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JANUARY 1997 £2.20

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practical **Wireless**

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antennas
in action

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REVIEWED

KENWOOD'S FRIENDLY TS-570D



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WALLPLANNER**

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ADS**

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At Siskin we'll try our best to take away the guess work and guide you through the "techno-maze" and chances are you'll wonder what all the fuss was about. (Our oldest customer is 82 whilst our youngest is just 9.)

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THE SYMEK TNC2H - a beautifully made German 9600 TNC2 compatible, ideal for regular AX25 Packet plus TCP/IP and satellite operations. The TNC2H employs officially licensed G3RUII 9600 technology and is gaining popularity fast. We've kept the price keen on the TNC2H at just £179 plus carriage including a ready-made computer cable and software. (Ready-made radio cables are available at just £14.95 each.)



THE AEA PK96 - similar to the PK12 but with the added convenience of 9600 or 1200 baud Packet Radio with a simple software command. Supplied complete with ready-made transceiver and computer cables, software, and, if you mention the words "I SAW YOUR AD IN PW" we'll chuck in the 128K optional ram upgrade free of charge (offer ends January 31st 1997). Price £219 plus carriage.

BREAD AND BUTTER STUFF !!



The AEA PK-12, a no-nonsense plug in and play 1200 baud TNC with built-in Personal Mailbox (expandable to over 100K), software DCD as standard (means you can run with the squelch wide open) and of course ready-made cable and software. A snip at £129 plus carriage. (128K upgraded model available at just £149.)

The PACCOMM TINY 2 MKII - over 19,000 sold and still going strong. The superbly engineered 1200 baud TNC again sports a built-in Personal Mailbox, upgradable to 9600 baud operation, lots of their party add-ons for Node and BBS operation, also makes an ideal platform for satellite operations. Again the Tiny includes ready-made computer cable plus software, £139 including VAT plus carriage.

THE SISKIN MINI-PAK - well, this isn't actually a TNC but a surface mount constructed miniature modem built inside a 9-way D Shell. The Mini-Pak is actually made for us by Baycom in Germany and unlike many dubious clones you'll see advertised elsewhere the Mini-Pak is supplied with an official copy of the BayCom software and manual plus ready-made lead.



OUR FLAGSHIP MODEL...



THE AEA DSP232 - at last, we have them in stock and they are going like wildfire. The DSP232 is the natural successor to the best-selling PK232 model. Using state-of-the-art Digital Signal Processing techniques the DSP232 is able to emulate many popular hardware based modem characteristics such as RTTY, AMTOR, ASCII, PACTOR, CW, HF PACKET, 1200/9600 Packet and more! At the moment we are also bundling a free copy of PC Pakratt for Windows II software (normally £79) and ready-made cables! £479 plus carriage.

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Wireless

JANUARY 1997
(ON SALE DECEMBER 12)
VOL. 73 NO 1 ISSUE 1078
NEXT ISSUE (FEBRUARY)
ON SALE JANUARY 9

EDITORIAL & ADVERTISEMENT OFFICES

Practical Wireless
Arrowsmith Court
Station Approach
Broadstone
Dorset BH18 8PW
☎ (01202) 659910
(Out-of-hours service by answering machine)
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PW's Internet address is:
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mail to anyone at PW, just insert their
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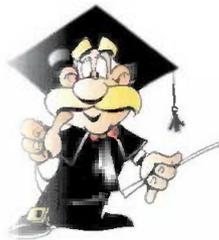
Front Cover Photograph: Craig Dyball

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Published on the second Thursday of each month by PW Publishing Ltd.,
Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel.
(01202) 659910. Printed in England by Southampton Print (Web Offset) Ltd.
Distributed by Seymour, Windsor House, 1270 London Road, Nurbury, London
SW16 4DH. Tel: 0181-678 1899. Fax: 0181-678 8907. Telex: 8817945. Sole Agents
for Australia and New Zealand - Gordon and Birch (Asia) Ltd, South Africa -
Central News Agency. Subscriptions: INLAND: £7.2, EUROPE, OVERSEAS
(by ASP) £20, payable to PRACTICAL WIRELESS, Subscription Department,
PW Publishing Ltd, Arrowsmith Court, Station Approach, Broadstone, Dorset
BH18 8PW. Tel: (01202) 659930. PRACTICAL WIRELESS is sold subject to the
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literary or pictorial matter whatsoever. Practical Wireless is published
monthly for \$45 per year by PW Publishing Ltd., Arrowsmith
Court, Station Approach, Broadstone, Dorset BH18 8PW.
Royal Mail International, c/o Yorkshire International, 37
Burrows Court, Hackensack, NJ 07601, UK, Second Class
Postage paid at South Hackensack, Send USA address
changes to Royal Mail International, c/o Yorkston
International, 2378 Ryan Boulevard, Elk Grove Village, IL
60007-9937. The USPS (United States Postal Service) number
for Practical Wireless is 00703.



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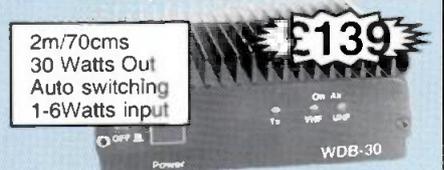
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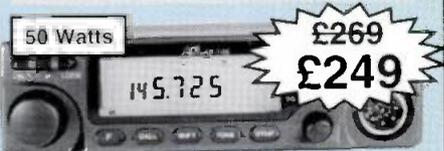
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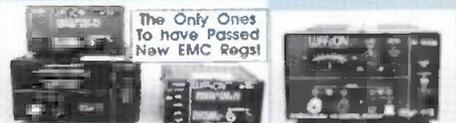
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Please use the form on page 70 of this issue

Merry Christmas



&

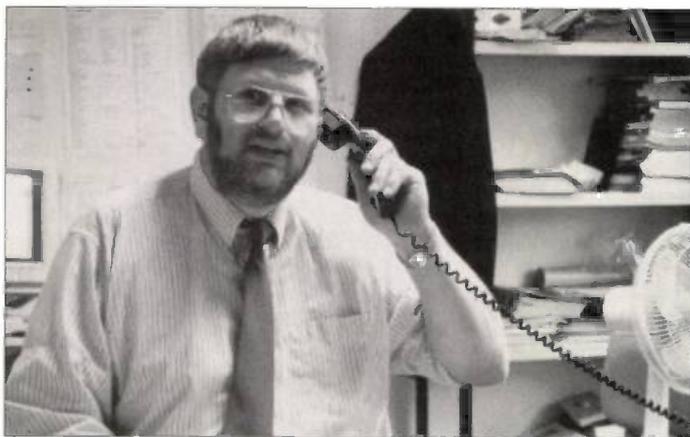
**A PROSPEROUS
NEW YEAR**

TO ALL OUR READERS & ADVERTISERS



EDITOR'S Keylines

Rob Mannion's viewpoint on the World of Amateur Radio



Anything to do with antennas, how they work, projects and ideas are all very popular with *PW* readers. So with that in mind, the Editorial team have come up with something rather special for you on this subject. And appropriately enough the new bi-monthly section is called 'Antennas In Action'.

Antennas In Action is a very apt title for the new 8-page section because that's exactly how **Tex Swann G1TEX** plans to present our latest offering. There'll be loads of 'antenna action', projects, news, ideas, up-dates and discussion on literally anything to do with antennas and associated subjects.

Tex Swann G1TEX as the member of the team in overall charge of the new section - has taken to the job 'like a duck to water' (Swann more like it!) and produced an excellent first edition. As the section 'Editor' Tex can call on the rest of the *PW* team to prepare what we think will become a very popular part of the magazine.

We hope you enjoy the first edition of A-i-A and that you'll send your comments, suggestions and ideas straight to Tex here at the Broadstone offices. And don't forget that Antennas In Action is an extension of our coverage of this topic. 'Antenna Workshop' and other associated articles will continue to appear monthly but will also form part of our new section.

In the meantime, between answering your letters on the subject, I'm hoping to recruit Tex's help to rebuild my h.f.

antenna system which was wrecked during the recent storms in October. It's not that my new antennas were at fault (I built in as many 'fail safes' for the weather as I could think of) but I didn't allow for flying roofs from other properties - plus a small greenhouse from next door - demolishing my systems.

So, with the help of Antennas In Action (and perhaps Tex) I hope to be on air again soon on the full system rather than the 'jury rigged' temporary wire I have up at the moment!

Amateur Radio Beacons

Amateur radio beacons provide a very useful service in helping the operator evaluate the prevalent propagation condition. They're an extremely useful aid on whatever part of the spectrum they operate on.

I often listen out for the v.h.f. beacons, particularly when there's a 'lift' on...just to see what happens. And although I'm not a 'DX chaser' I really do find propagation and the variability factor to be absolutely fascinating. I can really understand why some people make a hobby of listening for beacons themselves...rather than using them as aids.

However, I'm becoming increasingly frustrated with the QRM on the common 14MHz beacon frequency. The problem is h.f. packet radio 'interference' and I'm finding it extremely difficult to listen on the International beacon frequencies between 14.099 and 14.101MHz.

As readers will appreciate I have access to the most modern receiving equipment. But even the

most selective has difficulty in providing readable signals from the h.f. beacons due to the very potent h.f. packet radio transmissions on (very close indeed) adjacent channels.

So, what can be done about the 'interference' problem? I don't want to 'interfere' with the packet user's enjoyment of 14MHz...but conversely I don't wish to be denied the use of the beacons either!

Have you had difficulty using the beacons on 14MHz? If so what do you think we can do? If it's a problem originating outwith the UK (as I think it must be) surely our National Society the RSGB cannot help in this respect? I'd like to hear your opinion on this matter because I feel that with care, both the low power beacons and the higher-powered packet stations can co-exist. After all both 'modes' are to someone's advantage.

Name That Trophy!

Following my request for your help in choosing a suitable name for the new special EI/GI Trophy (to encourage EI and GI entrants into the *PW* 144MHz QRP Contest), I've had many letters of support. I have also had many suggestions for a name for the new trophy and because of this I'm now announcing a little competition to choose the name!

As I'm personally sponsoring the new award - a miniature clock in a green (naturally!) hardwood case which will be presented each year. The recipient/recipients will keep the clock as a memento of the occasion and a small brass plaque will record the callsign of the winning station, the year and the title of the trophy.

The new trophy will be presented to the winner on behalf of *Practical Wireless* (depending on what station wins it) either by the **South Dublin Radio Club** or the **Glengormley Electronics Amateur Radio Society** from Newtownabbey in County Antrim, Northern Ireland. (The two societies are 'twinned' which I think in itself is a marvellous idea!). And I have to thank **Peter Lowrie G17JYK** and friends for their help, advice and support on this matter.

So - now to the competition itself! The shortest and most appropriate title will be selected by the Editorial team from your entries. (Don't forget...as sponsor **I'm denied entry into the competition and disqualified from being mentioned!**). The title you choose should reflect the nature of the trophy, the contest itself or the personality behind it (**Dr. Neill Taylor G4HLX**).

Please send your entries (on a postcard) to **EI/GI Trophy Title Competition, C/O The Editor, Practical Wireless, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW**, to reach us by **Monday 27th January 1997**. I'm donating a special prize and the nature of the prize will be announced when we publish the results in the June 1997 issue of the magazine. The winner will be notified and my decision will be final! Good luck.

Africa Up-Date

I'm still receiving offers of help from Radio Amateurs all over the world keen to help budding radio enthusiasts who live in Africa. I hope to provide more details as soon as possible. In the meantime keep writing in and we'll soon amass a shipload of radio 'bits & pieces' for Nigeria and other countries!

Peace & Goodwill

It's the time of the year when I - on behalf of everyone working on *Practical Wireless* - like to wish you all a happy Christmas. We also wish you all a happy, peaceful and prosperous new year. God willing our world, our families, our day-to-day lives and our wonderful hobby will go from strength to strength in the coming months.

I wish you all well. God speed and Bless you all...wherever you are.

Rob Mannion
G3XFD

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.

RECEIVING You

Letters Received Via The 'Internet'
Many letters intended for 'Receiving You' now arrive via the 'Internet'. And although there's no problem in general with E-Mail, many correspondents are forgetting to provide their postal address. I have to remind readers that although we will not publish a full postal address (unless we are asked to do so), we require it if the letter is to be considered. So, please don't forget to include your full postal address and callsign along with your E-Mail hieroglyphics! Editor

PW's Postbag. If your letter is published you'll win a prize.

'CB' Radio On 6MHz

Dear Sir
Does Tim Cattley G0CWZ (November 'Receiving You' regarding 'CB' on 6MHz) live in a different world or listen to different 10, 15 or 20m bands to those I receive here? I refer to his comments that 'all radio amateurs know exactly what frequency they are transmitting on and certainly what band they are on and do not call 'CQ 10, 15, 20 or any other metres'.

All I can say is that there must be an awful lot of 'pirates on these bands then as I regularly log radio amateurs from all over the world, including the UK, using just such a call.

John Charles
Louth

Enamel Wires

Dear Sir
Can anyone tell me how to scrape the enamel off the thinner wires, 24s.w.g. to

30s.w.g. without making the wire brittle or getting pieces of copper embedded in my finger. I usually scrape mine with a knife, but have come to the conclusion there must be an easier and safer way.

John Noble
Kent

Editor's reply: For many years I've kept an old mustard jar half filled with methylated spirit on the bench to prepare wire that's not covered with the 'solder through' modern enamel. I heat the enamel wire in a match flame (A cigarette lighter would perhaps be better, but I neither smoke or have the dexterity to hold a lighter and keep it working!) before plunging the hot wire into the 'meths'. A bright copper wire ready to solder results (of course, the cover is kept on the jar when it's not in use). A refinement of this method is to put a small amount of 'meths' into a METAL container,

heating the wire in the flame before plunging the wire into the reservoir of liquid under the flame. Any other tips from readers?

Under 'Twenty Shillings'

Dear Sir
Having been a reader of PW since around 1959, I have read and enjoyed the various articles over the years, one series that I found very good from around the seventies was the articles entitled something like 'under twenty shillings'. Each month a small project was described that could be built for under a pound.

Now, obviously, time and inflation go on but I wonder if the Editor would consider running a new series of simple cheap projects designed to be built for under, say, a 'fiver' or a 'tenner'? I am sure this could be very useful to newcomers, Novices and

old hands alike.

Who knows, with confidence and experience gained in little projects, the sky is the limit. So, I'll put the soldering iron in the fire and wait eagerly for lift off. All the best and thanks for many years of interesting reading.

Tony Green GW4JGU
Swansea

Editor's reply: Reader's comments and suggestions are awaited with interest on this one!

PW 144MHz QRP Contest

Dear Sir
You asked for views for the award for the leading EI/GI station in the PW QRP 144MHz Contest, I think as you suggest, the award should be in honour of Dr. Neill Taylor G4HLX. This is because as you say in 'Keylines', Neill has adjudicated the contest for all these years.

Thanks for the excellent

contest in 1996 and I am looking forward to the 1997 event. I think it will be hard to win leading single operator again as G17JK/P now knows which station to beat!

Dave Hewitt G8ZRE
Chester

Editor's reply: Please see 'Keylines' for further news on the proposed EI/GI Trophy.

Packet Radio

Dear Sir
Reference: Packet Panorama and packet radio. Shortly after amendments to the rules on Amateur Radio to allow unattended operation on Packet Radio, we now find that BBS operators now wish to provide a private radio club within Packet radio. The plan to use password control to exclude other amateurs from BBS services, and then only to allow usage by approved operators.

Surely the best way to cut down alleged abuse is to make the author of any libel responsible for the libel by making the callsign a compulsory part of any packet operation. The 24 hour monopoly of a huge part of the band is bad enough.

Denying access to other legitimate amateurs operators is bad enough. (Remember the clause 'with the permission of other amateurs' when a further portion of the band was 'hijacked' for packet radio). The hidden agenda is to section off amateur radio for private use.

Perhaps the rescinding of permission for unattended operation is the only way to prevent abuse which would be regrettable. I view

Broadcast Receiving Filters

Dear Sir

I have just returned home from a trip to the amateur radio show held in Leicester, with the intention of looking for a suitable replacement for my now ageing Trio TS-830 amateur transceiver, which has served me well for the last 14 years. As I am also a keen broadcast band short wave listener, high on my list of priorities was that it should have general coverage receive capability and also a good performance in the a.m. mode.

After coming home and looking through the pile of leaflets passed onto me from dealers, it would appear that in nearly all cases the a.m. mode has been added as an extra to promote sales, with poor bandpass filters being fitted in most cases, (no doubt to cut costs). Is it too much to ask, when one may be paying over a thousand pounds, and sometimes two or three thousand, to expect to see a good quality bandpass filter, to give good selectivity in the a.m. mode.

I would expect to see selectivity readings of 12kHz wide at 60dB down the skirt, instead of 20kHz wide at 40dB down, which seems to be the norm on a lot of these transceivers. Some manufacturers do offer high quality

6kHz crystal filters for a.m. use on some models in their range as an optional extra, but not all.

It is clear to me that in most of the test reports that are published in the radio press, very little is said about the performance of some of these transceivers, when they are used for serious short wave listening on the broadcast bands. In a lot of cases, the selectivity results for s.s.b. and c.w. will be printed, but nothing is said about the a.m. performance. Could you please, if possible, spend some time when doing your tests, to report on the sets suitability as a short wave receiver on a.m. Or am I alone in thinking that this information will be of interest to your readers?

The outcome after reading through my stack of leaflets on the latest batch of super transceivers is to soldier on with my old TS-830S for the amateur bands and carry on with a separate receiver for my broadcast band listening. (This at least has some good filters for a.m.).

Roy Maskey G4TDW
Lancashire

Editor's reply: Comments from readers and manufacturers would be of interest here. As a keen h.f. broadcast band listener myself I'll be interested to read YOUR comments!

password control in the same light as encryption which is banned.
M. Charlton G0MDF
Nottinghamshire

Editor: I passed on Mr Charlton's letter to Roger Cooke G3LDI (author of 'Packet Panorama') for comment and his reply follows:

I feel Mr Charlton is being somewhat churlish in his letter when he suggests that BBS operators wish to provide a 'private radio club' within packet radio. This is, of course, total nonsense.

However, having seen the utter mess that some of the voice repeaters are in, and hearing some of the garbage emanating from them, we would seek to prevent ANY such happening on packet radio. This mode at least does give the opportunity to exclude the abusive operators that seem to enjoy preventing normal, sane amateurs from using the voice repeaters.

I would agree totally with Mr Charlton when he says that the author of any libellous comment should be made responsible for their actions. But again, he is being naive to assume that any person using the packet network for this purpose would be stupid

enough to use his own callsign!

By issuing passwords, the BBS Sysop can ensure that **ONLY** legitimate licensees would have access. It would be mandatory for the user to use the password and they could not assume any other identity because they would **NOT** then access the BBS. Garbage cut 100% in one stroke! **NO** legitimate user would be denied access; a new user would be able to read messages and send a message to the Sysop, in order to obtain full access. This would then be issued on a personal basis only, and only then, if the applicant was a known trouble-maker (and we do know some) would be refused a password, **UNTIL** such time as they were considered acceptable.

Again the BBS Sysop would have the right to exclude anyone again if they caused any problems. Thankfully, in our amateur radio barrel of apples, there are very few rotten 'fruit'. But we want a 100% pure barrel of fruit without any rotten 'apples' at all, and packet gives us that possibility.

Mr Charlton is also right when he says that the hidden agenda is to sell off parts of the amateur bands for private use. But that

threat comes from the commercial sector, **NOT** from radio amateurs. In fact, using packet on the bands on a 24 hour basis is probably the best thing that has happened to the v.h.f./u.h.f. bands in order that we keep them.

Use of the segments for packet are actually part of a bandplan. Room has to be found to accommodate new modes in the same way that we had to make room for RTTY in the late 1950s. Being involved with that too, I well remember the objections to 'those jingle-bells on OUR bands'. Prior to packet, you could listen over both 144 and 430MHz hearing very few signals. Such evidence is just what the commercial intruders are looking for. Use them or lose them is the motto!

There is still plenty of room on both bands to cater for all modes, albeit we would very much like the same spread as our American and Canadian cousins enjoy, double what we have. To sum up, the BBS Sysops are interested in making the system more enjoyable for the genuine user and making life extremely difficult for the graffiti artist.

I hope that Mr Charlton will try packet radio and all that it offers.

Roger Cooke G3LDI.

grounds in Toronto in Lake Ontario.

Local 'hams' used the packet system to find parts that are now longer made, but they did it and the ship is now operational, the radio room is just as it was when she was at sea. I may write to the airlines as well to see if they will do the same from this side to the destination or ship to you if you have luck in finding a sponsor to ship the 'bits & pieces'.

If you have time and more details how you're doing, let me know and I will keep you informed as to how things are going this side of the pond.

Meanwhile As I told you I had a place a 'wanted ad' on packet "all@can" and I am getting offers of parts for the cost of shipping. But I, like you, am trying to get Air Carrier to ship for free if possible. It has been mentioned in so of the replies what part are needed.

Here is one offer from **Herb Sweet K2GBH** in the USA as follows: "I have a large collection of tubes which are mostly receiving tubes (valves) and some small transmitting tubes, I also have high voltage electrolytic capacitors and air variable types. I'd be glad to help out anyone who has a need. Let me know what that is and the parts are yours for the cost of shipping. 73 Herb K2GBH". So...we're all here waiting to help!
Brian Lowe VE3TJE
Canada

Editor's reply: Thanks to you **Brian** and everyone else who has responded to the editorial in November 1996's *PW*. For the latest up-date please see 'Keylines' this issue.

Left-Handed Operators

Dear Sir

I know this may sound like a bit of a 'whinge' and I suppose in a way it is! But

it's something that has annoyed me ever since I bought my first h.f. rig eight years ago and I feel I've just go to get it off my chest. Why is it that manufacturers of h.f. rigs never consider the left-handed operator?

Nearly all h.f. transceivers, whatever the make, invariably have the microphone socket located in the bottom left hand corner of the front panel. This makes life somewhat difficult for the left-handed operator who, being left handed, usually hold a writing implement in the left hand for making notes, etc. whilst the microphone is held in the right hand.

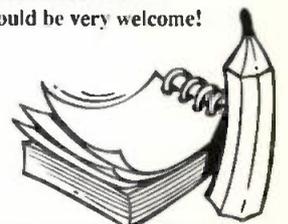
This causes the microphone cable to be stretched across the desk to enable the mic. to be held to the mouth. As the cable runs across the desk it becomes very difficult to use a pad, atlas, callbook, prefix list, etc.

The problem can be solved by extending the microphone cable to such an extent that it can be wrapped around the right hand leg of the transceiver. But it's not an ideal solution and has in the past caused me r.f. feedback problems.

In these days of modern technology with computer interface ports, twin receiver controls, dual display and digital signal processing controls all on the front panel, is it too much to ask that the manufacturer put an additional microphone socket on the right hand side of the rig for us left handers?

Chris Carrington G0IYZ
Derby

Editor's (left-handed) reply: Quite a problem for us eh Chris? Comments from manufacturers would be very welcome!



This Month's Star Letter

Contest Operating

Dear Sir

On listening to the WWW CQ Phone Contest this weekend 26-27th October 1996 I was appalled that once again the c.w. end of 7MHz has been taken over by s.s.b. operators disregarding the band plan. Despite complaints to *CQ Magazine* and the RSGB asking that anyone operating in the Contest, outwith the band plan be disqualified, the practice still continues.

If more people complain about the bad operating, etc., then something might be done. I am more convinced than ever before that contests encourage bad practice and will in time end the enjoyment of operating. How many operators switch off when they hear a contest on the bands?

T. Sorbie GM3MXN
South Lanarkshire

Editor's comment: Unfortunately, many contests also discourage me from going on the h.f. bands. It's a great pity this happens, especially when the contests are actually encouraging (and can be heard doing so!) amateurs to come on the air! Has anybody got the answer so we can reach a 'happy medium'?

Components To Africa

Dear Sir

With reference to your suggestion in 'Editor's Keylines' (November *PW*) to send radio components, etc., is a great idea. So I have taken liberty and posted on our BBS packet you idea for parts and old use gear. I will let you know how things go if I get a response to it. It has in the past worked for some pieces that we were wanting to build gear for the HMCS *Haida* (Her Majesty's Canadian Ship) a Second World War frigate now moored alongside the Canadian Exhibition

Reader's letters intended for publication in 'Receiving You' must be original and not be duplicated. Letters are accepted on the understanding that they have only been submitted to *Practical Wireless*. Please ensure that your letter is clearly marked for publication in 'Receiving You' and that it has not been submitted to other magazines. We reserve the right to edit or shorten any letter. The views expressed in letters are not necessarily those of *Practical Wireless*.

Send your letters to the *PW* Offices, marking it clearly for 'Receiving You'

NEWS 1997

Compiled by Donna Vincent G7TZB

Electronic Constructors Catalogue

The Winter 1996/97 edition of the Cirket *Electronic Constructors Catalogue* has recently been published. This new edition contains all the usual lines, with everything from batteries, through kits & modules to test equipment and transformers being included within its 248 pages.

This 1996/97 *Electronic Constructors Catalogue* offers readers the chance to win a 28,800 Fax Modem, as well as containing £25 worth of discount vouchers.

There is also a free 32-page Computer catalogue with every issue.

So, if you are a keen electronics constructor, then this is one catalogue you should have on your workbench. Copies of the *Electronic Constructors Catalogue* are available for £1.95 from larger newsagents or direct from Cirket Distribution Ltd., Park Lane, Broxbourne, Herts EN10 7NQ.

Licence Revocations By RA

The Radiocommunications Agency have informed *PW's* Newsdesk that two Radio Amateurs have had their licences revoked for undisclosed reasons.

In her Press Release statement dated 5th November 1996, Mrs Karen Scott, Head of Amateur Radio & Citizens' Band Radio Unit announced that the licence of Mr D Randles G0WNG and that of Mrs M Faint G0UGN had been revoked. No further details have been provided and no one from the RA was available for further comment.

Martin Lynch Celebrations

On Saturday 2nd November, Martin Lynch held his annual open day at his Northfields Road Radio 'Superstore'. As usual he had something to celebrate, and it's usually something very worthwhile too.

In the past, it's been an anniversary, the birth of 'MicroHenry' or an important announcement for his customers. This year it was Martin's 40th Birthday and, as usual, he promoted it to one and all well in advance of the event.

As Martin's business goes from strength to strength, so does the popularity of his open days. This year Martin pre-empted the number of people attending by erecting a marquee on the pavement outside his shop, to cram more bodies in. This actually made the event a little more comfortable, being able to stand outside for a breath of fresh air with a glass of wine and a bite to eat from the superb running buffet, which gets bigger and better too!

Thanks must go to Daniel, Martin and Jennifer's eldest son, for keeping everyone well fed during the day, not forgetting the ladies behind the 'bar' keeping us lubricated!

On technical note, all the major distributors were present to answer questions and talk of new developments in the hobby. A quick glance around, while I was there (only for a couple of hours) saw representatives from Icom, Yaesu UK, Kenwood, AOR, Waters & Stanton and, of course, Martin's staff.

A novel event throughout the day was a 'reverse auction'. Prices tumbled quickly, so when you thought the price was right, you had to strike quickly for that bargain - wait too long and it had gone!

When Martin picks a day to celebrate next year, take note of the date and put it in your diary, so as not to miss a tremendous day out. It's really worth making an effort to travel to his store to meet old friends, make new ones and see the very latest gear in action.



Getting top class advice from the people that have all the answers in an atmosphere where there is absolutely no pressure to buy anything (and get fed and watered too) has to be a worth making an effort for in my book!

Steve Hunt.

Dayton Experience

The world's largest radio show takes place in Dayton, Ohio USA. The *PW* trip to this awe inspiring show, has in the past brought much in the way of experience and enjoyment to the many readers who have experienced this trip of a lifetime.

The 1997 Dayton HamVention takes place over the weekend of **May 16, 17 & 18th** and you could

be there! Yes, the *PW* trip is running again, but this year it's slightly different in that you can have a tailor made trip to suit you.

All you have to do is contact **Andy Garside** or **Marie Tozza** at **Guillivers Groups & Incentives, Fiddington Manor, Tewksbury, Gloucestershire GL20 7BJ. Tel: (01684) 293175** and ask for details on the Dayton HamVention Holiday 1997. They will then be able to help you sort out a holiday to suit your

needs. Please note we are unable to deal with any enquiries via the Editorial Offices.

House Of Elliott



Three generations of the Elliott at the 1996 Leicester Amateur Radio & Computer Show. The picture, shows on the far right, **Frank Elliott G4PDZ**, who is not only well known and respected in the amateur radio but is also the organiser behind the Leicester Show.

To the side of Frank (R-L) are his son **Paul G4MQS** and his grandson **Scott 2E1FJB** who has just gained his Novice Licence. Both Paul and Frank were busy searching out bargains at the **Waters & Stanton** stand when this photo was taken by **Jeff G6XYU**.

Seeing three generations of the Elliott family enjoying a day out a radio show just goes to show that radio can be handed down through the generations and is truly a hobby for all the family! And of course you'll be able to meet the family at the 1997 Leicester Show, the date and venue of which we will publish as soon as it's announced.

Radio Amateurs Examination Course

Joh Beaumont G3NGD will be running a 36 week RAE course starting on Monday evenings in early January 1997 and running through to the examination in December. John says the reason behind running such along course is that in the past he has found it difficult to cover the syllabus when starting a course and September in

preparation for a May exam.

John is also hoping to run an Electronics Servicing course starting in the New Year. The dates and time are to be arranged depending on the demand for the course.

For more information on either of John's courses contact him direct at **North Trafford College, Talbot Road, Stretford, Manchester M32 0XH. Tel: (0161) 872 3731.**

Kenwood's New Mobile

Kenwood (UK) Ltd. have announced the introduction and imminent arrival of their latest dual-band f.m. v.h.f./u.h.f. mobile transceiver. The new TM-V7E is to replace the current TM-733E.

Claiming it as a "World first" Kenwood announce that the TM-V7E incorporates a 'cool blue' i.c.d. display panel. The display is capable of showing dot matrix characters which can be switched between positive and negative display modes to ensure optimum visibility in all conditions.

The control panel on Kenwood's new transceiver is larger and also incorporates a five-in-one programmable memory, provides dual receive on the same band and up to 280 multi-function memory channels.



A feature which will be of interest to many v.h.f./u.h.f. mobile operators is the TM-V7E's 'Auto Simplex' checker facility. This checks whether or not it's possible to achieve simplex, rather than repeater, communication.

Some of the many features include: a removable front panel 'head', auto-band change, time-out timer and audible frequency identification. Kenwood (UK) have informed *PW*'s newsdesk that the new transceiver will be available early in 1997 at a price to be announced.

Editorial note: There's a review on the new TM-V7E coming to *PW* in the very near future.

Joy Does It Again!

The second National Novice Contest organised by **Poole Radio Society** took place on Sunday 22 September 22 1996. The number of entries were up on last year and there were many new entrants taking part.

As you can see from the result tables most of the QSOs took place on 430MHz f.m. simplex channels, band. For the second year running the overall winner was **Joy Fowler 2E1DXA/M**, operating from Derbyshire. The runner up was **Graham Westwood 2E1FDP/P** who was entering the contest for the first time.

The logging standards for the competition were generally good and the number of contacts on 50MHz more than doubled from last year. It was suggested by one station that future contests be moved to June, July or August to bring it into the main Sporadic-E propagation season and also suggested was the possibility of including the h.f. Novice bands or to run a separate contest. Your comments are welcomed on both these points by the Poole Radio Society.

All entrants who enclosed an s.a.e. will receive a certificate. Check logs were received from **Robert Snary G4OBE** and members of the Poole Radio Society.

Congratulations go to all winners, participants and everyone who helped to make the contest a success.

50MHz Band				
Pos	Callsign	QSOs	Points	QTH
1	* 2E1FAK	15	45	Wakefield
2	* 2E1AFN/P	9	27	Stroud
	* 2E1AQS	9	27	Enfield
4	* 2E1EMK	6	18	Pewsey

430MHz Band				
Pos	Callsign	QSOs	Points	QTH
1	2E1DXA/M	29	87	Derbyshire
2	* 2E1FDP/P	21	63	Kent
3	2E1AQS	15	45	Enfield
	* 2E1FFB	15	45	London
5	* 2E1FHD	10	30	E. Sussex
	* 2E1ESV	10	30	E. Sussex
	* 2E1ESU	10	30	E. Sussex
8	* 2E1EXB/P	9	27	Dunstable Downs
9	2E1DZT	8	24	Enfield
	2E1DTD	8	24	Selsey
	* 2E1EWY	8	24	New Malden
	* 2E1EOF	8	24	Weymouth
13	* 2E1EMK	4	12	Pewsey
14	* 2E1AFN/P	3	9	Stroud
15	* 2E1DSA	2	6	Havant

* = New Entrant

Popov Versus Marconi 1996

Plus

Titanic & The Radio SOS 1997

Popov versus Marconi: The Centenary of Radio was the title of a lecture given by **Ralph Barrett G2FQS** at London's Institute of Physics in Portland Place on Wednesday 23rd of October.

Ralph Barrett CEng MIEE MIERE provided the lecture and the reputation he has as an authoritative speaker - and an enthusiast on the subject - was truly reinforced. And although controversy has reigned from the early days of wireless...both Marconi and the Russian scientist Popov paid tribute to the work of Oliver Lodge which paved their way to successful radio communication.

Another of Ralph Barrett's popular lectures - which should be of particular interest to *PW*'s readers, is to take place in the Maple Room, Fairfield Halls, Croydon in Surrey (Outer London) on Wednesday evening 12th of February 1997. Entitled 'Titanic And The Radio SOS' the dissertation will tell of the RMS

Titanic's maiden voyage and sinking and the radio apparatus which made played such a vital part in the event.

Working models will demonstrate the principles of the early 'state of the art' radio equipment. The account will also cover the recent high technology finding of the ship and recovery of artefacts.

Admission is free and there's no charge for coffee and sandwiches at 7pm. No tickets are needed and *PW* readers are invited to 'just come along'. Further details on the evening are available from the **Hon. Secretary, IEE London Centre C/O IEE, Savoy Place, London WC2R 0BL**. (Photocopies of the full leaflet with car parking, train station and location details are available from the *PW* office on request).

Editorial note: **Rob Mannion G3XFD** and **Tex Swann G1TEX** from *PW* are planning to attend and look forward to meeting readers for an enjoyable evening's meeting listening to another of Ralph Barrett's very popular presentations.

Did it really work? Fascinated members of the audience examine replicas of the equipment used in the early days of wireless during Ralph Barrett G2FQS's lecture at

Portland Place, London on 23rd October 1996.

(Photo courtesy of Susan Aldridge).



Tennamast News

Anyone living in the Benelux countries wishing to obtain any of the Tennamast range products can do so through their Dutch distributor **Doeven Elektronika**. Doeven are based at **Schutstraat 58, 7901 EE HOOGEVEEN, The Netherlands. Tel: 0528 269679 or FAX: 0528 272221.**

Lucky Winner

Paul Mooney G7SPV (right) is pictured here with **Martin Lynch** in front of a new Icom display at the **Martin Lynch & Son** showroom in Ealing, West London. Paul won first prize of an IC-706 in a joint competition run between *PW* and Martin Lynch which ran in of *PW* three issues last year.



Paul travelled from his home in Cleveland to London on his motorbike to collect his prize and to take the opportunity to look around the Lynch emporium. Paul winning came as double surprise, as he received notification on his birthday!

The Editorial team would like to say 'congratulations' to Paul and wish him many hours of happy operating with his IC-706 and also 'thanks' to Martin Lynch for supplying the prize.

