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Transceiver
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Tested by
G3RJV

Plus - Kits
& Bits And
Lots More!



The Kenwood TS-850S

Plus

The New Ten-Tec
Scout 555 Transceiver

ISSN 0141-0857



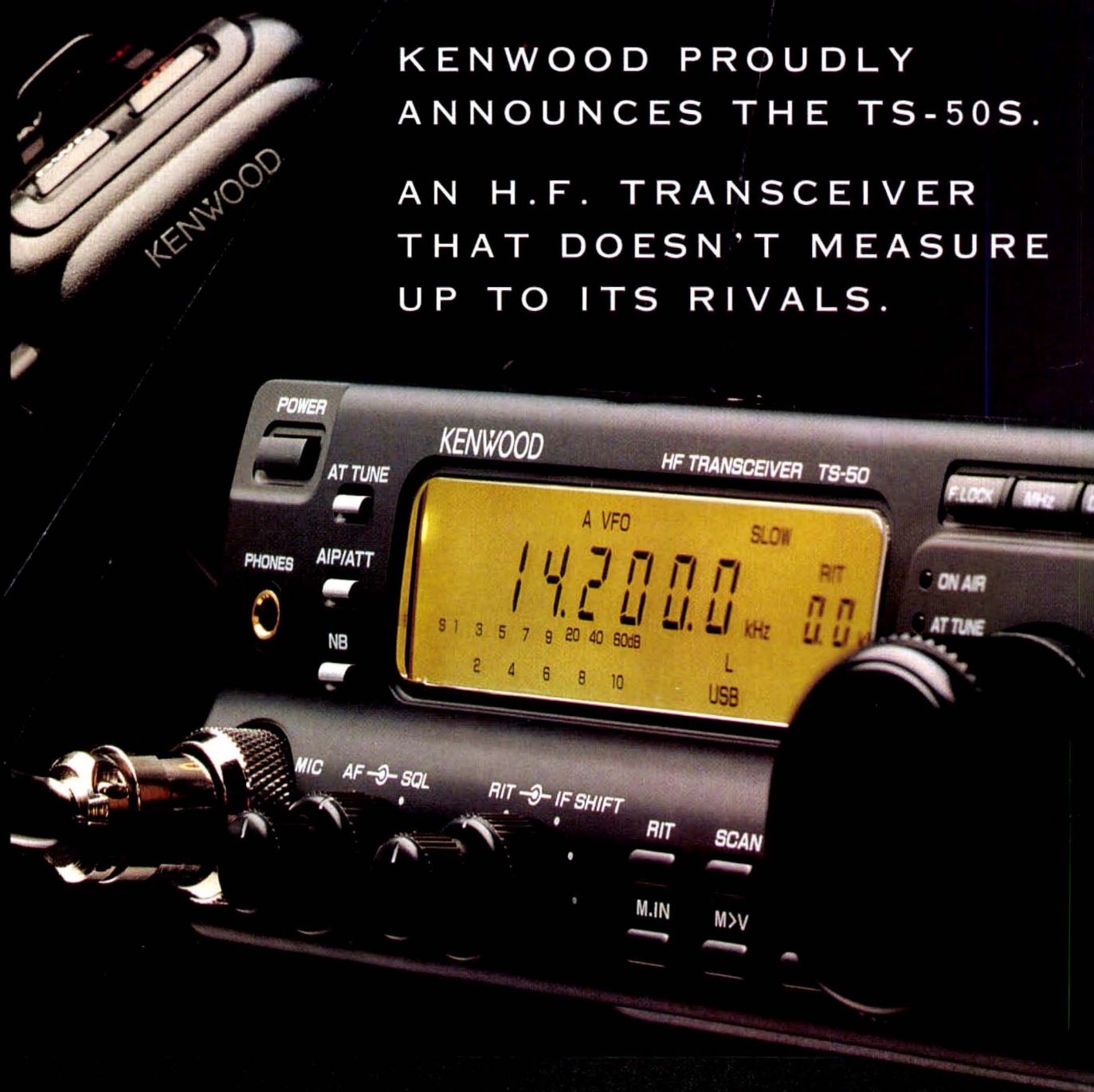
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2 RIGS REVIEWED

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practical Wireless

JANUARY 1994 (ON SALE DECEMBER 9)

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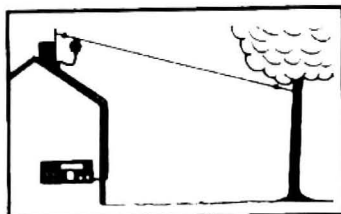
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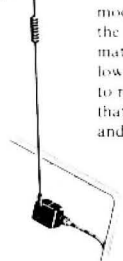
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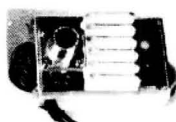


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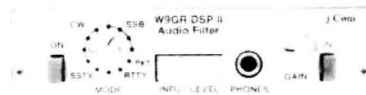
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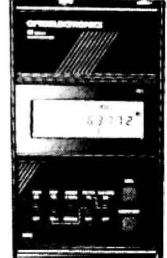
LED's are OUT!

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LED's are heavy on battery current and poor in daylight



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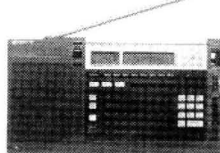
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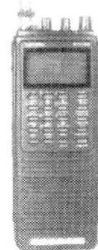


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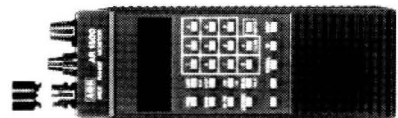
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IC-729 HF/6m All Band, General Coverage Rx, 12v		£1166.00	D
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IC-UX98 2.4GHz Band Unit		£1359.00	B
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Guest Keylines - Donna Vincent News & Production Editor PW

As promised in the December 1993 'Keylines' Rob Mannion G3XFD has stepped aside from writing this column for this month and next. This month it is my turn to 'Guest' in the Keylines chair.

Firstly, let me introduce myself. I am Donna (Toad) Vincent, News & Production Editor for PW. This means that as well as looking after the News and Production on the magazine, I have the task of keeping both Rob G3XFD and Tex G1TEX in line, which is the hardest part of my job!

Many of you, who I've had the pleasure of meeting or talking to over the telephone have asked why I

have the nickname of 'Toad'. The nickname came about because of Rob's eating habits. As a lot of you know Rob is a little on the large side with a rather healthy appetite and at one time in the editorial office we had a tuck shop run by Elaine Richards G4LFM. One day Rob, who was supposed to be on a diet, asked me to go and buy him a bar of chocolate. Now Elaine knew that Rob was meant to be dieting and after watching me deliver the chocolate to him, promptly threatened to tell his wife! It was at this point that Rob turned to me and said "You're a real Toad, fancy telling Elaine it

was for me", and that was it, the name stuck and has been with me ever since, along with the various Toad items which include a mug with a resident toad. So that's the story of my 'Toad' nickname, it's not because I have webbed feet!

Another editorial mystery that I've been asked to explain is why Rob takes forever to answer the letters that arrive at the PW offices. The reason for the delay in letter answering is that Rob tends to know a lot of people, places and train stations and if you fall into any of these categories your letter is likely to be on the personal reply pile of letters.

This means that not only will you get an answer to your query but a chatty letter with Rob explaining any connections he has with you or your area! Of course we do try to reply to letters as soon as possible but the sheer volume of mail we receive, added to the fact that we are trying to stick to our publishing schedules, all adds to the backlog. So please bear with us.

Finally I would like to on behalf of the PW team wish you all a Merry Christmas and a Happy New Year and who knows, as I am currently studying for my RAE maybe I'll work some of you on the air in years to come.

Next month PW's Technical Projects Sub-Editor, Tex Swann G1TEX takes over the Keylines chair.

Our Donna

COMPETITION CORNER Spot The Difference

Mark the ten differences between the two cartoons, showing Donna 'Toad' Vincent in our Editorial Office in Broadstone, as visualised by our 'tame' cartoonist John Worthington GW3COI.

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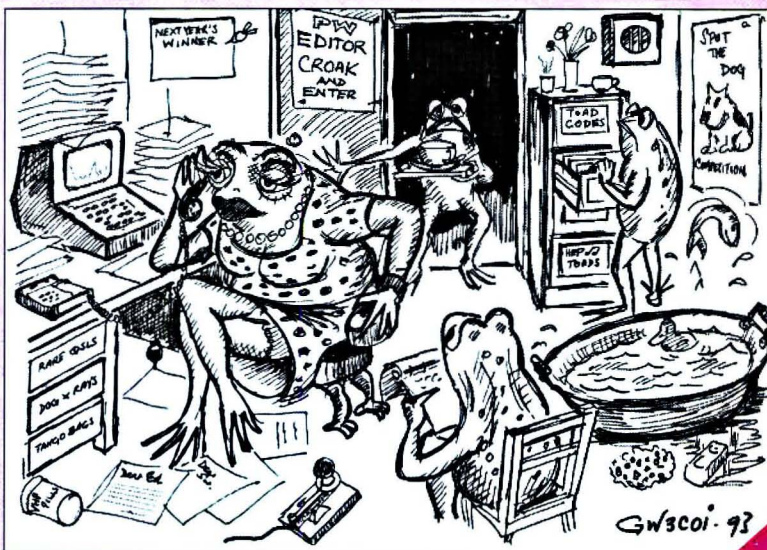
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Send your entry (photocopies acceptable with corner flash) to: Competition Corner, Spot The Difference Competition, January 1994, PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Editor's decision on the winner is final and no correspondence will be entered into. Entries to reach us by Friday 21 January 1994.

GOOD LUCK!



RECEIVING *you*

STAR LETTER

Practical Wireless Rediscovered

Dear Sir

I was pleasantly surprised to discover your address recently, and to learn that *PW* is very much alive!

Throughout most of the 1960s and the mid 1970s, when I was employed in the Far East, I used to eagerly await my copy of *PW* each month, and I must say, I was never disappointed by the quality of its contents.

However, having moved to California in 1978, I must regretfully admit that I lost touch with *PW*, which was if I remember correctly, undoubtedly one of the best publications, for enthusiast and professional alike!

Having said that, I would like to add, this serendipitous discovery of your address has prompted me to want to resume my subscription to *PW*. Therefore, I would appreciate very much if you would kindly let me know how I may set about doing this with economy and despatch!

If I am not asking too much of you Sir, I would also like to take this opportunity to find out how best I can lay my hands on a copy of *PW* that had a project titled 'World's Smallest Radio' based on the Ferranti ZN414 a.m. i.c. (I believe it was sometime between 1973 and 1976). I shall be indebted to you, if you would let me have a back copy of this issue or a reprint of this particular project or even just a photocopy of this article.

I have hunted high and low here in the USA for back copies of *PW* and particularly a copy of this issue, but alas, to no avail! I am looking forward to my next copy of *PW* and let me thank you in advance for your co-operation. Long live *PW*!

Mark Rasiah
California USA

Editor's comment: After a plea written in those terms Mark...who could refuse! I'm pleased to say that by the time *PW* is in print, you should have your ZN414 circuit from the magazine in question. Strangely enough, we have a project using the ZN414 coming up later in 1994, the marvellous little t.r.f. i.c.s can still provide a very useful service and make excellent little portable receivers.

Self Training

Dear Sir

With reference to the letter from Colin Kendrick G0STW in the July 1993 issue of *Practical Wireless*, when it comes to hobbies, the important thing is not to take them too seriously. But, where amateur radio is concerned, surely we must pay at least passing attention to the 'self training' aspect stipulated in our licence.

Of course we can't all drone on about radio all the time, but the letter from Colin Kendrick really takes the cake!

Trivia quizzes, crosswords, bingo? Surely these belong more in

the local pub or on CB than on our valued amateur bands? What is happening to our hobby - hardly anyone makes anything anymore, very few talk about radio, and now Mr Kendrick advocates the playing of silly games on the air. Far from 'use it or lose it', it will soon be a case of 'abuse it then lose it'.

I can only comfort myself with the thought that this kind of 'operator' usually doesn't last long before returning to CB, which is after all, where this type of rubbish belongs.

There! I've said it. Now wait for the reaction!

Andy Howlett G1HBE
Cheshire

Scottish Complaint

Dear Sir

It is not all that often that I feel the need to write to *PW* and complain, but on this occasion, I feel that I must.

With reference to Club News, *PW* March 1993, pages 19 and 20 and *PW* April 1993, pages 16 and 17. Why are the Scottish Clubs all lumped together under the general heading of 'Scotland'?

All the other British Clubs are listed under their counties, so why treat Scotland differently?

Why put Aberdeen (Grampian), Dundee (Tayside), Stirling (Central) and Wigtownshire (Dumfries and Galloway) under a Country and not a County/Region heading?

I noticed in the March edition that the Wigtownshire club was mentioned twice, once under 'Scotland' and once (correctly) under Dumfries and Galloway.

I have also noticed that in previous editions of *PW*, the Dundee Club was the only club to be wrongly headed. I suppose there might be room for confusion with the Club in Tayside and the Secretary's address in FIFE!

It has always been a pleasure to read *PW* and it's a pity to spoil it with something like this.

Wallace Shackleton GMOGNT
Tayside

Editor's reply: Sorry to cause offence Wallace. It's all down to a question of space, and as the former GM3XFD (Ross-Shire, Highland Region) you'll appreciate I know the geography and administrative areas of Scotland well. We'll try our best to avoid the problem in future.

Standard Of Operation

Dear Sir

I have been an avid listener since 1953 when I was six. Over the years I have noticed that as the RAE becomes easier, the standard of operation drops.

Almost every time I tune in, I hear somebody causing somebody else problems. I think that in this present time with the use of computer controlled rigs, it should be possible to

give the make, model and serial number of a high speed data burst which could be after every transmission, my problem transmission could then be traced easier.

What is the opinion of your readers?

G. Bramwell
Greater Manchester

Second Childhood

Dear Sir

I am 84 and therefore in my second childhood...and harking back to my first. What has this got to do with Wireless?

Well, in those far off days I used to listen to Daventry, Eiffel Tower and the BBC...on a crystal set.

Now I am wondering if it is possible to recreate such a set and whether it would receive f.m.?

If so, are there any ancient firms that have still got the parts necessary and give guidance regarding coils and condenser values?

If you don't know, could I put a small advert in that might ring a bell - in somebody's attic!

There is no Mr Raymond in Lisle Street now but perhaps your files go back to those days - I seem to remember *Practical Wireless* and certainly *Popular Wireless* and *Wireless World*, the last was my guide to valve sets.

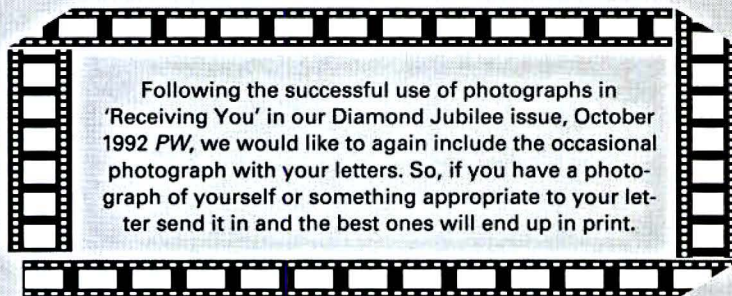
Gerald Carr
London

Editor's reply: Various 'vintage style' wireless sets, with modern receivers are available now Gerald, particularly in London. However, I've no doubt readers might have some other ideas for you.



Send your letters to the editorial offices in Broadstone. They must be original, and not duplicated in any other magazine. We reserve the right to edit or shorten any letter. The views expressed in letters are not necessarily those of *Practical Wireless*. 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.



Following the successful use of photographs in 'Receiving You' in our Diamond Jubilee issue, October 1992 *PW*, we would like to again include the occasional photograph with your letters. So, if you have a photograph of yourself or something appropriate to your letter send it in and the best ones will end up in print.

Lucrative Source Of Income

Dear Sir

Rallies: Is this the right word to call what now has become a lucrative source of income to fund many of our clubs?

They are certainly a far cry from those of the late 1950s and early 1960s, but of course, it is only we of the long teeth that have those memories.

Gone are the top band mobiles with their home-brew rigs and aerials, some even with a top band horizontal on the roof! Now replaced, alas, with a slick commercial 114 or 430MHz mag mount complete with black box. Amateur Radio?

For all practical purposes, I think the word mobile can now be deleted from these so called rallies. In fact, why not just call them 'markets' for this is what they have degenerated into.

Toys, trinkets and toffee among other things now being on sale. Profit seems to be the driving force, entrance fees, unthought of in the 1950s, are now being pushed up and up, but the last straw is this never ending quest for profit in the charging, to put items on the Bring & Buy stall. If the item remains unsold, then you lose the £1 or whatever it was to enter it in the first place. Amateur Radio?

Very few events cater for the comfort and well being of their visitors. It is becoming very difficult to find a suitable place in which to relax and chat with friends. A family outing? Totally out of the question, unless they are all in the rugby business!

Of the many events which I get to in the year in this Northern territory, one stands out for its friendly and comfortable atmosphere, the QRP Mini Convention at Rochdale. The promoters here have got their priorities right. Others please note!

I suppose these alleged Rallies serve a purpose, but we are living in a fast changing world and I am afraid that hoping for past memories to once again come alive is wishful thinking.

Let us hope therefore that organisers of the future will be more thoughtful and caring for their many visitors, who, after all, are the ones that keep the show on the road.

J. G. Openshaw G2AYG
Lancashire

June And July Practical Wireless

Dear Sir

I have been meaning to write and congratulate you on the two latest issues of *PW*, namely the June and July issues. Although I hold a Class A licence, I confess at not using the mode of c.w., preferring to use 'phone. But the special c.w. issue and the fact that it came out close to National Field Day has made myself (and at least one other Class A to decide to get our speed back to NFD level). I also know of at least one Class B who also wants to get the c.w. for next years NFD.

I also enjoyed the QRP issue as I am a member of the G-QRP Club and I now find that the block of flats where I live has a piped TV system and I now find that I am breaking through, (along with p.m.r., 27MHz etc., signals), so I have built a 50dB switched attenuator, in 1dB steps, which goes between the final and drive so reducing power from 100W to approximately 10mW, so I am, able to work h.f. still.

I am not able to run outside antennas and I am looking forward to reading the next *PW* 'special' issue on antennas, which might give me some ideas. I am currently running a home made trapped dipole run dog-legged around the loft with separate dipoles for 14, 21 and 28MHz from the same feeder as I was not happy with the v.s.w.r. on those bands. I am looking for an aerial which would work, reasonably on all bands so therefore maybe a multi trapped dipole?

Finally, has *PW* considered 'sponsoring' a low power c.w. event on h.f. to increase the usage of c.w. by Gs on h.f. and to get us lowly people lacking in confidence in using the key?

Anyway, keep up the good work and maybe I may have a c.w. QSO with you.

Chris Baker G4LDS
Essex

Editor's reply: We're pleased you enjoyed the June and July issues Chris. The QRP h.f. idea is also interesting. Other readers' comments are welcomed!

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

Coming Soon - New Mainline Catalogue

Mainline Electronics, the largest broadline component distributors in the UK, have recently informed *PW* that they are currently preparing their new catalogue.

The new 128-page catalogue will contain components from Avantek, Hewlett Packard, Watkins Johnson and ITT Selectro to name a few. There will also be new v.h.f./u.h.f. transverters, 10GHz transverters and 1691 Meteor Satellite kits available.

Watch this space for more details on the New Mainline Catalogue.

Ten-Tec Revival

Waters & Stanton Electronics have, as a result of the recent Ten-Tec revival, available a video produced by the manufacturers. The video contains a ten minute introduction to the Ten-Tec brand, as well as a demonstration of the functions and facilities of their top range Omni VI transceiver.

Waters & Stanton feel that the video would be ideal for radio clubs to borrow to show to their members. Any club that would be interested in borrowing a copy of the Ten-Tec video should get their secretaries to send a self addressed label to **Jeff Stanton at Waters & Stanton Electronics, 22 Main Road, Hockley, Essex SS5 4QS.**

The 1993 Practical Wireless 144MHz QRP Contest

Steve Clements G1YBB from the Hereford VHF Contest Group GW1VDF/P, overall winners of the *PW* 1993 QRP Contest, is pictured being presented with the special prize of a Cushcraft 144MHz antenna by Mike Ellis (left), Specialist Antenna Systems and contest adjudicator Dr. Neill Taylor G4HLX (right). The presentation took place at the 1993 Leicester Amateur Radio Show on October 30.

The Oldham Radio Club, runners up in the 1993 contest, were also present at the show represented by Steve Crane G0KUY. Steve was presented with the runners up prize of a Portable Battery Pack donated by Bob Keyes GW4IED of Key Solar Systems.

NEWS 1994



Howes ATU Kit

Dave Howes G4KQH has recently informed *PW* of his latest kit, the CTU150, added to the C. M. Howes Communications range.

The Howes CTU150 antenna matching unit kit has been designed for use with h.f. transceivers running up to 150W PEP. The unit covers 1.8 - 30MHz by using 12 switched inductance settings and two wide-spaced tuning capacitors in a 'T match' configuration.

All the a.t.u. components are mounted on a glass-fibre printed circuit board, which is screen printed with the part locations to aid accurate assembly. Howes can also supply an optional hardware pack, the HA150R, consisting of an aluminium case with printed and punched front panel, plus knobs and coax sockets to accompany the kit.

The CTU150 kit costs £49.90 plus £1.50 P&P and the HA150R hardware pack costs £16.90 plus £4 P&P and both are available from C. M. Howes Communications, Eydon, Daventry, Northants NN11 6PT. Tel: (0327) 60178.



Rexon Handy Transceiver

South Midlands Communications Ltd., have introduced the Rexon handy transceiver to their range of products. The Rexon is manufactured by the Rexon Technology Corporation in Taiwan and is available for 144 or 430MHz operation.

The RL-102 features include 20 memory channels, 5W output, selective tuning steps from 5 - 50kHz. There's also a back light keyboard, multi-function i.c.d. read-out and tone and code squelch.

South Midlands Communications have an introductory offer on the RL-102, for a limited time the transceiver is available for £179 including VAT (normal selling price £199).

For more details contact South Midlands Communications Ltd., S. M. House, School Close, Chandlers Ford Industrial Estate, Eastleigh, Hants SO5 3BY. Tel: (0703) 255111.

Crash Course

Just as *PW* was going to press we received details of a 12 week Radio Amateur Examination crash course being run in Nottingham. The course starts on Thursday 6 January 1994 at the **Arnold & Carlton College, Nottingham** in preparation for the May RAE examination.

For more details contact the course tutor, Alan Lake G4DVW on (0607) 382509.

Jaytee To Distribute Vågårda Radio Antennas

Jaytee Electronic Services, who are based at Herne Bay in Kent have recently been appointed sole UK distributor for the Vågårda Radio AB, Sweden, range of v.h.f./u.h.f. antennas.

The antenna range available consists of dipoles and yagis for the 50, 144 and 430MHz amateur bands. The antennas are manufactured from aluminium and are resistant to salt water, with all attachments being made from non-corrosive stainless steel, making them very well suited for harsh environments. Jaytee are also looking to set up a full dealer network of retail outlets with full technical support.

For more information on the full range of Vågårda antennas contact Lee Adams G4RKV at Jaytee on (0227) 375254 or Fax: (0227) 365104.





New Alinco Hand-Held

The latest hand-held to be launched by Alinco is the DJ-G1 and is said to be the first hand-held to feature a spectrum 'scope' type of display.

The DJ-G1 is a conventional 144MHz hand-held transceiver that has the ability to receive on 430MHz. There is also, as with all Alinco hand-helds, the provision for expanding to the receive frequency including a.m. reception on the civil airband.

The newest feature of the DJ-G1 is the spectrum analyser, this means that the receiver not only monitors the frequency to which it is tuned but also monitors the three channels either side. This facility gives a total of seven channels being monitored at any one time. The channel activity is shown by a series of vertical bar graphs in the top part of the window display.

Other features on the DJ-G1 include 80 memory channels, DTMF squelch (DSQ pager), illuminated keypad, auto dialler and low power indicator.

Waters & Stanton Electronics, 22 Main Road, Hockley, Essex SS5 4QS. Tel: (0702) 206835 are supplying the Alinco DJ-G1 for £349 including VAT.



New HF Mobile

Icom have recently produced a new h.f. all-band transceiver in the form of the IC-707. Icom say that due to the well thought out spacing of the switches, to avoid accidental input and the large function display they consider the IC-707 is the ideal rig for the newcomer to h.f. operation. The IC-707 measures 240 x 95 x 239mm making it convenient for use in a variety of locations.

nient for use in a variety of locations.

The IC-707 features include 32 memory channels, 100W output power, general coverage on all bands ranging from 500kHz - 30MHz, a band stacking register and a noise blanker to help reduce pulse type noise. The rig also comes ready supplied with a HM-3 hand microphone.

The IC-707 is available for £895 from Icom (UK) Ltd., Sea Street, Herne Bay, Kent, CT6 8LD. Tel: (0227) 741741.

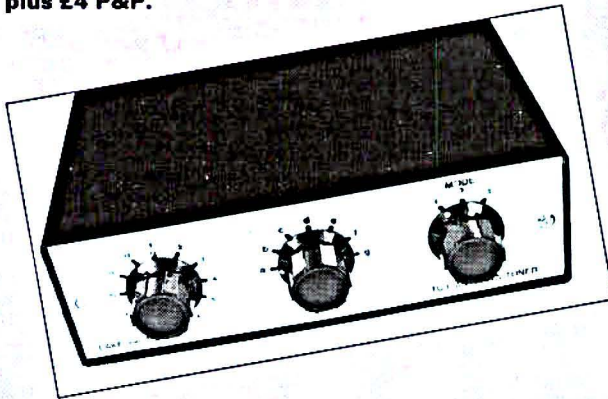
New Antenna Tuner Kit

Lake Electronics of Nottingham have recently produced the TU3 antenna tuner kit to add to their range. The TU3 has been primarily designed for the short wave listener who uses a long-wire type of antenna covering the 1 - 30MHz bands, although for the Novice and QRP enthusiast it can handle up to 20W of r.f.

The design for the TU3 is based on the L-Match and the circuitry can be arranged into three different configurations. This results in a versatile a.t.u. that is able to match a wide range of receiver, antenna and frequency combinations.

Measuring 170 x 140 x 50mm the unit is housed in an aluminium case, finished in matt black with a brushed aluminium front and back. The TU3 kit is also supplied with all the necessary components and hardware, including pre-punched panels and case.

Lake Electronics, 7 Middleton Close, Nuthall, Nottingham NG16 1BX can supply the TU3 antenna tuner kit for £44 plus £4 P&P or ready made for £54 plus £4 P&P.



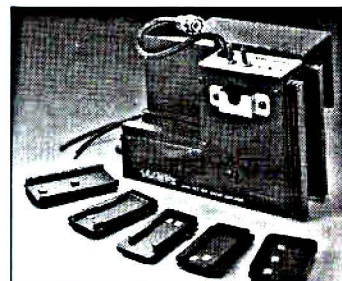
Amateur Amplifiers

Nevada Communications of Portsmouth have recently advised PW of their new range of v.h.f. amplifiers, which have been introduced into their range. The new range of amplifiers can provide 30-100W output for the 144MHz amateur band at low cost.

Of particular interest is the NBC-50R Docking Booster which can boost the output of your hand-held to over 50W. The unit is supplied with a built-in 18dB GaAs

FET pre-amplifier and a range of five adaptors designed to fit most well known makes of hand-held. Specifications for the NBC-50R include 144-146MHz, 1-5W, 13.8V d.c. and f.m. mode.

The NBC-50R booster is available for £99.95 from Nevada Communications, 189 London Road, North End, Portsmouth, Hants PO2 9AE.



Successful Leicester Show

Frank Elliott G4PDZ organising secretary for the Leicester Amateur Radio Show committee has reported that the 1993 show held at the Granby Halls, Leicester was the most successful yet. Ticket sales for the show exceeded 8600 over the two day event.

The Leicester Show committee would like to offer their thanks to the members of the Leicestershire Radio Clubs and Societies for the time they gave up to steward the event. Thanks also go to all those who visited the exhibition.

Frank G4PDZ who retired early in 1993 from the amateur radio business, has been involved with the organising of the Leicester Amateur Radio Show for the past 11 years. This is a position that he hopes to hold for many more years to come.

