

The success over the QRM was partly due to the ability to alter the bandwidth of the DSP i.f., Add to this the Notch Function, Noise Reduction and DSP Noise Blanker and you've got a formidable electronic armoury at your disposal!

Received audio quality is excellent and I didn't notice any of the 'switchy' (obviously reconstituted analogue sounds, often the result of a poor choice of 'sampling' rates when using Digital to Analogue converters) audio effects as I have experienced with other DSP equipped receivers. I also had very favourable comments on the quality of the transmitted audio.

Incidentally, although the built-in loudspeaker is more than adequate for communications work, I found that when listening to short wave broadcasting stations - which I enjoy doing - the extension loudspeaker socket was useful. Here, by using a larger external speaker listening to the h.f. broadcasters became a real pleasure.

Fig. 4: Photograph illustrating the rear panel of the Icom IC-756PRO transceiver. Unusually, this transceiver has a centrally-mounted panel with details of the various sockets, rather than having them individually marked.

Although around half of my QSOs were on s.s.b., I feel that if I owned an IC-756PRO myself I'd probably end up using it on c.w. more than 'phone. It's a delight use on c.w. and despite the built-in electronic keyer, which I found to be very convenient - I used my favourite 'Kent' 'straight' key. But if I kept the rig there's no doubt that I'd end up using the 'memory' keyer which no doubt will prove ideal for contest working, with such facilities as incremental serial numbering built-in.

The automatic antenna tuning unit (a.a.t.u.) on the IC-756PRO was a surprise. It's so quiet in operation that apart from the transmission appearing on the spectrum scope's centre frequency display there's not much to see or hear as it works.

However, I found the a.a.t.u. worked very well and it matched into my 'long wire' for 7MHz and into a good selection of antennas including my set of Pro-AM mobile whips for 3.5, 7, 14, 18 and 21MHz. The manufacturers aren't keen on promoting the a.a.t.u.s for use with 'long wire' antennas but generally they do work very well indeed in my experience.

Apart from several pre-arranged QSOs on 50MHz I found no activity on the band - but the IC-756PRO proved itself on the next band down - 28MHz in no uncertain manner. In fact, I had more QSOs on 'Ten' than any other band because it seemed 'wide open' for the whole of the review period.

The increasingly popular n.b.f.m. mode on 28MHz is attracting a lot of operators nowadays and using 10W or so I was able to work all over Europe. I think that the receiver gave a good account of itself on the n.b.f.m. mode.

In Rob's Shack?

So, finally I come to the 'crunch time' where I must convey my opinions - to the best of my ability - as to whether I would like to own an IC-756PRO myself. And simply stated - it has to be a 'Yes'.

During the *PW* 'Into the future' talk at the London Show on Sunday 12th of March, a reader in the audience said that I (G3XFD) "Rarely gave a bad review" - and although, as you've already read, I have had some criticisms of this transceiver - I'm again not in a position to criticise the manufacturers in any major sense. This is because, for the money, I think the IC-756PRO is an excellent performer and it's good value, especially when you consider the many advanced features.

Having just bought myself an almost new, specially adapted car, this transceiver is out of my price range. But when my finances have recovered I shall give very serious thought indeed to buying one. The much improved spectrum 'scope, the excellent DSP, and very many other facilities packed into a very reasonably-sized rig make the IC-756PRO very desirable indeed. However, for myself ... I think the greatly improved spectrum 'scope has got to be one of the most desirable additions, waiting to go on my operating desk!

Cost:	£419.99 inc. VAT
Company:	Icom (UK) Ltd
Contact:	Mark Jarvis (01227) 741741
Web site:	http://www.icomuk.co.uk

Four Bands One Hand-Held!

Richard Newton G0RSN proves that you can have four times the fun with only one hand-held. The Icom IC-T81E is a multi-band (four bands, in fact) hand-held which, Richard says, also has extended receive coverage. Is this little radio for real? Read on and find out.

The **Icom IC-T81E** is a multi-band f.m. Amateur Radio transceiver which offers an impressive array of transceive bands: namely: **50-52MHz**, **144-146MHz**, **430-440MHz** and **1240-1300MHz**. This splendid collection of bands on which you can communicate is complemented by **extended receive coverage** encompassing **Air band**, **Marine band** and the **v.h.f. Band II broadcast band** and much more.

The radio is supplied with a **6V 700mAh Nickel Metal Hydride (NiMH) battery pack** (see **Fig. 1**), a belt clip and carry strap and an helical antenna and finding out what the transmit power was for each band took a little hunting through the handbook. It would seem that when the radio is fed with 13.8V, the output power is approximately 5W on all bands except 1200MHz, where it drops to 1W.

The low power setting gives approximately 500mW on all bands except 1200MHz where it drops to 100mW. It would seem that the high power setting with the supplied battery pack is 2W for all bands except 1200MHz.

I couldn't find any further mention of output power with the supplied battery pack, however I would assume that the high power on 1200MHz would remain at 1W and it would be normal for the low powers to remain the same as well. (The 'T81E also comes with a wall charger which plugs into the 'DC13.5V' connector on the right-hand side of the radio, see **Fig. 2** and **Fig. 3**).

Well Labelled

The controls on the Icom IC-T81E are well labelled and well set out (as you can see from the heading picture). The readout window is a little small, but the readout itself fills this window and the characters are more than adequate and compare favourably with other similar radios on the market.

I personally feel that the radio is smart in appearance and has a reassuring feel of quality about it. The antenna socket is an SMA type and the radio has a standard 3.5/2.5mm speaker/microphone socket on the top panel (See **Fig. 4**) and a connection for 13.8V d.c. on one of the side panels. (See Fig. 3).

A rotary switch on the top panel (left-hand side) controls the v.f.o. ranges and some other functions. The other **main** functions on this little multi-band hand-held such as the volume control, changing bands, selecting off-sets and CTCSS tones are all accessed by a rather strange five-way circular switch on the front panel. (See **Fig. 5**).

The five-way circular switch is about the size of a new five pence piece and it caused me constant frustration. (It was, however, my only disappointment with this otherwise excellent bit of kit).

As an idea, the five-way switch is a sound one. However, as I tried to 'get to grips' with the 'T81E and find my way around it, this switch was frustrating me at every turn. When I tried to push it straight in to select duplex operation, the radio would either change volume setting or leap to another band. On occasions it would do both in rapid succession!

I'm relatively young and dextrous and my fingers are relatively small so I dread to think what it would be like for someone less able. Having said that, I got over the problem by programming all the frequencies that interested me in the memory banks and I was then able to enjoy using the radio. In contrast, using this five-way button to navigate around the different bands was a simple and less traumatic procedure!

Very User Friendly

One thing I will say for the Icom IC-T81E is that it's very 'user friendly'. As you can imagine, it has a multitude of advanced features, yet getting on air and programming in memories is wonderfully straightforward.

One thing that I'm not sure of is the fact that the auto repeater offset facility was only available for the American version, which made programming in repeaters slightly more difficult. But once they were programmed into the memories this didn't matter any more.

However, even if you do get stuck, there's an excellent user handbook and a quick reference card to help you. If you're in SET mode or INITIAL SET mode and don't do anything for five seconds, the radio will start scrolling the name of the particular function across the screen, thus making it easy to look it up in the book and find out what to do.

The Icom IC-T81E has 100 standard memories, augmented by ten pairs of programmable scan edge memories for mixed bands and one call channel for each amateur band. The Marine band is part of the 144MHz amateur band and not a band of its own.

When programmed in, all the standard memories are grouped together and numbered consecutively, unless you change the destination when programming. The call channels,

Richard Newton G0RSN has been writing reviews for *Practical Wireless* for eight years. He has been interested in Amateur Radio since he was little as his father was an Amateur. He specialises in h.f. mobile rigs.

● Fig. 1: The IC-T81E which Richard had to review came with a 6V 700mAh Nickel Metal Hydride (NiMH) battery pack, pictured here on the right-hand side of the picture.

● Fig. 2: You can recharge the NiMH battery pack from a power point using this wall charger which plugs into the connector on the right-hand side of the radio.

● Fig. 3: The back view of the IC-T81E. Here you can clearly see the 'DC13.5V' connector.

● Fig. 4: The top of the Icom IC-T81E. On the left is the rotary switch which controls the v.f.o. ranges and some other functions. In the middle you can see the 3.5/2.5mm speaker microphone socket and finally, on the right-hand side is the SMA antenna socket.

● Fig. 5: Clear view of the front of this multi-band hand-held where you can see the five-way circular switch (about the size of a new five pence piece) which was the cause of a little bit of frustration for the reviewer.

● Fig. 6: The right-hand side of the 'T81E where you can see the 'PTT' and 'SQL' (squelch) buttons.

however, are band specific.

After I'd programmed in all my favourite frequencies I discovered a lovely little feature as far as scanning the memories was concerned. Using the five-way button (the one the size of a five pence piece), you can easily select to scan all the memories, or just memories relating to a specific band - I was able to scan just the memories in Air band for example.

At the touch of a button I could swap to the 433MHz band or all the memories in the radio, remember though, the Marine band is part of the v.f.o. range given to the 144MHz amateur band. Memories can be assigned an alphanumeric name up to six characters in length.

The Icom IC-T81E comes with a full array of user definable options such as Auto Power Off, display back lighting and Power Save. The radio will also display the voltage supplying it which you switch Power ON if you wish.

The transceiver also has CTCSS and DTMF facilities for squelch control and repeater access. (See **Fig. 6**). As well as all this, also available as an optional extra is a cloning/programming software pack.

Fare On Air?

It was time to see how the IC-T81E would 'fare on air' so I tried out the IC-T81E's receive performance first. For the tests, I tuned the Band II f.m. broadcast band and found it to be excellent.

I could hear all the national stations and the local BBC and independent stations as well. The audio quality was superb considering the small speaker in the case of this multi-band hand-held and I was also impressed with the sensitivity and stability.

I compared the IC-T81E to a dedicated Air band receiver loaned to me by **Terry G7VJJ** - a Yupiteru designed for v.h.f. and u.h.f. Air band - I also compared it with my AOR 8200.

I also used a dedicated Air band helical antenna and the low power, continuous loop departure information transmission from the nearby Bournemouth International Airport served as a constant signal. The IC-T81E was slightly better than the AOR 8200. In comparison with the signal received by the dedicated Air Band rig, it wasn't quite as good. All in all I was somewhat impressed with the performance on the Air Band.

"It's very well made and very easy to use"

On the Marine band the receiver was just as impressive, however it did suffer a little with pager break through on 156MHz. But I have to say that this was the only time I had any problems of this nature.

The 'receive' performance on every one of amateur bands was very good. I could hear all the local repeaters on 144MHz and 433MHz and I even heard some of the more distant stations. (My home is in Bournemouth and I could hear the 433MHz Salisbury repeater, the Weymouth repeater on the same band as well as the Wells repeater on 144MHz).

I have a log periodic antenna at my home that will transmit and receive on almost any frequency between 50 and 1300MHz and I used this to monitor the 1200MHz band for any sign of life. I even put some calls out, but alas I heard and talked to no-one - I feel that it's far more likely that this is an indication of the lack of activity than any shortcoming in the radio.

I then called on 144MHz and **John G0TZW** from nearby West Moors answered my plaintive cry. John was very kind and helped me out with some reports.

John reported the received audio as being "Not too punchy - just right" and he was using an Icom IC-746 with the W2000 tri-band vertical antenna. I too was using this particular antenna and the signal I was getting from John was end stop.

John switched radios to his IC-207 and we moved to 433MHz where we were joined by **Mike M5ACX**, my first 'M5' QSO - so thank you Mike! Mike actually helped me out once before when he was the proud owner of a 2E1 call, so congratulations to Mike on his relatively new call. He also reported both good audio and good signal strength, he was quite local to me as well, at about 8km away.

We all went to 50MHz and I took the IC-T81E off the main antenna and put its helical on. Mike couldn't hear me at this point, but John reported hearing me perfectly well, though with a little background noise.

Despite my best efforts I couldn't seem to get any more contacts, the v.h.f. and u.h.f. bands are depressingly quiet these days and the little activity there seems to be centred around repeaters. I was unable to try the IC-T81E on 1200MHz and I have to say that I was a little disappointed as I have yet to work any station on that band.

Product

The Icom IC-T81E – Multi Band FM Transceiver

50-52MHz, 144-146MHz, 430-440MHz and 1240-1300MHz. Complemented by extended receive coverage encompassing Air band, Marine band and the v.h.f. Band II broadcast band.

Accessories

Supplied Accessories: Battery pack/case; antenna; belt clip; wall charger (depending on variation).

Pros & Cons

Pros: Extended receive coverage; well labelled & well set-out; user-friendly; 100 standard memories; ten pairs of programmable scan edge memories; navigating around the bands with the five-way switch is simple; excellent user handbook & quick reference card; Auto power off; display back-light and Power Save.

Cons: The five-way circular switch is a little frustrating; repeater offset facility is only available for the American version making programming repeaters slightly more difficult.

Summary

To sum up then, the Icom IC-T81E **gave a good account of itself** both in the box and on air. This multi-band f.m. transceiver is **very well made** and apart from the rather frustrating centre button on the five-way 'five pence' button, I found that it was **very easy to use**.

If you're looking for a multi-band hand-held radio which will give you transceive access on 50, 144, 433 and 1200MHz as well as wide band receive, then **the Icom IC-T81E is definitely worth a look**.

My thanks go to:

Icom (UK) Ltd
Sea Street
Herne Bay
Kent CT6 8LD
Tel: (01227) 741741
FAX: (01227) 741742
E-mail:
info@icomuk.co.uk

For the loan of the review hand-held.

£419.99 (including VAT)

Manufacturers' Specifications

General:

Frequency coverage:	50MHz	50-52MHz
	144MHz	144-146MHz
	430MHz	430-440MHz
	1.2GHz	12.4-13GHz
	w.f.m.	88-107.995MHz (not guaranteed)
Operating mode:	f.m. (F3E), w.f.m. (receive), a.m. (receive)	
No. of memory channels: and 4 call)	124 (100 regular, 20 program scan edges	
Tuning Steps:	5*, 10, 12.5, 15*, 20, 25, 30, 50 & 100kHz *Not available for 1200MHz band	
Frequency stability:	±3ppm (-10°C to 60°C)	
Power supply requirements: battery pack/case	(negative ground) 4.5-16V d.c. or specified	
Current drain (at 13.5Vd.c.):	RX:	power saved: 40mA (typ.) standby: 80mA (typ., 90mA: 1200MHz) rated audio: 220mA (typ.)
	TX:	max. power: 1.4A (0.8A typ.: 1200MHz)
Antenna connector:	SMA (50Ω)	
Usable temp. range:	-10°C to +60°C	
Dimensions:	58(w) × 106(h) × 28.5(d)mm	
Weight (approx.):	300g (w/ant & BP-197) 280g (w/ant & BP-199) 310g (w/ant & BP-200)	

Transmitter

Modulation system:	variable reactance modulation	
Output power (at 13.5Vd.c.):	High:	5W type (except 1200MHz) 1W (1200MHz)
	Low:	0.5W typ. (0.1W typ. for 1200MHz)
Spurious emissions:	Less than -60dB Less than -50dB (Eur/Italy) (Less than -40dB for 1200MHz)	
Max. deviation frequency:	±5kHz	
Ext. microphone connector:	3-conductor 2.5(d)mm/2kΩ	

Receiver

Receive system:	Double conversion superheterodyne	
Intermediate frequencies:	1st:	69.45MHz (f.m./a.m.) 13.35MHz (w.f.m.)
	2nd:	450kHz
Sensitivity (except spurious points):		
FM:	50MHz	less than 0.18µV
(at 12dB SINAD)	144MHz	less than 0.18µV
	430MHz	less than 0.18µV
	1200MHz	less than 0.25µV
WFM:	91.5MHz	less than 1.99µV (at 12.5dB SINAD: 1/52.5kHz deviation)
Squelch sensitivity:	0.18µV (f.m.) 0.25µV (1200MHz) 5.6µV (w.f.m.)	
Spurious & image rejection ration:		
50, 144MHz bands:	less than -60dB	
430MHz band:	less than -50dB	
1200MHz band:	less than -38dB	
(-50dB typ. for i.f., except 2nd image, 50MHz band i.f. and w.f.m.)		
Audio output power (at 25°C):	250mW typ. at 10% distortion with an 8Ω load.	

ICOM

4 X THE FUN WITH A T81

This month's *Practical Wireless* carries the Richard Newton (G0RSN) review of this ground-breaking handportable - the IC-T81E was the world's first quadband FM handportable.

Here are some quotes from Richards review:

- "well labelled and well set out"
- "radio is smart in appearance"
- "very user-friendly"
- "audio quality was superb"
- "definately worth a look".

You'll find the full review on pages 30 and 31.

The world's first quadband handportable still cuts the mustard!

- 6M + 2M + 70CM + 23CM All-in-one compact radio.
- 'Joy-stick' multi-control for intuitive operation.
- Multiband receiver with FM, WFM and AM modes.
- Up to 5 watts on 6m, 2m and 70cm, with 1 watt on 23cm.
- Water-resistant, commercial-grade construction for reliability & durability.
- Tone squelch compatible.
- Automatic squelch mode.
- RIT & VXO for 23cm.

IC-T81E

MAD MARCH SALE

Don't forget you can get an IC-T81E absolutely free if you buy an IC-706MKIIG*

FREE! IC-T81E

*At participating dealers while stocks last

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e-mail: info@icomuk.co.uk

Count on us!

Carrying on the Practical Way

An interesting receiver project with a long and equally interesting history!

This month the Rev. George Dobbs G3RJV describes an interesting 'Regenerative Receiver Module'. But don't forget ... you can't start reading the article until you've read the quotation!

"When the solution is simple God is answering".

Albert Einstein (1879-1955)

Like many Amateur Radio projects, the subject of this month's column has a long history and an interesting evolution. So, let's take a look back at the recent history. In the late 1980s the famous 'Technical Topics' column, written in the Radio Society of Great Britain's *Radio Communications* journal by **Pat Hawker G3VA**, followed some discussion on the 'Super-gainer' receiver. (This is an old Amateur Radio idea for building a superhet receiver with a regenerative intermediate frequency stage and detector).

One of the follow up items on the 'Super-gainer' was from **Des Vance GI3XZM**, (October 1987) who described a regenerative receiver with an infinite impedance detector and Q-Multiplier. This was followed (February 1991) by a circuit from **Tony Langton GM4HTU**, which used the GI3XZM regenerative receiver as the 'back-end' of a 7MHz Super-gainer receiver.

The Plot Thickens!

The plot thickens, because in the meantime I had been reading a paper called 'An Active Crystal Set' by **Chris Garland G3RJT**, from Holmfirth (well known as the setting of BBC TV's 'The Last of the Summer Wine' village) published by the **Denby Dale Radio Club**.

Chris describes a short wave crystal set and moves on to a field effect transistor (f.e.t,) infinite impedance detector with Q-Multiplier. He even produced a whole QRP transceiver based upon his version of the receiver. This was an amazingly simple but viable little rig, the circuit of which filled the back of his QSL card!

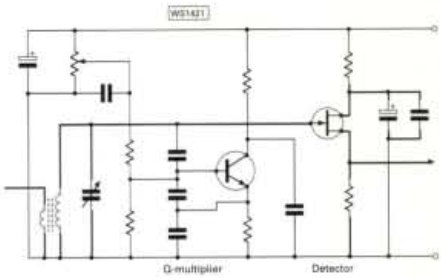
Later, in the G-QRP Club journal, *Sprat* (number 70, Spring 1992), **Colin Davies G3VMU** described a receiver called 'Nicky's TRF'. This was a simple receiver that Colin built for his son using the basic circuit idea from GI3XZM.

The circuit looked interesting and I developed a printed circuit board (p.c.b.) so that one of my own sons could build it as part of his Duke of Edinburgh Award scheme. We built several of them and I was amazed at how well the receiver worked.

The purpose of this preamble is to show just how exciting Amateur Radio can still be. Little circuit ideas are devised and shared and then developed by others.

The world of the Amateur Radio constructor can be interesting and co-operative. And it also serves to introduce this little project!

For some time I had been playing around with Super-gainer ideas and decided to build another version of the 'Nicky TRF' project as a possible basis for such a receiver. The receiver described below represents a very simple and viable short-wave receiver with a low parts count. This month I'll describe the receiver and come back to some applications of the circuit in later editions of this column.



The Circuit

The diagram, **Fig. 1**, shows the circuit of the receiver which follows the general pattern of the 'Nicky TRF'. The first f.e.t. is an aperiodic stage that isolates the antenna from the detector circuit.

A 1kΩ linear potentiometer provides a rudimentary r.f. gain control to the impedance matching transformer, T1. This matches the typical low impedance amateur antenna input. If a short wire antenna is used, it may be connected to the gate of the f.e.t. via a small value capacitor, C_x.

(The value of C_x is open to experimentation and it could be a small trimmer or variable capacitor.

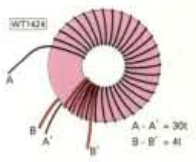
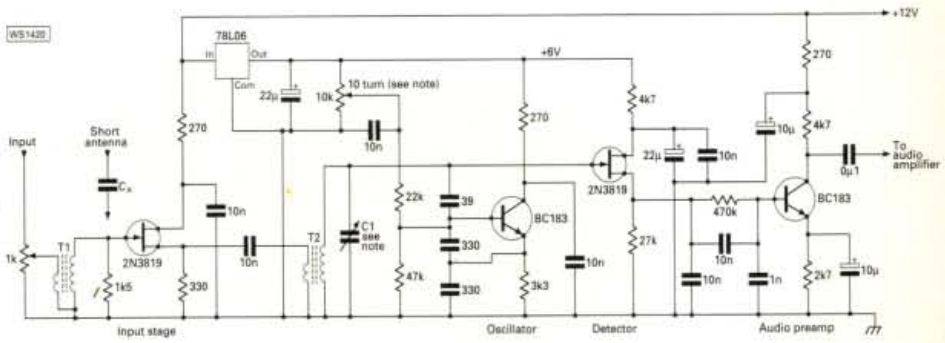


Fig. 2, Incorporated into this circuit is the oscillator (Q-Multiplier) and detector section of Fig. 1. Here you may recognise the BC183 stage as a Colpitts Oscillator with capacitive tapped feedback from the emitter to the base (see text).Transformer, T2 (inset), is wound on a T50-2 core and is 30 turns, 26s.w.g. shown as 'A - A'. Link winding is four turns shown as 'B - B' and A and B connect to ground. B connects to capacitor from f.e.t. amplifier and A connects to 39pF oscillator.



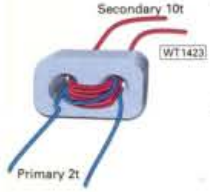


Fig. 1: The circuit of the receiver which follows the general pattern of the 'Nicky TRF' (see text). The first f.e.t. is an aperiodic stage that isolates the antenna from the detector circuit. Transformer, T1 (inset), is wound on a ferrite binocular core from JAB Electronic Components and is ten turns secondary, two turns primary using 36s.w.g. enamelled wire. Wind secondary first and mark, primary goes to input and secondary goes via capacitor to f.e.t.

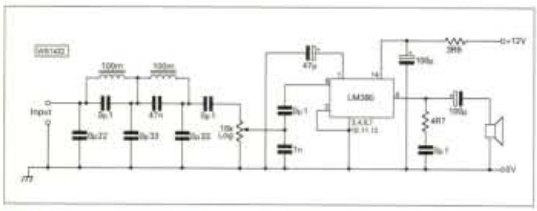


Fig. 3: Circuit of the audio output stage that G3RJV used with his prototype receiver. The input feeds to an audio low-pass filter. Two commercial moulded chokes form the basis of the filter (see text).

Fig. 4: An 'overhead' view of G3RJV's prototype receiver showing the lay-out and subsequent front panel controls (see text).

This source follower circuit feeds to the input winding of T2, which is the only tuned circuit in the receiver).

I think it's now best to refer to **Fig. 2** to look at the function of the next two stages. Incorporated into Fig. 2, is the oscillator (Q-Multiplier) and detector section of Fig. 1. And here you may recognise the BC183 stage as a Colpitts Oscillator with capacitive tapped feedback from the emitter to the base. A small value (39pF) capacitor couples to the tuned circuit formed by T2 and C1.

The bias voltage on the base of the BC183 is controlled by a 10kΩ, ten-turn, potentiometer. This provides adjustment through the threshold of oscillation. **Note:** It's useful to select a high gain BC183 for the oscillator circuit.

Oscillation occurs when the tuned circuit losses are at a minimum. This is equivalent to having a very high 'Q' tuned circuit. So the stage functions as selectivity control for the tuned circuit and as a beat frequency oscillator (b.f.o.) to resolve c.w. and s.s.b. signals.

Incidentally, the ten-turn potentiometer provides a very smooth 'reaction' control (this is the term often used for feedback controls used in regenerative receivers). However, **although it is possible to use a single turn potentiometer** ... the adjustment is very critical (be warned!). There are ways of avoiding the use of a ten turn potentiometer, which I will describe another time.