RADIO DISCOVER THE BASICS

By Rob Mannion G3XFD

In his new regular column aimed at the beginner, Rob Mannion G3XFD plans to go 'back to the basics' of radio. And to launch this new initiative, Rob introduces the PW 'Cadet'....a radio kit specifically designed for the beginner to 'whet their appetite'.

The completed PW Cadet receiver. (top right)

The PW Cadet Receiver Kit

The specially designed and commissioned Cadet receiver kit is available direct from the *Practical Wireless* offices for £23.95 £1 P&P (UK), £2 P&P (overseas). The kit contains comprehensive instructions and all the components needed to build the project, plus wire for the antenna. All you need to supply is a battery, suitable headphones, solder and soldering iron.

The smile says it all! Young Barry Rimmer discovers the world of radio.

The Editorial team on the magazine have been increasingly aware that a budding enthusiast reading *PW* for the first time with no knowledge of radio, would be stuck! The result is this new bi-monthly column in which I'm aiming to help 'launch' them off on a lifetime's interest in radio.

And although I'm probably breaking with tradition (usually theory first then a 'bit of building') my approach has worked over the years. So, here I go and in marches the PW 'Cadet' kit.

The PW Cadet is very basic receiver kit specifically designed for the beginner on behalf of *Practical Wireless* by Tim Walford G3PCJ. Tim has produced for us a kit aimed specifically at encouraging the 'raw' beginner, in the form of a project that will work well and give enjoyment at the same time.

Training Exercise

Along with the pleasure of building something that works well, the PW Cadet also provides a very useful training exercise. And to test this out I used one of the first kits produced to encourage young Barry Rimmer, the 10 year old son of a friend of mine.

Barry, along with his elder brother Carl, had been somewhat discouraged when some simple radios we'd built together didn't work at first! However, they were fascinated by the simple telephones that we'd built together worked well and Barry in particular was keen to work on the Cadet.

The photograph, top, shows the



completed Cadet. It's built on a single-sided printed circuit board and is 'open plan' (it doesn't have a case) style. As you can see...it's very straightforward.

The receiver covers the medium wave bands (approximately 500kHz to 1.5MHz) and one short wave (from approximately 3.3 to 6MHz) band. It uses one 2N3819 junction field effect transistor (JFET) as an infinite impedance detector, with two stages of audio amplification provided by two BS170 metal oxide semiconductor field effect transistors (MOSFETs).

Audio output is suitable for feeding into portable stereo cassette player headphones. Power is provided by an on-board PP3 style 9V battery.

Assembling The Kit

Assembling the kit is very simple and the designer has provided some excellent instructions. However, although the kit is designed for the beginner, I suggest that (depending on the ability of the individual of course) anyone under the age of 12 be closely supervised.

The p.c.b. is not screen-printed with a component overlay. Tim considers that the learning process is helped if the builder has to check the component placing carefully with the (accurate) placing diagram which he supplies. And having helped Barry build the radio I agree that it does help!

Careful orientation of the semiconductors (the JFET and MOSFETs) is important in kit building and this is the area where anyone can go wrong. But the really difficult area is soldering!

Young Barry - although he'd tried soldering before - tended to put too much solder 'on the job'. So, my advice is that if you're trying a kit for the first time, that you practice your soldering first.

Altogether, assembling the kit took two hours. We built it on my dining room table (rather than in the shack) and used an angled desk lamp to improve the lighting. Extra time taken was spent on explaining things as we progressed. That's why I think this type of kit is an idea 'let's do it together' exercise.



At the end of the assembly stage Barry had learned (thanks to the comprehensive and clear instructions provided in the kit and some help and reassurance from me) how to identify the resistors and capacitors and their associated values. He also learned how to handle the transistors and to solder them correctly.

Excellent Results

The 'proof of the pudding is in the eating' and I'm pleased to say we got excellent results! With the antenna supplied in the Cadet kit (draped around the room) we could hear medium wave stations from all over Europe. And on short wave we could hear many short wave broadcasting stations. **Radio China** was predominate on the evening the Cadet was built!

I didn't have any portable cassette player headphones, so we used some low impedance stereo headphones. These had separate (in-built) volume controls...quite useful because on some stations the resultant audio was quite loud!

The smile on Barry's face said it all! But I must add that the kit does all that I hoped it would and the many discussions that the designer and I had, was time well spent!

However, the next stage has started because Barry asked me the inevitable question: "How does it work Rob, how does electricity flow?"

So, in the March issue you'll be able to join Barry and I as we look at the basics of electricity with the aim of answering the questions and exploring this fascinating subject together! We'll be setting out to really discover the basics behind radio.

PW

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RADIO

Compiled by Zoë Crabb

1996

***December 15:** The Verulam ARC Rally is to be held at the Watford Leisure Centre, Horseshoe Lane, Garston, Watford, Herts, off A405 near M1 junction 6 and M25 junction 21A. Doors open 10am to 4pm. Features include trade stands, Bring & Buy, grand raffle, cafe, licensed bar and free parking. Morse tests will be available. Details from **Walter G3PMF** on (01923) 262180 or **Ralph G1BSZ** on (01923) 265572.

1997

January 19: The Oldham ARC Mobile Rally will be held at the Queen Elizabeth Hall, Civic Centre, West Street, Oldham, Lancs. Doors open at 11am (10.30am for disabled visitors). This event will feature all the usual traders and a Bring & Buy stall. Morse tests are available on demand. Talk-in on S22 via GB40RC, commencing at 7.30am. Mobile contact prize up to 2pm. Refreshments and free parking available. (01706) 846143 or 0161-652 4164.

February 2: The 12th South Essex Amateur Radio Society Radio Rally is being held at the Paddocks, Long Road, Canvey Island, Essex. The Paddocks is situated at the end of the A130. Doors open at 10am. Features includes amateur radio, computer and electronic component exhibitors. There will also be a Bring & Buy, RSGB Morse testing on demand (two passport photos required). Home made refreshments, free car parking with space outside main doors for disabled visitors. Admission is £1. Further information from **David G4UVJ** on (01268) 697978.

February 2: The Harwell Amateur Radio Society are holding their indoor Radio & Computing Rally at the Harwell Science & Engineering Centre, 1 mile west of the A34 between Oxford and Newbury. Talk-in on S22. Doors open at 10am. There will be trade stands, a Bring & Buy, craft exhibitors, bar and light refreshments. Admission is £1 and children are free. **Arthur G0KOC** on (01235) 815399 or <http://www.rmpic.co.uk/eduweb/sites/ntaylor/rally.html>

February 16: The 16th Northern Cross Rally is to be held at Thornes Park Athletics Stadium, Wakefield - one large hall - just out of town on the Horbury road. Easy access from M1 junct. 39 & 40 - well signposted and with talk-in on 2m and 70cm. Doors open at 11am (10.30am for disabled visitors and Bring & Buy). Further details from **Peter G0BQB** on (01924) 379680.

February 22: The Tyneside Amateur Radio Society will be holding their 11th annual rally at the Temple Park Centre, South Shields. The Temple Park Centre is located on John Reid Road, approached from A194 and with excellent access from all parts. Doors open at 11am with special entry at 10.30am for disabled persons. Admission is £1 on the door. The talk-in station will be provided on S22 from 8am. There is ample parking space for

visitors and special arrangements will be made for disabled visitors. There will be a Bring & Buy and all the usual trade stands. More details from **Jack G0DZG** on 0191-265 1718.

February 22: The 12th Rainham Radio Rally, sponsored by the Bredhurst Receiving and Transmitting Society. This is the 4th year at the new venue, which is, The Rainham School for Girls, Derwent Way, Rainham, Kent ME8 9PP. Talk in on S22 GB4RRR. Doors open 10am, (9.30am for disabled visitors and items for Bring & Buy). Admission is £1.50, under 14s free. There will be the usual mix of trade stands, Bring & Buy, many special interest groups will also be represented, ie. RNARS, RAYNET, KRG, KEPAC, BARTG, etc. There will be plenty of off road parking, a licensed bar, food and refreshments. More details from **Martin M0AAK** on (01634) 365980 at any reasonable time.

***March 8-9:** The London Amateur Radio & Computer Show is to be held at the Lee Valley Leisure Centre, Picketts Lock Lane, Edmonton, London, N9. Doors open 10am to 5pm each day. There will be a trade show, Bring & Buy, on-demand Morse tests, talk-in on 2m and 70cm, special interest groups, disabled facilities, priority admission for disabled persons, bars, restaurants, ample free car parking and lectures. (01923) 893929.

March 9: The Wythall Radio Club are holding their 12th Annual Radio Club Rally on Sunday at Wythall Park, Silver Street, Wythall, near Birmingham on the A435, just two miles from junction 3 of the M42. Doors open from 10am to 4pm. Admission is just £1. The usual traders in three halls and a large marquee. Bar and refreshment facilities on site, big Bring & Buy stand and talk-in on S22. More information from Rally Organiser, **Chris G0EYO** on 0121-430 7267 evenings, weekends for details.

March 16: The Mid-Devon Rally, sponsored and arranged by the Tiverton South West Radio Club is a permanent fixture, set for the 3rd Sunday in March, so no need to watch the magazines for the date in future! There will be a wide selection of traders to the rally, no matter what your interest, you will be able to find something useful to take home to the shack. There will also be all the usual, excellent catering facilities. More details from **Alan G0MAS** on (0884) 252259.

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

The Editorial staff of *PW* cannot be held responsible for information on Rallies, as this is supplied by the organisers and is published in good faith as a service to readers.

If you have any queries about a particular event, please contact the organisers direct.

Editor

*Practical Wireless & SWM in attendance

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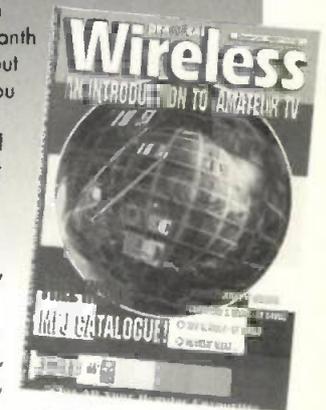
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Zoë says:
"keep the News and
those Club
magazines coming!"

CLUB Spotlight

Compiled by Zoë Crabb

Amateur Radio Marathon

Glyn Jones GW0ANA has recently written into 'Club Spotlight' to report on a successful event held at Barry Amateur Society's Club House back on Sunday 22 September. On that day, the Barry Amateur Radio Society did a 24 hour radio marathon to raise money to buy specially built radio cassettes for use by the blind in South Wales.

The object of the 'Marathon' was to contact as many people and countries around the world by amateur radio in 24 hours using only 100W. All contacts were sponsored by the following groups of people: BP Plastics Rugby Club, RAF St. Athans Engineers, Barry Lions Club, Cardiff Lions Club, Bridgend Lions, Llantwit Lions, Cowbridge Lions and the Barry ARS



Brian Brown GW0PUP refreshing those vocal parts around 4.30am in the morning. Like the T-Shirt Brian!

members.

The Marathon team members were: Glyn Jones GW0ANA (Club Chairman), Brian Brown GW0PUP, Alf Cornick M0AML and Clive Tombs GW4MOM. Unfortunately, the event was not blessed with good radio conditions due to QRN, static crashes and bangs.

The bangs, hisses and crackles made it hard on the ears, but in the spirit of the cause, the team battled on and made 260 radio contacts

in 44 countries. Their efforts were rewarded with some good contacts.

The farthest country reached was Thailand (HS1GUW), 6047 miles from Barry! The most interesting contact was in Baghdad Iraq (YI96BIF), 2688 miles from Barry. This station was celebrating 1000 years of the founding of Babylon in Iraq.

Despite the troubles in Iraq, the station operator passed on his good wishes to the people of Wales and to

the blind in particular. He said that if it was possible, he would send a contribution to the club's appeal, but it was not possible, but he sent his kind thoughts as he fully understands the tragedy of blindness.

Due to the generosity of the sponsors, the team managed to raise £700 and this money will buy 10 specially built radio cassettes for blind people in South Wales.

New Venue For Three Counties

The Three Counties Amateur Radio Club meet at the Bramshott Institute and Parish Club in Liphook on the 2nd and 4th Thursday in the month. Meetings start at 8pm.

The club is in a new venue, which is warm and ideal for a 'chin wag' and social gathering, particularly for people from all walks of

life with an interest in electronics, computers, communications and, of course, the radio (amateur or commercial). Visitors are always welcome to the meetings, although the club would prefer to be contacted by non-members of the club before the meeting so as to sign in guests, which is a requirement of the Parish institute.

More details of the club from Damian Kamm G7RFV on (01428) 724456.

Darlington's Award

The Darlington & District Amateur Radio Society is pleased to offer the DADARS Award, both licensed amateurs and short wave listeners. In order to claim the award the operator/listener must work or have heard 40 stations whose last letter of the callsign make up the words Darlington & District

Golden Anniversary For Yeovil

Back in October, the 17th, the Yeovil Amateur Radio Club celebrated its 50th Anniversary in style, with over 50 members and guests in attendance, including the Mayor of Yeovil, Councillor Mrs P. Martin and her husband Ian, Vice Chairman of South Somerset District Council, Mr Roy Mills, the RSGB RLO, Dick Atterbury and three founder members of the club, 'Nobby' Clark G3BEC, Don McLean G3NOF and Den Hayward G3OMH.

The event was opened by the club chairman (who was persuaded to keep the welcoming speech to less than five minutes!), which gave the club the opportunity to explain the significance of Yeovil town in the amateur radio world. The club received many letters of congratulations from neighbouring radio clubs and also from the major radio publications.

A representative range of radio equipment spanning the 50 year period was on display, which attracted considerable interest, as did the h.f. on-air station operated by the club's newest

A-class operator, Rob M0AGT. The evening was then rounded off by a superb buffet provided by the ladies of the British Red Cross, (the Red Cross being the club's landlord).

A commemorative booklet of useful circuits and club history was released to the unsuspecting members and guests, at which point, the Treasurer George G3ICO had to earn his keep by collecting £2 from the many purchasers. The book is available from G3ICO or G7SDD, QTHR, for £2.50 including P&P.

Overall, a most successful and memorable evening was had by all. It must have been good as the club are already starting to plan for the Centenary celebrations!



(L to R) Founder member Don McLean G3NOF, Councillor Ian Martin, Ashley Edwards G7WFL, Chairman Mike Smith G7SDD, The Mayor, Councillor Mrs P. Martin and Councillor Roy Mills of the South Somerset District Council. The isolated hand (centre) on the Morse key belongs to Rob Markam M0AGT, the club's newest A-Licence holder!

Part of the display of radio equipment spanning the 50 year period.



Amateur Radio Society. The make-up is as follows:

- A x 5
- C x 2
- D x 4
- E x 2
- G x 1
- I x 5
- L x 1
- M x 1
- N x 3
- O x 3
- R x 4
- S x 2
- T x 5
- U x 1
- Y x 1

In order to claim the award, a copy of the log must be sent, marked clearly as being a claim for the s.w.l. award or the worked award, along with a cheque for £4 made payable to Darlington & District Amateur Radio Society and an attractive certificate will be issued upon receipt. Logs from 1 January 1996 onward will be accepted in any mode in any amateur band.

Meetings are held each Monday evening at 7pm at **The Grange, Hurworth On Tees, Nr. Darlington, Co. Durham DL2 2BN.** Visitors are always made welcome.

To find out more, including news of a new RAE course which will be starting soon, contact **Gary Smith M0AMM** on (01325) 468204.

Help Is RARE

With reference to **Rob Mannion G3XFD's** Editorial

in the November issue of *PW*, 'Club Spotlight' has heard from **Brian Collinge G7NYD**, a member of The **Radio Amateur Relief Expeditions (RARE)**, who assist amateurs and clubs in eastern Europe with items of components and with complete stations when possible. In Romania, they have supplied equipment to the *Federatia Romana De Radioamatorism* and have found accommodation for the club station in *Turnu Severin*.

At the same time, they have made arrangements with the education authorities in *TS* to have a club station at the *Tirana High School*, which is accepted as the main High School in Romania. Equipment is required for both these stations.

The main problem is lack of storage space in the British Isles and because of this, they have had to turn down offers. So, by the time they leave, the equipment offered has already been scrapped.

Members of *RARE* will be off next summer to *Albania* and *Slovakia*. Apart from *Romania*, they hope to help clubs in these countries.

Celebration Award For 50th Anniversary

The year 1997 marks the 50th anniversary of the formation of the *Lothians Radio Society*. The *Lothians* has served the *Edinburgh* and the surrounding counties of *East*, *Mid* and *West Lothian* since its formation in 1947. The current membership, which

includes some of founder members, are introducing an award for the 50th year.

The award is aimed at allowing all amateurs and short wave listeners to take an active part in our celebrations. The call signs **GB50L**, **GS3HAM** and **GM3HAM** are all operated by members and are the keys to the award.

The award is a 50th celebration certificate, a special prize of a modern 16 channel 25W u.h.f. f.m. transceiver and will be awarded to the applicant who has worked the most qualifying *Lothians* operators. To obtain the award requires four contacts with any of these call signs operated by four different *Lothians* operators.

Listeners need to report four QSOs using these call signs operated by different *Lothian's* operators. The qualifying period for the award is from 0000UTC 1 January 1997 to 2359UTC 31 December 1997.

Applicants may submit their log details at any time but they should note the closing date is February 28 1998. Application after that date will not be considered.

In order to reduce the administrative workload resulting from applications after the 31 December 1997, the award committee actively encourages early applications for the certificate and a second application for the transceiver prize. The transceiver prize winner will be notified within two months after the closing date. In the event of a tie, the winner will be chosen by a simple draw at one of the

The Spotlight's On Again!

Yes, it's true, this is the 2nd year of the Spotlight Trophy, awarded to the Radio Club magazine of the year by *Practical Wireless* and *Kenwood* (UK). Last year, the *Hoddesdon Club* won, but who will have their club name engraved on the cup this year?

How did it all start I hear you ask? Well, **David Barlow G3PLE**, a retired Marketing professional and former member of the *Birmingham Press Club*, who now lives in *Cornwall*, wrote to **Rob Mannion G3XFD**, Editor of *PW*, and myself, suggesting a special trophy for the best radio club magazine or newsletter.

Both Rob and I thought David's idea was an excellent way of encouraging the often (hard-pressed) magazine and newsletter editors. **David Wilkins G5HY** of *Kenwood* (UK) thought so too! So, a new competition was born!

So, let's see your magazine, whether it be weekly, fortnightly or monthly, glossy, duplicated A4, PC produced or whatever. They're all of interest and yours could win!

To enter your club magazine for the award, all you have to do is to send in two of your most recent club magazines and details of how they're published to the *PW* Editorial Offices. Most importantly, remember to mark your envelope 'Spotlight Club Magazine Competition'.

The panel of judges (as last year) are: **Dave Wilkins G5HY**, myself, (**Zoë Crabb**), **Jim Bacon G3YLA**, **David Barlow G3PLE** and last, but certainly not least, **Rob Mannion G3XFD**. We're all looking forward to receiving and reading your club magazines, and as we want to receive more than last year's ten entries, you'd best get busy, the spotlight's now on!

Zoë

Lothian's normal meetings.

It is planned to activate as many bands and modes as reasonably possible. 1.8MHz through to 24GHz may be used at any time. Contacts by v.h.f., u.h.f. and microwave may be arranged by schedule.

Those requesting a scheduled contact should contact the information officer. Longer lead times for scheduled contacts will stand a greater chance of a scheduled contact being arranged. Please contact the information officer.

All contacts must be direct with the exception of satellite use. The use of repeaters of any other form is not

permitted. A contact must have the minimum amount of information that defines a QSO.

Lothian's members are not eligible for the transceiver prize. The decisions of the *Lothians Radio Society* Committee are final and not open to negotiation or litigation. QSLs via the bureau, direct requests need an IRC.

Applications and information from: **Information Officer, Mr T. Main GM4DCL**, *Lothians Radio Society*, 15 Polton Road, Lasswade, *Midlothian EH18 1AB*.

Hornsea's 25th Anniversary

Back in October, the *Hornsea Amateur Radio Club* celebrated the 25th anniversary of its foundation by holding a reunion of current and past members of the club in the *Hornsea Floral Hall*. Over a hundred members and guests enjoyed a very pleasant social gathering.

The club was formed from an RAE class of six students and the instructor **G3TLI**. Three of the founder members, **Duncan Heathershaw G3TLI** and his wife, **Joan G4CHH** and **Norman Shields**, who was the first Chairman.

Running the RAE and subsequently the Novice scheme has been two of the main activities of the club and it has produced many local amateurs. Among the guests were two members who became Presidents of the *RSGB*,

Joan Heathershaw G4CHH who held the post twice and the current President **Peter Sheppard G4EJP**.

An ex-council member **Percy Winsford G4DC** and the Chairman of the club **Mr C. Reynolds G8EQZ** were also present. Included in the many activities of the club is participation in the major h.f., v.h.f. and TV contests with some success and the running of the successful *Hornsea Amateur Radio Rally*.



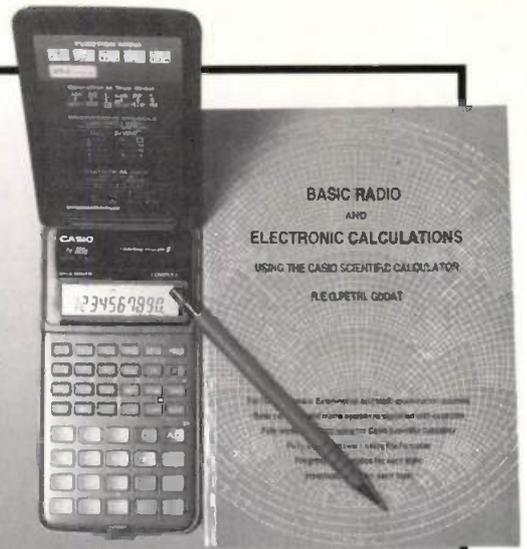
(L to R) **Norman Shields**, **Joan Heathershaw G4CHH** and **Duncan Heathershaw G3TLI**.

A few of the hundred plus that attended the *Hornsea Club's 25th Anniversary*.

Special Offer

Following the publication of Ray Petri's GOOAT new book *Basic Radio and Electronic Calculations* and the favourable review it was given by Rob G3XFD in the December 1996 issue, we've managed to put together a special offer for PW readers.

We are offering *Basic Radio and Electronic Calculations* together with the Casio FX-115s Scientific Calculator as featured in Ray's book for the special price of £24.95 plus £1 P&P (UK), £4 P&P inc. insurance (overseas). That's a saving of over £7, as the pair would normally cost £31.94 plus P&P. And, don't worry if you've already got your copy of *Basic Radio and Electronic Calculations* or already own a Casio FX-115s as we are able to offer you the chance to buy either item separately at an equally special price.

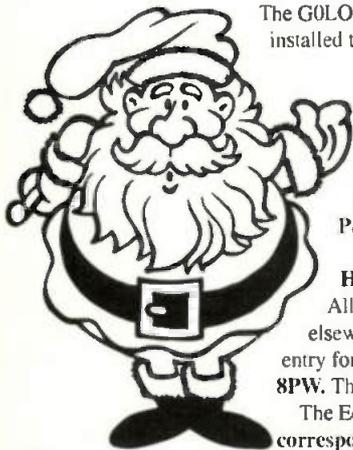


You can buy *Basic Radio and Electronic Calculations* for the special price of £13.50 plus £1 P&P (UK), £2 P&P (overseas) and the Casio FX-115s can be yours for just £13.50 plus £1 P&P (UK), £4 P&P inc. insurance (overseas).

So, go on what are you waiting for? - Place your order today by using the Order Form on page 70 of this issue or calling the Credit Card Hotline on (01202) 659930 and quoting PW1

Offer open until 24 January 1997.

Christmas competition



The G0LOV & G4LUE UK Callbook-On-Disk gives listings for callsigns up to M0AMR, M1BBR and 2E0APE and 2E1FIG. Once installed the callbook can be used to search for information by callsign, address, postcode, surname or frequency (repeaters).

The callbook requires an AT-PC 286 (or a PC with a '286 processor) computer system (or better) with a VGA/mono monitor. 3.5in 1.4Mb floppy disk drive. The program is supplied on three 3.5in disks and requires a minimum of 6.5Mb of hard disk space to run the basic data or a total of 10.5Mb hard disk space to run the full address and surname searches.

So, if you want to put your computer to good use or just want a quicker and easier way of finding callsign entries, why not enter our competition and you could be one of 25 lucky recipients of a UK Callbook on disk. If you're not lucky enough to win, copies of the G0LOV/G4LUE Callbook-On-Disk are available from the PW Book Store for £11.75 plus £1 P&P (UK), £2 P&P (overseas).

How To Enter

All you have to do be in with a chance of winning a copy of the UK Callbook on disk is to find Santa. We've hidden Santa elsewhere in this copy of PW and all you have to do is fill in the form telling us where you found him. Then send your completed entry form to Christmas Competition, Practical Wireless, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. The first 25 entries pulled from Santa's sack will win a copy of the UK Callbook on disk.

The Editor's decision on the winner is final and no correspondence will be entered into. Please do not put any other correspondence in with your competition entry.

I found Santa On Page

Name:

Callsign:

Address:

.....

.....

G0LOV / G4LUE
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Closing date for entries is 10 January 1997





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antennas in action

■ NEWS & PRODUCTS ■ QUESTIONS & ANSWERS ■ ANTENNA WORKSHOP ■ REVIEWS ■

Automatic Auteck

At last, Auteck Research have launched a v.h.f. version of their rather neat antenna and feeder analysing tester. The RF Analyst RF1 model for h.f. has been available for some time, now it's joined by a v.h.f./u.h.f. version, the VHF Analyst model RF5.

The Auteck RF5 model has a coverage of 35-550MHz in three



bands, over which it will measure frequency, s.w.r. or impedance automatically, displaying the result on a four digit display. Like its low frequency partner, the RF5 runs from a single 9V battery and has a series of small push-buttons to select the desired function to be displayed.

A function of the RF5 is its ability to display two parameters alternatively, by pressing the desired buttons rapidly

Kit Or Bits

One of the most popular antennas for general h.f. operation has to be the GSRV version of a doublet. Haydon Communications make a full kit of high quality parts to self-assemble your own antenna. If you have a GSRV already, is it due a refurbishment? If so, Haydon will supply all the various parts to refurbish the one you already have.

The full kit costs £39.95 for a full sized GSRV and £29.95 for a half-sized version. For the cost of the parts contact Haydon Communications at 132 High St. Edgeware, Middlesex HA8 7EL. Tel: 0181-951 5781/2 or at their West Midlands branch at: Unit 1, Canal View Industrial Estate, Brettel Lane, Brierley, W. Midlands DY5 3LO. Tel: (01384) 481681.



one after another. You can watch the impedance and s.w.r. on the display while sweeping through the frequency range.

A rather neat 'trick' is that by pressing both the UP and DOWN together, the unit will sweep the current frequency band to find the point of lowest s.w.r. A tap on the

FREQ then the SWR buttons will show both the frequency and s.w.r. alternately, a rather neat idea.

The VHF Analyst Model RF5 costs £289.95 + £10 P&P from Eastern Communications, Cavendish House, Happisburgh, Norfolk NR12 0RU Tel: (01692) 650077 or FAX your order on (01692) 650925.

Tonna Lives On

Franck Tonna F5SE, son of Marc Tonna F9FT, and Daniel Jacquinet have recently bought out Tonna Antennes from the parent company. They will now trade under the new name of Antennes FT, and promise to create many new products in the near future. A new product catalogue is to be available early next year from their UK distributors, Waters & Stanton Electronics, 22 Main Road, Hockley, Essex SS5 4QS. Tel: (01702) 206835, FAX: (01702) 204965.

Second Edition

A very useful book for anyone interested in experimenting with antennas is Peter Dodd G3LDO's book *The Antenna Experimenter's Guide*. This book is, as Peter himself says, "not an antenna book in the normal sense..."

■ MORE NEWS & PRODUCTS ON PAGE 30

welcome to AiA!



Welcome to the first issue of *Antennas in Action*, the new bi-monthly section of *Practical Wireless*. This section is to feature radio related items that start after the r.f. output socket of your rig: be it cable, feeder, accessory or antenna.

In this section I hope to bring you news of related products and try and answer your questions that relate to getting your

precious r.f. energy out into the wild blue yonder.

Along with 'Antenna Workshop' and a good project, I shall try to answer your questions. I'm not claiming to know it all, I just might know someone who can answer your questions and I have access to a good library.

I shall look upon this section as a way that we can all learn more about antennas and how to feed them. We also want your ideas, to learn we have to listen, but someone has to talk while we listen. Let's do both in this section.

G1TEX

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8 pages of
antennas

Postage Stamp Loops



Perspex sheet 800x400mm. To aid tuning a 10:1 slow motion drive and tuning control was then added.

To connect the capacitor (I wrote a small BASIC program to calculate what value it should have $\$$) to the loop, I soldered two pieces of coaxial cable braid, 100mm long, to the ends of the of the loop with a complete turn round the tube. The new 'tails' were soldered one to each stator. Each end of the loop was then mechanically secured to the Perspex with two small 'U' bolts.

I decided to use a gamma matching system to feed the antenna so, a small copper angle bracket an SO239 coaxial socket was fabricated and fitted. This socket and bracket was then soldered to the loop diametrically opposite the tuning unit to form the input side of the gamma match.

The gamma matching rod I made from a piece of 3mm copper tube 550mm long. One end was soldered to the SO239 socket inner, the other has a copper clip to slide along the loop to find the best matching point for the lowest s.w.r. The drawing of Fig. 1 shows the general idea of my first loop antenna.

As a support for the complete antenna, I used a good strong broom handle treated with several coats of marine varnish. One end on the handle was fastened to the Perspex sheet with 'U' bolts and across the circle was secured to the small angle bracket.

Testing Phase

Then came the testing phase of the job, during which the antenna was mounted on a portable folding workbench. After connecting to the transceiver and applying about 20W of r.f. I quickly tuned the loop to resonance. Then, using a pair of well insulated pliers, I made the final adjustment to obtain 1:1 s.w.r. by varying the distance between the gamma rod and the loop.

Loop tuning is critical and made more difficult by the effects of hand capacity, so I decided to motorise the task. I used a barbecue spit motor as it need only a two volt reversible supply to tune the loop. (There was a suitable

unit described in 'Barbecued Loop Tuner' a WAGI published in 'Antenna Workshop' February 1995 issue of PW. Ed.)

The first loop performs well from 14 to 29.7MHz, where it excels on 21MHz. But with the decline of the sunspot cycle I needed a better performance for the 14MHz band. The calculations I carried out indicated that a diameter of 1.48m would be needed for optimum performance on the lower band.

To solve the problem of bending the 22mm pipe into the correct loop shape I decided to use Heliac coaxial cable

perspex sheet as before, but I fitted the tuning parts inside a plastic food storage box 250x150x100mm. This simple container provides excellent weather protection.

Two lengths of heavy duty copper braid were soldered to the ends of the loop, which was then bolted to the Perspex base with plumbers pipe saddles. The new tail connections were then taken through the insulated box and to the vacuum capacitor.

The insulation on the cable meant that I had to try a different method of feeding the loop. I decided to use a Faraday loop method, in which a small section of coaxial feeder is formed into a smaller loop with the inner of the coaxial cable connected to the outer screen after forming the loop. Have a look at the layout of Fig. 3.

Faraday Loop

The Faraday feed loop was made from a 930mm length of coaxial cable with the inner conductor connect to the braid. This particular method proved very difficult to obtain an acceptable match. So, as a second attempt I tried a loop of 3mm copper tube 930mm long. This new feeder method gave an s.w.r. of unity first try, but trials showed that noise levels were still very high. I had to screen this new loop to reduce noise pick-up.

I covered the tube with heat shrink tubing then with a length of braiding from coaxial cable. Finally I then covered the new 'screen' with heat shrink again before connecting the braid to the SO239 outer at the feed point. This new feed loop, as shown in Fig. 4, works really well on 14 and 18MHz.

The loop, with its general layout shown in Fig. 5, is then mounted on a length of light grey or white 40mm pvc tube. Don't be tempted to use the cheaper dark grey or black piping. The colouring is carbon based and makes the tubing lossy at r.f. which absorbs your precious power.

On c.w. in just over two years, I've worked nearly 200 countries, without burning midnight oil. But since my initial trials I've since made made another loop, with a diameter is 860mm and using the same type of

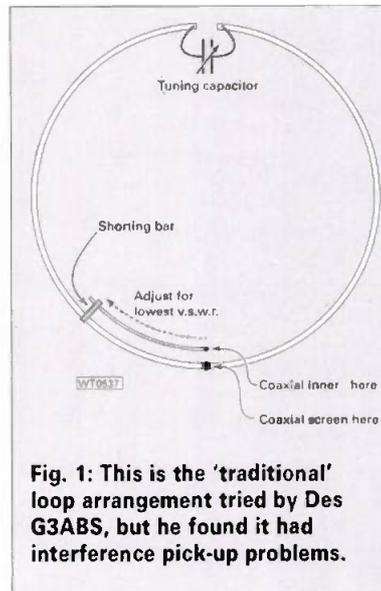


Fig. 1: This is the 'traditional' loop arrangement tried by Des G3ABS, but he found it had interference pick-up problems.

instead of copper pipe. Heliac cable is stiff heavy duty coaxial cable with a solid outer screen, and a trip to a local rally yielded a six metre length at a reasonable price.

As an added bonus, I managed to find a 5kV working vacuum capacitor with a range of 4 to 65pF, at the same rally. After some hard bargaining, the capacitor, shown in Fig. 2 cost me £18. With this treasure secured, construction was to become much easier.

The Heliac cable was cut to 4.65m overall, then 40mm of insulation was removed from each end and the copper screen was thoroughly cleaned and tinned. To finish off the ends, a 40mm length of 12mm copper tube was slipped over each tinned section and soldered on.

Then the vacuum capacitor and drive motor were mounted on a

Since I was first licensed, my main interest in Amateur Radio has been the construction of antennas. I had many years of making doublets, 'V' beams, and courtesy of two local farmers I even tried rhombics antennas. Then I had to move house and, due to the shortage of space, had to find new ideas for my antennas. I would have to scale down the size of the antenna farm.

In the new location, local bye-laws prevented me putting up a tower with a rotary beam, so my only option seemed to be a vertical antenna. Vertical antennas have given me reasonable success, but they were not without their problems. I was almost at my wits end, when an article on magnetic loops by an Italian amateur set me off on a completely new track. Magnetic loops, or electrically tuned physically small loop antennas were to revitalise my activities again.

My first attempts at a magnetic (mag) loop led to unsuccessfully searching for copper tubing long enough to make a loop of 1.4m in diameter. Then a farm implement supplier said they had lengths of 22mm soft copper tube available in large diameter rolls. A single turn off the roll would do for the job in hand, so solving the first problem.

The next problem was to find a suitable split stator capacitor capable of working at several kilovolts. In the end I used the largest one from a TU5B unit and removed the centre vane of the stator. The ex-TU5B capacitor I mounted on a 10mm thick piece of

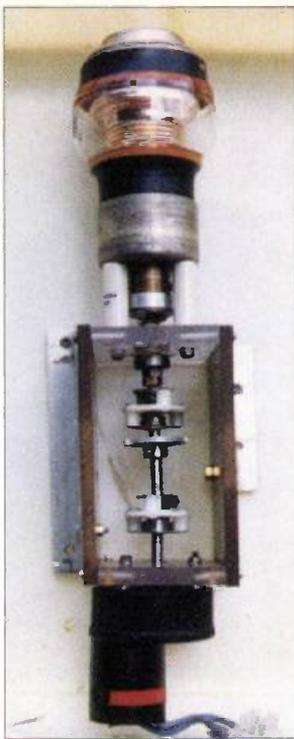


Fig. 2: The vacuum tuning capacitor and spit motor tuning drive mounted in an insulated box prior to wiring into the loop.

cable, for the 24 and 28MHz bands. The feed loop in this instance is 170mm diameter. The performance of the smaller loop works as well as the 14MHz loop. But sad to say there isn't much activity on the the higher h.f. bands at the present time.