NOVICE *matter*

Elaine Richards G4LFM starts this month with the phrase, "I dedicate most of this column to novice licensees - past, present & future", and says that the overwhelming topic in the post bag this month is the Novice Licence. Elaine hopes the following will help, **R. Cahill** and **J. Collins** amongst others

Becoming A Novice

If you are thinking about becoming a novice, the first place to go for the information you need is to the **Radio Society of Great Britain, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE. Tel: (0705) 659015.**



I phoned them on a Monday morning asking for information. It arrived on Thursday morning, not bad!

I was sent a leaflet called *Novice Licence Training Scheme*, a copy of *D-i-Y Radio* (a very enjoyable read that even had competitions in it), *How to become a Radio Amateur* by the Radiocommunications Agency and details of the exams, where they are held, who runs courses and the names of senior instructors. Altogether it is a really informative package.

A Novice Licensee has access to certain amateur bands using low power without having to go for the full Radio Amateur's Exam. There are three steps to follow.

First you must successfully complete the Novice Licence Training Course. This is a practical training course run by the RSGB all over the country, so you shouldn't have to travel too far. Your local radio club may be running a course, so it's worth checking with them.

For step two you need to sit and pass the Novice Radio Amateur's Examination. This is held four times a year and is just a single paper which should last

about one and a quarter hours - there are 45 multiple choice questions to answer.

The final step only applies if you want to use the frequencies below 30MHz. To do this you need to pass a 5w.p.m. Morse test.

Local radio clubs are very involved in the Novice Licence. But how do you find out about the local club? They aren't likely to be listed in the 'phone book.

There are several ways to contact a club, the RSGB can help yet again, or if you like, you can write to me and I can dig out of my files the nearest clubs to you. You'll find that if you speak to the secretary of the club before you go, they'll look out for you and make you very welcome.

Finally, the only other bit that I can tell you about is the cost of the licence. It's £15 a year for those over 21, but if you're under 21 once you've passed all the necessary exams, it's free!

Novice Meetings

News on Novice meetings now. I've heard from **Con GW0FJH**, the secretary of the Pontypool & District Amateur Radio Society. Every 2nd Wednesday of the month between 7 and 9pm they hold a meeting especially for holders of Novice Licences.

At each meeting there are at least two fully licensed members present to supervise the use of the Club Station. Or they are on hand to help with any practical or theoretical problems the Novices may have.

The only drawback to these meetings I can see is that Novices need

to become members of the club - but if you're under 18 that means 20p per visit, so it's hardly a king's ransom! And that's the only downside I can find from the project they are running. The Pontypool club meet at **Pontypool Community Education Centre (The Settlement), Pontymoile, Pontypool**. If you live in the area and would like to know more, contact **Con on (0495) 762604.**

I've also heard from **Eileen Mainwaring 2W1BPS**, her husband is a local instructor in Llandeilo. So far her log has just three QSOs in it, but I'm sure that will change once she gets her hands on a better rig.

Eileen's husband has sent in a tip for a little circuit to add to S-meters, but I'll have to make space for that next month.

Awards

Since mentioning the BARTG Quarter Century Award the other month, I've received details of other awards available from them.

The British Amateur Radio Teledata Group (BARTG) Members Award is available after making contact, or hearing, 25 different BARTG members. There are further endorsement stickers available for every subsequent 25 members worked or heard.

The contacts can be on any of the amateur bands although you can get an 'all 80m' award, for example, if you work all the members on just one band.

You must send either the QSL cards for the 25 contacts (they are returned to you) or alternatively, you can photocopy both sides

of the card. You must be able to see both callsigns to show that two-way contact took place.

If you belong to a radio club, then there is an alternative. You must get a check-list of the BARTG members worked, showing the date, time, band, callsigns, BARTG membership number, RST, etc., and get this signed by **two** officers (or committee members) at your local club.

Finally, if you log or work the 25 stations during a BARTG contest, then your contest log is sufficient.

The cost of the award is £1.50 in the UK, US\$6 or 30 recent IRCs if you're overseas. The update stickers cost either 20p for the UK, US\$1 or 3 recent IRCs. If you send QSL cards, you should add 50p or 5IRCs for their return.

Claims should be sent to: **BARTG Awards Manager, Nigel P. Roberts G4KZZ, 6 Perk End, Forsbrook, Staffordshire ST11 9DR.**

Looking At Antennas

Let's now look at antennas. One problem when you're starting out in any hobby is there never seems to be enough money for all the things you want. Often after buying the 'rig of your dreams' there's not enough money left to get an antennas

I've received details of some very reasonably priced h.f. antennas from Waters and Stanton Electronics. The single band antennas are helical whips with adjustable resonators, with one available for each of the bands between 1.8 and 28MHz (160 and 10m). The price for these antenna start at £19.95.

A 5-band version with auto switching is also available. The power rating for these antennas is 250W p.e.p. **More details from Waters & Stanton Electronics, Tel: (0702) 206835.**

And Finally.....

I would like to introduce keen Novice Ned. He'll often have a message for you! Also I'd like to take this chance to wish all the readers of *PW* a Merry Christmas and Happy New Year and look forward to lots more of your letters in 1994.

Unfortunately due to the pressure of schedules I am unable to bring you the answers and winners to last month's questions but all being well these will appear next month.



Novice Ned says: "Contact the RSGB or your local radio club to find out more about becoming a Novice".



NORMAN G4THJ

400 Edgware Road, London W2

Telephone: 071-723 5521 Telex: 298765

Opening times: 9.30am-5.30pm Tuesday-Friday. 10am-4.30pm Saturday

Closed Monday but open 'till 7pm on Wednesday

Normally
24hr
despatch but
please allow
7 days for
delivery.



★ CHRISTMAS OFFERS ★

STANDARD C5608D TWIN BAND MOBILE

for only **£575.00** (Limited Quantity)

- True Twin Band
- 40 Memory Channels
- Simultaneous RX & TX
- Solid-State Construction
- Flexible Car-Installation
- 50W/40W (VHF/UHF) RF Power
- High 0.158 μ V Sensitivity (12dB SINAD)



TRANSMITTER:	VHF	UHF
RF Power Output	Hi 50 W	40 W
	Mid 10 W	10 W
	Lo 3 W	3 W
Modulation Method	Reactance Modulation	
Spurious Emissions	60 dB	
Maximum Deviation	± 5.0 kHz	
Harmonic Distortion (at 1 kHz)	5%	
Frequency Stability (-20°C to +60°C)	$\pm 0.001\%$	
Frequency Setting Accuracy	± 1.0 kHz	

RECEIVER:	VHF	UHF
Circuitry	Double Conversion Superheterodyne	
Intermediate	1st IF 21.8 MHz	23.05 MHz
Frequency	2nd IF 455 kHz	455 kHz
Sensitivity (12dB SINAD)	0.158 μ V	
Threshold Squelch Sensitivity	0.112 μ V	
Selectivity (2-Signal method)	60 dB	55 dB
Audio Power Output	3 W (10% distortion)	
S/N ratio at 0.5 μ V input	30 dB	



STANDARD C558

Dual band
with AM.
20 channels
£429
inc nicads
and charger

£499
cell case only



STANDARD C528

Dual band
simultaneous
transmit/receive
20 channels.
Now includes
nicad and wall
charger
***£420**



STANDARD C188-2M C488-70CMS

Special
Offer
£279
inc
nicads
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SWR meters – Diamond

SK100 1.6-60MHz 30/300/3kW PL259	£124.95
SK900 1.8-900MHz 5/20/200 Watts PL259	£89.95
SK400 140-595MHz 5/20/200 Watts PL259	£104.95
SK600 1.8-525MHz 5/20/200 Watts PL259	£164.95
SK1000 1.8-1300MHz 5/20/200 Watts PL+"N"	£299.95
SK900 automatic 1.8-200MHz 5/20/200 Watts PL259	£129.95
SK900 1.8-160+430-1300MHz 5/20/200 Watts	£259.00
SA450 2 way aerial & changeover switch	Special Price £1450

PL+"N"

Aerials – Diamond Base	
CP5 10-15-20-40-80 mtr vert. rigid radials	£265.00
CP6 as above with 6 mtrs.	£275.00
X30 2m/70cms fibre glass 3dB/5.5dB gain 1.3m long	£64.95
X50 2m/70cms fibre glass 4.5/7.2dB gain 1.7m long	79.95
CP92 2 mtr colinear 2x5/8 6.5dB gain	£49.95

THE NEW STANDARD C408

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

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

We are waiting for full specs and leaflets.

The projected price is just under **£200.**



**DUE TO THE FLUCTUATING EXCHANGE RATE, PRICES MAY VARY
– PLEASE PHONE BEFORE ORDERING –**

Lee Electronics

CLUB news

Bedfordshire

Bedford & DARC. Tuesdays, 8pm. Club Shack, Church End, Ravensden, Bedford. December 14 - TV Licensing, 21st - Xmas Festivities. **M. G. Reeves G6YNW** on (0234) 349004.

Shefford & DARS. Thursdays, 8pm. Church Hall, Amphill Road, Shefford, Bedfordshire. December 9 - The G4ME0 Challenge, 16th - Chairman's Mince Pie Night, January 6 - Welcome Back, 13th - Constructors Contest G8EMJ. **Paul G1GSN** on (0462) 700618.

Cheshire

Stockport RS. 2nd & 4th Wednesdays, 7.45pm. Room 14, Dialstone Centre, Lisburne Lane, Offerton, Stockport, Cheshire. December 15 - Xmas Party. **Jim France G3KAF** on 061-439 4952.

Cornwall

Poldhu ARC. Tuesdays and Fridays, Wednesdays HF Net, 7.30pm. (0326) 290638.

Derbyshire

Buxton Radio Amateurs. Lee Wood Hotel, Buxton, 8pm. December 14 - Social Evening, January 11 - Live Morse Night. **Derek Carson G4IHO** on (0298) 25506.

Derby & DARS. Wednesdays, 7.30pm. 119 Green Lane, Derby. December 22 - Xmas Party, January 5 - New Year Surplus Sale. **Hayley Winfield G7PXA** on (0773) 856904.

Devon

Exeter ARS. 2nd Mondays, 8pm. The Moose International Centre, Blackboy Road, Exeter. January 10 - Welding Techniques by Basil Bolt. **Ray Donno** on (0392) 78710.

Torbay ARS. Fridays, 7.30pm. ECC Social Club, Highweek, Newton Abbot. December 10 - TARS Xmas Party. **W. Hipwell G3HTX** on (0803) 526762.

Dorset

South Dorset RS. 1st Tuesdays, 7.30pm. Wessex Lounge of Weymouth Football Club. December 12 - SRDS Xmas Dinner, January 4 - Meeting details to be confirmed. **Mike Lenzi G7HNY** on (0305) 773860.

Down

Bangor & DARS. 1st Fridays, 8pm. Bangor Technical College, Room A13. December 11 - Xmas Dinner, Winston Hotel, Bangor, tickets from Terry G13USS, January 7 - Quiz Night at Winston Hotel. **Keith GIOSSA** on (0247) 883315.

East Yorkshire

North Ferriby United ARS. Fridays, 8pm. North Ferriby Ltd., FC Social Club, Church Road, North Ferriby, East Yorkshire. December 10 - Amateur Television by Clive G8EQZ, 17th - Xmas Social, January 7 - On The Air Night. **Frank Lee G3YCC** on (0482) 650410.

Essex

Braintree & DARS. 1st & 3rd Mondays, 8pm. The Clubhouse, Braintree Hockey Club, Church Street, Bocking. December 13 - Cheese & Wine Party, January 3 - Widgets 2, 10th - Club Net. **J. F. Button G1WQQ c/o G4JXG, 88 Coldnailhurst Avenue, Braintree, Essex CM7 5PY** or Publicity Secretary on (0376) 327431.

Colchester RA. Colchester Institute, Sheepen Road, Colchester. December 16 - Cheese & Wine Xmas Party. **Trevor Bradbeer G7OWC** on (0206) 764034.

Vange ARS. Thursdays, 8pm. Barnstaple Community Centre, Long Riding, Basildon, Essex. December 9 - Television, 16th - Xmas Buffet, January 6 - Junk Sale, 13th - Guns by Bob G3IUC. **Doris** on (0268) 552606.

Greater London

Crystal Palace & DRC. 3rd Saturdays, 7.30pm. All Saints Parish Rooms, Beulah Hill, London SE19 (opposite junc. Grange Road). December 18 - Xmas Social & Video/Film Show. **Wilf Taylor G3DSC** on 081-699 5732 or **Bob Burns G30OU** on (0737) 552170.

Edgware & DRS. Watling Community Centre, 145 Orange Hill Road, Burnt Oak, 8pm. December 9 - Junk Sale, January 13 - AGM. **Rod Bishop G0SQL** on 081- 204 1868.

Silverthorn RC. Fridays, 7.30pm. The Chingford Community & Adult Education Centre, Friday Hill House, Simmons Lane, Chingford, London E4 6JH. December 10 - Night On The Air, 17th - Xmas Party. **Andrew Mowbray G0LWS** on 081-529 4489 between 5.30 & 6.30pm weekdays only.

Southgate ARC. 2nd & 4th Thursdays, 8pm. Winchmore Hill Cricket Club Pavilion, Firs Lane, Winchmore Hill, London N21. December 9 - AGM. **Brian Shelton G0MEE** on 081-360 2453.

Greater Manchester

Rochdale & DARS. Mondays, 8pm. The Cemetery Hotel, 470 Bury Road, Rochdale, Lancs. December 20 - Xmas Talk. **Brian** on 061-653 8316 or **Dave** (0706) 32502.

Gwynedd

Dragon ARC. 1st & 3rd Mondays, 7.30pm. Four Crosses Hotel, Menai Bridge. December 20 - Xmas Party. **Tony Rees GW0FMQ** on (0248) 600963.

Hampshire

Basingstoke ARC. 1st Mondays, 7.30pm. Forest Ring Community Centre, Sycamore Way, Winklebury, Basingstoke. December 27 - 144MHz Direction Finding Competition. (0256) 25517.

Itchen Valley RC. 2nd & 4th Fridays, 7.30pm. Scout Hut, Brickfield Lane, Chandlers Ford. December 10 - Astronomy & Amateur Radio by Alan Dowdell, 25th - Usual Xmas Day Net on S22. **Les Kennard G3ABA** on (0703) 732997.

Winchester ARC. 3rd Fridays, 7.30pm. Red Cross Centre, Durngate House. December 17 - Xmas Party. **Peter Simpkins G3MCL** on (0962) 865814.

Hereford & Worcester

Bromsgrove ARS. 2nd & 4th Tuesdays, 8pm. Lickey End Social Club, Alcester Road, Burcot, Bromsgrove. December 14 - Xmas Dinner. **Mr B. Taylor G0TPG** on (0527) 542266.

Bromsgrove & DARC. 2nd Fridays. Avoncroft Arts Centre, South Bromsgrove, Worcester. December 10 - Xmas Party, Waseley Country Park. **Joe Poole G3MRC** on (0562) 710010.

Hertfordshire

Dacorum AR & TS. 1st (informal) & 3rd (formal) Tuesdays, 8pm. The Heath Park, Cotterells, Hemel Hempstead. December 21 - Club Xmas Dinner. **Nicholas Camp, 48 Northfield Road, Harpenden, Herts AL5 5HZ.**

Hoddesdon RC. Alternate Thursdays, 8pm. Conservative Club, Rye Road, Hoddesdon, Herts. December 9 - AGM, 23rd - Xmas Social. **Roy G4UNL** on 081-804 5643.

Stevenage & DARS. Tuesdays, 7.30pm. Stevenage Day Centre, Chells Way, Stevenage. December 14 - Xmas Dinner, 21st - Natter Night. **Neil Ravillious 2E1ASZ** on (0438) 350882.

Humberside

Goole R & ES. Fridays, 7.30pm. West Park Pavilion, West Park, Goole, last Fridays at the 'Old George Inn', Market Place, Goole. December 10 - Junk Sale, 17th - Xmas Lecture, 27th - Lifeboat Evening, January 3 - On The Air Night, 10th - Repeater Report. **Steve Price G8VHL** on (0405) 769130.

Kent

Bromley & DARS. 3rd Tuesdays, 7.30pm. The Victory Social Club, Kechill Gardens, Hayes, Kent. December 14 - Xmas Party. **Alan G7GBH** on 081-777 0420

Clifton ARS. Fridays. Earl Of Derby Public House, Dennetts Road, London SE14. December 17 - Cheese & Nibbles Evening. **Karl Lewis** on 081- 859 7630.

Medway AR & TS. Fridays. Tunbury Hall, Catkin Close, Tunbury Avenue, Walderslade, Chatham, Kent. Visitors & new members welcome. December 17 - Xmas Social, January 7 - The VIP Quiz by John G6IVP. **Mrs Gloria Ackerley G7OVI, 40 Linwood Avenue, Strood, Rochester, Kent ME2 3TR.** Tel: (0634) 710023.

South East Kent ARC. Wednesdays. Duke Of Yorks School, Guston, Nr. Dover.

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

December 15 - Xmas Social,
January 5 - Novice Evening, 12th -
Kanga Kits Presentation. **Paul
Turvey G1PJJ on (0304) 214030.**

Lancashire

Bury RS. Tuesdays, 8pm. The
Mosses Community Centre, Cecil
Street, Bury, Lancashire.
December 14 - AGM, 22nd -
Ragchew & Xmas Preparation.
**Steve Gilbert G3OAG on 061-881
1850 or Colin Fox G3HII on (0204)
883212.**

Hesketh ARC. Every other
Tuesday. Birkdale, Southport.
December 10 - Club Xmas Dinner.
Bernie G7DEM on (0704) 63344.

Leicestershire

Charnwood AR Contest C. 1st &
3rd Sundays. The Albion,
Loughborough. December 19 -
Xmas Meeting, 26th - Club Net.
Phil on (0509) 232927.

Lincolnshire

Grantham RC. 1st & 3rd Tuesdays,
8pm. Kontak Sports & Social Club,
Barrowby Road, Grantham.
December 21 - Cheese & Wine
Evening, January 4 - Intruder
Watch by Dave G4MQM. **John
Kirton G8WWJ on (0476) 65743.**

Merseyside

Liverpool & DARS. Tuesdays, 8pm.
Churchill Club, Church Road,
Wavertree, Liverpool. December
14 - Night On The Air, 21 - Xmas
Party, 28 - Open Night, January 4 -
Quiz, 11th - GX3AHD On The Air.
Ian Mant G4WWX on 051-722 1178.

Wirral & DARC. Irby Cricket Club,
Mill Hill Road, Irby, Wirral, 8pm.
December 15 - D&W, The Hotel
Victoria, Heswall, 22nd -
Chairman's Night, 29th - D&W, The
Ridger, Newton, January 5 - D&W,
The 12th Man, Greasby, 12th -
AGM. **Paul Robinson G0JZP on
051-648 5892.**

Norfolk

Fakenham ARC. 1st Tuesdays,
7.30pm. Trinity Church Room,
Hempton. January 4 - Microwaves
by John G4BYV. **(0485) 528633.**

King's Lynn ARC. 7.30pm. The
King's Lynn Scout HQ, Chequers
Lane, North Runcton, Nr. King's
Lynn. December 16 - Xmas Social.
**Derek Franklin G0MQL on (0553)
841189.**

Norfolk ARC. Wednesdays,
7.30pm. University Arms, South
Park Avenue, Norwich. December
15 - Xmas Party, January 5 - Club
Quiz, 12th - Real Radio Evening.
Dale Simkin on (0603) 37393.

Nottinghamshire

Mansfield ARS. 2nd Mondays,
7.30pm. Polish Catholic Club, off
Windmill Lane, Woodhouse Road,
Mansfield. December 13 - Xmas
Social. **Mary GONZA on (0623)
755288.**

Nottingham ARC. Thursdays,
7.30pm. Sherwood Community
Centre, Mansfield Road,
Nottingham. January 6 - Forum &
On The Air Night, 13th - Bring Your
Gear Night. **Simon GOIEG on (0602)
501733.**

Scotland

Grampian

Banff & DARC. 1st & 3rd Fridays.
Banff Castle, Castle Street, Banff,
Aberdeenshire AB45 1DL.
December 17 - Club Quiz Night.
**Martin Andrew GM6VXB on
(03465) 82061.**

Tayside

Dundee ARC. Tuesdays, 7pm.
College of Further Education,
Graham Street, Dundee.
December 14 - Medical Imaging
by Paul Rudd GM0CQL & Magnetic
Resonance Imaging by Dr.
Malcolm Nimmo GM8JVZ, 21st -
Construction Night, January 11 -
Construction Night. **George Millar
GM4FSB, 30 Albert Crescent,
Newport-on-Tay, Fife DD6 8DT.**

Shropshire

Salop ARS. Thursdays, 8pm. Oak
Hotel, Shrewsbury. December 9 -
Annual Construction Competition
Advice by Terry Hall G8DIQ,
January 13 - EGM at Beauchamp
Hotel, Shrewsbury. **Sheila
Blumfield G0SST on (0743) 361935.**

Somerset

Wincanton ARC. 1st & 3rd
Mondays (except Bank Holidays -
2nd & 4th), 7.30pm. The Community
Lounge, King Arthur's Community
School, Wincanton, Somerset.
December 20 - General
Discussion, January 10 - Packet
Radio by Mr W. Brennan G3CQE.
**Dave G3ZXX on (0963) 34360 or
Andy G1FPW on (0747) 51381.**

Yeovil ARC. Thursdays. Red Cross
HQ, Grove Avenue, Yeovil,
Somerset. December 9 - Quartz
Crystals by G3USC, 16th - Club
Station On The Air, 23rd - Mince
Pies and Goodwill On The Air,
January 6 - Checking VHF Rigs For
Deviation, 13th - Bring & Buy Junk
Sale. **Cedric White G4JBL on
(0258) 73845.**

South Yorkshire

Barnsley & DARC. Mondays 7pm.
Three Horseshoes, Barnsley Road,
Brierley, Nr. Barnsley, South

Yorkshire. **J. P. Caledon-Scott
G4LRS on (0226) 203448.**

Sheffield ARC. Mondays
7.30pm. Firth Park Pavilion,
Firth Park Road, Sheffield.
December 13 - Xmas Dinner
at the Devonshire Arms, 20th
- Xmas Toast. **(0742) 446282.**

Suffolk

Felixstowe & DARS. December 20
- Social Video Night. **Paul Whiting
G4YQC on (0394) 273507.**

Surrey

Dorking & DRS. The Friends
Meeting House, South Street,
Dorking, 7.45pm. December 10 -
Annual Dinner, 21 - Xmas Meeting,
Surprise Evening With
Refreshments, January 11 -
Informal Evening at the Falkland
Arms, Dorking. **John Greenwell
G3AEZ on (0306) 631236.**

Surrey RCC. 'Terra Nova' The
Waldrons, Waddon, Croyden,
Surrey. December 20 - Natter
Night, January 3 - Oscilloscopes
For Amateurs by Phill Pardy G00HI
and Peter Burton G3ZPB. **Berni
G8TB on 081-660 7517.**

Sutton & Cheam RS. 3rd
Thursdays, 7.30pm. Sutton United
Football Club, The Borough Sports
Ground, Gander Green Lane,
Sutton, Surrey. Natter Nights - 1st
Thursdays. December 16 - Xmas
Buffet & Get Together. **John
Puttock G0BWV, 53 Alexandra
Avenue, Sutton SM1 2PA.**

The Kingston & DARS. 3rd
Wednesdays, 8pm. Alfriston, 3
Berrylands Road, Surrey KT5 8RB.
December 15 - Christmas Special.
Ray Fuller on 081-398 1128.

Wimbledon & DARS. 2nd & last
Fridays. St. Andrews Church Hall,
Herbert Road, Wimbledon SW19.
December 10 - Xmas
Social. **George Cripps G3DWW on
081-540 2120.**

Warwickshire

Mid-Warwickshire ARS. 2nd &
4th Tuesdays. December 14 -
Xmas Meeting. **Don Darkes G8HRI
on (0926) 424465.**

Stratford-Upon-Avon & DRS. 2nd
& 4th Mondays, 7.30pm. Home
Guard Club, Main Road,
Tiddington, Stratford-Upon-Avon,
Warwickshire. December 13 -
How To Get Started On Satellite
And Work The World On VHF/UHF
by John Heath G7HIA, 25th -
Morning On The Air, January 10 -
New Year Social. **Alan Beasley
G0CXJ on (0608) 82495.**

West Midlands

Solihull ARS. 3rd Thursdays. The
Shirley Centre, 274 Stratford Road,
Shirley, Solihull, West Midlands.
December 16 - Xmas Party. **(0827)
53344 daytime.**

South Birmingham RS. 1st
Wednesdays, 8pm. Club House
open on Mondays, Thursdays &
Fridays 8pm. Hampstead House,
Fairfax Road, West Heath, South
Birmingham. December 10 - Xmas
Party, January 12 - Holes In The
Ground by Dudley Canal Trust.
021-474 3784.

West Sussex

Mid-Sussex ARS. Thursdays,
7.45pm. Marle Place Further
Education Centre, Leylands Road,
Burgess Hill, West Sussex.
December 17 - Grand Xmas
Dinner, January 13 - AGM. **Chris
Coward G3YTU on (0444) 458992.**

West Yorkshire

Halifax & DARS. 1st & 3rd
Tuesdays, 7.30pm. December 21 -
Xmas Social. **David Moss G0DLM
on (0422) 202306.**

Keighley ARS. The Ingrow Cricket
Club, Ingrow, Keighley, 8pm.
December 9 - Natter Night, 16 -
Xmas Buffet, 23 - Natter Night.
**Kathy Conlon G0RLO on (0274)
496222.**

Spen Valley ARS. Thursdays, 8pm.
Old Bank Working Men's Club,
Mirfield. Alternate Thursdays -
'Noggin & Natter Nights'.
December 16 - RAFARS by Peter
G0JKW. **Tony Galvin G0IKD on
(0532) 534437.**

Wiltshire

Trowbridge & DARC. 1st & 3rd
Wednesdays, 8pm. Southwick
Village Hall, 8pm. December 15 -
Natter Night. **Ian G0GRI on (0225)
864698.**

*Merry Christmas and a
Happy New Year to all my
regular contributors and
readers. This column will
continue to support Radio
Clubs around the UK in
1994.*

Toad.

NEVADA

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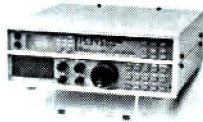
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one shot, high speed.....£269

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Model 1350
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KENWOOD TS-50S

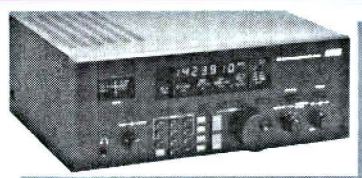
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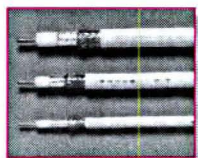
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Tokyo HT115 15m monobander	£195
Yaesu FT One HF base TX	£1050
Yaesu FT707 HF mobile TX	£475

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Alinco DJ580 dual band handie	£385
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Kenwood TH26 2m hand-held, boxed, vgc	£155

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Yaesu FT227 memoriser 2m mobile	£185
Yaesu FT230R 2m mobile, boxed	£175

Scanning receivers

Alinco DJ-X1 hand-held, vgc	£215
AOR 2100 base scanner 20 channels	£199
AOR AR1000 hand-held, 1000 channels	£185
Beacat 200XLT hand-held, c/w 900MHz	£165
Fairmate HP100 scanner	£175
FDK TMS6B 2m. Xtal receiver	£65
Icom R100 mobile scanning RX	£425
Kenwood RZ1 mobile scanner	£315
Yaesu FRG9600 scanning RX	£365
Yupiteru MVT-7100 almost new	£315

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Drake RBE "as new" condition	£750
Icom IC71E shortwave receiver	£675
Kenwood R2000 RX+VHF conv.	£525
Lowie HF225 c/w keypad RX	£395
Sony SW55 portable RX	£219
Trio JR500/S basic S/W RX	£95
Trio R1000 general coverage receiver	£295
Yaesu FRG7 RX, old but faithful	£195
Yaesu FRG7700 digital S/W RX	£425
Yaesu FRG7700 shortwave RX	£395

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The Kenwood TS-850S



Keen operator Ed Taylor G3SQX takes a look at the Kenwood TS-850S, an h.f. transceiver which has established itself well since its introduction into the UK during 1991.

times, because the documentation is in six languages!). Everything is there in writing if you need to know.