The tuned circuit (C1 and T2) is connected to a detector circuit, which is shown in heavy outline in Fig. 2. If you imagine the f.e.t. as a triode valve, older constructors will probably recognise this circuit as an infinite impedance detector.

The high impedance of the detector enables it to be connected directly across the tuned circuit without any damping effect. The f.e.t. also provides a small amount of audio power gain for the detected signal.

Fig. 5: Close-up of the main receiver p.c.b. of the receiver. The 'pig nose' ferrite bead transformer (described by G3RJV) can be seen mounted immediately to the left of the electrolytic capacitor in the lower centre of the p.c.b., just above the terminating coaxial connection (see text).

Audio Output

Returning to Fig. 1, the audio output for the detector f.e.t. is r.f. decoupled by a resistance and capacitance filter and fed into the second BC183. This stage is an audio pre-amplifier designed to give enough output to feed the audio output stages.

As you'll see - the circuit in Fig.1 is built as a single module and could feed a variety of audio output stages. (The reader may have a suitable amplifier to hand).

The diagram, **Fig. 3**, shows the audio output stage that I used with my prototype receiver. The input feeds to an audio low-pass filter. Two commercial moulded chokes form the basis of the filter, which cleans up the audio output from the detector. (This filter originated with **DK4RW** and was described by **G3XJS** in *Sprat*).

An LM830 audio chip provides the output stage. There are losses in the low-pass filter but there is sufficient output to drive a small loudspeaker and plenty to drive the portable cassette player type of headphones. (The filter may seem to be over-kill but it really is worth the effort).

Fig. 6: The audio amplifier p.c.b. (see text for suggestions).

Ugly & PCB Style

I built the receiver (Fig. 1) and audio amplifier (Fig. 2) boards 'ugly' style and then transferred the design to a home-etched p.c.b. because I wanted to build more than one of each for future experimentation. The boards are shown in the photographs. You could also 'Perf' board to provide another construction option.

The transformer T1 is wound on a small (about 6 × 6mm) 'pig nose style' ferrite core. I used the 4300 2402 core from **JAB Electronics** with ten turns of 36s.w.g. enamelled wire for the secondary and three turns for the primary.

Next, T3 is wound on a T50-2 core with 30 turns of 26s.w.g. enamelled wire for the tuned winding and four turns for the link winding. The link winding is wound over the 'ground end' of the main winding. This allows the tuning of the 7, 10 and 14MHz amateur bands with a suitable variable capacitor.

Polyvaricon Capacitor

Inexpensive variable capacitors are getting difficult to obtain. For my version of this receiver, I used a polyvaricon capacitor kit sold by Jab Electronics. The PV01 polyvaricon kit includes a variable capacitor of the type used in portable medium wave and Band II v.h.f. receivers with a mounting kit and shaft extender.

It is possible to get several combination of capacitance swing by using the available sets of vanes. I used the 4-125pF range for a general coverage version and the 4-22pF range for a 7MHz only version of the receiver.

This little receiver is well worth building. With careful use of the reaction control (just bring it into oscillation for c.w. and s.s.b. reception) surprising results can be achieved. In fact, I have my 7MHz version "playing" in the background while I am typing these words!

I'll come back to this little receiver in a later column! Until then - keep building! *PW*

Ferrite cores used in this article were obtained from **JAB Electronic Components, PO Box 5774, Birmingham B44 8PJ.**

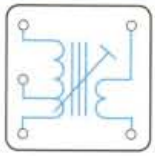
Errors & Up-Dates (April)

Unfortunately, various errors (not the responsibility of the author) crept into last month's (April) 'Carrying On The Practical Way', pages 22 and 23. For a full summary of corrections please see the information below.

Missing crystal: There was a first crystal 'missed out' of the circuit, Fig. 1 on page 22 of the April issue. The missing crystal should be inserted between the 0µ1 capacitor on the drain of the MPF102 f.e.t. and the junction of the 150pF with the crystal marked 'XL1' in Fig. 1 (p22). This new crystal should now be marked XL1 and all original numbers 'moved' up one.

The coupling capacitors shown in the gate input of the left-hand f.e.t. of Fig. 1 and the 0µ1 capacitor shown attached to pin 4 of the NE602/612 i.c. of Fig. 2 (p.23) are one and the same. On a similar vein, the Tantalum capacitor (2µ2) shown on pin 4 of the NE602/612 i.c. of Fig. 3 is also the same component as shown at the input of the audio amplifier of Fig. 4.

The correct component icon that should have been used for the coils L1 and L2 (KANK3333) and L4 (KANK3337) should have been shown as adjustable). The core 'marker' should have been multiple dotted lines, signifying that the core material is of a ferrite material, rather than the air core as suggested by the present drawings.



Pin out for the TOKO coil (please see 'Errors & Up-date' text).

Of the three TOKO coils, L4 is actually rather difficult to see on the photographs, as it is 'hiding' under the 35pF tuning capacitor on the front panel. The legs are just visible behind the vanes of the capacitor shown in Fig. 5.

The pin-out for the KANK series of coils is shown here, as seen from below. The coloured lines represents the circuit symbol. In two of the coils only the 'primary' winding is used and in all cases in this project the tapping point isn't used.

The coils L1 and L2, have nominal values of 45µH (KANK3333) which, with a 39pF capacitor in parallel would (nominally) be resonant around 3.7-3.8MHz. Though you might need a little 'tweaking' to give the best results depending on the actual area of the band that interests you.

You will need to 'tweak' the L4 coil value from its nominal 5µH to put the first oscillator in the right frequency area to create the correct i.f. By drilling a small hole in the appropriate place underneath the tuning capacitor, so as to gain access to the core or L4 will allow the user to adjust the tuning frequency range.

Please accept my apologies for the errors which undoubtedly spoiled an otherwise very worthwhile project. (Rob Mannion G3XFD, Editor *PW*)

The Low Down On Lynch!

The man himself - Martin Lynch at your service!

In the ten years or so that I've known him, **Martin Lynch G4HKS** has become a 'trading force' to be reckoned with. Martin has also become one of Amateur Radio's 'characters' and there can't be many of us who haven't faced the 'Lynch Mob' - and the famous 'Lynch Grin' (from Martin himself) in the last few years.

But, what of the man himself? What's the story behind the now famous Lynch 'Blue-Line' corporate image? Where did it start and how? Well, to find out I travelled up to London to his Northfields Road base in Ealing to have a working lunch with Martin to get the 'Low Down'. It was the only way to stop him selling for a while!

Local Boy

Martin G4HKS really is a 'local boy' who has made his mark as he was born in Ealing 43 years ago. Answering my obvious question as to how he'd first got into the hobby he answered "I first got interested in Amateur Radio when I was 12 ... and of course it was an R1155 which was my first set" he told me.

"The very first Amateur I heard was G3ZHB on 'Top Band' and the first amateur I met was Graham G3XTZ - who is still a really big 'Top Band' man nowadays". These comments came accompanied by a smile that told me that Martin still remembers those days fondly.

However, I just had to ask the question: would I buy a used car from this man? So, I asked Martin outright - just what was the story behind the 'Used Car Salesman comments'. Laughing he replied " While I've always enjoyed the hobby - I've always enjoyed the challenge of selling something to somebody and I really was a car salesman. But I get the 'buzz' out of selling something to somebody who I know will enjoy it. I like the money - but I also like them to be satisfied" he confirmed.

With pride in his voice Martin explained: "In fact, one of my School Reports said that 'Martin would do a lot better if only he would stop selling things to his friends' - and that's true as I've actually still got that report"! (It turned out that he was eight years old when that was written!).

After School

After leaving school Martin worked for Racal, serving an Engineering Apprenticeship. However, in the latter years of this job he started working part-time for Bernie & Brenda Godfrey in their Amateur Radio business. This was also in Ealing and in the same road where the Martin Lynch & Sons shop is nowadays.

However, before getting to the story of his own Amateur Radio shop Martin elaborated on the 'Used Car Salesman' story. "Yes, as I've said ... I was a car salesman and actually worked - albeit only for a couple of years - as a Volvo salesman and yes, I did enjoy it. Although I do so enjoy selling Amateur Radio equipment - selling cars was such a change for me".

Continuing, with the typical impish grin on his face, Martin said "And of course - I had many satisfied customers probably because I had owned and driven Volvos myself - my first-hand experience was so important. I suppose that the interest in cars goes back to when I was a kid - as my interest was equally divided between Amateur Radio and motorbikes".

Although Rob Mannion G3XFD has known Martin Lynch G4HKS for over 10 years ... until now they've both been too busy to sit down and have a 'real' chat. So, in the first of an occasional series where he plans to meet major dealers, Rob drove up to London to get the 'Low Down On Lynch'.

It turned out that the two interests helped each other. "I'd sell a radio to buy a motorbike then I sell the motorbike to get a radio" he told me and his two hobbies obviously vied for his interest and time. But, as we've already learned, in 1980 Martin's radio hobby turned into a full-time occupation.

Martin then answered another inevitable question - whether or not his hobby had taken a back seat because he was working in it full time? "Well, I'll admit I'm not on the radio all the time - other than the occasional trip to 'Top Band' to work friends " he said "but I must say that most of my friends are Radio Amateurs and most of my career leads have come through the hobby. I owe it much".

Future Of The Hobby

When asked about his views on the future of the hobby Martin said (referring to the sales side first): "as long as the manufacturers carrying on producing - I'll carry on selling" he replied. And when I looked around the shop I could see every evidence of his commitment to the Amateur Radio hobby.

When asked about the recently diversified Martin Lynch shop (now selling a fascinating range of motorbikes, scooters and electrically powered 'mopeds') he replied: "In the ten years I've owned my own shop it's seen dramatic changes. When I first started there were 11 retailers in the London area, and now there's only myself now.

"And where we used to boast in those days that we were totally dedicated to Amateur Radio - unlike some of the retailers who've now gone who had for many years been involved in music, hi-fi and other electronics - we've now had to diversify ourselves, because of the way the hobby, interest and approach has changed.

During our discussion - over a delightful working lunch - it became obvious that Martin has some definite opinions as to the way the major manufacturers are approaching the design of equipment. "In fact" he said - with obviously strongly held opinions, "I think the major manufacturers are really making a rod for their own back - particularly with the 'everything in one box' transceivers which cover everything from h.f. to v.h.f. and now u.h.f.".

Martin then delved into recent history - from the first Yaesu multi-mode transceiver in 1978, right up to the latest version of the Icom IC-706. He then explained that from the introduction of the '706, and latterly the FT-100, single band 'separate' multi-mode rigs have disappeared. No-one, it seems, wants to make or buy them anymore!

"Top marks for the designers" says Martin " and in fact you must pay tribute to the Japanese engineer for bringing multi-band access into the 'affordability' range of most Amateurs ... but what of the future? I think they've designed themselves into too small a

box ... where do they go now ... even smaller perhaps?

"I also think that in two or three years time there'll only be a handful of major dealers. This isn't good news for the hobby, for competition and for our specialised amateur customers because there's nothing like 'hands on' and actually seeing what you want to buy. The 30 000 customers we've gained over the last ten years look at our comprehensive Web site - **www.MLandS.co.uk** - and the catalogues and other details, but then drive 300 miles or so to take a final look at what they're intending to buy. That surely proves my point"!

Martin & Family

So, for himself, Martin is investing much in the future - backed by his wife, Jenny (the diminutive cheery faced lady many of you met at the London Show) and their two sons: Daniel, 17, and four and a half year-old Henry so that they can continue to sell you a

Just the thing for the Radio Amateur - plenty of radio equipment on hand, plus an electrically powered 'moped'. Ideal for rallies and as it's electrically operated ... likely to interest radio enthusiasts too!

hobby - one which you'll enjoy and so come back to the 'Lynch Mob' time and time again".

Incidentally, young Henry Lynch has his own Suzuki 'Quad' motorbike! "It only travels at six m.p.h." says Dad ... "so it's quite safe". Just like those fascinating electric bikes I sell. A 25 mile range - no insurance, tax or crash helmet. Ideal transport for the electrically minded Radio Amateur round rallies'!

Finally - Martin assured me the now famous 'Lynch Blue-line' corporate look is to stay. "It's come to mean 'approachability' to customers" Martin told me "And I, and my dedicated, keen staff and family will always be approachable. So, here's to the future"! (And Martin also told me he's got a surprise coming up for his Amateur Radio customers!)

Thank you Martin! And if any of you decide to visit Martin Lynch & Sons, I can thoroughly recommend the restaurant we used. Just ask Martin and he'll point you in the right direction - and maybe you might like to get on your (electric) bike at the same time! *PW*

*PRACTICAL WIRELESS & SHORT WAVE MAGAZINE IN ATTENDANCE

RADIO DIARY

April 16: The 16th Yeovil QRP Convention is to be held at Digby Hall, Sherborne, Dorset. Doors open at 1000, talk-in on S22. There will be traders, construction challenge contest judging, three talks, QRP forum, in-hall catering, free parking, invalid facilities. Further details on **(01935) 813054**.

April 16: Swansea ARS will be holding their annual show in the Swansea Leisure Centre on the A4067 Swansea-Mumbles coast road. Doors open 1030-1700 and attractions include: trade stands, Bring & Buy, local interest groups and full catering & licensed bar. Admission is only £1, children just 50p. Further details from **Roger Williams GW4HSH**, Show Secretary, on **(01792) 404422**.

April 16: The Cambridgeshire Repeater Group are holding their annual rally at Bottisham Village College, Bottisham, which is about 10km east of Cambridge, access is via A14 and A1303. Features include a large hall, car boot sale, Bring & Buy and their renowned auction of radio and electronic equipment. Doors open 1030 and admission is £1.50. Refreshments available. Talk-in on S22. **Paul Dyke G0LUC** on **(01462) 683574**.

April 22: The Crystal Palace & District Radio Club are holding a Spring Sale, Amateur Radio, Electronics, Computing, Tools, etc., at St. John's Hall, Sylvan Road, London, from 1030 till 1300. Admission is just £1 (includes one free drink), children free. Refreshments will also be available. More information from **Bob G3OOU** on **(01737) 552170**.

April 30: The 14th Rainham Radio Rally is to be held at the Rainham School for Girls, Derwent Way, Rainham, Kent. Doors open 1000 (0930 for disabled visitors and items for Bring & Buy). Admission is £2, under 14s free. There will be a good mix of traders, selling new and used amateur radio equipment, electronic components, computers, etc. Many special interest groups will be represented also. Food and refreshments available. Talk-in on S22. Plenty of off-road parking. More information on **(01634) 365980** or E-mail: **martinm0aak@yaho .com.uk**

April 30: The Lough Erne Mobile Rally (Northern Ireland) takes place at the Killyhelvin Hotel, Enniskillen, starting at 12 noon. There will be the usual trade stands plus a Bring & Buy, etc. Everyone welcome. More information from **Joe Maguire** on **(02866) 323196/324796**.

May 1: The Dartmoor Radio Rally is to be held at Pannier Market, Tavistock, Devon. In the same new location as last year giving much more space for traders and visitors than in the past, with access for disabled visitors. There is plenty of free public parking within five minutes walking distance. There will be trade stands, a Bring & Buy stand, refreshments, etc. Doors open 1030. Talk-in on S22. Beautiful views over Dartmoor, ideal for picnics - bring the family. **Ron G7LLG** on **(01822) 852586**.

May 7: The Drayton Manor Radio & Computer Rally will be taking place at Drayton Manor Park, Fazeley, Tamworth, Staffs on A4091. Main traders in four marquees, large outside traders flea market, Bring & Buy stall, local clubs and special interest stands. Opens 1000 onwards. Trade information from **Norman** on **0121-422 9787**, other information from **Peter G6DRN** on **0121-443 1189**, evenings please.

May 14: Dunstable Downs Radio Club will be holding its 17th Annual National Radio Car Boot Sale at Stockwood Country Park, Luton, Bedfordshire. Site will be open from 0900-1500. Leave M1 at Jnc J10a and follow signs for 'The Mossman Collection'. Talk-in on S22. For further details and booking form access: **www.ddrcbootsale.freeserve.co.uk** or write to **DDRC, PO Box 4053, Dunstable, Bedfordshire LU5 5ZJ** enclosing an s.a.e., **FAX** enquiries to **(01525) 383898** or E-mail: **ddrc@magstripe.demon.co.uk**

May 21: The Three Counties Radio & Computer Rally is to be held at Perdiswell Leisure Centre, Bilford Road, Worcester. There will be trade stands, radio and computer dealers, parts and accessories, refreshments, licensed bar and free car parking. Admission will be £2 and there will be a free raffle with good prizes. Trade stands available, contact **Eddie Cotton** on **(01905) 773181**.

May 21: The Mid Ulster ARC Rally will be held in the Silverwood Hotel, Lurgan, Co. Armagh at 1200. Trade stands, Bring & Buy, etc. Talk-in on S22. Further details from **Jim GI0OND** on **0283-885 1179**.

May 28: The East Suffolk Radio Rally (the Ipswich Radio Rally) will take place at 'The Hollies', IACSSA, Straight Road, Foxhall, Ipswich. The ESWR is now principally a large car boot sale with indoor trader and special interest group support. Open from 0800 for traders and 0930 for buyers. In common with many rallies, the event will close mid afternoon. Talk-in will provided on S22. Further details from **Sam Jewell G4DDK** on **(01394) 448495**.

June 4: The Mansfield Amateur Radio Society's annual Radio & Electronics Car Boot Sale is to be held at Debdale Lane Sports and Social Club, Debdale Lane, Mansfield Woodhouse, Nottinghamshire, commencing at 1000. Bar, refreshments and ample parking available. Details from **Angela** on **(01623) 429218**, E-mail: **andange@netscapeonline.co.uk** or for the latest information visit **http://members.netscapeonline.co.uk/andange/rally.htm**

June 4: The 4th Red Rose QRP Festival is to be held at Formby Hall, Alder Street (off High Street), Atherton, Manchester, between 1100 and 1600. There will be trade and club stands. There is a huge car park, disabled facilities, refreshments and bar. Display of Morse keys and QRP rigs, plus a low cost Bring & Buy. Admission is £1. More details from **Les Jackson G4HZJ, 1 Belvedere Avenue, Atherton, Manchester M46 9LQ** or Tel: **(01942) 870634**.

June 18: The Newbury & DARS will be holding their 14th annual Amateur Radio Car Boot Sale at Cold Ash playing field near Newbury, Berkshire. Sellers/traders should arrive at 0800 and the sale will be open from 0900-1500. Sellers/traders don't need to pre-book and the charge is £9 per normal size pitch. Any telephone enquiries should be made to **George Cook** on **(01488) 682814**.

June 25: The Bangor & DARS (Northern Ireland) are holding their Summer Radio & Computer Rally at the Clandeboye Lodge Hotel, Bangor. There will be a good selection of traders attending, plus there is the always excellent Bring & Buy, with the addition of a new computer section. Doors open 12 noon and admission is just £2. Further details from the club Web site at **http://welcome.to/bdars** or from **Mark MI1DRU** on **0289-058 6515** or E-mail: **mildru@amrad.net**

July 8: The Cornish Radio Amateur Club are holding their 37th Cornish Mobile Rally at Penair School, Truro. **Ken Tarry G0FIC** on **(01209) 821073** or E-mail: **ken@jtarry.freeserve.co.uk**

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

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

Well, what a start to the new millennium. Only a few months in and already one of the oldest established retailers of Ham Radio has pulled out. When I first opened my doors in 1990 and started trade, there were ten retailers all in and around the London area. Today there is just one.

Despite the market shrinking at an unprecedented pace, I have held on to the Number one spot promoting Amateur Radio equipment in the form of Yaesu, Icom and Kenwood for longer than anyone else still left in the market place today. (Despite other competitors claims to the contrary). Martin Lynch & Sons have done this through supporting its customers and putting money back into the hobby.

ML&S Sponsorship Continues

Over the years, we continue to sponsor and support prestigious events like the H.F.& IOTA Convention. Not because of the actual hard cash taken at the weekend events, but more important, to promote this rewarding side of our hobby - HF operating. Without question, ML&S have sold more H.F. equipment to U.K. Radio Amateurs over the past ten years than any other dealer. And that's a fact.

Morse Campaign

More recently, supporting the 'Morse Camp' campaign (dreamt up by me!) and taken on by brilliant fellow Amateurs like Bob Whelan, G3PJT with the RSGB's assistance helps to get more people onto H.F. With the 10 metre band as open as it is, who can blame anyone for wanting to do that?

Supporting Clubs & Rallies

Supporting the various clubs and rallies is important to us too. Active clubs up and down the country have had our support since we first started. Now we are open a FULL SEVEN days a week we still try to attend as many clubs and rallies as we can. If we miss you this year we will certainly try and see you next.

Petrol at 6/7d Per Gallon?

More importantly anyone who hasn't noticed the change in the Ham Radio business over the last two or three years probably still thinks petrol can be bought at 6/7d a gallon. Now it's all litres, no one has a clue what MPG your car does. Have you noticed how the petrol companies have given up with their little litre/gallon per pence converters on the side of the pumps? Unlike Ham Radio prices, petrol has gone up, radio prices have gone down.

Prices Smashed!

Unlike the car market in the U.K., the prices have been well and truly smashed to such an extent that the few left in our business have all diversified. We have, as visitors to the premises will tell you. Surrounded by rather attractive two wheel devices otherwise known as scooters, old Lynchy has finally gone astray. Not a bit of it! Read on...

New Store to Open Soon

You will be pleased to know, I have finally taken the decision to move the radio into a self contained NEW PREMISES. Whilst the Radio business stays pretty constant, the scooters seem to be taking over the place and I thought it only fair to split the two companies.

Don't worry - you'll all be invited. As soon as things are finalised the opening will be promoted and you won't have to travel far. Parking is much easier (for London anyway) and the prices will still be on the floor. Wouldn't have 'em any other way, would you?!

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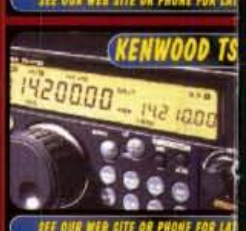

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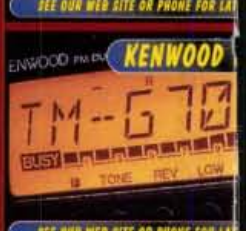

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Turbo-Charging Receivers

The Roberts RC828 radio.

This is how it all started - when I received a telephone call from a certain, large, bearded magazine Editor!
"I'd like you to build a pre-amp for 28 megs"! said he.

"No problem" I replied - "Is it a kit or a design that's been submitted" ?
Editor's reply: "No. I want you to design and build it"!

G4SLU's surprised sigh: "Er...Okay"!

And that's how this article was born!

Turbo-charging a receiver on 28MHz? Well, no ... not quite! But Clive Hardy G4SLU has an interesting project which is ideal for 'All Band' general short-wave coverage receivers and the popular synthesised sets such as the Roberts RC828.

Now that 28MHz is waking up it's an ideal time to brighten up a receiver with average performance on the band with a pre-amplifier. I say this because if an h.f. receiver is going to start going 'deaf' it's going to occur in the higher part of its coverage and a pre-amplifier is a useful way to overcome some of those shortcomings.

As for designs, I thought it would be very easy to find one! But after searching through the usual books I only found a couple of circuits. Isn't it strange that however many designs of a circuit you find, no design is ever quite what you want?

What I wanted was something simple, reliable, and 'bombproof', which used easy-to-obtain components. Looking at the designs I found that circuits using f.e.t.s are simpler than those using bi-polars, so I opted for a design using a 2N3819.

The Circuit

The eventual design I eventually opted for isn't the simplest f.e.t. circuit for a pre-amplifier available. This is because I wanted a design that was reasonably frequency specific rather than very broad-band.

To enable some tuning of the pre-amplifier to be undertaken requires tuned circuits and the final design has two. One at the input, the other at the output. Both use Toko coils.

The circuit isn't a million miles from a design published some years ago by the RSGB, but a pre-amplifier is such a basic circuit that most designs are going to be fairly similar. Unlike all the other designs that I've found, this pre-amplifier uses pre-wound commercial coils - the TOKO type already mentioned.

Why pre-wound commercial coils? Well, in answering that question I'm told that winding coils is one of the biggest 'turn-offs' to budding 'home-brewers'. I can quite believe that statement as being true!

As a novice constructor I certainly remember being held back in my home-brewing exploits by phrases such as "take the output from a suitable number of link turns wound close to the hot end of the coil". Which is the hot end? How many turns make a suitable number?

I still like to see everything relating to coil winding explained down to the last twist and turn, and I suspect a lot of others do too! That's why, to make life a lot easier, I opted for the pre-wound coils. And Toko, for their part, make exactly the right coil for the job!

The coil used is the CSK3464 which is designed for use in 27MHz radio control designs, but also covers 26 to 29MHz and so is ideal for this 28MHz pre-amplifier. No coil winding means probably the hardest bit of the construction is already done. So, wow there's no excuse for you not 'having a go' at building the project!