I don't have sufficient space in the garden to mount all three loops at the same time. So I have a 2m length of aluminium mounting pole driven into the ground close to the shack. The coaxial cable feed and the motor control cables are contained in a small die cast box bolted onto the tube. It's only a five minute job to put one of the loops on the tube, screw the coaxial cable, plug in motor control plug to be on the air on a new band.

The power supply for the tuning motors uses 6.3V a.c. from an old heater transformer, rectified and feeding two voltage regulators. The regulators provide a 2V and 1V at about an ampere. A double-pole double-throw reversing switch and a

push button control look after motor direction and drive control.

The shack control box is connected via three wire cable and a socket to the outside control box. It's most important that each voltage feed control wire is amply bypassed with capacitors of about 10nF to common.

Bi-directional

The loop's power lobes are bi-directional and at right angles to the plane of the loop. There are narrow deep nulls (in the radiation pattern) in the plane of the loop. These may be used to reduce local interference. To take full advantage of the directional properties of the antenna, two cords are fitted to the antenna and mount. The two lines enable the loop to be rotated through 90° from inside the shack.

The performance of these loop antennas can be improved by fitting four radials (twice the loop diameter in length) at right angles at ground level. These earth radials improve the bandwidth, and tuning is made easier using them. I've found still greater improvement by covering an area some four metres square with small-mesh wire fencing buried under the turf and connected to the radials.

Miniature Antenna Farm

With the further decline of the sunspot cycle and to complete my miniature antenna farm, I needed a loop covering the 3.5 and 7MHz bands. To be efficient on these bands a loop

circumference of 8.750m is required. The Heliac cable I'd used for the smaller loops was too thin to keep its shape, so a more robust material was needed. This time I used LDF5-50HD Heliac, which is about 30mm in diameter.

The LDF5-50HD cable proved ideal and was cut to the required length of 8.750m. After removing 50mm of insulation from each end and tinning the exposed copper, I fitted two pieces of 25mm copper tube 50mm long as ferrules as described above.

The new cable was formed into a loop about 2.75m diameter. A visit to

regular weekly skeds with Torquay, and gets a 5-8/9 report on 80m using 100W s.s.b.

Contacts with stations east or west are usually 5-5. Eventually I hope to scrap the support frame and use a 10m length of 50mm diameter hardwood to support the loop and allow it to be rotated through 90° by a similar method to the other loops I've mentioned.

When I commenced this construction of loops I had a limited budget and I'm pleased to tell you that I can still afford one for the 10MHz band. Only this week I managed to buy another length of LD5-50 Heliac for a 2m diameter loop. Next rally I shall be looking for the capacitor to work with this new loop.

I read an article in a recent copy of *QST*, claiming that the overall efficiency of mag loops could be improved. This improvement could be achieved by using two FT240-61 ferrite toroids tied with a Faraday loop at the end of the coaxial cable in place of the normal feed loop. I have tried this but without success, the s.w.r. is 1.4:1 at its best and the received signal is two or three 'S' points down.

I think the main reason for the failure to improve the efficiency, is because the toroids are too big a diameter for the small Heliac. I am waiting the arrival of two FT411-61 toroids which are a better fit on the Heliac and I think they will give a better performance.

I would also like to record my thanks to Jack G3KKP, Maurice G3MMK and Neale G3AAV for their help and encouragement during the last few years working on this project. By the way, I'm having some success with two parallel Heliac Loops, but using one tuning capacitor. But more of that in my next report.

‡ Des has made the 'QBASIC' programs available and you may have a copy by sending either a formatted IBM 31/2in disc or a request for the printed version, along with a self addressed label to: Practical Wireless Loops Program, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.

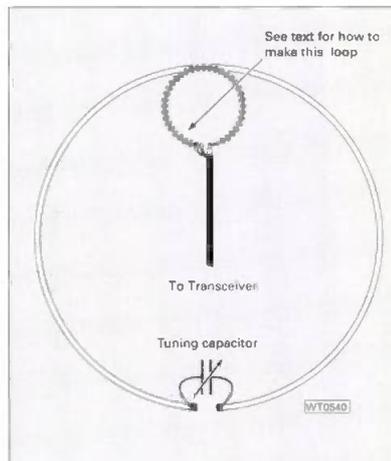


Fig. 5: Combining a tuned loop and the Faraday loop of Fig. 4 gives the final improved loop antenna. See the text for sizing details.

the next rally provided a 1000pF 7.5kV vacuum capacitor although, this time I had some hard work haggling to keep the cost down to £25. And as the loop is much bigger, this time I made a wooden frame to support the loop.

To enclose the tuning components I used two plastic trays (sold as cat litter trays) and fixed a piece of 10mm perspex to reinforce the bottom of one tray. The capacitor and motor are mounted on this and the second tray fixed on top to keep the weather out. The tuning unit is fixed at the bottom of the support frame, connection of the loop ends is again made with copper braid.

The feed loop is 550mm diameter and made from 5mm copper tube. It's shielded in the same way as the 14MHz loop. With the present fixed support this loop is unable to rotate, so it is installed firing north and south. The loop performs quite well during

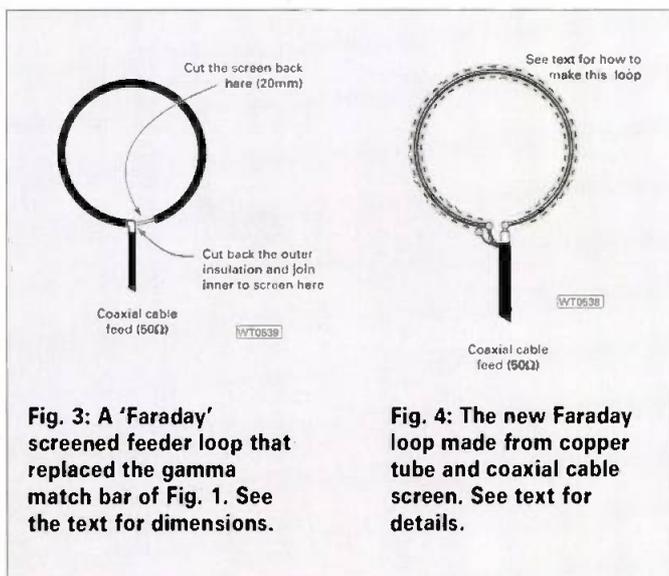


Fig. 3: A 'Faraday' screened feeder loop that replaced the gamma match bar of Fig. 1. See the text for dimensions.

Fig. 4: The new Faraday loop made from copper tube and coaxial cable screen. See text for details.

in mind Mike G3JVL then, in the spirit of development, used the previous work to design skeleton slot antennas for use on various v.h.f., u.h.f. and s.h.f. amateur bands.

Antenna Construction

Although it's not my intention to give methodical step-by-step details of construction the following notes will enable any competent constructor to fully assemble the antenna. The construction although relatively simple in component parts does require the use of an aluminium MIG welder. This is probably the time to get in an expert, as many of you won't have the necessary skill. So have a look in the *Yellow Pages* for a welder that can do the job at your place.

As shown in the diagram of Fig. 1, the skeleton Alford slot antenna simply consists of two tubes onto which fifteen split loops are attached. A backing structure, consisting of a single tube, is attached to the loops on the side directly opposite the slot. There's also a matching balun which is attached to the feed point at the base of the structure.

Two aluminium tubes, 19mm x 10.8m long, form the slot material. Because of the length of each tube it will be necessary to construct them from several pieces. If you use 18 s.w.g. tubing then each length can be joined together by using a section of 15mm aluminium tubing which should be a sliding fit inside the 19mm tube. Affix each joint with stainless steel screws.

The two tubes should be arranged to have a 65mm gap between them. The tubes are short circuited at the top and attached to a glass fibre printed circuit board (p.c.b.) at the feed point. The p.c.b. acts both as an insulator between the tubes and as a fixing point for the balun assembly.

The loops are also made from 19mm diameter aluminium tubing, each 1333mm in length. Each section of tubing is formed into a circle around a former approximately 400mm in diameter. This is not particularly easy, but after the first half dozen or so it gets easier! The fifteen loops are then welded to the support tubes, spaced 720 mm apart. The upper and lower loops are located at a distance of

360mm from either end of the support tubes.

To enable the antenna to be fixed to a supporting vertical mast a single aluminium tube (size unimportant, but the prototype used 19mm for convenience) is welded to the loops directly opposite the slot. (I will leave

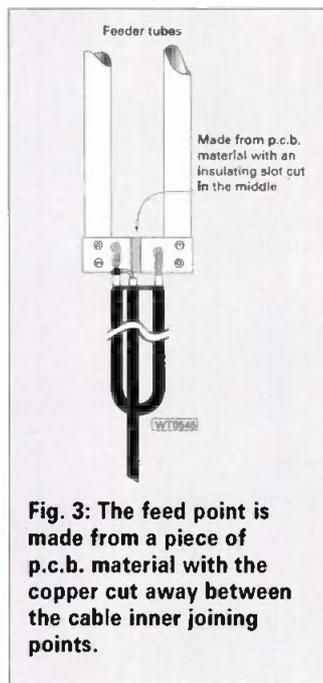


Fig. 3: The feed point is made from a piece of p.c.b. material with the copper cut away between the cable inner joining points.

fixing methods to your imagination). The completed antenna assembly should now be located ideally in an area away from nearby buildings.

Matching The Antenna

The base impedance of this slot antenna is some 200Ω and because of this feedpoint impedance a 4:1 balun is required to match the (balanced) antenna to the (unbalanced) 50Ω coaxial feed line.

The diagram, Fig. 2, shows the connections to make a coaxial 4:1 impedance transformer (balun). Although you may not recognise it as a balun because it uses transmission line techniques. It consists of a half wave electrical length of 50Ω feeder, approximately 2.29m long.

The balun is conveniently connected to the copper lands of the p.c.b. insulator fitted to the base of the radiating slot. To tune the antenna connect a low power transmitter to the feed line and measure the voltage

standing wave ratio (v.s.w.r.) at the required operating frequency. If desired the width of the slot can be altered to optimise the v.s.w.r. reading.

Robust Antenna

On completion you will possess a robust antenna ideal for general DXing on the 50MHz band. The gain is 6dBd (8.1dBi) and the circularity (ratio of maximum to minimum gain) is typically better than 1dB. The prototype v.s.w.r. bandwidth (< 2:1) measured ± 250kHz from the selected frequency of interest. Of course, on receive, the antenna can be used over a considerable frequency range without any apparent drop in performance.

Although Mike's prototype antenna was constructed from aluminium parts an alternative method could be to use copper water pipe and a 20m length of surplus LDF-450 heliex hard line feeder for the loops. This cable has a solid copper inner and outer conductor and is easily soldered to the copper water pipe.

Principle Of Operation

The principle of operation is somewhat complex and I'm not going to go into it at all. But it involves signal velocities apparently greater than the speed of

light in the feed slot. In practice it's actually the standing wave pattern that 'appears' to travel at this speed along the length of the slot.

The standing wave pattern leads to a field distribution similar to that obtained when feeding a number of dipoles in phase. And unfortunately the antenna that triggered this article suffered badly in the recent winds and is unavailable for photography.

So, from Mike G3JVL, I quickly got hold of an example of a skeleton Alford slot that has been built for the 1.3GHz band. I've shown this version in the photograph, Fig. 4. This antenna is scaled and constructed by G3JVL to confirm that the dimensions for the 50MHz antenna were correct. It measures only 540mm in length, unlike the 50MHz version which is nearly 11 metres tall.

However, this scaled version isn't an exact copy of the design it uses 19 loops each 20mm in diameter. The feed point details are also different on the 1.3GHz version. It's fed in the centre of the slot via a 4:1 matching transformer made from 3mm semi-rigid feeder.

If you need any further details regarding construction of these skeleton Alford slot antennas you can contact Mike Walters G3JVL on 01705 464482.



Fig. 4: David's son William models the colourful England football team's sweatshirt and the 1.3GHz version of the skeleton slot antenna.

Antenna Workshop moves back to its usual spot next month.

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Charging The MFJ Antenna Analyser

Kicking off the first Tex Topics is a missive from reader Niel Starkie who says "a friend of mine got one of the MFJ antenna analysers that you in PW had as a special offer some time ago, and he was (and in fact is) very pleased with it. Pleased that was until he noted how fast it gobbled up batteries when he inadvertently left it switched on.

He solved the cost problem when he fitted eight rechargeable batteries inside and this is definitely a much cheaper option. But after a while opening the case to take the battery packs out to recharge them became a nuisance. He then asked me if I could come up with a solution to the problem of charging the batteries in situ.

The MFJ Antenna Analyser has a power socket for a 12V supply that bypasses the internal batteries. But strangely enough it doesn't have a charging socket for charging NiCad batteries. So this is how I modified the MFJ Antenna Analyser to charge the batteries from a cheap plug-top p.s.u.

Have a look at the part circuit shown in Fig. 1. This shows the battery

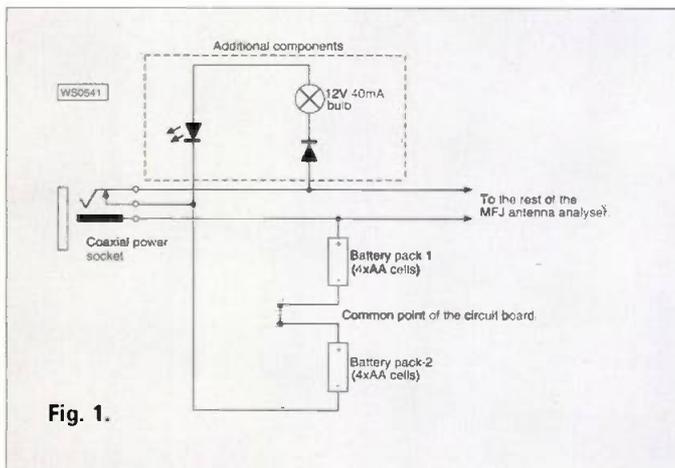


Fig. 1.

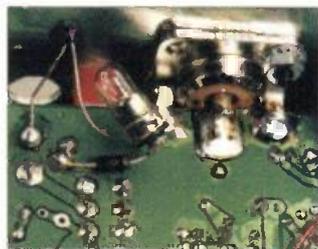


Fig. 2. and p.s.u. area of his MFJ Antenna Analyser unit. With ordinary 1.5V dry cells fitted the total voltage would be a nominal 12V to the unit. But using eight NiCad rechargeable batteries the voltage is a 'nominal' 9.6V, although this doesn't seem to alter the working of the unit. The centre connection of the two battery packs is on the main p.c.b. but seems to be unconnected with any other part of the circuit. So all that is needed is a small circuit to supply a charge current to the battery when not in use.

The simplest way would have been to have put in another power socket, but that would have been overkill as there already is a power socket on the



Fig. 3.

unit. So I added a few components to the box. These components are an i.e.d. a diode (to prevent wrong polarity units discharging the batteries) and a small 12V 40mA bulb as a current limiter.

I've used a small bulb as a current limiter because it keeps the charge current more constant with differing voltage applied to the circuit. The photograph of Fig. 2 shows how simply the modification fits inside the case, while the photograph Fig. 3 shows where I've mounted the small charge indicating i.e.d.

Needless to say my friend hasn't had to open the case to change the batteries since this modification was made many months ago".

Thanks for that interesting modification to the MFJ Antenna Analyser Niel. I'll have to try that one on my own unit, as I also find that taking out the eight screws, just to charge the batteries a bit of a fiddle.

For those that haven't seen the MFJ Antenna Analyser, it's a combined 3-170MHz oscillator, frequency counter, and resonance and s.w.r. bridge. It's an extremely useful piece of equipment and I'll be showing you some of its versatility in future issues of A-i-A.

Identifying Plugs

I'm often asked by friends how to identify plugs and sockets just by looking at them, and just which one should they use for which 'job'.

And I have to admit that identifying the basic types is fairly easy, but there are two types that can catch me out. Have a look at the photograph of Fig. 4, where you can see a variety of coaxial plugs from the business ends. Now let's have a look at each type as to their usefulness.

The PL259 plug (on the right) matches the SO239 socket (see later) and this combination must be the most widely found plug/socket pair (also the only pair with different names for the plug and the socket) in amateur radio related circles. This pair is a good unit to use at h.f. and low v.h.f. as they are very cheap to buy and may be found everywhere. Above the 144MHz band they are not ideal as their mismatch

losses start to increase due to a non-constant characteristic impedance.

The PL259 plugs are available with entry holes on the rear of the plug to accept differing coaxial cables such as RG58, with its 5mm overall outside diameter, to the thicker and RG8 or RG213 both with an overall diameter of 10.3mm. They may have a simple 'screw-in' action or be soldered in place. Details of how to wire both types is shown on the Antenna Reference Data Chart given away with the January 1996 issue of PW.

So what should you look for when buying PL259 and SO239 plugs and

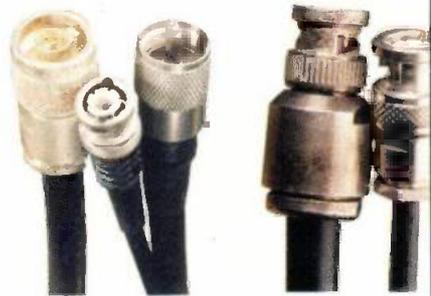


Fig. 4.

sockets? If they are 'used' then look to see if they're clean without trace of corrosion, and I try to buy silver plated ones rather than the more usual nickel plated ones. A little care is needed when buying this way, as some of the plugs I've seen on sale have a slightly different thread on the locking cap.

So if it's to mate with some you already own, take a plug or socket along with you to check for a matching thread if at all possible. When tightened up as far as possible there should be no movement in between plug and socket.

As well as the thread on the locking cap, look carefully at the insulation used to support the pin tube in the plug. I try to avoid the type that uses, what looks like Paxolin (or synthetic resin bonded paper s.r.b.p.). This insulator seems to absorb moisture and become lousy and noisy when used outside.

Similar in size to the PL259 plug is the N-type plug (on the left in Fig. 4). The N-type plug has a more constant characteristic impedance making the plug/socket useful up into the s.h.f. and



Fig. 7.

Qs & As

Welcome to the first 'Tex Topics' column in the first Antennas in Action (A-i-A). The purpose of this section is to become a questions and answer type of column, not that I intend to answer all questions! As I see it, Antennas in Action is to become a clearing house of ideas and answers to many of the problems to do with transmission and measurement of signals.

We want your ideas for antennas, feeders, plugs and sockets, modifying equipment to improve it, tips and tricks of how to do something. You can tell us all about how you do it. Or if you have a question to ask about any of the above topics - then let's have it and I'll try and get an answer for you.

microwave frequency range. It's often found on coaxial cables that carry microwave signals using very low loss (thick) coaxial cables, but they are easily the most expensive plug/socket combination.



Fig. 6.

plug and socket probably the most popular for test equipment such as signal generators and oscilloscopes.

What are the things to watch out for when buying BNC connectors? Well, in answer to that, there are at least two characteristic impedance versions of BNC connectors (50 and 70/75Ω) which are not compatible. I've also seen 90 or 95Ω versions for computer local area networks in the past. There are also variants of the BNC plug to suit both thick and thin cable as shown in Fig. 5. So choose your BNC connector with care.

Being physically smaller than the N-type and with its own quick-lock method it's possible, when using BNC connections to get more coaxial cables into a smaller area. There is also a variant of the BNC system that uses a threaded locking cap known as the TNC plug and socket. The TNC

plug and socket may be used where a more weather proof combination is needed. Although none of these coaxial connector are very weatherproof, and would need extra covering if used outdoors.

Photographs of matching plugs and sockets are shown in Figs 6, 7 and 8. The pair shown in Fig. 6 is a PL259/SO239 combination. The PL259 is also an adapter to a BNC socket, but more of that later. The N-type plug/socket pair is shown in Fig. 7 (my apologies for the quality of the photograph Ed.). The photograph of Fig. 8 shown the BNC pair, the socket (on the right) is actually part of a 'T' adapter that allows two test leads to be twinned onto one BNC socket.

Both the PL259 and the N-type plugs have a multi-turn locking cap, but the BNC type plug (in the middle in Fig. 4) and socket lock together with just a short quarter-turn action. Two small pegs on the outside of the barrel of the socket locate into two small slots in the locking cap of the plug.

By pushing gently on the body of the plug and giving a short clockwise twist (as seen from behind the plug) the plug is locked into the socket. Like the N-type plug the BNC may be used up into the s.h.f. range where its quick action locking makes coupling up coaxial cable quick and easy. The speed and ease of connection makes the BNC

Leads & Plugs

When connecting equipment together we may need a number of leads with plugs (or sockets) on each end. These are known as patch leads and you should have a variety in various lengths. You should also ideally have them in various lengths with combinations of different plugs and sockets available.

The patch lead shown in Fig. 9 is a very short one I made up to couple a 144MHz transceiver to the 430MHz transverter I was using. This adapter illustrates the principle of using the correct plug for the job. The PL259 plug was to connect into the 144MHz rig. The N-type connected into the transverter, although over this sort of length losses do not present much of a problem.

In Fig. 10 I've shown a few of the many types of adapters available to couple equipment together. One type I'm very fond of is the PL259 plug to BNC socket in the middle top of the photograph. This particular adapter (I have a box full of these) allows me to use the quick fit type of lead (BNC plug) onto a rig that has the ubiquitous SO239 socket fitted (it seems to be about 99% of all rigs). Other adapters have many uses and remember it's almost impossible to have too many adapters (you never have the one you really need at the time).

Looking To The Future

Right that's all the space I have this time, let's look ahead to what I'll be letting you know about in the future. As I've already said, I'll be showing you how to make better use of the MFJ Antenna Analyser. I'll be looking into using the new Autek RF5, that's if I can convince Eastern Communications to let me borrow one for some time. I shall also try to get the UHF version of the MFJ Antenna Analyser from Waters and Stanton Electronics. But that doesn't mean I'm going to ignore 'home-grown' products.



PL259.

N-type.

Fig. 9.

Both Lake Electronics and C M Howes Communications have promised details of kits and projects relating to antennas and feeding them.

If there are any other suppliers out there, write or FAX in to A-i-A and let everyone know what you can supply - watch this space.

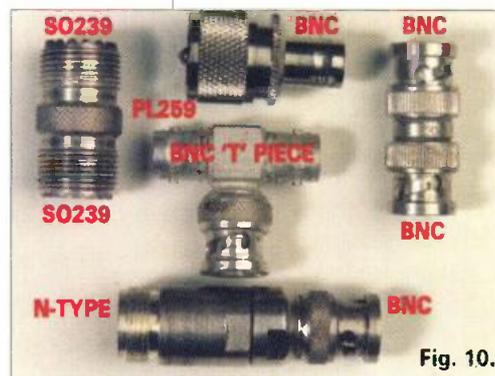


Fig. 10.

Take care - see you next time

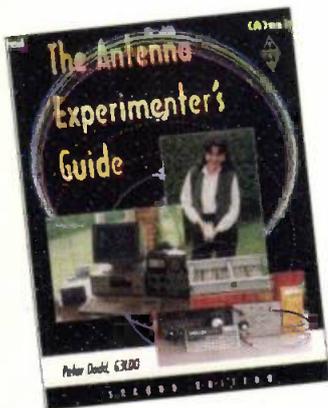
Tex
an

News & Products

antennas in action

it is to encourage you to make antennas and to measure the performance of them and to know what it is that you are measuring".

This second edition of his very popular book is broken down into eight chapters and three appendices. The eight chapters deal with subjects such as 'Experimenting and measurement' with chapters on measuring impedance, resonance, field strength, and overall performance.



Materials, masts and coaxial cable are dealt with in one chapter, as is mathematical modelling in its own chapter with colour screen grabs of computer generated simulation. But it's not just about how to measure, plan and build, there are also some experimental antennas featured in chapter seven of this book.

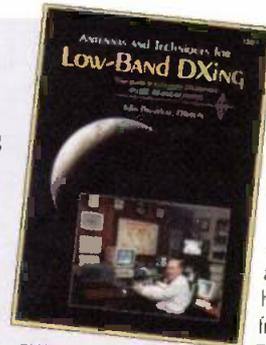
Antennas covered are: an all-metal cubical quad antenna, the W1QPW8CPC compact h.f. beams, the VK2AQB wire beam, a 14MHz vertical and a directional discontinuous ring radiator (DDRR) antenna.

Also covered are three versions of

Low Banding DX

Recently back in stock in the PW Book Store is an interesting book, on antennas and DXing techniques for the 1.8, 3.5 and 7MHz bands, by **John Devoldere ON4UN**. *Antennas And Techniques For Low-Band DX-ing* is a 395 page tome full of ideas for getting the best possible from your antenna and location.

Not everyone goes hunting for the best DX, but making your signal go as far as possible is surely the dream of everyone. The cost of this dream - £15.50 + £1 P&P from the PW Book Store.



the toroidal antenna. This was an antenna that had an unfortunate first publication in an April issue of *Radcom*, which caused many readers to believe it was an April fool's joke!

This 160 page book which has to be an essential book in your library, whatever type of antenna you intend experimenting with. *The Antenna Experimenter's Guide* (RSGB) second edition by Peter Dodd G3LDO is available for £15.50 +£1 P&P, from the PW Book Store. See the PW Book Store pages in this issue.

Three-Up The Pole

The name **Watson** appears on a small, but growing range of radio related accessories. The range covers p.s.u.s speakers, earphones and power and v.s.w.r. meters (including the SWR-50RM 144/430MHz antenna tuner/power meter).

Many of us are limited in the amount of space we have for mounting an antenna farm, and so we must

compromise somehow. One of the best compromises is to use a multi-band antenna covering more than one v.h.f. band.

The Watson W-2000 antenna covers the very popular 50, 144 and +30MHz bands in a 2.5m high vertical antenna. Offering rising gain with frequency, the antenna can withstand 150W maximum but costs less than £30 a band at £89.95 + £8 P&P.

Details of the W-2000 and the other items in the range of Watson products is available from **Waters and Stanton Electronics, Spa House, 22 Main Road, Hockley, Essex S55 4QS. Tel: (01702) 206835.**



VHF/UHF Eagles

Eagle Communications can supply a range of high quality antenna to suit the 70, 70, 144, 430 or 1296MHz

bands. The range of antennas for each band is comprehensive and there must be at least one Eagle antenna to suit your pocket or performance.

The Eagle DX range of optimised Yagi antennas features a folded driven element and a ptfé high power capable balun fed from a silver plated N-type socket.

The Oscar range in each band features crossed Yagis with either left or right hand circular polarisation (switchable polarisation is an option).

If you want to stack and buy a number of antennas then you will need power dividers for the particular band. Eagle can provide these for the 50-1296MHz bands, along with frames and phasing harnesses to suit the bands.



To find out about the Eagle range of antennas, and when their 2.4GHz versions will be available, contact **Eagle Communications at Unit E3, Bank Top Industrial Estate, St Martins, Oswestry, Shropshire SY10 7BB. Tel: (01691) 777511 or via Internet E-mail eaglecom@celtic.co.uk**

Welsh Traps

C. Reynolds GW3JPT tells us of his new 3.5 and 7MHz tuned traps for dipole antennas. Beacon Traps have three items presently available: a dipole centre, traps tuned for 3.5MHz and traps tuned for 7MHz.

Provide your own wire and coaxial cable and you have your own antenna that matches some of the more well known ones at a price that won't break the bank. For instance, a pair of 7MHz traps and a dipole centre costs only £23 post paid.

Please make all cheques (payable to C & E Reynolds) or postal orders to: **Beacon Traps, GW3JPT, Bronwylla Road, Welshpool SY21 7RD.**

I hope you've enjoyed the last eight pages...there's more Antennas in Action in the March Issue.



SGC On Tune

American equipment manufacturer **SGC** have announced a 500W automatic tuner that will tune any piece of wire longer than 23 foot (7m) anywhere within the h.f. amateur bands within 10 milliseconds (ms).

The SGC 235 automatic tuner is fully waterproofed to military standards and needs only a 24V supply to operate. The action has over half a million 'Pi'-match combinations available to tune a 3-500W signal. The unit remembers the best combination for the frequency in use and retunes within 10ms.

The SGC 245 costs £1017+VAT and is available from the importers **Nevada Communications, 189 London Road, North End, Portsmouth, Hants PO2 9AE. Tel: (01705) 662145.**

SPEECH PROCESSING

- THE BASICS

By Ian Poole G3YWX

Ian Poole G3YWX takes a look at how speech processors can help you to make use of all your transmitted power.

Fig. 1: Example of a waveform in speech.

In today's band conditions it's absolutely necessary to make the most use of all the transmitted power. Speech processors play a vital role in achieving this.

Speech processors have been in general use for many years, but even now some people doubt their real advantages. If used wrongly, a processor can degrade the sound of a signal, making it less intelligible.

When used properly, a speech processor can provide as much 'gain' as a linear amplifier and at a fraction of the cost. Without one, the full potential of a transmitter can never be realised. In fact when DXing a processor is absolutely vital whether it's an integral part of the transmitter or an additional unit.

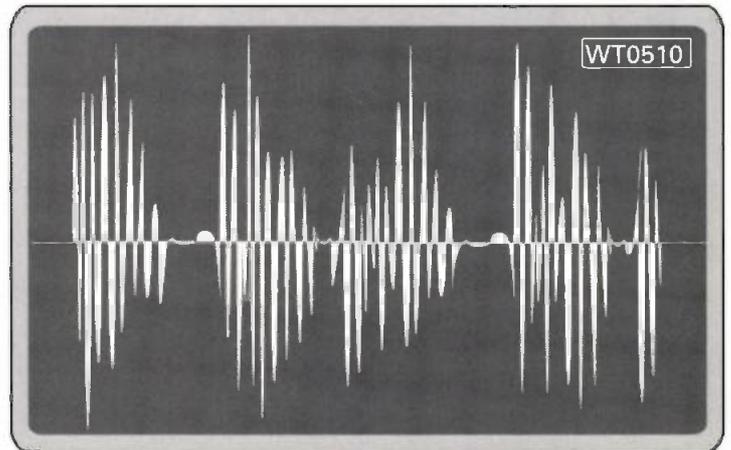
Need For Processing

Before looking any further at the mechanics of speech processing it's best to see why processors are needed. And to start human speech is far from the ideal form of waveform to modulate a transmitter.

Human speech has a whole variety of sounds which vary from the soft vowels to plosive sounds like 'p' and 'b' and fricative (produced by friction in the mouth) ones such as 'f' and 's' and many more. Owing to this very wide variety of sounds and their nature the waveforms which need to be transmitted become very inefficient in terms of modulating a transmitter.

In the first instance, the full frequency range of speech is very wide. To transmit high fidelity speech a bandwidth of 15kHz or more is needed.

Transmissions made on v.h.f. or f.m. use 15kHz of audio bandwidth and there is a definite improvement over the narrower audio transmitted on the medium wave



band. Unfortunately bandwidth is a very valuable item, and communications transmissions need their bandwidth limited so that there is room for other stations.

The additional frequencies required for the improved quality also use up valuable transmitter power and they may not add much to the intelligibility of the signal.

Apart from the wide bandwidth of speech it also has a poor peak to average power ratio. Looking at a speech waveform on an oscilloscope it will be seen that there a number of short peaks and the average power level is very low.

As the transmitter has to be able to cope with the peaks, the average power of the transmission will be very low, and the transmitter is under utilised.

There are two reasons for the wide range in levels. The first is that the sounds themselves have a high peak to average sound level.

Take as an example a vowel sound. This might be expected to have an almost sinusoidal waveform. However, this is not the case as can be seen by the example in Fig. 1.

In fact, within a waveform like this, the peak to average ratio can be as much as 10dB. This can be made slightly more difficult by the fact that the peaks are not symmetrical.

Secondly different, sounds in the same word will have vastly different power levels. Some will have a high level which

lasts for a short time whereas others will have much lower levels, possibly lasting for longer. This will also make the peak to average power level poor.

There are further variations in the sound levels which appear in speech. And in this respect a different emphasis is placed on different words or even different parts of words to stress some particular point. This is quite natural within speech and it would sound very dull without it.

However, it makes the task of fully modulating the transmitter all the time more difficult. In fact, by the time all these variations are taken into account, the peak to average level of the transmitted signal could be very low indeed.

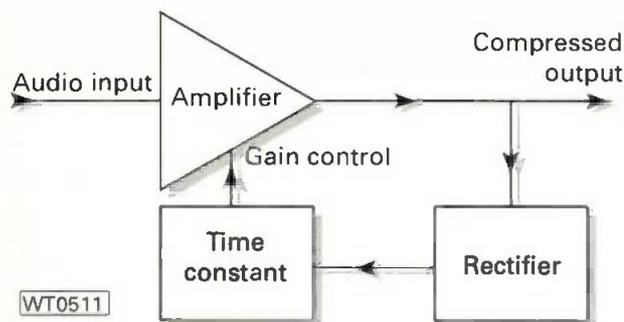
Fortunately, when most amateurs are talking into a transmitter they will keep one eye on the p.a. current and this tends to take out some of the level variations.

However, there is still a lot which can be done to improve the average level of the signal and make the optimum use of all the available power. Fortunately, there are several ways in which this can be done, and techniques like compression, clipping and frequency tailoring all play their part.

Compression

Speech compression can take a variety of slightly different forms depending upon the actual use in mind. However, they are all basically the same, consisting of an

Fig. 2: Block diagram of a speech compressor.



amplifier whose gain can be altered according to the level of the incoming signal.

For a small signal the gain is high and then as the level of the signal increases the gain is reduced. This has the effect of levelling the signal out.

There are two main types of compressor. In the first type the level of the gain is adjusted instantaneously, varying the gain of the stage over each part of the waveform of the signal. This form of compression is understandably called instantaneous compression.

The other type of compression has a time constant introduced into the adjustment loop as shown in Fig. 2. By doing this the gain will be dependent upon the level of the envelope of the audio signal.

To give a comparison the circuit operates much like an a.g.c. in a radio. This type of compressor is the one which is more likely to be found in amateur radio systems where names like VOGAD (Voice Operated Gain Adjusting Device) and others can often be seen. They are usually used to maintain a constant level of audio to the next stage of circuitry.

When designing the VOGAD type of compressor the time constants in the feedback loop must be chosen carefully. A fast attack time is of paramount importance. This is required so that the circuit can react very quickly to any sudden increases in signal level or transients which are always present.

If the attack time is too slow then the transients will pass through into the next stages where they may cause overloading and distortion. As a general rule an attack time of 10 milliseconds is taken to be quite adequate.

The decay time is also important, but it's generally longer. For most amateur applications a decay time of around 300 milliseconds is used.

The decay time of 300 milliseconds enables the compressor to follow the general undulations of the speech level and keep the overall level correct. If the time constant is reduced then it can be made to follow the different levels of each syllable. This type of syllabic compressor is not normally used, but can be effective in some situations.

It's worth noting that whatever the type of compressor, it's also possible to regenerate the original audio at the remote end. This can be done by having an expander with the inverse response i.e. it has a larger gain for larger signals.

The equipment usually contains a compressor and an expander and is called a compander for obvious reasons. Many systems use these techniques.

For example many telephone links or broadcast relays use companders to ensure the best signal to noise ratio while still being able to regenerate the original audio. However, companders are rarely used in amateur radio.

One reason for not using companders in amateur radio is that it would be almost

impossible to match the responses of all the different systems in use and usually there is no need for high quality transmissions. Another is that most amateur processors involve further stages of processing.

Automatically Clipping

When talking of speech processing most people automatically think of 'clipping'. Clipping forms the basis of very many speech processors and can give very large gains in terms of increasing the average power level of a transmission.