However, the basic operation of the TS-850S is straightforward. Although not quite as intuitive as the TS-940 (for example), most of the controls work as you would expect.

**The Kenwood TS-850S
1.8 to 30MHz h.f.
transceiver.**

Review

There are advantages in reviewing equipment which has been available for a year or two. The first flush of excitement will have died down, and a more considered judgement is possible.

Another advantage is that existing users can assess reliability. Comparisons may also be made with competing equipment.

The TS-850S appeared in Britain during 1991, and has been popular since. It's an h.f. transceiver covering nine bands, operating from 12V, and is designed with many facilities and provides good value for money.

Not Much Competition

Surprisingly, there has not been much competition for the TS-850S. With the extra facilities the transceiver contrasts with most 12V rigs, which are fairly sparse with features, although it costs less.

In my opinion, Kenwood are following the trend towards smaller equipment, allowing simple portable and mobile operation. On the other hand, mains-operated transceivers are becoming bulkier and this is where the 'features wars' take place.

I think that the TS-850S is a bit of a hybrid. It provides many of the best aspects of both types.

Other manufacturers may have underestimated the demand for a fairly large transceiver such as the TS-850S. They've missed the chance of providing a rig with the facilities of a base station, combined with the possibility of 'occasional' portable use.

Two Approaches

There are two approaches to getting new equipment going. You can sit down, read all the documentation, and cautiously try each facility.

Alternatively, you can simply plug the equipment in and switch on, hoping for the best. With the Kenwood, I started off with the 'study first' method.

After about an hour, I just connected up and started having QSOs. This was much more fun!

I enjoyed using the TS-850S. There are many facilities available, and they are all explained in the manual (six

Clean Receiver

The TS-850S has a very 'clean' receiver. Even doing the '7MHz at night test'. I kept the Advanced Intercept Point button (AIP) pressed all the time on the lower bands. This circuitry reduces the sensitivity of the rig, but provides improved handling on the noisy bands.

The filters are good, and on s.s.b. it gives a reasonable compromise between audio quality and selectivity. It's possible to switch in various filters at each of two i.f.s, giving an ever-narrowing passband.

Concentric **Slope Tune** controls cut the r.f. bandwidth from the upper and lower ends. This effectively reduces QRM in crowded conditions. However, for any reasonably serious c.w. operating, I think that one or more of the additional filters would be needed.

In practice I found the notch filter was most useful. On some transceivers, the notch function seems to be an afterthought, but the TS-850S was able to deal with quite severe interfering heterodynes.

I also liked the dual-speed tuning knob. The normal tuning rate can be reduced to 1kHz per revolution by pressing the **Fine** key, which is excellent for c.w. When you combine this with the **VFO CH** key (which lets you click up and down in 10kHz steps), the choices for rapid QSYs are very flexible.

Transmitting

On the transmitter side, I was pleased with the reports on s.s.b. I tend to keep the processor running at a reasonable level all the time, and favourable comments were received on the audio.

It was easy to set the processing. The operator is able to select the **Meter Peak Hold** option, and can then switch the meter to **Compression Level**. This facility allows continuous monitoring, and ensures that the compression level is not too high.

There's also a key which gives a high boost to the voice, which seemed to add to intelligibility in noisy conditions. It might have the opposite effect if used by a YL, and experimentation would be needed.

I checked the c.w. output, and found it to be

HF Transceiver

Review

acceptable, with a narrow bandwidth and no key clicks. Although the manual suggests that there will be a shortening of characters if full break-in is used at high speed, the effect was minimal at 40 words per minute (about my limit).

Using full break-in, there is a little more clatter in the headphones than with the TS-930/40 transceivers - a pity, because quiet QSK operation was a hallmark of Kenwood's equipment.

Metering was particularly good, making full use of the bar-graph style. My prejudices against this type of display disappeared completely, and I now find the needle movement on my own equipment harder to read. I suppose this is how they persuade us to buy new gear!

The s.w.r. monitor was very useful. Unfortunately you can only meter s.w.r. or compression level one at a time.

Memory System

The memory system on the Kenwood TS-850S takes a little mastering, but it works well. There are 100 memories, each storing mode and filter information. They are useful for nets, broadcast stations, contests and DXpeditions, etc.

I found the **Quick Memory** feature to be extremely valuable. Five frequencies can be stacked up and recalled easily on demand. This is ideal for temporary storage, where you can quickly page through the five to find the one you want and then retrieve it.

I also like the Kenwood system of dealing with split operation, to transmit on one v.f.o. and receive on the other. On the TS-850S there's little chance of transmitting on the wrong v.f.o., which is not the case with many rigs.

When on the air, it's helpful to monitor your transmit frequency, which can be done with the **TF SET** key. This control permits tuning of the transmit v.f.o., even if the dial lock is set. I consider these to be a well thought out combination of features.

There's also a choice of 35 selectable parameters through a menu selection on powering up. The parameters cover such options as changing step sizes for tuning, selecting frequency shift tones (f.s.k.), varying the c.w. keyer functions, and so on.

Most people will only need to adjust half a dozen of the selectable parameters. However, they are nonetheless useful to have available.

Another facility on the TS-850S, not available on all rigs is frequency input from numeric keys. I used this less than expected.

But when you actually need numeric key entry, there's no substitute for just entering the frequency required and having immediate access to it. This facility forms the basis for direct frequency control by computer, which switches directly to the frequency and mode derived from a DX spot on a Packet Cluster.

Automatic Antenna Tuning

The review TS-850S was fitted with the automatic antenna tuning unit, which I highly recommend. The automatic a.t.u. remembers the setting for each band. It also compensates for variations in the s.w.r. by a quick press of the **Auto Tune** key.

The auto a.t.u. specification suggests that it will match an s.w.r. of up to 2.5:1. But in practice, I found it can cope with s.w.r. levels worse than this.

If the automatic system fails to match, you can adjust the a.t.u. manually. I had to resort to manual tuning to load my 7MHz dipole on 1.8MHz! This was an unfair test, Practical Wireless, January 1994

which taxes the most versatile tuners!

However, loading the 7MHz antenna up on 1.8MHz worked, and I had some perfectly R5 QSOs as a result. There is an insertion loss with the a.t.u., approximately 1dB, so it's not really noticeable.

Another useful option on the TS-850S is the **Digital Recording Unit (DRU)**. This stores c.w. or 'phone messages for later transmission.

The **DRU** is invaluable in contests. It enables a CQ to be sent while you're drinking a cup of coffee or checking multipliers, as well as saving the voice in a long s.s.b. event!

The speech quality from the d.r.u. is reasonable, sounding like a voice over the telephone. It's not quite as good as the real thing, but is pretty close.

Other extras are available to carry out digital speech processing, interface to a computer, to provide voice indications of functionality, and a range of other options. But, of course, all these extras add to the initial cost.

Cost And Purpose

When considering facilities, you have to remember the cost. You also have to consider the purpose for which the equipment was designed.

There's no point in complaining about the lack of a feature which would normally only be found in a radio costing twice as much. Bearing this in mind, I still have a few grumbles about the way in which some of the many facilities of the TS-850S have been implemented.

For example, on the TS-850S there's a knob which purports to be an audio tone control. The knob is supposed to provide top cut, but the effect is negligible. It does no harm, but it's a waste of precious space.

Additionally, the **RIT/XIT** control, which allows the receiver or transmitter to be varied a little either side of the main dial frequency, is not well implemented. The knob is too small, given that it will be used almost as much as the tuning knob itself (this is a failing of many rigs).

When I used the **RIT/XIT** control on the TS-850S, the amount of variation (maximum $\pm 2.54\text{kHz}$) is not really enough for s.s.b. In use, I found it difficult to reset accurately to zero, although this can be done remotely, under computer control.

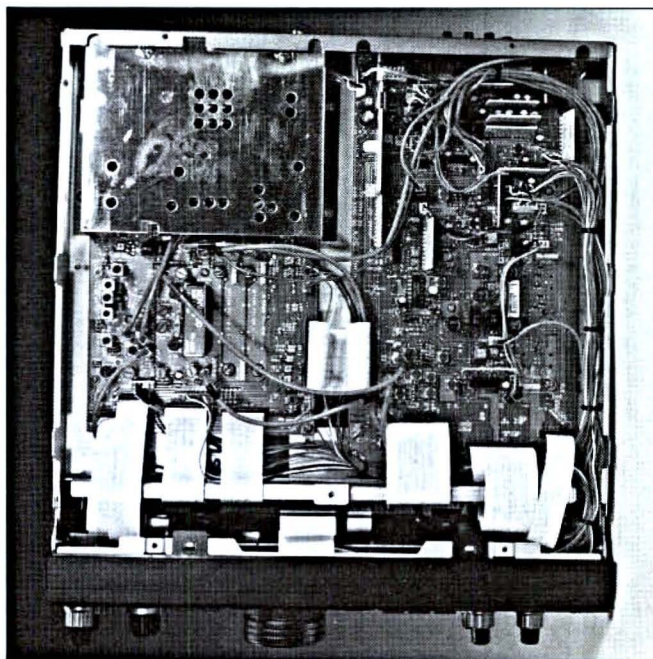


Fig. 1: A view of the deceptively uncluttered interior of the Kenwood TS-850S transceiver.

Review

I think that a 'clear' button would be useful on the RIT/XIT control. It would help if the designers should sit down with a contest operator or DXer, using all modes, and find out exactly what is needed.

As a c.w. operator I was pleased that there is an internal keyer. This facility can be operated with a standard paddle. It is selected with a back panel switch.

However, the keyer facility would be better done with an extra socket for the paddle, retaining a socket for direct keying. As it stands, an operator using a computer keyboard for sending (more or less standard now in contests) has to switch out the internal facility, and use an external keyer if this is also required.

Filter System

The filter system on the Kenwood TS-850S works well, but it's not ergonomically perfect. To change from (let's say) maximum s.s.b. selectivity to maximum c.w. selectivity requires several pushes of two buttons (one for each i.f.).

So, why have the designers allowed for stepping through the different levels of selectivity with a single switch? After all, it's not of great interest to the user where the selectivity is achieved.

It was convenient however, to be able to monitor the outgoing signal on s.s.b., with a variable level control. This knob could also allow adjustment of the c.w. sidetone level, rather than the preset method actually used on the TS-850S.

Summing Up

In summing up, I think the TS-850S is generally well-designed. It also sells at a reasonable price, and fits a market niche largely overlooked by its competitors.

The TS-850S is also easy to get used to and has a surprising number of features. During the review period I talked to several owners and, without exception, they were pleased with their rigs.

None of the TS-850S owners I spoke to had had any reliability problems. Any criticism was prefaced with a remark to the effect that they couldn't see how they would have done better for the cost, and I'm inclined to agree. I am also grateful to G0OFE, G4IFB and WA2UGT, who spent time discussing their experiences of the TS-850S with me.

PW

Manufacturer's Specifications

Modes	I.s.b., u.s.b., c.w., a.m. and f.s.k.
Output power	10 to 40W (a.m.), 20 to 100W all other modes.
Transmitter freq. coverage	1.8, 3.5, 7, 10.1, 14, 18.1, 21, 24.9 and 28MHz amateur bands.
Receiver coverage	100kHz to 30MHz (down to 30kHz with reduced specification)
Intermediate freqs.	73.05, 8.83MHz and 455kHz
Selectivity	(s.s.b. and c.w.) 2.4kHz, (a.m.) 6kHz, (f.m.) 12kHz at 6dB down
Audio output	1.5W into 8Ω at 10% distortion
Selectable RIT and XIT	1.2 or 2.4kHz each side of centre frequency
Memory channels	100
Power requirements	12 to 16V d.c. at 20.5A, negative earth.
Dimensions	339 x 135 x 375mm
Weight	10.9kg (not including a.t.u. and accessories)

Note: The above are a brief summary of what we consider to be the most important specifications from a very comprehensive list. Editor.

My thanks go to Martin Lynch of 140-142 Northfield Avenue, London W13 9SB. Tel: 081-566-1120, FAX: 081-566-1207, for the loan of the review transceiver. They can supply the TS-850S at a cost of £1849.95, plus £10 P&P. They can also supply the TS-850 without the automatic a.t.u. for £1699.95.

Fig. 2: Rear panel view of the transceiver (see text for comments by G3SQX on electronic keyer access).



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G4HKS

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Ten-Tec Scout 555 HF Transceiver

The Ten-Tec Scout 555 h.f. transceiver, fitted with the 7MHz band module.

The last time PW readers heard from Peter Barville G3XJS, he was describing his QRP DXpedition to Monaco in our QRP 'special' in July. This time however, Peter has had the chance to try out a newly-introduced h.f. rig from the USA - the Ten-Tec Scout 555 1.8 to 28MHz transceiver.

I have long thought that the amateur radio market lacks suitably priced quality h.f. equipment. By this I mean equipment that's within the financial reach of those less able to afford the (now) very expensive and sophisticated commercial equipment.

Ten-Tec's reputation for producing high performance transceivers is well known. And I had heard about the Scout's introduction (at Dayton 1993) with interest.

The Scout 555 was introduced by Ten-Tec as a "Back to basics - With real performance" rig. It also promised to be a truly budget-priced transceiver.

The Ten-Tec Scout is supplied as a single band s.s.b./c.w. transceiver. However, it's capable of operating on all bands, 1.8 to 28MHz (including WARC) with the addition of extra plug-in band modules.

The plug-in band modules are approximately the size of a packet of ten cigarettes. They locate into the front of the rig on the left hand side.

The correct sideband is automatically selected for each band and there's no mode switch. For review purposes, the Scout I had on loan came with the 7 and 14MHz modules.

Traditional Oscillator

Unlike the Japanese manufacturers, Ten-Tec prefer to use a traditional variable frequency oscillator (v.f.o.) with crystal mixing (rather than a synthesiser). The Scout is no exception to their rule.

The Scout v.f.o. tunes from 2.2 - 2.7MHz and is permeability tuned, with the tuning knob varying the oscillator inductor. This results in a very positive feel to the tuning, but with a slightly less 'free' feel. Back-lash was virtually non-existent.

Ten-Tec have employed their Frequency Lock System (FLS) with the Scout v.f.o., which automatically compensates for oscillator drift. This seems to work well, and I did not notice any appreciable drift when using the rig.

Internal Keyer

The internal keyer (an emulated Curtis type B) is adjustable between five and 50w.p.m. by a very unusual system. It's achieved by switching the digital read-out to indicate keying speed, adjustment is made by touching the 'Dit' paddle to increase the speed, and the 'Dah' paddle to reduce it!

Transmission on c.w. is not possible while the speed is being adjusted. Some c.w. operators may find this 'preset speed' an inconvenience. Also, there's no battery back-up, and therefore the Scout will always return to its default value of 25w.p.m. after the rig has been turned off.

Ten-Tec's superb c.w. QSK (full break-in) is legendary. It's one of the reasons why the Scout is a joy to use on c.w.

There is no transmit/receive switch provided on the Scout. However, for those who would prefer, the p.t.t. switch on the microphone could be used on c.w. as a

transmit override switch - with the microphone gain turned to zero!

Variable Bandwidth Filter

The Scout has a 9-pole 'Jones' type variable bandwidth filter with front panel control between about 500Hz and 2.5kHz. This avoids the need for an additional expensive narrow c.w. i.f. filter, and it works very well indeed.

The c.w. keying waveform on the monitor-scope looked very good. On air reports were of a pleasant 'soft keyed' sounding signal.

Similarly, reports received on s.s.b. (using the optional Ten-Tec hand-held electret microphone) were good. The rig easily delivered 50W (measured on a Bird Thru-line power meter) into a 50Ω dummy load.

The preset power control (accessed through the bottom cover) enables the power to be reduced to a minimum of 3W. I would have liked an externally adjustable power control, but was pleased to find provision for reducing the output to true QRP levels. The c.w. side-tone level adjustment control is also accessible through the bottom cover.

The transmitter is protected from instantaneous damage from load impedances ranging from a dead short to an open circuit. No damage should occur if the rig is inadvertently operated into a short, or open, circuit. Operation at full (or near full) power is allowed with an v.s.w.r. of up to around 2:1.

The Receiver

The receiver performed very well indeed. It appeared to cope without difficulty with the strong 7MHz signals after dark.

There are some spurious signals noticeable when tuning across the 500-kHz tuning range, but the strongest of these fell outside the 7 and 14MHz bands (the two modules supplied with the review model). The weaker spurious signals will not normally present a problem.

Noise from the digital frequency read-out is present on one or two discrete frequencies. But again this is not a problem in practice.

Summing Up

In summing up my impressions, I must say that I enjoyed using the Scout very much indeed. I found its performance very effective. It's a compact 'no frills' rig which is fun (and easy) to operate, and will make an ideal transceiver for portable working.

I did not have the opportunity to try it as a mobile rig. I actually wondered whether its mechanical frequency stability will be quite adequate, but there should be no difficulty finding somewhere to mount it in the car.

The Scout's price in the USA is \$495, with each additional band module \$25. At those prices, the Scout

Review

makes an excellent budget rig.

In the USA I would be very tempted indeed to buy one myself, together with two or three suitable band modules, for portable use. However, at the current UK price of £589 (and £39.95 for each band module), it's hard to recommend the Scout.

It's a pity, but the cost of the rig, plus modules for every h.f. band, will approach that of a Kenwood TS-50S. Ten-Tec have given us the "Back to basics - With real performance" rig - and all that's missing in the UK is the "budget price"!

My thanks go to Waters & Stanton Electronics of 22 Main Road, Hockley, Essex SS5 4QS. Tel: (0702) 206835 or 204965, FAX: (0702) 205843, for the loan of the review model which they can supply for £589 plus P&P. Extra band modules are available for £39.95 plus P&P.

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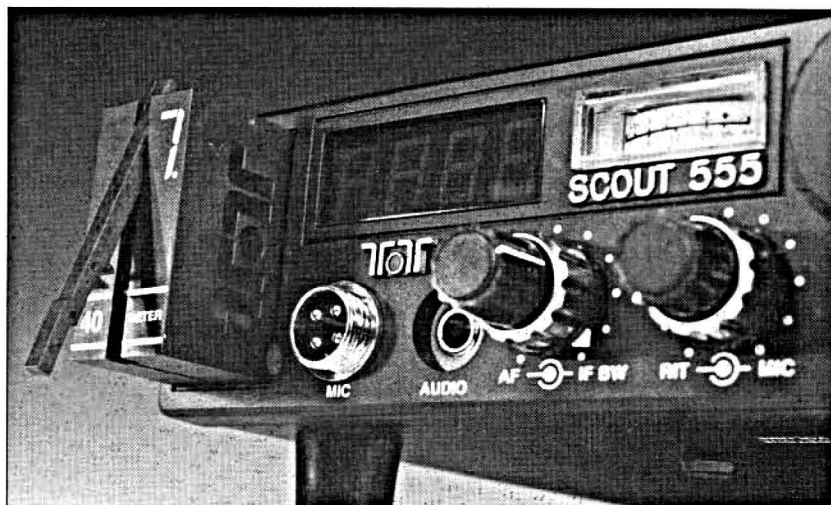


Fig. 1: Changing the band module on the Ten-Tec Scout 555.

Manufacturer's Abridged Specifications

General

Frequency coverage	All amateur bands 1.8 to 28MHz (plug in modules)
Modes	c.w., u.s.b., u.s.b. (selected automatically for band in use)
Frequency control	Permeability controlled crystal mixer v.f.o.
Offset tuning	±1kHz nominal (on receive)
Antenna	50Ω unbalanced
Power requirements	12 to 14V d.c., 600mA receive
Power requirements	10A transmit @ 50W output, 4.5A @ 5W output
Dimensions	64 x 184 x 248mm
Weight	2.4kg

Receiver

Type	Superhet (with 9-pole crystal filter adjustable 500Hz to 2.4kHz)
Intermediate frequency	6.144MHz
Sensitivity	0.35μV typical for 10dB @ 2.4kHz bandwidth
Dynamic range	85dB at 20kHz.
Audio output	1W into 8Ω with less than 2% distortion

Transmitter

Single sideband generator	Balanced modulator and 8-pole crystal filter
Output	50W a.l.c. controlled, internal power level control
Carrier suppression	-45dB typical
Unwanted sideband	-45dB typical
Keyer	lambic (Curtis i.c.) 5-50w.p.m.
Frequency offset (c.w.)	700Hz
Metering	s.w.r. or forward power
Microphone	200 to 50kΩ 5mV outputs (built-in power for electret inserts)

After seeing his copy of the G3XJS review, Jeff Stanton G6XYU of Waters & Stanton sent us the following comments in answer to points raised by Peter Barville. Editor.

Many thanks for letting me see the draft of Peter Barville's interesting review of the Scout transceiver. I was pleased to see that like other reviewers, he is generally very enthusiastic but there are one or two points I would like to clarify.

Peter compares the Scout with the Kenwood TS-50 but should bear in mind that the Kenwood rig has no v.s.w.r. meter, no variable band width filter and no electronic keyer, all of which the Scout has as standard. Peter mentions the American price of the Scout but omits to mention the local sales tax which would be added. Is the Dollar price relevant? You would never quote the Yen (Japanese) price.

However, I have saved the best news until last. This is that as we are selling the Scouts in such large quantities we have been able to renegotiate the selling price and from our next advertisement the UK retail price including VAT will be £499. Additional modules remain priced at £39.95 each.

Jeff Stanton G6XYU
Waters & Stanton
Electronics.

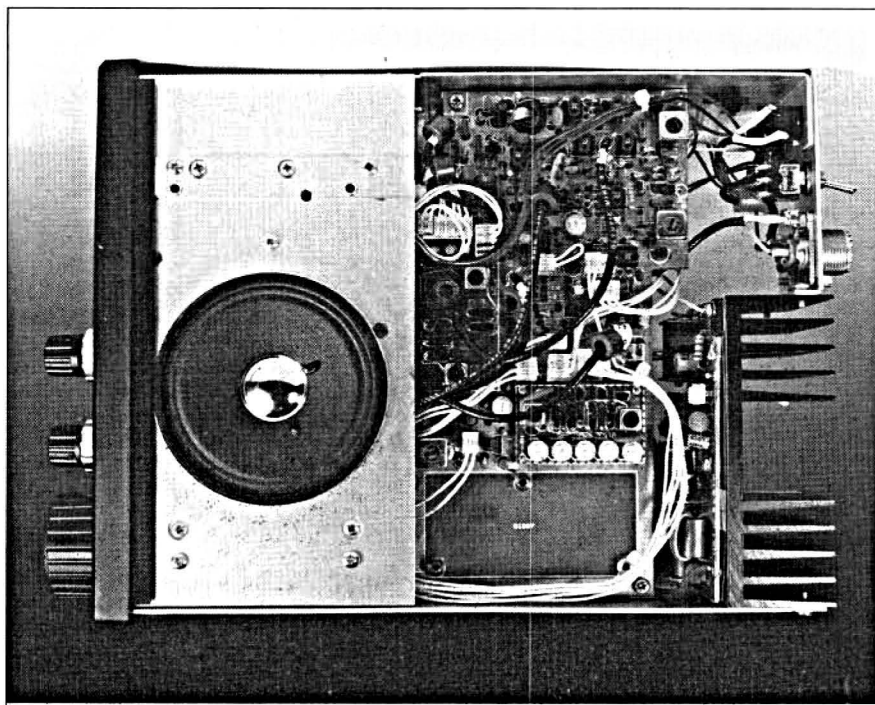


Fig. 2: An internal view of the Model 555 transceiver, showing the heatsinking for the p.a. stage (right).

Kits And Bits

Tex Swann G1TEX, explains where you can find those kits and building blocks for projects.

If you've read the articles 'Setting Up Your Workshop' and 'Tex's Tips' in the December 1993 issue of *PW*, then you're probably now looking for something to build. This article is to give you an idea of who can supply which parts.

There are some (although now becoming rare) corner shops where you can buy components and boxes. I'm not going to try and mention those shops here, even though they do a good job. This article is about where to get hold of those radio bits and pieces.

KITS OF PARTS

Let me start with kits of parts, or part kits to get you going more quickly. Kits can be of three main types: basic, full and excellent. Since the demise of Heathkit, not many suppliers fall into the top end of excellent. Cost alone makes kits of this type rather more expensive than most of us can afford.

To explain the method of coding kit types, I assume that a basic kit is merely a p.c.b. and the more difficult to find bits. This type of kit may be the cheapest form of building and a degree of knowledge may be necessary to complete it. If you are unsure about your abilities, perhaps you should wait until you feel more confident.

Kits supplied with all

components, and a set of instructions on how to put them all together, are ones that I term full kits. These are the kits that most people will choose, and they



You will find Dick Pascoe G0BPS of Kanga fame at many rallies.

provide excellent value for money.

Some full type kits cross over into the excellent category. In this group you get all the bits, including wire, screws and other hardware parts along with the instructions. This group of kits is good for those starting out in building projects.

Most of the 'homegrown' kits fall into the top end of full and the lower end of excellent, and will be suitable for the vast majority of readers. Some beginners may need help with parts of some projects. If you are unsure, build it with a friend.

COMPLETE HOME-BREW

The final type of project is the complete home-brew, possibly even designing it yourself. If this

type of project is for you, then we have included firms that will supply bits and pieces for your project.

If you don't want to do your own design,

than p.c.b.s are available, from Badger Boards for most previous *PW* projects. Reprints of the various projects are available from the *PW* Book Service. Prices vary, depending on how many issues of *PW* the project appeared in.

KIT SUPPLIERS

Of the kit suppliers we know of, most are to be found at rallies. Many suppliers support low transmitter power working (QRP is less than 5W of r.f.), and are active supporters of the GQRP club. Novice Licence holders should find these kits an ideal, not to mention cheap, entry onto the bands.

Badger Boards can supply p.c.b.s for *PW* kits. John Badger fully supports Novice and Full RAE students. As an instructor he has knowledge of their requirements. He has developed many electronic kits to further the self teaching side of amateur radio.

C. M. Howes Communications have been producing some very good kits for some years. At rallies, Dave is happy to discuss the projects in more detail. The kits are designed to a very high standard and come with information on general soldering and workshop practice (see the audio filter kit review in this issue). The latest kit is the CTU150 antenna tuner handling up to 150W of r.f.

Cirkut Distribution can supply kits for all sorts of projects, many of which are radio related. See their catalogue for more details.

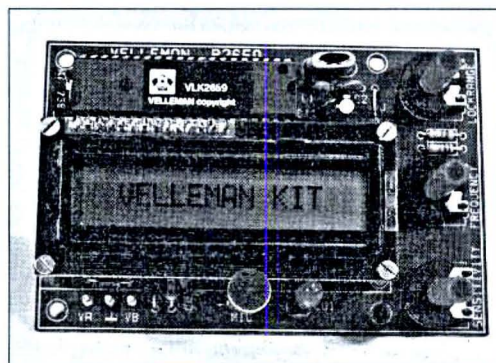
Hands Electronics Kits is a comparatively new name on the kit scene, but one that aims to become well known. Kits are available from test equipment to complex transceivers. See the Hands Kits TCV/7 review elsewhere in this issue.

J.A.B. Electronic Components can supply both kits of *PW* projects, and parts for other projects. Their latest catalogue sheets give details of many kits in a variety of price brackets. They can also supply almost any part you need for your own project.

Jandek manufacture a range of inter-related kits for the radio hobbyist. These kits range from the Noise Bridge that Peter Dodd finds so useful in his 'Antenna Workshop', to full blown transceivers covering most h.f. bands. More details of their range, can be found in their catalogue sheets.

Kanga Products may be found at most rallies. Look out for the Kangaroo sign on the day. Underneath the 'Kangaroo' you'll find Dick Pascoe selling and discussing the G3ROO kits. Kanga supply bits and pieces as well as kits, the kits cover a range of projects, and are suitable for all levels of skill.