Hardy's Islands

The technique I used to build the pre-amplifier is the 'glued island' variety, as you'll see from **Fig. 1**. This involves sticking strips, or 'islands', of copper p.c.b. laminate onto a p.c.b. base with one of the very rapid Cyanoacrylate adhesives.

The base provides the groundplane and earth connections. The strips provide the connection between components. Incidentally, I think that the big advantage of this technique is that you can see the circuit as it's all on one side of the board.

In other words the technique is a sort of 'surface mount' system. The components can often be laid out almost the same way as on the circuit diagram.

Additionally, as everything is on the same side of the board it is much easier to check connections and voltages. **But don't leave the soldering iron on the islands for too long as hot super glue gives off rather unpleasant smelling fumes, and it's hard to believe they do the lungs any good either!**

The **Rev. George Dobbs G3RJV** describes the same technique, along with a few variations in the February 2000 issue of *PW* in his series 'Carrying on the Practical Way'. It's worth reading, he also has some ideas for different adhesives for the islands.

The hardest part of using the Island techniques is cutting the strips for the actual 'Islands'. Robust scissors will do, but not very neatly and it's hard work. Hack-sawing is neater but still fairly time consuming.

Guillotining is best! The manual type of guillotine found in most offices will do the job, but it probably doesn't do anything for the cutting edge. Chopping the strips into the islands can be done with wire cutters. Finally, file off the edges for a tidy edge.

The Layout

The actual layout of the pre-amplifier can be seen from the illustration in **Fig. 2**. Here, as you'll realise is that the only major consideration when choosing the layout was to keep things tidy and ensure that signal routes were as short as possible. However, there's plenty of scope for creating a more compact layout if required.

As it turned out, the layout used is fine. The only thing of special note is that I snapped off the small lugs at the bottom of the coil cans that are intended for connection to the earth plane on conventional p.c.b. layouts. (This is to prevent them fouling other connections). I then soldered short wire links from the cans of the coils to the ground plane so that the coils remain screened.

Screening is very important in high gain circuits as used in this pre-amplifier. Why? Because without it there's always the possibility of signals at the output

On 28MHz?

radiating back to the input.

Once back at the input those signals go through the circuit and are amplified again. Back at the output, they add to the original radiation and send an even stronger signal back to the input. Fed with this continuous feedback the circuit 'takes off' and turns into an oscillator, usually operating over a wide range of frequencies. Running like that there's no chance of the pre-amplifier doing its proper job.

Back to the layout! And starting at the left, the input from the antenna is connected to the link winding of the first coil. I've used a 3.5mm jack connector for the antenna input, the same as the receiver. (More about the receiver later).

The link winding is connected to pins 4 and 6 of the coil. These are the two corner pins on the side opposite to the three pins 1, 2 and 3. **There isn't a pin 5**! Pin 2 isn't connected to anything.

The main winding of the coil between pins 1 and 3 has a 27pF capacitor connected across it to form the series tuned circuit. That capacitor is fitted into the base of the coil. To fit it onto the board the coil is soldered to two islands, one of which has a cut in the copper. (I just thought it was easier to cut a slot out of the copper on one strip than to use two pieces. You may disagree!).

The 2N3819 FET

Next is the heart of the pre-amplifier, the 2N3819 field effect transistor (f.e.t.). It's a good old reliable component (pin-out diagram provided in **Fig. 3**) that can supply all the gain required. Then, apart from the handful of minor components, four resistors and five capacitors, the only important bit left is the output coil.

For the output, a series tuned circuit is required. This is achieved by removing the parallel connected capacitor from the bottom of the coil and fitting a series connected capacitor of the same value externally.

No sophisticated skills are required to remove the capacitor, which is the round white ceramic item set into the base of the coil. It's easily accessible and is best dealt with by breaking it with a small screwdriver. After that, snip the wires from it and remove any residual ceramic for a neat job.

The output from the pre-amp is via a short length of screened cable to a 3.5mm jack plug. If your radio has a different antenna input use whatever plug is appropriate.

Experimental Failures

Now it's time to report on my experimental failures and mentioning these will save you time and frustration! Firstly, I did actually try to use the parallel tuned circuit at the output. But the result was wild self-oscillation.

The self-oscillation is identifiable when tuning the coils when it's possible to hear lots of noise from the receiver. Then there'll complete silence and a very high S-meter reading as the circuit 'takes off'.

I also tried to power the pre-amplifier from the same external 6V d.c. power supply that I used for the receiver. Unfortunately the only p.s.u I had produced some pretty rough d.c. That didn't worry the receiver itself, which worked fine. The pre-amplifier however, was very susceptible to the noise on the power supply, and let more hum than signal through.

So, rather than go to relatively great lengths to smooth out the supply I took the easy option and used battery power! Anything from 6 to 15V worked, and the current consumption is a little over 7mA. At that rate a cheap and cheerful PP3 should last approximately 60 hours.

A switch to take the pre-amplifier in or out of line might be useful. Something like a double pole, double throw (DPDT) switch with one switch pole linking the antenna input and output connections, and the other pole cutting the d.c. supply should work well enough.

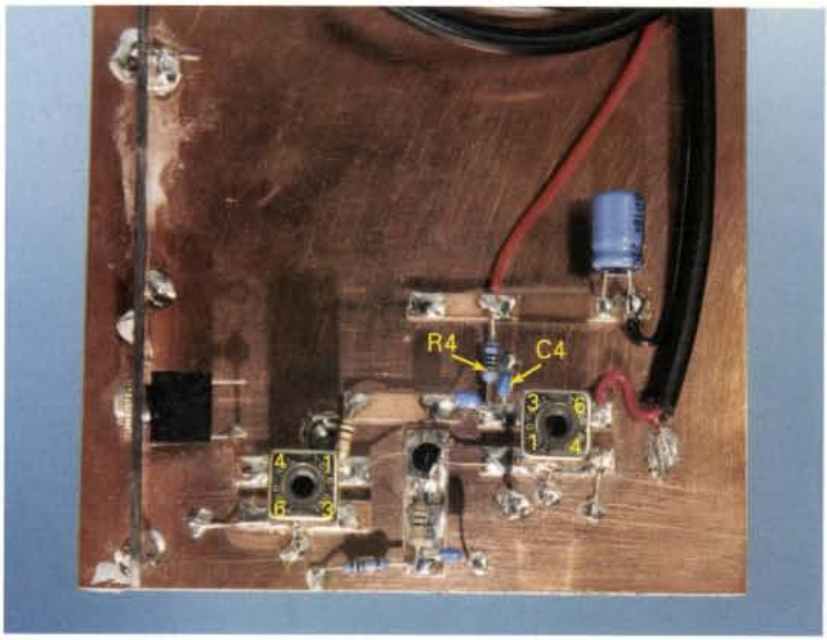

Fig. 1: The 28MHz pre-amplifier project uses the 'Glued Island' technique (see text).

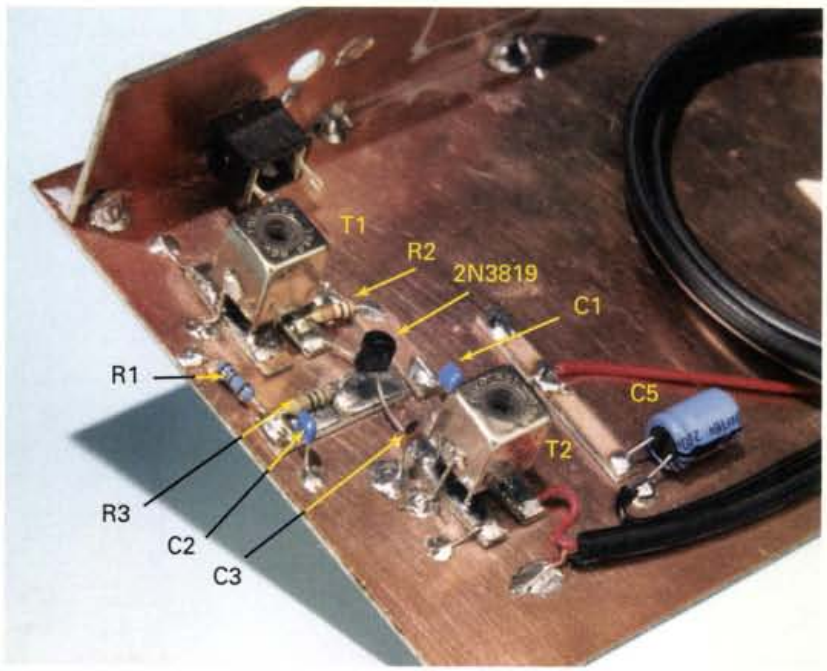

Fig. 2: The final - annotated - layout diagram of the pre-amplifier project (see text). Numbers on coil-screening cans (Fig.1) refer to base connections.

Building The Project

Building the project should be fairly straight forward, and the photographs of my prototype, **Fig. 4**, which give some idea of how it could look.

There's nothing complicated in the design. Just take care to get the correct legs of the 2N3819 connected to the right pads. Looking at the flat side of the device with the legs downwards, the middle pin (gate) goes to T1. The right-hand pin (drain) goes to T2. And the left-hand pin (source) goes to R3.

As always, lead lengths should be kept as short as possible. At 28MHz construction techniques should be closer to those used at v.h.f. rather than h.f.

As can be seen from the photographs, I haven't put the pre-amplifier in a box. As it works well without any further screening any sort of box will do.

Another advantage of the single-sided construction method is that the board can be held in place in the box with double-sided sticky pads. It saves all that drilling,

Continued on page 43

THE *PW* PERSONAL ORDER FORM

Roger Hall G4TNT – PW's Advertising Manager – describes how we're launching the PW Personal Order Form service to help readers buy with extra confidence from advertisements in this magazine.

Many readers will have noticed how the battle for their custom has become more intense as the popularity of the hobby has declined. Fewer amateurs buying less equipment means there are now some great deals to be had but it also means that some dealers may try to cut corners when it comes to honouring their commitments. Also, as the real cost of Amateur Radio equipment has fallen and the competition for your custom has increased, some of the smaller shops have either gone out of business or been swallowed up by the bigger companies. In some areas, it's almost impossible to find a local shop and now the trend is towards mail order purchasing.

This, in itself, is not a bad thing but it does mean you'll probably be buying from a shop you've never visited and from a salesperson you've never met. So, how do you know who to trust with your money? You could go on air and ask about the dealer you're thinking about buying from, but the risk is that there may be one or two vociferous individuals who will be happy to tell the world about their grievances while the majority of satisfied customers just keep quiet. The same is true of the Internet. The various radio related newsgroups are a good place to ask but, again, you may not get a representative (or honest) selection of answers.

The truth is, there is no real way of telling beforehand how your transaction will be handled, how well the equipment will perform or whether it will go wrong. All you can do is to take reasonable precautions before you buy and know what to do if the worst happens. This is where we aim to help. First of all, take a look at the Top Ten Tips in the Buyer's Guide box. If you follow those guidelines before you buy, you'll have minimised the chance of something unforeseen cropping up and you'll be prepared should the worst happen and you have to return the goods.

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Top 10 Tips

1: Telephone first to confirm the price and details are as in the advertisement. Dealers often have to send in copy up to 8 weeks before the magazine is published and prices and availability can change in that time.

2: Ask if it's a parallel/grey import or if it came from the authorised UK importer.

3: Ask if it is the full UK specification and if it has CE approval.

4: Ask about extra charges (delivery, VAT etc.) and find out the final, all-inclusive price.

5: Ask about their return/refund/repair policy for faulty goods and if they have a restocking fee for the return of non-faulty items.

6: Ask for a written quotation if it's a large order.

7: Make a note of all calls and who you spoke to and keep copies of all paperwork.

8: Pay by personal credit card whenever possible as the card company has insurance to cover all transactions above £100 and you will almost certainly get your money back from them should something go wrong.

9: Check everything as soon as it arrives. Open all the boxes and check that you have been sent everything exactly as ordered. If there is a problem, contact the supplier immediately.

10: If a problem develops later, write the supplier a concise and accurate letter outlining the problem and asking them how they intend to rectify it. If that fails, write to us with copies of all relevant paperwork and we'll take it from there.

and finding screws and spacers! And there won't be any screw heads to scratch whatever you put the box onto.

Finally on this topic here's a tip for you. As I didn't need to turn the board over during construction I kept it steady by sticking it to my workbench with pads of Blu-tac adhesive - it made the job easier. Try it for yourself.

Setting Up

Next, you'll have to start the setting-up process, and I can assure you it's not difficult. Firstly, all tune your receiver, without the pre-amplifier in line, to make sure there are some 28MHz signals about.

Using an external antenna, you can then tune around the band until a weak signal is heard. With luck you'll find a weak and fade free signal or two. Make a note of the S-meter reading. Now connect the pre-amplifier.

Hopefully the QSO you're listening to will still carry on, and you'll still be able to hear it. If all is well carefully tune the cores of T1 and T2 for the maximum improvement in the signal. (It doesn't matter which order the coils are tuned).

Keep tuning each coil in turn until performance is maximised. The tuning of T2 is quite sharp, that is, it's 'sharp' from the point at which the circuit is tuned to peak performance it takes only a small turn of the core to move the tuning way from that point. Don't worry! It isn't so sharp that you dare not breath after finding the spot!

You'll find that T1's tuning is somewhat flatter, but it's still quite apparent where the optimum point is. **However, here's a word of warning**: Tuning the coils requires the use of **a proper trimming tool**. The cores are **very brittle**. Don't be tempted to use a screwdriver as there is a real danger that you will crack the cores.

So, use the proper trimming tool, and use it carefully. Cracked cores will usually jam in the coil and can sometimes be extremely difficult to remove.

The Receiver

I used the prototype pre-amplifier with a Realistic DX-390 receiver. More expensive sets shouldn't need extra help in receiving signals, so using the pre-amplifier with a budget priced or non-specialist receiver (in other words something other tan a dedicated 'communications receiver') is a better test of its capabilities.

For the antenna I used an end fed vertical half wave of the CB variety. I've always found it to work very well on 28MHz Amateur Radio narrow band frequency modulation (n.b.f.m.). Of course, the best pre-amplifier is a better antenna. (Antenna gain is noiseless!).

I was quite impressed with what the radio could pick up with just its own antenna. For the price it isn't bad, but it does have one annoying feature: There's a delay between selecting a frequency and the radio receiving signals on that new frequency. This is due to the 'stepping' nature of the tuning on the receiver's synthesiser.

There isn't a smooth transition from frequency-to-frequency as the dial is turned. In fact, whilst the tuning control is being turned, nothing is received. Only when a frequency has been selected (for what seems like several hundred milliseconds) does sound start to come out of the speaker.

I suspect that all similar radios behave in a similar manner* (**see note below**). I also think that they probably weren't primarily designed for searching the bands, but for listening on fixed frequencies, so perhaps I shouldn't complain. However, back to the plot.

Editorial note:** The tuning knob on the type of receiver used by G4SLU is actually a rotary switch - you can actually feel the gentle 'notches' as it rotates. My Roberts Radio RC828 (reviewed by me in the March 1999 issue of PW) tunes in the same fashion and to be honest even when listening on the Amateur bands I don't find it a nuisance. In practice you very quickly get used to the system and potential 'first time' buyers new to the hobby should not be discouraged by the technique.* ***Rob Mannion G3XFD.

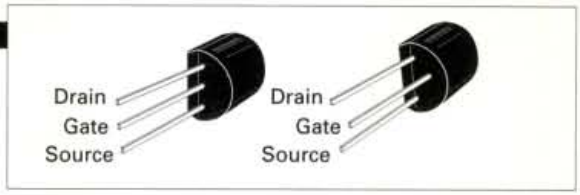


Fig. 3: Pin-out diagram for the 2N3819 field effect transistor.

In use the pre-amplifier certainly brought up the signals. Unfortunately though, it isn't possible to give S-points sort of figures as the receiver has a meter which read from zero to six. But some signals could be improved from barely moving the meter to almost 'full scale deflection' (f.s.d.)

Without proper measurements I wouldn't want to make any specific claims for the gain of the pre-amplifier project. But with it switched in there's a noticeable improvement in the strength of the received signals.

More adventurous constructors might wish to use a switch to take the pre-amplifier in or out of circuit, rather than swapping plugs around. Whatever you decided to do, this project certainly could add a little 'Turbo-charging' to your receiver.

Finally, my thanks go to **Rob Burrows G6DUN of the Shortwave Shop, 18 Fairmile Road, Christchurch, Dorset BH23 2LJ. Tel: (01202) 490099** for the loan of the Realistic DX-390 receiver.

PW

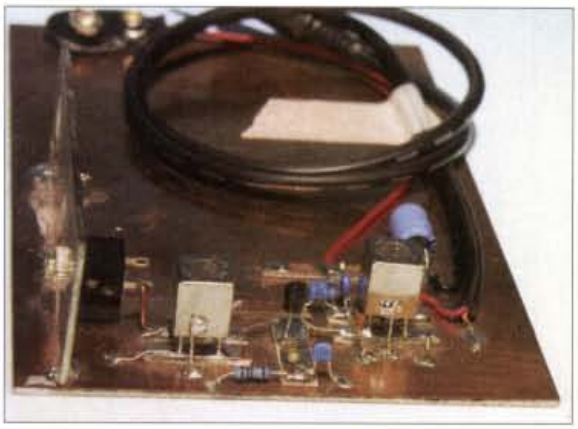


Fig. 4: The completed prototype project. In practice, the pre-amplifier can be built into any convenient case/box to suit your own needs.

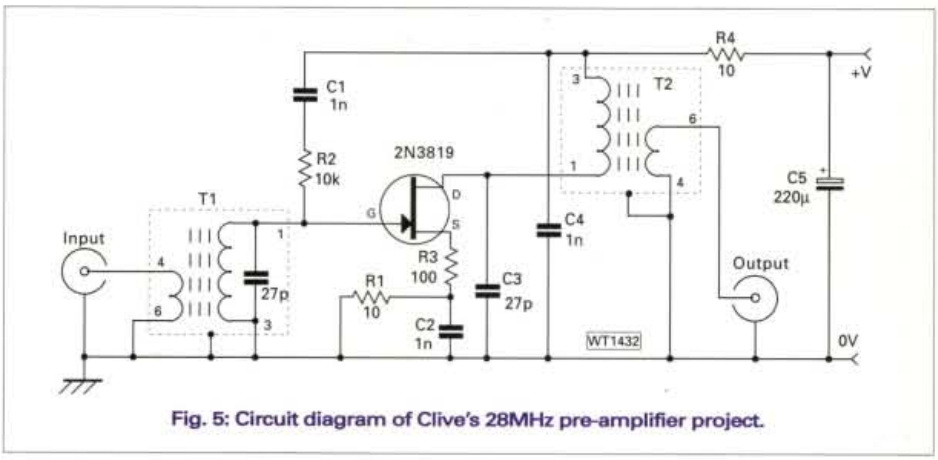


Fig. 5: Circuit diagram of Clive's 28MHz pre-amplifier project.

Shopping List

Resistors		
Metal film 0.4W 5%		
10Ω	2	R1, 4
100Ω	1	R3
10kΩ	1	R2
Capacitors		
Miniature disc ceramic		
1nF	3	C1, 2, 3
Miniature polyester		
27pF	1	C4
Miniature Electrolytic, 35V working		
220µF	1	C5
Inductors		
CSK3464	2	T1, 2 (See text)
Semiconductor		
2N3819	1	Tr1 (see text)

Miscellaneous

Battery and suitable connector (PP3 type recommended), 3.5mm jack plug socket, 3.5mm jack plug, 300mm miniature type coaxial cable, p.c.b. material, solder, trimming tool. (Available from various *PW* advertisers).

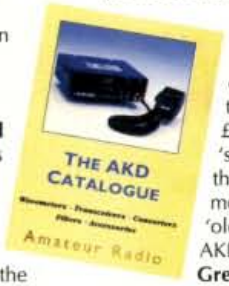
antennas in action

welcome to AiA!

Hello and welcome to the May 2000 'Antennas-in-Action' column with the spring Picketts Lock Show behind us. This month's column is packed with updates, information, a challenge and some books for your library. So, let me get started!

At the spring Picketts Lock show, one of the stalls nearby was the **AKD** display area with all their transceivers and receivers on display. I picked up one of their catalogues and was astounded to find that the enclosed pricelist was **dated May 1996**. On asking, I was told that the pricelist was correct and was still current. So the whole range of filters suitable for coping with TVI was still at the same price as four years ago - almost unheard of these days!

But if you cause - or suffer from - TVI, then there is surely one or more of AKD's range of filters that will help you. Individual filters are priced from £8.90 depending on the type. But surely the star of the list must be the DK1 kit of 11 filters for the total price of only £54.55 making them a 'snip' at little more than half price. For more details and an 'old' price list, contact AKD at **Unit 5, Parson's Green Estate, Boulton Road, Stevenage Herts SG1 4QG. Tel: (01438) 351710** or **FAX: (01438) 357591**.



A Note

I've had a note from **Richard Marris G2BZQ** who produced the 'Experimental Ferrite Rod Transmitting Antenna' that was published on page 38/39 of the April 2000 issue of *PW*, taking me to task somewhat for having missed out a vital stage of creating the longer ferrrite rod, of around 400mm length, from two (or more) shorter ones. Richard says that it is important that the ends of the ferrite rods are very carefully cleaned and joined together with superglue.

Both ends of the shorter ferrite rods should be very carefully cleaned and prepared by rubbing them with an abrasive coated paper (or cloth) as fine as possible. Make sure that they are as flat and even as possible. Repeat the treatment on each pair of ferrite rod ends, but before glueing the ends of the ferrite rods together, bring each pair of rods together and check that they fit snugly without wide gaps. When you are satisfied that the ends mate together closely, glue them with a Cyanoacrylate ('Superglue') type adhesive, making sure that they mate as cleanly and closely as possible. **Please make sure that you glue only the ferrite rods together!**

Transmission lines

In the February 2000 issue of *PW* **Geoffrey Billington G3EAE** wrote about 'Making Sense Of Transmission Lines', and **John Heys G3BDQ** has written in saying the illustration of Fig. 2 on page 40 of the February 2000 issue of *PW* may give the wrong impression if the accompanying text isn't read closely.

John suggest that readers might like to think of the curve shown as more of an impedance plot rather than as a plot of the voltage. Look at John's suggested plots as shown in **Fig. 1**, and assume that the open circuit is at the right-hand end of the feeder so it's a high impedance point as there is no current flowing at this point. Now let us plot the effective impedance along the feeder travelling towards the left hand end of the feeder.

As we travel towards the left-hand end, the effective impedance starts to fall, and its value follows a sinusoidal form, dropping initially quickly then the rate of change slows down before the impedance value reaches its lowest value at a point one quarter wavelength (at the operating frequency) away on the feeder, where the impedance has become an effective short circuit across which the voltage is zero (but the current is now a maximum instead).

If we then continue further along the line towards the transmitter, the impedance value starts to rise again, slowly at first then, at an increased rate until at a point one half wavelength away from the open circuit end, the impedance has again become high. In fact, if we take any two points along the transmission line that are exactly one half wavelength apart, they have exactly the same impedance value. Thanks John, this additional information may make readers look at the article again in a slightly different light.

Another Update

I've had another letter with an update to a previous article. An additional piece of information came from **Denzil G3KXF**, who read the article about **Ray Fautley G3ASG's** DX Edge 'greyline' predictor ('Antenna Workshop' March 2000 issue of *PW*). In his letter Denzil says "You might be interested in an historical point. The 'DX Edge' has been attributed to have originated in the USA (along with many other inventions). That might well be true regarding the name 'DX Edge' however, the 'greyline' concept was apparent many years earlier and may well have originated in Great Britain.

Fig. 2: Was this FISK Solariscope the ancestor of the DX Edge? See text for more detail.

"The earliest reference I've found, is in a publication titled *The Proceedings of the RSGB, No. 2 Winter 1948* where, on page 14, there is an advertisement by E.M.I. Sales & Service Ltd., (Amateur Radio Division), Hayes, Middlesex, for a product called 'The FISK Solariscope', price One Guinea. The Solariscope consists of a double Mercator-projection map, on which the land boundaries are repeated (i.e. continuous world map), wound in cylindrical form round a rigid former.

"Over the map may be fitted transparent charts, marked for the months for which

Fig. 1: This curve might explain the relationships of standing waves on transmission lines. See text for more detail.

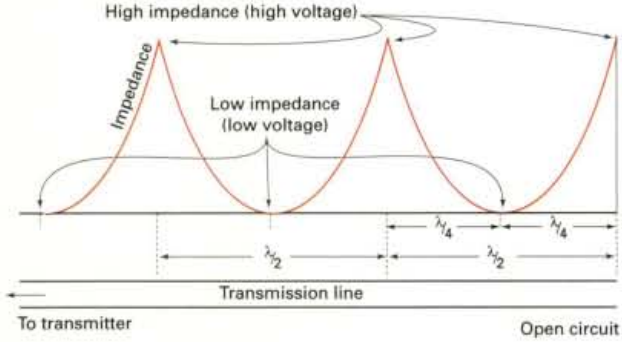


Fig. 3: Stage one of making a good connection to your PL259 plug. See text for an explanation.