Yet as the name implies clipping distorts the signal quite severely in terms of the waveform. In many respects it is quite similar to instantaneous compression.

Basically the action of a clipper is to remove the peak of any waveform once it reaches a certain level as shown in Fig. 3. The actual level of clipping is often quoted. This is simply the ratio of the peak level of the waveform (if no clipping takes place) to the peak level of the clipped waveform.

Clipping appears to distort the signal to a degree where intelligibility is almost totally lost, but this is not the case. The reason for this is that the ear recognises sounds by the frequency content and not by the amplitude shape.

However, clipping still introduces distortion which appears in the form of harmonics and intermodulation distortion. These products have to be removed wherever possible because they reduce the intelligibility of the signal.

As a result of the problems mentioned, it is standard practice to have a low pass filter to remove any products which fall outside the audio spectrum. Normally 3kHz is taken to be the cut-off frequency for this purpose.

Unfortunately, any products which fall below the 3kHz frequency cannot be removed and they actually reduce the intelligibility of the signal. This limits the amount of clipping to a maximum of about 15dB giving about 4 or 5dB of gain.

Radio Frequency Clipping

In order to overcome the problems of audio clipping it's necessary to remove all the harmonic distortion. This can be done if a radio frequency single sideband waveform is used.

Here the harmonics will be generated at multiples of the frequency of the r.f. signal as shown in Fig. 4. It's then an easy matter to remove the distortion and regenerate the clipped audio signal.

If the processor is part of a single sideband transmitter there may be no need to regenerate the original audio. This is because the sideband signal generated in the transmitter itself can be clipped then filtered.

Radio frequency clipping is undoubtedly far superior to a.f. It's possible to achieve almost infinite levels

of clipping whilst still retaining the intelligibility.

With the levels of clipping mentioned an r.f. clipper can offer a gain which is in the region of 8dB about 3 or 4dB more than an a.f. clipper. However, the circuitry required for the r.f. version is more complicated than its a.f. counterpart.

Circuits are required to generate a single sideband signal with good carrier suppression. Then this has to be clipped, filtered and demodulated. As this involves r.f. circuitry the layout is a little more critical, although there is no reason why the frequency of the sideband signal cannot be comparatively low.

Frequency Tailoring

Although limiting the amplitude range of a signal is very important, it's also necessary to reduce and tailor the frequency response of the audio signal. This can also bring improvements to the signal for a number of reasons.

The first reason is obvious. An audio signal with the full range of frequencies present will require a large amount of bandwidth and in today's crowded bands, this is not acceptable. In addition to this there is no advantage to be gained by wasting power on transmitting frequencies, which are not really needed to carry the speech information.

Fortunately the bandwidth of speech can be reduced quite substantially without unduly impairing the intelligibility. The main criterion is to be able to reduce the bandwidth as far as possible without unduly compromising the intelligibility.

Generally a bandwidth of 300Hz to 3.3kHz is taken as the telecommunications standard. Even so it is possible to reduce it still further and many amateur transceivers will only have a bandwidth of 2.7kHz or less.

The main problem encountered in reducing the bandwidth is that some of the sounds with a large high frequency content will not be easily distinguished

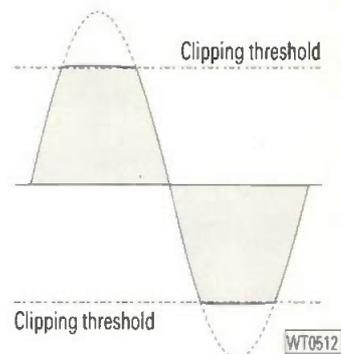


Fig. 3: The action of clipping on a waveform.

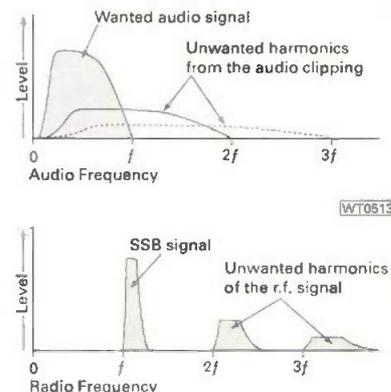


Fig. 4: Harmonics generated by a.f. and r.f. clipping.

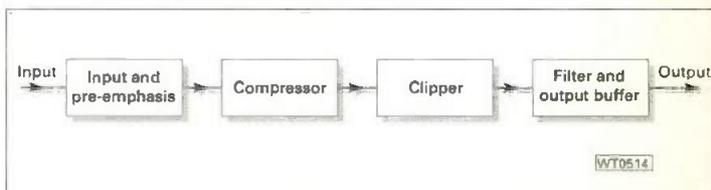
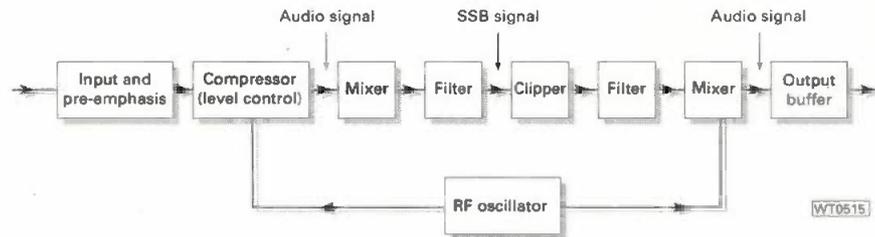


Fig. 5: A block diagram of an a.f. clipper.

Speech Processing - The Basics

Fig. 6: A block diagram of an r.f. clipper.



from one another. The letters 's' and 'f' are prime examples.

Not only is it advantageous to just limit the frequency response. There are a number of benefits which can be gained by altering the overall response and emphasising or reducing the level of various sections of the audio spectrum before the clipping process. This is called pre-emphasis.

It's found that components of speech below 600Hz have a fairly high power content but contribute little to the intelligibility, adding mainly to the natural sound of the speech. It can be an advantage to reduce these frequencies.

Conversely the components between about 1.5 and 3kHz are lower in level but carry more of the real information needed to recognise the words and it can be an advantage to emphasize them more.

It is also found that the act of clipping has the effect of reducing the portions of the spectrum which have a lower level, and giving even greater dominance to the frequencies with the higher power levels. Accordingly some form of pre-emphasis can be used to redress the balance. Usually a simple filter which reduces the level of frequencies below about 600Hz is quite satisfactory.

Full Speech Processor

To make a full speech processor, elements of each type of processing are needed. A typical block diagram for an a.f. processor is shown in Fig. 5.

As shown in Fig. 5 the audio from the microphone arrives in the unit and first it is filtered and pre-emphasised. The next stage of processing involves compressing

the signal so that a constant level is maintained before it is applied to the clipper.

The stage of compression or audio a.g.c. is very important because it enables a constant level of clipping to be maintained despite differences in the audio level. After being compressed and clipped the signal is then filtered to remove any out of band distortion products.

The diagram Fig. 6 shows the block diagram of an r.f. clipper. Again the signal from the microphone undergoes pre-emphasis and compression.

Then the signal is fed into a balanced modulator with a signal from a local oscillator to generate double sideband. This signal has to be filtered to remove the unwanted sideband to give the single sideband signal which is then clipped.

After this there is a further stage of filtering to remove the unwanted harmonics before the clipped audio is regenerated by mixing the r.f. with the local oscillator. This signal can be buffered before being fed out of the unit.

Number of Problems

Even though there are significant advantages to be gained from using speech processors there are also a number of problems which can be encountered. One of the most important is that of feedback.

Feedback is far more likely to occur than when no processor is used. This is because the audio gain is being increased by the degree of clipping which is employed.

As a result even very small amounts of r.f. on the microphone lead can cause a major problem. Sometimes the feedback does not show itself in terms of the normal 'howl round' effect noticed with audio systems. Instead it can cause severe distortion on the transmitted signal.

There are several measures which can be taken to cure feedback. Firstly ensure that the microphone screen is well earthed to the processor case as soon as it enters the unit.

Next check the tightness of the connector on the processor as this may not be tight enough. Obviously the case must be metal to give sufficient screening, but even so if it's made up from several

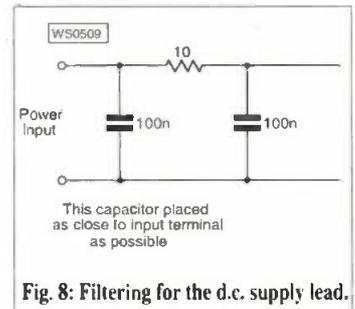


Fig. 8: Filtering for the d.c. supply lead.

sections, it may not be tightly screwed together and some r.f. may creep in.

Most processors have some r.f. filtering on the microphone lead. This is absolutely essential and two possible designs are shown in Fig. 7 in case none is fitted.

Another way r.f. can enter the processor is via the power input. If a low voltage d.c. supply is used then a few ceramic capacitors should be placed at the point where the supply enters the unit and also on the board.

The filtering will be improved if a small series resistor can be placed in the line as shown in Fig. 8. Another possibility is to place some ferrite beads over the supply lead.

It has already been mentioned that the limit of audio clipping is limited to about 15dB. If this limit is exceeded then it will be found that the quality of the signal will be reduced and the speech processor will make the signal less intelligible.

Accordingly it's absolutely necessary to resist the temptation of squeezing out a little extra from an audio clipper, so that it can add intelligibility to the signal rather than detracting from it.

Conclusion

Speech processing is part of today's DX communication scene and processors are included as part of most transceivers. Even so it's still necessary to have a working knowledge about them to ensure the best is being made of the signal.

PW

Fig. 7: Simple microphone filters to remove unwanted r.f. pick-up. A filter for high impedance microphones is shown in 7a while a low impedance version is shown in 7b.

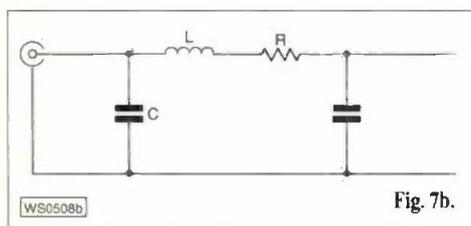


Fig. 7b.

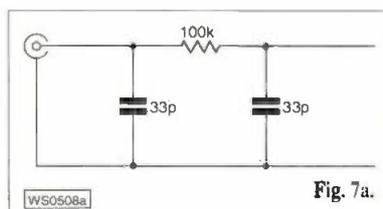


Fig. 7a.

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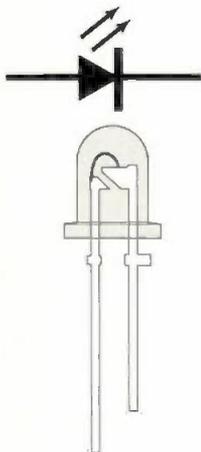
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73 from Dave G4KQH, Technical Manager.

Carrying On - The Practical Way

By Rev. George Dobbs G3RJV

This month the Rev. George Dobbs G3RJV presents what he describes as "an almost digital voltage indicator" project to monitor 12V in the shack, car or in the field".



How to identify an I.e.d pin.

After reading the quote from Mr. Horowitz and Mr. Hill (below, right) I think they are no doubt right. However, there's an exception: it's when you're using a power supply with a piece of radio equipment (then it's better when nothing interesting is happening!).

Most amateur radio equipment is designed to run at a nominal 12V. It's a 'nominal' voltage level because much equipment is actually designed to run at just above 13V (this is the usual voltage for a fully charged '12V' lead-acid storage battery).

Most of us have at least one bench power supply, run from the domestic mains supply to provide the nominal 12V. When the equipment is used in the car, or in the 'field' we'll probably use a battery, whether lead-acid, gel-cell, NiCad or even a non-rechargeable battery.

Over the years I have enjoyed portable operation with QRP equipment. It was either powered from a gel-cell battery or hooked up to the battery in the car.

Some of the equipment is quite voltage sensitive. I well remember one of my QRP expeditions being ruined towards the end of the day because the battery voltage had gone too low for the change-over relay of a

home-brew transceiver to operate. After that, I usually packed a meter to monitor the voltage of the battery supply!

Useful Unit

The useful little unit I'm describing this time replaces a test-meter. It is 'digital', but not 'fancy digital', in

"There are two quantities that we like to keep track of in electronic circuits: voltage and current. These are usually changing with time; otherwise nothing interesting is happening."

The Art of Electronics. Horowitz & Hill

that a line of light emitting diodes (I.e.d.s) indicate the state of the supply voltage.

It would be possible to set it up to read from zero volts to the required supply voltage but that is wasteful. All that we require is an indication around the nominal supply voltage.

In this case we have 10 I.e.d.s

showing half volt steps from 10 to 14.5V. (This is the likely area of interest for a 12V supply).

The indicator uses an LM3914 dot/bar display driver chip. The LM3914 lights up to ten I.e.d.s (in the bar mode) or one of 10 I.e.d.s (in the dot mode) in response to an input voltage.

The chip contains a voltage divider and 10 comparators that turn on in sequence as the input voltage rises. There is an internal reference voltage source which can be used to set high and low reference points on two pins at either end of the voltage divider chain to adjust the range of measurement.

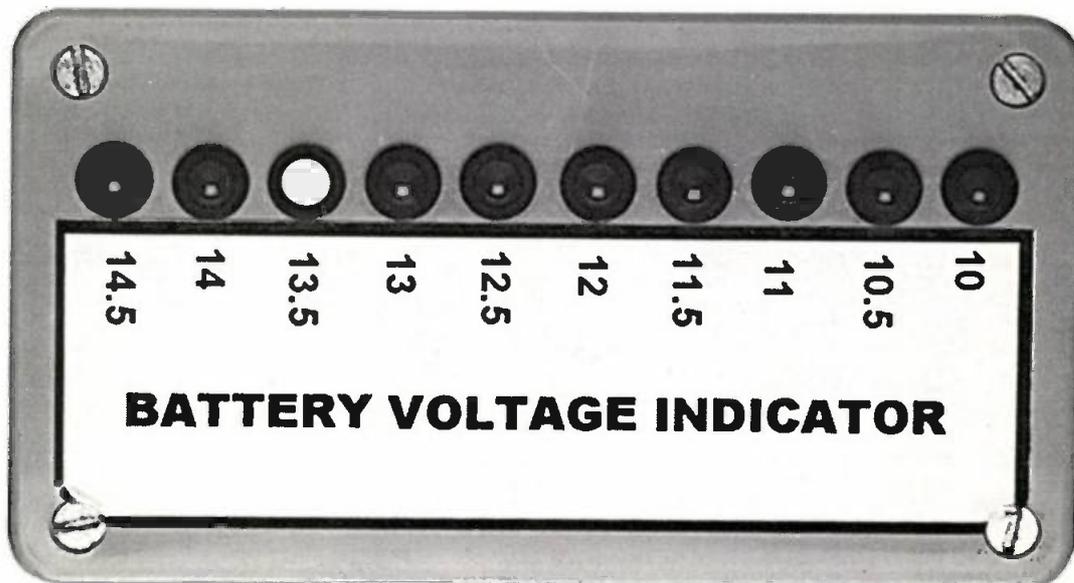
Another pin sets the LM3914 to operate in the dot or bar mode. Altogether a useful chip!

The Circuit

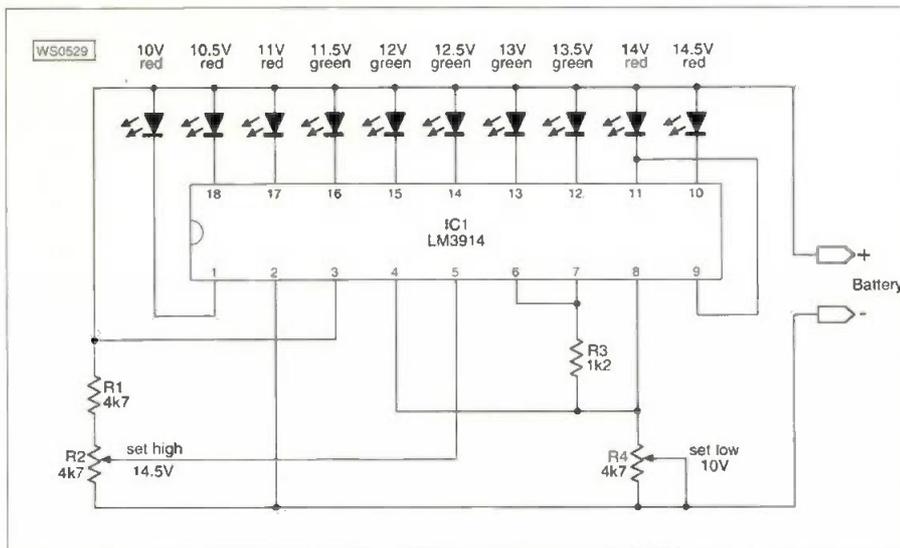
The circuit of the battery voltage indicator is shown in

Fig. 1. The battery (or supply) being monitored provides the operating voltage.

In practice, the LM3914 operates with any supply voltage from 3 to 18V. A preset potentiometer feeds the input to pin 5. This is used to set the highest reading point. Another preset control sets the low reading voltage



Slightly larger than life, showing that the voltage applied was about 13.5v. (anywhere between about 13.25 and 13.75v).



holders).

The I.e.d.s are mounted in a row along the lid of the box. The I.e.d.s holders are nice but can cost as much as the I.e.d.s themselves.

An alternative is to drill the mounting holes undersized and gently ream them out until the I.e.d.s are a push fit. Remember that the shorter lead of the I.e.d. (often marked by a 'flat' on the casing) is the cathode.

using the internal reference voltage.

Pins 1 to 10 feed the I.e.d.s. It is possible to obtain 'bar' indicators with 10 I.e.d.s mounted in a row but this indicator uses individual I.e.d.s. These are red or green according to the desirability of the voltage.

The diodes indicating 11.5 to 13.5V are green and the voltages above and below are red. The green represents the probable safety margin for using 12V equipment.

Building Techniques

Of all the building techniques for making amateur radio equipment, the one I like least is Veroboard. (Well... I have made an enemy with one company!).

Veroboard of course is that system which uses a 0.1 inch pitch matrix of holes with tracks joining the holes in one direction along the board. It's not that there is anything intrinsically wrong with Veroboard but that I find it difficult to think in straight lines!

Using Veroboard really requires careful soldering because the tracks are placed close together. The tracks are also easy to bridge by accident.

But despite what I've just said...this project lends itself so well to the Veroboard method of construction! The I.e.d.s are conveniently fed from sequentially numbered pins and the rest of the circuit fits with very little trouble.

Layout Design

The Veroboard layout design is shown in right. The parts simply fit onto the board as shown; note the direction of the tracks. Note: there are breaks between the pins of IC1 and the two variable resistor sliders. There are also breaks between the two 'end' contacts on R2 and R4.

The board requires five straight links and a link that curves around the edge of the LM3914. The tracks have to be cut in 12 places, nine of these being between the adjacent rows of pins on the LM3914.

I recommend that you use a proper Vero spot cutter, or alternatively a small twist drill held in the fingers. The connections to the battery and the I.e.d.s all come from one end of the board.

I mounted the completed unit in a small ABS plastic box, 110 x 60 x 30mm deep. (I happened to have the box, as I did the I.e.d.s and their

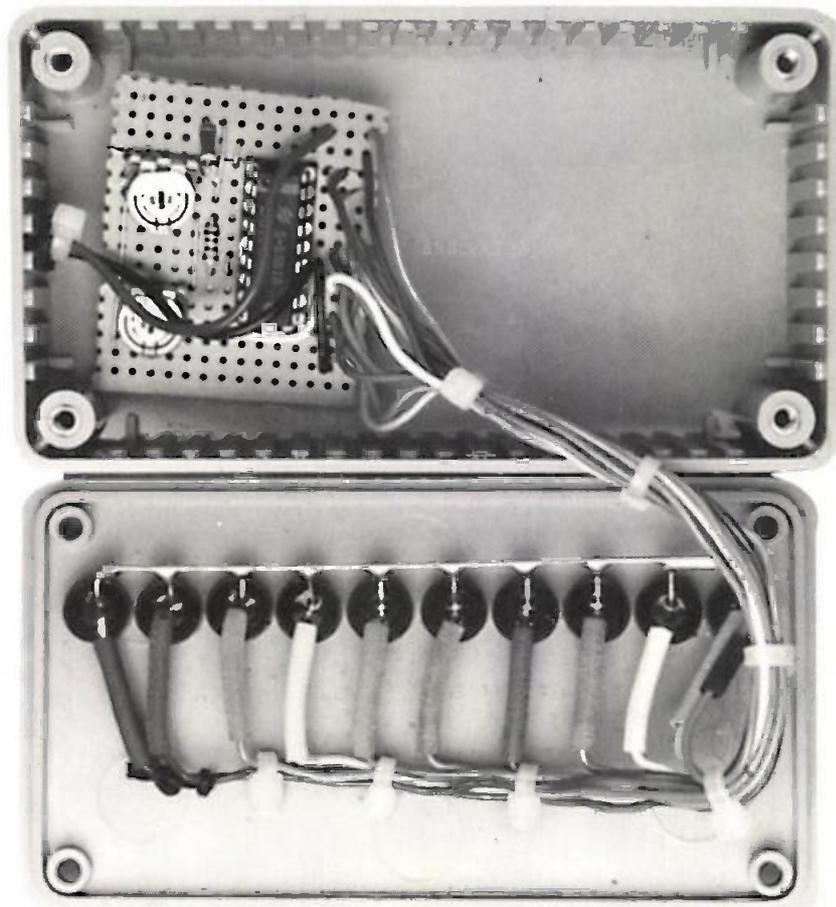
Fly Leads
Two fly leads (red and black) with crocodile clips seemed the easiest way to feed the indicator. And there you are - just clip the indicator on to the battery or supply and you know the state of the voltage!

By the way, if you prefer a bar display (with all the I.e.d.s up to the measured voltage alight) connect pin 9 to the positive of the supply rather than to pin 11. Go on...have a go...it's an 'illuminating' project this time!

PW

Circuit diagram of the G3RJV 'digital' voltmeter.

A photograph of the insides. Tracks on the Veroboard run horizontally.



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Who Invented Radio?

By Patrick Allely GW3KJW

*Patrick Allely
GW3KJW casts his
humorous eye over the
history books to make
up his mind on who
invented radio.*

Over a period of many years, I have been asked the question 'Who invented radio?' on a number of occasions. And depending on how I felt at the time, I would answer, 'Why, Marconi of course'!

However, if I was feeling a bit stropy, I would reply 'Professor A S Popov' and watch a blank look come over the face of my interrogator. It would be a good bet that they had heard of Marconi but Popov was a stranger to them and they would not want to display their ignorance by asking who he was!

Now, after much thought, I have come to the conclusion that radio was not invented, nor discovered, by any one man. Radio can be likened to a camel - no one person could ever design a camel, it is obviously the result of a committee, a gathering together and amalgamation of ideas. So, let me explain further...

Busy Fighting

In the 17th century, the super powers of the time were busy fighting each other and very often themselves (remember we had our civil war long before others!). But fortunately, a few more saner men were involved in exercising their minds instead of their muscles, Newton, Kepler and Wren being such examples.

A new age was dawning when the study of the sciences became a fashionable pursuit amongst the wealthy. Many of the big houses had a laboratory in which the lord and master could follow his hobby, (I suppose today's equivalent is a shack in the cubby hole under the stairs!).

By the beginning of the 18th century, electricity was the great mystery. It was believed to be part of the life force and experiments were conducted to try to understand it and to measure and control it. How many must have found that electricity has a habit of biting back?

First Experimenter

I suppose the first great experimenter was a genius named **Benjamin Franklin** (1706 to 1790). He was an

inventor, a diplomat (and possibly a spy during the 1770s) and a man who believed that electricity was a fluid which could be tapped.

Franklin went as far as flying kites in thunderstorms in order to induce his electric 'fluid' into the kite string and transfer it to a key suspended on the string. How these experiments did not kill him defies logic! But he understood the phenomena of electrostatic action.

Electrostatic action was, at the time, treated almost as a party trick, or a way of impressing your less brainy friends. But some men were seriously researching such matters.

One of the serious researchers was **Sir Henry Cavendish** (1731 to 1810), a man of independent means. He was a man with influence, a nephew of the Duke of Devonshire, and he was clever!

Cavendish had a wide range of scientific interests and identified Hydrogen as a separate gas and in 1798 deduced the density of the earth. He anticipated Coulomb. Ohm and Faraday, deduced the square law of electrical attraction and repulsion and discovered scientific inductive capacity.

Unfortunately Cavendish's main discoveries in electrostatics remained unpublished until 1879. (Many years after his death)

Similar Experiments

Over on the continent, similar experiments were taking place and the Italians were getting 'in on the act'. For example, **Luigi Galvani** (1737 to 1798) was an anatomist, who in the 1780s, made the chance discovery that frog's legs placed in an electric field produced by his electrostatic generator would twitch. Galvani believed that he had discovered another type of electricity - animal electricity and published his findings.

Galvani's claim was disputed by a fellow Italian, blessed with the name of **Alessandro Guisepppe Antonio Anastasio Volta** (1745-1824). Volta was following similar researches and suggested that Galvani was wrong in

saying that he had produced electricity out of animal tissue and that it was normal electricity produced by the contact of two dissimilar metals.

Volta proved his theory by inventing the voltaic pile (not the painful medical condition!), otherwise known as the electrochemical battery, a device to produce a constant source of electric current. Volta then toured Europe demonstrating his battery and on showing it Napoleon in 1801, was made a Count.

Also Busy

While Napoleon was ravaging Europe, one of his subjects was also busy. He was **Charles Augustin de Coulomb** (1736-1806) an experimenter from an old and wealthy French family.

Coulomb announced that the forces between two electrical charges are proportional to the product of the sizes of the charges and inversely proportional to the square of the distance between them. He thereby defined the quantity of an electrical charge. The Coulomb and Coulomb's Law are still with us.

The study of electrical charges was also being taken up in Scandinavia. And it was **Hans Christian Oersted** (1770-1851, who in Denmark in 1820, whilst passing a current through a length of wire (which just happened to be near a compass) noticed that the compass needle deflected. He then deduced that an electric current has a magnetic effect.

Oersted's findings were published and came to the notice of one of the greater mathematicians of the age, a Frenchman, **Andre-Marie Ampere** 1775 to 1836). Ampere became one of the founders of the study of electromagnetism and following Oersted's finding, mathematically proved the relationship between magnetic force and electric current.

In Germany

It doesn't seem strange to find from the history books that yet another



... THE RESULT OF A COMMITTEE ...

physicist, this time in Germany, was working on similar experiments. This man was **Georg Simon Ohm** (1789-1854).

It was Ohm who as we know found out our 'Ohm's Law'. He discovered that the electric current flowing through a wire is directly proportional to the potential difference and inversely proportional to the resistance.

It's not thought that Volta, Ampere and Ohm ever met each other. However, I wonder if they had, would they have stood in a triangle formation? But there's no doubt that their individual published researches were read by the others.

Two other men of the age pushed the electromagnetic knowledge further. One was the great **Michael Faraday** (1791-1867). Like others before him he initially concentrated on analytical chemistry, but his interests were wider.

In 1831, Faraday discovered electromagnetic induction by which a permanent magnet could generate electricity. This vital breakthrough in electrodynamics, previously investigated by Ampere, led directly of making a dynamo and a motor.

Faraday also proposed the concept of lines of force. But this time he left the proof to later physicists.

Independent Henry

At the same time and entirely independent from the others (although no doubt following the same lines of research available to Faraday, and indeed to all interested in academics) an American, **Joseph**

Henry (1797-1878) also conducted accurate research into electromagnetic induction. His name became the unit of induction - the Henry.

By the time Queen Victoria came to the throne, the basic building blocks of radio had been discovered and proved. Electricity and magnetism, potential difference, current and resistance were terms understood by the scientific community and were being used in commercial ventures.

The telegraph system was a prime result of the discoveries I've listed. Although research was being carried as a pure academic interest, the industrialists had realised that there was money to be made in faster communications and were beginning to finance research. Governments were also aware that military communications needed upgrading and so they also encouraged further studies.

Just As Clever

The men of the 19th century were just as clever as their mentors! For example, a Belfast man, **William Thomas Kelvin** (1824-1907) although famous for other studies, experimented in Faraday's theories of induction and Kelvin's concept of an electromagnetic field was derived from his own and Faraday's work.

Kelvin was involved in the laying of the first Transatlantic cable. His work influenced the Scot **James Clerk Maxwell** (1831-1879) who was the first Cavendish Professor of Physics at Cambridge in 1871.

Maxwell extended the work of Faraday and Kelvin. He produced field equations which unified magnetism and electricity.

James Maxwell also identified the electromagnetic nature of light and most importantly as far as we are concerned, predicted the existence of other electromagnetic radiation. (Here was the first suspicion of what may be termed radio waves). Maxwell also published the findings of Henry Cavendish in 1879.

Back To Germany

Back we go to Germany and to one of the greatest teachers of his age.

Hermann Ludwig Ferdinand von Helmholtz (1821-1894). He was involved in many sciences and amongst his research he studied the properties of oscillating electric currents. He left his assistant to continue with this line of enquiry.

How fortunate it was that Helmholtz's assistant was **Heinrich Rudolf Hertz**. He was born in 1857 and who so tragically died of blood poisoning at the early age of 37 in 1894. Hertz was made Professor of Physics at Bonn in 1889.

Hertz was able to follow the works of Helmholtz and Maxwell. In 1886 he demonstrated experimentally, by using an induction coil to produce sparks across a gap between two metal balls. He was also able to induce a current into a metal loop connected to another spark gap and thereby producing sparking across this gap.

continued on page 42

The receiver was placed a few feet away from the transmitter. Hertz then proved that the waves behaved like light and radiant heat, thus proving that they too, were electromagnetic.

In England

Back in England during 1879, Professor D. E. Hughes, produced electric sparks in his house and detected them half a mile away by means of a simple detector and earpiece. His peers refused to acknowledge his claims of radio waves, and the existence of radio waves were not accepted until Hertz, some seven years later, demonstrated his results.

During the same period, Sir Oliver Lodge was also experimenting and was developing an early form of receiver known as a coherer. This involved the use of dissimilar metals, (the principle of a semi-conductor) to

detect and rectify signals. In later life, Lodge became interested in spiritualism and tried to contact the dead (not unlike calling CQ on 144MHz at times!).

Early Radio

It can now be seen that early radio had arrived, although in a very primitive state. It was not appreciated by the general public and not thought to be much more than a scientific phenomena.

However, the 'super powers' of the time had already grasped the possibilities of improved communications. They were looking around for someone to come up with a reliable working system.

In the scientific world, where advances in any discipline are deemed to be original they are published for the good of all science. So it's not surprising that the discoveries and

inventions of Hertz and Lodge in particular came to the notice of two more men living far apart, but following similar lines of research.

One was Professor A. S. Popov (1859-1904), a physicist working in Russia. The other was an Italian, **Guglielmo Marconi** (1874-1937) who was an electrical engineer. It would appear that their experiments were almost identical and one supposes that they were working from the same published material.

Successful Communications

In the spring of 1897, Popov achieved successful communications over a range of 600m during experiments with the Russian Navy in Kronstad Harbour. Later the same year he increased the range to 5km.

In July of the same year, Marconi demonstrated communication between

ships in an Italian port over a distance of 15km.

Marconi, not being an academician, was not inclined to reserve his talents for pure research. He set out to make radio a viable system and at the same time to earn a good living from his endeavours.

Marconi was then invited to Great Britain where he was courted by the General Post Office and the War Department. They began a number of trials to prove his system and to improve its reliability.

Young Marconi then set up a firm, trained staff and sent them out to various parts of the United Kingdom and further afield. The first known use of the new fangled radio by the War Department was during the Boer War when ship-to-shore communication was set up in South Africa.

Transatlantic Transmission

The culmination of Marconi's early experiments was of course the first transatlantic transmission from Poldhu in Cornwall to Signal Hill, Newfoundland on 12 December 1901

using a spark transmitter rated at 25kW to a 'fan' aerial. At the Newfoundland end, reception was via a 'coherer'. This was a glass container with a plug of iron at one end, a copper plug at the other end and mercury in between. A kite was

used to support the aerial.

In the next few years, radio developed quickly. In 1904, Sir **Ambrose Fleming** invented the thermionic diode valve and two years later, **Lee de Forest**, an American, invented the triode, thereby allowing

amplification of current, an essential requirement for successful radio communications.

But to get back to the original question, 'Who invented radio?' I'm afraid I don't know and neither do I know who designed the camel!

PW

A British First....From Uzbekistan

By Phil Whitchurch G3SWH

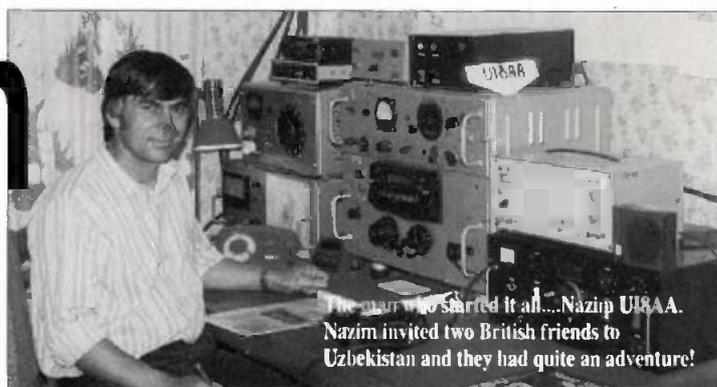
Phil Whitchurch G3SWH describes memories of the DXpedition to Uzbekistan that he and Barry Steele G3LZK enjoyed in 1991.

In August 1990, Barry G3LZK received a letter of invitation from Nazim Tahtarov UI8AA for him to visit Nazim in Tashkent, Uzbekistan. This letter was something of a surprise as Barry had only worked Nazim a couple of times on the air previously.

Barry was very keen and asked me if I would like to join him on a c.w. - only mini-DXpedition. Of course I jumped at the idea!

Barry then wrote to Nazim explaining what was proposed and duly received a telegram from Nazim saying 'No problem. Fly to Moscow then to Tashkent'.

So, it was decided to try and travel in May 1991. We started to organise reciprocal licences and airline tickets.



The man who started it all... Nazim UI8AA. Nazim invited two British friends to Uzbekistan and they had quite an adventure!

First Obstacle

The first obstacle was to get travel visa applications from the Russian Embassy in London, at a cost of £10 each. These had to be completed in triplicate with photographs and two copies sent to Nazim, the third copy being returned to the Embassy.

When he received them, Nazim had to take his two copies to the 'authorities' in Tashkent for them to issue us with a formal letter of invitation to the Soviet Union. This then had to be sent to the Embassy in London for the actual visas to be issued.

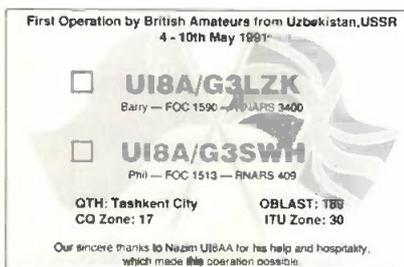
Copies of our UK amateur licenses were sent off to Box 88 in Moscow. And after much correspondence and the assistance of Vlad U3DR, we were issued with the call signs UI8A/G3LZK and UI8A/G3SWH.

Airline tickets were booked, but these involved a change of airport at Moscow, as well as an eight hour delay between flights. We fell back on our amateur radio contacts...much to our advantage!

We were met at Sherenetyevo Airport by Valery UA3DEA and Jacob UA3BR who showed us the sights. They also got us spectacularly drunk on vodka and they eventually

Continued on page 47

The QSL card issued to commemorate the trip.