Kent Keys make a variety of kits for Morse keys. So, you've

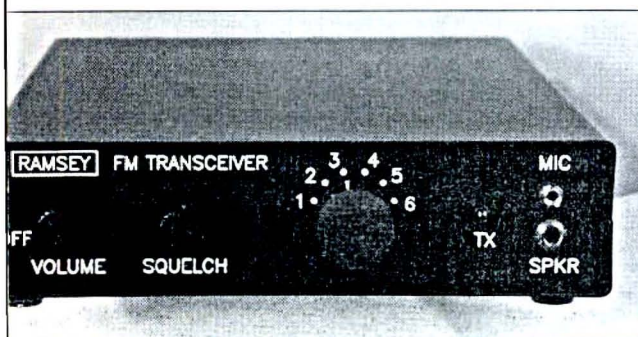


A wide range of Velleman kits are available from Maplin Electronics.

built a transceiver, and that works well, why not build your own Morse key, and make it a full blown home-brew station?

Lake Electronics, another kit manufacturer that has been around for a long time. Alan Lake is heavily involved with Novice Licence training and his kits, 'With all the bits', show this. Only space and a few tools are necessary to complete these kits.

LMW Electronics Ltd. is a comparatively new firm that specialises more in microwave projects, with transverter kits for



Waters & Stanton Electronics import the American Ramsey kits.

the 23, 13 and 9cm bands. They can supply power amplifiers for these bands, along with pre-built preamplifiers for the 934MHz CB frequency band.

Mainline Electronics is one of the best sources for hard-to-get r.f. parts. They also stock kits for some of the projects from the ARRL Handbook. Look out for microwave transverters and v.h.f. or u.h.f. power amplifiers.

Maplin Electronics have a

30mm thick catalogue, available through high street newsagents. Shown in it are many pages of projects to build, along with bits and pieces for your own projects.

Waters & Stanton Electronics stock not only the commercial equipment, they also stock a variety of kits to make. Their catalogue shows that their stock range includes Howes, MFJ and the well known range of Ramsey kits from the USA.

FURTHER READING FOR IDEAS

There are many books that a builder of home brew projects. The following are just a short list of what we feel are useful books. Prices are shown with each book, but please note P&P charges must be added to each order. For more details, refer to the Book Service pages in the Arcade section of *PW*.

ARRL UHF/Microwave Experimenter's Manual is a compilation a various projects for the more advanced builder. £14.50

A Beginner's Guide To Modern Electronics Components by Robert Penfold. £3.95

G-QRP Club Antenna Handbook a book concerning itself with antennas and transmission lines but with some projects to build. £5.00

Hints And Kinks For The Radio Amateur is a compilation of ideas that have been published in *QST* magazine. £4.95

How To Design And Make Your Own PCBs by Robert penfold. Just the book if you want to do it all yourself. £2.50

More Advanced Power Supply Projects All transmitters and receivers need a source of power. Robert Penfold shows you how to make all types. £2.95

QRP Classics, a number of low power (QRP) simple projects for hobbyists. £9.95

Solid State Design For The Radio Amateur designing your own projects with examples to follow. £10.95

Test Equipment Construction Test equipment is often forgotten when building projects at home. This book shows some simple projects to build. £2.95

W1FB's QRP Notebook. Doug De Maw is well known for the quality of his home-brew projects. Another one of the 'W1FB's....' series of books. £7.95

ADDRESSES

Badger Boards, 87 Blackberry Lane, Four Oaks, Sutton Coldfield B74 4JF. Tel: 021-353 9326.

C. M. Howes Communications, Eydon, Daventry NN11 6PT. Tel: (0327) 60178

Circuit Distribution Ltd., Park Lane, Broxbourne, Herts EN10 7NQ. Tel: (0992) 444111 or FAX (0992) 464457.

Hands Electronics, Tegryn, Llanfyrnach, Dyfed SA35 0BL. Tel: (0239) 77427.

JAB Electronic Components, The Industrial Estate, 1180 Aldridge Road, Great Barr, Birmingham B44 8PB. Tel: 021-366 6928 or FAX 021-366 6237.

Jandek, 6 Fellows Avenue, Kingswinford, West Midlands DY6 9ET. Tel: (0384) 288900.

Kanga Products, Seaview House, Crete Road East, Folkestone, Kent CT19 4AU. Tel: (0303) 276171.

R. A. Kent (Engineers), 243 Carr Lane, Tarleton, Preston, Lancashire PR4 6YB. Tel: (0772) 814998 or FAX (0772) 815437.

Lake Electronics, 7 Middleton Close, Nuthall, Nottingham NG16 1BX. Tel: (0602) 382509.

LMW Electronics Ltd. 12 Bidford Road, Braunstone, Leicester LE3 3AE. Tel: (0533) 630038.

Mainline Electronics, PO Box 235, Leicester LE2 9SH. Tel: (0533) 777648/780891 or FAX (0533) 477551.

Maplin Electronics, PO Box. 3, Rayleigh, Essex SS6 8LR. Tel: (0702) 554161. FAX (0702) 553935.

Waters and Stanton, 22 Main Road, Hockley, Essex SS5 4QS. Tel: (0702) 206835 or FAX (0702) 205843.

THE FOLLOWING SUPPLIERS PRODUCE KITS OR SUPPLY PLANS OR PARTS. SPACE DOESN'T ALLOW US TO LIST MORE DETAILS. PLEASE CONTACT THE SUPPLIER FOR MORE DETAILS.

Brian Jordan G4EWJ, 42 Ben Nevis Road, Birkenhead L42 6QY. Tel/FAX 051-643 8506.

(Suppliers of Toko coils and other components)

Bonex, 12 Eleder Way, Langley Business Park, Slough, Berkshire SL3 6EP. Tel: (0753) 49502.

(Heathkit Support)

Cedar Electronics 12 Isbourne Way, Broadway Road, Winchcombe, Cheltenham, Glos GL45 5NS. Tel: (0242) 602402.

Coltec Electronics 330 Brays Road, Sheldon, Birmingham B26 2PS. Tel: 021-722 2429 or 021-628 7839.

Greenweld Electronics, 27 Park Road, Southampton SO1 3TB. Tel: (0703) 236363 or FAX (0703) 236307.

Marco Trading, The Malting, High Street, Wem, Shrewsbury SY4 5EN. Tel: (0939) 232763 or FAX (0939) 233800.

(Plans Only)

F. G. Rylands, 39 Parkside Avenue, Millbrook, Southampton SO1 9AF. Tel: (0703) 775064

Spectrum Communications, Unit 4, Grove Trading Estate, Dorchester. Tel: (0305) 262250.

InterTAN (Tandy) UK Ltd., Tandy Centre, Leamore Lane, Walsall, West Midlands. Tel: (0992) 710000.

(PW Tiny TIM)

Walford Electronics, Upton Bridge Farm, Long Sutton, Langport, Somerset TA10 9NJ.

REVIEW

As a keen home-brew enthusiast, the Rev. George Dobbs G3RJV is very willing to encourage others to 'have a go' and he's tried out a transceiver kit from Hands Electronics, a relatively new name to the amateur scene in the UK.

The Hands Electro Transceiver Kit



One of my earliest amateur radio mentors always maintained that his ideal evening "was a good pipe of tobacco and a few watts on forty metres". Thirty years ago 7MHz was probably a more user-friendly band, but it still has the potential to give a lot of enjoyment with a modest amount of power.

Some time ago I reviewed the Hands RX1 Superhet Receiver kit for 3.5MHz. I found it capable of producing good results, so I was interested to try the TCV/7, a development from the RX1 receiver circuit to a 7MHz 10W c.w. transceiver.

SUPERHET RECEIVER

The TCV/7 is a superhet transceiver in kit form. It has the now familiar NE602, MC1350P, NE602, LM386 line up in the receiver.

It may be a popular arrangement, but the TCV/7 line-up requires quite a few touches of design skill to achieve the optimum results. The NE602 is not the world's best front end mixer and many a superhet transceiver has been thwarted by a poor i.f. filter.

The TCV/7 includes a

separate v.f.o. with RIT (receiver off-set tuning) circuitry. The first NE602A receives the antenna input via a three-pole Butterworth type bandpass filter.

The signal is then matched into the i.f. crystal filter. This filter is a 4-pole ladder type using 4.4336MHz crystals, which are mass produced for use in colour televisions.

The builder can opt for two nominal bandwidths, 2.2kHz or 500Hz. The MC1350 i.f. amplifier has a manual gain control but a.g.c. may be added with an optional board.

The second NE602A functions as a combined b.f.o. and Product Detector and feeds the LM386 Audio Amplifier.

THE TRANSMITTER

The transmitter takes the v.f.o. signal and mixes it, in another NE602A, with a crystal oscillator. The resulting signal passes through a band-pass filter terminated with a Pi attenuator with resistance values to set the output power of the transmitter.

The TCV/7 is somewhat unusual in having an LM6321 buffer. This device has the ability to accept a high impedance input

and drive a low impedance load.

The LM6321 drives a 2N3353 transistor in Class A feeding a 2SC1969 power amplifier. The 2SC1969 is rated at 18W, but in the TCV/7 is run at under 10W output. A 3-pole, 7-element, low pass filter cleans up the signal for transmission.

The control circuit offers semi-break-in facilities. This changes the circuitry from receive to transmit and mutes the receiver to allow monitoring of the signal.

THE KIT

The TCV/7 Kit is supplied with two printed circuit boards (main board and v.f.o.) all the components and a comprehensive manual. A case kit is also available at extra cost.

The p.c.b.s are high quality glass fibre boards. They are fully tinned and have all component placings screen printed on the top side. The manual layout drawings show exact copies of the placement markings at about twice the size.

EASY BUILD

It was easy to build the kit when following the "tick as you go"

Electronics TCV/7 CW

method of the manual. Most of the inductors are ready wound but there are some which need to be wound by the constructor.

The only likely problems could occur with the coupling transformers. But to overcome this, a series of simple drawings show how these are wound.

COMPREHENSIVE SECTIONS

The manual contains a comprehensive test and alignment sections. The only test equipment required is a high impedance multimeter, a general coverage receiver, a 50Ω dummy load and a power meter.

The text describes how a simple power meter can be made. Hands Electronics have also worked out the v.f.o. tuning values very well. The transceiver I built tuned across the required range within a couple of minutes.

After the d.c. checks on the main board, I switched on and could hear amateur signals immediately. I heard DL3KKN calling CQ.

So, throwing caution to the wind, I called DL3KKN on the unaligned TCV/7 into my doublet antenna. He came straight back and gave me a report of RST589 from Bonn! Feeling pleased, I carried out the rest of the alignment procedure.

INPUT FILTER TIP

The input band-pass filter can be aligned using signals on the band and I've a small tip here. It's tempting to peak for maximum noise. On 7MHz this is unwise because you can be peaking adjacent broadcast signals.

The best method is to choose a weak signal. Then tune for maximum before slightly detuning until the background noise reduces without much loss of the required signal.

The provided values for the Pi attenuator pad, which controls the

transmitter output, produced 7W of r.f. output. Slightly more or much less is possible by changing the values.

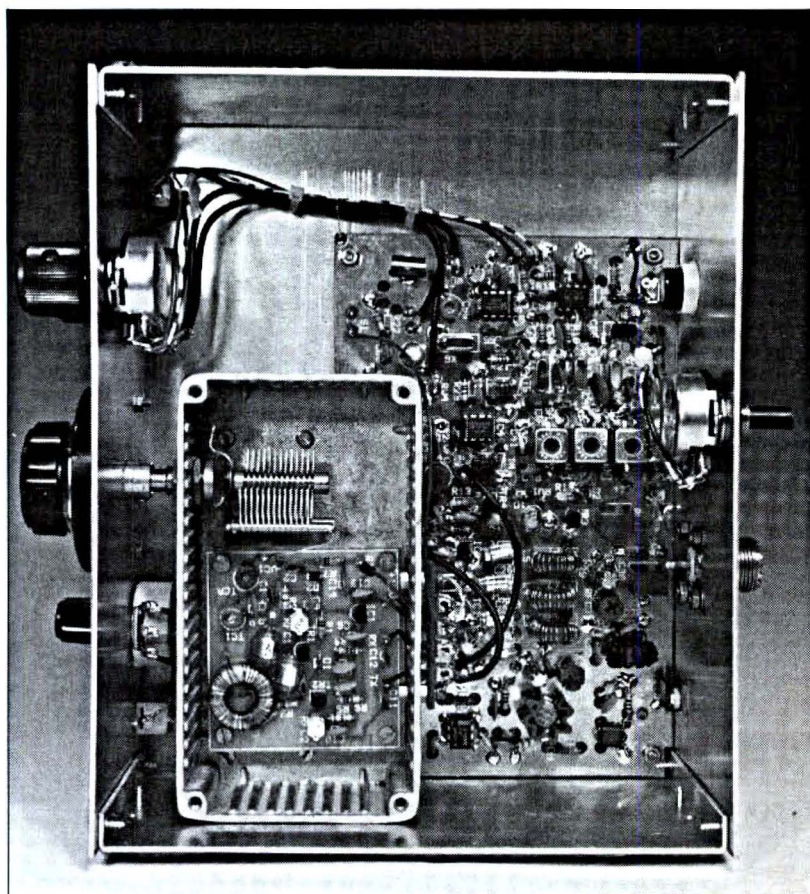
In a few evenings of casual use, I worked all across Europe with the 7W and the simple doublet antenna. I opted for the 500Hz ladder filter values and I was amazed at how well it worked for such a simple filter. It produced very pleasant c.w. reception.

I had two criticisms of the kit. The muting of the receiver was poor on the highest setting of the i.f. gain control. The control voltage could not override the effect of the front panel control.

Also the reset on the r.i.t. was not centred. I telephoned Hands Electronics about these two points. As a result of our discussion changes have been made to the values in both circuits.

Sheldon Hands told me he welcomes feedback from kit buyers. He also offers a telephone help service. **PW**

Fig. 1: Inside view of the transceiver as completed by Rev. George Dobbs G3RJV.



SUMMING UP

In summing up, I must say that I liked the TCV/7. It was easy to build, easy to get working and gave pleasing results. The input filter handles 7MHz very well during the difficult evening conditions.

I feel that the TCV/7 could make a main rig for a modest amateur station. Set to 5W output, the rig would be a worthwhile QRP transceiver for 7MHz.

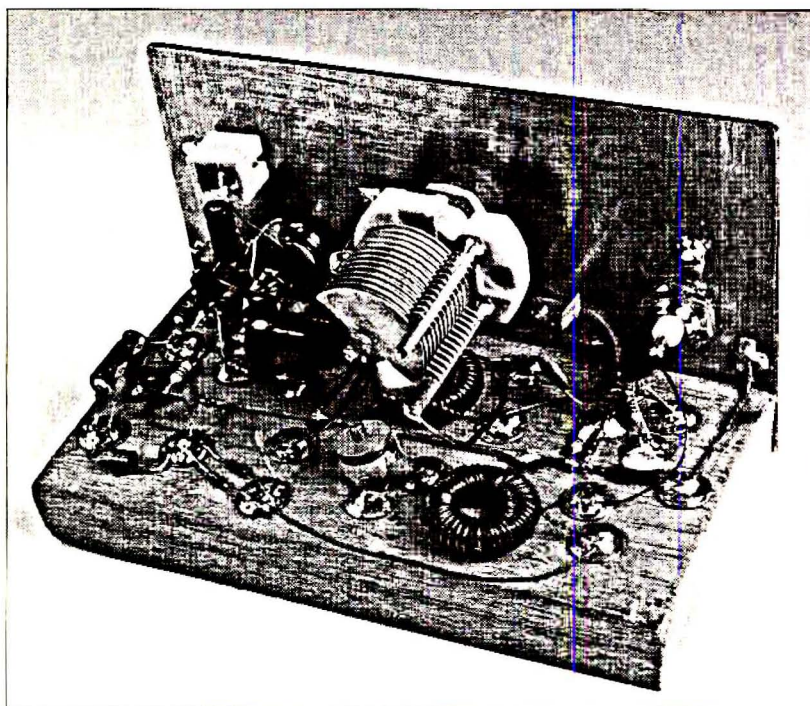
My thanks go to Sheldon Hands of Hands Electronics at Tegryn, Llanfyrnach, Dyfed, Wales SA35 0BL. Tel: (0239) 77427 for supplying the kit for review. The TCV/7 kit costs £85 plus £2.50 Postage and Packing.

Prices for the case kit and the a.v.c./audio filter kit are available on application.

Back To The Drawing Pin Board

The Drawing-pin board 7MHz direct conversion receiver project described by Steve Ortmyer G4RAW.

Steve Ortmyer G4RAW is very keen to encourage others to rediscover basic construction. So, he collared the entire stock of drawing pins in Yorkshire to come up with a simple 7MHz receiver using his practical drawing-pin and board method. Try it out - rediscover radio construction!



In Milan in 1398, a row broke out when the builders of the Cathedral were accused of not sticking to accepted theory. "Theory is one thing, practice is another" they said. They did not know much theory, but they knew how to build a Cathedral. Well, Milan

Cathedral is still there, so perhaps they were right!

The same is true of some radio amateurs who may not know much theory, but have some good practical ideas. Doug DeMaw W1FB is someone who knows all the theory and all the practice as

well! This simple d.c. receiver is based on ideas in his *Design Notebook* which is full of great projects.

THE CIRCUIT

The circuit is laid out on drawing pins to follow the

circuit diagram. The v.f.o. can be built first and checked for output with a diode probe.

The frequency covered can then be checked by listening to it on a receiver or with a frequency counter. You may have to experiment with the number of turns or

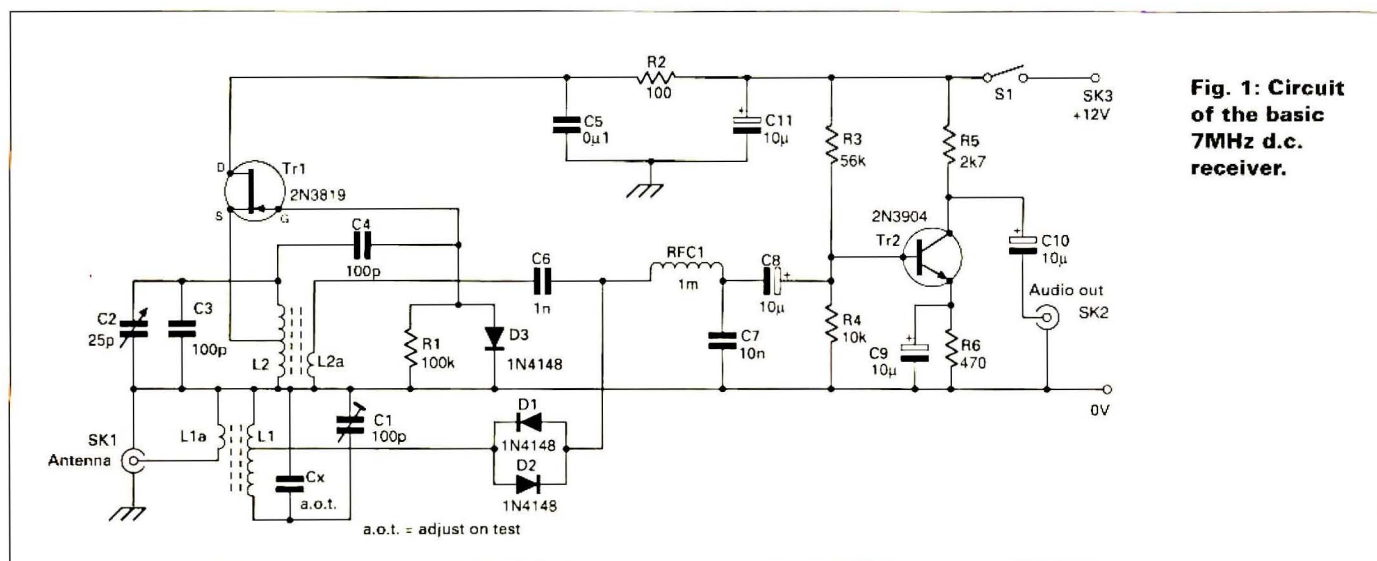


Fig. 1: Circuit of the basic 7MHz d.c. receiver.

Communications In The Red Zone

Adrian Knott G6KSN has come up with a rather novel approach to amateur communications using electromagnetic waves. Adrian's system uses the infra-red end of the spectrum to avoid the crowded bands and provide a rather 'different' project.

I've always been fascinated by the different ways of electronically processing speech and sending it to some remote location via electromagnetic radiation. This circuit uses a frequency modulated subcarrier superimposed on a main carrier at 319THz (940nm).

The system I'm describing is immune to most forms of interference which its a.m. counterparts suffer from very badly. It also has a good range and introduces very little distortion to the original signal and would be ideal for data transmission up to at least 2400 Baud.

PROJECT ORIGINS

The project origins started when I tried out an a.m. baseband system. The received audio quality was

excellent but it was very severely affected by mains hum from any incandescent bulbs in the vicinity.

Additionally, the original system had no a.g.c. So, as a consequence, I had to re-think the situation.

If an l.e.d. is pulsed on and off very quickly and the speed of the pulses is altered in sympathy with the desired audio, an f.m. signal superimposed on the light carrier will be created.

I eventually chose 65kHz for the centre frequency. This is a compromise between being able to switch the l.e.d. cleanly and modulator linearity.

The receiver can now be 'tuned' to 65kHz. The input signal is limited and then fed to a frequency discriminator/demodulator, and there's no more mains

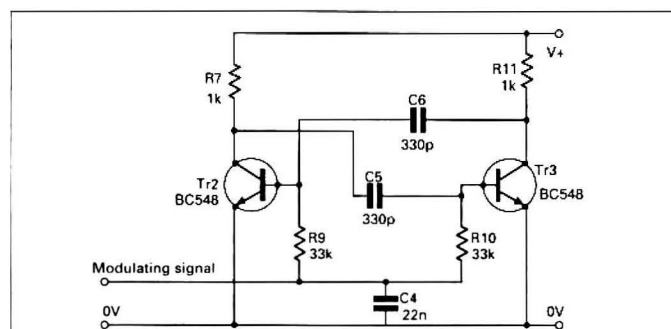


Fig. 1: A simple square wave generator, capable of being frequency modulated, forms the basis of the G6KSN infra red communications project (see text).

hum since the receiver is tuned well above the mains frequency.

With the new approach there are no more problems with received audio level. This is because it will remain constant (for a given deviation) and only the signal to noise ratio will change (the noise gradually increasing as the signal gets weaker).

THE TRANSMITTER

Let's now take a look at the transmitter. A simple square wave generator, capable of being frequency modulated in the form of the astable multivibrator is shown in Fig. 1.

The transmitter output

frequency, being proportional to V_{in} . (within limits) is ideal for the purpose. The final circuit is shown in Fig. 2.

The input from R2 via the pre-emphasis components R1 and C1 is fed into the base of Tr1 via C2. The transistor Tr1 forms an audio amplifier which provides the modulating voltage for the astable multivibrator, Tr2 and 3, whose free running frequency is set by R5 to 65kHz (peak deviation is about ± 12 kHz).

The collector of Tr3 whose output is a square wave, is fed to the voltage follower/buffer Tr4. The transistors Tr5 and 6 form the output driver and are configured as a Darlington pair.

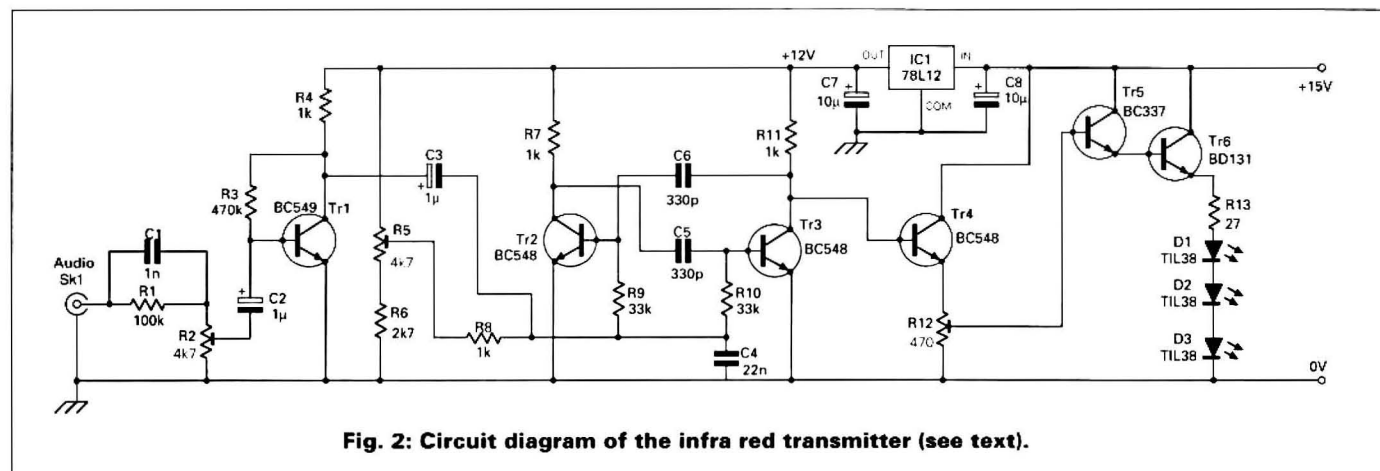


Fig. 2: Circuit diagram of the infra red transmitter (see text).

The resistor R13 serves as a current limiter. It can be used to monitor the diode drive which is set by R12 and must be set such that the i.e.d. (s) are not over-driven.

RECEIVER CIRCUIT

The receiver circuit diagram is shown in Fig. 3. The infra-red signal is received by D4 which is d.c. coupled to the wideband amplifier Tr7.

The output of Tr7 is capacitively coupled to the tuned circuit formed by C10 and L1. The now filtered output is fed to the base of Tr8, this is another amplifier which brings the signal level up sufficiently to directly drive the TBA120S f.m. limiter/detector.

The capacitor C13 is included to roll off the very high frequencies which may otherwise cause instability. The capacitors C16 and 18 are included to enhance the low frequency response of the i.c. This is because the internal capacitors are for use at typically 10.7MHz, and they don't provide adequate coupling in this application.

The tuned circuit formed by L2, C17 is damped by R20. This damping effect is in order to improve the bandwidth and thus minimise distortion.

The demodulated output is taken from pin 8 of the i.c. via C20. The capacitor C19 is part of the de-emphasis noise reduction circuitry.

Variable resistor R21 sets the audio level. It also feeds into op-amp IC3 which is biased to run from a single rail. The transistors Tr9 and 10 form the audio output stage, the standing current

being set by R29.

The main feedback path is via R26 and 27, and C24. These components set the gain of the amplifier and also help to minimise distortion.

The loudspeaker is a.c. coupled to the emitter junctions of Tr9 and 10. These devices should preferably be matched for gain (H_{fe}).

CONSTRUCTION STRAIGHTFORWARD

Construction is quite straightforward and the two units can be built on Veroboard or in similar fashion. Layout is not critical because the frequencies handled are not high.

If full duplex working (two-way operation) is required then obviously two of each circuit will be required. By carefully positioning the TX and RX diodes and employing a screen between them, telephone style conversation can be achieved.

Incidentally, L1 should not be mounted directly next to L2 otherwise the receiver may tend to self oscillate. In my prototype these inductors were mounted about 75mm apart.

The diodes should be fed remotely via screened cable. But watch the capacitance of the cable used to connect the receive diode since the impedance is rather high.

Unscreened cable should not be used. If you do, it may cause the transmitter to radiate or the receiver to pick up one of the v.l.f. transmissions such as MSF on 60kHz.

SETTING UP

When the construction stage is completed you can start setting up. Begin by checking the boards for any unwanted solder bridges, etc.

If all appears to be well, you can set the receiver R21 to minimum volume. Then set R29 to minimum resistance and with a multimeter (set to read milliamps) in line, apply 12-15V to the receiver.

The current consumption should be very low, about 10mA. If it's much more than this, switch off immediately and check for shorts on the board.

If all is well, advance R29 so that the current rises by 2-3mA. Then turn up R21 and white noise should be heard on the loudspeaker.

Now you can start with the transmitter. Turn R2 to minimum, R5 to its central position and R12 to minimum.

MONITOR CURRENT

Now apply 15V and again monitor the current which should be only a few milliamps. Next, you can rotate R12 clockwise and the current should start to increase.

If all is well, disconnect the meter and re-apply power. Set the meter on the low volts range (0-3V typical) and monitor the voltage across R13.