Fig. 4: Stage two of making a good connection to your PL259 plug. See text for an explanation.

Fig. 5: Stages three and four of making a good connection to your PL259 plug. See text for an explanation.

Fig. 6: Stage five, ready to fit the coaxial cable into the PL259 plug and solder them together. See text for an explanation.

they are applicable. Those not in use can be kept inside the instrument, which has a removable top and or bottom. The Solariscope functions exactly as the 'DX Edge', but is better because the world map is continuous. 'FISK' may be a brand or company name. I wonder if any ex-employees of EMI or FISK may be able to throw more light on the Solariscope - someone might even possess one? I would be interested if you can publish more information on this subject - especially if someone can suggest 'DX Edge' software for PCs running Windows".

So, come on readers, who is going to take up Denzil's challenge and tell us more about the FISK Solariscope? And who will let us know about a Windows 95/98 version of software that does the same thing? I know only of the program *GeoClock* but someone out there must know the answers to both of these questions!

South Africa

In a letter from South Africa, came an excellent idea for putting PL259 plugs securely onto RG213 coaxial cable. **Meyer Koch ZS5MMK**, even went as far as sending in samples of stages that he had 'prepared earlier'. The sequence of operations is shown in the photographs of **Fig. 3**, **4**, **5** and **6**. But I'll let Meyer 'take you through the process'.

Stage one (Fig. 3) is to prepare the PL259 plug itself. The type that Meyer recommends is one that has four 'solder' holes around the waist of the plug. File across the holes with a round file to give a tapered edge to each hole, this makes for very much easier soldering the braid and plug body together. Tin the edges and sides of each hole.

Stage two (Fig. 4) is, using a tube-cutter to partially cut through (although not completely through) the outer insulation of the RG213 coaxial cable about 45 or 46mm back from the end. Then score the insulation with a craft knife (taking care not to cut yourself in the process), before peeling the plastic back to the line scored around the cable.

Stage three (Fig. 5) is to tin the braiding of the coaxial cable starting about 5mm away from the outer insulation as you can see in the photograph. The soldering iron needs to have a high heat capability to tin the strands quickly and cleanly over a length of about 15mm. After tinning the braid allow the coaxial cable to cool off and the dielectric to harden again. A cold damp cloth can speed this part up (*although it's not the 'done thing' when dealing with ordinary solder joints*.Ed.).

Stage four is to cut the tinned braiding, using the tube cutter again 15mm from the end of the outer insulation. Remove the severed braiding, then carefully cut down through the inner insulation, without nicking the inner conductors. Twist the inner conductors tightly together and solder (again leaving a 5mm gap from the insulation.

Stage Five

You have arrived at stage five (Fig. 6) being ready to fit the coaxial cable into the previously prepared PL259 plug. Fit the PL259's locking sleeve over the cable first (it causes anguish when you find out later you've forgotten it!), then fit the cable into the plug proper. Twist the plug around the cable to seat it firmly and securely into the body of the plug.

You should be able to see most, if not all, of the soldered area of the braiding through the holes in the waist of the plug. Now solder the tinned areas around the holes to the tinned area of the braiding, then the inner conductor to the tip of the plug. Now let the plug cool down and the insulation reharden properly. Cut off the surplus inner conductor from the centre of the plug. You're ready to go - with a well connected plug! Many thanks for that Meyer, that should improve the connections on antenna systems where your system is used.

Some Books

Now to turn to some books for your library. I'm often asked what is a good book to start with understanding antennas. And although I feel there isn't one book that suits all, *W1FB's Antenna Notebook* is one that comes close to this ideal, and should be on everyone's bookshelf, especially beginners. With over 120 pages of information and note by the late **Doug DeMaw W1FB**, there's going to be something in this book whatever your level of knowledge.

Written in a 'chatty' notebook style there are nine 'chapters dealing with topics such as: 'Some Fundamental Antenna Data', 'Building And Using Dipole Antennas', ' Single Wire Antennas', High Performance Wire Antennas', Limited Space - And Invisible Antennas' Matching Techniques', Special Receiving Antennas' and the final chapter of 'Simple Antenna Measurements'.

Taking just the one chapter, chapter two: 'Building And Using Dipoles' you will find discussions and notes about the performance, dimensions, single and multiband versions, multiple-element dipoles trapped and dipole 'look-alikes' described in this seemingly short chapter. With illustrations used when their use simplifies an explanation.This book may be considered a book for everyone!

Second Book

The second book I have for you this time is *The Right Antenna*. This is the second edition of the book with the full title of *The Right Antenna - How To Select And Install Antennas For Entertainment & Communications Devices*.What a mouthful, but although the book is of American origin, it contains a great deal of good ideas and information that may be used throughout the world.

There are 12 chapters in this well illustrated book which cover such topics as: How Antennas Work, TV Antennas - General, Selecting A TV Antenna DSS Satellite TV Antennas, FM Antennas, Fringe Area And MATV Antennas, TV And FM Noise And Interference, CB And Cellular Antennas, Shortwave Antennas, Antenna Installation, Shortwave Antenna Projects and New Trends In TV Antennas And Amplifiers.
There's a useful glossary at the end of *The Right Antenna* which is a useful addition to anyone struggling to try and remember what the various terms mean. this publication is a useful starter book, though it is aimed more at the person looking for more general information about antennas and may not be for those looking for particular installations. But, overall it's a good book.

Final Book

My final book this session is is much more for someone looking for a more Amateur Radio related antenna setup. From the successful partnership of **William Orr W6SAI** and **Stuart Cowan W2LX** the 'just too big to be pocket sized' *The Radio Amateur Antenna Handbook* is an excellent start point. Within the 180 pages you will find ten chapters covering most topics that will be of interest.

Topics dealt with in *The Radio Amateur Antenna Handbook* are: An Introduction To DX Antennas That Work, Antenna Location As A Factor Of Performance, Antenna Performance And The Famous SWR Meter, Antenna Towers And Rotors, All About Baluns, Popular Vertical Antennas, Quads Delta Quads And Other Loop Antennas, Horizontal And Sloping Wire Antennas, HF Beam Antennas and VHF Beam Antennas You Can Build.

In chapter three, about antenna performance, there's a chart showing expected gains of a variety of simple antennas from the theoretical 'isotropic' with a gain figure that is shown as 2.1dB down on a half-wave dipole to a four-element quad loop antenna with a gain of about 12dB over a half-wave dipole. Using this antenna would mean that both your transmitted and received signals would be effectively 16 times stronger, meaning better station.

Thoroughly practical, although of course the 'Tower and lots of real estate' approach reflects it's American origins the authors in their usual 'no nonsense and let's get on with it' style take the reader step-by-step through the topics. *The Radio Amateur Antenna Handbook* a sensible book, it does not overwhelm the reader but instead it's more likely to fire you with enthusiasm.

Ah well that's it again for another column, once more space escapes me again. See you next time in 'Tex-Topics'

G1TEX

Antenna Workshop

A 136kHz antenna tuner

Fancy having a go on the relatively new band of 136kHz, but don't know how to drive the antenna? John Heys G3BDQ shows you how to make an effective antenna tuner for the band. It's big - but not as difficult as you think!

Over the past years I have built and used many antenna tuners to suit the amateur bands from 1.8-50MHz, but when I decided to operate on our new l.f. band (2200m) a re-think was called for. What we describe as 'long wires' are puny when you're contemplating operating on 136kHz. A wire 550m long is needed to resonate as a quarter wave on the frequency. Fortunately, a much shorter wire can be used with a suitable tuned circuit to allow resonance and provide some radiation. With our short (in terms of wavelength) wires the radiated power on 136kHz is very small, being between 40 and 50mW when using a transmitter output power of 100W.

Even with such small radiated power levels, the surface wave will often allow contacts with stations hundreds of kilometres away. My 100m of wire which zig-zags around and up and down the garden and a 100W transmitter power has given me contacts with stations in six countries after just three months on the band.

The Series Tuned Circuit

The circuit I've chosen to use is the series tuned circuit, consisting of an inductance of about 3.7mH in series with the antenna. For this setup to be effective, a good r.f. earth is needed. A coil made to have this inductance needs many turns and to minimise losses it must have a low ohmic resistance. By using large diameter coils and winding them with relatively thick wire, the losses can be reduced.

Tuning the antenna circuit to the frequency is quite critical owing to its high *Q*. I employ three ways to achieve resonance. Firstly, I arranged for several tapping points on the Coil L1 then I incorporated a variable capacitor, connected across part of the tuned circuit. Finally I included a variable inductance in the form of a variometer to give fine tuning.

The tuned circuit is made up with three separate inductors in series. The main coil, L1, has the greatest inductance (see **Fig. 1**). The 50Ω coaxial feed from the transmitter is tapped, over a number of turns at the earthy end of L1. A 0.75A thermo-couple r.f. current meter suitably shunted to have a full scale indication of 2A connects between the tuned circuit at L4 and the antenna.

I didn't even attempt to use my h.f. band s.w.r. meter so I reverted to the old time method of tuning for 'maximum smoke'. I've found that a neon lamp can also be a useful aid in tuning to resonance but take great care to avoid r.f. burns - 100W in a high *Q* circuit will give r.f. voltages that can exceed 10kV!

The variable capacitor C has a high voltage rating. It is a government surplus item with 2mm vane spacing which is enough to cope with 24kV voltage peaks. This capacitor is arranged to resonate the circuit when set to less than 100pF and two variable capacitors may be used and wired in series. They must then have a 'flash over' voltage of at least 10kV when the transmitter output power is no more than 100W. A vacuum variable capacitor would be best if higher output powers are proposed.

Coil Construction

I am indebted to **Peter Dodd G3LDO** for his suggestion that plastic garden mesh can be used as a low loss former for large diameter coils (see ***The LF Experimenters Source Book*** - RSGB publications). Both L1 and L2 have this mesh material as the former for their windings. The 20mm mesh size is ideal and it can be found at B&Q Stores or most garden centres.

It is suggested that L1 is made first for it has the greatest inductance and is physically large. The 136kHz a.t.u. can't be put together on a normally sized chassis or baseboard. Mine takes up a considerable space on and above a 'spare' table in the shack.

The other coils L2, L3 and L4 are actually suspended above L1. The mesh former for L1 has a diameter of 305mm (12 inches) and is wound with 100 turns of pvc covered 32 strand 0.2mm tinned copper wire. A 100m

Continued on page 48...

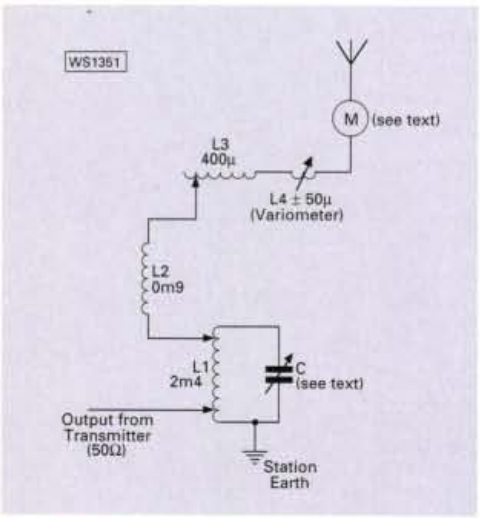


Fig. 1: Circuit diagram of the tuner showing coil inductance values.

Fig. 2: The main coil, L1, standing on a 'spare' table in the shack. The distribution of the winding into 'bunches' and the cable ties can be seen.

Fig. 3: Coil L2 which hangs vertically and to its right part of L3 can be seen. The variometer L4 is out of sight within the right-hand end of the coil former. On 2200m there's no advantage in having very short inter-connecting leads.

Continued from page 46...

SEE NEXT MONTH'S PW FOR MORE ANTENNA INFO

Fig. 4: A simplified drawing of the variometer L4. A glue gun was used to hold the winding in position and to secure the spindle where it went through the former.

roll will do nicely. The winding is arranged in 'bunches'. There are two bunches of ten turns each at the top or non-earthy end, then four bunches of 20 turns each. There are taps at 10, 20, 40, 60 and 80 turns.

My transmitter loads up correctly when its 50Ω impedance output is connected over the bottom 20 turns of L1. The photograph of L1 (see **Fig. 2**) sitting on the table shows how nylon cable ties hold the windings in place.

The second largest coil, L2, is also wound on 20mm mesh 'former arranged to have a diameter of 150mm (6 inches) and has a continuous unspaced winding of 115 turns using the same wire type used for L1. My first attempt at L2 didn't have enough inductance so extra turns were added. These used different coloured pvc wire.

The photograph (**Fig. 3**) shows how L2 hangs down in a corner of the shack above and to the left of L1. The coil, L3, can also be seen in Fig. 3 and is supported horizontally to the right of L2. This is wound with 1.5mm (16s.w.g.) enamelled copper and has 66 turns close wound on a length of plastic drain pipe. The external diameter of the former is 100m (a little under 4.5 inches).

A 50µH variometer (L4) is arranged inside the antenna end of L3 (**Fig. 4**). This has 30 turns of the plastic covered wire scramble wound on a 55mm diameter plastic tube (see Fig. 4). The tube is cut to allow its rotation inside and at one end of L3. Long leads from L4 allow for movement and a length of nylon spindle is used to turn the coil. When in place, the spindle is secured with dabs of glue from a hot glue gun.

There can be considerable hand capacity if the spindle isn't extended by at least 100mm with an insulating shaft, to move the knob well away from L3. This variometer will provide a plus or minus 50µH of inductance. I was assisted in making up the coils by my 'white gold' type WG020 multi-meter (available from Maplin) which has a most useful inductance range.

Testing & Setting Up

Before I made L2, L3 and L4, I adjusted the tapping on L1 and varied C to tune to 136kHz. It needed about 700pF to get resonance so I padded up my 300pF high voltage variable capacitor with some series connected high voltage capacitors and reduced power to about 30W. Listening first on 138.8kHz I tuned C and found an approximate setting for 136kHz. I've found that on 138.8kHz, there's a strong commercial signal that is always present.

I then connected a 40W light bulb across half of L1 and was delighted when my r.f. input power of 30W lit it to almost full brilliance. Then, with an r.f. current indicator in my antenna wire. I tried various tapping points on L1 until a point was found which gave the most antenna current. This tuning system, though not efficient did allow me to make contact with a station in the midlands, from my home on the south coast of England.

My temporary set-up was abandoned and the complete a.t.u. as described here was built. By trying different coil taps, finding the best tap on L1 for the input (actually 20 turns up) and adjusting the variable capacitor and the variometer, a high antenna current was achieved, almost 2A with 100W output. To double the antenna current, the power must increase by four times.

The more wire you have out on 136kHz, the bigger your signal ought to be. I increased the efficiency of my 80m length of wire by adding an extra 20m which connects to its centre and runs off to another pole, thus making a 'Y' arrangement. The self capacitance of added wires helps to top load the system.

Take more than usual care with your antenna insulation. Small 'egg' insulators are useless at these frequencies and I use Pyrex glass 'dog bone' insulators in tandem using nylon cords. But despite such efforts, wet or misty weather still affects antenna tuning.

Safety Warning

Keep all antenna wires well away from any possible contact by pets or people. Physical contact with 10kV of r.f. is not only very dangerous, but it can give serious r.f. burns which take a very long time to heal.

The LF Experimenter's Source Book is the second edition of the RSGB publication with articles selected and edited by **Peter Dodd G3LDO**. It's in a spiral-bound A4 format with six chapters containing over 140 pages of information about our newest band.

Chapter one deals with general low frequency radio information about both the original 73kHz band and the new band of 136kHz.

Chapter two consists of 36 pages of antenna systems and and propagation characteristics for the v.l.f. bands. Although many of the articles presented deal with the older, to be discontinued, band of 73kHz, the techniques and characteristics may also be applied to 136kHz too. Moving on to Chapter three, which deals with low frequency receivers using either up-converters or direct reception.

Chapter four deals with transmitters for v.l.f. including using 'audio' power amplifiers as the transmitter output stages. However, there is a description of a system used by **G3LNP** using a QY5-3000A valve to produce up to 3kW of output drive to the antenna. Specialist techniques are discussed in chapter five including two pages of software that uses the standard soundcard on an IBM PC to decode and display the recovered signals.

In the final chapter computer modelling methods and programs are mentioned along with measurement techniques. All in all, an excellent book for anyone interested in the new v.l.f. bands.

G1TEX

The AM Detector

This month Gordon King G4VFV is back with his regular 'Looking At' series and this time around he concentrates on the a.m. detector.

So far in this series I've followed the signal from the antenna, concentrating in turn on the various stages through which it has been processed. This has led me to the i.f. amplifier and filter stages. The accurately tuned and selected radio frequency (r.f.) signal is now ready to have the information it's been carrying extracted and restored to its original form which is an audio signal (in our primary area of interest). But it could equally be video, digital, pulse, etc.

The operation which extracts the audio signal from the carrier wave is called demodulation or detection and consequently, the circuit which performs the operation is known as the demodulator or detector. How the audio was modulated onto the carrier wave in the first place, determines the kind of detector required for its extraction.

The two main types of modulation are amplitude modulation (a.m.) and frequency modulation (f.m.), for which the corresponding type of detector is required. In this article, I plan to look first at the a.m. detector and will then turn my attention to f.m. detectors in the next two articles in this series.

Amplitude Modulation

With amplitude modulation (a.m.) the amplitude of the carrier wave is caused to vary above and below its steady, unmodulated level. This is in accordance with the loudness of the sound and hence the strength or amplitude of the modulating signal.

Percentage or depth of modulation is linked to the relative amplitudes of the modulation signal and carrier wave. For example, a carrier wave of 1V unmodulated amplitude, would be said to be 100% modulated when the audio signal causes it to vary in amplitude between zero volts at the troughs and 2V at the peaks. Variations between 500mV and 1.5V relate to 50% modulation - and so on.

Driving beyond the 100% level causes overmodulation and severe distortion. This is because the modulated carrier wave would then be pushed down to its zero level and held there until the strong modulation peaks pass.

In very bad cases, the modulated carrier wave would consist of short bursts of signal, producing multiple interfering sidebands. This problem might well be audible all over the band, much to the frustration of other users!

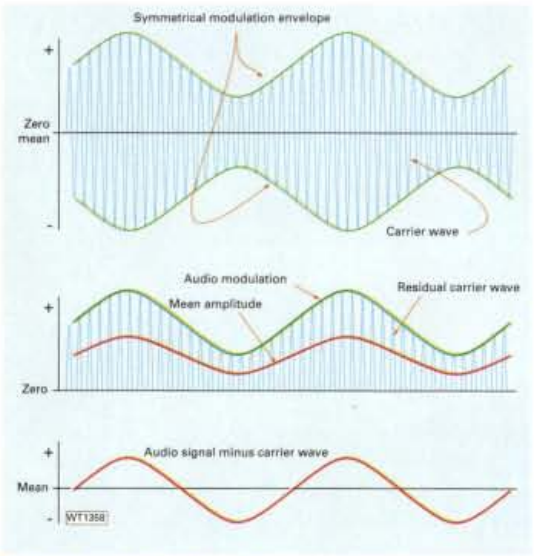


Fig. 1a (top): Waveform of an a.m carrier wave, modulated to a depth of around 50%. Fig. 1b (middle): The waveform after one half has been 'sliced off' by the detector to yield a varying mean amplitude. Fig. 1c (bottom): The audio information remaining after removal of the residual carrier wave.

The diagram, **Fig. 1a**, illustrates a carrier wave modulated with a pure sine wave to a depth of around 50%. It's worth noting that the modulation waveform, known as the **modulation envelope**, is symmetrical above and below the mean zero level of the carrier wave and that it contains all the characteristics of the modulation signal.

An a.m. signal consists of the carrier plus two sets of sidebands (upper and lower). Each sideband is separated from the carrier frequency by an amount equal to the modulation frequency and forming a mirror image.

With pure sinusoidal modulation (minimum harmonics) at 1kHz for example, there would be just two sidebands, one at the carrier frequency **plus** 1kHz and the other at the carrier frequency **minus** 1kHz. Each sideband will have a quarter of the **power** of the carrier wave (both sidebands amounting to half the carrier power).

Both sidebands are used for double sideband (d.s.b.) but only one (upper or lower) for single sideband (s.s.b.).

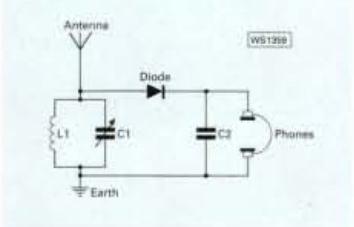


Fig. 2. A crystal set circuit based on a simple a.m. detector.

With speech and music there are, of course, multiple pairs of sidebands which, for fidelity, all need to be passed by the i.f. filter.

Audio Signal Extracted

So, how is the audio signal extracted? The modulated carrier (such as that in Fig. 1a) is applied to a simple rectifier circuit, which eliminates one half of the modulated waveform so as to make it asymmetrical, as shown in **Fig. 1b**.

Now, instead of the mean carrier level being at zero volts it now tracks the modulation envelope and thus corresponds to the originating audio information. Another part of the a.m. detector circuit, the filter simply eliminates the residual carrier wave, so that all that remains is the audio signal alone, as shown in **Fig. 1c**.

It's the audio signal which is fed to the audio stages of a receiver to activate the headphones or loudspeaker, that's all there is to it really! This simple a.m. detector action typifies that of the crystal set, whose circuit is given in **Fig. 2**. Here the wanted signal is selected by the tuned circuit consisting of the variable capacitor C1 and inductor L1.

The selectivity (and hence the degree of rejection of unwanted signals appearing at the antenna) is governed by the *Q*-factor (ratio of reactance to resistance) of the tuned circuit. A basic, two element tuned circuit, as shown, cannot be very selective, so the tuning will be fairly broad.

However, when the signal is sufficiently strong, an improvement in working '*Q*' can be accomplished by connecting the diode to a tapping a little way down L1 and the antenna to a coupling coil or, again, to a tapping down the coil rather than right at the top. In this way the tuned circuit damping is reduced.

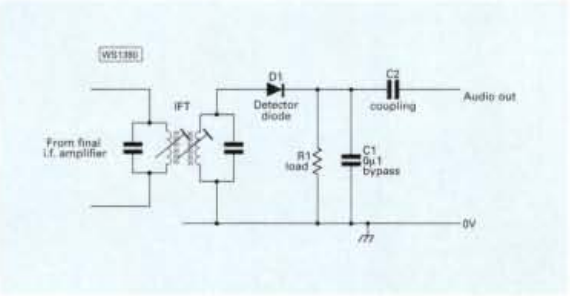


Fig. 3. A basic a.m. detector circuit as it may appear in a superheterodyne receiver.

Capacitor C2 bypasses the residual carrier wave, so only the audio signal appears across the headphones, such as in Fig. 1c. For best results, the crystal set requires a good antenna and earth system and the headphones should be high impedance (around 2000Ω), bearing in mind there are no active devices! The diode, of course, takes the place of the old-time crystal and cat's whisker, which was one of the first semiconductor diodes.

The diagram, **Fig. 3**, shows how a basic a.m. detector circuit may appear in a superhet receiver. The audio signal appears across the load resistor R1, this taking the place of the headphones in Fig. 2, with C2 bypassing the residual i.f. signal. The resulting audio signal is then coupled to the following a.f. stages through capacitor C2.

A by-product of demodulation is a direct current (d.c.) component whose strength relates to the amplitude of the i.f. signal. This d.c. is commonly used as a variable bias for automatically adjusting the gain of the r.f. and i.f. amplifiers, according to the strength of the incoming signal.

Known as automatic gain control (a.g.c.), this is where the bias is arranged so that should the strength of the incoming signal reduce, then its voltage will change in the direction to increase the gain of the controlled stages and vice versa.

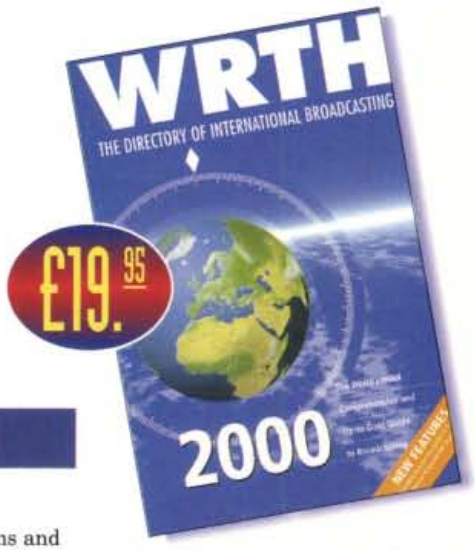
So, that's the basics of a.m. detection ... join me in the July issue of *PW* when I will be looking at f.m. detectors.