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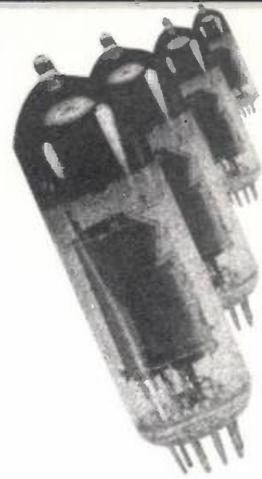
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Valve & Vintage



By Charles Miller

It's Charles Miller's turn to look after PW's vintage 'wireless shop' this month. Charles continues the story of the pioneers and in the first of a two part story he turns the spotlight onto one of the most famous...John Scott-Taggart.

If you talk to almost anyone who was around in those vintage days of radio, the 1920s and 30s, it's a near certainty that sooner or later the name of **John Scott-Taggart** will crop up. It comes as something of a shock to find that Scott-Taggart was really in the public eye for less than 20 years, because in that time he contrived to make himself better known than almost everyone in radio, save Marconi himself.

It's almost pretty certain that for every person you find who considers Scott-Taggart a near genius, there'll be another who will denounce him as a near charlatan. One thing that is certain is that he had a wonderful gift for (mainly self) publicity.

One Hundred Years

John Scott-Taggart was born one hundred years ago. It was just at the time when the 23 year-old Guglielmo Marconi had arrived in Britain with his 'new-fangled' ideas about wireless telegraphy. Whether the timing had any effect or not, John grew up to make an extraordinary career exploiting Marconi's discoveries.

Scott-Taggart's education ranged from, what he described as various (unspecified) Technological Institutions, to University College London, where he studied Law. He was, in fact, eventually 'called to the bar' but

seems never to have practised, which isn't surprising as it would have been difficult for him to have found time in between his other activities!

According to his entry on the 1954 *Who's Who*, Scott-Taggart also managed to serve in the Army during the First World War with some distinction, being mentioned in dispatches and gaining the Military Cross. This wasn't bad for a lad who was still only 21 when hostilities ceased.

It was probably the war that brought him into contact with and stimulated his interest in wireless. This was to such an extent that by 1918, again according to *Who's Who*,



Photograph showing John Scott-Taggart demonstrating one of his receiver designs to Mr Shadbolt's workers in 1936. Even the somewhat bland posed photograph helps to convey some of the charisma surrounding Scott-Taggart and his work...judging by the looks on the admiring faces!

he had already taken out the first of over 30 patents relating to valves, transmitters and receivers. He was also under way with the first of a series of books on these subjects.

Two years later, Scott-Taggart was in charge of the patents department of the then influential Radio Communications Company, but was still looking farther ahead. In 1922 he founded The Radio Press Limited, and embarked on the job of putting the name of Scott-Taggart firmly before the eyes of the public.

Radio Year Book

In an advertisement published in Pitman's first *Radio Year Book* (1923) Scott-Taggart announced modestly that "as publishers of authoritative wireless literature we can guarantee that everyone

interested in the science, either professionally, experimentally or merely as a fascinating hobby, will derive full satisfaction from reading some (or all) of the following publications".

The list appended gave the names of *Modern Wireless* (edited by John Scott-Taggart) and four books that also had come from his pen. As a matter of fact, the source of the above quotation is his own copy of the *Year Book* (I acquired this some years ago along with a good selection from

Scott-Taggart's personal library) and it has a cross marked against it in the great man's own hand.

There are many small annotations and underlinings in the

Grandiose Advertisement

In a characteristically grandiose advertisement (6 November 1926) Scott-Taggart announced that he had relinquished all his journalistic activities in order to go into the production of valves that were (naturally!) going to be better by far than anything else on the market.

As far as Radio Press was concerned, all its publications passed to the Amalgamated Press of Fleetway House, EC4. *Modern Wireless* continued for a while, under the editorship of Norman Edwards with G. V. Dowding as technical editor.

Wireless Constructor carried on for some years under the guidance of Percy W. Harris. Then he was replaced in the early 1930s by the more charismatic P. P. Eckersley, late chief engineer of the BBC. The title *Wireless* was absorbed into Almagamated's long running *Popular Wireless*.

Meanwhile, what of John Scott-Taggart and his wonderful new valves? Pictured at his desk, looking the reader straight in the eye, as he asked diffidently in a display advertisement:

"Supposing a month ago you had been on your way to a dealer to buy a valve and you had met Scott-Taggart. If he had recommended a certain valve as ideal for your purpose, would you have taken his advice?"

The advert continued "Supposing he had said, 'When you get it I shall be happy to test it out thoroughly and, after I am satisfied it is up to standard, give you a personally signed certificate to that effect', would you have accepted this offer?"

You would not consciously have analysed the reputation he has built up as the best known expert on valves in this country. You probably did not even know that his books on this subject have been a guide to over 500,000 readers of them. It might flash across your mind that he was the head of their great Elstree Laboratories and the keenest of critics of valves and apparatus.

How far would his opinion have influenced your judgement? Would you have put his recommended and tested valve in your valve holder with confidence? Today you have actually to answer this question. John Scott-Taggart has relinquished all other activities to produce the best valve he can.

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How could any wireless home constructor resist this blandishment? Especially when it was followed by several more pages of highly coloured prose extolling the virtue of the new valves? *But I can't find any reference to 'Torodium' in any scientific dictionary. Perhaps it's a word 'invented' by Scott-Taggart himself?

Here's an example of the prose accompanying the adverts: "...Mr Scott-Taggart was in charge of the manufacture of valves made for the British Government...more than fifty patents (but compare it with his entry in *Who's Who!*), all concerned with valves, stand in his name, some proof of the inventive genius of one of whose technical life has been concerned entirely with this branch of radio.....inside the glass bulb is all the ingenuity of modern science, the precision of specially designed machinery and painstaking care in testing have contributed to make a valve which stands head and shoulders above the others.....in the early stages the designer of the S T valve refused to continue unless he was entirely unhampered and able to use any invention he desired. As a result, S T Ltd. are operating under all the leading patents which have contributed to the design and advancement of the valve. Nothing has been sacrificed in design through inability to use some invention essential to achieve the best results.....".

book, giving a good indication of who and what was engaging his attention at the time. And although Scott-Taggart must have had backers when he started Radio Press, he later became its sole proprietor.

Modern Wireless

Modern Wireless wasn't a bad magazine and it's fascinating now and again to browse through the early issues (again from Scott-Taggart's own collection, in my

case). It seemed to be holding its own against the very considerable competition in those days from the many other publications aimed at the wireless enthusiast.

By 1926, Radio Press had moved from its original location in Devereux Court to new quarters at Bush House in the Strand. Now that's a familiar name!

A good editorial team had been assembled, including Percy W. Harris, H. J. Barton-Chapple, G. P. Kendal and J. H. Reyner. Each of whom became well known in his own right.

Also on the authors list were John W. Barber and John Underdown. But these may well have been pseudonyms used by Scott-Taggart!

There were now companion magazines. *Wireless Weekly*, also edited by Scott-Taggart, and *Wireless Constructor*, a monthly under the guidance of Percy W. Harris. In addition, there was a trade-only weekly called *The Radio Dealer*.

To those of us engaged in producing single monthly or bi-monthly publications, the very idea of bringing out all that

reading matter week after week is daunting indeed! But as if that wasn't enough, Scott-Taggart had established what he called a research laboratory in Elstree to develop and test new wireless equipment.

Although on the surface all seemed well with Radio Press, there must have been rumblings underneath. The first indication of changes to come was the sudden abandonment of *Wireless Weekly* ('the 100% valve paper') halfway through 1926 and its incorporation (a polite euphemism for submergence) in a new weekly entitled simply *Wireless*.

Initially, Percy W. Harris and J. H. Reyner were credited as joint editors with G. P. Kendal as assistant editor and John Scott-Taggart as technical director. Although in September, his name was erased (literally since the gap in the credits list is quite obvious) and a month later the other names went as well.

Economical Or Prodigal

Whatever you may think of Scott-Taggart's ability to be economical or prodigal with the truth as the occasion demanded, in the cause of self-advancement, it had to be admitted that he

really did show real talent for grabbing publicity!

Scott-Taggart is such an important 'character' of the vintage wireless days that I've run out of space this time. So, I'll have to continue his fascinating story when it's my turn to look after the 'shop' again in the new year. Until then I wish you all the best and good reading, happy Christmas and New Year!



PW

Cheerio from Charles, see you in April.

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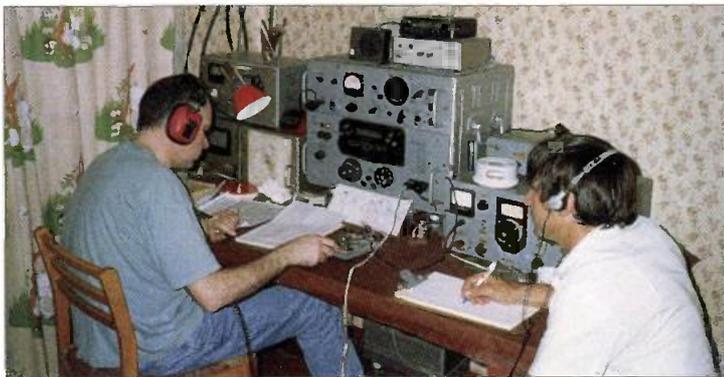
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Phil G3SWH operating with Nazim UI8AA looking on.

literally 'poured' us onto the aircraft at Domodedova Airport for the overnight flight to Tashkent.

Arrival At Tashkent

On our arrival at Tashkent Airport we were met by Nazim, his friend Bahadyr and a teenage girl called Lena. She introduced herself as our interpreter, as Nazim was not at all sure of his spoken English and we spoke about four words of Russian between us.

We then drove in Bahadyr's car to Nazim's home and settled in. Our room was next to the shack and after a couple of hours sleep, we lost no time in getting on the air.

Barry had taken his Bencher keyer, but without the supporting electronics. This proved to be a problem as Nazim's electronic keyer was not designed for iambic keying. So Barry had to learn to use Nazim's home-made hacksaw blade keyer in a very short time.

I had taken my Vibroplex mechanical bug, which just connected to the electronic keyer output and worked first time. Thus, I had the first QSO with UB4LOI on 21MHz. Our first G station was G5VQ, who was in fact QSO No. 8.

As soon as Barry had mastered Nazim's crude keyer, we spent as much time as possible on the air, taking turn and turn about of an hour or so each. Activity was, however, restricted to 14 and 21MHz.

All of Nazim's equipment was home-made, with exception of the receiver, which was an ex-military general coverage type. The transmitter was capable of 100W output of s.s.b. as well as c.w. and was built to the famous UW3DI design. The equipment used valves throughout.

Antennas were mounted on a lattice tower and consisted of three element monoband beams for 28, 21 and 14MHz. Wire dipoles were available for 7 and 3.5MHz.

Nazim is chief operator for three other club stations locally. These included UI9AWD located at a hostel for Tashkent textile factory workers, UI9SWI located at a secondary

school, literally next door and UI9BWR located at a 'Pioneer' camp near the town of Charwak, about 100km north of the city.

With the exception of the universal ex-military receivers in use, all the towers, antennas, transmitters, etc. at all three stations had been constructed by Nazim. That at UI9AWD the station was particularly impressive.

The antenna set-up at UI9AWD it had no less than four 22m towers with full sizes monoband beams for 7MHz (3-element), 14MHz (5-element), 21MHz (5-element) and 28MHz (6-element). We later learned that this was the station operated by Lloyd and Iris Colvin of YASME fame during their own visit in June 1989.

Pioneer Camp

The high spot of the trip was a visit to the Pioneer camp at Charwak where UI9BWR is located. From an amateur radio viewpoint, this is a superb location, with good take-offs in all directions, especially to Europe.

There was an impressive array of low band delta loops as well as the inevitable lattice tower and 3-element monobanders. We planned to spend two days here and lost no time in getting on the air, as we had now access to 7MHz as well as 14 and 21MHz.

The signal was obviously much stronger than from Tashkent city and the pile-up built up very quickly. We kept strictly to our one hour on and one off routine with breaks for meals, etc. and the number of QSOs in the log increased dramatically, finally reaching 3152.

Last Night

All too soon it was time to pack up and return to Tashkent for our last night before the trip home. Nazim's wife Merxem had laid on a special meal of pilau rice with beef followed by strawberry gateau and we were

showered with beautiful gifts. We did our best to reciprocate with western consumer products, but were agreed that we were outdone.

After some fairly emotional farewells at the airport the following morning, the flight to Domodedova Airport in Moscow was uneventful. But we arrived early and missed our meeting with Valery UA3DEA and took a taxi to Sheremetyevo, as our connecting flight time to London did not allow any room for error.

When we arrived at Sheremetyevo, the first people we saw were Valery, Jacob UA3BR and Alex UV3DPP who, having missed us at Domodedova, had driven to Sheremetyevo to wish us farewell. Needless to say, we were very embarrassed, but parted the best of friends.

We should particularly like to thank Nazim UI8AA and his family for their unsurpassed hospitality Vlad



The impressive operating position (note transmitter ventilation trunking on left of photograph) at UI9BWR.

U3DR for his help with the licenses, Valery UA3DEA and Jacob UA3BR for their help and assistance in getting us across Moscow.

PW

(Left to right) UI8AA, Lena, Yuri RI8BDN and Bahadyr.



VISIBLY

KE

By Rob Mannion G3XFD

Kenwood have just launched the TS-570D transceiver which they say is aimed at replacing the TS-450 transceiver. Rob Mannion G3XFD takes a look at the many facilities - including digital signal processing - on the new rig.

On looking back through my bound copies of *PWI* see that I reviewed the Kenwood TS-450SAT (automatic antenna tuning unit version) in the April 1992 magazine. I was impressed with the rig then and on the few occasions I've operated one since...the effect has not worn off.

Many h.f. transceivers come my way and I have been impressed by several. The TS-450SAT was one, and the Yaesu FT-900AT was another. These 'favourites' were then joined by the Alinco DX-70 which suited me very well indeed.

However, everything I've had the pleasure of trying in the last few years was overshadowed by the mighty Kenwood TS-870. What a machine and what amazing facilities and performance! And although I realise that it would be difficult for anything to come up to the standards of the TS-870, I was more than pleased to be the first Amateur Radio

journalist in the United Kingdom to get the opportunity to review the new TS-570D.

Remarkable Looking

The new Kenwood TS-570D has a remarkable looking display. It's very large, clear and exceptionally concise. Unusually for Kenwood the display is black l.c.d. with a sandy-yellow backlighting colour.

I was immensely impressed with the display as it is very 'pleasant on the eye'. (I think it will prove to be ideal for those long hours of operating during contests!)

And although I'm not keen on using too much 'techno-speak' I must also add that the ergonomics on the TS-570D are good. This is particularly noticeable with the exceptionally well laid out keyboard 'switch pad' on the front panel. They (much to my surprise) were very easy to use despite the limited feeling I have in my fingertips.

In fact, Kenwood's designers have engineered the switches with a sloping surface so that (in effect) the button control surface is facing slightly upwards. This provides the operator with an excellent tactile characteristic. Because of this I've no doubt this transceiver will prove to be very useful for someone with limited or failing sight, (there's also a voice synthesiser unit available to further help in this respect).

Another feature which I (as someone who does not usually enjoy working with 'computer type' equipment) is the 'scrolling' message facility which informs the operator of exactly what's been selected. This is provided when the operator selects 'Menu Mode'. It's very useful, helpful and non-confusing as it really does tell you in words. There's no need to look for a code translation book for symbols of abbreviations.

So, now I've briefly described the initial impression of the transceiver it's time to delve deeper. Let's find

out what's in this particularly 'user friendly' (a very appropriate word in this case) rig.

Digital Signal Processing

There's no doubt about it...digital signal processing is gradually making its mark on Amateur Radio transceivers. In a few years time I think all 'mainstream' h.f. transceivers will come with d.s.p. as standard and at increasingly lower prices. Whereas at the moment it's only fitted (as standard) on the higher price equipment.

The TS-570D includes a 16-bit d.s.p. unit to process the audio frequencies. And along with providing enhanced interference facilities, it also improves transmitted audio quality.

The transceiver uses a double conversion superhet for a.m. c.w., s.s.b. and f.s.k. and triple conversion for f.m. First i.f. is 73.05MHz and the second is 8.83MHz. (Third i.f. for f.m. use is 455kHz).

The TS-570D employs the d.s.p. technology to provide high performance receive filters and enhancement of the heterodyne and noise reduction capabilities. It also provides an interesting facility by providing 'automatic zero-beating for c.w. operating.

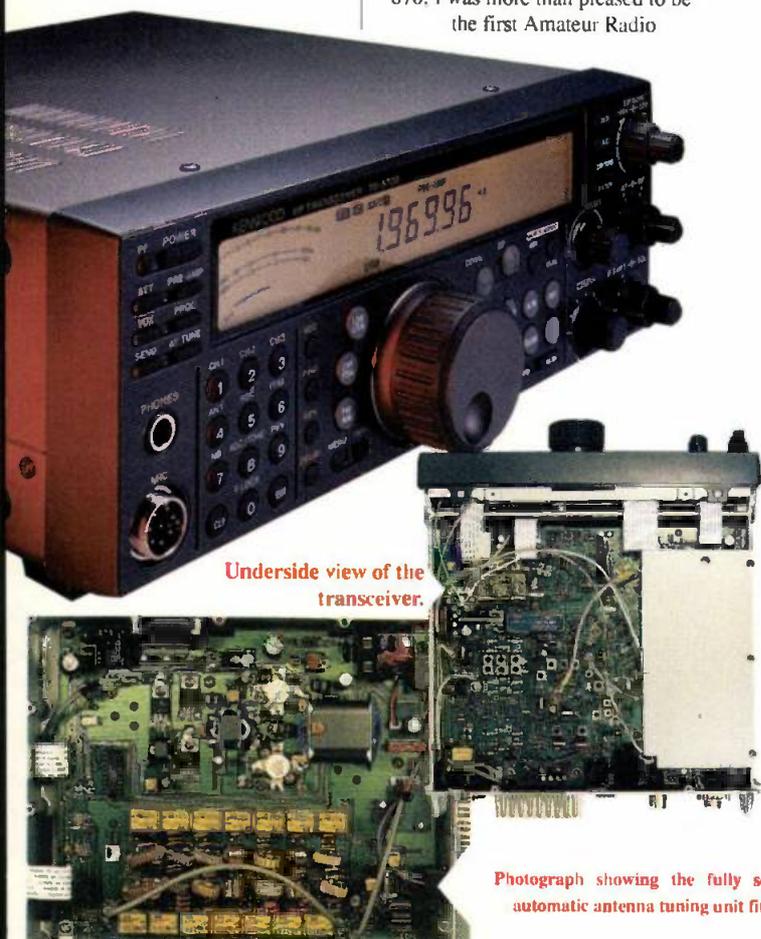
The d.s.p. facilities on transmit are also very useful. This is because the operator can actually 'tailor' the transmitted audio to suit their voice and operating conditions by using the 'transmit equaliser' function.

The Manual

As I was privileged to be the first Amateur Radio journalist in the UK to have the TS-570D on review, I was also the first to have it on loan without the manual!

The TS-570D I had was the model which was on display at the Leicester show and I had the pleasure of taking it back to Dorset with me. The manual arrived several days later.

In my opinion it's a credit to the 'user friendliness' presentation of the TS-570D that I was able to go on the



Underside view of the transceiver.

Photograph showing the fully solid-state (fully electronic, no mechanics) automatic antenna tuning unit fitted to the TS-570D (see text).

ENWOOD



air without the manual. In fact, I had many QSOs on the day after Leicester (Sunday 19th October) and the only difficulty I had was that quite a few of my friends didn't recognise my voice until I found out how to adjust the transmit audio characteristics. And I achieved this without the use of the manual, but with the help of the 'scrolling menu' and a lot of practice.

However, once the manual arrived I realised it was worth waiting for. As is usual with most manufacturers now, the 'Japanese English' has gone, to be replaced by accurate, precisely prepared and well thought out instructions. But the advice from G3XFD is - "If you got the manual...read it"! And this sentiment is certainly applicable with the TS-570D instructions as you'll save a lot of your time which could be used on the air or listening.

On The Air

I was fortunate...indeed I was lucky that the time I had the transceiver on review - and on the air - was before the storms (the tail end of a hurricane apparently) struck hard here on the south coast. All my new h.f. antennas were wrecked and I was forced off air, until I 'jury rigged' a crude long wire antenna.

However, I managed to put the TS-570D through its paces and experience a rather different automatic antenna tuning unit (a.a.t.u.) before the storms. I'd been warned the auto a.t.u. on the transceiver was an electronic switching type but it still caught me unawares!

The electronic a.a.t.u. didn't seem much quicker than the electro-mechanical types which use 'roller coaster' or mechanically switched tappings. On the other hand because it was very quiet I had to watch the front panel display to see if all was well. Rather un-nerving at first, but you soon get used to it and the a.a.t.u. then memorises the settings for that frequency for the antenna you're using at the time.

Audio from the transceiver's built-

in speaker (there's an optional external unit available) was very good. The reports from other station on my transmitted audio (as I've already mentioned) were also good following the initial set-up process.

Incidentally, I found that the built-in speaker gave very reasonable results on broadcast band listening when I used the general coverage receive capabilities. This is not often the case with a communications receiver and to be quite honest I didn't feel the need for an external speaker for communications use.

Morse Mode

Most of my operating is in 'Morse Mode' although I like to have a chat on 'phone. And it was on c.w. that I found the 'auto' zero beat' function to be helpful. This provides a quick (very!) automatic zero beat to the incoming c.w. signal.

The auto zero-beat also takes into account the operator's preferred offset (beat note). And although I did find it useful I've no doubt that this ingenious facility will really come into its own for contest working.

Working The DX

Tuning up and down my favourite band (7MHz) I found that the impressively clear display made operating a relaxing time and I thoroughly enjoyed working the DX. The d.s.p. proved its worth by virtually eliminating the splatter from another European station who

(although beaming to New Zealand) was obviously firing a lot of r.f. at me - assuming he was beaming his 7MHz beam the other way of course!

I worked a string of ZLs on 7MHz and then a few West Coast American stations on phone and c.w. And by using a selection of setting combinations on the DSP Slope (high and low) control) was able to copy all the DX without difficulty. It was particularly helpful on c.w. because on this mode I often found myself literally 'buried' under signals as other European operators called the DX station.

The d.s.p. facilities really come into their own on 3.5MHz - and 'Top Band'. This is where I really found the interference reduction capabilities to be very helpful indeed in reducing line timebase interference from TV receivers, and the various high power (it's a problem down on the south coast) maritime signals which seem to spread or literally appear from nowhere on a previously quiet frequency.

At the times I operated, neither 21, 24 or 28MHz were offering any DX or worthwhile signals. However, 14 and 18MHz were busy and I had many QSOs on s.s.b. and c.w. on the bands.

There's a real challenge for any receiver to be met on 10MHz though. But the d.s.p. helped on this band - our narrowest allocation. I'm often

KENWOOD

The Kenwood TS-570D HF Transceiver

continued from page 49



Table 1 Sensitivity Specifications

Mode	From	To	Sensitivity
s.s.b., c.w., f.s.k. (@10dB S+N/N)	500kHz 1.705MHz 24.5MHz	1.705MHz 24.5MHz 30MHz	<4µV <0.2µV <1.3µV
f.m. (@12dB SINAD)	28MHz	30MHz	<0.25µV

Table 2 Selectivity Specifications

Mode	@-6dB	@-50dB	@-60dB
s.s.b., c.w., f.s.k.	2.2kHz		4.4kHz
a.m.	4kHz	20kHz	
f.m.	12kHz	25kHz	

KENWOOD

discouraged from working on this band...but with d.s.p. it becomes easier to 'winkle out' stations and have a good QSO on the occasions the band becomes busy.

To round off my comments on using the TS-570D 'on the air' I should emphasise that it's a very pleasant transceiver to use. The menu system, the memories the front panel controls and the general 'feel' of this transceiver makes me think that it will be very popular with the contest operator and anyone who likes to have prolonged operating sessions.

The built-in electronic keyer also proved its worth and I enjoyed using it. However, I was rather surprised that although the transceiver was equipped with d.s.p., an electronic keyer and many features to assist the

c.w. operator...the narrow c.w. filter comes as an extra.

Personally, I would prefer that Kenwood fit all necessary filters on the TS-570 and dispense with the built-in keyer. I say this because it's easier for me to select the keyer and system I prefer, whereas it's nowhere near as convenient to have to purchase and install an 'optional extra' filter.

Comparing Equipment

Normally I always try to avoid comparing equipment because I feel it can be very confusing to the reader. However, in this case I feel it's a very good idea because the TS-570D is being marketed to replace an existing model which was (and still is) very popular.

Looking in my log book 'notes' section I see that the most popular Kenwood rig (used by stations I've worked) is the Kenwood TS-850 and the TS-850SAI (with auto antenna tuner) closely followed by the TS-450. So, do I think the TS-570D is likely to prove attractive to anyone who owns a TS-450? In short the answer has got to be a 'Yes'.

The addition of the digital processing, larger memory capacity, an excellent main display (you've got to see it to appreciate the clarity) and good lay-out and simplicity of operation does make the TS-570D an

attractive proposition. However, personally I must say that I'd prefer manufacturers (when they've gone to the extent of offering d.s.p.) also make any other filters a standard fitting.

But on the other hand, Kenwood intend that this transceiver sells at a lower price - with the benefit of d.s.p. - than the model it replaces. So I suppose in the long run you have to be realistic and although I would like the c.w. filter fitted too...the d.s.p. would be the first choice!

With everything considered, if you can't afford the absolutely superb TS-870 (my 'dream machine!') the TS-570D will provide you with an excellent transceiver. And although the TS-870 requires some 'driving' (it really is an 'operator's rig' to provide its best, the new TS-570D is much easier to use from the word 'go'. And that's why I think many Kenwood enthusiasts will go straight to their dealers to try one for themselves. They won't be disappointed!

My thanks go to Kenwood UK Ltd. at Kenwood House, Dwight Road, Watford, Hertfordshire WD1 8EB, Tel: (01923) 816444, FAX: (01923) 819131, for the loan of the review model. The TS-570D is available from Kenwood dealers for a recommended price of £1499.95.

PW

Manufacturer's Specifications

General

Dimensions	270(w) x 96(h) x 270(d)mm
Weight	6.8kg (approx)
Power requirements	13.8V (Nominal) negative ground 2A on receive 20.5A transmit
Antenna impedance	50Ω nominal (16.7Ω - 150Ω with a.t.u.)
Frequency stability	within ± 10p.p.m. (room temperature) within ± 10p.p.m. (-10° C to 50° C)

Receiver

Frequency range	500kHz - 30MHz
RIT range	± 9.999kHz (reference the transmitter frequency)
Conversion type	Double conversion superhet (a.m./s.s.b./f.s.k./c.w.) Triple conversion superhet (f.m. only)
First i.f.	73.05MHz
Second i.f.	8.83MHz
Third i.f.	455kHz (f.m. only)
Sensitivity	See Table 1 (above)
Selectivity	See Table 2 (above)
Image rejection	>70dB (1.8 - 30MHz) >70dB (First i.f. when tuning 1.8-30MHz)
Squelch sensitivity	<20µV (500kHz - 1.705MHz on a.m./s.s.b./c.w./f.s.k.)

Audio output	<2µV (1.705 - 30MHz on a.m./s.s.b./c.w./f.s.k.) <0.25µV 28-30µV f.m. only) >1.5W (into 8Ω at 10% distortion)
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Transmitter

Modes	J3E (l.s.b./u.s.b.) A1A(c.w.), A3E/F3E (voice), F1D (f.s.k.)
Frequency range (MHz)	1.8 - 2.0 3.5 - 3.8 7.0-7.1 14.0 - 14.35 18.068-18.168 21.0-21.45
Output Power	24.89-24.99 28-29.7 5-100W (on s.s.b./c.w./f.s.k./f.m.) 5-25W (on a.m.)
Modulation	Balanced (s.s.b.), Reactance (f.m.), Low level (a.m.)
Spurious emissions	-50dB or less
Carrier suppression	40dB or more
Unwanted sideband suppression	40dB or more (at 1kHz modulating frequency)
Deviation (f.m.)	± 2.5kHz (narrow), ± 5kHz (wide)
XIT frequency	± 9.99kHz (transmitter offset tune)

BITS & BITES

Mike Richards G4WNC rounds-up the month's news and views from the computing world.

One of the benefits of running my readers offers is that I have been able to keep a very close eye on the price of good quality formatted disks. Whilst you can get unbranded disks very cheaply, I've found them to be very unpredictable and generally not worth the effort.

As a result, I only use branded disks. I've been using the office stationers **Staples** for some time now and their latest offer is unbelievable. They are currently offering AT&T branded, formatted HD IBM disks at £22.50 inclusive of VAT for a box of 100. This is extremely cheap!

Staples are also offering smaller packages at equally silly prices. If you need disks I would recommend you get down to your local branch of Staples.

Leicester Rally

It was great to see so many of you at the Leicester show this year. Thanks for making the effort to come and see me. The show didn't seem to be quite as busy as usual but this was probably because the Motor Show was also running at the NEC along with a Multi-Media Computer show.

I didn't spot any particularly stunning new applications at the Leicester show although there were some good software offers around. Windows '95 upgrades were available for £49 whilst the Capital Products stand had lots of bankrupt stock that was well worth a close look.

I did however, manage to pick-up a copy of Visual Basic 3 Professional for just £22. There were also a host of other Microsoft applications available at knock down prices.

SSTV Software

There seems to be lots of SSTV software about these days and the latest to get my attention is GSH-PC by **DL4SAW**. Like many of the new programs, this package has been designed solely for SSTV and so has not had to compromise on any of the facilities.

Although the GSH-PC program has been around for a while, the UK distribution for registered copies has just been taken over by **Pervisell**,

famous for their excellent Hamcomm/JVFX interfaces. **Phil Perkins** of Pervisell has kindly sent me a full, registered version for review.

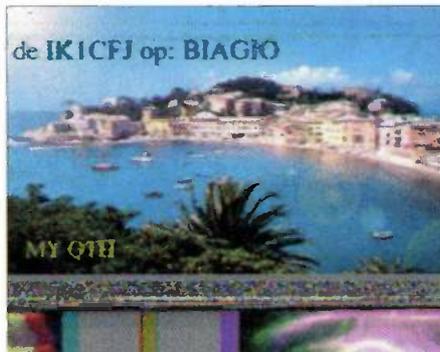
In its compressed, distribution format the GSH-PC program fits neatly on a single PC disk and self expands once copied to an appropriate directory. It takes full advantage of the VESA video format and so requires a 386 or better PC with a VESA graphics card that supports 640 x 480 VESA modes 15, 16 or 24 bits per pixel (VESA modes 272, 273, 274).

You will also need at least 1Mb of extended memory, though 4Mb is recommended. The interface with your rig is dead easy as it uses the standard comparator system and is fully compatible with existing Hamcomm/JVFX interfaces.

Because GSH-PC needs expanded RAM and likes a hefty chunk of conventional memory, I found I needed to make-up a boot disk to configure the PC for best operation. However, to be fair, I have to do this with most DOS based applications, (I really ought to tidy-up my config.sys and autoexec.bat files!).

Once the programs are up and running you're presented with a very smart graphical interface with 3-D control buttons and 2 main image screens. This was supplemented by a number of thumbnail frames where received images are temporarily stored as a reminder of what you've received.

There are all the usual options to save and view images and everything was available at the touch of a button. The image formats supported were bitmap and TIFF though it's only the INTEL variant of TIFF without LZW compression. There was also some good on-line help just in case you got stuck.



An SSTV picture received using GSH-PC version 2.1.

The transmission of test cards was made very easy with a whole range available for rapid loading into the transmit screen. You can also add your own text over the top of an existing image using the text edit mode.

On the receive side, GSH-PC has a couple of excellent tuning aids. You can either choose the oscilloscope or a bargraph type display.

The oscilloscope is fairly conventional and I found it to be particularly useful for helping to get the best from noisy signals. However, for most occasions the bargraph/spectrum analyser display was just the job.

The bargraph/spectrum analyser display was very clearly set out with markers for black, white and sync pulse. I was particularly impressed with the responsiveness of both displays.

Another well set-up aid was the slant correction that's used to adjust the PC's clock off-set. In this program you first receive an image with a slant and then align a marker with the slant. A press of the Return key calculates the offset and automatically stores the details for future reference.

If you want to try a copy or buy a registered version of GSH-PC, you need to contact **Pervisell Ltd.** at **8 Temple End, High Wycombe, Bucks HP13 5DR.** Tel: (01494) 443033. You can also visit their Web site at <http://www.pervisell.com> My thanks to Pervisell for the supply of the review copy.

That's all for this month so, until next time keep computing and keep those letters coming to me Mike Richards G4WNC at PO Box 1863, Ringwood, Hants BH24 3ZD. Internet mike.richards@dial.pipex.com or visit my Web page at <http://dialspace.dial.pipex.com/mike.richards/>

Special Offers

Those of you who've ordered any of the Special Offers recently may well have suffered rather long delays, I'm sorry for that but unfortunately demand has outstripped my ability to supply.

I've therefore been trying to find a better way to handle the offers. As a result I've managed to secure a very special offer with the **Public Domain and Shareware Library**, (PDSL).

The PDSL have put together a library set of all five disks for just £12 all inclusive. Using PDSL also makes ordering simpler as they accept all the usual credit cards so you can order by 'phone and don't even have to write a letter.

In future please direct all requests for this disk set to **PDSL, Winscombe House, Beacon Road, Crowborough, Sussex TN6 1UL.** Tel: (01892) 663298 and request library volume: H008739abcde.

The disk set consists of IBM PC Software (1.44Mb disks): Disk A - JVFX 7.0, HAMCOMM 3.1 and WXFAX 3.2; Disk B - DSP Starter plus Texas device selection software; Disk C - NuMorse 1.3; Disk D - UltraPak 4.0 and Disk E - Mscan 1.3 and 2.0.

I am still supplying my FactPacks, but am looking at better ways to do this, so watch this space!

Printed Literature

Beginners Utility Frequency List (Order Code **BL**)
Complex Signals Utility Frequency List (Order Code **AL**)
Decode Utility Frequency List (Order Code **DL**)
FactPack 1 Solving Computer Interference Problems (Order Code **FP1**)
FactPack 2 Decoding Accessories (Order Code **FP2**)
FactPack 3 Starting Utility Decoding (Order Code **FP3**)
FactPack 4 JVFX and HAMCOMM Primer (Order Code **FP4**)
FactPack 5 On the Air with JVFX and HAMCOMM (Order Code **FP5**)
FactPack 6 Internet Starter (Order Code **FP6**)

For the printed literature just send a self addressed sticky label plus 50p per item (£1.50 for four, £2.50 for seven and £3 for nine) to me at the address at the foot of the column.

END

BUYERS GUIDE

AMATEUR RADIO

Welcome to The Practical Wireless Amateur Radio Buyers Guide. This has been compiled from information supplied by the various manufacturer's specification sheets. It is only intended as guide as to what you can expect to find on the dealer's shelves and to help you decide which radio will suit your needs.

All the data given is correct, to the best of our knowledge, at the time of going to press. You are strongly advised to consult your local dealer before finally deciding on which radio to buy, as he will be able to demonstrate working models to you. Further information and full specification sheets are available from all approved dealers or direct from the manufacturers.

The PW Editorial team would like to thank Icom UK Ltd., Kenwood Electronics UK Ltd., Waters & Stanton Electronics and Yaesu UK Ltd. for their help in supplying the information needed to compile this new regular feature.

We hope you find the 'Buyers Guide' useful and would like to point out that many more radios will be added to the list in the near future.