Now you can adjust R12 for the required drive level, i.e. $I_{av} = V/27$. So, for 1, 2 or 3 TIL38s this can be set about 75mA or 2V on the test meter.

If more than three diodes are to be used, it's better to

add another feed resistor from the emitter of Tr6. But of course each resistor/diode combination should be identical. Watch also for the temperature of Tr6, as a heatsink may be required for large stacks.

You can now adjust R5. And if a frequency counter is available this may be set precisely to 65kHz by monitoring the emitter of Tr4.

If a frequency counter is not available, R5 can be set approximately by placing the transmitter unit close to a long wave receiver. The receiver is then tuned to the harmonics.

WHISTLE TUNED

The harmonics should occur at 195 and 260kHz. A 3kHz whistle should be heard when tuned to Radio 4 at 198kHz. But, make sure by checking at 260kHz because it may be oscillating at 48.7kHz (4th harmonic 195kHz).

Once the receiver is tuned, apply audio line level to the transmitter (about 500mV r.m.s.) and set R1 at the midway point. If the transmitter is now brought close to the receiver, the receiver noise should reduce and audio should be resolved.

Now adjust L2. Then you should separate the transmitter and receiver until the signal becomes noisy. Then adjust L1 on the receive board for best signal to noise ratio.

If the core of L1 has to be screwed fully in, then C10 can be increased to 27nF and L1 retuned (in practice this is unlikely to happen). The units are now aligned and may be installed.

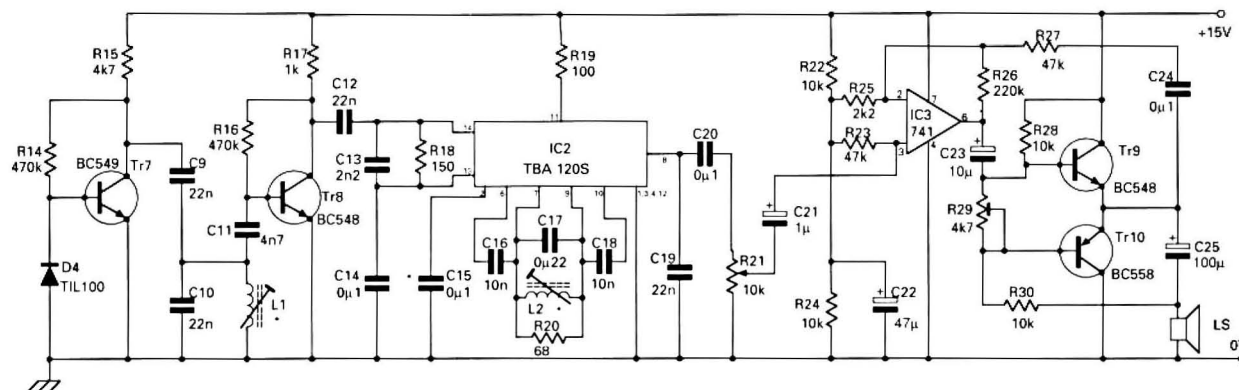


Fig. 3: Circuit diagram of the infra red receiver developed by G6KSN (see text).

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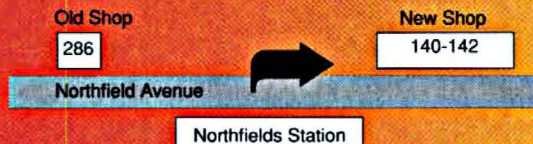
SPC-300D Roller Coaster, 300W RMS, 1kW pep
SPC-3000D Roller coaster 1kW RMS, 3Kw pep

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READY FOR USE

The infra-red units are now ready (reddy?) for use. If the required path is indoors then no more needs to be done. If, however, the path is long or is in a brightly lit location, then a tube fitted over the receive diode should minimise interference from the sun, etc.

If the path is very long but still 'optical' then lenses may be required. Placing the transmit (only one is used now) and receive diodes at the focal lengths of converging lenses (Fig. 4) depending on lens quality, ranges of several kilometres should be possible.

In general if the path is 'optical' and the lenses are sufficiently good, then the system will work. For ranges up to 1km lenses of 32mm diameter should be adequate.

The receive diode should be mounted in a tube. I found that plastics drainpipe works well, as this minimises incidental radiation from the sun.

Communications via obstructed pathways are also possible, providing that some means of scattering the light round the obstruction is available. Signals via scatter of reflection from buildings are likely to be very weak.

OBSTRUCTED PATHWAYS

With obstructed pathways, large lenses giving high 'gain' must be used in order to obtain an acceptable signal to noise ratio. With any lenses in use, the 'beam' is very tight and alignment will be critical (to within a couple of degrees in both horizontal and vertical directions, so be warned!).

I recommend that a tilt and pan mount should be used and it must be

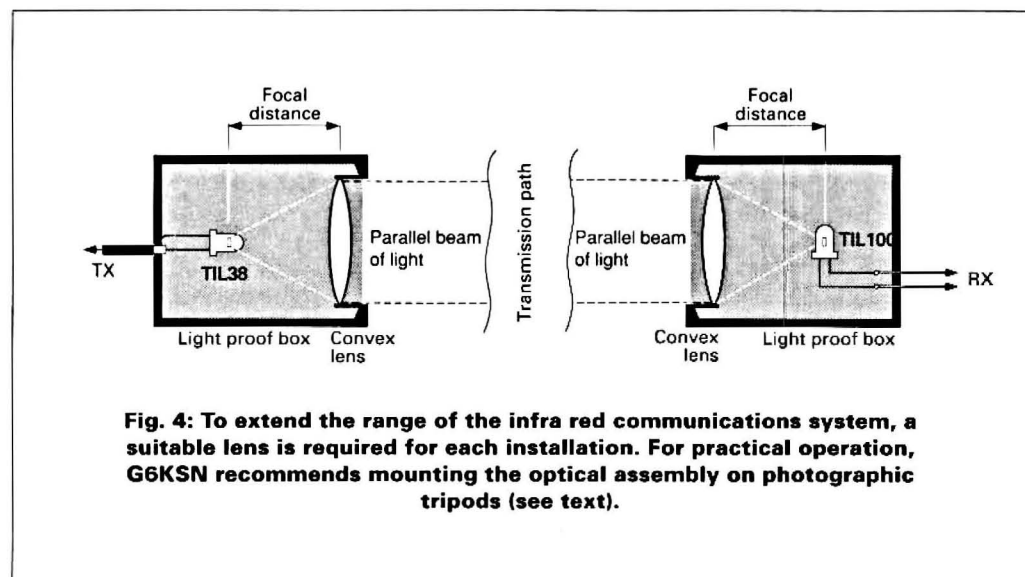


Fig. 4: To extend the range of the infra red communications system, a suitable lens is required for each installation. For practical operation, G6KSN recommends mounting the optical assembly on photographic tripods (see text).

mechanically very stable. For portable use, a photographic tripods work well.

I've also got a tip about the weather. If the diodes are to be mounted for outdoor use, it's a good idea to weatherproof the installation to prevent the ingress of moisture.

HOURS OF FUN IN THE RED ZONE

In use, the unit has proved reliable and has provided me with hours of fun experimenting with various pathways, etc. I hope my 'red zone' project will be of use to others either for fun, or

perhaps some more serious work in this fascinating part of the electromagnetic spectrum.

PW

SHOPPING LIST

Resistors

Carbon/Metal Film 1W 5%		
27Ω	1	R13
Carbon/Metal Film 0.4W 5%		
68Ω	1	R20
100Ω	1	R19
150Ω	1	R18
1kΩ	5	R4, 7, 8, 11, 17
2.2kΩ	1	R25
2.7kΩ	1	R6
4.7kΩ	1	R15
10kΩ	4	R22, 24, 28, 30
33kΩ	2	R9, 10
47kΩ	2	R23, 27
100kΩ	1	R1
220kΩ	1	R26
470kΩ	3	R3, 14, 16
Skeleton Preset (Linear law)		
470Ω	1	R12
4.7kΩ	3	R2, 5, 29
Skeleton Preset (Linear law)		
10kΩ	1	R21

Capacitors

Miniature disc ceramic		
1nF	1	C1
2.2nF	1	C13
4.7nF	1	C11
10nF	2	C16, 18
22nF	5	C4, 9, 10, 12, 19
Miniature Polyester		
100nF	4	C14, 15, 20, 24
220nF	1	C17
Miniature Polystyrene 5%		
330pF	C5, 6	
Miniature electrolytic 16V working		
1μF	3	C2, 3, 21
10μF	3	C7, 8, 23
47μF	1	C22
100μF	1	C25

Inductors

L1	50t close wound enamelled copper wire (e.c.w.) on a 5mm former with a ferrite core.
L2	100t pile wound e.c.w. on a 5mm former with a ferrite core.

Semiconductors

Transistors

BC337	1	Tr5
BC548	5	Tr2, 3, 4, 8, 9
BC549	2	Tr1, 7
BC558	1	Tr10
BD131	1	Tr6

Diodes

TIL38	3	D1, 2, 3 (or any infra-red transmitter diodes)
TIL100	1	D4 (or any infra-red detector spectrally (colour) matched to Ds 1-3)

Integrated circuits

'741	1	IC3 (any manufacturer)
78L12	1	IC1 (any manufacturer)
TBA120S	1	IC2

MISCELLANEOUS

Interconnecting wire, miniature coaxial cable, suitable boxes and hardware to house the project, plugs and socket to suit, lenses and housing (optional), loudspeaker, a regulated 15V power source.

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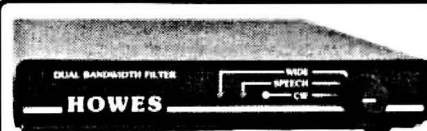
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		Kit	Assembled PCB
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CTX	QRP CW Transmitter, 40M or 80M versions	£15.50	£22.90
MTX20	20M 10W (adjustable) CW Transmitter	£29.90	£39.90
HTX10	10 & 15M SSB/CW Exciter (inc crystal filter)	£49.90	£79.90
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73 from Dave G4KQH, Technical Manager.

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2M16dx, 16 element, 14.5dBd, 9.4M boom
2M14dx, 14 element, 13.8dBd, 7.7M boom
2M12dx, 12 element, 13.0dBd, 6.1M boom
2M10dx, 10 element, 12.0dBd, 4.6M boom
2M8s, 8 element, 11.0dBd, 3.6M boom
2M6s, 6 element, 9.5dBd, 2.5M boom
2M3s, 3 element, 7.0dBd, 1.0M boom

SEVENTY CENTIMETRES

70CM30dx, 30 element, 17.5dBd, 7.0M boom
70CM24dx, 24 element, 16.3dBd, 5.4M boom
70CM18dx, 18 element, 15.0dBd, 3.7M boom
70CM12s, 12 element, 12.9dBd, 2.0M boom
70CM6s, 6 element, 9.5dBd, 1.0M boom

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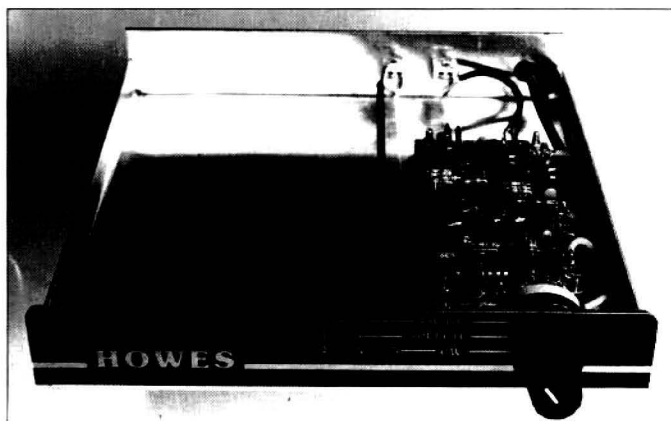
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The Howes Communications ASL5 Audio Filter Kit

Tex Swann G1TEX, the PW Technical Projects Sub-editor has been busy building an interesting filter kit from the well known C. M. Howes Communications range.

The Howes Communications dual bandwidth ASL5 filter kit, built into the associated HA50R enclosure.



One of the main features to be found on a modern commercial transceiver or receiver, must be a variable bandwidth control. This effectively sets the audio bandwidth to suit the incoming signal type.

In operation, you set the bandwidth control wide for listening to broadcasting stations. It's then set to narrow for speech on single sideband (s.s.b.) mode or very narrow for Morse. (c.w.)

On many commercial transceivers or receivers this control is actually applied at one, or other, of the i.f. frequencies. However, when constructing a simple set for everyday use, this technique may not be easy or cheap to apply.

Fortunately, it's possible to

kit, its specifications, and what tools were required. There's also one and a half pages of important Do's and Don'ts for kit builders.

As this is a review of a kit, I decided to follow the assembly instructions to the letter. So, beginning on the third page, I was instructed to insert the terminal pins into lettered holes on the p.c.b.

FULL MARKS

I awarded full marks to the Howes instructions for two small diagrams. These showed a terminal pin and how it should look when inserted into the board.

Then it was on to the resistors. In the instruction sheets,

There follows two pages of advice and diagrams of linking the ASL5 board into a typical set-up. It was all very easy to follow and p.c.b. assembly took about three hours.

The final page of instructions includes the full circuit diagram. This reveals that the units are twin dual cascaded filters followed by an audio amplifier.

An audio level control is fitted in the narrow band filter output. This allows the subjective level on c.w. to be brought up to the other two bandwidths.

BOXING IT UP

My next job was to start boxing the project up. I had chosen the C. M. Howes Communications HA50R to compliment the filter kit.

The housing kit consists of two pre-formed pieces of heavy gauge bright aluminium sheet. One piece, which becomes the bottom, has a neat screen-printed panel already fitted to the pre-punched front panel.

I only had to drill four 3mm holes for panel mounting bolts which were supplied. I then had to drill three larger diameter holes for the power cable (grommet supplied) and for two 3.5mm jack sockets (also supplied).

Marking out, drilling the holes and mounting the p.c.b. was not difficult. But this work and making a fairly neat job of wiring the three l.e.d.s that show the selected bandwidth, took me another four hours.

It took me four hours to complete the job because I had to hunt for some suitable hook-up wire. I also had to find a length of audio coaxial cable.

The lack of the audio coaxial cable has to be a (largish) minus point I'm afraid. I would have felt disappointed to have arrived at this point as a beginner on a

Sunday afternoon, to find that I needed some other wire to get it up and running, as it's not mentioned in the instructions.

Dave Howes commenting on the review said "Audio coaxial cable is not required for wiring the module within the screened metal case, only for the external inter-connecting jack leads. It's non inclusion in the hardware pack is because it is not required".

SUMMING UP

In summing up, I must say that the project worked very well indeed. I tried the completed project out on the PW Tiny TIM in the middle of the evening on a very crowded 3.5MHz band segment.

On switching to the **Speech** filter the incoming audio became much cleaner and easier to listen to. Off frequency signals were reduced from annoying, to just about audible but of no concern.

I could hear a few c.w. signals. But with my poor ability to read Morse code, and the general babble of other signals I would have given up had I not tried the **Narrow** setting of the unit.

When switched to **Narrow**, and with a little retuning to bring the c.w. tone into the passband of the filter, the Morse became much more readable. I even found it easier to identify the few Morse characters I do recognise.

I think the project provides an excellent add-on for radio listening. I would rate the pair of kits as ideal for the beginner and the more experienced builders.

My thanks go to C.M. Howes Communications at Eydon, Daventry, Northamptonshire NN11 6PT, tel: (0327) 60178, for the two kits which they can supply for £29.80 plus £4 p&p.

PW

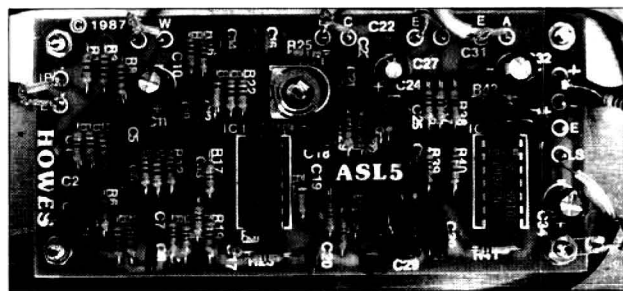


Fig. 1: Close-up photograph of the completed ASL5 dual bandwidth audio filter, as built by Tex Swann G1TEX.

add an audio bandwidth limiter after demodulation. In essence, this is what the C. M. Howes Communications ASL5 is.

TOP QUALITY

The ASL5 kit arrived well packed with top quality components. Along with the silk-screened p.c.b. and components in sealable plastics bags were six A4 pages of instructions.

The first two pages of the instructions consisted of general information. These described the

the resistors are listed in ascending value order. Each value has its colour code shown along with the positions to receive those values. Again, I awarded full marks for two more small diagrams showing how to read the colour code.

Then I came to the capacitor installation stage. Their value markings were also described more than adequately, along with the positions to be filled. I was also impressed with the paragraph on how to identify the '+' and '-' leads of electrolytic capacitors.

Static Control And The Constructor

How often have you been walking into a department store and received a static shock as you have touched the counter? Apart from the pain and the surprise, just consider the effect this could have on electronics components.

It's worthwhile to return to the basics, remembering those science experiments from school. You'll probably remember that some materials when rubbed cause a static charge to be built upon them.

The effect is called triboelectric charging (from the Greek 'tribein' to rub). This varies in both type of charge (negative or positive) and potential, which is based upon the triboelectric series of the materials in question.

Varying surface conditions make it difficult to get a reliable indication of the resulting charge, so I've not shown that table. However, it's enough to say that the further apart the two materials are in the series, the greater the potential.

BODY CHARGE

Walking across a floor causes your body to charge up. It does so in the same way as the science experiment charged up the material.

In fact, any movement causes your body to become charged. As

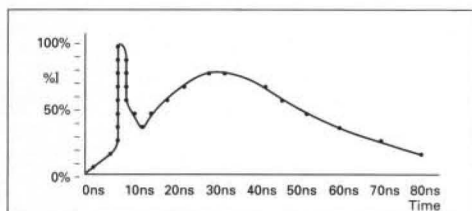


Fig. 1: A rough graphical model of the discharge current waveform for the human body (see text).

you are insulated from the floor by your shoes, the charge obviously goes somewhere!

In practice, as soon as you touch an earthed object (a large metal body can be classed as an earth), the potential is discharged and that's when you'll say "Ouch"! And surprisingly perhaps, the average human sensation level for static discharges is about 3000V.

The human body can be regarded roughly as 100-300pF bulk 'capacitor' with a discharge resistance of 50-5000Ω. Female radio enthusiasts usually have a slightly higher capacitance due to thinner soles on their footwear. A rough model of the discharge current waveform for the human body is shown in Fig. 1.

Some examples of the voltage that can be developed while

carrying out the normal day to day shack operations are shown below.

Walking across a carpeted floor: up to 35000V

Walking across a vinyl floor:

up to 12000V

Working at the bench in the shack: up to 6000V

Picking up a polythene bag from the bench: up to 20000V

Standing up from your seat and stretching: up to 1000V

If you reduce your capacitance by sitting on a stool and lifting your feet from the floor, as $Q = CV$ (Q = charge, C = capacitance and V = voltage), Q will remain the same but as the capacitance has decreased (roughly halved), the voltage will increase (roughly doubled).

As your capacitance and voltage vary by the same factor, your stored energy value ($= 1/2 CV^2$), also increases in proportion to the reduction in capacitance. Sceptics may ask where this energy has appeared from! The answer is that it's from the mechanical effort of lifting the foot.

LIMIT TO VOLTAGE

There is a top limit to the voltage that you can charge your body up to. This is due to the finite minimum capacitance that your body has (in the region of 30pF) and the corona which will bleed off charge around 35000V.

Now look at the data available for the susceptibility of some electronic devices, as shown in Table 1. From the data it's obvious that if nothing is done to try and reduce the potential on your body, serious damage is likely to occur to electronic devices.

The problem of high static voltages is but one difficulty. Another is caused by the rise time of the current peak of the discharge, and this is an important consideration.

For example, discharges from the end of the finger have a relatively slow rise time which may damage devices. However, discharges from the end of a screwdriver etc., produce the shortest rise time which is almost guaranteed to destroy the device.

Devices are reported to fail in the following ways:

1: Junction burnout. When a semiconductor junction is carrying high current, the junction melts.

2: Dielectric breakdown. When the insulating silicon dioxide layer



Steve Best G6EJP takes at look at the causes of the many problems caused by static charges. Steve also provides tips on how you can minimise problems in the workshop.

Fig. 2: A Residual Current Circuit Breaker (see text).

of the device is punctured. (This may also refer to the capacitors). **3: Metallisation melt.** When the bond wires inside the device act as fuses.

Now we have some idea about the values involved, what can the amateur do to reduce the risk of damaging his precious components. Remember, that even when a device is in a p.c.b., damage can still occur, so rigs under repair are at risk too.

The storage of components is a good area to start with. So, try answering the three questions below:

Do you?

1: Use small plastic bags to hold loose components in?

2: Use polystyrene to avoid bending legs of components?

3: Use polystyrene ceiling tiles to push components into during assembly?

If you are like me, most of you will admit to answering yes to at least one, if not more of the three questions.

Unfortunately, by using the three methods outlined in the questions you're likely to 'kill' devices or at least reduce their efficiency or working life.

One solution is to store components in the tailor made plastics bags which have a dissipative coating. Or if that's not possible, how about plugging the components into the black conducting foam used in the electronics industry for holding components, then putting them into the bags? To protect them, Dual In Line (DIL) i.c.s can be stored in i.c. tubes as these are specially treated.

BLACK FOAM

The black foam is also useful for holding components during assembly. This is because working on the bench is a hazard unless

the surface is of the static dissipating type.

Work mats are available but quite expensive, but are well worth the expense if you do lots of construction. For the occasional constructor, a large static dissipative bag, cut open and connected to earth via a crocodile clip with a 20MΩ resistor in series with the lead, is better than nothing. (Remember of course that only the inside of the bag is static dissipating, so this side must be upwards facing).

How about investing in an anti-static wrist strap, which when connected to the wrist and a suitable earth point, will discharge these potentially device 'killing' voltages, safely?

(Warning: these straps have a high value resistor in series with the lead, and home-brewed straps could be dangerous).

Suitable wrist straps and earth point plugs are available from most mail order suppliers. A Residual Current Circuit Breaker

Device Type	Range of vulnerability
VMOS	30-1800V
MOSFET	100-200V
GaAsFET	100-300V
JFET	140-7000V
OP-AMP	190-2500V
CMOS	250-3000V
Bipolar transistor	380-7000V
TTL device	1000-2500V

Table 1: Killer voltages for common components.

(RCCB) on the shack mains will help avoid risk of shock.

A humid atmosphere will help reduce the values of the static charge. But I would advise against buckets of water in the shack!

Remember, that if you are working with high voltages, and you are connected to earth via a wrist strap, it could be lethal. All good shack safety precautions must be taken, so it's better to kill a component than kill yourself!

PW

Specifications - The Mysteries Explained

IF THERE'S ANY ASPECT OF EQUIPMENT SPECIFICATIONS PUZZLING YOU, PLEASE WRITE AND LET IAN POOLE KNOW. WRITE TO 'SPECIFICATIONS - THE MYSTERIES EXPLAINED', C/O OF THE PW OFFICES IN BROADSTONE.

Ian Poole G3YWX begins to unravel the mysteries of equipment specifications in the first part of a series of articles. And to start off Ian deals with receiver selectivity.

One of the most important features of any radio is its ability to pick out the required signal and reject the unwanted ones on other frequencies. This characteristic called selectivity is at the heart of any receiver. As a result, receivers boast a number of figures and specifications about their selectivity characteristics.

ACCEPT AND REJECT

The selectivity of the receiver which enables it to accept the wanted signal and reject others on adjacent channels is governed chiefly by the selectivity in the i.f. stages. In the i.f. stage a high quality crystal filter is generally used in most of today's receivers.

Crystal filters allow exceedingly high levels of selectivity to be achieved. They often render signals inaudible when they are just a few kilohertz off channel.

To investigate how selectivity specifications are quoted it's necessary to look at the characteristics of the filters which are used. In an ideal world a filter characteristic would look like that shown in Fig. 1.

From Fig. 1 you can see that a signal will suffer no attenuation within a certain band of frequencies known as the pass band, and it will be heard in the receiver speaker. Outside this band is the stop band where the signals are highly attenuated, and consequently can't be heard.

A PERFECT FILTER

Unfortunately it is not possible to make a perfect filter. A more realistic characteristic with a number of imperfections is shown in Fig. 2. It can be seen that there is a small amount of loss, often about 2dB.

The loss caused by a filter is not important as far as the overall

receiver specification is concerned, as it is overcome by the receiver gain. Similarly the ripple in the pass band, or the in-band ripple is not normally quoted.

Because the filter response does not fall away infinitely fast it's necessary to choose a point on the response where the pass band can be defined. This is normally taken to be the point where the response has fallen by 6dB, i.e. to half the voltage or a quarter of the power.

The pass band is then the band width between the two -6dB points. To be totally correct the pass band is

In fact to give an indication of the shape of the filter response a 'shape factor' is sometimes quoted.

The shape factor is simply the ratio between the pass band and the stop-band bandwidths. Thus a filter having a bandwidth of 3kHz at -6dB and 6kHz at -60dB would have a shape factor of 2:1. For this figure to have real meaning the two attenuation figures must also be quoted. In other words it might quote a shape factor of 2:1 at 6/60 dB.

Filters may also be quoted in terms of the number of poles they

possess. To explain this in any detail requires looking at some filter theory. However it is sufficient to say that for every crystal a filter contains, there will be a pole.

Put simply, an eight pole filter has eight crystals. In fact most filters today have six or eight poles.

DIFFERENT BANDWIDTHS

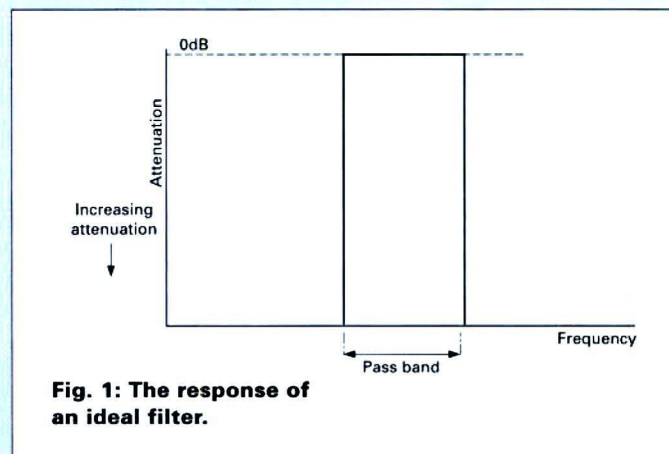
Often a receiver will have several different bandwidths quoted. This is because different bandwidths are required to receive different types of transmission.

The bandwidth used on communications receivers for a.m. is normally about 6kHz, although for m.w. broadcast reception a wider bandwidth might be needed. However, s.s.b. reception needs a bandwidth of just 3kHz and most receivers use between 2.2 and 2.7kHz.

For Morse reception much narrower bandwidths can be used. For c.w. work 250Hz filters are sometimes available, although most people prefer a wider filter and use 500Hz.

I hope I've solved some of the mysteries of specifications for you.

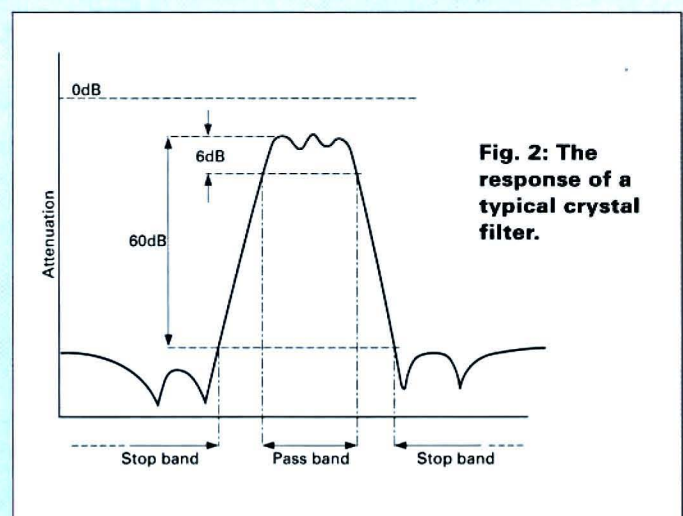
PW



the amount by which the response has fallen should be quoted, e.g. a bandwidth of 2.2kHz at -6dB. If the response figure is not quoted it is most likely to be -6dB.