PW

Book PROFILES

After the huge success of the London Show at Picketts Lock this March, the Practical Wireless Editorial team thought that we should bring you news of just six of our best sellers. If you've ever visited the PW stand at any of the shows we do (London, Leicester, Blackpool or Longleat, etc.) then you will know that we always have plenty to interest Radio Amateurs.
This March we had a large stand swamped in books for you to look through and buy. The six books profiled here were our best sellers! So, if you couldn't make it to the show then we hope that this might make up for it!

TELEPHONE, FAX, E-MAIL OR USE THE ORDER FORM ON PAGE 74



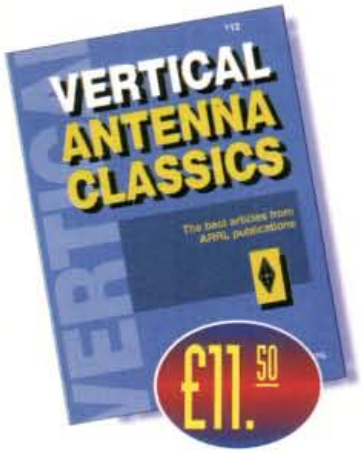
Vertical Antenna Classics

Edited by Robert Schetgen KU7G

Published by the American Radio Relay League (ARRL), *Vertical Antenna Classics* consists of some of the "best articles from ARRL publications" (according to its front cover). "If you're in the market to buy or build a vertical, you'll find a wealth of advice on choosing the design that's best for you" this book states.

Some of the chapters in *Vertical Antenna Classics* include those on 'Theory and Modelling' ('Designing A Vertical Antenna, 'A Beginners Guide To Using Computer Antenna Modelling Programs', 'Weather Protection For Vertical-Antenna Feed Points', etc.), 'VHF and UHF' ('An Investigation Of 2-Meter HT Antenna Performance', 'Decoupler VHF Verticals', 'A VHF-UHF 3-Band Mobile Antenna', 'A Vertical 6-Meter Wire Extended Double Zepp', etc.), 'HF', 'Directional Arrays', 'Reduced Size' and 'Radials and Ground Systems'.

Once again, this ARRL book is well illustrated with good, clear diagrams and it was very popular with the visitors to the *PW* stand at London this March. If you feel that the only was is up where antennas are concerned, then this could be just the book you need. **Highly recommended**.

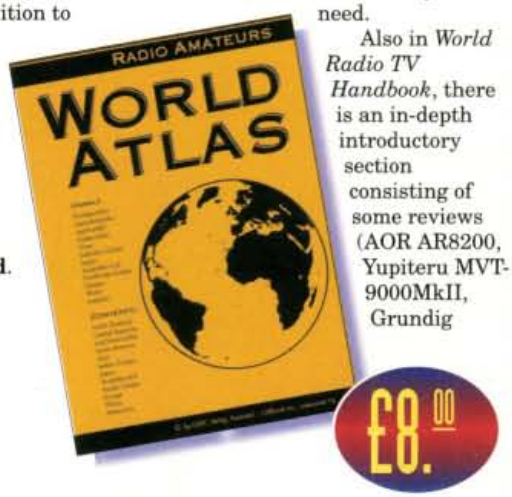


Radio Amateur's World Atlas

The ***Radio Amateur's World Atlas*** is everything that the title suggests! It covers North America, Central America and the West Indies, South America, Asia, Indian Ocean, Japan, Australia and Pacific Ocean, Europe, Africa and Antarctica.

In this A4 sized book, printed in Germany, you will find that, on each page, the country shown has lines drawn over it depicting locator square and its reference. Other information covered in the book includes: 'Continental Boundaries', 'DX Zone Boundaries', 'Radio Amateur Prefix Boundaries' and 'Capitals'.

So if you are in need of a handy reference map then this could be just what you're looking for. At only £8 it will be a handy addition to any shack and it is only a small and light paperback, so it won't take up very much room on your desk. **Highly recommended**.



World Radio TV Handbook - WRTH

Edited by David Bobbett

The new ***World Radio TV Handbook - WRTH*** for 2000 was on sale on the *PW* stand at the London Show this March and it was, as always, very popular. The *WRTH 2000* is a very handy reference book and has the names, addresses, programmes and frequencies of radio stations from all round the world.

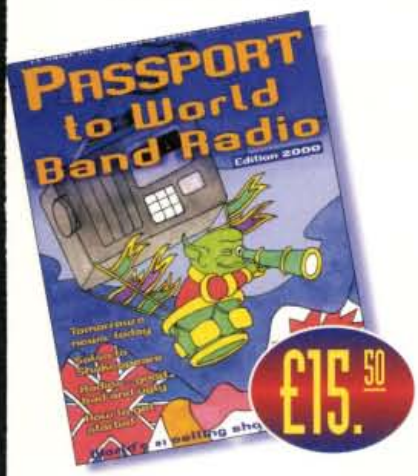
The Editorial floor here in Broadstone have their very own copy because it is so handy. If you are the kind of person who regularly needs to know the address, telephone number or E-mail address of almost any radio station, anywhere in the world then this is the book for you!

The 2000 edition is even better than the 1999 version as the format has changed just slightly, making it easier to find stations. Radio stations are listed under the country and all countries are split up into continents, making it much easier to turn straight to the station you need.

Also in *World Radio TV Handbook*, there is an in-depth introductory section consisting of some reviews (AOR AR8200, Yupiteru MVT-9000MkII, Grundig

YB400, AKD HF-4E, Icom IC-PCR100, WiNRADIO WR-1300E, Drake R8B, Icom IC-R75 and the Kneisner & Doring KWZ 30) as well as the "WRTH Receiver Guide 2000". Also part of this introductory section includes articles on h.f. broadcasting conditions, 'The Kosovo Conflict' and a section on how to use the A-Z system of the book to find the station that you're after.

So, if you are a Radio Amateur with a passion for the broadcast bands (especially if you read Peter Shore's 'Broadcast' column every month!) then this book is a 'must have'. **Highly recommended**.



Passport To World Band Radio

2000 Edition

Another one of our best sellers at the March 2000 London Show was the *Passport To World Band Radio* - edited by Tony Jones. The front cover of the "world's #1 selling short wave guide" claims that it includes: "Tomorrow's news, today"; "Salsa to Shakespeare"; "Radios - good, bad and ugly" and "How to get started".

"*Passport To World Band Radio* covers it all" it claims and this includes what's on 'world band' radio, what to buy, how to get started and would probably make interesting reading for someone who is just getting started on 'world band' radio.

Very much like the *WRTH*, *Passport To World Band Radio* contains an extensive mix of articles including: 'Afghanistan: Jihad of the Airwaves'; 'Central Asian Radio: Tajikstan'; 'Ten of the Best: 2000's Top Shows'. Another big section of the book is given over to the 'Compleat [sic] Idiot's Guide to Getting Started' (with sub-sections such as 'Three "Must" Tips to Catch the World'; 'PASSPORT's Five-Minute Start'; ' Best Times and Frequencies'; 'Setting Your World Time Clock'; 'First Tries: Ten Easy Catches' and 'Weird Words'), so if you've never thought about 'world band' radio before, then this book might be a good place to start.

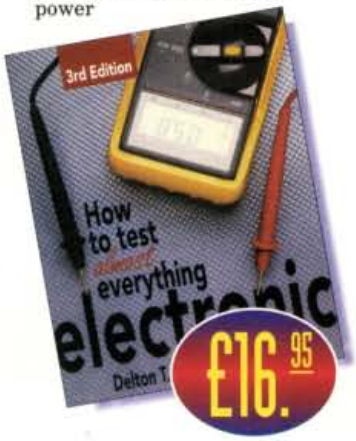
If you're looking for fresh, new ideas, or if you would just like to broaden your Amateur Radio horizons, then this could be a useful addition to your book shelf! **Recommended**.

How To Test Almost Everything Electronic

Delton T Horn

This third edition of *How To Test Almost Everything Electronic* claims to be "Your complete guide to today's electronic test equipment" and it certainly agreed with the customers who visited our stand at the London Show. It is "filled with helpful examples of typical circuits and easy-to-follow instructions that show you how to pinpoint problems in all types of electronic systems ...".

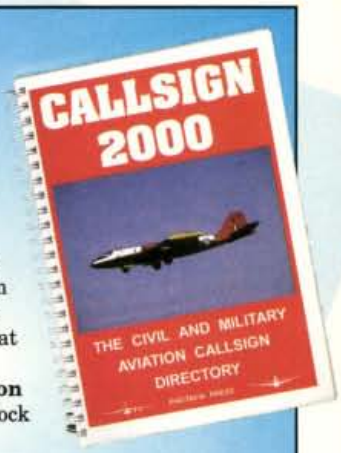
Some of the topics covered in this book include test equipment (multimeters, oscilloscopes, signal generators, signal tracers, capacitance meters, servicing test equipment, etc.), d.c. voltage tests and power supplies (problems with circuit breakers, checking for a hot chassis, polarity indicators, full-wave power supplies, power supply ripple, half-wave/full-wave doublers, etc.). Other aspects covered in this book include current tests, oscilloscope tests, component tests, TV tests, special tests, digital circuits and much, much more.



How To Test Almost Everything Electronic is very well illustrated using clear circuit diagrams and drawings and it finishes up with a chapter on flowcharting and troubleshooting so if you electronics is your 'bag' or even if you feel that you should/could know more about electronics and test equipment, you couldn't go far wrong with a copy of this book in your shelf! **Recommended**.

New In This Month

Callsign 2000!



As this issue was just about to go to press, we managed to find room to squeeze in the news about this new book which has now arrived at the *PW* offices. ***Callsign 2000* - 'The Civil And Military Aviation Callsign Directory'** is now in stock here at the *PW* Book Store .

If you want to get your hands on a copy then please call **Shelagh or Jean on (01202) 659930** or write to the **Book Store, PW Publishing Ltd, Arrowsmith Court, Station Approach, Broadstone BH18 8PW**. The book costs **£9.95 plus £1.50** P&P one book **UK only** - for details of overseas postal charges please see the Order Form on p.74.

£9.95

The UK Scanning Directory

Seventh Edition

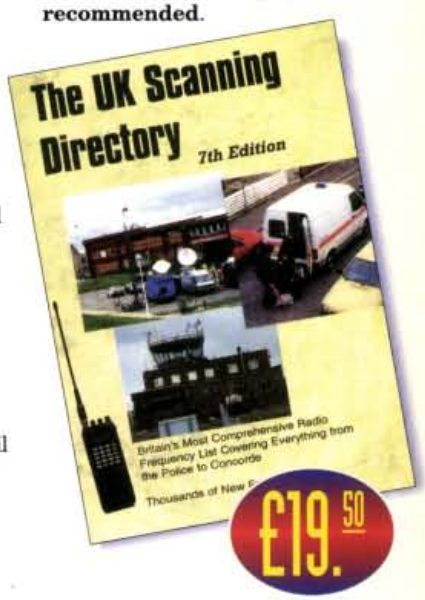
This **seventh edition** of ***The UK Scanning Directory*** claims that it "covers everything from secret government frequencies down to your local traffic warden". This radio frequency list covers 26MHz-1.8GHz but has also been revised to include "thousands of new frequencies" from "Police to Concorde"!

Part one of the book lists "tens of thousands of frequencies" including the civil and military aviation, Army, Navy, police, DSS Snoopers, GCHQ, Bailiffs, prisons, outside broadcasting, motor racing, universities, railways, telephones, couriers and many more, the book claims.

Part two, on the other hand, covers the civil aviation band with every airport in the UK listed. Finally, part three includes European frequencies "of interest to the DXers in the UK".

There's also a fairly extensive introductory chapter which includes an introduction to scanning for beginners (covering simplex and duplex, through to repeaters and trunking) to buying a scanner and a guide to using *The UK Scanning Directory*.

So, if your main passion with radio lies in scanning or if you would like to know more about it then you mustn't be without this book! **Highly recommended**.



VALVE & VINTAGE

Fig. 2: The R1116 receiver, again, two tuning dials and very similar controls to the AR8 set.

This month, resplendent in traditional Australian 'outback' shorts and 'bushwacker' hat, Ben Nock G4BXD looks at some interesting Second World War equipment from that sunny continent. Finally, he returns home again to discuss some British 'Heavyweight' sets.

Hello again and I hope you are all settling into the new millennium with ease. No evidence of the 'bug' here but, of course, with the exception of my PC that I write this on, everything else here is valved! I'll start first with a recent addition, an AR8 receiver, which brought my total of Antipodean sets to three. However, this was after the set finally found its way here after a worrying delay from the shippers.

The Australian made AR8 receiver, along with its companion transmitter the AT5, was used in many Royal Australian Air Force (RAAF) aircraft during the Second World War. These included the Mosquito, the Beaufighter and the Beaufort.

Preliminary designs for the AR8 receiver were started in 1938 which finally led to the sets being manufactured by the AWA (Amalgamated Wireless Asia) company in Sydney. The AR8 and its transmitter were apparently the only Australian designed sets ever to go into mass production during the Second World War.

Unusual Feature

The AR8 covers 140kHz to 20MHz in six bands and an unusual feature is that the set has two completely independent front ends: a low frequency unit and a high frequency unit. A common i.f. (intermediate frequency) and audio stage are used, an unusual i.f. of 755kHz being employed which does mean good image rejection and selectivity on the higher bands.

Fig. 1: The Australian AR8 receiver with the two tuning dials: low frequency on the left and high frequency on the right.

The low frequency front end tunes 140kHz to 2MHz while the high frequency unit tunes 2 to 20MHz, both in three bands. The two units allow the receiver to be set-up in DF (Direction Finding) mode on the low frequencies in conjunction with a loop antenna while the h.f. unit is left tuned to a communications frequency. Selection between the two is by means of a single switch.

There are 11 valves that are employed in the receiver. They include type 6U7 as the r.f. amplifier in both tuners, 6A8 as the mixer and 6J5 as the oscillator. Two stages of i.f. employ 6U7 types, a 6A8 serves as b.f.o. and 6G8 and 6J7 as detector, a.v.c. and audio output valves. A 6X5 in the antenna feed acts as a protection device in the event of any high voltages that may occur on the antenna (static volts for example).

Power supplies operated from 12 or 24V provided the 250V h.t. required for the receiver. The valve heaters could be run from either supply directly. In aircraft use, the receiver would be connected to a junction box along with the transmitter and the ACU (antenna control unit). A RCB (remote control box) connected to this junction box and allowed the Pilot, or 'Sparks', to operate the set. The receiver also carries the intercom facilities.

The R1116 Receiver

In the UK, at the same time as the AR8 was seeing service 'down under', the RAF were using a similar set here. The R1116 receiver was designed for general aircraft use in association with the T1115 transmitter.

The similar frequency coverage of 142kHz to 1.6MHz and 2 to 20MHz allowed the set to be used in direction finding duties as well as the standard communication role.

The 8 valve receiver operates as a double conversion set, with a first i.f. of 1700kHz and a second i.f. of 100kHz. The receiver can be switched from the l.f. ranges to the h.f. ranges by switching between two banks of coils as opposed to the AR8's twin tuners. This allowed two frequencies to be set up, one on the l.f. range suitable for DF use along with a loop antenna and one frequency on the h.f. range suitable for aircraft-to-aircraft or aircraft-to-ground communication.

A diode valve, a VU33, is used as a surge limiter across the antenna circuit to prevent any high voltages affecting the receiver. The input signal is fed directly to the first mixer oscillator, a VR82, followed by the first i.f. amplifier, a type VR83 valve.

The second mixer oscillator is another VR82 with the second i.f. amplifier again using a VR83 type. A type VR44 is used as detector and a.g.c. with a VR35 as audio output. Finally, a VR21 is used as the b.f.o.

The 'V' Numbers

The 'V' numbers are the RAF nomenclature for the valve types used. Typical civilian equivalents are 220TH, 220UPT, 210DDT, QP21 and 210LF types. These are 2V heater types, the receiver requiring a further supply of 10.5V for grid bias and 120V for the h.t. supply.

The necessary voltages would have normally been supplied by battery and these were changed before each flight. A remote control option, a Type No. 2 (as the set was normally mounted out of reach of the pilot) offered a limited tuning range and operation of the volume control.

The matching transmitter housed the transmit/receive

switch and the receiver carried further components allowing it to be used in an intercom role.

The British R1116 is slightly smaller than the Australian AR8 but is a little heavier. The tuning and knob location are a little easier to use on the AR8 than the R1116 but I haven't, as yet, had the opportunity to compare the matching AT5 or T1115 transmitters.

The Mighty 53 Set

Another new arrival here in Kidderminster is the Wireless Set No. 53 and at nearly 1.5m tall and weighing 272kg it is a **mighty big transmitter**. This 'beast' uses a pair of 813 valves in the power amplifier (p.a.) stage with a further pair in the modulator. Used for long range communication in the British Army and normally housed in the back of a 3-ton lorry, the 53 Set was used in conjunction with the R107 receiver.

In use, an output of around 250W can be expected from the 53 and the set is powered from a 240V a.c. supply, drawing 1.8 kW. A mobile generator would have been attached to the communications lorry in normal service.

At the time of writing the column I've got as far as pulling the master oscillator unit out for initial tests. It uses a VT501 as oscillator, and another as buffer/doubler and an 807 as driver valve.

The unit produces around 12W out on c.w. and one or two of you might already have worked me with it on the key. Incidentally, the keying of the whole set is different in that a valve, a 6C5G, is keyed from the negative bias line and this in turn switches the screen supply to the master oscillator stages.

Long Term Project

Full operation of the 53 Set will be a long term project for the summer. While on the subject of using old military sets on the air it should be remembered that in their original form, most of these sets were connected directly to a long wire antenna and, although that was fine back in the war years, it is not a practice to be encouraged today.

Indeed, I feed all my military sets through a low pass filter and then a decent antenna tuning unit (a.t.u.) ... a Yaesu FC-902 before feeding the signal to the antenna. Most of the sets I've mentioned will tune into a 50 or 75Ω load so can easily be patched this way. It helps to reduce any stray emissions and keeps everyone happy.

Fig. 3: The 53 Set transmitter. The power supply unit is at the bottom, with the modulator above. The r.f. deck is above the modulator, with the antenna loading coil at the top.

Fig. 4: The small Racal 'handbag' set, with handset and coaxial antenna adapter (see text).

'Green Handbag'

I've got a 'Green Handbag'! No, not that sort! Instead it's a nice little set, the Racal 'Minical' or TRA6929, which is a compact s.s.b., a.m. and c.w. transceiver.

Operating from around 2 to 7MHz, it delivers about 1W on six crystal controlled channels. A rechargeable battery is attached to the bottom of the set and the set operates into a whip of around 2.4m in length or external antennas via a small adapter. The set is basically an s.s.b. rig but can also run a.m. in the 'tune' position and (with a special adapter) can be used on c.w.

Interesting Internet

Finally, I have a couple of interesting Internet items. First, a dedicated location biased towards vintage gear. This is a Mailing List run by **Brian Gibbs G3MBN**. You can E-mail him directly for further information at **brian@brimar.demon.co.uk** Then there's the AD MM2000 award for military radio set operators, contact **Mario IK0MOZ** at **mario.g@pcg.it** for information and rules.

My thanks must go to Ann and the team at the Harwell rally for the nice welcome, it's a different venue next year so watch the *PW* 'Radio Diary' page. Well that's it for now. As usual I can be contacted at the usual locations including a new site at **www.qsl.net/g4bxd** or **http://ourworld.compuserve.com/homepages/G4BXD/** or you can E-mail me at: **G4BXD@compuserve.com** *PW*

RadioScene

VHF REPORT

REPORTS & INFORMATION BY THE LAST SATURDAY OF EACH MONTH:

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THIS MONTH DAVID BUTLER G4ASR TAKES A LOOK AT YOUR ACTIVITY REPORTS AND SUGGESTS THAT PROPAGATION COULD BE MUCH BETTER.

DAVID BUTLER G4ASR IS A VHF SPECIALIST, THIS MONTH HE DISCUSSES PROPAGATION ON THE VHF BANDS

Last time around in this column, I remarked that some v.h.f. operators had been disappointed with the lack of any substantial DXactivity on the 50MHz band. World-wide openings via F2 propagation are normally expected around the peak of the 11 year solar cycle and that should be right now.

High latitude east-west contacts, such as between Europe and North America, were scarce from October to February - normally the high point of the F2 season. The easier paths via trans-equatorial propagation (t.e.p.) to central and southern Africa have also, so far, been negligible and it's now very clear that Solar Cycle 23 hasn't been living up to expectations.

Emil Pocock W3EP explained in his 'World Above 50MHz' column in *QST*, that consistent transatlantic 50MHz propagation usually occurs when the solar flux is sustained above a level of 175, this occurs during the late autumn to early winter season. Even with the daily flux at 200, experience from Cycle 22 has demonstrated that there's just a 40% chance of openings from Europe to North America.

The solar flux did exceed 200 for several days running in November and again in December, but these were short-lived peaks. The flux just as quickly dropped below 175. In addition, the long-term average hasn't risen as steeply as in previous cycles and as a consequence, there were only a few days with mediocre transatlantic openings in each month and nothing like the openings at a similar stage in Cycle 22.

There have been a lot of less intense geomagnetic storms as well which may be an indirect result of overall lower solar activity. In contrast, the early years of Cycle 22 had several strong auroras and one quite extraordinary event, the great aurora that occurred on March 13th-14th 1989.

LOOKING BACK

Looking back, the geomagnetic storm in 1989 was really amazing with contacts being made via auroral back-scatter on all bands between 50MHz through to 1296MHz. The following is just a very brief look at some of the UK activity.

The first authenticated transatlantic contact on the 50MHz band via Auroral-E (Au-E) was recorded during the opening. **Dave Newman G4GLT** (IO92) spent most of the time looking westward for North America contacts and was rewarded by hearing VE1BPY at 559 between 2153 and 2157UTC.

Fig. 1: Andy Adams G0KZG/MM's antenna installation.

Bob VE1YX was heard briefly on s.s.b. at 53 a few minutes later and finally at 2234UTC the station of G4GLT contacted KA1MFA for the first two-way Au-E contact with reports of 579 and 559 being exchanged. At my QTH (IO81) I concentrated in making long distance contacts on the 144MHz band.

A total of 186 c.w. QSOs were made with stations in 18 countries and 74 locator squares. Amongst these were contacts with two Ukrainian stations, UK5KY (KO31) at 2029km and RB5PA (KO21) at 1920km.

Other c.w. contacts included 27 QSOs with stations in Czechoslovakia (OK), 17 in Poland (SP), 12 in Hungary (HG) and ten contacts with stations in Yugoslavia (YU). Six Italian stations were also worked showing just how far south the auroral back-scatter propagation was reaching.

Even more interesting was the news that **Keith G4FUF** (JO01) made a one-way c.w. contact with HG2RD (JN87) on the 1.3GHz band. Keith received a report of 55A from the Hungarian but couldn't make it a two-way as HG2RD was only running 2W - certainly nothing like that has happened yet this solar cycle.

Emil W3EP mentions that solar activity has simply been lower than expected and the underlying causes aren't clear. Each of the 22 recorded solar cycles has been unique in terms of rise to maximum, peak activity, duration and other quantifiable characteristics.

Most predictions are essentially statistical probabilities based on the observations of previous cycles, with some modifications based on certain recurrent patterns. A few months ago it appeared that Solar Cycle 23 would reach its peak later this year or early next.

It's not likely that the peak will be anywhere near as high as the previous two cycles, thus it now appears that 50MHz activity will probably not be as good as Cycle 22. Next autumn may well provide the best opportunities for world-wide DX on the 50MHz band for this cycle and how good that activity may be is anyone's guess.

CONDITIONS IN UK

Now back to the present, conditions in the UK on the 50MHz band during February were devoid of any substantial propagation events for the reasons just described.

A Sporadic-E (Sp-E) opening to southern Europe on February 7, a brief t.e.p. opening to South Africa on February 20 and some weak auroral back-scatter events throughout the month was all that has been reported.

The Sp-E opening on February 7 commenced around 1715UTC and lasted for over three hours. Stations throughout much of England and Wales were heard making contacts into Morocco (CN), Portugal (CT), Spain (EA), Slovenia (S5) and Croatia (9A).

The t.e.p. opening on February 20 took place between 1220-1300UTC. The only station reported was that of ZS6PJS (KG46) who worked stations in IO81, IO83 and IO90. The beacon station ZS6DN (50.050MHz) was also heard at the same time.

A number of minor auroral back-scatter events were reported on eight days in the period February 6-8 and February 11-15. All were generally restricted to stations located in northern England and Scotland with most activity being noted on the 50MHz band.

Ole OZ2TF (JO46) mentions that during the aurora on February 12 he made 17 contacts on the 144MHz band between 1433-1757UTC. He uses an Icom IC-271H transceiver with an external pre-amplifier, a 750W amplifier and four 9-element Yagis.

Ole's furthest contacts included LY2SA (KO14) at 886km, ES2DF (KO29) at 968km, ES1RF (KO29) at 987km, RU1AA (KP40) at 1287km and best DX of the event, RA3LE (KO64) at 1441km. All contacts on c.w. of course.