	MODEL	COVERAGE	MODES	POWER OUT (W)	POWER SOURCE	CHARGER SUPPLIED	SIZE (HxWxD MM)	WEIGHT	MEMORIES	SPECIAL FACILITIES	RRP - Approx	REVIEWED IN PW	MODEL
HAND-HELDS	Alinco												
	DJ-G5	V, U	F	5, 3.5, 1	B	✓	138x57x275	350g	100	C,D,E	440.00	Sept 95	DJ-G5
	DJ-S41	U	F		B	x	100x55x288	185g	20	C,D	149.95	Nov 96	DJ-S41
	DJ-190	V	F	5, 3.5, 1.5	B, E	✓	151x57x27	300g	40	D	199.95	May 96	DJ-190
	DJ-191	V	F	5, 3.5, 1.5	B, E	✓	151x57x28	300g	40	-	249.95	Dec 95	DJ-191
	DJ-180	V	F	5, 2	B, E	✓	132x68x33	-	10	D,E	199.95	Feb 93	DJ-180
	Icom												
	IC-17E	V,U	F	4, 3	B, E	✓	122x57x29	320g	70	C,D	329.00	June 96	IC-17E
	IC-W31E	V, U	F	5, 7?	B, E	✓	125x57x31	340g	100	C,D	425.00	Oct 95	IC-W31E
	IC-2GXE	V	F	7, 2.5, 1	B, E	✓	125x57x35	380g	43	-	255.00		IC-2GXE
	Kenwood												
	TH-22E	V	F	5, 3, 2.5	B, E	x	116.5x56x24.5	290g	40	D	254.95	Mar 94	TH-22E
	TH-28E	V	F	5, 2.5, 0.2	B, E	x	115.8x49x37.8	330g	40	D	319.95	-	TH-28E
	TH-42E	U	F	5, 3, 2.5	B, E	x	116.5x56x24.5	290g	40	D	289.95	-	TH-42E
TH-48E	U	F	5, 2.5, 0.2	B, E	x	115.8x49x37.8	330g	40	D	369.95	-	TH-48E	
TH-79E	V, U	F	5, 3, 2.5	B, E	x	129.5x56x24.5	320g	80	AB,D,M	479.95	Dec 94	TH-79E	
Yaesu													
FT-10R	V	F	5, 2.8, 1, 0.1	B, E	x	57x99x30	325g	30	C,D,K	249.00	Nov 95	FT-10R	
FT-11R	V	F	5, 1.5	B, E	✓	102x57x25.5		150	E	299.00	-	FT-11R	
FT-23R	V	F	5	B, E	x	126x55x32		10	-	199.00	-	FT-23R	
FT-40R	U	F	5, 2.8, 1, 0.1	B, E	✓	57x99x30	325g	30	C,D,K	289.00	-	FT-40R	
FT-41R	U	F	5, 1.5	B, E	✓	102x57x25.5		150	E	369.00	-	FT-41R	
FT-50R	V, U	F	5, 2.8, 1, 0.1	B, E	✓	57x99x30	325g	112	C,D,E,K	339.00	Aug 96	FT-50R	
FT-51R	V, U	F	5, 1.5	B, E	✓	119x56x26		120	D,E	489.00	May 95	FT-51R	
FT-530	V, U	F	5, 3, 1.5, 0.5	B, E	✓	134x55x33		82	C,E	449.00	Apr 93	FT-530	
						BRACKET SUPPLIED							
MOBILE	Alinco												
	DR-MO6	H	F	10, 1	E	x	140x140x115	760g	100	C,D	339.95	Dec 94	DR-MO6
	DR-130	V	F	50, 5	E	x	40x140x155	860g	20	C,D	289.95	-	DR-130
	DR-150	V	F	50, 25, 10	E	x	40x140x129	800g	100	C,D,E	359.95	June 95	DR-150

Keys

Coverage

Frequencies listed are not 'true' bands, they are just an indication of the amateur bands that the set covers.

- L 100kHz - 30MHz
- H 30 - 50MHz
- T 50 - 52MHz or 70 - 70.5MHz
- V 144 - 145.995MHz
- U 430 - 439.995MHz
- S 1200 - 1300MHz

Modes

- A AM
- F FM
- S Sideband
- D Data

Power Source

- B Battery (in-built)
- E External 12V (13.8V) source
- M Mains (in-built)

Special Facilities

- A Antenna Tuning Unit built-in
- AB Automatic Band Change
- C CTCSS

- D Double Conversion Superhet
- D+ Triple Conversion Superhet
- D++ Quadruple Conversion Superhet
- E Extended Receive
- G General Coverage Receiver
- K Keypad Options
- M Dot Matrix Display
- P 9600bps Packet Operation without mods needed
- S Channel Scope
- T Theft Deterrent Front Panel
- * Includes one extra coverage band

	MODEL	COVERAGE	MODES	POWER OUT (W)	POWER SOURCE	BRACKET SUPPLIED	SIZE (HxWxD MM)	WEIGHT	MEMORIES	SPECIAL FACILITIES	RRP £approx	REVIEWED IN PW	MODEL	
MOBILE	DR-430	U	F	35, 5	E	x	40x140x155	860g	20	C,D	389.95	-	DR-430	
	DR-605	V,U	F	50, 35, 5	E	x	40x140x176	1100g	100	C,D,P	495.95	Oct 96	DR-605	
	DR-610	V,U	F	50, 10, 5	E	x	40x140x162	1100g	120	C,D,P,S	649.95	July 95	DR-610	
	Icom													
	IC-2000	V	F	10, 5	E	x	50x150x151	1200g	60	D	369.00	-	IC-2000	
	IC-2350H	V,U	F	50, 10, 5	E	x	40x140x204.5	1200g	110	D	495.00	-	IC-2350H	
	IC-281H	V	F	50, 10, 5	E	x	40x140x171	930g	60	D,P	399.00	-	IC-281H	
	IC-481H	V	F	35, 10, 5	E	x	40x140x171	930g	60	D	465.00	-	IC-481H	
	IC-2710H	V,U	F	50, 35, 10, 5	E	x	40x140x212.4	1400g	220	D	675.00	-	IC-2710H	
	Kenwood													
	TM-251E	V	F	50, 10, 5	E	x	40x140x160	1000g	40	C,D,E,P	419.95	June 94	TM-251E	
	TM-255E	V	F,S,D	40, 5	E	x	60x180x216	2700g	100	D,P	949.95	May 94	TM-255E	
	TM-455E	U	F,S,D	35, 5	E	x	60x180x216	2700g	100	D,P	949.95	-	TM-455E	
	TM-451E	U	F	35, 10, 5	E	x	40x140x160	1000g	40	C,D,E,P	459.95	-	TM-451E	
	TM-733E	V,U	F	50, 35, 10, 5	E	x	40x140x153	1200g	70	D,E,T	729.95	Sept 94	TM-733E	
	TM-742E	V,U,(H/S/T)	F	50, 35, 10, 5	E	x	50x150x175	1500g	100	AB,D,E	879.95	-	TM-742E	
	TS-50S	L,H	A,F,S,D	100, 25	E	x	60x179x233	2800g	100	D+	1059.95	June 93	TS-50S	
	Yaesu													
	FT-2200	V	F	50, 20, 5	E	✓	40x140x160	-	50	E	419.00	-	FT-2200	
	FT-290RII	V	F,S,D	2.5	E	x	57x150x194	-	-	-	599.00	Dec 81	FT-290RII	
FT-690RII	T	F,S,D	2.5	E	x	57x150x194	-	-	-	649.00	-	FT-690RII		
FT-790RII	U	F,S,D	2	E	x	57x150x194	-	-	-	749.00	-	FT-790RII		
FT-2500M	V	F	50, 25, 5	E	✓	50x60x180	-	31	C	399.00	Sept 94	FT-2500M		
FT-3000M	V	F	70, 50, 25, 10	E	✓	40x140x180	1250g	81	D,E	479.00	June 96	FT-3000M		
FT-7200	U	F	35, 15, 5	E	✓	40x140x160	-	50	-	559.00	-	FT-7200		
FT-7400H	U	F	35, 15, 5	E	✓	50x60x180	-	31	C	559.00	Sept 94	FT-7400H		
FT-8000R	V,U	F	50, 35, 10, 5	E	✓	40x140x152	1000g	110	D,E,P	549.00	-	FT-8000R		
FT-8500	V,U	F	50, 35, 10, 5	E	✓	40x140x155	-	110	E,P	749.00	Nov 95	FT-8500		
FT-5100	V,U	F	50, 35, 5	E	✓	40x140x155	-	94	C,E	679.00	May 93	FT-5100		
BASE STATIONS														
						PSU SUPPLIED								
	Alinco													
	DX-70	L,H,T	A,F,S,D	100, 40, 10, 4	E	x	58x178x230	2700g	100	D	895.95	Aug 95	DX-70	
	Icom													
	IC-706	L,H,T,V	A,F,S,D	100, 40, 10, 5, 4	E	x	58x167x200	2500g	102	D+,E,M,S	1195.00	Feb 96	IC-706	
	IC-728	L,H	A,F,S,D	100, 40, 10	E	x	94x241x239	4600g	26	D+,G	1089.00	-	IC-728	
	IC-736	L,H,T	A,F,S,D	100, 40, 5, 4	E	✓	111x330x285	10500g	101	A,D+	1969.00	-	IC-736	
	IC-775DSP	L,H	A,F,S,D	200, 50, 5	E	✓	150x424x390	16700g	-	A,D++	3699.00	-	IC-775DSP	
	Kenwood													
	TS-60s	T	A,F,S,D	90, 23	E	x	60x179x233	2900g	100	D+	999.95	-	TS-60s	
	TS-870s	L,H,T,V,U,S	A,F,S,D	100, 25	E	x	120x330x334	11000g	100	A,D++	2399.95	Dec 95	TS-870s	
	TS-950SDX	L,H,T,V,U,S	A,F,S,D	150, 40	E	x	141x402x400	23000g	100	A,D+	3999.95	-	TS-950SDX	
	Yaesu													
	FT-736R	V,U (T,S)	A,F,S,D	25, 10	E	✓	129x368x286	-	100	-	1699.00	June 88	FT-736R	
	FT-840	L,H	A,S,D	100, 25	E	x	93x238x243	-	100	C	959.00	Mar 94	FT-840	
	FT-990	L,H	A,F,S,D	100, 25	E	x	129x368x335	-	90	A	2199.00	Dec 91	FT-990	
	FT-1000	L,H	A,F,S,D	200, 50	E	x	150x420x375	-	100	A	3799.00	-	FT-1000	
	FT-1000MP	L,H	A,F,S,D	100, 50, 25	E	x	135x410x347	-	100	A,D++	2849.00	-	FT-1000MP	

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VHF REPORT

This month David Butler G4ASR takes a look at the variety of propagation modes that were observed recently on the v.h.f., u.h.f. and s.h.f. bands.

During the month of October a surprisingly high number of propagation modes were observed on the v.h.f., u.h.f. and microwave bands. These included aurora, sporadic-E (Sp-E), trans-equatorial propagation (t.e.p.), meteor scatter (m.s.), rain scatter and tropospheric enhancement (tropo).

At the end of the October there was also the international ARRL earth-moon-earth (e.m.e.) contest. Although not strictly a propagation mode it does involve a scattering medium, albeit 395,000 kilometres away!

Of course not all parts of the spectrum were similarly affected by the modes I've just mentioned. For example t.e.p. was only observed on the 50MHz band whereas rain scatter was only observed on the upper microwave bands.

Nevertheless there was sufficient variety to keep many v.h.f./u.h.f./s.h.f. enthusiasts very happy. It's just a pity that activity on some bands was fairly low because there were some very good DX contacts being made.

Now I'll take a look at the openings in more detail. One of the modes that occurs at the lower end of the v.h.f. frequency spectrum is auroral propagation. It's frequently observed on the 50 and 70MHz bands, although lack of serious DXers on this latter band means that many openings regrettably go unnoticed.

Openings on the 144MHz band are fairly common whilst those at 430MHz are encountered only during larger events. Three auroral openings on the 50MHz band were noticed in central and northern England on October 19, 22 and 23.

All were small scale events and connected to solar activity associated with the previous solar rotation. Virtually no amateur activity was detected although all events did reach the 144MHz band, albeit only with reception reports of the SK4MPI beacon.

Sporadic-E Openings

One of the propagation modes that did generate some activity during October was Sp-E. Openings on the

50MHz band were reported in the UK on October 5, 13, 14, 15, 16, 20, 21, 22 and 23.

Virtually all openings were with countries to the south-east of the UK. For example, between 1000-

during this period. These openings however were very much weaker in terms of intensity and duration compared to those over the south-easterly path.

The Sp-E openings on the



Fig. 1: The e.m.e. antennas for the 144 and 430MHz bands at the QTH of JA4BLC.

1330UTC on October 5, contacts were made with stations located in CT, EH and YU.

A further eight days of openings between October 13-16 and 20-23 produced contacts with stations in CT, EH, F, HB9, I, OE, S5, Y0, YU and 9H. There were also reports of contacts being made with stations to the north-east (ES, LA, OH, OZ, SM)

50MHz band were unusually late in the season, possibly nature's way of making up for the very poor conditions experienced during the summer! At times during October the maximum usable frequency (m.u.f.) almost reached the 70MHz band.

According to DL8EBW the m.u.f. was around 67MHz on October 13 and 14 in the EA/CT direction. On

October 20 at 0830UTC the m.u.f. was in excess of 90MHz in the LZ/YO direction and at 0934UTC the station of DL8EBW heard LZ2FR on the s.s.b. calling frequency 144.300MHz.

Another LZ1 station was heard on c.w. but signals faded out before contact could be made. The m.u.f. bounced around the 90MHz mark all morning of the 20th reaching the 144MHz band again between 1000-1015UTC. At that time the station of LZ1QI reported working a number of Belgian stations.

In central England, operators of the 50MHz band were reporting contacts with S52R, Y07VJ, Z32MA and many Italian stations between 0930-1020UTC. Did you hear any unusual activity on the 144MHz band during this period?

Trans-Equatorial Propagation

Last time I reported that a number of stations throughout England had noted the return of trans-equatorial propagation (t.e.p.) on the 50MHz band. This propagation mode allows contacts to be made across the geomagnetic equator (hence trans-equatorial) with countries situated within southern Africa.

Theoretically many countries are workable from the UK, for example Botswana (A2), Malawi (7Q7), Namibia (V51- previously ZS3), Zambia (9J) and Zimbabwe (Z2). However, it very much depends on the resident amateur activity and beacon availability.

Both V51, Z2 and 7Q7 have operational beacons (V51VHF on 50.018, Z21SIX on 50.052, and 7Q7SIX on 50.003MHz). As reported last month the V51VHF and 7Q7SIX beacons were heard in the UK on September 28 and 29. Amateur activity in these two countries is very low but at least they have more than one active 50MHz operator.

Look out for V51DM, V51E, 7Q7JL and 7Q7RM. Unfortunately in other countries the only active stations are those of A22BW, Z23JO and 9J2CR. On October 16 between 1545-1645UTC the V51VHF beacon (JG87) was heard by G7EXO and G4RGK, both in locator square IO91 and by GOPQO in IO92.

The station of G7EXO also

reported hearing 9H5ET (JM75) at the same time indicating that the t.e.p. path was being extended into the UK via Sp-E propagation. I mentioned last time that this is perfectly normal and that a two-mode path occurs relatively frequently.

On reflection I should have mentioned that in my opinion this normally refers to the period around solar minimum. At other periods, in the years either side of solar maximum, the first hop from the UK (towards the main t.e.p. zone) could well be sustained by F-layer propagation. It's also a possibility that at solar maximum the northern t.e.p. zone may well extend north as far as central England. The need for an additional propagation mode (such as Sp-E or F-layer) to get into the t.e.p. active region is therefore not required.

I also mentioned last month that the t.e.p. season is accepted to occur between September/November and February/April. The recent openings in the UK on September 28-29 and October 16 tend to confirm this.

Incidentally if, like me, you want to predict when these openings might occur it's worth noting that the last recorded opening in the UK was on 24 October 1993. So, there has been a two-year gap (1994-1995) with no t.e.p. activity reported in the UK.

The autumnal openings in 1993 occurred on October 14 (to A22BW, Z23JO, ZS6WB and 7Q7RM) and October 24 (to 7Q7JL and 7Q7RM). Earlier that year (1993), the spring openings occurred on March 16 (7Q7) and March 25 (V5 and ZS6).

Openings in the previous year, 1992, were much better with two openings in September (V51 and 7Q7) and five in October (A2, V5, ZS5, ZS6, ZS9 and 7Q7). Even better propagation was recorded during the spring equinox period with eight openings recorded in March and three in April 1992.

So, based on this (very short) reporting period it could be deduced that there might be two or three t.e.p. openings around March 1997 and even more (possibly four or five) later in the year around October. Well you can't say I didn't warn you!

Other Modes

Now I'll continue with reports of other propagation modes. A number of diffuse meteor streams were encountered during October, the best of these being the Orionids shower.

The earth passed through the Orionids shower between October 16-27, with maximum activity being noted on October 21. Very little activity was noted on the 50MHz band. This is a shame because some good results can be obtained even with low power and a small antenna.

Many years ago I ran a series of meteor scatter tests with LA6QBA on both the 50 and 144MHz bands.

These tests were always scheduled outside of shower periods and relied on random meteors, early in the morning.

Running 8W of s.s.b. into a 5-element F9FT Yagi on the 50MHz band I could generally complete a contact within 15-20 minutes. However, on the 144MHz band, running 150W of c.w. into an 18-element Cushcraft Yagi, the schedules would take up to one hour or more to complete.

The simple example quoted shows how easy it is to make m.s. contacts on the 50MHz band. My personal choice however, is to make schedules or carry out random operation on the 144MHz band. There are undoubtedly more DX'ers interested in making schedules on this band than all the others put together.

Among those making m.s. contacts on the 144MHz band during the Orionids shower were G4RKV (JO01) who contacted I8TWK/8 (JM79) some 1720km away and G0FIG (IO90) who worked ES2RJ (KO29) over a path in excess of 1900km.

Rain Scatter

A propagation mode that very few operators encounter is rain scatter. That is unless you happen to be a microwave operator! Heavy rain between two microwave stations will almost always attenuate signals by many tens of dBs. That's because large numbers of rain drops can act as a reflector to s.h.f. signals.

However, if the rain storm is located away from the line of sight path then both operators can beam at the 'reflector' and make a contact via rain scatter. Interestingly, many fixed station 10GHz operators find they can often work greater distances during intense rain storms rather than trying on a calm summer day.

The rain cloud effectively becomes a 'metallic mirror' in the sky and can enhance signals by 30dB or more. The only problem is locating the specific rain storm that acts as a reflector to microwave signals and communicating that fact to other operators, maybe up to 800km away.

Recent contacts made by Sam Jewell G4DDK (JO02) via rain scatter on the 10GHz band include PA0CIS and DF7JS. A contact was also made with DL3YEE over a path length of 540km.

Deadlines

That's enough of me for this time. Thank you to everyone that has written in to the column with news and photographs. It's very much appreciated.

It therefore only leaves me to wish you a very 'Happy Christmas' and hope that 1997 is yet another year full of DX on the v.h.f. bands.

As usual please send any news, comments, photographs for your column or entries for the all-band tables to me (by the end of the month) at Yew Tree Cottage, Lower Maescoed, Herefordshire HR2 0HP. You can also forward material to me via packet radio @ GB7MAD, the UK DX Cluster @ GB7DXC or E-mail via davebu@mdlhr1.igw.bt.co.uk Alternatively you can telephone me on (01873) 860679.

Signals peaked 56RS (the 'RS' is the convention used to indicate rain scatter. It's similar to sending 56A to indicate an auroral contact).

Interestingly because of the relative motion of the rain storm there is a pronounced doppler shift on received signals. On the 10GHz band c.w. signals can spread more than 1kHz making the signals sound auroral.

Autumnal Lifts

It's generally recognised that the best tropo enhancements are often observed during the months of October and November. These autumnal 'lift' in conditions normally occur when mist or fog are present and high pressure extends from the UK for hundreds of kilometres into Europe.

True to form such conditions existed on a number of days during October allowing many operators to make some long distance contacts. For example, the station of G4FUF (JO01) reported hearing HB9AMH/P (JN37) peaking 579 on October 22.

Simon Freeman G3LQR (JO02) also made some good contacts, working HB9MIO/P (JN37) over a distance of some 700km and DL4VCG (JN39) at 550km. The station of G4ODK had similar success contacting DJ6JJ at 430km and F6DKW over a 360km path.

Did I forget to mention I was reporting activity on the 10GHz band! Yes, that's right, 10,000MHz! Milliwatts of r.f. and 60mm dishes. So, just imagine what was being worked on lower frequencies.

Probably the best period for lift conditions occurred in the three days between October 22-24. The build up to the openings was predictable and as usual it was the u.h.f. and s.h.f. operators that capitalised on the tropo enhancements.

On the 1.3GHz band, operators as far north as locator square IO93 were making contacts into Germany, Switzerland, southern France and Spain. John Quarby G3XDY (JO02) reported making many s.s.b. contacts including QSO's with DK2LR (JN57) at 910km and HB9SNR (JN36) at 800km.

John also worked F/G8MBI (JN04) over a 890km path and EA2LP (IN93) at 1013km. Not bad for an s.h.f. band.

It was a similar state of affairs on the 430MHz band with much traffic being noted on the DX

Clusters. Among the more distant stations being worked from the UK were EA1BLA (IN53), EA2AWO (IN93), EA3YX (JN11), HB9AMH/P (JN37) and IK1MTZ (JN35).

German stations, both to the south of the country (JN48, JN58) and to the east, (JO50, JO51) were putting in rock crushing signals for much of the period.

Ralph Sachs G2CZS (JO01) mentions that having missed out on the Sp-E openings earlier in the summer he is happy to report some OX on the 144MHz band at long last. In addition to many s.s.b. contacts with stations in F and DL he also worked LX1JA (JN29), HB9RDE (JN37) and HB9WNA (JN37). According to Ralph the Swiss stations were 'end-stopping' at his QTH.

Earth-Moon-Earth

The last 'mode' I'll look at this month is that involved with earth-moon-earth (e.m.e.) communication. The principal behind this is relatively simple.

Create as much power as you can, point your group of Yagis at the moon and attempt to bounce your signal off the lunar surface to someone on the other side of the world. In practice it's a little more complicated than this!

Conditions during the ARRL contest on October 26-27 were quite good. The geomagnetic activity was low which meant that there was insignificant absorption to v.h.f. signals.

Activity was good on all bands, most operation taking place on the 144, 430 and 1296MHz bands. Stations of note being worked from the UK included JA4BLC (Fig. 1) and KL7X on the 144MHz band and HP3XUX and PY5ZBU on the 430MHz band.

Activity Table

Just another reminder for you that I will be running an activity table during the 1997 period. Entries can be for any v.h.f., u.h.f. or s.h.f. band and for any mode.

Although intended for terrestrial communications I'm not averse to the idea of satellite contacts being included (as long as they are entered as a separate listing). To enter you only need send details of the number of counties, locator squares and countries worked on each band.

END

SCENE USA

This time Ed Taylor WT3U, explains how to get a reciprocal licence for Canada, he also continues with his look at the US licensing system.

Canadian Reciprocal Licence

Before anyone tells me, I know that Canada is **not** part of the United States, and that this column is called 'Scene USA'. However, that won't stop me mentioning Canada occasionally! I explained last time (October 1996) how to get a reciprocal permit for the USA and I would now like to do the same for visits north of the border.

For reciprocal operation in Canada you need a form called an 'Application to Operate an Amateur Radio Station in Canada' see Fig. 1. This is very straightforward and it reflects the laid-back attitude Canada has towards regulation of amateur radio.

The Canadian national society, **Radio Amateurs of Canada**, can supply copies of the form. They can be contacted at **720 Belfast Road, Suite 217, Ottawa, Ontario K1G 0Z5, Canada. Tel: (from the UK): 001 613 244 4367**. If you have access to the Internet, everything you need is available at <http://www.rac.ca>

When you have completed the form, send it to the address corresponding to the proposed location of your operation in Canada, as shown on the second page of the paperwork. Use airmail, allowing plenty of time.

Your callsign once you are in

Canada will be (for example) **VE3/GOQLF**. The VE3 is the prefix for the call area you are operating in, and GOQLF is your home callsign.

To find out the correct prefixes for the various areas, see Fig. 2. As you would expect, if you hold a Class B licence in the UK, you must not operate below 30MHz.

David GMOODW, wrote to say that he was made to feel at home on his trip to Alberta and British Columbia. His first contact was with **VE6OF**, who advised him of routes to drive across the Rocky Mountains, and was very hospitable.

When approaching a new town, David talked to local 'hams' who gave him information on Motel accommodation, which was very useful. Then he joined a Net in Vancouver which was welcoming visitors to the area. "A nice touch!" he says. I'm sure you'll receive similar hospitality when you make your own visit to Canada.

Licence Examinations US Style

In last April's 'Scene USA' I gave examples of some of the questions a prospective amateur would encounter when taking the Novice and Technician examinations. Look at the April '96 copy of *Practical Wireless* if you have it, for background on the testing and

'Volunteer Examiner' system. Let's have a look now at questions for the General, Advanced and Extra Licences. As well as all of the v.h.f. and u.h.f. allocation, the three higher levels of General, Advanced and Extra Licences allow access to ever-greater sections of the h.f. spectrum. Remember that there are six



Ed WT3U at his workbench.

- (b) 50:1
(c) 1:5
(d) 5:1

2: What sidebands are generated by a double-sideband 'phone transmitter with a 7250kHz carrier when it is modulated less than 100% by an 800Hz pure sine wave?

- (a) 7250.8kHz and 7251.6kHz
(b) 7250.0kHz and 7250.8kHz
(c) 7249.2kHz and 7250.8kHz
(d) 7248.4kHz and 7249.2kHz

categories of US licence, and each must be obtained before going on to the next. In addition, there is a Morse test at 13 words per minute

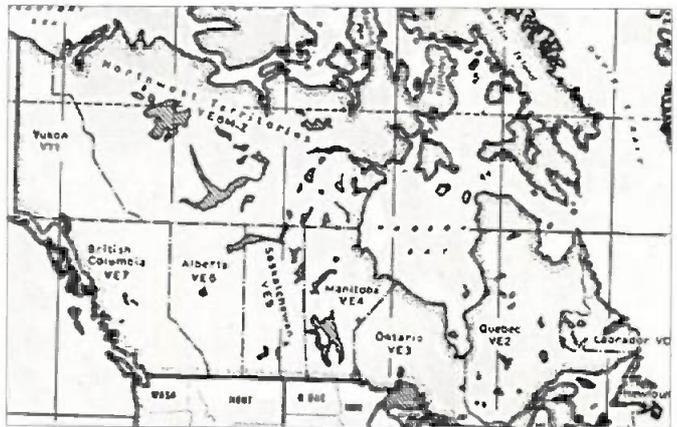


Fig. 2: Map showing Canadian call areas, which are determined by the province you're operating in.

(w.p.m.), rising to 20w.p.m. for the Extra class.

The General Licence is the most popular, although it is being overtaken by Technician ('No-Code', v.h.f. and u.h.f., similar to our Class B). Every h.f. band is available to a General Class licensee, but certain useful sections are reserved for higher licence categories.

General Practice

The General examination contains 25 questions and a pass requires 19 correct answers. Here are some questions representative of the level of ability required.

1: What will be the standing wave ratio when a 50Ω feed line is connected to a resonant antenna having a 10Ω feed point impedance?
(a) 2:1

3: What is the total bandwidth of an f.m. phone transmission having a 5kHz deviation and a 3kHz modulating frequency?

- (a) 3kHz
(b) 5kHz
(c) 8kHz
(d) 16kHz

4: A signal report is '20dB over S9'. If the transmitter power is reduced from 1500W to 15W, what should be the new signal report?

- (a) S5
(b) S7
(c) S9
(d) S9 plus 10dB

How did you get on? I found myself wondering if an intelligent guesser would be able to pass, then decided it would be difficult! Question 3 sent me scurrying to a text book and question 4 made me reflect on why

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Applicant's Name	_____
Address	_____
Amateur Radio Call Sign	_____
Arrival Date in Canada	Departure Date from Canada
Address in Canada	_____
I, the undersigned amateur radio licensee, request a permit for operation of an amateur radio station in Canada. I understand that if a permit is granted, my operation of an amateur radio station must be in accordance with Canadian rules and regulations and the terms and conditions of the amateur licence issued by my government.	
Enclosed are:	
1. A copy of operator's licence.	
2. A copy of station licence, if issued separately.	
Date	_____
Signature	_____

Fig. 1: This form is used to apply for a Canadian reciprocal licence.

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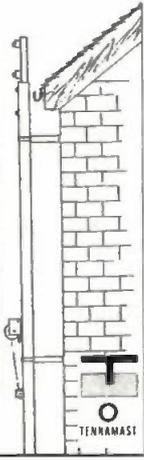
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5: Only one problem per letter please.

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some people over-use high power! Here are the answers: 1: (d), 2: (c), 3: (d), 4: (c).

In April's 'Scene USA' I was a little bit hard on the Novice and Technician examinations. The main problem is that the standard is not really commensurate with the ability to go straight out and use a kilowatt amplifier, fortunately this is not what most American amateurs do!

I am much happier with the level in the General examination. The breadth of knowledge is quite large, although the depth is relatively superficial. This seems fine to me, after all, we are testing for a hobby, not a postgraduate degree.

It's interesting to note the lack of diagrams in the exam questions. The General syllabus could be criticised for being too theoretical.

Advanced Level Licence

The Advanced Licence is designed to appeal particularly to h.f. s.s.b. operators. It allows operation in the 'phone bands anywhere except for three 25kHz slices on 80m, 20m and 15m (which are reserved for Extra class). Since there are no additional c.w. privileges associated with Advanced Class, a c.w. operator is likely to view this as a stepping stone to the Extra Licence.

The Advanced examination has 50 questions and 37 must be answered correctly to pass. Here are some examples:

5: What is the purpose of D1 in the circuit shown in Fig. 3?

- (a) Line voltage stabilization
- (b) Voltage reference
- (c) Peak clipping
- (d) Hum filtering

6: In Fig. 4, what values of V2 and R3 result in the same voltage and current characteristics as when V1 is 10V, R1 is 20k Ω , and R2 is 10k Ω ?

- (a) R3 = 30k Ω and V2 = 10V
- (b) R3 = 6.67k Ω and V2 = 10V
- (c) R3 = 6.67k Ω and V2 = 3.33V
- (d) R3 = 30k Ω and V2 = 3.33V

7: What is the Q of the circuit in Fig. 5, when the resonant frequency is 3.625MHz, the inductance is 3 μ H and the resistance is 2,200 Ω ?

- (a) 0.031
- (b) 32.2
- (c) 31.1
- (d) 25.6

There are plenty more interesting questions where those came from! Did you have trouble with number 6? This tests Thevenin's theorem, which is useful for analysing complex circuits. Here are the answers: 5: (b), 6: (c), 7: (b).

The Advanced exam is perhaps more difficult than the others, since it has more questions and covers quite a bit of material. There is no time limit, as with all the US licensing exams.

I would say that the syllabus

encompasses more subjects than the UK's Radio Amateur's Examination (RAE), but there is also a certain amount of overlap.

Extra Class

The Extra Class Licence allows access to all frequencies and modes. The keen DXer or contester will study diligently to get this licence, and with it, the coveted 25kHz slices at the bottom end of h.f. c.w. and 'phone bands.

My judgment is that the Extra Class exam is not really any harder than the Advanced exam, but there are plenty of additional topics. Of course, many amateurs have trouble with the 20 w.p.m. morse test as well.

There are 40 questions in the Extra Class exam and a candidate needs 30 right to pass. Here are some sample questions:

8: What frequency range will be covered by the circuit in Fig. 6, when L is 10 μ H, C1 is 156pF and C2 is 50pF maximum and 2pF minimum?

- (a) 3508 through 4004kHz
- (b) 6998 through 7360kHz
- (c) 13.396 through 14.402MHz
- (d) 49.998 through 54.101MHz

9: How long does it take for an initial charge of 20V DC to decrease to 7.36V DC in a 0.01 μ F capacitor when a 2M Ω resistor is connected across it?

- (a) 12.64seconds
- (b) 0.02seconds
- (c) 1second
- (d) 7.98seconds

10: What voltage gain can be expected from the circuit in Fig. 7 when R1 is 10 Ω and Rf is 47k Ω ?

- (a) 0.00021
- (b) 9400
- (c) 4700
- (d) 2350

Here are the answers: 8: (a), 9: (b), 10: (c). The Extra syllabus requires understanding of many other subjects, including licence regulations in some detail, as well as the examination system itself, satellites, moon-bounce, logic circuits, the Smith Chart, active circuit components, modulation and more advanced antenna theory.

Exam Wrap-Up

That 'wraps-up' my perusal of the US licence examinations. Obviously, I have only been able to look at things in overview.

My opinion of the American licence system is that it works very well, and covers a lot of ground. A beginner starting from scratch would have to work hard to get an Extra Class licence. But nothing's perfect, and I would like to see more emphasis on practical matters, including antennas and operating.

The sample questions above came from the excellent ARRL manuals, one manual is available for each class of licence. Even if you didn't want a US licence, you would learn some very useful things. Call the ARRL mail-order department, telephone (from the UK): 001 860 594 0200.

Morse Endeavour

The July 1996 'Scene USA' about Samuel Morse continues to attract your correspondence. Jim W6CF, wonders why I made no mention of Alfred Vail, Morse's partner in their Wireless Telegraph business.

Jim says: "After all Alfred Vail, did invent the key, the sounder, was responsible for virtually all of Morse's mechanical and electrical improvements (other than the relay) once they became partners. And there is even reason to believe (although not iron-clad proof) that it was Vail himself who set the ball rolling on Morse code. Some day I do hope Vail gets his just due. Even Morse wished as much shortly before he died".

Yes, Jim, there is some argument about who actually invented the various innovations attributed to Morse. Sources are not clear on the subject, and Vail was obviously a leading inventor as well as Morse. Thank you for your contribution to this fascinating discussion!

That's all for this time. In the next 'Scene USA' in the April PWI'll be interviewing the President of the US national society, the ARRL. He has some interesting things to say about the future of amateur radio in America and world-wide.

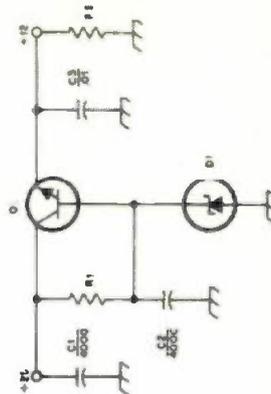


Fig. 3.

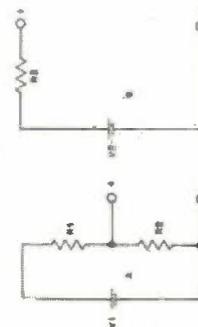


Fig. 4.

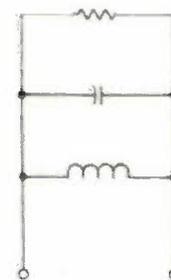


Fig. 5.



Fig. 6.

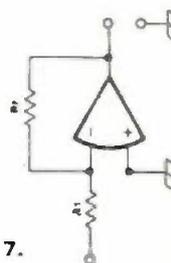


Fig. 7.

73, keep writing to me Ed Taylor WT3U, PO Box 261304, Denver, Colorado 80226, USA or E-mail me at 102662.2222@compuserve.com The deadline for April is the middle of January.

END

HF FAR & WIDE

Leighton Smart provides his monthly report on what YOU have been up to on the h.f. bands.

I'm writing this month's column in late October, and the dark autumn nights have finally arrived, heralding an increase in DX traffic on the lower bands. Unfortunately, the weather has also taken a 'darker' turn - last night saw some of the worst storms we've had here in Wales since the 'big' one in 1987.

As a result, my one and only antenna (the 80m long wire) was cast adrift, so to speak, and ended up tangled around neighbours sheds, washing lines, garden fences, etc.! Oops! Time to 'go and have a little chat' I think! Afterwards I'll have to consider putting up a spare antenna or two as well!