It is also important to know how quickly the filter response falls outside the passband. To give an indication of this, a second point on the response is defined. This is usually a point where the response has fallen to -60dB i.e. the voltage level is one thousandth of the in-band level, or the power is a millionth of the in-band level.

The difference between the -6dB and -60dB bandwidth points on the curve show how quickly the response falls away. Ideally the two figures almost should be the same.



It's The Big One.....

Fresh In From 'Stateside The ARRL Handbook For Radio Amateurs 1994 Has Arrived

You can almost imagine a fanfare as this amazingly popular book arrives in from the USA. The 'Handbook' has got to be the single most comprehensive book available for radio amateurs anywhere in the world. Now in its 71st edition, the book continues to grow in size and reputation every year. The 1994 Handbook runs to over 1150 pages with 39 chapters and appendices.

The 1994 edition of the handbook continues the tradition set by previous years and it's packed with all the basic information and latest circuits with the added bonus of some really up-to-date projects. Ideas for 1994 include W9GR's new digital signal processing project which introduces you to the exciting technology with the traditional 'hands on' approach appreciated by PW readers. There's also an up-date and new circuit approach for the popular Curtis-keyer-on-a-chip. The Digital Equipment chapter includes a new version - small enough to fit in virtually any rig. For the h.f. operator there are new versions and several completely new projects to build. Many of the projects have p.c.b. templates supplied separately at the back of the book.

The ARRL Handbook Editor Robert Schetgen KU7G has moulded yet another marvellous collection of theory, projects, practical ideas and dedicated subject chapters into yet another winner. I found the sections dealing with v.h.f., u.h.f., video and space communications to be particularly interesting.

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G3XFD

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Radio Diary

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

***December 12:** Centre of England Christmas Radio, Satellite, Computer & Electronics Rally is being held at the Sports Connexion Centre, Leamington Road, Ryton on Dunsmore, Coventry A45/A423. Doors open at 11am, 10.30am for disabled visitors, admission £1. Over 80 traders, Bring & Buy, talk-in on S22. Bar and hot food all day, ample free parking. Christmas special 'Spot The Cracker' on many of the trade stands to win a prize. **Frank Martin on (0952) 598173.**

1994

January 23: Oldham ARC are holding their annual radio rally at the Queen Elizabeth Hall, Civic Centre, West Street, Oldham, Lancashire. Large trade presence, free parking, doors open at 11am, 10.30am for disabled visitors. Morse testing available, talk-in on S22, Bring & Buy. Free programme draw prize and mobile contact prize. **Kathy G4ZEP, QTHR.**

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

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

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

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

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

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

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

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

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

May 29: The 18th Annual East Suffolk Wireless Revival will be held at The Maidenhall Sports Centre, Stoke Park Drive, Ipswich, Suffolk. Attractions include vintage radio display, Novice stall, RAIBC, BYLARA, RAYNET. Non radio stalls and refreshments. Talk-in on S22. **Bob Baal on (0394) 271257.**

June 19: Denby Dale & DARS Annual Mobile Rally will be held at Shelley High School. **Phil G4FSQ on (0484) 644827.**

June 26: The 37th Longleat Amateur Radio Rally is being held at Longleat House, Warminster, Wiltshire. **Shaun O'Sullivan G8VPG on (0272) 860422 (office hours) or (0225) 873098.**


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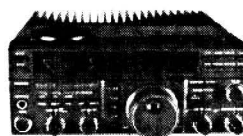
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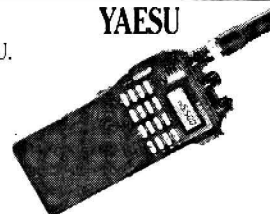
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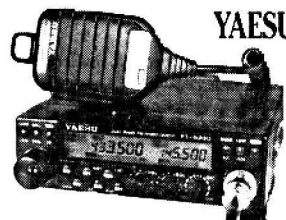


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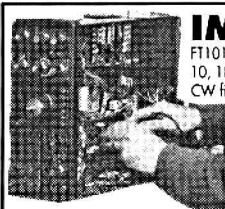
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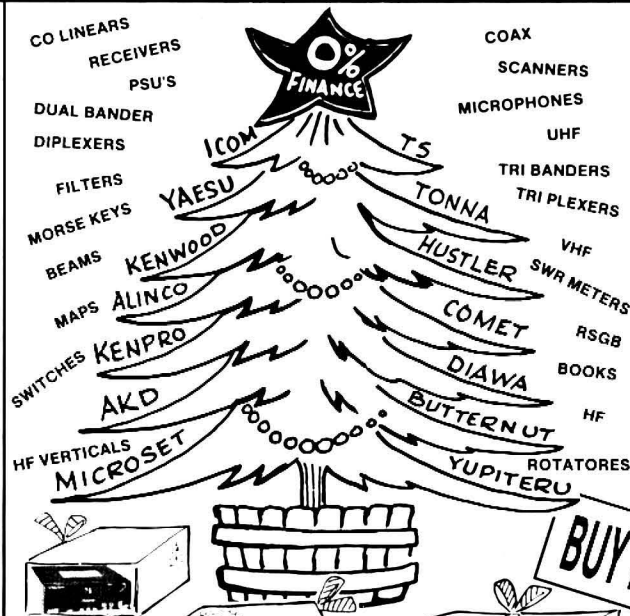
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BYTES
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This month Peter Hunter GOGSZ has a mixed bag, which should please everyone reading the column.

I'll start off this time with a cry for help from **Peter DK4BF**. He wants information of a ZX81 User Group in the UK.

Peter belongs to a group of 60 in Germany called the ZX-TEAM. Six of the group are radio amateurs. There are user groups in the Netherlands and Canada. Peter feels sure their must be ZX81 users in the 'Fatherland of Sir Clive'.

I haven't been able to find any information, but if anyone can help please write to me, or direct to:
Peter Liebert-Adelt DK4BF
Luetzowstrasse 3, D 38102
Braunschweig, Germany.

Pride And Joy

Ted G8VEL sent me a photograph of his 'shack' layout a little while ago (see **Fig. 1**). This got me thinking that a lot of you out there may want to share your 'pride and joy' with other readers. So I decided a new feature 'Readers' Spot' is called for.

If you'd like to see your 'computerised shack' featured in 'Bits & Bytes' just send me a clear photograph, with your name and any other information and I'll do the rest. **Please**, do not write on the back of the 'photo'. Photographs can't be returned, so make sure it's a spare.

Amiga Group

If you belong to the Amiga Amateur Radio Users Group (AARUG) please note that the new PD library manager for surnames A - M is: **Ross McKinnon G0TXK**, 30 John Smale Road, Barnstaple, N. Devon EX31 2HR. And please don't forget the return postage.

If you're not a member of the AARUG, but would like to be, then write to: **Bob Welbeloved G3LMH**, 8 Orchard Close, South Wonston, Winchester SO21 3EY. Please enclose a large s.s.a.e. (1st class stamp) and a 3.5in disk.

Whist on the subject of the Amiga, if you (or your



Fig. 1: The computerised shack of G8VEL.

company) have produced any radio related software or hardware that you would like to see mentioned or reviewed in this column, just send it to me and I'll try and include it in the next available issue.

Public Domain Software Library (PDSL) have a new CD-ROM, **QRZ Ham Radio**. This disk was made in May 1993, so it's very up to date. Apart from thousands of amateur radio programs: logbooks, antenna design, packet, contest, etc., etc. it also includes the entire **FCC 1993 Callbook**!

A very fast search program is included on the PDSL CD-ROM, just type in the call sign and the information is almost instantly displayed on screen. The **QRZ Ham Radio** disk is available for £25 plus VAT & postage from: **PDSL, Winscombe House, Beacon Road, Crowborough, Sussex TN6 1UL. Tel: (0892) 663298.**

Upgrades

Now let's look at upgrading. If you are one of the many who upgraded from the Spectrum to the SAM Coupe, you will be happy to know that there is software available for all the popular modes, plus much more.

For more information write to **Ian D. Spencer, DJ0HF/G3ULO**, Fichtenweg 10C, 53804 Much, Germany including an IRC for return postage.

If you use any other

machines such as the Spectrum, BBC, VIC20, C64, CPC6128, Atari ST, etc., then the following is for you.

Technical Software have been running a 'Birthday Bargain' special on most of their products. Because the demand has been so great, they have extended the 'special price' of the RX-8 for the BBC for a further period. Contact them

at: **Fron, Upper Llandwrog, Caernarfon, Gwynedd LL54 7RF. Tel: (0286) 881886.**

Also, J & P Electronics have software, filters, packet controllers and other add-ons for most of these machines. J & P can be contacted at **Unit 45, Meadowmill Est, Dixon Street, Kidderminster DY10 1HH. Tel: (0562) 753893.**

That's it for another month, and indeed for 'Bits & Bytes' first year. It'll be interesting to see what 1994 brings! Your letters etc., to me Peter Hunter GOGSZ, 2 Mayes Close, Bowthorpe, Norwich NR5 9AR. Tel/ Fax: (0603) 748338. Packet: GOGSZ @ GB7LDI.#35.GBR.EU. 73 de Peter.

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E N D

Ron Ham invites you once again to enter the friendly atmosphere of PW's very own 'wireless shop'. But, watch out for those sprigs of holly hanging from those storage racks!

Valve &

Firstly, may I wish all of my readers a very happy Christmas and a prosperous new year. Secondly, I want to thank many of you for your kind remarks about 'Valve & Vintage'.

You have entered into the spirit of the column. And believe me your letters, comments and tips about the various items of vintage equipment that I have mentioned, are much appreciated.

Vintage Wireless Day

Despite the rain, it was a happy get-together for the many collectors and enthusiasts who visited the special Vintage Wireless Day, held at the Amberley Chalk Pits Museum (West Sussex), on September 11.

Everyone attending the vintage wireless day was pleased to welcome Tom Morita, a collector from Japan, who was paying a flying visit to the UK. Tom heard about the event through this column and stayed an extra day to be at the Chalk Pits.

The Chalk Pits event was organised by David Rudram. David is the Honorary Curator of the

museum's wireless exhibition and he was assisted by radio engineer Ron Weller.

Ron and I were young engineers together at the same firm 45 years ago. During the Wireless day we were delighted to meet Joe Hastings, another of our former colleagues.

We remembered some of our work together all those years ago. Each day, Joe, Ron and myself took our turn in connecting up about 150 2V lead-acid accumulators from wireless sets for charging!

As guests, Joan and I met many old friends among the exhibitors and visitors. The magazines *Radio Bygones* and *405-Alive* were represented by Geoff Arnold G3GSR and Barbara his wife, and Andy Emmerson G8PTH (Andy writes the ATV 'Focal Point' column in *PW*) respectively.

Gerald Wells was there representing the British Vintage Wireless Society. A 405-line television display was demonstrated by Bill Journeaux with his own collection and Ron Weller, who had prepared the museum's sets for the day.

Famous Booklets

Periodically, original copies of such famous wireless booklets, from the 1920s as *The Popular Wireless Radio Handbook* and *Wireless Questions Simply Answered* appear on the second hand market. However, if you can't find a copy, your luck has changed!

Reprints of the 1920s booklets are now available from Peter & Valerie Wallage. Peter and Valerie now have 18 of the publications on their reprints list.

The Wallages had a selection on their stand at the Chalk Pits special event. Each one measures approximately 145 x 206mm, have between 30 and 45 pages, and the post-free price varies between £2.95 and £3.95.

I think the Wallage reprints are good value for money. Particularly for illustrated

publications that are a mine of contemporary information for wireless collectors. Readers who are interested can obtain the Vintage Wireless Booklets contents and price list by sending an s.a.e. to: Peter and Val Wallage at 48 Albert Road, Ashford, Kent TN24 8NU.

One of my favourites in the Vintage Wireless series is the already mentioned Handbook. Pages 7, 8, and 9 entitled 'Selected Radio Definitions' are especially interesting. In addition, among its 32 pages, are 15 plus circuits, a page of circuit symbols and easy to read text

were busy. They kept everyone entertained with contemporary music and live interviews with visitor and exhibitors.

Visitors to the event could also see themselves on the video screen. This was provided by courtesy of roving TV cameras, operated by members of the Video Repeater Group.

Beautifully restored sets and speakers from the 1920s and 30s were shown by Mr. R Brett-Knowles, John Narburgh, Mr Patten and Bob Smallbone. Gramophones were shown by Mr. K. Stroud.

A replica of the Baird 30-line television system, was demonstrated by Dave Sumner. Dave had built the mechanical system himself.

As well as showing a 1920s McMichael 'Super Range Portable Four' David Rudram pointed the way for future collectors. He is seen in Fig. 1, next to his McMichael.

David is shown holding a Philips NT300 (left), a Wonder 880 a.m. pocket radio and a Sinclair Micromatic (right). These are all from his considerable collection of 'novelty' transistor receivers.

Among the visitors to the Chalk Pits

Museum event was Dave Higginson, Fig. 2. Dave soon became the proud owner of a Marconiphone Model 82 superhet receiver which he plans to renovate.

Because the Model 82 has an unusual design, I took the opportunity on behalf of Valve & Vintage readers to have a detailed look at it. The set, made in the 1920s, was recently found in a garage.

Although complete, Figs. 2 and 3 show the deterioration of the cabinet and the remnants of rotting wire on the frame antenna. Fortunately the 'G. Marconi' emblem (lower centre) has survived



Fig. 1: David Rudram, Honorary Curator of the Wireless Museum at Chalk Pits Museum, with part of his collection of 'novelty' transistor receivers. Among them is a Sinclair 'Micromatic', produced by (now Sir) Clive Sinclair who of course once worked on the Practical Wireless editorial team.



Fig. 2: When Dave Higginson attended the special Vintage Wireless Day at the Amberley Chalk Pits Museum, he became the proud owner of a rare Marconiphone Model 82 superhet receiver.

dealing with antennas and earths, batteries, components and loudspeakers.

Peter told me what they're aiming at. He said "we're aiming to preserve and make available to enthusiasts, in reprint form, at a reasonable cost, information on their hobbies from ephemera such as booklets, books and magazine features which are now hard to find".

Hospital Radio

During the vintage wireless day, a team from our local hospital radio service 'Coastway Hospital Radio'

Vintage

By Ron Ham

the damp and the woodwork of the cabinet is complete.

The sub-chassis holding the eight valves and other components is mounted on a strip metal, skeleton frame, Fig. 4. Some of the wiring is bare and where necessary it's insulated with black china beads.

Typical inter-valve transformers with their 'I', and 'O' primary and 'I' and 'O' secondary markings are at the top centre. The multiple contact, two-way, wave change switch (top right) is mounted below the tuning coils.

One of the valves and a side

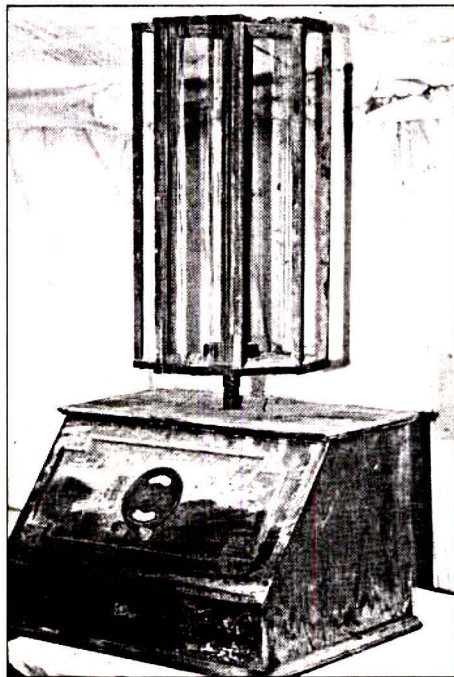


Fig. 3: The Marconiphone Model 82 bought by Dave Higginson will need restoration as it had been stored in a garage for many years. Fortunately, Dave is a professional radio and television engineer who can carry out the work himself (see text).

view of the framework can be seen on the right of Fig. 2. The dial and the three-gang tuning capacitor, mounted at an angle, are visible in the centres of Figs. 2 and 4 respectively.

It's thanks to Dave Rudram, who located and identified the Marconi receiver and Dave Higginson who purchased it from the original finder, that I had the chance to photograph such a rare set for you all to see.

Readers may also find it useful

to know that **Dave Higginson of 28 High Street, Misterton, Doncaster, Yorks DN10 4BU (0427) 890768**, is a professional radio and television engineer. Dave says he'll give estimates, without obligation, for repairs and renovation of vintage sets.

One Valved Receivers

A recent episode of 'V&V' reminded **Mr E. Redshaw** (Belper, Derbyshire) of the one valved receivers he and his friends built, around 1928, at the age of 14. Mr

Redshaw says he'll never forget the wooden baseboards, Ebonite or plywood front panels and the Mullard PM1 'A', 'HF' and 'HL', series of 2V filament valves and the Igranac, Lissen or Telsen coils and transformers.

"We didn't get into cabinets for some years!", Mr Redshaw wrote. He added that "one 'house' set resided on a table, along with all the batteries".

The moving-coil loudspeaker, mounted on a baffle-board, hung from the ceiling above. His father used to "twiddle the knobs" on dark nights trying to get German stations on the medium-wave, especially to hear their military bands.

Marconi CR100

My recent reference to the Marconi CR100 has prompted several of you to write to me about this wartime communications

receiver. One letter came from **John Long** (Cambridge).

John told me that he served as a Radio Officer on a Merchant Navy Aircraft Carrier during the Second World War. He knew the Marconi CR100 communications receiver as the Royal Navy 'B28' with a blue front panel and a black cabinet.

John's ship also had the low-frequency version of the CR100, a 'B29'. This they used to copy weather forecasts from Whitehall.

From my memory John, the

appearance of the 'B29' matched the 'B28'. The frequency coverage ranged from 10 to 600kHz in several bands.

After the Second World War the Royal Navy replaced these sets with the 'B40' and 'B41' respectively. They worked well, but were still just as weighty!

"A lot of the ex-Royal Navy sets will have a RIS (radar interference suppression) input up on the top left of the front panel". So wrote **Ron Wilson** (Exeter).

Ron continued, "This terminal is connected to the suppressor grids of the two r.f. stages and should be disconnected and the suppressor grids connected to their respective cathodes". Ron was a Petty Officer radio mechanic in the Royal Navy during the Second World War.

Ron is very familiar with the 'B28'. He would like to emphasise the need to be very careful of the smoothing capacitors.

On one occasion Petty Officer Wilson had drawn a set from storage and was getting it ready for service. A few minutes after switch-on Ron says "there was an almighty bang. The electrolytic had exploded, the lid of the set was open and the can dent the ceiling of the workshop".

As a result, the inside of the set was covered "with an infernal mess". Ron told me that these sets tended to drift in frequency but

"experienced operators, keeping listening watch on specified frequencies, would prop the front of the lid open to reduce heat and consequent drift".

"About five years ago a rather dirty but original CR100 came into my possession" said **John Hoban** (Bolton) who wrote in to say he was overcome by "great waves of nostalgia".

John, remembering the fun he had operating a CR100 back in the late 1950s, embarked on a restoration project that lasted several months. The set was completely stripped with only the mains transformer and valve holders left on the chassis.

He replaced all the perished rubber wiring with modern coloured

wire. He even opened the i.f. transformers for re-wiring!

John spent a long time on the coil packs. He also replaced the Paxolin wafers with ceramic on the wave change and i.f. band-pass switches.

Changing from Paxolin to ceramic was achieved by raiding other switches from his stock for bits. He cleaned all of the small silver-plated switch contacts in a jewellery cleaner and when complete, added a single application of Electrolube.

John has used Electrolube for many years and tells me that it is available from Maplin Electronics. Apart from replacing the 'small' capacitors and resistors and realignment throughout, John also sprayed the front panel in a gunmetal grey (and re-lettered it) and finished the case in metallic silver.

Well done John! I've no doubt that all your hard work was worth it at the end.

Well, that's the lot for this time. And I'm looking forward to your company next time the *PW* 'wireless shop' is open for business next month. In the meantime you can write to me at 'Faraday', Greyfriars, Storrington, West Sussex RH20 2HE.

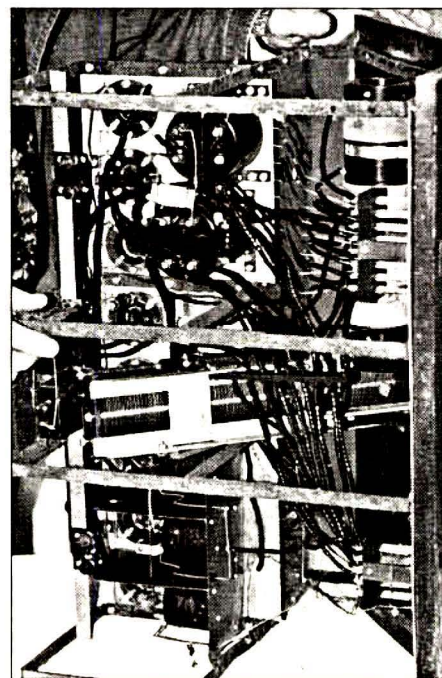


Fig. 4: The sub-chassis of the Marconiphone Model 82 (see text).



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Report

S BANDS HF

Paul Essery GW3KFE passes on some h.f. operating tips, news from your letters and information on activities on the bands.

When you're on the air, you must be able to know immediately when the set-up deviates away from being top-notch. Normally however, the tools you have available are few. Usually there's the s.w.r. indicator, field-strength meter, multi-range test meter and the rig's own meter.

Once you have things to your liking, you're only looking for changes. Be careful, though. Always record the beam heading, the precise position and reading of the f.s. meter, a.t.u. setting, and the power input, at 50kHz intervals across each band.

By recording the data I've suggested, you ought to be able to spot changes of a very small order. On the receiving side, a quick and quite severe check is to look at a dummy load through the a.t.u.

You should be able to notice the change of noise level as you peak the a.t.u. tuning. Or, if you're using an older rig, observe the same effect as you tune up. A tune round the band will soon show you that your filters and your audio are working correctly.

Back for a moment to the pile-ups. Remember that when the DX operator works split-frequency they do so to prevent all but the very experienced operators from working them.

It's up to you to work out their operating pattern and so get the contact!

Conditions Variable

Recently, conditions have been variable with days of no sunspots, and others with lots. Occasional openings on 28MHz for a few minutes, lots of SID (Sudden Ionospheric Disturbance) events blacking things out. At the time of writing though, things were looking up.

Don G3NOF notes that the 14MHz morning long-path openings to VK and ZL were good up to 0900UTC. He says the short path to W6, VK, Asia and KL7 around 1500-1900. He says 18MHz has also been pretty fair, with N. Americans sometimes from 1030 up to midnight. On 7MHz Don

reports that South America has been noted between 2200-2300UTC.

Coming Events

Now it's time to look at coming events. The 3Y1, Peter 1st Island expedition is still a 'go'. But at the time of writing the arrangements are still being finalised. Keep an ear open for this - it'll be a 'biggie'!

The BV9 Pratas effort is reported as slipping. It may not take place until late November.

All 1.8MHz band addicts should remember the 1994 CQ WW 160 Metre Contest. The c.w. leg runs between 2200UTC January 28 to 1600 on January 30, followed by the 'Phone weekend over February 25-27.

Intending contesters should note that the rules specify a DX window between 1.825-1.835MHz. This is to attract the rare countries, who will listen outside the window. A change to the rules makes the /MM stations worth five points but no longer valid for multiplier status.

Notice also that for this contest KH6 and KL7 are counted as countries not states. Also, the WAE countries are added to the DXCC ones, so GM Shetland for instance counts as another country.

Disqualification rules are more severe now. Those who are borderline - e.g. just short of the 3% dupes mark - may have a warning and have this indicated in the published results. So play, but be aware!

Mailing date for logs is February 28 and March 31 respectively. They should go to: **David L. Thomson K4JRB, 4166 Mill Stone Court, Norcross, GA30092 USA.** Please indicate 'c.w.' or 'Phone' on the envelope.

Your Letters

Time to look at your letters now. A note from GW3JSV up the road from me, tells that he has worked ZD8M. This operator started on September 17 and will be there until March 1994. No cards have been printed as yet.

Alas, Ted G2HKU has

been in the wars again. A quick (very quick, complete with blue flashing lights) trip to the bandage factory meant radio activity has fallen this month.

Nonetheless, despite the hospital trip, Ted caught VQ9QM on 10MHz. He also worked him again on 18MHz, where ZD9SXW was also hooked with QRP. The latter was also raised on 24MHz using full power.

Ted also picked up TA6JM on 18MHz. Equipment at G2HKU comprises an Omni-V at 70W, IC-721S at 5W. On the QSL front, Ted mentions that T97T is via SM5AQQ, and TA6JM is via SP7LZD.

Another operator who has not been feeling too good, is G4ITL. He had a heart attack in August and comments that he isn't quite what he was before. Our message of 'best wishes and get well soon' go to both G4ITL and G2HKU.

A late holiday cut into the operating time for John G3BDQ in Hastings. On 1.8MHz John found OH0BCI, 4X4NJ (at 1756UTC!) and 5V8ZS, and he notes that while the lads in the north west of England and Ireland have been working the ZLs - split frequency - in both the morning and the evening openings, the south eastern England stations have heard the ZL either weakly or not at all.

The geographical advantage for the north western operators on 1.8MHz is in accordance with theory. This states that the grey-line path can only cross both countries at certain times of the year, and even then favours the western parts.

Thanks to a misplaced paperclip I nearly missed out Leighton GWOLBI. Leighton uses a 3A8 end-fed on 1.8MHz from Trelewis.

Leighton's low power signals got out to G0EOB in north Devon in daylight, GM3OXU, GD0LQE/QRP, and DJ8WL. The trap dipole used on 7MHz got him across the 'pond' to N3RS and KP2JA, while 14MHz yielded a new one in HT1T.

John G3BDQ has gone to a GAP antenna for 3.5/7MHz. It is only used for listening on 3.5MHz, as the s.w.r. is

too high in the DX segments. But on 7MHz the antenna netted ZD9SXW, who has been giving the bands a right shaking-up from Tristan da Cunha. (Roger is due to go QRT as I write this, with well over 20 000 contacts in the log). On 21MHz T18PRS/4 vies with the TZ70(Mali) found on 14MHz; and on 18MHz 3B8CF is back in business, joined by 3B9FG.

In Stevenage, Angie G0HGA notes that she has been having a few 1.8MHz contacts. But for G3JUT Angie had to move down to 3.5MHz as signals were weak.

Down west now, to Yeovil and Don G3NOF. Don tried 3.5MHz for the Edgware Activity Period, while on 7MHz he contacted UH8EA who has a four-element Quad on the band, and an S-9 signal to go with it.

On 14MHz Don's pick was VK9MM on Mellish Reef. On 21MHz, the odd African opening was noted, amid generally very 'patchy' conditions.

Don reports that 24MHz gave the odd brief openings and T17DBS was perhaps the best. The 28MHz band on the other hand resulted in no contacts, with only PY/LU stations being heard. For his 18MHz report Don noted at around 0900 there have been short path openings to Asia, VK, and ZL. There have been Africans at any time of day, and north Americans from 1030 through to midnight. Pick of the crop here were T17DBS and 7Q7XX.

Arthur Milne

Arthur Milne G2MI passed away on October 6. In 1939 Arthur took over the RSGB QSL Bureau 'for a short time' which was to stretch out to over 40 years. Arthur was President of RSGB in 1954, and a main GB2RS News reader for many years too.

That's it for another month. As usual, the deadline is the middle of the month, addressed to me at 287 Heol-y-Coleg, Vaynor, Newtown, Powys SY16 1RA.

E N D

Antenna Workshop

This month Peter Dodd G3LDO describes a multi-band antenna with the ability to be used on 7, 14 and 21MHz without an a.t.u.

The antenna described here, was designed for a site where planning restrictions wouldn't allow a separate antenna mast. However, a short mast on the roof of the chimney of the house was permitted.