From reports received from the UK it can be seen that propagation on the 50MHz band has been very poor. However, 1500km to the south it was a completely different matter.

Stations located in Spain and the Mediterranean area have been enjoying almost daily t.e.p. openings to South America. The station of EH7KW for example has been making hundreds of nightly contacts with stations in Argentina (LU), Brazil (PY), Chile (CE) and Paraguay (ZP) - during February he also contacted stations in Malawi (7Q), Nigeria (5N) and South Africa (ZS).

In other parts of the world some remarkable DX has been worked on the 50MHz band. For example on February 13, during a large-scale USA to New Zealand opening, the station of ZL4AAA contacted EH8BPX in the Canary Islands over a path of 18900km.

The winter Sp-E season also got off to a remarkable start and **Pat Dyer WA5IYX** (EL09) in San Antonio, Texas reports that the maximum usable frequency (m.u.f.) was very high at his QTH on February 13. The Sp-E event started off at 2200UTC with a multitude of television signals being detected on low-band v.h.f. around 47MHz.

Over the next few hours the m.u.f. continued to rise, enabling various parts in the USA to be linked into paths to New Zealand already open via F2-propagation. At 0100UTC on February 14 the m.u.f. rapidly extended through 108MHz to reach up to the 144MHz band.

Pat was then able to make eight s.s.b. contacts on the 144MHz band with stations between 1700-1900km away. During the peak of this Sp-E opening a contact on the 220MHz band was reported between the station of W5UWB (EL17) and N6HKF (DM13) - the ionisation must have been very intense for this rare event to occur.
By 0200UTC, however, the Sp-E ionisation had reduced such that only contacts on the 50MHz band were being made. Linkage via F2 propagation to the South Pacific (mainly VK4) and South American still continued into some areas of the US (W5-7) for another two to three or more hours.

Philip Lancaster G0ISW passes

on the news that after an absence of five years he has returned to chasing DX on the v.h.f. bands. He's located in Penrith Cumbria (IO84) at 153M a.s.l. and uses an Icom IC-746 transceiver and a Create Log Periodic Yagi.

Philip mentions that he has discovered a wonderful logging program by EA6VQ called *VQLog 2.1* which keeps track of squares worked, confirmed and QSL cards and awards. It also features the print out of summaries and colour locator maps of Europe. He says that this is by far the best logging program he has seen in a long time.

LOCATOR SQUARES

Operators interested in contacting as many locator squares as possible on the v.h.f. and u.h.f. bands had a unique opportunity during February to work a number of uninhabited grids. This was made possible because the station of **DK5KK/MM** had installed high power equipment onboard a container ship which went from Hamburg in Germany to Rotterdam, Funchal in the Madeira Islands, Canary Islands and then back to Hamburg via Casablanca, Cadiz, Felixstowe and Rotterdam.

The equipment was very comprehensive, running 100W into a 4-element Yagi on the 50MHz band, 1kW into a pair of 11-element Yagis on the 144MHz band, 170W and a 22-element Yagi for the 430MHz band and 40W and an array of four 35-element Yagis on the 1.3GHz band. From observations made on the DX Cluster system it appears that many contacts were made with the maritime mobile station via meteor scatter and troposcatter on the 144MHz band and tropo on the 430MHz band.

The station was also QRV on all h.f. bands with 100W and wire antennas allowing it to be active on the v.h.f. net. By the way, this meeting place on 14.345MHz isn't a formal net and is used primarily at weekends and during most meteor shower periods for m.s. scheduling.

Expedition news and forecasts of impending propagation events, aurora, etc., can also be heard. To arrange schedules simply call "CQ European v.h.f. net" - but avoid 14.345MHz itself after 1500UTC at weekends because that is when the intercontinental e.m.e. net meet.

The v.h.f. net and the e.m.e. nets are an invaluable source of up-to-date operational news. Newcomers to meteor scatter or moonbounce will find the detail of other people's schedules particularly useful when first setting up their receive systems.

Another station well known for his maritime exploits is **Andy Adams G0KZG/MM** who informs me that he joined the Royal Research Ship (RRS) ***Charles Darwin*** in Leith, Scotland on March 25. His first cruise between April 3-12 in the north-east Atlantic (Scotland to Norway) will be over by the time you read this but other research cruises are planned.

Between April 20 and May 4, Andy will be operating in the north Atlantic, probably in the Rockall area, following that he will then be active in the Irish Sea, around the Clyde approaches. Other trips are planned for the period August to October.

Specific details of other trips are unknown at the present time except that a cruise between September 16-29 will be to the west of Ireland around the mid Atlantic ridge but these are provisional details and could be subject to change. The station of G0KZG/MM is now using Yaesu FT-847 transceiver, operating on a working frequency of 144.240MHz for c.w. and s.s.b. contacts and 144.125MHz for high speed meteor scatter.

The photograph, **Fig. 1**, shows the antenna installation of G0KZG/MM during his last trip - Andy remarks that it's the usual shoe-horn job to get the 11-element F9FT Yagi in place. In this instance the Yagi is normally placed 6m to the left but the scientists got there first this time!

Andy has fitted a replacement 3CX800 valve to his amplifier and will be using up to 800W output when appropriate (he has a high power permit). His operating times are 0400-0700 and 1800-2100UTC, although he's active at other times subject to work loads.

Later in the year Andy will also be active on the 50MHz band when the RRS *Charles Darwin* ventures outside of 144MHz range. That operation should certainly be something worth looking out for.

SOLICITING INFORMATION

Guy DL8EBW has for a number of years been soliciting information via specialist magazines, Packet radio, DX clusters and the Internet regarding the most wanted locator squares on the 144MHz band. This year's result show that the most sought after squares are located in eastern Europe.

The majority of these squares are in excess of 2000km from central England and not even the most enterprising of UK v.h.f. groups would be inclined to activate them. However, a number of squares do appear in the most wanted list, all being located either in Ireland (EI, GI) or Scotland (GM) - the most requested is IO42 followed in descending order by IO52, IO65, IO43, IO41, IO66, IO44, IO55, IO54, IO61 and IO53 - so, if you're making your expedition plans, it's worthwhile bearing these in mind.

Guy has also maintained a list of most wanted countries on the 144MHz band. The top three are Albania (ZA), Sovereign Military Order of Malta (1A0) which is a DXCC country in Italy and Algeria (7X). These are followed by Morocco (CN), Mount Athos (SV/A), Vatican City (HV), Monaco (3A), Libya (5A), Tunisia (3V), Dodecanese Islands (SV5) and Market Reef (OJ0).

OLD BIRD, NEW TRICKS?

According to the ARRL newsletter it appears that you can teach an old bird new tricks. The venerable British satellite UO-14 was recently switched back into Amateur Radio operation, in an f.m. repeater mode similar to the AO-27 satellite.

Chris Jackson G7UPN reported on the AMSAT bulletin board that UO-14, launched in January 1990, spent its first 18 months in orbit operating as a store-and-forward satellite. It was then switched for use by Volunteers in Technical Assistance who used it for medical messaging into Africa.

Chris reported that since the computer which is used for store-and-forward communications is no longer able to perform the task then UO-14 cannot be used in that mode. It is, however, possible to use the satellite as a single-channel f.m. voice repeater and it has recently been configured to do just that.

To use UO-14, you transmit (uplink) on 145.975MHz and receive (downlink) on 435.070MHz. Very little power is required to access the satellite, something like 5W and a very small beam. Indeed some stations have made contact via UO-14 using only a hand-held transceiver.

It's official! According to the February edition of the **Arianespace** newsletter: **http://www.arianespace.com/news_espace.html** the long-awaited launch of the Amsat P3D satellite is scheduled for late July 2000. It has been designated as flight V132 and will use an Ariane 507 launcher.

Note though that Arianespace retains the right to modify this provisional manifest as the result of the availability of payloads or for other reasons. **Freddy de Guchteneire ON6UG** reminds me that uplinks to Amsat P3D are in the 21MHz, 24MHz, 145MHz, 435MHz, 1.268/1.269GHz, 2.400/2.446GHz and 5.668GHz bands and downlinks from the satellite will be in the 145MHz, 435MHz, 2.400/2.401GHz, 10.451GHz and 24.048MHz bands.

Next time around I'll be providing more details of this amateur satellite and how to use it. For further information about P3D and other amateur satellites point your web browser to: **http://www.qsl.net/kg8oc**

DEADLINES

That's it again for another month. Please 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

Web Watch:

Information on P3D and other amateur satellites: http://www.qsl.net/kg8oc
Arianespace newsletter: http://www.arianespace.com/news_espace.html

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THIS MONTH LEIGHTON SMART GW0LBI HAS TWO PAGES OF HF BAND REPORTS FOR YOU WITH NO LESS THAN 11 REPORTERS FROM ALL ROUND THE UK. IT SEEMS THAT NOW'S THE TIME TO GET GOING ON THE HF BANDS - WHY NOT HAVE A GO?

What a difference a month makes? This month we have no less than 11 (yes that's 11!) reporters, which just goes to show how much the h.f. bands have improved recently, with all parts of the globe crashing in at what were literally huge signal strengths.

Our reporters agree that the 21, 24 and 28MHz bands in particular have seen a spectacular increase in activity as we amateurs 'rediscover' the delights of the higher bands after the long period of low sunspot activity. Great to see them back in shape isn't it?

WARM WELCOME

A very warm welcome to the h.f. bands to the new A/B licensees, who are no doubt having a whale of a time with their shiny new callsigns and who can blame them? What with the increase in the sunspot numbers and the corresponding improvement in DX conditions, I'll bet that this is a time they'll not forget in a hurry!

With the introduction of the new licence, it seems like the UK is taking a different approach to many other countries such as the USA, who are currently reducing their number of licence classes. We now

LEIGHTON GW0LBI HAS TWO PAGES OF HF NEWS FOR YOU WITH NO LESS THAN 11 REPORTERS!

have no less than five licence classes, which I think shows that the UK is definitely thinking ahead in terms of Amateur Radio and its future and long may that continue.

However, I must admit to having heard some, shall I say less-than-complimentary remarks about the new licensees by other Radio Amateurs on the lower bands. Comments which I'm certainly not going to repeat here.

Come on folks! We're **all** amateurs, regardless of our licence classes and we should, for the love of our great hobby, promote it and encourage new people into it, not deride or sneer at those with different types of callsign.

LAST TIME FOR GB75AFS

A letter came in this month from **Dennis Egan GW4XKE** who informs us that this July will be the last time that the special call GB75AFS will be on the air. The **Radiocommunications Agency (RA)** have granted the **Royal Signals ARS** and the **RAFARS** permission for the callsign to be used this last time.

Members of both organisations will be operating the station on **Saturday 8th of July** as well as from **Monday 24th** to **Friday 28th July** inclusive. More information can be obtained from Dennis via **johnny.e@ic24.net**

THRILL OF DX

Those of you who like the thrill of the DX chase are still no doubt lamenting the loss of the RSGB's *DXNewsheet* which closed last year. However, all is not lost as you can find snippets of DX information in the of **GB2RS** broadcasts.

One of the regular broadcasts can be found on 1.990MHz s.s.b. at 2130UTC every Sunday evening. The station puts out a potent signal, so reception should be reasonable almost anywhere in the British Isles.

PROPAGATION REPORT

Now over to avid DXer **Don McLean G3NOF** for his usual 'Propagation Report'. Don says: "With the approach of longer daylight hours I found the bands opening earlier and closing later. Although, as conditions have improved, I feel that they've not been as good as this time in the previous cycles.

"The 14MHz band saw good conditions to the west coast of North America between 1500 and 1800UTC. The short path to Asia was also good at around 1600 to 1900UTC and at the same time, the path to Alaska and Hawaii was open over the North Pole - the band closed at around 2100UTC.

"On the 18MHz band the long path to Asia was generally good most days between 0800 and 0930UTC followed by the short path. North America came in between 1200 and 1800UTC, when the band usually closed.

"Up on 21MHz the long path to Asia was open from 0800 to 1000UTC with the short path to the same part of the world following from 1000 to 1200UTC and Australian and New Zealand stations were heard at the same time. The band remained open sometimes until 2100UTC, but with mostly east coast Americans coming in at that time.

"There were good conditions on the 24MHz band at times, but I found it patchy. The long path to Asia was open on some days between 0900 and 1100UTC.

"Finally, the 28MHz band showed some promise, with the short path to Asia open between 0900 and 1100UTC. North America was heard between 1200 and 1800UTC, although after this time the band became patchy. African stations were also heard during the afternoons".

Fig. 1: 'HF Far & Wide' author, Leighton Smart GW0LBI, at his station!

YOUR REPORTS

I'll delve into your reports now, starting this month with the 7MHz log from **Sean Gilbert G4UCJ** of Milton Keynes who used 30W of c.w. on the band to hook up with 8Q7DV (Maldives Islands) at 0027UTC, C56JHF (Gambia) at 0034UTC, PY1FB (Brazil) at 0005UTC, J3/K4LTA (Grenada) at 0145UTC, as well as YS1/OH2BAD (El Salvador) at 0153UTC. His QRP exploits with 3W output gave him KL7XX (Alaska) at 0100UTC and XZ0A (Myanmar) at the earlier time of 2249UTC.

Also active on 7MHz c.w. this month was **Ted Trowell G2HKU** on the Isle of Sheppey in Kent, who lists 70W contacts with JY9NX (Jordan, S79SXW (Seychelles Islands) and 9K2UB (Kuwait) at around 2000UTC. While **Robin Trebilcock GW3ZCF** of Bishopston listed a solitary (but very nice) s.s.b. DX contact on 7MHz with 9M2JI (Malaysia) at 2013UTC, who says Robin "was just as surprised as I was - his QSL arrived in the post just four days later"!

THE 14MHz BAND

The very reliable 14MHz band proved a happy hunting ground this month for Don McLean G3NOF of Yeovil in Somerset. Using 100W of s.s.b. into a TH7 beam antenna, Don lists his contacts with AP2JZB (Pakistan) at 1638UTC, HS1NGR (Thailand) at 1732UTC, KH6LEM (Hawaii) at 1725UTC, as well as S79XC (Seychelles Islands) at 1712UTC QSL via G0IXC, VU3NAX (India) at 1834UTC, special call WY2000 (USA) at 1742UTC QSL via K4MQG and 3B8GD (Mauritius) at 1833UTC.

New reporter **Dean Godden M5AEM** of Pinxton in Nottinghamshire has certainly been putting his new callsign through its paces! He sent in a log which included his 100W s.s.b. contacts on 14MHz using a Pro-Am whip antenna with A45XM (Oman) at 0830UTC, CN8NK (Morocco) at 1950UTC, ZS6BXN at 0943UTC, as well as KB6NAN (USA) at 1607UTC, special call ER2000D (Moldova) and 9G5ZW (Ghana) at 0729UTC.

Fig. 2: The Alinco DX-70 - the receiver that Terry Ibbitson G0VTI of Wakefield uses to make his contacts on the 18MHz band. Also a favourite of Rob Mannion G3XFD of course!

THE 18MHz BAND

The 18MHz band has always been a favourite of **Carl Mason GW0VSW** of Skewen in West Glamorgan, who this month lists his early morning all-c.w. contacts using 80W and a half-sized G5RV antenna with JA0ELA (Japan) at 0730UTC, VK1WJ (Australia) at 0830UTC and 6W6/K3IPK (Senegal) at 0842UTC. Later in the day he also hooked up with EK6LF (Armenia) at 1100UTC QSL via KZ5RO, P40MH (Aruba Island) at 1252UTC, FH/G3TXF (Mayotte Island) at 1700UTC and finally KG4KO (Guantanamo Bay) at 1939UTC QSL via K1KO.

Next comes a reporter from a while back, **Terry Ibbitson G0VTI** of Wakefield has returned to the 'HF Far & Wide' fold! Terry uses an Alinco DX-70 (see **Fig. 2**) these days and a half-sized G5RV antenna (still well used after all these years, the G5RV!) and reports 18MHz s.s.b. contacts with JO1DZA (Japan) at 0936UTC, special call EK1700LR (Armenia) at 1214UTC and RU9WW (Asiatic Russia) at 1223UTC. Welcome back, Terry!

PW Listening & Operating Watch List

(all times in UTC)

Charlie Blake M0AIJ listens and operates:
0500-0700 on 7.061MHz s.s.b. with an NRD-525 receiver & Sloping Wire antenna and is also busy with his mobile rig.

John Heys G3BDQ operates:
mainly weekends during daylight hours on the 136kHz band using 100W and an end-fed wire.

George Woods G3LPT (Suffolk) operates:
an open net on 29.630 f.m. every weekday morning except Monday at 0930 local time.

Don McLean G3NOF operates:
1030 Saturdays on 3.685MHz on the ISWL Net or 1030 Sundays on the Yeovil ARC Net on 3.665MHz s.s.b. using a Kenwood TS-950 & trapped dipole antenna.

John Wheeler G0IUE monitors:
29.600 n.b.f.m. every evening between 1730 and 2230 regardless of conditions using a Yaesu FT-920 running 100W and a 2-element TET tri-band beam antenna/half-wave vertical antenna.

Leighton Smart GW0LBI operates:
on 1.949MHz s.s.b. and around 1.820 - 1.836MHz c.w. on weekday evenings between 1900 and 2230 using a Yaesu FT-747 transceiver at 5W or 25W depending on conditions and a 60m long wire Marconi antenna.

Rob Mannion G3XFD listens and operates:
from his new home on 7MHz c.w. during the week and on weekends and from his new 'portable shack' using a variety of antennas and equipment.

Sean Gilbert G4UCJ operates:
around 0700 to 1100 and 2100 to 0000 seven days a week on 14MHz and 7MHz using an FT-307 and Alinco DX-70 transceivers at 3/30W output and a G5RV dipole antenna in the loft space.

THE 21MHz BAND

Onto the 21MHz band now and according to new reporter **David London G0VGB** of Stockton-on Tees, "the DX found him" on the 21MHz band this month. Due to his working patterns, he's only able to get on the higher bands when they've begun to close down, but after an early finish one day he managed to hook up with VU2LB (India) at 1552UTC using the c.w. mode at 50W output.

David's other report for 21MHz was ZS6AVP (South Africa) at 1745UTC the same day, both contacts making him a very happy man indeed. Well David, as our reporters always say, it's all about being on the right band at the right time, so keep up the good work!

Meanwhile, Robin GW3ZCF spent quite a bit of time on 21MHz with his s.s.b. and lists contacts with 4Z5AO (Israel) at 1043UTC for his first contact of the millennium, as well as W6VZY (west coast USA) at 1732UTC, LU5W (Argentina) at 1026UTC, C6ANI (Bahamas) at 1645UTC and ZL4AS (New Zealand) at 1004UTC.

Finally for 21MHz comes **Hughie Purvis M5ABM** of Middlesborough. Hughie, as well as being a member of the c.w. club FISTS, used the c.w. mode to hook up with KB4LGG (USA) at 1520UTC, Z37GBC (Macedonia) at 1100UTC, special call T92000 (Bosnia-Hecegovina) at 1400UTC and RW9MZ (Siberian Russia) at 1600UTC. Hughie comments that: "I find that most c.w. operators play the game and slow down a bit for me"! Well, hurrah to that I reckon!

THE 24MHz BAND

The 24MHz band, although a narrow allocation, is where some nice juicy DX crops up and it's surprisingly quite free of QRM (whenever I'm listening at least)! Ted G2HKU lists some nice c.w. contacts in the form of S79/G3TXF (Seychelles Islands) at 0900UTC, with LU4FC (Argentina) and C56JHF (Gambia) being worked at 1500UTC.

Meanwhile Sean G4UCJ offers c.w. contacts at 30W with FR5FD (Reunion Island) at 1524UTC, 5U7X (Niger) at 1500UTC, XZ0A (Myanmar - formerly Burma) at 1205UTC and NP2/K7BV (US Virgin Islands) at 1618UTC. Don G3NOF wielded some pretty mean s.s.b. here too and hooked up with BV4QC (Taiwan) at 1044UTC, P40MH (Aruba Island) at 1115UTC QSL via OH2BAD, TL8CK (Central African Republic) at 1127UTC QSL via F6EWM and TU5IJ (Cote d'Ivoire - formerly Ivory Coast) at 0856UTC.

THE 28MHz BAND

The 28MHz band is where the action was for most of our reporters this month and, back with a vengeance is **John Constance G0VGD/2E0ANZ** of Aylesford. He used his full **G0VGD** callsign and 100W of s.s.b. on 28MHz to notch up contacts with BA4DW (China), EX4MFW (Kyrgystan) and JY4NE (Jordan) at around 0900UTC, while BV4KR (Taiwan) and UK8GZ (Uzbekistan) came in at 1100UTC and A41LZ (Oman) at 1224UTC.

However, using his "loved and retained" Novice callsign, **2E0ANZ**, John used 10W s.s.b. to work LW9DVA (Argentina) at 1330UTC, K4SX (east coast USA) at 1600UTC and W7CNL (west coast USA) at 1700UTC. Nice to have you back, John!

Using up to 80W of c.w. on 28MHz was Carl GW0VSW who listed his contacts with HC5AI (Ecuador), PJ2/DL1CW (Netherlands Antillies Islands) and FR5FD (Reunion Island) at around 1400UTC. While operating at 1600UTC brought contacts with V51AS (Namibia) and KG4KO (Guantanamo Bay).

David M5AEM racked up a huge list of US stations on 28MHz s.s.b., including W1FN and N2EOC, but also hooked up with EA9IB (Ceuta & Melilla) at 1018UTC, LU3FCL (Argentina) at 1550UTC, ZW2V (Brazil) at 1600UTC, TA3DD (Turkey) at 1410UTC, SV2FNN (Greece) at 0900UTC and UA9MTS (Asiatic Russia) at 0913UTC.

Down in Bishopston, Robin GW3ZCF used s.s.b. to work 5R8DA (Madagascar) and LU9APM (Argentina) both at around 1400UTC, while at 1700UTC he lists W6XS (west coast USA), CE5ERN (Chile) and V31DE (Belize). Using the key on 28MHz at 30W output this month was Sean G4UCJ, who spent quite a bit of time here it seems.

Sean's log shows contacts with EZ8AQ (Turkmenistan) at 1100UTC, as well as FG/W8MV (Guadeloupe), 5A1A (Libya), VP9/KE0UI (Bermuda) and C56JHF (Gambia) at around 1300UTC and while operating at around midday gave him JW5HE (Svalbard Island) and FH/G3SXW (Mayotte Island), all using an indoor wire dipole!

However, not to be outdone, 'our Ted' G2HKU used a pretty nifty c.w. to notch up contacts with XU7AAV (Cambodia), ZS1AAX (South Africa) and 9J2BO (Zambia) at around 1000UTC, while operating at 1600UTC brought in N7XM (2143m up in the Colorado mountains!), FM5CD (Martinique Island), J38A (Granada Island) and lastly CX8DR (Uruguay), who, says Ted, "is 81 years old, has been licensed for 62 years and lives in a place called 'Shangrila'"! Well, the truth is often stranger than fiction, Ted!

Finally for this month, we welcome **Mike Evans MW0CNA** of Swansea who claims that "Easter has come early this year" after he worked CE0Y/G0KBO on Easter Island the other day, using 100W and a 3-element beam antenna. Well done Mike, now how about working Christmas Island?!

THAT'S IT!

Well that's it folks and what a month it's been! It's certainly good to see the DX coming back on the higher frequency bands, if only because it increases the band occupancy and hopefully helps to safeguard them from 'predators'.

It's also very nice to see some new names appearing in the column and I hope that it helps 'old timers', newcomers and amateurs-to-be to get as much out of this fine hobby as possible. Thanks again to all reporters and good DX to all readers!

Leighton

ROGER COOKE G3LDI DISCUSSES COMPUTER SECURITY, FIREWALLS & MUCH MORE!

DATA SCAPE

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THIS MONTH ROGER COOKE G3LDI DISCUSSES COMPUTER SECURITY, FIREWALL AND MUCH, MUCH MORE. CONFUSED? READ ON AND FIND OUT HOW YOU CAN PROTECT YOUR COMPUTER FROM VIRUSES. HE ALSO LOOKS AT THE UNIVERSAL SERIAL BUS PORT - STILL CONFUSED? SOUNDS LIKE YOU NEED TO READ THIS COLUMN!

With the advent of E-commerce and the ever-increasing popularity of the Internet, it's inevitable that there will be a lot of bad apples in this very large barrel. Call me a pessimist if you like, I always was a "half-empty" glass person rather than a "half-full" type, that way I find you have few disappointments! I never ever give my credit card details over the Internet either, although the modern trend is for protection, protection and more protection.

Most of us run virus checkers on our PCs, especially those that connect regularly with the Internet. However, there are some 'clever cretins' out there who can even crack open your system whilst you're on-line. This is quite off-putting and, although the likelihood of this happening to an individual is fairly remote, I think that a little security leads to peace of mind.