Nevertheless, I have no doubt that many of us will be welcoming the winter season. Not for the weather of course, but for the hoped for upturn in F2 propagation on the higher bands like 14, 21 and maybe even 28MHz. (Don Mclean G3NOF has reported 28MHz openings to Africa of late).

Certainly, 1.8, 3.5 and 7MHz will have shown a marked increase in DX compared to the summer months by the time you read this. So let's hope the higher bands become more reliable too.

Mind you, the thought of a warm, cosy shack at this time of the year away from the cold blustery winter conditions is attractive. And this must surely mean that this is the time of year when more and more amateurs are on the air, and as a result, there's more to work!

News & Snippets

I received a short note from s.w.l. reporter Len Stockwell of Grays, Essex, who has informed me that he has now passed the RAE, and will be active on the air soon. Well done Len, keep up the good work!

Secondly, I also received a query from Walter Farrar G3ESP who says "I don't believe it! Yesterday and

today (27/28 Sept) on 3.5615MHz c.w. at dusk I heard "CP1MS de L9CC" repeated ad nauseam, without the sender even stopping to listen! Surely it can't be Argentina calling Bolivia"?

Walter asks "Do you or any readers have any ideas on this?"

Well...it's a bit of a puzzle this one Walter, although it's possible that it could have been a commercial or Government (Fixed or Maritime Mobile) c.w. station judging by the 'L9' call sign. Normally they call a particular station and give a separate receive frequency. However, perhaps other readers may have an answer. Any ideas anyone?

Finally,

some really spectacular stuff.

In his propagation report, Mike says that "Around the 7th of October, the K index went to zero - this means that polar absorption due to the sun's radiation is very low, and the ionosphere becomes very stable".

The result was a really good opening across the polar region to Alaska and the west coast of the USA. At one point I heard no less than seven Alaskan stations on 1.8MHz at the same time - a rare occurrence on this band"!

Mike's list shows c.w. contacts with

Editorial note: now that Mike's a 'new' Dad...he's given up sleeping to keep his baby daughter company in the 'wee small' hours. Rumour has it that he's already teaching her Morse!

The 3.5MHz Band

Down to Skewen in West Glamorgan now, and Carl Mason GW0VSW. He's been bashing away at the key again.

Carl's 3.5MHz c.w. list, at around 90W output into a simple dipole antenna includes contacts with VE1UA (Canada) at 2326UTC, and HA6GT (Hungary) at midnight.

For his report Ted Trowell G2HKU on the Isle of Sheppey in Kent confirms 70W c.w. contacts with RA2FJ/MM in the North Sea, plus HB0/HB9NL in the Principality of Liechtenstein, both at around 0500UTC.

Not to be outdone, Don Mclean G3NOF in Yeovil offers a solitary s.s.b. contact on the 3.5MHz band, in the shape of OY3JE in the Faroe Islands.

The 7MHz Band

Now 7MHz is definitely one band which gets overcrowded during the winter months! Love it or hate it, '40' is a great DX band, although my preference is for c.w. here, due to its restricted bandwidth. Nevertheless, if you want to increase your country score, this is one place you might just like to try - if you've never tried it before now, that is!

'Forty' is certainly a favourite of Charlie Blake M0AIJ in Milton Keynes. And although suffering from local noise on the band in the early morning, he still digs out the DX.

Charlie has made his first h.f. contact with Greta HB9ARC, who has received many s.w.l. QSLs from Charlie in the past. "Was she surprised!" says Charlie.

Charlie has been operating the



Charlie Blake M0AIJ reports many hours of listening on the 7MHz band using an NRD 525.

here's a 'stop press' item received at the PW office from Brian Alderson G3KJX. Brian will be operating on all; the h.f. bands from Portugal as CT1/G3KJX from the 8th of December to 19th January 1997. Enjoy the sun and your operating Brian!

Your Reports

Straight into your reports now, starting with a 'hefty' 1.8MHz report from Mike Devereux G3SED of Southampton, whose list includes

EM1KA (Antarctica) at 0136, 3V8BB (Tunisia) at 2242, 9K2MU (Kuwait) at 2345, 5X1D (Uganda) at 2242, 5N0MVE (Nigeria) at 2256, and literally scores of US stations. He also included RX10X/FJL (Franz Josef Land) at 2301, AA0RS (Colorado, USA) at 0523, ZD8Z (Ascension Island) at 2301, and S92SS (Sao Tome & Principe Islands) at 0458UTC.

Meanwhile, G3SED's s.s.b. (yes, they do use s.s.b. for DX on this band!) included XQ8ABF (Chile) at 0240, ZL2JR (New Zealand) at 0620, plus N4MXJ and KA3RKW (USA) at around 0500. Which makes me wonder Mike, when do you actually get to go to sleep eh?????!

Milton Keynes ARC station as there are strict local planning laws where he lives. But he says that their GB2BP special event station in aid of the 'Children In Need' appeal was a success.

For now, the new M0AIJ's s.w.l. report indicates s.s.b. reception of ZL4BD (New Zealand) working I0SNY in Italy at 0504, and YV50GV (Venezuela) in contact with IN3ZNR (Italy) at 0546UTC.

Charlie also logged VR6PAC (Pitcairn Island) working I5YSZ (Italy) at 0600, LU8KDI (Argentina) in contact with YO2LDR (Romania) at 0502. There was also TI2OHL (Costa Rica) working F6EZR (France) at 0633, TY1IJ (Benin) in contact with I0SNY in Italy at 0521, TG9AOP (Guatemala) working F5LTT at 0700, and HK4UT (Colombia) working F8ZW (France) at 0628UTC.

Ted G2HKU hooked up with ZF8BS (Cayman Islands) at 0500, and FM/PA3BBP (Martinique Island), CO2VG (Cuba), and CN8BK (Morocco) at around 1800UTC.

Don G3NOF has been having a go at 7MHz too, listing s.s.b. contacts with KC1XX (USA), LP7N (Argentina), VE9MY (Canada), ZW5B (Brazil), 3V8BB (Tunisia) and 5A1A in Libya.

Carl GW0VSW, again on the key has worked AD4IL (USA) at 2327, 9H3WM (Malta) at 2341UTC. And at midnight he worked RX3QFM (Russia).

The 10MHz Band

The 10MHz allocation is our narrowest h.f. band. But although it's just 50kHz wide, it still throws up a few surprises.

Ted G2HKU for instance, always a c.w. man, reached out to ZL4SEA (New Zealand) at 0700, with 9H3WM (Malta) and EA8CN (Canary Islands) at around 2100UTC.

Carl GW0VSW lists contacts with J79BP (Dominica) at midnight, N4BV (USA) at 2126, J590N (Guinea - Bissau) at 0729 (QSL via DJ90N). He also worked EA6/DK4KL (Balearic Islands) at 1840UTC.

The 14MHz Band

I'll start the 14MHz band report this month with Don Maclean G3NOF. And as usual he provides his regular h.f. propagation report.

Don says that "14MHz has been the best h.f. band again. In the mornings around 0800UTC there were openings to Japan and Australia on the short path. But the best time on the band was around 1500, with good signals from north America. African stations were

heard between 1600 and 1900UTC with excellent signals".

Don's 14MHz log includes s.s.b. contacts with A61AN (United Arab Emirates), SU3YM (Egypt) QSL via Box 545 Port Said, 42111, Egypt. He also reports VK4UA (Australia), A45/H5ANX (Sultanate of Oman), VQ9WM (Chagos Island), ZV0MB (QSL to PT1GTI), 9K2MG (Kuwait), 7X5JF (Algeria), XE1YQR (Mexico), and CP6UA (Bolivia).

Back to Ted G2HKU now, whose c.w. worked a treat here on 14MHz, hooking up with 7Z50D (Saudi Arabia). He also logged SV0/G0KBD (Aegian Island), ZB2/DL5JAN (Gibraltar), and FY5YE (French Guiana), all at around 1500UTC.

Meanwhile, Carl GW0VSW has listed his 14MHz s.s.b. contacts with SU3AM (Egypt) at 0800, J38B0 (Grenada) at 1100, and JY9QJ (Jordan) at 0600. His c.w. on this band reached out to CN8GB (near Casablanca, Morocco) at 1733UTC, and 9A800S celebrating 800 years of Osijek, Croatia.

The 18 & 21MHz Bands

A huge 18MHz log came this month from Don G3NOF. But unfortunately (because of lack of space) there's just a small selection included here.

Using s.s.b. as usual, Don logged contacts with A29GD (Botswana), FG5HR (Guadeloupe), J38B0 (Grenada) QSL via DL7B0, S92SS (Sao Tome & Principe Islands). He also reported 5N0MVE (Nigeria) QSL to DN7LX, 5H3ES (Tanzania) and Z21CS (Zimbabwe).

Still on 18MHz, it's Carl GW0VSW's turn and he reports working XE3AJM (Mexico) at 1751, 9Q5MRC (Zaire) at 1800, QSL to G3MRC, and 9H3WD (Malta) at 1826UTC.

Moving up to 21MHz, Eric Masters G0KRT in Surrey is back in college, so has little time for radio these days. However, he did squeeze in a contact or two on 21MHz with EG2NS at 1530, and EC5CLN (Spain) at 1542UTC.

Good luck with your studies Eric!

The 28MHz Band

Finally, proof that 28MHz is not dead yet! Don G3NOF has worked CX7BF (Uruguay) and ZW5B (Brazil) here of late, both on s.s.b.

Let's hope it's a sign of things to come eh? I've no doubt that more reports will be coming through soon.

Regular Reports

We've got a really good 'team' of

regular reporters sending information in for 'HF Far & Wide' and many readers appreciate it. But, I thought it would be a good idea to remind everyone (especially as this is the first issue of the new year!) how we're trying to help everyone get the very best results on h.f.

So, to help us all can you please make sure that you include in your reports the following information: Time, date, frequency, antenna type (and where you were beaming if appropriate), your mode and power levels. And of course everyone will be very interested to read what equipment you're using.

While on the subject of equipment, I hear from the Editor - G3XFD - that several listeners have written in to say they're too embarrassed to admit that they're using non-too sophisticated basic broadcasting receivers (with b.f.o.s) and home-brewed ultra-simple designs. Well, both Rob and I agree - that they've got nothing to worry about!

Surely if you hear a DX station on a simple receiver it's an achievement? So...let's have your reports. Join in the fun, submit your reports with as much information as you can and encourage others to think 'I can do that too'!

Finally, you must never forget that new people are 'discovering' radio every day. If they read what you've achieved...it can help and encourage them in a very positive fashion.

All Bands This Time!

Phew... that was a case of (almost!) all h.f. bands being featured this time! Must be a first! My grateful thanks to all reporters for your time and efforts. I get many favourable comments over the air about the column, but always state that it is **not my column, but yours**. This is because without your continued (and patient) support, it wouldn't be here at all!

So to all reporters and readers, I say (in Welsh too!) a Merry Christmas and Happy New Year / Nadolig Llawen ar Blwyddyn Newydd Dda i chi! See you next year!

PW Listening & Operating Watch List

All times in UTC

Charlie Blake M0AIJ listens: 0500-0700UTC on 7.061MHz s.s.b. with an NRD 525 receiver & Sloping Wire antenna.

Steve Locke GW0SGL operates: 1100-1500UTC most days around 14.180MHz s.s.b. using a Kenwood TS-940 & TH7 beam antenna, normally beaming to Other continents.

Don Mclean G3NOF operates: 1030 Saturdays on 3.685MHz on the ISWL Net or 1030 Sundays on the Yeovil ARC Net 3.665MHz s.s.b. using a Kenwood TS-950 & Trap Dipole antenna.

Leighton Smart GW0LBI operates: Most Sundays (and some weekday evenings) at around 1000-1300UTC on 1.933 or 1.949MHz s.s.b. using a KW 2000B transceiver and a long wire Marconi antenna.

Rob Mannion G3XFD listens and operates: (weekdays & weekends) 1800-1830UTC 3.7MHz 100W s.s.b., & 3.530MHz QRP c.w. using an Alinco DX-70 transceiver and Trap Dipole/Long Wire antennas. Also at 23.00 on either 3.530, 7.025MHz (c.w.) or 3.7MHz s.s.b. Occasionally on 7.025MHz c.w. between 0100-0200. *Station temporarily QRT late October-early November due to gales damage to all antennas (join the club Leighton!). Normal service to be resumed as soon as possible!* Editor.

Gordon Foote G7NCR listens: 1730-1930 & 2030-2200UTC (weekdays) and 1430-1630 (weekends) on 14.250MHz s.s.b. using a Howes DcRx receiver and loft mounted wire antenna.

T. Ibbitson G0VTI operates: Each evening between 1900-20UTC on or around 7.020MHz c.w., or 14.035MHz c.w. using a Ten-Tec Scout at 50W.

David Kennedy G7GWF listens: On 7MHz using a Howes Lake DTR-7 Transceiver. (No times or frequencies are specified)

As usual, reports and information (and photos!) by the 15th of each month to: **Leighton Smart GW0LBI**, 33 Nant Gwyn, Trelewis, Mid-Glamorgan CF46 6DB Wales.

Tel: (01443) 411459 or (01443) 710749 (9am - 6pm)

END

Due to the fast turn around of popular secondhand items, readers should check on availability of advertised stock. In other words...if you spot something you fancy...don't delay or you could miss it!

Traders

YOUR GUIDE TO SECOND-HAND EQUIPMENT

WATERS & STANTON

01702 206835

PLEASE NOTE SECONDHAND ITEMS COME WITH FULL 3 MONTH PARTS & LABOUR GUARANTEE. FOR MORE INFORMATION PHONE ANDY TIETJEN 01702-206835 OR FAX 01702-205843.

HF TRANSCEIVERS

INDEX QRP+ 5w QRP HF transceiver £449.
MFJ 9040 40M CW 5w portable transceiver £139

TRIO TS-530S 100w HF transceiver £299

MIZUHO MX-28S 10M QRP handheld transceiver £179

TEN-TEC SCOUT HF transceiver 5-50w 80, 40, 15m £449

VHF/UHF TRANSCEIVERS

MOBILE/BASE STATION

ALINCO DR-590E 2m/70cms 50w/35w mobile transceiver inc CTCSS £329

ADI AR-146 2m 50w FM mobile £199

ICOM IC-25E 2m 25w mobile £149

ALINCO DR-430E 70cms 35w FM mobile £199

YAESU FT-690RH 2m multimode portable transceiver £369

VHF/UHF TRANSCEIVERS

HANDHELD/SPORTABLE

ALINCO DJ-580 x4 2m/70cms handheld £249

ALINCO DJ-500 2m/70cms handheld £199

ALINCO DJ-180 2m handheld £109

ALINCO DJ-F1E 2m handheld £139

KENWOOD TH-78E x2 2m/70cms handheld £299

ICOM IC-32E 2m/70cms handheld £199

ICOM IC-24ET 2m/70cms handheld £229

KENWOOD TH-26E 2m handheld £129

YAESU FT-530R x2 2m/70cms handheld £329

ADI AR-145 2m handheld £129

ICOM IC-14ET 70cms handheld £179

ICOM IC-W21E 2m/70cms handheld £299

KENWOOD TH-22E 2m handheld £169

YAESU FT-415 2m handheld £179

YAESU FT-40R 70cms handheld £229

ICOM IC-2E 2m handheld, thumbwheel £99

KENPRO KT-22E 2m handheld (same as IC2E) £99

KENWOOD TH-42E 70cms handheld £199

STATION ACCESSORIES

MFJ 208 VHF SWR analyzer £79

DATONG FL3 Audio filter & notch filter £99

MIZUHO PI-7S 40M 10 watt linear amplifier £129

VECTRONICS AT100 Indoor active antenna unit £59

MM/MODULES MMS1 Morse tutor £99

MFJ 722 SSB & CW filter unit £139

MFJ 1020A Indoor active shortwave listening aerial £59

MFJ 752C All mode dual tuneable audio filter £79

DEWSBURY Morse tutor £69

MAGELLAN GPS3000 Handheld GPS receiver EX-demo £199

LOWE PR-150 Active HF preselector £149

W9GR DPS-II Digital signal processor £129

ICOM RM-2 Remote controller £59

OPTOELECTRONICS R10 Auto locking FM receiver 30-2000MHz £199

LOWE ELECTRONICS

0117-931 5263

HF TRANSCEIVERS

Icom, IC726, HF Transceiver and 6m, £625.00

Icom, IC728, HF Transceiver, £595.00

JST135, HF Transceiver, £975.00

Trio, TS120V, Mobile HF Transceiver 10 watts, £350.00

Kenwood, TS530SP, HF Transceiver valve PA, £499.00

Kenwood, TS830S, HF Transceiver, £595.00

DATAKOMMS

Kantronics, KAM, Multimode TNC, £185.00

Kantronics, KAM PLUS, Multimode TNC V7.1, £299.00

VHF/UHF TRANSCEIVERS

Allinco, DJ160E, 2m handheld, £160.00

Allinco, DJ180E, 2m Handheld, £160.00

Allinco, DRM106SX, 6m FM Mobile Transceiver, £215.00

Icom, IC24ET, Dual band handheld transceiver, £269.00

Icom, IC25E, 2m Handheld, £150.00

Kenwood, TH205E, 2m Handheld, £150.00

Kenwood, TH28E, 2m Handheld with 70cms RX

Kenwood, TH45E, 70cms handheld

Kenwood, TH46E, 70cms Handheld with class

Kenwood, TH47E, 70cms Handheld

Kenwood, TM231E, 2m Mobile, £195.00

Kenwood, TM451E, 70cms Mobile, with 2m RX, £330.00

Yaesu, FT11R, 2m Handheld, £195.00

Yaesu, FT203R, 2m Handheld, £149.00

Yaesu, FT2200, 2M FM mobile transceiver, £289.00

Yaesu, FT290R, 2m Multimode base/mobile/portable £225.00

HF RECEIVERS

Icom, ICR71E, HF Receiver with FM and SSB Filter, £600.00

JRC, NRD535, Top class receiver, £1000.00

Kenwood, R2000, HF Receiver with VHF Converter fitted, £475.00

Low, HF225, HF Receiver, £350.00

Sony, ICFSV55, Worldband portable - suitcase version, £175.00

Sangean ATS818, Worldband Portable with SSB, £129.00

SCANNERS

ARI1000, Wide band handheld scanner, £150.00

ARI1500, Wide band scanner with SSB, £185.00

AR2800, Mobile scanner with BFO for SSB, £225.00

AOR, AR2001, VHF/UHF Base/mobile scanner 25-550MHz, £195.00

Nevada, MS1000, Base/mobile scanner, £185.00

WIN, WIN108, VHF airband handheld, £75.00

OTHER ITEMS

BNOS, CLP50350, 6m Linear amplifier, £175.00

BNOS, CLP1330350, 2M Linear amp 3 in 50 out, £99.00

JPS, NTRI, DSP Filter, £145.00

MFJ, MFJ1214PC, Multimode Decoder, £120.00

Momentum, MCL1100, RTTY/CW/AMTOR Decoder, £161.00

Items are held at various branches, please contact Bristol branch for location on 0117 9315263

MARTIN LYNCH

0181-566 1120

ICOM IC290E 2M MULTIMODE

TRANSCIEVER £329.00

ICOM IC25E 2M FM HANDHELD

TRANSCIEVER £125.00

ICOM IC730 HF 100W MOBILE

TRANSCIEVER £295.00

ICOM IC735 HF TRANSCEIVER

GENERAL COVERAGE RX £695.00

ICOM IC735 HF TRANSCEIVER

GENERAL COVERAGE RX £695.00

ICOM IC737 HF TRANSCEIVER WITH

AUTO A.T.U. £995.00

ICOM IC737 HF TRANSCEIVER WITH

AUTO A.T.U. £995.00

ICOM IC740 HF TRANSCEIVER

£475.00

ICOM IC751 GENERAL COVERAGE

HF TRANSCEIVER £695.00

ICOM IC751A GENERAL COVERAGE

HF TRANSCEIVER £595.00

ICOM IC751A GENERAL COVERAGE

HF TRANSCEIVER £749.00

ICOM IC765 GENERAL COVERAGE

HF TRANSCEIVER + AUTO ATU

£1295.00

ICOM IC765 GENERAL COVERAGE

HF TRANSCEIVER + AUTO ATU

£1495.00

ICOM IC775DSP HF 200W DSP

TRANSCIEVER WITH ATU AND PSU.

£2495.00

KENWOOD TH26E RUGGED 2M

HANDHELD TRANSCIEVER £149.00

KENWOOD TM702E DUAL BAND

MOBILE TRANSCIEVER £395.00

KENWOOD TS50S 100W HF

"MOBILE" ALL MODE TRANSCIEVER

£699.00

KENWOOD TS50S 100W HF

"MOBILE" ALL MODE TRANSCIEVER

£649.00

KENWOOD TS50S 00W HF "MOBILE"

ALL MODE TRANSCIEVER £725.00

KENWOOD TS830S AMATEUR BAND

COVERAGE TRANSCIEVER £450.00

YAESU FT227R 2M 10W FM

SYNTHESIZED TRANSCIEVER

£125.00

YAESU FT290R 2M MULTIMODE

TRANSCIEVER £250.00

YAESU FT290R2 2M MULTIMODE

TRANSCIEVER £349.00

YAESU FT290RMK1 2M 2.5W

MULTIMODE TRANSCIEVER £269.00

YAESU FT290RMK2 2M MULTIMODE.

2.5 WATT TRANSCIEVER £349.00

YAESU FT411 2M HANDHELD

TRANSCIEVER £159.00

YAESU FT470R 2M/70CM HANDIE

TRANSCIEVER WITH NICADS £229.00

YAESU FT36M VHF/UHF ALL MODE

TRANSCIEVER 2/70 £150.00

NEVADA

01705 662145

ALINCO DJ-100.....£99.00

ALINCO DJ-180.....£150.00

ALINCO DJ-F1.....£185.00

ALINCO DJX-1.....£225.00

FDK MULTI 750X.....£199.00

FDK-700E.....£159.00

ICOM IC-725.....£595.00

ICOM IC-W2E.....£275.00

KENWOOD TH-28E.....£199.00

KENWOOD TH-41E.....£159.00

KENWOOD TH-45E.....£145.00

KENWOOD TH-79E+SM33.....£375.00

KENWOOD TM-221M.....£199.00

TRIO TR-2200.....£99.00

TRIO TR-2300.....£99.00

YAESU FT-790RI.....£325.00

YAESU FT-207R.....£110.00

YAESU FT-211RH.....£225.00

YAESU FT-221R.....£329.00

YAESU FT-290II.....£375.00

YAESU FT-480R.....£299.00

AOR AR-800E.....£125.00

AOR AR900.....£140.00

BEARCAT 350A.....£99.00

BLK JAG 200 MKIII.....£125.00

ICOM IC-R1 WIDE RX.....£279.00

REALISTIC 2036.....£179.00

REALISTIC PRO-50.....£69.00

ICOM R-72.....£675.00

KENWOOD R-2000.....£395.00

KENWOOD R-5000.....£699.00

LOWE HF-150.....£279.00

LOWE HF-225.....£375.00

YAESU FRG-8800.....£499.00

YAESU FRG-9600.....£299.00

DAIWA 2002A.....£260.00

DRAKE TR4/AC4.....£345.00

ICOM IC-728.....£795.00

ICOM IC-735.....£599.00

ICOM PS-15.....£149.00

JST - 100.....£395.00

JST NA-88.....£45.00

JST NBD-500 PSU.....£95.00

KENWOOD AT-50.....£225.00

KENWOOD TS-120V.....£279.00

KENWOOD TS-180S.....£345.00

KENWOOD TS-440S.....£745.00

KENWOOD TS-850SAT.....£1250.00

KENWOOD RZ-1.....£249.00

YAESU FL-2500.....£79.00

YAESU FT-101.....£225.00

YAESU FT-707.....£400.00

YAESU FT-980 HF.....£699.00

YAESU FT-900 AT.....£899.00

YAESU FT-ONE.....£699.00

POWER MAX CEPT.....£89.00

SATCOM SCAN 40.....£75.00

SATCOM P40 (PAIR).....£149.00

TAPR TNC-2.....£75.00

TEAM 3004UK.....£125.00

TEAM 3100 UK.....£95.00

NEC SPEAKER/CLOCK.....£69.00

KENWOOD TH-215E.....£145.00

TRIO 520SE.....£250.00

PLEASE MENTION TRADERS' TABLE WHEN ENQUIRING ABOUT ANY ITEMS ON THESE PAGES!

Traders' Table

YOUR GUIDE TO SECOND-HAND EQUIPMENT

ARC EARLESTOWN 01925 229881

HF TRANSCEIVERS

Yaesu FT-900AT - boxed £950
Icom IC-765 plus matching speaker £1650
Kenwood TS-850SAT plus DSP-100 as new with all accessories £1599
Kenwood TS-140S c/w AT-230 boxed £1E1.
Kenwood TS-140S + PS-50 £630
Yaesu FT-102 £475
Yaesu FT-102 + FC-102/FV-102DM. £799
Kenwood TS820S + SP120/AT250/PS30 £799
JRC JST-135HP deluxe c/w matching NBD-520 PSU (opt units fitted) £TEL
Yaesu FT-757 FC757/AM303 deskmic £699
Yaesu FT-757 boxed £550
Kenwood TS140S + AT230 £650
Yaesu FT-747GX + FM £499
Icom IC-706 £TEL

MOBILE/BASE VHF/UHF TRANSCEIVERS

Kenwood TS811E + mic £575
Kenwood TS711E + mic £575
Kenwood TS-700 boxed £275
Kenwood TS700S £TEL
2 x Yaesu FT-290R Mk 1 plus accessories from £225
Navico AMR-1000S from £140
Kenwood TM-742 + 10m module as new £625
Icom 229 - boxed £225

RECEIVERS

2 x Yaesu FRG-8800 + extras from £425
2 x Yaesu FRG-7700 with memories & accessories £TEL
Icom IC-R7000 + HF Module £750
Kenwood R-5000 boxed £699
Yaesu FRG-100 VGC £375
AR-2001 £175
Sony SW-77 Immaculate condition £TEL
2 x Icom IC-R71E boxed £599
Regency MX-7000 £TEL
Trio R-2000 + VHF converter £425
Yaesu FRG-7 + mechanical filter /FM £175
Icom IC-R7100 + HF module £999

PHOTO ACOUSTICS 01908 610625

Icom IC-728 100W HF General Coverage Transceiver. (Mint Condition) £699.00
Icom IC-730 100W 80 - 10M Amateur Band Transceiver £349.00
Icom IC-290E 10W 2M Multimode (Very good cond.) £269.00
Icom IC-738 100W HF General Coverage Transceiver with Auto ATU (Mint) £1100.00
Yaesu FT-707 100W 80 - 10M Amateur Band Transceiver c/w matching ATU, memory unit and Heavy Duty power supply £475.00
Kenwood TM-733E 2m/70cms Mobile with removable front panel. (VGC) £479.00
Kenwood TM-701E 2M/70cms Mobile Transceiver (VGC) £329.00
Yaesu FT-470 2M/70cms Dual Band Handheld £249.00
Icom IC-735 100W HF General Coverage Transceiver c/w AT100 Auto ATU and Shure Desk mic. £699.00
Kenwood TS-50S 100W HF Mobile General Coverage Transceiver (Demo) £829.00
Kenwood AT-50 Matching automatic antenna tuner for TS-50S. (Demo) £249.00
Yaesu FT-290R1 2M Multimode 2.5W output. £249.00
Kenwood TH-75E 2M/70cms Handheld c/w speaker mic. £249.00
Tokyo HX-240 2M to 1HF Transverter, covers 80 - 10M Amateur Bands. £189.00
Trio TM-201A 25W 2M Mobile. £179.00
Kenwood TH-22E 2M Handheld, battery box, no charger. £139.00
Yaesu FT-76R 70cms Handheld £159.00
Alinco DJ-F1E 2M handheld £159.00

SHORTWAVE SHOP 01202 490099

HF EQUIPMENT

Yaesu FT902DM c/w FTV902R Tvr.(2Mtr) and SP902 Spkr. £495.00
Yaesu FT707 c/w FC700 ATU. £355.00
Yaesu FT707 c/w H/B PSU. £350.00
Yaesu FT102 VGC. Fm.Fitted £395.00
Yaesu FT101E Mint c/w Frequency counter. £275.00
Yaesu FT101EE VGC. £250.00
Yaesu FT101Z as new £275.00
Icom AT180 Auto ATU. £145.00
Yaesu FR101 HF Receiver £165.00
Grundig Satellit 00 as new £265.00
Philips 2924 FM/SW Broadcast Band Receiver. Mains/Battery. £69.00
Tokyo HX240 2Mtr to HF Transverter 3.577/14.21/28.MHz. £165.00
JRC. NRD 515 Revr c/w Memory Unit and Speaker £425.00
JRC. NRD 525 HF Revr. Mint. Boxed. £625.00
Ileathkit GR78 HF Revr. £75.00
SONY PRO 80 HF Revr c/w VHF Cvir. £165.00
TEN TEC ARGOSY 515. c/w ATU and PSU. £285.00

VHF/UHF

Icom IC 2811H 2Mtr. Mobile. Wide Band Rx. £345.00
Yaesu FT290R Mk1. c/w MMD11 Mobile Mount. VGC. £235.00
Icom IC32 Dual Band H/H. £195.00
Trio TR9000 VHF Multimode. £185.00
ICOM IC2E VHF Handheld. £95.00
YAESU 708R 70cm. Handheld. £95.00

MISCELLANEOUS

MFJ 294 Antenna Analyser. £179.00
MFJ 901B ATU. £55.00
YAESU FC301 ATU. £135.00
YAESU FC107 ATU. £155.00
KENWOOD VC10 VHF Converter for R2000. £125.00
AEA PACKRATT PK232MBX Data Terminal. New. To clear. £245.00
YAESU FRV VHF converter for FRG7700/8800 £45.00

CALL FOR LATEST UPDATE ON
USED EQUIPMENT AVAILABLE

SMC GROUP 01703 251549

HF TRANSCEIVERS

PX HT180 Tokyo 80 mtr 10w £259
PX HL7000B Tokyo HF L/amp £899
PX FT747G Yaesu HF 100W £449
PX FC700 Yaesu Man ATU £169
PX FT77 Yaesu HF 100W £349
PX FP707 Yaesu PSU 12v £119
PX IC737 Icom HF 100W £1060
LX FTONE Yaesu HF 100W £675
LX FT890AT Yaesu HF 100W £1250
LX TS520SE Kenwood HF Valve £335
AX FT767GX Yaesu HF 100W £1450
AX FT990 Yaesu HF 100W £1650
AX IC765 Icom HF 100W £1699
RX JST10 JRC HF 100W £395
RX FT101 Yaesu HF Valve £260
RX FT102 Yaesu HF Valve £450
RX FT747 Yaesu HF Mobile £450
RX FT107M Yaesu HF 100W £275
RX TS690 Kenwood HF/6m £1175
RX TS440 Kenwood HF 100W £750
RX IC726 Icom HF 100W £1850
RX 2KL Icom HF L/Amp £1595

VHF/UHF TRANSCEIVERS

PX FT736R Yaesu 2mtr/70cm £1195
PX FT290R1I Yaesu 2mtr port £375
PX FT690R1I Yaesu 6mtr port £375
PX IC900E Icom 2mtr/70cm £475
PX C500 Standard VHF/UHF £219
LX FT290R1I Yaesu 2mtr port £400
LX TH21E Kenwood 2mtr port £100
AX FT790R Yaesu UHF port £310
AX TM-732E Kenwood 2mtr/70cm £525
AX IC2GE Icom 2m trans. £179
RX DJ160 Alinco 2mtr/70cm £155
RX DJ560 Alinco 2mtr/70cm £335
RX FT76 Yaesu 70cm port. £155
RX FT212RH Yaesu 2mtr FM £175

RECEIVERS

PX R5000 Kenwood HF RX £649
PX AR2800 AOR RX M/base £359
PX AR3000 AOR 1kHz - 2GHz £599
PX AR1500 AOR Scanner £225
PX AR3030 AOR HF RX £475
PX HF225 Lowe HF Gen RX £445
PX FRG100 Yaesu HF Gen RX £449
PX MVT7000 Yupiteru H/Scanner £159
PX SW-7600 Sony Portable RX £139
PX PRO2006 Realistic B/Scanner £239
LX ICR-72 Icom HF RX £675
LX FRG7700 Yaesu RX + mem £299
AX PRO-80 Sony S/wave RX £120
AX 2001D Sony S/wave RX £169
AX HF150 Lowe HF Receiver £325
RX ICR1 Icom H/H Scanner £185
RX AR1500 AOR H/H Scanner £165
RX ICF-7600 Sony Port RX £120
RX PRO43 Realistic Port Scanner £110
RX NRD525 JRC HF Gen. RX £725
RX FRG7700 Yaesu HF Gen. RX £225

PX = Chandlers Ford HQ 01703 251549
RX = Reg Ward 01297 34918
LX = SMC Leeds 01132 350606
AX = ARE London 0181-997 4476

Disclaimer

Advertisements from traders for equipment that is illegal to possess, use or which cannot be licensed in the U.K. will not be accepted. While the publishers will give whatever assistance they can to readers or buyers having complaints, under no circumstance will the magazine accept liability for non-receipt of goods ordered, late delivery or faults in manufacture.

PLEASE MENTION TRADERS' TABLE WHEN ENQUIRING ABOUT ANY ITEMS ON THESE PAGES!

PACKET PANORAMA

Roger Cooke G3LDI brings you the latest news from the Packet radio scene.

Clem Patchett VK6CW lives in Thornlie, near Perth, Western Australia, regularly sends me the data news from that part of the world. I usually file this away in the Teletext server of the BBS here and update as necessary.

Clem is very keen on h.f. working and has just invested in a Clover installation, utilising the HAL board for his PC. Once he had configured it all properly, he reckons that it performs extremely well, and he spends a lot of time working on that mode.

I must confess to complete ignorance of Clover and am not sure if there are many stations using it in the UK. However, I would be interested in hearing from those that are, together with any further information regarding activity that might be available.

Multi-Mode Interface

Peter Lockwood G8LSB has sent me details of his multi-mode interface units that he has available for SSTV and FAX. They come in kit form or as fully encapsulated units.

The encapsulated units seem to be very popular and do stand up to the rigors of "heavy hands" much more so than a p.c.b. mounted on a plug. The complete JV FAX PACK for the PC comes complete with manuals, software, and a selection of pictures.

Peter's units will transmit and receive SSTV, FAX, c.w., RTTY, ASCII and AMTOR. It will also receive SITOP, NAVTEX, SYNOPS and PACKET, but will not transmit these modes. Peter does advertise in *PW* and can be contacted at most times on 0181-595 0823.

Radiocommunications Letter

The Radiocommunications Agency (RA) recently sent out a letter to all BBS Sysops together with a questionnaire which we had to complete and return. This letter underlines the concern that the RA has regarding the prohibition of and control of abuse on the packet network.

Abuse using Packet radio is a subject that every responsible Sysop is also concerned with and some

form of mandatory control of the type of bulletin allowed on the BBS is being considered. In other words, a self-policing and monitoring of **All Locally Entered Bulletins** before allowing them onto the network. I, for one, have no problem with that, and in fact already do it anyway.

I have very few, if any, problems locally and consider myself lucky that I live in a relatively sensible part of the country. However, there are those that would try to upset and abuse the system and these must be stopped.

Luckily packet radio has the means to do this quite easily and possibly with the introduction of passwords, only then will we be able to clean up the network completely.

Some people advocate the abolition of the NOV system of BBS licensing altogether, allowing a free-for-all which would, in my opinion, lead to chaos. When comparing our licensing system to that of the USA or Canada, we are more restricted, and seem to have the usual British red-tape surrounding our every move.