The antenna can be accommodated in a garden with a maximum length of 16 metres, and it will operate on 7, 14, and 21MHz without an a.t.u. The loop has reasonable DX characteristics with a relatively low angle of radiation.

My research into a suitable antenna narrowed to a full wave (on the lowest frequency of 7MHz) loop. I was very interested in the experimental results of L. V. Mayhead, G3AQC [1]. His work involved measuring polar diagrams of different u.h.f. loop antenna configurations close to the ground.

John Devoldere, ON4UN also favours low height, full wave loops for low band DX. His book [2] gives a wealth of information on antennas for low band DXing.

Equilateral Triangle

A loop antenna in the form of an equilateral triangle needs only

one support point. If this support point is a mast fixed to the chimney then it overcomes the planning restrictions described above.

I decided to try to model this loop antenna using the computer modelling program ELNEC. This was to try to determine the antenna DX characteristics and to find the optimum point to feed the antenna.

Wishing to investigate other loop shapes, I started with an equilateral triangle delta loop antenna so that I could compare it with existing documented results. The first model was fed at the apex, resulting in a mainly horizontal polarization with pronounced vertical directivity, Fig. 1.

The reason for the antenna's vertical directivity is, that the polarisation is mainly horizontal. The results I found agree with existing data relating to low horizontal antennas.

Because of the pronounced vertical pattern this configuration is not suitable for DX. Although, the antenna would be useful for short skip QRP contacts.

When I moved the feed point on the antenna model to one of the lower corners, I obtained a

much improved low angle radiation pattern. The result was probably due to the antenna being predominantly vertically polarised.

On the basis of the test results, I decided to build a real wire delta loop at my QTH, where the chimney is near the centre of the house. This means that the loop must be tilted from the vertical.

As the house is not in the centre of the plot, I felt this would be similar to the situation for most of you who try to reproduce this antenna. The constraints of the location, mean that the loop cannot be an equilateral triangle. The best I could manage was an asymmetrical, tilted delta loop, Fig. 3. From this drawing, you can see the antenna comes close to the ground.

Possible Danger

There is a possible danger of someone receiving an r.f. burn if they touched the antenna when the transmitter is on. For this reason I recommend using insulated wire for the lower half of the antenna.

As a loop antenna is not a high Q device, extremely high

voltages, such as those found at the tips of a dipole, do not occur. So, the thickness of the insulation on the lower section of the antenna depends on the r.f. power used. For very high power I would use 50Ω coaxial cable with the outer braiding removed.

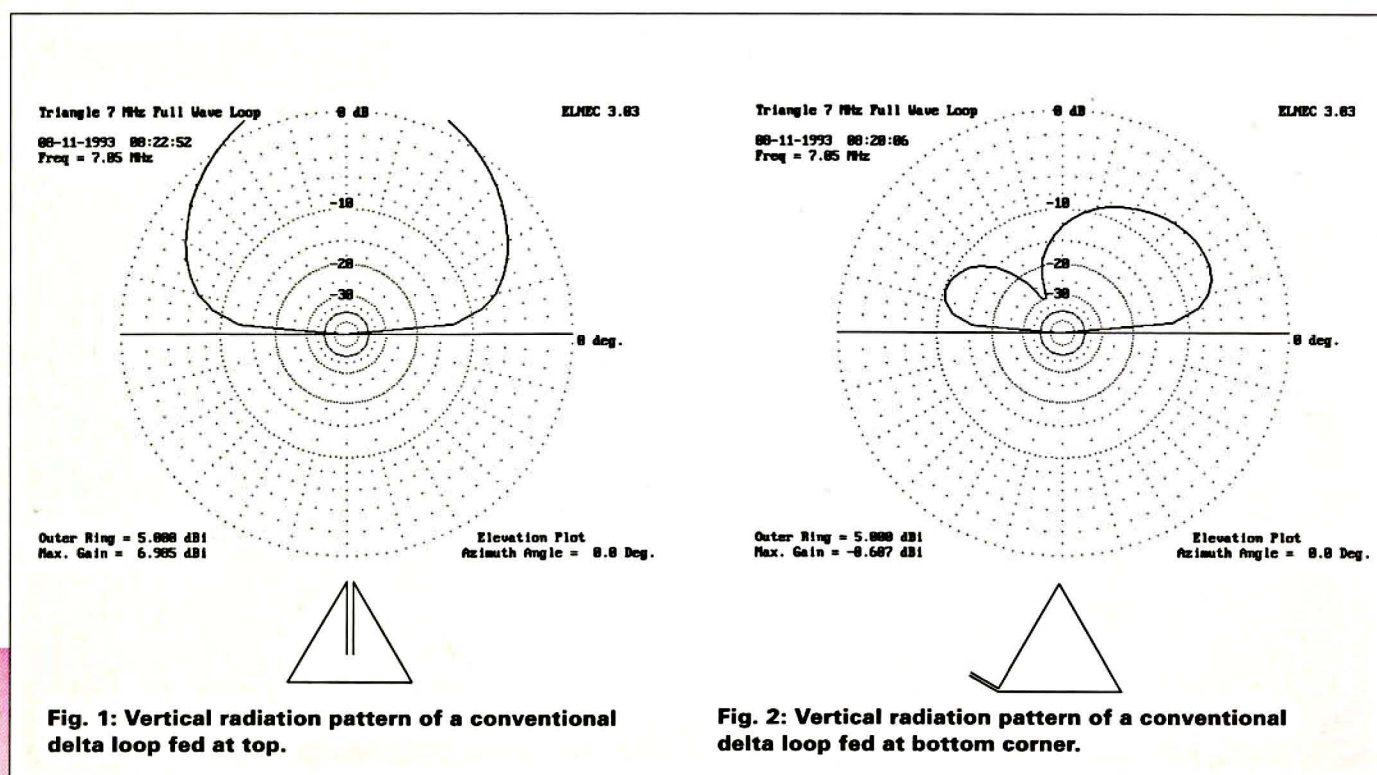
As this was experimental loop antenna, I used 2.6 mm wire with 1.0 mm thickness of insulation, obtained from the local scrap yard. Using an earthed wire, and 100 watts into the antenna, I was unable to draw a spark through the insulation of the element with this test.

For the top part of the antenna, I used bare copper wire. You could use insulated wire for all the loop, but lighter wire for the upper part, and a lightweight support, has a lower visual impact.

Using thinner wire doesn't have much affect on the antenna performance, because the radiation resistance of a loop is fairly high.

First Experiments

My first experiments were carried out with the coaxial feed connected directly to the loop. I



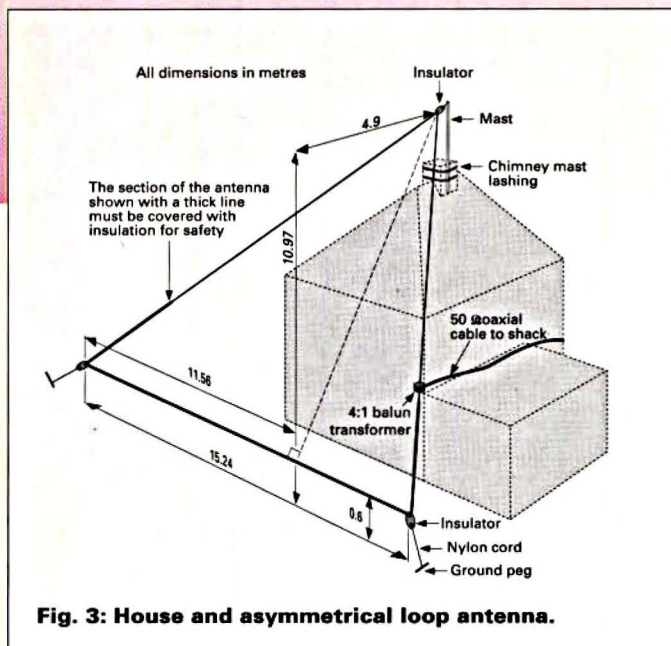


Fig. 3: House and asymmetrical loop antenna.

found the s.w.r. was over 3:1. As I didn't have a noise bridge, I couldn't measure the feed point impedance. But most literature places the feed point impedance of a loop antenna above 100Ω.

After fitting a 4:1 balun, see Fig. 4, the s.w.r. dropped enough so that the antenna could be used without an a.t.u. The s.w.r. measurements for this antenna, with the balun, are shown in Fig. 5.

I tried feeding the antenna, first at the top apex then at one of the lower corners. With the antenna fed at the top the results were as predicted by ELNEC.

When fed at the lower point the results were not as good as I expected them to be. This could have been an environmental effect, or that my antenna is not an equilateral triangle.

I decided to model this tilted, lop-sided antenna creation using ELNEC. I've not attempted to model its environment - but more of this later.

When the antenna was fed at either bottom corner the results were not as good as if the loop had been an equilateral triangle. I gave this antenna configuration up as a poor performer, so I tried modelling other feed points on the loop.

The best results occurred when the antenna was fed about one third up from the bottom on the most vertical of the triangle sides.

Constructional Details

Now, a bit more on the constructional details. Note that the lowest leg of the triangle is only 0.6m above ground.

The insulated corners are held in position with a tentpeg like arrangement. Although with a fence, together with shrubs and small trees I found enough fixtures for the lower corners.

The antenna apex is supported on a 2.5m length of scaffolding pole fixed to the chimney about 9m above the ground, with a double TV antenna pole lashing kit.

This method of attachment gives the antenna enough height and a reasonable clearance above the roof. The apex of the loop is nearly 11m high.

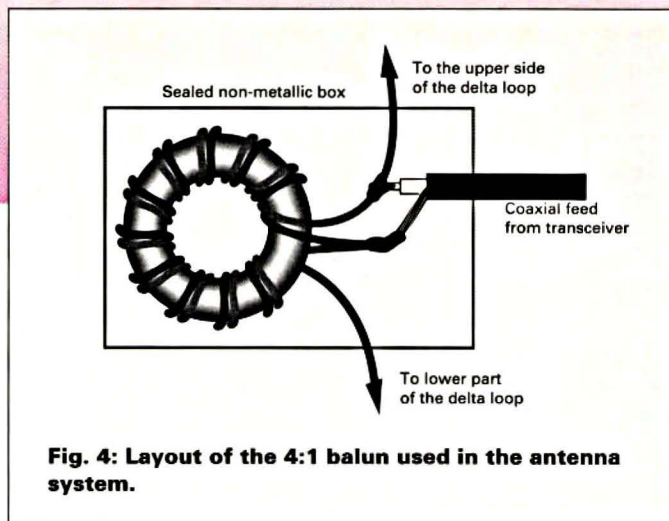


Fig. 4: Layout of the 4:1 balun used in the antenna system.

The antenna feedpoint, with my antenna, came level with the flat roof of the house extension. This was a convenient point to experiment with matching devices, feeding the antenna with a 4:1 balun.

Environmental Effects

Now, a bit more about the environmental effects on the performance of the antenna. Traditional multi-band antennas, such as the G5RV, just don't work at this house. Loop antennas fare much better.

The only long antenna that worked here was the Barker & Williamson BWD 1.8-30 Antenna. This antenna, reviewed in 'Antenna Workshop' (PW Feb. '93) worked quite well, even though it has relatively low efficiency due to a terminating resistor.

My house is a bit of an r.f. black hole. This is due to house plumbing, comprising of a mixture of steel, lead and copper

pipes. The spiders web of telephone wires that radiate from a nearby telegraph pole to many houses in the area doesn't help either.

The new asymmetrical tilted loop antenna worked quite well considering its average height above ground. I have worked quite a lot of DX with this antenna and I feel that is a space saver for the lower frequency bands.

In a later 'Antenna Workshop' I will describe how this antenna can be used on other h.f. bands.

PW

References

[1] 'Loop Antennas Close to Ground' a section in 'h.f. Antenna Collection'. An RSGB Publication

[2] *Low Band DXing* by John Devoldere, ON4UN. An ARRL Publication

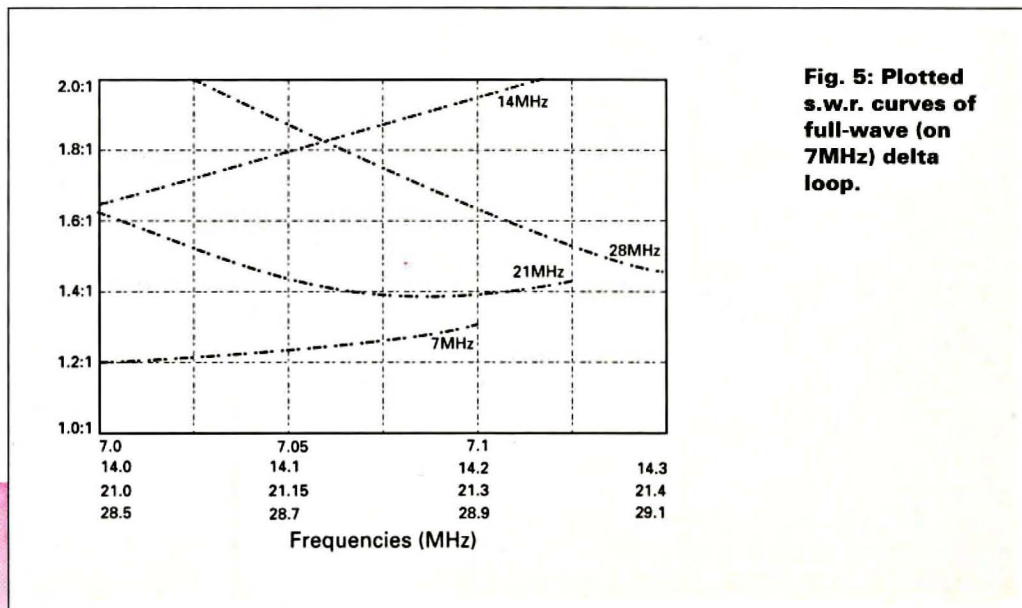


Fig. 5: Plotted s.w.r. curves of full-wave (on 7MHz) delta loop.

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In South Africa Frank ZR1AGD is a PW reader and a regular RS-10 user. He runs just 10W of uplink power into a 5λ8 length base loaded vertical.

Frank tells me that the satellite is still in excellent condition with all temperatures and supply voltages nominal. Frank also reports that he puts the telemetry and call signs of stations worked via RS-10 onto the Capetown packet network every weekend.

Translation Frequency

The usual method used in calculating your translation frequency from 145 to 29MHz is to add a figure to the downlink you are listening on, to give the uplink that will put you on that frequency. This is roughly 116.500MHz.

Recently, WD8LAQ has done some more precise frequency measurements. He's found that the exact addition figure is 116.5048MHz, plus or minus up to 3.7kHz of Doppler shift. Whether this change is due to an earlier approximation, or to a slight drift of RS-10's oscillator through time is unknown.

To help, I've provided Table 1. This gives a small chart that may be read off to give the Doppler shift corrected uplink to downlink frequency relationships.

To use the table, just tune your downlink to the desired clear 29MHz frequency. Then leave it there, and look up the required uplink frequency from the table.

The AOS column gives the uplink at acquisition of signal. The TCA column gives the uplink at time of closest approach and the LOS column that uplink required at the time of loss of signal.

All the information is for a typical pass going from 10°

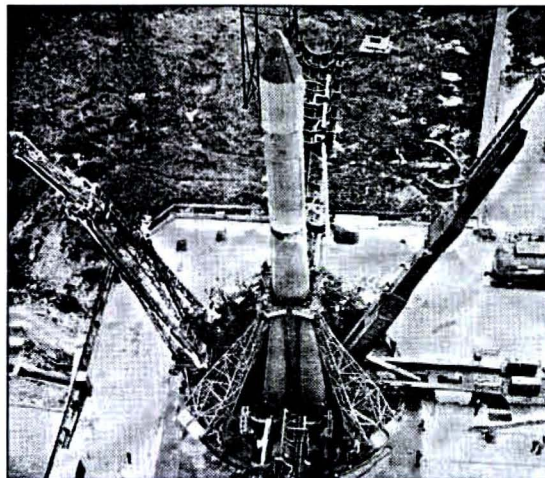


Fig. 1: The launch of a RS-series amateur radio satellite from the Russian Northern Cosmodrome at Plesetsk.

up to 40° of maximum elevation for the pass. It should give you your frequency within 1kHz, well within your receiver's audio passband.

By following the procedure you should hear your signals coming down from RS-10's transponder. But please remember to do it this way round. Don't calculate your expected downlink for an already transmitted uplink, otherwise you may inadvertently find yourself on top of an established QSO.

The normal practice in a pass is to gently adjust your uplink frequency transmitted to allow for the Doppler change. This is so that your downlink from the satellite stays reasonably constant.

If you rely upon changing your downlink as you QSY, you then run the risk of being unpopular. This will be due to the chance of 'colliding' with other QSOs on adjacent frequencies (see Table 1.).

If you need values in between the 5kHz points, then just add on, e.g. for a 29.362MHz downlink, the increment of 2kHz to the 145.8615 MHz uplink given for AOS for a 29.360MHz downlink. You'll then have an uplink transmitting frequency of 145.8635 at AOS. If you add the 2kHz to the TCA figure of 145.8648, and you will then get 145.8668MHz, and so on.

Radio Sputnik Visit

Nico Janssen PA0DLO reports that he recently visited the Radio Sputnik command centre near Moscow. There he met Leonid Labutin UA3CR, his son Evgeny RA3APR, Sergei Samburov RV3DR, and the operators of RS3A.

Together with Andy Mirinov RK3KPK they pass on the following information on the Russian satellites.

Current RS Operations are as follows. For a number of technical reasons, command problems, interference and the like, the radio amateur satellite systems RS 10/11 and RS 12/13 cannot presently be switched to modes other than those presently in use.

Consequently, for the immediate future, RS-10 may be expected to continue to operate in mode A (145MHz uplink and 28MHz downlink) and RS-12 in mode K (21MHz uplink and 28MHz downlink). In the meantime RS-11 and RS-13 will remain switched off and in 'standby' mode.

New Satellite System

The new Russian 70kg amateur satellite system RS-15 is now complete and ready for launch. It will be built into another Cosmos navigation satellite, similar

Pat Gowen G3IOR provides the latest news on both the current and future Russian RS satellites programme.

to NAVSAT Cosmos-2123 that houses RS 12/13.

At the moment it's not known exactly when the launch of the RS-15 satellite will be. But as soon as an older spacecraft in this series of navigation satellites reaches the end of its operational life the replacement with RS-15 on board will be launched into its circular 2300km high 67° inclination orbit.

The RS-15's assembly consists of a mode 'A' 145MHz up and 28MHz down 5W linear transponder. There are also 0.4/1.2W beacons at either end of the 40kHz linear non-inverting downlink passband.

The antennas are quarter wave monopoles for both uplink and downlink. The RS-15 spacecraft will have a bulletin board with two megabytes of memory, a command complex, and a 64 channel metered parameter telemetry system. The frequencies to be used are:

Uplink passband: 145.857 to 145.897MHz

Downlink passband:

29.357 to 29.397MHz

Beacon 1: 29.398MHz

Beacon 2: 29.353MHz

Anyone interested in experimental work with RS-15 have been invited to contact: V. Yamnikov at the Laboratory of Aero-Cosmic Technology, ROSTO; ul. Zemlynoi Wal 46/48; Moscow 103 064, Russia. Or you send via e-mail to RW3DZ @ RW3DZ.PUBLIC.SU for A. Zaitzev, or RW3DZ @ RK3KP->#MSK.RUS.EU via PACKET.

There are no plans for any further RS satellites after RS-15. The only project that the RS team is involved in now is the voice experiment satellite VOXSAT. In this project, the Russian team will work together with AMSAT-LU to build this amateur satellite system also to be built into a Russian satellite.

That's all from the world of amateur radio in orbit this time. Cherio for now and Happy Christmas to one and all.

E N D

Table 1. RS-10 Uplink Frequency Table

Downlink	AOS	TCA	LOS
29.360	145.8615	145.8648	145.8681 (c.w. only)
29.365	145.8665	145.8698	145.8731
29.380	145.8815	145.8848	145.8881
29.385	145.8865	145.8898	145.8931
29.390	145.8915	145.8948	145.8981
29.395	145.8965	145.8998	145.9031
29.400	145.9015	145.9048	145.9081



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EAB080	1.95	EM87	4.00	OV006-40A Mull	40.00	6BR7	4.00	6X4	3.00
EB91	1.50	EN91 Mull	7.50	OV03-12	10.00	6BR8A	6.00	6XSGT	2.50
EBF80	1.50	EY51	3.50	U19	10.00	6BS7	8.00	12A17	2.25
EBF89	1.50	EY86	1.75	UAB080	1.50	6BW6	4.50	12A17	2.25
EBL31	12.50	EY88	1.75	UBF89	1.50	6BW7	1.50	12AX7 GE	3.00
ECC33	7.50	EZ80	1.50	UCH42	4.00	6BZ6	2.50	12AX7A GE	7.00
ECC35	7.50	EZ81	1.50	UCH81	2.50	6C4	1.95	12BA6	2.50
ECC81	2.25	EZ81 Mull	8.50	UCL82	2.00	6C6	5.00	12BE6	2.50
ECC82	2.25	G232 Mull	8.50	UCL83	3.00	6C6A	3.00	12BH7A GE	6.50
ECC83	3.00	G233	4.50	UF89	3.00	6C6BGA	5.00	12BY7A GE	7.00
ECC85	3.50	G234 GE	7.50	UL41	12.00	6CL6	3.75	12E1	20.00
ECC88 Mull	6.00	G237	4.50	UL84	2.00	6C6T	7.50	12HG7 12GN7	8.50
ECC91	2.00	KT61	10.00	UY41	4.00	6CH6	6.00	30FL1/2	1.50
ECC91	2.00	KT66	12.50	UY85	2.25	6CW4	6.00	30P19	2.50
ECC91	1.50	KT88	15.00	VR105/30	2.50	6D6	5.00	300B(PR)	120.00
ECH35	3.50	N78	9.00	VR150/30	2.50	6DQ5 GE	17.50	572B	70.00
ECH42	3.50	QAZ	2.70	W759	35.00	6DQ6B	12.50	805	50.00
ECH81	3.00	Q82	2.70	2803U	25.00	6EAB	3.50	807	5.00
ECL80	1.50	QCS	2.50	2021	3.50	6EH5	1.85	811A	18.50
ECL82	3.00	QD3	2.50	3828	20.00	6F6	3.50	812A	52.50
ECL83	3.00	PCF80	2.00	4CX250B EIMAC	75.00	6GK6	4.00	813	27.50
ECL86 Mull	3.50	PCF82	1.50	4CX250B STC	45.00	6H6	3.00	833A	85.00
ECL800	25.00	PCF86	2.50	5R4G	6.00	6H56	4.95	866A	25.00
EF37A	3.50	PCF801	2.50	5U4G	5.25	6J5	3.00	872A	20.00
EF39	2.75	PCF802	2.50	5V4G	4.00	6J6	3.00	931A	25.00
EF40	5.00	PCL82	2.00	5Y3GT	2.50	6J7	4.00	2050A GE	18.00
EF41	3.50	PCL83	3.00	5Z3	4.00	6J8A GE	17.50	5751	6.00
EF42	4.50	PCL84	2.00	5Z4GT	2.50	6J6C	20.00	5763	10.00
EF80	1.50	PCL85	2.50	6AH6	4.00	6J56C GE	15.00	5814A	4.00
EF85	1.50	PCL86	2.50	6AK5	4.50	6K6GT	3.00	5842	12.00
EF86	7.50	PCL805	2.50	6AL5	1.00	6K7	4.00	6080	8.50
EF91	1.95	PDS00	1.35	6AM6	1.95	6K8	61.45	6080 GE	15.00
EF92	2.15	PL36	2.50	6AN5	5.00	6K6 GE	16.50	6550A GE	15.00
EF183	2.00	PL81	1.75	6ANBA	4.50	6L6G	8.50	6883B GE	18.00
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EL33	10.00	PL84	2.00	6AS6	6.00	6L6C GE	9.50	7072A GE	17.50
EL34 Siemens	6.00	PL504	2.50	6AS7G	9.50	6L7	3.50	7199	10.00
EL36	4.00	PL508	6.50	6AT6	2.00	6L06	20.00	7360	25.00
ELL80	25.00	PL509	6.00	6AUSGT	5.00	607	4.00	7581A	12.00
EL81	5.00	PL519	6.00	6AU6	2.50	6RHHB/6KN8	12.00	7586	15.00
EL84	2.25	PL802	6.00	6AW8A	4.00	6SA7	3.00	7587	23.00
EL84 Mull	6.00	PY81	1.50	6B7	4.00	6SC7	3.00	7868	12.00
EL86	2.75	PY88	2.00	6B8	4.00	6SG7	2.50	8417GE	17.50
EL91	4.00	PY500A	4.00	6BA6	1.50	6J57	3.00		



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Panorama

PACKET

Roger Cooke G3LDI, brings you more information on how to address those packet messages for 'Down Under'.

I've recently had a lot of mail for routing to Australia, much of it with the incorrect addressing. This causes unnecessary work as each message has to have the correct address edited. The information has to be found in either the *White Pages*, or from memory!

To help with mail to that area Phil VK6KS, a BBS holder in Perth, Western Australia, has been kind enough to send me the following information. This information was in answer to a request, on my behalf, by Ian VK6CR. Ian, you may remember, set the scene about Western Australia (WA) in last month's column.

"The original specifications for packet H-addresses (as specified by N6VV, WORLI et al) was a maximum of four fields (with a minimum of two fields in any H-address). The fields are read order from right to left, and are: *Continental, Country, State/Provincial and Sub-state fields*.

To show how this addressing is implemented, let's have a look at Ian's H-address as shown last month in the column. Ian's full address was VK6KC @ VK6KS.#PER.#WA.AUS.OC (*Continental field*) stands for Oceania (*mandatory item*).

AUS (*Country field*) stands for Australia (*mandatory item*).

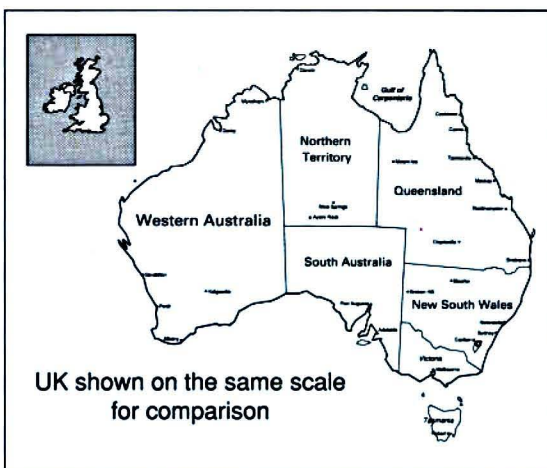
#WA (*State/Provincial field*) stands for Western Australia (*optional item*).

#PER (*Sub-state field*) stands for Perth (*optional item*).

Not shown, is the Local Area Network (PERLAN) that is rarely given. This is an optional item. Also not shown is the BBS callsign, which is not strictly part of the H-address".

All Four Fields

"In the case of my H-address (& all those in WA for that matter) we use all four fields although the first three are enough for routing around Australia. We use the Sub-State field because of the sheer size of the state



of WA. This allows for easy routing of intra-state mail.

When H-addresses were being implemented in Australia about three years ago, we found ourselves with the dilemma of how to structure the state field of our H-addresses. The State abbreviations don't have the same number of characters.

Unlike the US post office, which uses only two characters for its state abbreviations (e.g. HI for Hawaii, CA for California etc.), we have states with two and three letter abbreviations. States, such as New South Wales (NSW) and Victoria (VIC) do not use the # character in the State field.

Originally the # char was to be used for the State or Sub-state fields, to eliminate any possible conflicts with continental or country H-address fields. An example is the possibility of confusing SA for the state of South Australia with SA for the continent of South America.

Those states with only two letter abbreviations Western Australia (WA) or New Territories (NT) use the # as the first character, padding the sub-state field out to three characters.

In Victoria, due to its small size, most BBSs have direct connections with each other, and can route mail based on callsigns alone. However, in WA we are spread over an enormous area, and using the sub-state field solves

many problems.

The beauty of H-addressing scheme, is that the H-addresses (areas) remain constant, although the callsigns of various BBS's are relatively volatile. The moral of the story is that if you use H-addresses properly, whether a BBS uses # or not, will be irrelevant.