You need to determine whether you need a firewall. You need one if:

1. Your computer's files need to be accessed remotely over the Internet;
2. You're operating any sort of Internet server, such as *Internet Web Server*;
3. You use any sort of Internet-based remote control or remote access program, such as *PC Anywhere, Laplink* or *Wingate*;
4. You want to properly and safely monitor your Internet connection for intrusion attempts;
5. You want to pre-emptively protect yourself from compromise by 'inside the wall' Trojan Horse programs, such as *Netbus*.

Obviously the issue of interest to most people will be the fourth one, but it's also worth providing protection of any sort.

Leighton Smart GW0LBI

A 'Thank You' from the Editor

It is with great regret that I have to announce to the readers of his column that **Leighton GW0LBI** - through no fault of his own and certainly no wish of the *PW* Editorial team - can no longer continue to write the column for the magazine. Leighton has worked extremely hard on writing, organising and instilling enthusiasm into our regular reporters and it seems, therefore, rather ironic that just as h.f. band conditions are on the 'up' and we're being joined by keen M5 Licence holders - that Leighton has had to stop.

I'm planning to write more on this unfortunate state of affairs in the June 'Keylines'. In the meantime, I'm delighted to announce that **Carl Mason GW0VSW** - a regular contributor to 'HF Far & Wide' has kindly agreed to take over the column. I also intend to welcome Carl in the next 'Keylines'. Thanks to you Leighton ... and welcome to you Carl!

Rob Mannion G3XFD.

Fig. 1: Introductory page found at: www.grc.com where you will find Steve Gibson's Firewall program.

Fig. 2: More information which can be downloaded or read at www.grc.com

Fig. 3: The two tests found at www.grc.com that you can perform on your own system.

Fig. 4: Want to be able to avoid those awkward questions that you don't know the answer to? Take a look at: www.howstuffworks.com and worry no more.

WALL OF CODE

The firewall isolates your computer absolutely from the Internet using a wall of code that inspects each packet of data, whether it's inbound to the computer, or outward bound from the computer. The firewall determines whether the packet should be passed or blocked - it's a sad fact that such devices are necessary these days, but this is very worthwhile installing.

All Internet communication is accomplished by the exchange of individual 'packets' of data. Each packet is transmitted by its source machine toward its destination machine. Packets are the fundamental unit of information flow across the Internet.

Even through we refer to "connections" between computers, this "connection" actually comprises of individual packets travelling between those two 'connected' machines. Essentially, they 'agree' that they're connected and each machine sends back "acknowledgement packets' 0.6m to let the sending machine know that the data was received.

In order to reach its destination - whether it's another computer two feet away or two continents distant - every Internet packet must contain a destination address and port number. Also, so that the receiving computer knows who sent the packet, every packet must also contain the IP address and a port number of the originating machine.

Any packet travelling the net contains - first and foremost - its complete source and destination addresses. An IP address always identifies a single machine on the Internet and the port is associated with a particular service or conversation happening on the machine.

Since the firewall software inspects each and every packet of data as it arrives at your computer - **before** it's seen by any other software running within your computer - the firewall has total veto power over the receipt of anything from the Internet.

A TCP/IP port is only 'open' on your computer if the first arriving packet which requests the establishment of a connection is answered by your computer. If the arriving packet is simply ignored, that port of your computer will effectively disappear from the Internet. No-one and nothing can connect to it!

But the **real power** of a firewall is derived from its ability to be selective about what it lets through and what it blocks. Since every arriving packet must contain the correct IP address of the sender's machine (in order for the receiver to send back a receipt acknowledgement).

The firewall can be **selective** about which packets are admitted and which are dropped. The firewall can "filter" the arriving packets based upon any combination of the originating machine's IP address and port and the destination machine's IP address and port.

Steve Gibson of **Gibson Research Corporation** has made available a very nice Firewall program, free for the individual user. I suggest you visit his Web site and give consideration to installing it for yourself.

I have a copy running on the PC I have that connects to the Internet, the URL is simple: **www.grc.com** The picture in **Fig. 1** shows the introductory page, **Fig. 2** shows more information that you can download or read and **Fig. 3** shows the two tests that you can perform on your own system. After you've done this, download the program, *ZoneAlarm 2* and install it.

UNIVERSAL SERIAL BUS

Being a rather aged 'G3', USB has always been the initials for Upper Side Band tone! However, in this digital age, it stands for **Universal Serial Bus**. The latest PCs on the market all sport the USB port and we've long since suffered from a limited choice of inflexible external expansion ports.

Serial: this is probably the best of a bad bunch, allowing for simple but slow network connections between computers. More commonly, you would use this port for connecting a modem, TNC, or some other device. Normal on-board serial ports support speeds up to 119kB, which is enough to support most of the requirements of the user, such as a V90 modem and ISDN adapter, but will not be sufficient for future expansion.

Parallel: this is normally exclusively used for connecting printers, scanners and storage devices. Parallel port access can be extremely processor intensive, but can be faster than serial. Most parallel ports support one device only.

PS/2: this is a small six-pin circular interface normally used for the connection of mice and keyboards, that's about it.

AT: this is a large five-pin circular connector used for the keyboard.

All these ports are fitted on-board to all standard PC motherboards. Additional cards can give access to more flexible and faster interfaces such as faster serial ports and small computer systems interface (SCSI), but this too is getting old and expensive to support.

About three years ago, the USB began to appear on new PCs and motherboards. The USB is a multi-function port interface, similar to SCSI, allowing the simple connection of multiple storage, input and networking devices in a chain.

Unlike SCSI, USB also supports the connection of controller devices such as keyboards and mice, made possible by its serial-like architecture and does not need manually terminating. USB only came to prominence for PC users

Web Watch:

Steve Gibson's Firewall program: www.grc.com
Want to know 'How Stuff Works'?: www.howstuffworks.com
***Winlog32* Web site: www.winlog.co.uk**
W1FB's contesting program: www.wf1b.com

Fig. 5: Fancy taking a look at the Winlog32 program? Just turn to: www.winlog.co.uk

Fig. 6: This picture gives you an idea of what Winlog32 actually looks like when running.

with the launch of *Windows 98*, which brought mainstream USB support to the Windows operating system.

The USB port supports the simultaneous connection of 126 devices, compared to the seven or 15 of SCSI, with a bus speed of 12Mbit/sec, far in excess of existing serial and parallel ports. The main advantage of USB over many SCSI controllers and the onboard ports is its 'hot-plugging' ability, which lets you connect and disconnect devices while the computer is powered up.

Lots of new external peripheral devices for PCs now come with USB compatibility, it really is unfortunate that most of us already have the older devices which aren't! However, this is real progress and will serve to eliminate lots of problems we have had in the past with port deficiency!

An interesting device that's now on the market is the **Xircom Portstation**. It's essentially a generic USB docking station, which can be used as an expansion device for the desktop PC.

The Portstation is a modular system, comprised initially of two small blocks, containing the USB computer connection and additional power inlet on one and the USB pass-through on the other. These sit at either end of the Portstation unit and in between them you add your own combination of actual device modules.

The modules interlink using 25-pin D male and female connectors and simply snap together to form a rectangular block. There's no limit on how many or how few modules you use and you can use multiples of the same module type. The completed block then connects to your computer with a single USB cable.

WORRYING TIME

A very worrying time for a parent is when their child asks them questions like: "Dad, how does a jet engine work"? Not wishing to look ignorant, the usual retort is to try to postpone the answer, or suggest that Mum should be asked!

However, you need worry no longer, an interesting Web site that I've found could be just what you need. Have a look at **www.howstuffworks.com** (It's home page can be seen in **Fig. 4**). It really has some interesting information on all sorts of devices and you need never be stumped again.

WINLOG32

Winlog32 v1.00 is another logging program that might be of interest to *PW* readers and it's available for download from the Internet free of charge. *Winlog32* is a general purpose logging software with special interest to the h.f./v.h.f. DXer.

Based on the popular *Super Winlog v2, Winlog32* is all new but retains as much 'feel' for the original as is practical, considering the new features. *Winlog32* has some specialist features including DXCC, IOTA, VHF LOC., WAZ, WAS, USCH.

Databases for QSL Managers, QSL cards and Beacons. Support for ADIF, DXCluster and many other features including Graphs, Audio Recorder, Note Pad, QSL Labels are also included. A good prefix database and lookup and many other tasty things. ***Winlog32* is NOT a contest logger**.

This handy program is available from the following site: **www.winlog.co.uk** and **Fig. 5** shows the fist page. Finally, **Fig. 6** gives you an idea of what it actually looks like when running.

SOME RTTY CONTESTING

Back in the late 1950s (the last century - is it really that long ago?), RTTY contesting was quite a demure event in comparison to the cacophony heard on the bands now. We used to have time to have a short chat with each other.

The day prior to the contest was spent overhauling the Teleprinter, oiling and greasing where necessary, adjusting gaps with feeler gauges and making sure we had plenty of paper on hand. Now it's much more sophisticated.

Dedicated programs are available for either chatting, DXing or contesting and one of the most popular contesting programs is that written by **WF1B**. This program, however, isn't free - although you can download an evaluation copy from the Internet.

The total cost is around **$49** but it comes with handbook and the ability to update your version from the WF1B site, you can also subscribe to a mailing list and so on. Take a look at **www.wf1b.com** see **Fig. 7**.

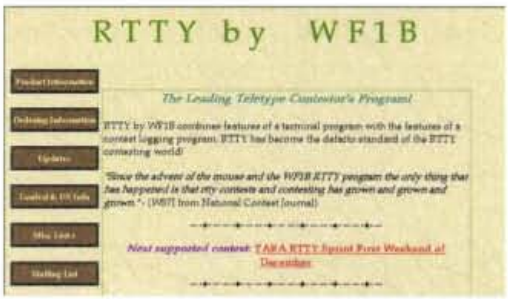

Fig. 7: One of the most popular contesting programs, written by WF1B. This program, however, isn't free - although you can download an evaluation copy from the Internet. The total cost is around $49 but it comes with handbook and the ability to update your version from the WF1B site, you can also subscribe to a mailing list and so on. Take a look at www.wf1b.com

AND FINALLY ...

And finally ... a woman called the Canon help-desk with a problem she had with her printer. The technician on the other end of the telephone asked her if she was "running it under Windows"?

The woman responded: "No, my desk is next to the door. But that's a good point. The man sitting in the cubicle next to me is under a window and his is working fine"! Gotta smile!

Editorial Note: Any lady reader wishing to complain to Roger is asked to contact him directly, not via the *PW* office - Joanna Williams.

WELL, THAT'S ALL FOR THIS MONTH'S 'DATA SCAPE' COLUMN. DON'T FORGET, KEEP SENDING ME ANY NEWS, VIEWS AND THINGS YOU'D LIKE DISCUSSED TO THE ADDRESS AT THE TOP OF THIS COLUMN. UNTIL NEXT MONTH ... HAPPY COMPUTING!

Roger

BROADCAST

REPORTS & INFORMATION TO ME PLEASE:

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PETER SHORE RETURNS TO THE *PW* PAGES AGAIN THIS MONTH WITH MORE BROADCAST NEWS FOR YOU. THIS MONTH HE TELLS YOU ABOUT HOW THE BBC WORLD SERVICE IS INCREASING THEIR 24-HOUR ENGLISH-LANGUAGE OPERATION ... AND MUCH MORE.

Last month, the **BBC World Service** launched more programme streams in its 24-hour English-language operation. It's making a big improvement in the amount of news that's available, principally to benefit local stations that take World Service around the globe.

There are news bulletins on the hour, every hour and longer news programmes, These include the established 'The World Today' and 'Newshour' which are joined by 'World Briefing' slots that include business news, sports news and British news.

In addition to the traditional "rich-mix" stream of programmes, there's now a continuous news and information stream. If you log on to the World Service Web site: **www.bbc.co.uk/worldservice** you

can listen to either the general programme service, or the new rolling news stream.

"We have been working towards the new schedules for the past two years", says **Mark Byford**, Chief Executive of BBC World Service. "As we want to broadcast to 24 different time zones, it is no mean feat to give listeners the programmes they want to listen to at the right time of day - but our scheduling experts have cracked it.

"No matter where you are in the world, you will now be able to hear news and analysis in the early morning, midday and early evening and tune in to favourite World Service programmes at regular and appropriate times". All this new investment in World Service in English comes at a time when it's enjoying record audiences of around 40 million regular listeners around the world.

Listeners in the UK can hear BBC World Service overnight from 0100 until 0600UTC at weekends and from 0105 to 0600UTC on weekdays on Radio 4's f.m. and long wave frequencies. If you live in south-east England, World Service is available on 648kHz m.w. Also, don't forget that World Service is available on analogue and digital satellite and on DAB Digital Radio in the UK.

INTERESTING LETTER

An interesting letter arrived on my desk from **Roger Liddell** in Tewkesbury, Gloucestershire who is retired but keeps himself busy with "a little bell ringing" and looking after the clocks of Tewkesbury Abbey and Tewkesbury Town Hall. Roger was interested in the story about the possible return of **Radio Luxembourg** on 208m (1440kHz) and reminds me that back in 1996, **Radio Netherlands** (see **Fig. 1**) started to use the RTL transmitter at Marnach for its English-language programmes to Europe.

Roger goes on to say "sometime in 1998 I switched on early one morning and to my surprise I heard the familiar Luxembourg chime that I used to hear early mornings between 1959 and 1967 when I was with British Railways. Then, as at the present time, this signal opened up the station for the German religious programmes, the English service started in the early evening".

Roger says that he's a regular listener to **RTL Radio** although "it does fade away during the day but the signal does not get completely lost. I use a Russian Vega B212, 9V mains transformer and an inverted 'L' antenna (assisted by a tuner of sorts). The other set is an R707 and I've also got an AR88 and various other receivers.

"RTL Radio is 'on-air' from 0400UTC until closedown at 2200UTC Monday to Saturday, with an hour later start on Sunday". Thanks for the letter, Roger and keep enjoying good old 208, there's still no sign of the English-language service launching, but I'll let you know if that changes!

Radio Netherlands continues to use m.w. and s.w. to reach Europe, it has a two-hour block each morning on 6.045 and 9.86MHz between 1030-1225UTC and at night there's another two hours on 1512 kHz starting at 2030 GMT. Further afield, Radio Netherlands reaches into the USA and Canada at 2330-0125UTC on 6.165 and 9.845MHz and from 0430-0530UTC on 6.165 and 9.59MHz.

PETER SHORE HAS NEWS OF HOW THE BBC WORLD SERVICE ARE INCREASING THEIR 24-HOUR ENGLISH-LANGUAGE OPERATION

Web Watch:

Radio Ethiopia: www.angelfire.com/biz/radioethiopia/

BBC World Service: www.bbc.co.uk/worldservice

All Shades of Opinion

Radio Netherlands

Fig. 1: A sticker which came courtesy of Radio Netherlands.

DX REPORTER

American DX reporter, **Glenn Hauser**, has reported that **Radio for Peace International (RFPI)** in Costa Rica faces a 'make or break' year - the station has said that it needs more funds to allow it to continue on the air and has appealed for listeners to become members at a rate of US $40. RFPI is on the air throughout the day on one or more of these frequencies: 6.975, 15.05, 21.46 and 25.93MHz.

If you're visiting Rome this year, **Vatican Radio** (see **Fig. 2**) is laying on a special radio service for you! Called 'Jubilaeum', the one-year only station is on the air on 105MHz f.m. and 527kHz m.w. in a variety of languages, including English. The Holy City expects more than 20 million visitors and Vatican Radio has been charged with keeping them informed and entertained throughout their visits.

Fig. 2: One of Vatican Radio's many and varied QSL cards.

'GLOBAL SOUND KITCHEN'

Sponsored radio programme 'Global Sound Kitchen' continues on Friday evening in Europe on 3.975MHz, relayed by **Merlin Communications**, with a repeat on Saturday at 1600UTC on 3.965 and 9.655MHz. The 'Kitchen' is produced by **Ginger Media Group** in London and is broadcast by s.w. and satellite - Ginger plans to place the programme on local stations across Europe and North America in time.

I've discovered a Web site for **Radio Ethiopia**. Log on to **www.angelfire.com/biz/radioethiopia/** to catch a RealAudio version of the country's national anthem, plus a range of links about the African country. The station is still available on s.w. at 1030-1100UTC on 5.99, 7.11 and 9.705MHz with the External service on the air at 1600UTC for an hour on 7.165, 9.56 and 11.80MHz.

If you've tuned to Namibia's domestic radio service that is relayed on s.w. in the past few months, you may have come across some interesting broadcasts. **World Radio Network's** African service has been carried from 0000 to 0600UTC on its local transmitters and the high frequency ones used to cover the entire country, these are on 3.27 and 3.29MHz.

THAT'S ALL

That's all for this month, do keep your letters and E-mails coming in with any news and information about the world of international broadcasting.

UNTIL THE NEXT TIME I'M IN *PW*, GOOD LISTENING!

Peter

SEND YOUR ADVERT TO PRACTICAL WIRELESS, BARGAIN BASEMENT, ARROWSMITH COURT, STATION APPROACH, BROADSTONE, DORSET BH18 8PW

FREE ADVERTS

Now's your chance to send in a photograph of your equipment (a good idea if it's really unusual) to accompany your advert. Please note that **all photos** will only be **published at our discretion** and are **non-returnable.**

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Bargain Basement

Advertisements from traders or for equipment that is illegal to possess, use or which cannot be licensed in the UK, will not be accepted. **No responsibility will be taken for errors.**

You should state clearly in your advert whether the equipment is professionally built, home-brewed or modified.

The Publishers of *Practical Wireless* also wish to point out that it is the responsibilty of the buyer to ascertain the suitability of goods offered for purchase.

For Sale

70cm (430MHz) linear with GaAsf.e.t. pre-amplifier incorporated. Type "Tono" M70G, 60W, s.s.b./f.m. switchable, £85 (postage extra). Also microwave modules transverter, s.s.b./f.m./repeater 144-432-434MHz, 8W output, £45. Tel: GW0GHF (QTHR) 0292-070 3429.

757GX p.s.u. h/b a.t.u. s.w.r. meter, £400 o.n.o. MFJ MEM keyer 490, £50 o.n.o. 'Scope, 20MHz, new, £80 o.n.o. 2 h/b mag loops 80m h/b TX/RX. Paddle key b/pounder, £20 o.n.o. Books and lots of goodies. *Sprat* magazines 42-101 f.e.t. dip oscillator going QRT, offers. Tel: Jack G0FTW (QTHR) (01271) 343779.

AEA PK-232MBX multi-mode data controller, version 7.1, immaculate condition, complete with all cables, software and original operating manual, £125 post paid. Tel: Ken on NW London 0208-455 8831, anytime.

Alinco DX-70TH EP-925 30A power supply, MFJ-969 tuner, MFJ-817 v.h.f./u.h.f., SX200 as new, £500. Tel: Vinc (01487) 823879.

Alinco DX-70TH good condition, original packing and remote kit EDS-4, £450. Tel: G4ZQT (01754) 760150.

AR-88D valved receiver with manual, front panel temporarily removed. Not used for ten years but believed sound. Standing Cumbria but can deliver to Warrington, Cheshire, offers. Tel: John (01697) 361010.

Comet CD160H 2kW s.w.r./p.w.r., 1.6-60MHz, £20 Auto NiCad charger 7.2V discharge/charger/trickle charger, £20. Yupiteru MVT-7100 with power supply, £150. ATU, full legal power made with CapCo parts, £60. Tel: Derek G0OEW on Nantwich (01270) 668111.

Diamond X-50 antenna 144.430MHz, two months use, as new, £30. 100ft RG8 cable, £10. Mast couplers (x 3) unused, £15. Breni power supply, £15. Pile of *PW* mags (about 60), offers. Tel: SW London (07939) 551385, anytime.

DX394 general coverage receiver, 1.73-30MHz l.w./m.w. l.e.d. display as new, boxed, instructions, used for one hour, £75 o.n.o. plus carriage. Tel/FAX: (01234) 720591.

Eddystone 770RMkI Immaculate, with spares and H/B, £110. Vintage Heathkit oscilloscope (working), £25. 5A p.s.u. (g.w.o.), £15. AKD filter kit (new, half price), £15. Kenwood MC355 noise cancelling f/mic (new), £15. Tel: Notts 0115-970 4184, leave message if answerphone.

Eddystone 990RS v.h.f./u.h.f. receivers, cabinet, models to be sold as a pair, v.g.c., £225. Eddystone active antenna, £35. IC-R7000 wide band receiver, manual, box, mint condition, £425 o.n.o. ERA BP34 audio filter, manual, box, £30 o.n.o. Eddystone square speaker, £35. Tel: David on Warwickshire (01788) 574099.

FDK multi 750A multi 2m (144MHz) mobile, £50. Write to: 7 Wyatt St, Kettering, Northants NN16 0DT.

FDK-750XC 2m (144MHz) multi-mode, fair condition, £120. MML 144/100S 2m linear amplifier including pre-amplifier, £100, buyer pays P&P. Tel: Duncan on Northumberland (01670) 811950.

For sale or swap: TB3 h.f. beam, £125. Trio 430S h.f. g.c. receiver with f.m. board, also s.s.b. filter, immaculate condition, £400 with manual and box. PK232 MBX, £125. 30A power supply variable, £70 plus small a.t.u. or swap/exchange for a h.f. linear, prefer solid state, WHY? Tel: John G0HMF (QTHR) on Bucks (01234) 240979 or (0410) 415924 or E-mail: john@jtite.freeserve.co.uk

For sale: Q-Tek Penetrator, six months old, 15 feet, no a.t.u. required, 1-8 60MHz, £80. Tel: M1ASM (01872) 270679.

For sale: Yaesu FT-290MkII with clip-on linear, NiCads and mobile mount, all boxed, £200 plus P&P. Grundig YB500 portable, £50. Tel: Jon Kempster (01908) 504140.

FT-101E with c.w. filter and manual, etc., £150. FT-270R, boxed with manual, £100, both in working order. Tel: Bob G4KSG (QTHR) on Solihull 0121-705 1089 or (07803) 662155.

Function generator Thandar TG-501 5MHz unused with user and workshop manuals, current model, £100 plus P&P. Tel: G4LJO (01934) 843507.

Heil Pro micro HC5 headset, £45. DCI 144MHz bandpass filter, N-conn, £50. MFJ Morse Tutor 418, £30. Bencher BY1 iambic paddle, £30. M2 2M12 Yagi new in box, £75. Tel: Paul on Lincoln (01522) 878784 or E-mail: bradbeerfamily@aol.com

Icom IC-203H dual-band mobile, as new, extended receive/transmit, complete, boxed, bargain, £240. Kenwood THG-71E hand-held, new, still boxed, £150. Kenwood 79E hand-held, as new, £145, must go. Tel: Bob on NE Wales (07803) 054448.

Icom IC-725 with f.m. board, mint condition, original box and manual, desk microphone included in price, £395. Tel: Shaun (01228) 573004 or (0771) 3532550.

Icom IC-735 mobile plus matching power supply PS55, both in g.w.o. plus manuals and boxes, full TX/RX, £450. Tel: N Wales (01407) 832197.

Icom IC-746, excellent condition, boxed, manuals, h.f. 6m (50MHz) plus Pro-Am h.f. mobile antennas, £950 o.v.n.o. Tel: Mike on Milton Keynes (01908) 639287.

Icom IC-T8E 6/2m/70cm (50/144/430MHz) hand-held, as new, £180. Yaesu FT-709R and FT-209R both with new NiCads plus speaker, microphone and charger, good condition, £70 each. Tel: Ian on Walsall (01922) 630668, after 5pm.

Interrupter 10-18V, 10A by Griffin and Tatlock Ltd, museum piece, offers required. Trio 520S starter rig to clear, £145. Tel: (01494) 530018.

Kenwood R5000 communications receiver plus v.h.f. module, a.m. filter as new, £600 o.n.o. Yaesu paddle key plus p.c.b., £20. AVO signal generator 2.5-250MHz, £60. Yaesu base microphone, £25. Tel: Brian (01285) 850949.

Kenwood TM-251E 2m (144MHz) 50W transceiver with microphone, manual, etc., boxed, as new (never used mobile), £175. Tel: Tony G4KHT (QTHR) (01482) 843457 or E-mail: tonylord42@netscapeonline.co.uk

Kenwood TS-430S with f.m. board, £250. Mutek 144 transverter, 28MHz i.f., £50. Mutek 50MHz transverter, 28MHz i.f., £50. Microwave modules, 432MHz transverter, 28MHz i.f., £50. FT-790R with 30W linear, £125. IC-Q7E micro hand-held, £80. Tokyo high power 144/h.f. transverter, 40W 80-10, no WARC, £50. Black & white h.f. manual a.t.u., £30. PK232 multi-mode data, £40. Tel: Phil Williams G3YPQ on Swanage, Dorset (01929) 426091.