More local organisation is possibly a good idea, but under the umbrella of a national body still has to be the best way for us in the UK, especially when comparing bandplans. We have exactly half of what the USA and Canada have on both 144 and 430MHz, so they are able to have more packet allocations than we have.

Down Under

As well as receiving news from Clem VK6CW, I also receive the *AAPRA Newsletter*, a quarterly bulletin sent out by the **Australian Amateur Packet Radio Association**. The AAPRA has an impressive list of over 200 members, including five G stations. If you would like to join, please send \$18 Aus to: **AAPRA, 59 Westbrook Avenue, Wahroonga, NSW, 2076, Australia**.

In the latest edition of the AAPRA bulletin there's news of the long awaited 9600baud link on a dedicated frequency from Sydney to Newcastle. Now up and running this link has been long planned and struggled with. Thanks are due to **Dave VK2DSU, Brian VK2YBE, and Gerard VK2DAA** for their efforts in



A sample of a picture captured using Peter Lockwood G8LSB's SSTV multi-mode interface units.

this project.

The link comprises at each end a PacComm Tiny-2 9600b TNC and a Plessey 8000 u.h.f. 25W transceiver. The antennas are 9-element horizontally polarised Yagis.

The path is about 120km and a great deal of trouble has been suffered getting the link to work due to poor signal path. Putting the antenna at VK2RNS at 100ft helped a great deal!

There is also a 4800b link working between VK2RND at Newcastle and VK2RGL at Forster. User ports are also planned for 4800b access.

The AAPRA have a very comprehensive software library, with nearly six pages of updates and details. Rumours have it that F6FBB is about to announce a Linux version of his BBS program.

'Aunt Harriet' has an interesting feature each time with helpful comments, hints and excerpts from readers letters. I didn't get to meet Aunt Harriet when I was there, or did I?

Norfolk News

We are still in the planning stages of our 19.2kb 1.2GHz network, although the modem, by **Matthew Phillips G6WPJ**, and **John Ferguson G8STW** is working. A demonstration has been organised and radios are just about ready, so I hope to report next time that the first link is in place.

User ports at 9kb are planned, but problems with Maxon radios are holding back that project at present. Hopefully, by the time this is being read, the problems will have been solved.

As for work down in deepest Bedfordshire, **Rob Compton G1ZPU**, reports he is currently working on a 10Mbit (yes MEGABIT) 10GHz link between **GB7KHW** and his system. Although the distance involved is only a couple of miles, it should be possible to prove the technology, leading to the possibility of linking hilltop sites at this 'unheard of' speed using simple and cheap equipment.

For example, the transceiver kit will work out at around £40, based on an ATVTX with mods for data. The receiver will be nothing more than a cheap Amstrad or similar Satellite RX which can be had for around £10 at the rallies.

An LNB modified for 10GHz receive will be about £30 (new) or £25 (second-hand). The receiver will only need to have a base-band output for the raw video signal.

For video read data! The communication medium is actually 4 wire ethernet. Speed can be anything from 1Mbit/sec to 10Mbit/sec (100Mbit would require modifying the receiver circuit even more, and also some serious TX mods, plus it's also pretty band hungry as the 10Mbit link will want 20MHz of the band for a full duplex link, therefore a 100Mbit link will want 200MHz!).

It 'would' be possible to have a number of T/RX units on a hilltop site linked into an ethernet active hub (inanimate black box that buffers the ethernet signals, and send them out on the ports), which would act as a 'node' allowing multiple sites to be connected together, just as an office LAN system, only for the amateur packet network. User access will be via their local BBS/TCPIP gateway.

The system will be predominantly for IP since that is designed to work over ethernet links, or should I say that ethernet was designed to carry TCPIP! AX25 data can be piggybacked using the AXIP protocol (as used between **GB7ZPU** and **GB7KHW**, and **GB7MHD** and **GB7KHW** to great effect - more efficient than normal AX25!!).

To users it will be both totally transparent, and very fast! Coupling it up with some RUH, or RUH clone modems for fast user access at up to 64Kbit/sec, there is no reason why full 'Internet' World Wide Web type services could not be used. This is pie in the sky, and requires the first prototype link to work, but it's nice to dream!

That's all for now, so Merry Christmas and Happy packeting. Don't forget to keep all our news coming to me G3LDI @ G87LDI or The Old Nursery, The Drift, Swardeston, Norwich.

END

BROADCAST

ROUND-UP

This month Peter Shore has news of a new station, reports that the BBC World Service faces a potential shortfall and catches up on broadcasters' schedules

The uncertainty surrounding the long-term future of many of the world's most well-known international radio stations continues as budget cuts take affect from Washington DC to Melbourne. The Voice of America (VoA) announced that cash cuts would reduce almost seven per cent of the station's short wave transmissions.

English to the Americas via short wave is almost wiped out. And reductions also affect services to Europe in Croatian, Polish and Serbian, plus Spanish to Latin America, and, most surprisingly, two hours of Arabic are lost.

Contrarily, a week or so after the cuts were announced, VoA revealed that it had started a television service in Persian, carried via AsiaSat2. As regular readers will know, owning satellite receiving equipment in Iran is illegal. And so half of the first programme was devoted to a technical explanation of how to receive VoA television in Iran.

The new VoA service is not what you might consider a traditional TV station, though, as it has no programmes of its own. Instead VoA TV 'simulcasts' traditional VoA radio programme on television, with listeners (or are they viewers?) able to see the presenters in the studio. That is apparently what VoA listeners - or potential viewers - are believed to want.

Potential Shortfall

Back in Britain, BBC Director-General John Birt revealed to the House of Commons Foreign Affairs Committee that BBC World Service faces a potential shortfall of £40 million in two years time unless budgets are restored by the government. Birt said that some savings would be achieved by the plans revealed earlier in the year to merge World Service production and resources into the domestic BBC, but these would not solve the problem entirely.

Radio Australia's chief, Derek White, has warned that the station will probably have to close its Cantonese and French services if planned budget cuts go ahead. In addition, output in Indonesian and

Mandarin would be reduced.

With all these cuts planned, is international broadcasting going to become the plaything of the Murdochs of this world? Will short wave become the Cinderella of the frequency spectrum?

Maybe it is destined to become a niche market, whatever else happens. Radio St Helena which took to the air on one of its annual forays in October generated huge response from around the world. And now another island - albeit somewhat less remote - is reaching out to the world regularly on short wave.

Regular Programmes

The Republic of Ireland recently came on to the international broadcasting scene with the launch of regular programmes from West Coast Radio (WCR). Since Thursday 31 October, WCR has been beaming programmes to Africa, Europe and North America. The programmes include news and features from Ireland, plus music, letters, and the odd competition or two.

West Coast Radio is hiring transmitter time at the Julich site in northern Germany, initially sending the programmes over on tape. But if the programmes prove successful, says Michael Commins, one of the organisers, the station may change to a live format.

You can tune in to WCR at: 1500-1600 on 6.015MHz to Europe, 1800-1900 on 11665 to Africa and 0100-0200 on 5.91MHz to the Americas.

New Station

Another new station is Radio Free Asia, the Far Eastern equivalent of Radios Free Europe and Liberty. This US-run station is on the air in a number of Far Eastern languages, and has attracted negative

comments from the state-controlled press in many of the countries to which it beams programmes. Radio Free Asia is hiring time on a range of transmitters in the former Soviet Republics, plus Monitor Radio's Saipan transmitting station. Try the Mandarin transmissions at these times and frequencies revealed in Media Network on Radio Netherlands: 1500-1600 on 5.86, 6.205, 6.24, 7.495, 7.53 and 9.43MHz; 2300-0000 on 5.86, 6.205, 6.24, 7.495, 7.53 and 13.80MHz

Language Services

Catching up on broadcasters' schedules is always an uphill struggle after the twice-yearly frequency changes. I have been trawling through the stacks of programme guides that arrive on my doormat from around the world, and have come up with this selection of English language services for you.

Radio Austria International can be heard at: 0530, 0830, 1030 (except Sunday) 1330 and 1530UTC on 6.155 and 13.73MHz and at 1930 and 2230 on 5.945 and 6.155MHz. All programmes are 30 minutes long.

Kol Israel can be heard at: 0500-0515 on 7.465, 9.435 and 17.545MHz; 1500-1530 on 9.39 and 11.605MHz and at 2000-2025 on 7.465, 9.365 and 15.64MHz.

Radio Netherlands can be heard at: 1130-1325 on 6.045 and at 7.19MHz via Julich and Nauen transmitters in Germany; 2130-2325 on 1440kHz medium wave via Luxembourg. Also on Astra via WRN (transponder 22, audio at 7.38MHz) at 1030-1125, 1730-1825, 0030-0125

and via R Netherlands, own Astra feed (transponder 58, audio at 7.38 or 7.56MHz) at 0030-0325, 0730-1025, 1130-1225 and 1830-0025.

Radio Norway International can be heard at: Half-hour programmes on Sundays only at 0600 on 5.965, 7.18MHz; 1300 on 9.59MHz; 1900 on 5.96, 7.485MHz and 1314kHz medium wave.

Radio Sweden can be heard at: 1930-2000 on 6.065, 7.24 and 9.655MHz; 1179kHz medium wave 2030-2100 on 6.065MHz and 1179kHz medium wave 2130-2200 (weekends only) on 6.065, 7.23MHz and 1179kHz medium wave 2230-2300 on 6.065, 7.325MHz and 1179kHz medium wave and via Astra (ZDF television, audio 7.38MHz).

Radio Vlaanderen International (Holland) can be heard at: 0730-0800 on 5.985, 9.925, 9.94MHz and 1512kHz medium wave, 1000-1030 Monday to Saturday on 6.035MHz; 1900-1930 and 2200-2230 on 5.91MHz and 1512kHz medium wave

Name Changes

Finally this month news of name changes in broadcasting. This is because NHK Radio Japan, the international service of Japan's public service broadcaster, has become Radio Japan NHK World Network. NHK's international television service also becomes NHK World. In Europe, Belgian Radio and Television is to be renamed Flemish Radio and Television from the beginning of 1997.

That's all this month. Please let me know if you find something interesting on the short wave broadcast bands, from frequencies to programmes. I'm sure that other readers of PW will be interested to hear your discoveries!

Until the next issue of the magazine, when I'll be offering a sneak preview of the newest short wave portable receiver, good listening!

END

Advertisements from traders or for equipment that is illegal to possess, use or which cannot be licensed in the UK, will not be accepted. No responsibility will be taken for errors.

You should state clearly in your advert whether the equipment is professionally built, home-brewed or modified.

The Publishers of *Practical Wireless* also wish to point out that it is the responsibility of the buyer to ascertain the suitability of goods offered for purchase.

BARGAIN

b a s e m e n t

Compiled by Zoë Crabb

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Alinco DJ-180EA hand-held 2m (144MHz) extended RX, NiCad pack, charger, speaker mic., v.g.c., £130. Mobile 2m (144MHz) whip with mach mount, £10. Andy, Mid-Glamorgan. Tel: (01656) 773065.

Army sets, R210 inc. p.s.u., £85. R216, £85. Morse key, type 'D' 10F373, £50. Receiver USAF WW2 MN26C, £40, s.a.e. for list of other equipment. P. Brown, 22 Raby Terr, Chilton, Ferryhill, Co. Durham DL17 0JD.

Battery eliminator for valve battery radios, 90V and 1.5 outputs. Tel: Worthing (01903) 206882 evenings for details.

Class D wavemeter, Brenell recorder, £30. QSL cards 1937-1995, valves, mags, books, Belcom s.s.b. receiver (144MHz), £25. Power units, various, silent key last few items, executor. Dave G4NZY, Birmingham. Tel: 0121-427 1788.

Collection of pre-war HMV radiograms, 1931 to 1936, models 521, 531, 540, 570, 581, all in good condition, £750 or offers for individual models considered. Tel: Derby (01332) 700658.

Communications receiver IC-R7000 voice synthesiser plus remote controller boards fitted, will also run off 12V d.c., £600 o.n.o. Buyer collects. Graham, Shropshire. Tel: (01691) 622368.

Cushcraft AP8A vertical all bands 10-80m (28-3.5MHz), £120 o.n.o. Cushcraft rotary dipole, 10-40m (28-7MHz), £175 o.n.o. Both antennas only been used by listener, both come with instruction book. Richard J. Guess Jr., 16 Shakespear Close, Braintree, Essex CM7 7DB. Tel: (01376) 349908.

Daiwa d.c. power supply, max 30A, 15V variable, room needed, buyer must collect, as new, £70 o.n.o. Uniden Bearcat BC700A scanner, £50 o.n.o. Reg G1IHN, Leicester. Tel: 0116-288 9903.

Datong FL3 multi-mode audio filter with auto notch filter, excellent condition, £85 o.n.o. CapCo SPC300 a.t.u., excellent condition, £125 o.n.o. Tel: Manchester 0161-283 1689.

DRAE SSV TX/RX unit, mic. and camera input, TV or monitor output, four picture memories, eight second mono, mains powered with leads and instructions, £30 post paid. Eddie GM4EWM, QTHR. Tel: (01343) 544234.

Drake 4C line station, late S/N, T4XC, R4C, c.w. filters plus auto

switched roofing filters. MS4 spk/p.s.u., Datong r.f. clipper, Shure 444 mic., electronic keyer, manuals, all excellent condition, £650. Tel: Hants (01705) 265101.

Dummy load DL1000 300W (cont), 1000W (three minutes) max, must collect, £200 o.n.o. Uniden Bearcat BC700A scanner, £100. Reg G1IHN, Leicester. Tel: 0116-288 9903.

Eddystone EC10, £90. Marconi Atlanta 15kHz to 28MHz, £120. Heathkit HW30 2m (144MHz) TX/RX, £65. KW2000E and p.s.u., £185. Racal MA79 transmitter exciter, 1.5-30MHz, £150. Rare Bendix RA-1B aircraft receiver, 0.15-15MHz, £130. Tel: Yorks (01482) 869682.

Eddystone, thinning out some doubles in my collection, several available, all in nice order and condition, s.a.e. for list, collection of larger items advised! Tel: (01372) 454381 or (0374) 128170 anytime.

Ferrograph vintage reel to reel taperecorder, series seven, model 71311, suit collector, offers. Tel: Erdington 0121-373 4965.

FRG-100 with f.m. module, as new, boxed and manual, £350. Thurlby Logic analyser LA160 with all probes, as new, £250. Chris, Southampton. Tel: (01703) 282366.

FT-40R u.h.f. hand-held, brand new, unwanted prize, all boxed, Alpha numeric display c.t.c.s.s. with SMA to BNC converter, compact design, £225 o.n.o. Rotator controller, five core, v.g.c., £20. Jonathan, Leamington Spa. Tel: (01926) 887442.

FT-530 dual-band hand-held, cell, case and p.s.u. lead, £250 o.n.o. Steve G7PWH, Sussex. Tel: (01444) 441460 after 8pm please.

FT-ONE general coverage all-mode transceiver, c/w mic., manuals, excellent, £525 o.n.o. Capco SPC300 a.t.u., £100. Simpson frequency meter, 10Hz to 60MHz, £65. Ferguson small cassette player, battery mains, £10. Tel: NW London 0181-455 8831.

FV-707 external v.f.o., v.g.c., boxed + manual, £50, buyer collects, or w.h.y.? Tommy M1AIV, Rochdale. Tel: (01706) 712722 anytime.

Heathkit GR-78 gen. coverage RX, £38. MM 10-2 transverter, £50. GRC-9 h.f. RX/TX p.s.u., mic., 1.s., v.g.c., £180. TCS-12 RX, £40. W552 RX, £50. BE-201 and p.s.u., £80. Tel: Worcester (01562) 743253.

Heathkit HW32A with manual, no power unit, £40. Tel: Birmingham 0121-458 2406.

Icom 728 narrow c.w. filter and f.m. board, boxed, £600. Kenwood DC30 frequency controller, £25. 1000pF 5kV vacuum capacitor, £20. All items plus carriage. Tel: Norfolk (01953) 882076.

Icom 740, f.m. board and internal p.s.u. fitted, 240V and 12V TX/RX, 100W, manual, hand mic., £425, also 6m (50MHz) transverter, 25W output, variable input with manual, £90. G. Chatfield G0LEH, London. Tel: 0181-670 7397.

Icom 751A 100W TX/RX general coverage, £750. Kenwood TH75E hand-held dual-band extended RX speaker, mic. and soft case, £225. Trio TR9130 two metre multi-mode, £300. All in good condition and boxed. Dave GW4JAD, Mid-Glamorgan. Tel: (01443) 683912.

Icom IC-451E 432MHz multimode transceiver, 10W output, mains or 12V operation. IC-HM7 hand mic., good condition, £395. Buyer collects or pays carriage. Bob GBVOI, Portsmouth. Tel: (01705) 250830 after 6pm.

Icom IC-706 mobile transceiver, coverage a.m., f.m., sideband 50 + 144MHz. Data 100-30MHz, 30-50MHz, 50-52MHz, 144-145.995MHz, channel scope, triple conversion superhet MEM102, size 58 x 167 x 200, just over 12 months old, mint condition, £785 o.n.o. Tel: mobile (0402) 744011, ask for Graham, evenings please.

Icom IC-740 with f.m. and match speaker, boxed, mint, £545. FC-700 a.t.u., mint, £100. FL-100 100W h.f. amp, mint, £130. Watson dual-band Micro Mag, brand new, £15. Tel: Watton (01953) 884305 after 6pm please.

Icom ICR-7000 v.h.f. 25-2GHz, excellent condition, manual, boxed, £550. Kenwood R5000 with v.h.f., like new, £600. Century s.w.r. digital s.s.b. table model, £130. Panasonic DR2900, digital s.w.r., s.s.b., like new, £130. Panasonic RF-B65, boxed, like new, £90. ICR-71E, v.g.c., £450. Tel: London 0181-813 9193.

Icom R70, £270. No offers, ex working order. Racal 1218, plus manual, mint receiver is in nice console case, (h) 33", (d) 12.5", (w) 22", £300. No offers. Tel: Nr. Keighley (01535) 630361 anytime.

Infotech 6755 FAX machine, plain paper, £180. Tel: 0181-386 4503. Infotech decoder plus monitor, decodes packet, RTTY, ASCII, c.w., etc., etc., price, £50. David, Lancs. Tel: (01282) 437768.

Interesting items of amateur and video equipment for sale, s.a.e. for list. G3HWX, Fourways, Morris Lane, Halsall, Ormskirk, Lancs L39 8SX.

Kenwood 5000 receiver with v.h.f. converter and s.s.b., c.w. and a.m. filters, extn. speaker, a.t.u., excellent condition, boxed with manuals, £750. Rapid Results RAE course books plus others, £50. Tel: Middlesex 0181-429 0257 evenings.

Kenwood R2000, v.g.c., £270. No offers. Tel: Tyne & Wear 0191-565 2482.

Kenwood R5000 receiver with v.h.f. fitted, 18 months old and immaculate, c/w power cord, manual and box, £600. Wallace MMOAMV, East Lothian. Tel: (01875) 810207.

Kenwood TR-751E 2m (144MHz) 25W, multi-mode transceiver, boxed and manuals, complete with mobile antenna and Diamond boot mount system, hardly used, v.g.c., £500 o.n.o. Nicky G7HPY, Cheshire. Tel: 0161-928 9474 evenings/weekends.

Kenwood TR751E 2m (144MHz) 25W multi-mode, boxed, complete, £495. Yaesu FT-7902 70cm (430MHz) multimode, c/w Yaesu FL7025 25W clip-on linear, boxed, complete, £495. All equipment in excellent condition and never used mobile. Ian G1HQK, Cambs. Tel: (01354) 660800.

Kenwood TS-440 SAT, all-mode h.f. transceiver, looks like new, all extra filters, s.s.b., c.w., computer, original box and manuals, built-in auto a.t.u., genuine reason for sale, £750. Tel: Berwick-upon-Tweed (01289) 307870 (home). (0589) 706167 (mobile) or E-mail on mrcolin@enterprise.net

Kenwood TS-50S h.f. transceiver, c.w. filter, mic., manual, mobile mount, original packing, excellent condition, very little used, £695. Latest Comet CAHV h.f./v.h.f. mobile ant., as new, £80. PK88 TNC, £80. Tel: Waterlooville (01705) 265101.

Kenwood TS-820 1.8-30MHz, u.s.b., 1.s.b., c.w., f.s.k., 200W p.e.p. checked and up to spec, £350 o.n.o. Arthur, QTHR. Tel: 0181-684 3974.

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Large collection of 1930s Practical Wireless magazines, Tel: South Glamorgan (01222) 531700.

Linear amp UK 6m (50MHz) discovery with 1kW coaxial relay, used 33 short QSOs only, cost, £1295, £850. Tel: Cornwall (01736) 62809.

Motorola 'Spectra' microphone plus mounting bracket (plug has been cut off but retained), all v.g.c., £45 o.n.o. Tel: Gwent (01633) 862265.

Nevada MS1000 scanner for use as a mobile or base unit, 1000 channels, a.m., f.m., w.f.m., two antennas, one telescopic and one miniature rubber duck. Frequency coverage is 500Hz to 1.2GHz, good condition and has 12V power

supply, £140. Tel: Berwick-upon-Tweed (01289) 307870 (home). (0589) 706167 (mobile) or E-mail on mrcolin@enterprise.net

Palomar RX100 noise bridge, as new, with manual, £35. Tel: Worcs (01527) 546048.

Pye Olympic for conversion to 4m (70MHz) c/w mic. loud speaker and postage, £15. Ham FAX kit with software and postage, £15. J. A. Butterworth, 9 McKenzie Road, Buckle, Scotland AB56 1DH.

Radio mast, dismantled into six poles, average length 7yds each, various fittings, but no cables, £70. Tel: Surrey (01372) 458589.

RCA AR88 receiver, good condition, £80 o.n.o. Buyer collects. J. Winn, Oxon. Tel: (01235) 525324.

Realistic DX302 0-30MHz receiver, a.m., s.s.b., c.w., digital read-out, mains, battery or 12V supply with instruction manual, excellent condition, £100 o.n.o. Alan G7KMW, Birmingham. Tel: 0121-608 6584.

RN Electronics 6m (50MHz) transverter, 25W, £125. MFJ 9420 20m (14MHz) s.s.b. transceiver, 10W, £130. Kenwood TM2311A/E service manual, £8.50. GW3WSU, Barry. Tel: (01446) 738756. **Rohde Schwarz u.h.f. 300-1000MHz signal generator**, offers. Tonna 21-cle 70cm (430MHz), new and boxed, £25. Tel: Walsall (01543) 377860.

Sell or exchange Hustler 3TBA beam antenna, never assembled, new, £275 cash or take good HF-5B beam + cash in p/ex. 3TBA last of the greats, h/duty + postage. GOGQJ, Cornwall. Tel: (01872) 55235.

Service manual for Icom R72E receiver, £12 inc. postage. Stephen G1ARXX, Co. Antrim. Tel: (01232) 843135 evenings.

Skanti TRP6000 6001 power supply, marine TX/RX duplex 400W, good condition, £600. Skanti R8001 marine comms RX, excellent condition, £1000. Sailor 19in rack TX/RX N1401, R1120, S1301L, T1127L, H1201L, offers. C. White, Lincolnshire. Tel: (01472) 398695.

Sony CRF320, best of Sony, world zone, 32 band digital a.m., s.s.b., f.m., 1.w., excellent radio, £350. NRDS525, mint condition, boxed, £550. Icom IC-R7000 v.h.f., like new, £550. Kenwood R-5000 + v.h.f., £600. Century 21D digital s.w.r., very sensitive, £150. AOR7030, new, swap or sale. Tel: London 0181-813 9193.

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Star Masterkey MkII, £39. Icom desk microphone, type SM6, £40. Spectrum Communications 2m

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EDDYSTONE Rx 960 £60. 1155Rx large model complete with power pack plus 5 valves. Unused boxed £90. Both sets not working but serviceable. Buyer collects. Pat Delaney. Tel: 0181-989 3621 after 6pm. (London).

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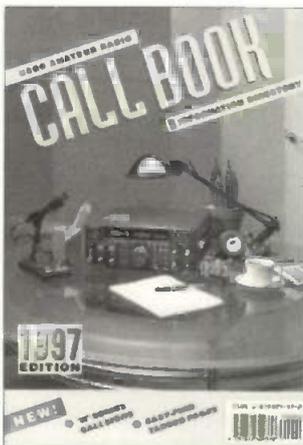
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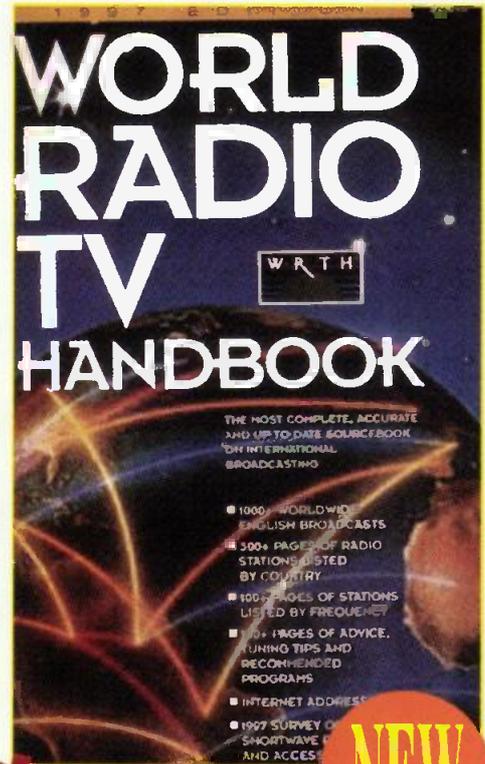
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**World Radio TV Handbook
1997 - Order Now & Save £2
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New in this month is the 1997 edition of the *World Radio TV Handbook (WRTH)*. This book is billed as 'the most complete, accurate and up-to-date source book on international broadcasting' and has been called the 'authoritative reference book for anyone seeking information on radio and television around the world'.

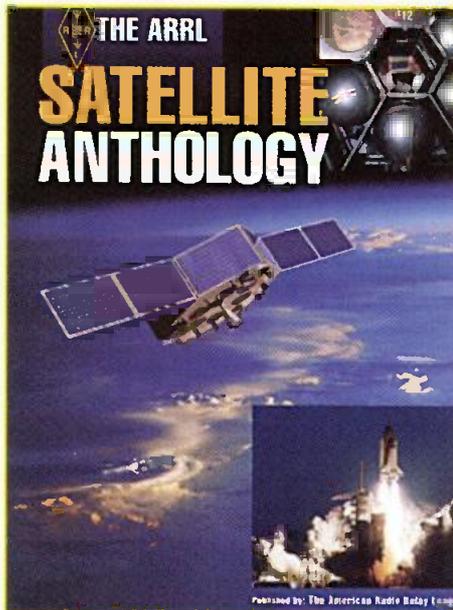
The information contained within its 608 pages includes details of stations on the long, medium and short wave bands together with contact information, listings given in frequency order of medium wave and shortwave broadcasts, an hour-by-hour guide to 1000 broadcasts in English. There is also a section giving internet addresses of international broadcasters, independent reviews of shortwave receivers and accessories and a directory of hobby clubs for international listeners.

The *WRTH* is already a bestseller world-wide and is eagerly awaited every year by many radio enthusiasts who use it daily as an invaluable reference guide. So, if your interests lie in the world of international broadcasting then this book is a must for you and at only **£17.95** it's well worth every penny!



Profiles

The ARRL Satellite Anthology

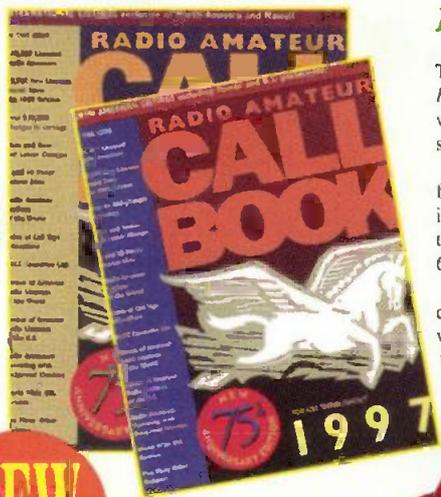


If you're looking forward to joining Amateur Radio activity that's really in the 'space age' the *ARRL's Satellite Anthology* will provide a great deal of information and a good read. This relatively small book packs a great deal of information within its covers.

Browsing through the pages and chapters such as 'A brief history of amateur satellites' and 'Phase 3D, 'Radio Sputnik' (the Russian satellites) and Microsats shows the reader just how much is available 'up there'! There's even a section telling the reader how to get information 'off the Web', software details and future satellites.

Altogether this book provides a very good 'read' and there's no doubt it will launch many more Radio Amateurs off into 'extra terrestrial' radio operations. With price tag of just **£7.95** is affordable too!

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1997 Radio Amateur Callbooks

The latest editions of the *North American* and *International Listing Radio Amateur Callbooks* have just arrived in the PW Book Store and with over 1600 pages they are surely an essential directory for every serious DXer.

The *North American* edition lists the calls, names and addresses for over 700,000 licensed amateurs in all countries of North America including Panama, Greenland, Bermuda, the Caribbean, Canada and the US Possessions. The *International Callbook* contains entries for 600,000 licensed amateurs in countries outside North America.

Both the *North American* and *International Listing Callbooks* contain Beacon lists, DXCC countries list, information on the world-wide QSL bureaus and radio amateur prefixes of the world in addition to their comprehensive call sign listings. Copies of both books are available for £20.95 each.



The ARRL UHF/Microwave Projects Manual

The PW team is often asked for advice on where to get the latest information on u.h.f. and microwave projects. In answer the team point readers to the ARRL books on the subject.

While not decrying the RSGB's books on the subject the Americans have the advantage in that they can publish their books more often and as a direct result the projects are also up-dated. *The ARRL UHF/Microwave Projects Manual* is a prime example of this and although it certainly has an American 'slant', a great deal of the contents are directly applicable here in Europe and elsewhere.

The book is not just a 'projects' manual, it's also a comprehensive guide to 'getting going' on u.h.f. and microwaves. Covering topics and projects from 'Making the most of microwaves' plus 'Getting Started on the microwave Bands' through to filter, amplifiers, transmission lines, antennas and test equipment...The PW team think it can be justifiably be called a 'Practical Microwave Working Manual'.

Copies of the *The ARRL UHF/Microwave Projects Manual* are available for £15.50 from the PW Book Store.



ARRL UHF/Microwave Projects Manual

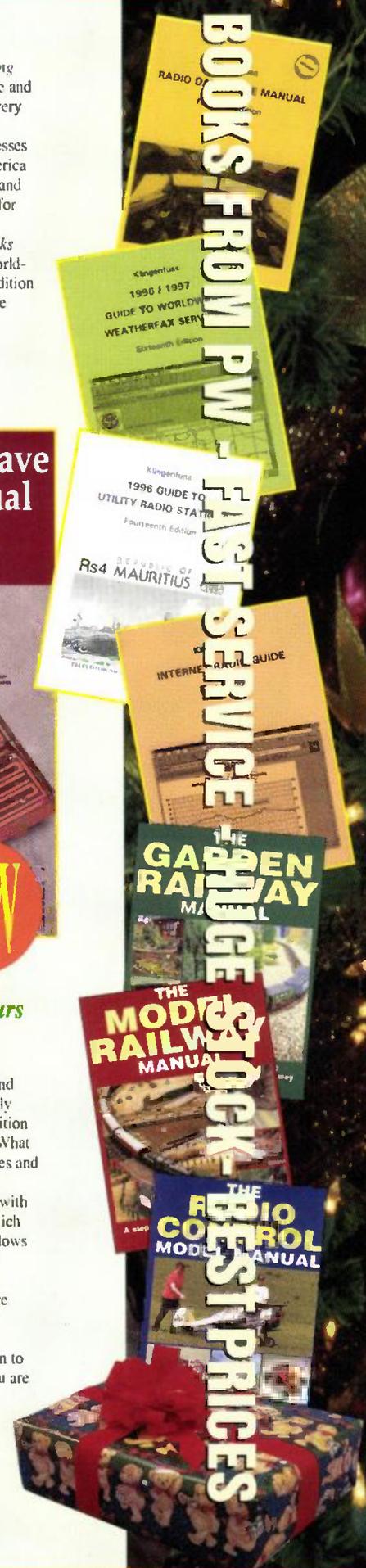
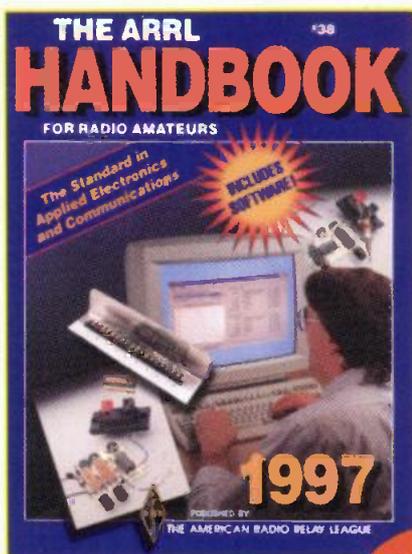


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Following the success of the decision to include software with last year's Handbook the ARRL have again included a disk which contains design and information software. The disk has a Windows database, TISFIND, which contains information on over 1000 equipment and parts suppliers. Also included on the disk are a standard value capacitor filter design program and a grid-square locator to name but two.

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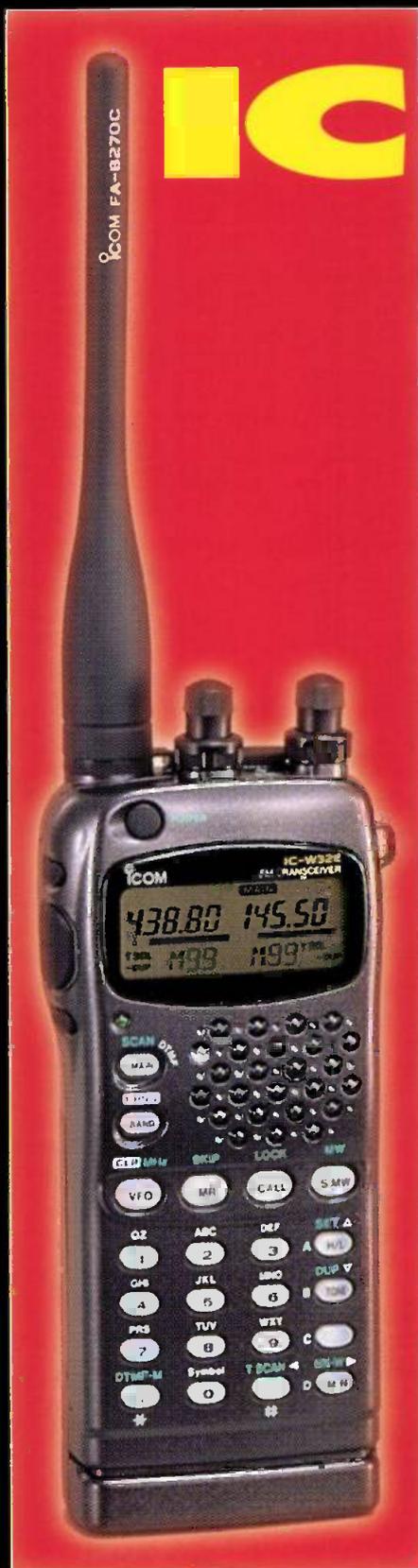
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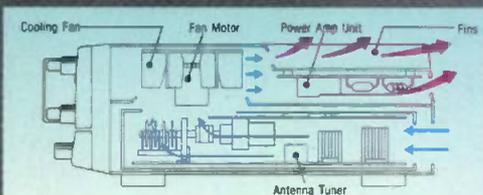
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