Having said this, if sysops set up their routing tables correctly, it shouldn't matter as the H-address is parsed (checked) from right to left (in order of largest domain to smallest) until a match is found. When you think about it, it makes perfect sense as one entry can cover a massive area.

Addressing Information

I also sought some addressing information from Brian VK4BBS, who's been running his own BBS (VK4BBS) for some years now. He's sent some details of the various Australian state area H-addresses. Use them, and take some of the heat off your poor overworked, and definitely underpaid, sysop.

VK1 Australian Capital Territory = .ACT.AUS.OC
 VK2 New South Wales = .NSW.AUS.OC
 VK3 Victoria = .VIC.AUS.OC
 VK4 Queensland = .QLD.AUS.OC
 VK5 South Australia = #SA.AUS.OC
 VK6 Western Australia =

#WA.AUS.OC
 VK7 Tasmania = .TAS.AUS.OC
 VK8 Northern Territory = #NT.AUS.OC
 VK9 & VK0 no apparent packet activity.

Brian says that he has a White Pages Data Base with some 9000 plus callsigns in it at present and if any UK station would like to make use of this please do.

In brief, the commands are: SP REQWP @ VK4BBS, Subject: Query msg: I callsign (info on that callsign) I@ Callsign/BBS (info of stations currently using that BBS) I@ GB* (Info of UK BBSs and users currently in Data Base)

End the message with a 'control+Z' (NO TEXT)

The text in *italics* is not typed in, and is for information only.

In a Similar way, for VK information, use 'I@ VK4*' for info on VK4 users, or 'I@ VK*' for all VK users and BBSs currently in the data base. Use IH Area like IH GBR or IH JPN etc all known users and BBS within the H-address of GBR and JPN etc etc

IZ 41* etc etc all stations known in data base to have a Zip starting with 41.

End with control Z (NO TEXT)

Note: IH #23 would give a list of all known users and BBSs within the areas used in both UK and ZL who have #23 in the H-addressing.

Regards Brian VK4BBS @ VK4BBS.BNE.QLD.AUS.OC
 Satellite Gateway
 Brisbane

I have purposely left the complete H-address of both VK6KS and VK4BBS in the text so that you may address any queries you may have to Ian or Brian, knowing the address will be correct!

Space has caught up with me once again! News, views and pictures to G3LDI, QTHR or G3LDI @ GB7LDI. Happy packeting.

E N D

Round-up

BROADCAST

It's not only listeners who read this column each month in *Practical Wireless*. Staff in radio stations around the world read it too.

I've recently received a letter from Nigel Holmes, Radio Australia's Transmission Manager. Nigel noticed that I had mentioned some of the station's transmissions in the June issue of the magazine. Nigel kindly sent me a copy of Radio Australia's operational schedule which details all transmissions from each of their four short wave sites, together with bearings, power and language.

I sat down and extracted all the English language broadcasts from Radio Australia's transmitters that radiate 100kW or more, and are likely to have some chance of being heard in the UK.

The transmission times from Carnarvon are: 0000-0530, 0700-0900 on 17.750 with 300kW on a bearing of 347°; 0600-0700 on 17.670, 300kW, 347°; 1430-2100 on 7.260, 300kW, 325°; 0000-0100 on 13.605, 100kW, 347°; 1300-1430 on 13.755, 100kW, 347°; 1430-1800 on 11.660, 100kW, 325°; 0030-1200 on 15.240, 250kW, 347°; 0730-0900 on 21.525, 250kW, 347°; 2100-0000 on 11.855MHz, 250kW, 347°.

From Darwin: 0900-0930, 1000-1030 on 13.605, 250kW, 340° and from Shepparton (all transmitters 100kW) at 2100-0730 on 15.320, 355°; 1430-1600 on 9.770, 329°.

Perhaps you'd let me know, via the *PW* Editorial Offices in Broadstone how you get on picking up Radio Australia on these channels, or on any others that I have not listed.

You may also be interested to learn that an additional two 250kW transmitters have been installed at the Darwin site. Test transmissions were carried out during October, and the transmitters should be on the air serving by the time you read this.

Look out on 7.26, 7.30, 9.54, 9.825, 13.755, 15.24, 15.63, 17.63, 21.825 and

25.75MHz. Transmissions on 17.63 and 25.75 will alternate between normal full carrier a.m. and carrier reduction of 6, 12 or 20dB, in effect testing for a possible future introduction of single sideband broadcasting.

Winter Schedules

The winter schedules for both Radio Prague in the Czech Republic and Radio Slovakia International have reached me. English from Prague can be heard at: 0700 on 11.990, 9.505, 7.345 and 6.055; 1130 on 15.355, 11.99, 9.505, 7.345 and 6.055; 1600 on 15.505, 13.58, 11.99, 7.345 and 6.055; 1800 on 13.58, 11.99, 9.49, 7.345 and 6.055; 2100 and 2200 on 9.49, 7.345, 7.265 and 6.055MHz. All broadcasts last either 27 or 30 minutes. English from Bratislava to Europe is at 1930 on 9.44, 7.345 and 5.915MHz.

Radio Vilnius, Lithuania, is still on air despite financial problems. Two English broadcasts are carried on the single short wave frequency of 9.71MHz at 2000 and 2230 daily. There is also a service in English to the Americas on 7.15MHz from a Russian transmitter Tuesday to Saturday.

Programme News

Now for some news of programmes. From Deutsche Welle in Cologne on Christmas Day, listeners will be able to hear the opera Hänsel and Gretel in the series *Arts on the Air*.

On December 18, *Development Forum* will look at the work of the 'Bread for the World' charity and its efforts to ensure justice for the poor.

Programmes are on short wave, and the Astra satellite.

There has been a study carried out into Deutsche Welle service following the merger with Deutschlandfunk during 1993. It looks as though there will be another hour of English added for European audiences. However, the

smaller services, such as the Scandinavian languages and Dutch, are under threat as they will have to rely on satellite following the closure of the medium wave transmitter on 1269kHz medium wave. This was scheduled to happen at the end of 1993 because it is considered too costly to run. This sender also carried the European English service.

If no other German station takes over the 600kW transmitter, it should be possible to hear one of four low-powered Spanish stations on the channel. Or, assuming it is still operational, a 750 transmitter in Novi Sad in the former Yugoslavia may be received.

There should be more space on the bands now that Radio Free Europe (RFE) has closed its Hungarian service and transmissions to Afghanistan under the name of Radio Free Afghanistan.

Other services will be reduced in the coming months as budget cuts implemented by the Clinton Administration take effect. RFE/RL's budget this year is around US\$225 million, but will fall in the next three years to just \$75 million. The two stations' technical operations will be merged with those of the Voice of America.

The Armenian international station, Radio Yerevan, has English, French and Spanish language news bulletins in some transmissions. European listeners should try at 2200 when an hour long broadcast, including French at about 2230 and English at around 2245, is transmitted on 11.92, 9.704 and 7.44MHz.

On Sundays, it is reported that there is a transmission at 0900 on three frequencies in the 19 metre band: 15.51, 15.484 and 15.445MHz.

Live Broadcasts

I can confirm that many international stations do not produce any live broadcasts

- including news. I came across Radio Ukraine International during the siege of the Russian White House in October and there was not a mention of the events in Moscow as the evening broadcast began. This seems a curious way to run a radio station to me!

If you would like to sample broadcasts from Kiev, tune in to English at 2200-2300 on 9.86, 9.745, 9.685, 9.505, 7.24, 7.195, 6.02, 6.01, 5.96 and 4.825MHz; 0100-0200 on the same channels and 7.205, 7.38 and 10.344 all upper sideband

Radio Canada International has English to Europe: 0600 on 11.905*, 9.76, 9.74*, 7.155*, 6.15, 6.05*MHz; 1430 on 17.82#, 15.325+, 15.315#, 11.935*, 11.915+, 9.555*; 2130 on 17.82, 15.325, 15.14, 13.69, 13.65, 11.945, 7.26*, 5.995*; 2300 (Sundays) on 11.94, 11.845, 9.755, 9.535, 7.23*, 5.995*, 5.96.

There are relays of the domestic CBC programmes to Europe at 0000, 2300 and 2330 on weekdays only, on many of the same frequencies, (* indicates relay from BBC Skelton, # means not Sunday, + denotes relay from Sines, Portugal).

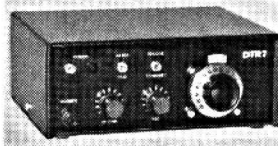
Channel Africa's winter schedule for English broadcasts is: 0300-0500 on 9.73 and 5.96; 0500-0600 on 11.745, 7.23; 0600-0700 on 17.71, 7.23; 1000-1100 on 17.805; 1100-1200 on 9.73; 1500-1800 on 15.24, 7.27MHz.

Finally, details of daytime transmissions from Swiss Radio International are: 0500 and 0600 on 6.165 and 3.985 (Monday to Friday); 0700 on 6.165 and 3.985; 1100 on 9.535 and 6.165MHz. Other broadcasts are carried only on satellite. **Space has caught up with me again so until next time keep listening and sending me those tips from the broadcast bands.**

E N D

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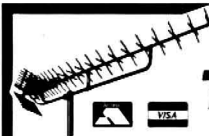
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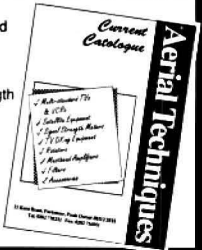
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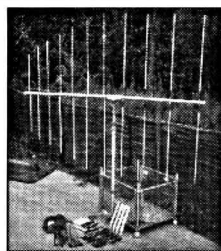
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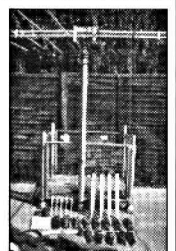
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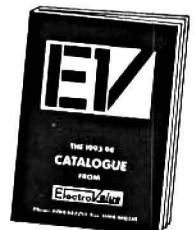
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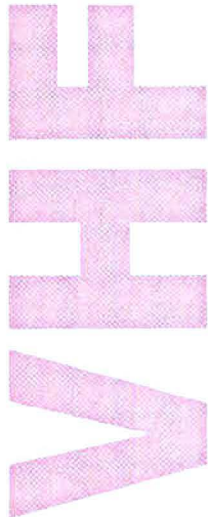
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This month David Butler G4ASR has news on propagation, moonbounce techniques and what's been happening on the microwave bands.

Report



October was an amazing month. Everything was there. Tropo, aurora and the Orionids meteor shower. For the specialist there was the ARRL moonbounce contest.

On the 50MHz band multi-hop Sp-E and t.e.p. openings to Africa and South America. What more could you ask for!

Tropospheric Conditions

It's always expected that the autumn season brings with it enhanced tropospheric conditions and again we weren't let down.

The period from October 19 through to the beginning of November was arguably the best for some considerable time. It didn't seem to matter where you were located. Literally the whole of the UK got in the action.

Joe Ludlow GW3ZTH reports that the BBC weather map on October 19 indicated a strong possibility of an opening to Scandinavia. Quickly packing up his eight lead-acid accumulators (to power the 400W solid-state p.a.) he headed for his portable QTH.

Between 1630-2130UTC GW3ZTH/P made 77 QSOs on the 144MHz band with stations in 22 locator squares. Many SM, OZ and DL operators were worked. Joe reckons that the opening was caused by a cold front passing NE/SW through the centre of the high pressure system.

On October 29, inter-UK conditions on the 144MHz band were excellent. As a result G00FE (IO90) on the south coast reported hearing the GB3LER beacon and GM0ILB (IP90) on the Shetland Islands.

A number of stations in central England also heard the OY6VHF beacon in locator IP62. Now that is unusual!

Heading for November, the conditions got even better. Some operators, including GW4VEQ (IO73) and G4RGK (IO91) heard

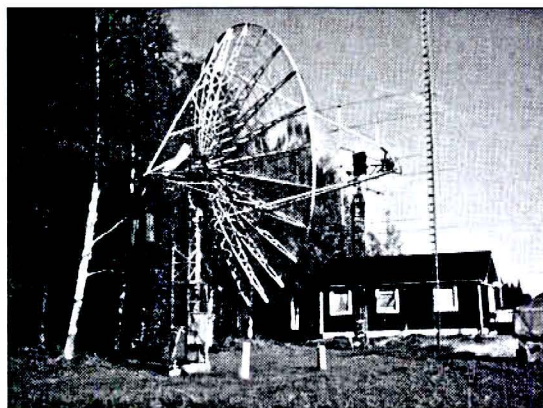


Fig. 1: The e.m.e. antennas at the QTH of SM2CEW in Sweden (see text).

I2FAK and I2FHW on October 30-31.

At my QTH (IO81) on October 31, the 144MHz band was open from HB9 and OE through DL to OZ and SM. The 430MHz band was also in tremendous shape.

The stations of HB9SNR and HB9MIN/P were in much demand, the latter being worked by GM4JJJ. Further to the east OE3XUA (JN77) and OE5XBL (JN68) were being contacted by stations situated in southern and central England.

The club station G6RAF (IO92) were heard having a marvellous time! They were working DX from southern France through Czechoslovakia and into Scandinavia.

The microwave bands also experienced tropo ducting. Following a contact with HB9MIN/P on the 430MHz band Neil Underwood G4LDR (IO90) tried for a QSO on the 10GHz band.

The Swiss station HB9MIN/P, running 15W to a 1m dish, was heard straight away at S9+. Although Neil was only running 100mW to a 500mm dish he received a 53 report in a two-way 10GHz contact lasting 20 minutes. Signals over the 775km path were strong enough to be relayed back on the 430MHz band.

Auroral Events

During October a total of four auroral events were recorded in central England. These occurred on October 11, 25, 26 and 27, slightly less than that recorded in the

previous month.

You must bear in mind that the report on auroral events relates to what was heard in the middle of the UK. Stations in Scotland and northern England will detect more activity and will have openings to different locations.

Not very much appears to have been worked on the 50MHz band. Perhaps operators don't like working stations less than 1000km away!

On the 144MHz band there was some DX to be found particularly in the openings on October 25 and 27. But not all was plain sailing, as both openings coincided with other propagation modes.

On the 50MHz band it was possible to make auroral contacts when beaming north. By turning the beam to the south it was also possible to work stations around the Mediterranean area via Sp-E.

On the 144MHz band it was a similar situation, with the exception that Sp-E was replaced by enhanced tropo. If you beamed north you could work DL, OZ and SM via auroral reflection.

If both stations beamed at each other then contact could be made on tropo! Now try sending on the key "CQ DX but only via aurora please". Yes I know that CQA is supposed to signify that, but it didn't stop the tropo DX from calling!

The 50MHz Band

Now it's time to look at the

50MHz band in depth. During October this part of the v.h.f. spectrum certainly lived up to its reputation for being the 'magic' band. (Although I cannot understand what is particularly 'magic' about listening to white noise for hours at a time!).

Just when you thought that E-layer propagation had died away up it popped again. In addition to that there was also some t.e.p. into Africa and South America, a few auroras, the Orionids meteor shower and even some tropo. Enough to keep everyone happy!

The Sp-E propagation was quite remarkable and was noted nearly every day between October 9-30. At times it was knocked out by auroral activity. At other times it co-existed with it.

According to the DX Cluster, the 50MHz band was open to over 20 European countries via Sp-E during October. On some days double-hop Sp-E was observed extending propagation down into northern Africa.

Eric F5JJK (previously F1JJK, TA5ZA, TL8MB, XU0UN) has recently become active from Mauritania. He first came on signing 5T5/F5JJK but now has the call sign 5T5JC.

Eric will be QRV from Atar (IL30AM) for two years. On October 8 between 1638-1728UTC he had his first opening on the 50MHz band to EH, F, I and 9H.

At 1650UTC Eric heard the beacons GB3NHQ and GB3RMK, but nobody answered his CQ calls. Where were you?

Two days later, on the 10th, 5T5/F5JJK had another opening to the UK. He then contacted a number of stations including GJ4ICD, GJ8ORH, G3WOS, G3ZYY, G4CCZ and G4IG0.

There were also a number of other openings into Africa. On October 5 around 1730UTC the V51VHF beacon was heard in the south of England but no other Namibian stations were active.

A good opening occurred on October 14 between 1800-1900UTC. Many operators in central England reported working A22BW, ZS6WB, Z23JO and 7Q7RM.

A similar event took place around the same time on October 24. Stations in northern England were heard working 7Q7JL and 7Q7RM.

An opening to South America occurred around 2100UTC on October 11. The band had been open to CT via Sp-E and a little later to EH8ACW in the Canary Islands. This extended to Brazil and the station of PY5CC made a number of contacts with stations in F and ON before contacting a few G stations.

Moonbounce Scene

Let's now take a look at what's been happening on the moonbounce scene. The first leg of the ARRL e.m.e. contest on October 9-10 created much interest on the v.h.f. and u.h.f. bands.

One of the more unusual stations active was that of the Toronto VHF Society VE3ONT in Ottawa. They were using a 46m diameter radio telescope on the 144 and 430MHz bands.

Of course with an antenna of that size signals were going to be enormous. However, although they were loud it seemed they were not as strong as expected.

Nevertheless on the 144MHz band they appeared to be about 3dB stronger than the old W5UN array. And that's quite strong!

A total of 236 world-wide QSOs were made with 43 multipliers. In this contest a multiplier is W & VE call areas plus DXCC countries.

On the 430MHz band the group were plagued with a 120Hz buzz on all received signals. The antenna feed consisting of a multi-turn helix didn't perform as expected with a consequent loss of antenna gain.

It was calculated that single-Yagi stations with 100W would be able to contact the station, but the results didn't show this to be the case. Even so a total of 166 QSOs and 37 multipliers were made on this band.

Nick Gregory G0HIK tried listening for VE3ONT on the 430MHz band. He was using an Yaesu FT-780 transceiver and a 48-element Multibeam fed with Andrews LDF4-50 Heliax. However, he didn't hear anything on October 9 from

the Canadian station.

Peter Sargent G0BJJ also attempted to hear 430MHz signals from VE3ONT. Peter was using an Yaesu FT736R transceiver, a Landwehr pre-amplifier and 12-element crossed Yagi.

The antenna was configured for r.h.c.p. and was also steerable in azimuth and elevation. However, he also heard nothing identifiable despite intensive listening between 0500-0930UTC.

On October 10 VE3ONT was scheduled to operate on the 144MHz band. At the station of G0BJJ e.m.e. signals from VE3ONT were first heard at 0609UTC.

On the 144MHz band Peter was using the FT-736R, Landwehr pre-amplifier and a 9-element crossed Yagi with elevation. He reports it was brilliant and well worth the effort!

I had a brief listen during moonset on both October 9 and 10. Using a single 18-element Yagi and an FT-221GT a number of e.m.e. stations on the 144MHz band were heard.

The stations I heard included DL8DAT, HB9CRQ, K2GAL, SM2CEW, SM5FRH, UZ2FWA and VE3ONT. Contacts were made with K5GW and W5UN. The photograph, Fig. 1, shows the e.m.e. arrays at the QTH of SM2CEW.

John Regnault G4SWX (JO02) was active on the 144MHz band during the contest. He runs 4 x 16-element Yagis each 8m long and an 8877 power amplifier.

A total of 41 QSOs and 28 multipliers were made. These included contacts with 17 x W and 3 x VE. A station in Alaska, KL7X, was called for 40 minutes but the pile up was huge, and regrettably he was not worked.

Microwave Bands

Up in frequency now, to the microwave bands. There's been some tremendous work recently on the 10GHz band by the G3WDG/G4KGC duo.

More e.m.e. contacts have been made with the 3m dish (shown in the May issue) since working SM4DHN and WA7CJO earlier in the year. During May QSOs were completed with DJ7FJ and I4CHY.

The station of DJ7FJ runs 15W into a 3m dish with linear polarity. That of I4CHY runs 20W into a 4m dish with circular polarity.

On September 12 the station of WA5VJB was contacted in a QSO taking 20

minutes to complete. The American station was running 58W into a 3m dish.

Further improvements have been made to the system at the G3WDG/G4KGC QTH. A new waveguide input h.e.m.t. low-noise amplifier with an FHX16 device is being used.

This gives a front-end noise figure of 0.65dB and produces an overall system noise figure of about 0.8dB at 10.368GHz. A new p.a. consisting of two 20W t.w.t. (travelling wave tube) amplifiers combined in a magic Tee gives nearly 40W output. Incidentally a 'magic Tee' is a waveguide combiner (or splitter) device with mystical qualities!

Remote control and monitoring (RC&M in professional circles) of both the antenna steering and transmit systems is now possible from the warmth of the shack at G3WDG/G4KGC. The dish position is indicated by the use of 10-turn potentiometers.

The 10-turn potentiometers are chain driven from the dish mount. This system allows the dish to be pointed fairly accurately at the moon.

With the G3WDG/G4KGC system, the readout accuracy is not so important as tracking is accomplished by listening to moon noise. With the new l.n.a. in place about 2dB of lunar noise is detectable.

A p.i.n. diode attenuator has now been included in the drive to the t.w.t. amplifier. Remote power monitoring at the dish feed is fed back to the shack.

The technique adopted by Charles and Petra enables them to carry out echo testing at reduced powers. When conditions are favourable it is possible to hear echoes from the moon with as little as 4W output!

Earlier in the year G3WDG/G4KGC carried out e.m.e. tests with WA7CJO. That station runs 350W output on the 10GHz band and calculations showed that it would be possible to hear him with a 1.2m dish.

This prompted **John Fell G0API** and **Andy Talbot G4JNT** to combine their talents and attempt some small-dish e.m.e. tests. Along with **G7DKS** and **2E1AES** a series of listening sessions were conducted on October 9-10 at the Flight Refuelling Club (G4RFR) in Dorset.

The G4RFRF receiving system consisted of a 1.6m off-set fed dish, a h.e.m.t. pre-amplifier and G3WDG

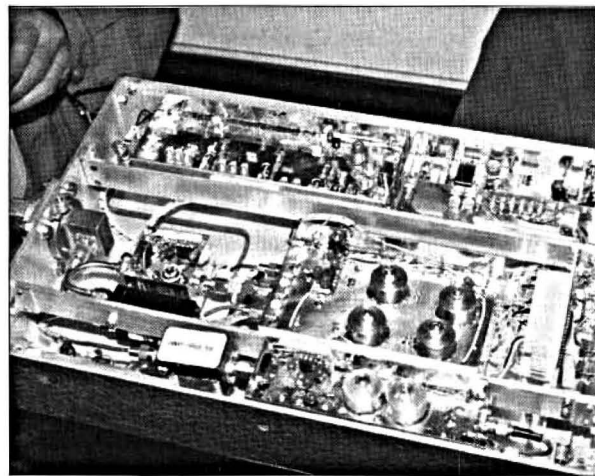


Fig. 2: A 10GHz transverter using typical G3WDG 10GHz transverter).

With this system the operators at G4RFR found it was possible to hear 0.3dB of moon noise and signals from WA7CJO on 10.3681GHz. Although weak, they were peaking S1.

The G4RFR set-up is probably the smallest dish system to hear 10GHz e.m.e. signals so far. John Fell G0API has now started work on using a 3m dish from the Flight Refuelling Radio Club QTH.

Activity via this mode is certainly capturing the interests of a number of operators. The station of **ON6JZ** running 20W into a 1.8m dish recently made contacts with SM4DHN and WA7CJO. The gear was then transported to the QTH of PA3CSG who also worked the same two stations.

The performance from these small-dish systems is very impressive. A few tens of watts and a 2-3m dish and you have the capability of working a number of countries around the world. This brings 10GHz e.m.e. within reach of many UK operators running conventional narrow-band systems and a small t.w.t. amplifier.

Deadlines

It's that dreaded deadline time again! Please send your letters to reach me by the end of the month at the very latest. Don't forget that I can also receive messages via packet radio @ GB7MAD or at my DX cluster GB7DXC.

Photographs of your shack, antennas or any v.h.f. activity are especially welcome. Other pictorial items such as QSL cards, awards, certificates etc, are also useful.

E N D

ARCADE

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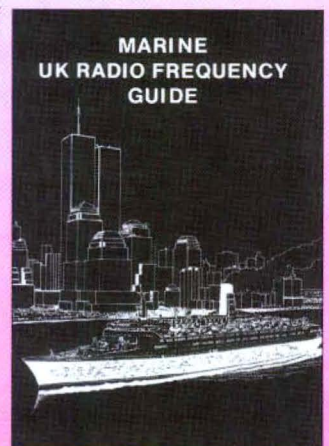
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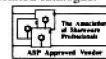
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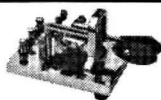
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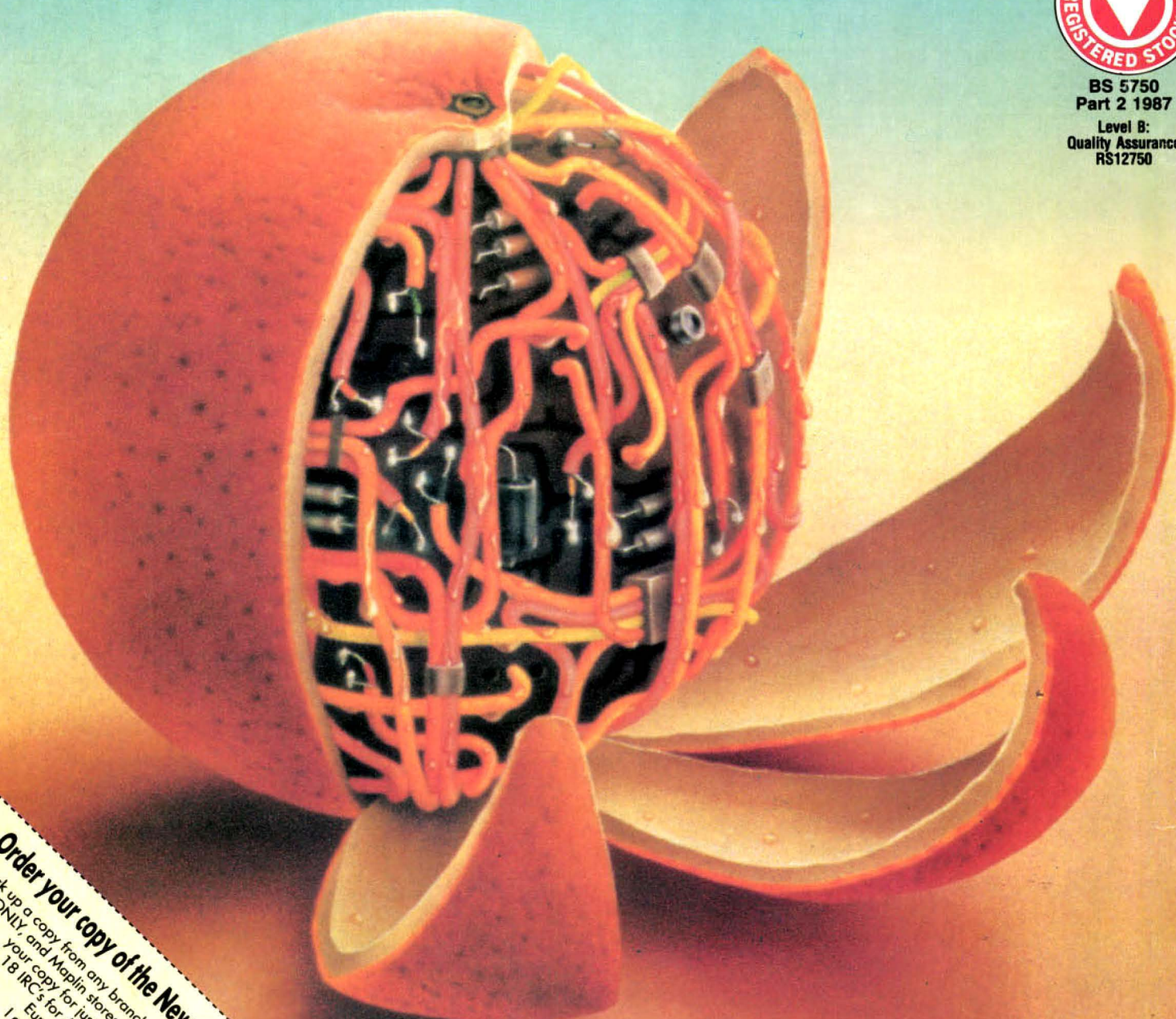
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