Kenwood TS-450S h.f. transceiver, general coverage, excellent condition, boxed, manual, v.g.c., £425. Icom IC-706MkI h.f., 2m (144MHz), as new, boxed, manual, £425. Tel: (01582) 662183 or E-mail: m1bfi@talk21.com

KW200A plus PS, KW107 a.t.u., KW500 linear amplifier/200W output plus 6 spare 813s, external r.f. switch, box, Shure 444D - wired for KW2000A all cables, all manuals, except KW107, no split,

buyer to collect, £400. Tel: Peter on Truro (01872) 242311, anytime.

KW-202 receiver KW-204 transmitter handbooks, £50 each. Yaesu FR-101DD receiver, digital, all filters, good condition, £100. Tel: David on Suffolk (01359) 244349.

KW1000 linear amplifier with instructions and two new 572B valves, £275. Tel: Roland G4NGW on Leigh On Sea, Essex (01702) 710000.

Leak ST70 amplifier, stereo FETIC tuner, £25. Truvox amplifier, tuner, £20. Heathkit OS1 scope, £20. CR70A, £25. Grundig battery tape recorder, boxed, £20. Eagle semicon, tester, £10. *RadCom* magazines: 1930-1989. Tel: Ken on Glos (01453) 845013 for details.

Marconi Electra 1018 receiver with manual, good condition, offers reasonable, buyer to collect. Tel: Bob (01908) 511709.

Matching pair 2m/70cm (144/430MHz) hand-helds HTX202/HTX404. Realistic Radio shack, both with speaker/microphones and carrying cases, single charger and mobile mount, prefer no split, £100 the pair. Tel: Duncan on Northumberland (01670) 811950.

Memory keyer, £60. 1.3m satellite dish polar mount, etc., £125. AVO model 8 including leather case, £30. 8-element 2m (144MHz) quad, last director damaged, £7.50?? Cushcraft R7000 vertical 40-10m, boxed, £175. Tel: John GW4TQD on Chepstow, SE Wales (01291) 621526.

MFJ a.t.u. MkII in perfect condition, £80. Six months old, balun 1 to 1, £15. Tel: John (01283) 221870.

MFJ loop antenna model 1786, 10-30MHz, complete with control unit, £125, buyer to collect Doncaster area. Tel: (01427) 752746 or (0589) 733808.

Microphone for Icom IC-706MkII new, unused, £15 plus £1 P&P. Contact: Tom Chapman G0MKA, 17 Trevor Rd, Swinton, Manchester, Lancs M27 0YH.

MuTek TVHF 230C v.h.f.-h.f. transverter, 12V/10W, £95 with instructions. Alinco DR-510E and microphone, dual-band (50W 2m/144MHz), CTCSS and tone, etc., £95. Aiwa TV/video combined unit model VX-5140TH?? (NTSC - m/m) offers, £150 plus will swap any items for WHY? Second World War radio. Tel: Anthony (01908) 373114.

Old TV used valves, all tested OK. 88, all types U25-026?? EY51 EF92 8CL84, £30 the lot. Old radio valves tested OK, 61 total, N78, EAA91, 6BJ6, etc., £40 the lot, all ex-equipment. Tel: (01945) 465995.

Pilot U106 McMichael 135, Marconi 557 and other vintage domestic radios, offers please. Tel: (01455) 238299, evenings.

PK12 Packet controller complete with all leads & handbook, £75 o.n.o. Nova MR-224, 2m (144MHz) f.m. complete circuits and all, £80 o.n.o. Tel: 0117-908 6947.

PRO-44 hand-held scanner 50 channels, 68-88MHz, 108-174MHz, 380-512MHz charger and p.s.u., £90 or swap for PC Pentium also want 2m/70cm (144/430MHz) antenna Diamond. Tel: Patrick GW1SXN (01286) 675468.

R&N Electronics 6m (50MHz) transverter, 50-144MHz, good condition, £95. Tel: Roy G0SLR (01925) 725402 OR E-mail: roy@rlisle.freeserve.co.uk

Racal RA1772 h.f. receiver in cabinet with manuals, v.g.c., £460. Tel: G0JFY on Nuneaton 0247-673 0669.

Realistic PRO-2039 program scanner, 200 channels, boxed, manual, good as new, price £70, plus P&P. Tel: Barrie on Maidenhead (01628) 668438.

Receivers: RCA AR-88, national HRO, Collins R-391/??, Eddystone 840C, Hallicrafter 27/36A, Racal RA17, Ship's receiver Yupiteru 8000, HRD-525, Kenwood, Trio 1000, BC-221, 52-19 Set USAF, headphones, spares, parts, valves, etc. Send an s.a.e. to Bob, 247 Sandy Lane, Hindley, Wigan WN2 4ER. Tel: (01942) 255948.

Revco car antenna, £5. Casio super FX Scientific calculator, £5. 13 x 4ft lightweight poles, interlocking metal tubes, £12. Adonis mobile hands free microphone fits behind sun visor, £7 plus P&P. Tel: Vic M0AVS (QTHR) on Plymouth (01752) 340065.

Roberts Radio model R606MB, good condition, offers, circuit diagram for a national short wave radio model T100. Tel: 0181-452 3119.

Sony ICF-SW77 l.w./m.w./f.m./s.w./p.l.l./s.s.b. synthesised world band portable radio receiver, mint condition, £199. Tel: Jerry on Luton (01582) 654154.

TCS receiver, £95. Matching TCS transmitter, £125. AR88LF receiver, £90. HRO with some coil packs, £80. Marconi h.f. signal generator type TF144, £25, all in good condition. Tel: Yorkshire (01482) 887938.

Ten-Tec Argosy h.f. transceiver, 5/50W digital readout, plus Yaesu FC-700 a.t.u., £395. Trio 7800 f.m. 2m (144MHz) transceiver, 5/25W, £80. Tel: 0161-301 3750.

Timewave DSP-599ZX audio noise reduction filter, boxed and manual in pristine condition, five months old, cost £359 will sell for £200. Tel: John on Kirkcaldy (01592) 203279, anytime.

Tri-band Diamond V2000 6/2m/70cm (50/144/430MHz) vertical, little used, packaged, £35. 6m cross polar Yagi, 3-element horizontal plus three vertical, £30. T&K brackets, £5. Tel: Sidcup (0956) 208003.

Trio 830S h.f. transceiver a.t.u. AT230 dummy load revalved and serviced by Castle Electronics with Shure 444D desk microphone, £380. Tel: Alan on Crewe (01270) 581460.

Trio TS-515 h.f. transceiver 80/40/20/15/10m (3.5/7/14/21/28MHz), 100W+, including PS-515 p.s.u./LS, manuals, £100. FDK Multi-2700 2m (144MHz) multi-mode including microphone, OK on s.s.b./f.m., a.m. needs attention, £150. Timewave DSP-9 switched DSP, £90, offers considered, buyer to collect. Tel: G3LRQ (QTHR) on Twyford, Reading 0118-934 5823.

Trio TS-930S with auto a.t.u., narrow c.w. filter, f.m. board, £495 RN Electronics 10-6m (28-50MHz) transverter, £65. Tektronics storage scope, 4 channel with manuals, £250 o.n.o. (model 7623A). Tel: Paul (01254) 706181 or paul@g0kao.freeserve.co.uk

TS-530S plus a.t.u. plus RVFO h.f. transceiver. TM-201A 2m (144MHz) f.m. Kantronics KPC4 all in working order, £450 o.n.o. Tel: Mick GW4XMH (02920) 592790 or mobile (07880) 761666.

Two magnetic loops with control box, £175. FRG-7700 communications receiver and memory unit and converter (x 5), £399.99. TR-9130 2m (144MHz) all mode transceiver, box, £249.99. Ten-Tec Omni-D power supply, £1450, all in g.w.o. Tel: (01869) 244166.

Yaesu FRG-8800 with v.h.f. and extension speaker with filters, also PC Pentium P75, CDROM, speakers, *Win 95* with JAFAX, ACARS, WXFAX, pagers, SSTV software, 15 radio books, lot £500 only. Tel: (01608) 662488.

Yaesu FT-101ZD f.m. board and manuals, v.g.c., £325. Daiwa CNW418 a.t.u., £35. IKW maximum dummy load unused, £30. Feedback instruments, frequency counter 5Hz-1.3GHz unused, £60. Tel: Derek G4XVY on Broxbourne (01992) 461056.

Yaesu FT-102 all mode h.f. transceiver, mint, manual, wiring plan, brand new MFJ-949E deluxe Versa Tuner II s.w.r. power and 300W dummy load open to offers. Tel: (01527) 516387.

Yaesu FT-23R 2m (144MHz) hand-held transceiver, two NiCad packs and one dry cell case with charger, perfect working order, £90. Tel: Greg G7CUF on London 0171-336 0622.

Yaesu FT-23R 2m (144MHz) hand-held, v.g.c., two NiCad packs one dry cell case with charger, £70. 13.8V, 3-5A regulated p.s.u., £10. Tel: Greg G7CUF on London 0171-336 0622.

Yaesu FT-2600M only three months old, 21 months warranty, 2m (144MHz) and marine transceiver, 60W maximum output under five hours use to include Daiwa meter £195 including carriage. Tel: G4OLC on Ashington (01670) 811273.

Yaesu FT-290MkI (Sommerkamp 144-148MHz) MuTek front-end, charger, microphone, soft case, no batteries, £150. Yaesu FT-790MkI charger, microphone, soft case, no batteries, never used mobile, £250. Contact: J G Dowse, 5 Tennyson Close, Sutton-on-Sea, Lincolnshire LN12 2TL.

Yaesu FT-290R 2m (144MHz) multi-mode with battery charger and base and mobile power leads, g.w.o., £175 o.n.o. Tel: 0239-279 8395 or E-mail: lshep@cwcom.net

Yaesu FT-50R v.h.f./u.h.f., v.g.c., boxed, £125. Yaesu FT-ONE transceiver a.c., g.w.o., £300 o.n.o. Tel: Dennis Geddes (01604) 670485 or E-mail: dennisgeddes@talk21.com

Yaesu FT-707 transceiver FP-707 p.s.u., FC-707 a.t.u., FV-7070M memory, nice condition, £500. FR60B amateur band receiver, £60. Racal c.w. keyboard, £50. 4-250 valve and base, £30. Racal a.t.u. coil, £10. All o.n.o. Tel: Brian (01285) 850949.

Yaesu FT-726R v.h.f./u.h.f. multi-mode base transceiver, 6/2m/70cm (50/144/430MHz) modules, 10W output, ideal novice rig, excellent condition, manual, £485 o.v.n.o. Tel: Chippenham, Wilts (01249) 656702.

Yaesu FT-8100 dual-band 2m-70cm (144-430MHz), 5, 20, 50W, g.w.o., as new, boxed £250. Tel: Nigel on Wolves (01902) 566193.

Yaesu FT-840 Vectronics a.t.u. VC300, Zurich 25A, metered p.s.u. complete h.f. station, £450, all as new, could split deliver reasonable distance or carriage at cost. Tel: Jim G4ILK on N Devon (01271) 325898.

Yaesu FT-990, as new, £699. Yaesu FRG-7, £50. Icom IC-24G, £100. HF active antenna, new, £25. Datong Morse Tutor, £20. Yaesu FT-208R including p.s.u., £75. Tel: NW London 0208-841 8190.

Yaesu VX-1R dual-band hand-held with wide band receive, as new, boxed, pair (two) for £200, may split. Tel: Nick G7IYG on Uxbridge (01895) 236397.

Yupiteru MVT-7100 scanner, boxed with all accessories, £125. AAA magnetic loop AMA3, £95. Protek ultra multi-media Pentium II, 350MHz, 15 inch screen, £550. Yaesu FT-840, boxed, hardly used, £450, no offers. Tel: Northants (01536) 522007 or (07887) 934341.

Yupiteru MVT-7100 scanner, £125. AMA3 magnetic loop, 13.9-30MHz, £95. Yaesu FT-840, little used, boxed, £450. Protek Pentium multi-media, £500. Tel: Northants (01536) 522007 or (07887) 934341 (mobile).

Yupiteru MVT-9000 multi-mode 1000 channel scanner, as new, complete with NiCads charger, instruction manual, £180 o.v.n.o. Tel: Stroud, Glos (01453) 755937.

RULES!

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Wanted

A copy of *History of Radio Telegraphy and Telephony* by G G Blake, published in 1926 by Radio Press Ltd. Tel: (01691) 830277 or E-mail: stan@idlew.freeserve.co.uk

A/F board type X49-1140-00 for Kenwood TS-830S. Tel: 0161-427 6094 or E-mail: g0cmm@ibm.net

ACC706 plug needed, 13-way DIN type, will pay reasonable price plus postage, etc. Tel: Steve Harrison G0UTN on Notts (01623) 471376 or E-mail: g0utn@iparc.com

Any military type sets: spy, special forces, UK or other. Need R1082 T1083 and WS53 r.f. amplifier, No.4, complete or part. Have sets to trade, genuine serious collector. Tel: Ben G4BXD on Worcs (01562) 743253 or E-mail: g4bxd@qsl.net

Any paperwork or information on the Kenwood MC80. Tel: Robert Guscott (01872) 270679, 19 Springfield Way, Threemilestone, Truro, Cornwall TR3 6BJ.

AVO 8 resistance range extension unit. Tel: John 0208-868 7684.

BSR PAZOB (1940s valve p.a. amplifier) wanted for BSR BM40 and Grampian reproducers type e.f. (p.a./guitar amp). Tel: Ben (01653) 648344.

Circuit and alignment data for Armstrong f.m. tuner type 524 (transistor) stereo. Tel: Bryan (01703) 615722.

Circuit diagram for Eddystone group 2 830/9 (BP1157) non-working Eddystone 1830 and 1837 receivers, any condition even not complete. Tel: Tony on Worcester (01905) 641759.

Circuit diagram for Tandy radio shack DX-394 many thanks. Tel: Richard G4SYV (01869) 244453 or E-mail: richard@ackroyd17.freeserve.co.uk

Datong active antenna AD270, AD370, working or not. Tel: (01745) 857119 or E-mail: dgibb@gw4dtq.freeserve.co.uk

Datong FL3 filter with power pack, near mint as possible. Tel: Tyne & Wear 0191-5267902.

Digital board for Kenwood TS-930S. Tel: John (01258) 830688.

Ex WD suitcase type radio sets from the First World War and since wanted by private collector, cash waiting. Tel: Bill on E London 0181-505 0838, evenings/weekends.

Information please: small 455kHz marker oscillator made by LabGear for Pye Telecomms, 1960s, type PT503, circuit diagram supply voltage and battery type, details needed. Tel: Chris (01767) 316939.

K2659 Morse decoder with l.c.d. display made by Velleman or any other type decoder Maplins and Cirkit did stock this decoder but has now been withdrawn from stock. Tel: Peter G1XCB (01457) 853397, 91 Station Rd, Hadfield, Glossor, Derbyshire SK13 1AR.

KW Decca 109 Supermatch KW160 a.t.u. CapCo SPC300 a.t.u. Jackson 6.1 slow motion ball bearing drive for KW EE-ZEE?? match. Tel: G3KGM (QTHR) 0208-300 0767.

Manual for PacComm TNC320, photocopy OK. Tel: Kevin G7SVF (01983) 296924 or E-mail: g7svf@qsl.net

Manual TR-2200G, accessories for TR-2500 hand-held, quality variable attenuator for spec analyser project. Also medium power TX attenuator, valves EB41, E241, etc. Leica/Pentax adapters for BPM bellows lenses, camera. Tel: Jack McDonald (01705) 233245, 13b Alsford Rd, Waterlooville, Hants PO7 5NE.

Morse keys wanted by private collector, also telegraphic relays, sounders, Galvanometers, anything considered, Silent Key, sales, etc. Tel: Gerald 0118-983 4307.

National NC303 or Hallicrafters SX101 MkIII, 160-10m (1.8-28MHz) receiver, Arthur Munzig's 1939 book 'R9 sigs' Collins F455J60 mechanical filter for 75A4, Astatic D104 microphone head or spare insert. Tel: Dave G3UUR on Norwich (01603) 721310 or E-mail: g3uur@dgs.freeuk.com

Plessey 2280 module "A" part number: 630/1 /45011. Tel: G3JAX (QTHR) (01243) 574210.

Power supply Daiwa PS304MkII 24A. Tel: Andy (01642) 278955.

R216 output transformer T4 or scrap receiver with transformer in. Tel: Barnes (01229) 584466, 6 Cross-a-Moor, Ulverston, Cumbria LA12 0RT.

Racal s.s.b. unit 121 Racal Panadapter?? RA366, Racal diversity unit MA168, your price, will collect. Exchange Collins receiver TCS13 USA Navy 1944. Tel: John on Staffs (01538) 385735.

Radiometer Automatic Distortion Analyser BKF10, too complicated for me to repair without technical details. Please help with loan information, etc. Tel: John on Hampshire (01425) 653845.

Required to complete WS36 restoration project: harmonic filters, types ZA10885 (40-60MHz), ZA10884 (20-40MHz), ZA10791 (10-20MHz), line coupling unit type ZA10066, also original handbooks and service data for the set. Tel: (01482) 887938.

SEM Z-match/transmatch a.t.u. or MFJ-901B a.t.u. Tel: Mike 0191-389 2822, anytime.

Service manual for Lowe SRX30 receiver, any reasonable price. Tel: C Jones on Nottingham 0115-966 3346 or E-mail: sabre2@ic24.net

Teleprinter equipment for my collection, including specialised test gear for teleprinter systems, very old teleprinters, terminal units, line relays, etc. anything interesting considered, will collect. Tel: Yorkshire (01482) 887938.

Wanted: one 10-4m (28-70MHz) transverter. Tel: (01698) 815565.

Wanted: Realistic DX394 or similar. Tel: (01452) 522025, anytime.

Wanted: Yaesu colour catalogue or brochure showing FT-747GX, FT-900AT. Tel: John on Bristol (01275) 845351.

Yaesu CPU 2500 mobile and Standard C78 70cm (430MHz) transceiver??, both v.g.c., g.w.o. Tel: Ray G4OWY (01305) 777494.

Yaesu FT-101ZD dead or irreparable, need frequency counter digits on mine. Also want good atlas 210X. Tel: Notts 0115-917 5728.

Yaesu FT-102 f.m. and r.f.boards, RSGB pamphlets: "Valve Technique" and "Service Valve Equivalents"??, both 1948. Eagle RF40, FL20HA field strength meter, T&R?? bulletin August 1947. Tel: Ken on Glos (01453) 845013.

Eugen Beyer stereo professional headphones - 8Ω impedance. Tel: Rob G3XFD at *PW* offices (01202) 659910.

Exchange

50A dryfit battery and charger for 2m (144MHz) hand-held any age or condition but working. Tel: Tom on London (0930) 755358.

HiGain Telex DX77 vertical antenna, 40-10m (7-28MHz), new, will exchange for Cushcraft R6000, 20-6m (14-50MHz) or sell. Tel: G3NQX (01772) 703957.

Swap DR-M06TH boxed with manual (6m/50MHz rig) for 2m (144MHz) multi-mode mobile, must have CTCSS and memories. Tel: David (01268) 776401.

Yaesu mobile rig, 30W output, 12.5/25kHz spacing with microphone and mounting bracket, boxed, as new, swap for GPS. Tel: Dave on Glasgow 0141-579 8589 or E-mail: mm1bjt@yahoo.com

Please use the form from a previous issue to send in your advert or write it neatly on a postcard (always include the corner flash)

Trader's Table

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KENWOOD TS530S HF Ham Bands	£295
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LOWE HF 150 Compact HF Rx.	£250
LOWE HF225 HF Rx. SYNC AM/FM	£235
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YAESU FP707 20A. Power Supply	£75
KENWOOD SP430 Speaker for R5000etc.	£45
YAESU FTV700 6/2/70cm Transverter	£155
DATONG D70 Morse Tutor	£45
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TRIO VB-2200GX 10WATT AMP FOR 2200GX	£39.00
YAESU YM48A 8 PIN DTMF MIC	£19.95
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Uniden 360 lazer radar speed detector	£159
Garmin GP38 G.P.S.	£89
SGC230 Smartuner	£249
Yaesu FRT7700 short-wave A.T.U.	£49
Watson 25amp P.S.U. Demo model	£79
Yaesu FC-20 auto atu for FT847	£169
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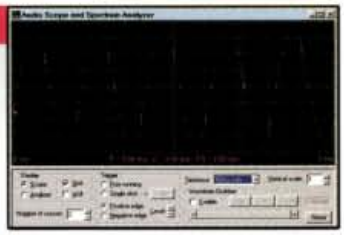

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Frequency range	0.5-1300 MHz	0.15-1500 MHz	0.15-1500 MHz
Modes	AM,SSB/CW,FM-N,FM-W	AM,LSB,USB,CW,FM-N,FM-W	AM,LSB,USB,CW,FM-N,FM-W
Tuning resolution	100 Hz (5 Hz BFO)	10 Hz (1Hz for SSB and CW)	10 Hz (1Hz for SSB and CW)
IF bandwidths	6 kHz (AM/SSB), 17 kHz (FM-N), 230 kHz (W)	2.5 kHz(SSB/CW), 6 kHz (AM) 17 kHz (FM-N), 230 kHz (W)	2.5 kHz(SSB/CW), 6 kHz (AM) 17 kHz (FM-N), 230 kHz (W)
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Scanning speed	10 ch/sec (AM), 50 ch/sec (FM)		
Audio output on card	200mW	200mW	200mW
Max on one motherboard	8 cards	8 cards	6-8 cards (please ask)
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All-Mode HF Transceiver FT-1000MP

The year was 1956. Electronic communication throughout the world was on the threshold of significant and remarkable change. Intrigued by the development of single-sideband radio theory, a young engineer and amateur radio experimenter painstakingly assembled an SSB transmitter. Word of his successful efforts spread quickly among his friends, and soon radio amateurs from all over the country were requesting transmitters just like it. Thus was born the first invention of JA1MP, founder of Yaesu. Though his key is now silent, in tribute to his leadership and exceptional contributions to the radio art, the FT-1000MP carries the memory of his call sign.

An HF Masterpiece, Combining the Best of Digital and RF design technology. The FT-1000MP.

Specifications

- EDSP (Enhanced Digital Signal Processing)
- Shuttle-jog Rapid Tuning Enhancement
- Directional Tuning Scale for CW/Digital mode and clarifier offset display
- Dual In-Band Receive w/Separate S-Meters
- Selectable Antenna Jacks
- Collins SSB Mechanical Filter built-in, 500 Hz CW Collins filter plug-in, optional
- Selectable Cascaded Crystal and Mechanical IF Filtering (2nd and 3rd IF Filters)
- User-Programmable Tuning Steps w/0.625 Hz High Resolution Low-Noise DDS Circuit
- Custom Feature Set-up via New Menu System
- Adjustable TX Output Power: 5-100W(5-25W AM)
- True Base Station: Both 100-117 or 200-234 ± VAC 10% 50/60 Hz and 13.5 VDC Power Inputs

Blending digital and RF technology, the FT-1000MP features a Yaesu exclusive: Enhanced Digital Signal Processing (EDSP). Beginning on the receive side with Yaesu's industry-standard high-intercept front end design, the RF signal is then fed to the IF stages, where an impressive array of 8.2 MHz and 455 kHz IF filters (including a built-in Collins SSB Mechanical Filter) establish the tight shape factor so important in obtaining high dynamic range and low noise figure. Finally, the EDSP system provides specially-designed filter selections and response contours for maximum intelligence recovery.

Only with this combination of EDSP, independently selectable 8.2 MHz and 455 kHz IF filters, and a low-noise DDS local oscillator system can receiver performance without compromise be obtained. You can customize your FT-1000MP by choosing from 2.0 kHz, 500 Hz, and 250 Hz optional, cascaded IF filters, then zero in on weak signals using Yaesu's exclusive Shuttle-jog Rapid Tuning Enhancement and high-resolution (0.625 Hz) DDS VFO. Without question, the FT-1000MP is the most technologically advanced HF rig today.

EDSP operates in both transmit *and* receive modes. On receive, the EDSP produces enhanced signal-to-noise ratio and significantly improved intelligence recovery during difficult situations involving noise and/or interference. The result of hundreds of hours of laboratory and real-world experimentation, EDSP's 4 preset random noise reduction protocols and 4 digital filtering selections are controlled by easy-to-use concentric controls on the front panel of the transceiver. High, low, and mid-range cuts for voice work are teamed with razor-sharp CW bandpass filters and an automatic notch filter which identifies and attenuates undesired carriers or heterodynes. Also operational in the transmit mode, EDSP provides 4 performance-enhancement pattern selections for different operating circumstances, ensuring best readability of *your* signal on the other end of the path.

Once again, Yaesu's engineers have reaffirmed the vision and dedication of JA1MP which began nearly 40 years ago. See the incomparable FT-1000MP today.

YAESU

Choice of the World's top DX'ers

http://www.yaesu.co.uk

The FT-1000D continues to offer unsurpassed performance for the serious Dx'er who requires a full 200 Watt Power output packaged with full Cross-Band Dual Receiver Capability

The Best of the Best

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