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## *Reviewed*

**Index QRP HF Transceiver**

**AEA PK-232 Multi-mode Controller**

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Collecting**

**Baird's Beams**

## *Build*

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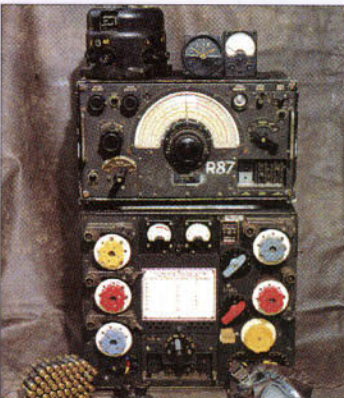
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## COMING NEXT MONTH

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73 from Dave G4KQH, Technical Manager.



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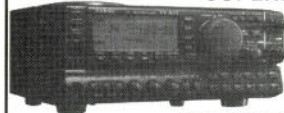
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TSB3303

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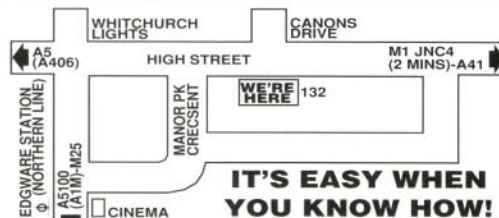
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# EDITOR'S *Keylines*

**S**o, 'they' have got the contract again! However, the old saying 'Better the devil you know than the one you don't' may apply. But just who is the mystery 'they' I'm talking about? (just in case you're wondering). It is of course none other than Subscription Services Ltd. (SSL), the contractor chosen by the Department of Trade & Industry to

operate the Amateur Radio Licence administration.

By the time this 'Keylines' appears, all radio amateurs holding a British Licence will have received a letter from the DTI's Radiocommunications Agency explaining who the 'new' contractor is. And (speaking entirely for myself), I must say that at the same time I was both disappointed and unsurprised at the DTI's decision to renew most of SSL's contract.

In the past I've been extremely critical of SSL's service as their performance was decidedly poor. At one point 75% of the radio amateurs employed by PW Publishing Ltd., had licence problems. Mine varied, ranging from receiving over 30 reminders

and multiple validation documents for a school club callsign (G0RSC) I hold, to receiving none for G3XFD.

However, SSL's performance does seem to be improving. We now receive more compliments (especially from G licensees living abroad) on their service than complaints. And grudgingly I've got to admit that SSL's service is also improving in my direction.

In 1994 I didn't receive 30 licence reminders for G0RSC. In fact...I didn't receive any reminder! But I suppose that's an improvement of sorts, and I've only got to convince SSL that the school (they log all incoming mail) never received a reminder, to hopefully renew G0RSC.

Readers can be sure of one thing in 1995. The PW team will be monitoring the SSL service very closely!

It's going to be my pleasure to temporarily vacate the 'Keylines' chair next month to make way for our guest contributor - Clive Trotman GW4YKL, RSGB President for 1995. So, until April...cheerio for now.

*Rob Mannion G3XFD*

## COMPETITION *Corner*

### Wordsearch rules:

Twelve different words have been hidden in the letter grid. They have been printed across (forwards or backwards), up and down, diagonally, but they are always in a straight line without odd letters between. You can use the letters in the grid more than once for different words. Once you have found all 12 words, mark them on the grid and send it, along with your name and address (photocopies accepted with the corner flash) to our editorial address, marked 'Competition Corner' Wordsearch February 1995.

Send your entry (photocopies acceptable with corner flash) to: Competition Corner, Wordsearch Competition, February 1995, PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Editor's decision on the winner is final and no correspondence will be entered into.

**FIRST PRIZE:** A year's subscription to *Practical Wireless* or a £20 book voucher.

**SECOND PRIZE:** A six month subscription to *Practical Wireless* or a £10 book voucher.

Entries to reach us by Friday 24 February 1995.

### Words To Find

Armstrong  
Baird  
Collecting  
Focal

Index  
Natter  
Novice  
Point

QRP  
Telechrome  
Valve  
Vintage

R	W	X	N	R	S	K	A	T	T	Z	O	G	O	M
G	S	R	N	E	A	O	Y	S	Y	B	G	N	V	Y
F	F	A	O	Z	Z	K	C	F	A	N	A	P	G	P
M	T	T	V	X	R	H	P	I	O	T	P	N	O	S
S	Y	Z	I	E	S	I	R	R	T	H	I	B	S	E
J	Y	B	C	D	X	D	T	E	X	T	E	A	G	E
K	R	H	E	N	S	S	R	I	C	H	F	A	M	N
D	F	Q	U	I	M	K	K	E	Q	B	T	O	F	B
R	J	D	L	R	Q	T	L	V	A	N	R	H	W	W
V	G	C	A	Q	F	L	P	I	I	H	Y	D	K	U
P	A	V	P	O	O	R	A	V	C	T	K	X	Z	X
M	R	L	C	C	Q	F	U	E	D	M	N	V	C	S
Y	I	A	V	L	X	S	L	U	I	I	I	I	D	G
V	L	A	Y	E	T	E	Y	E	H	N	D	A	O	N
U	Z	W	J	K	T	L	A	C	R	Y	L	V	K	P

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**PW COMPETITION  
FEB 1995**



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

# RECEIVING *You*

## Wet Behind The Ears?

**Dear Sir**

Your correspondent Mr B. J. Clark, (December issue) may be interested to learn that there are quite a few bounders like me who had the confounded cheek to acquire a callsign in the G0S series, yet who could hardly be described as 'wet behind the ears' since we were s.w.l.s and constructors when Mr Clark was very young. I have met a number of them on the air.

But then of course our friend will not have met them, we can be sure he would not be caught speaking to a G0.

Mr Clark's theory about the reason for 'Particulars withheld' gave me a good laugh. So it's to prevent fellow amateurs demonstrating their approval of bad operating methods?

Anyhow, I'm sure Mr Clark, in spite of his sweeping statements, is quite a nice chap, who wrote that letter with tongue in cheek. Throw a big stone into the water and watch the splash!

**John A. Gaukrodger  
G0STP  
Devon**

**Dear Sir**

In reply to the letter printed in *PW* December regarding QSL cards from G3BEC I should like to raise several points of my own. I am a female licensee with a fairly recent callsign. I have never been on CB and I am not a member of the RSGB.

I am on invalidity benefit and cannot work. I have been going to take the RAE for several years, but each time the

exam came round I could not afford to pay exam fees.

Eventually I took the exam last December and passed. I have been able to read Morse at over 14w.p.m. for the last four years. I do not wish to, and cannot afford to take the Morse test. I cannot afford to join the RSGB and there must be many others who are out of work who cannot afford these things either.

I am totally fed up of being classed as 'wet behind the ears' an ex CBER or a 'blackleg' because I don't belong to the RSGB.

As for giving an address for the call book there are obvious reasons for withholding this. And when will some of the older licence holders realise that some of us do not wish to have an A licence as all our interests are covered by our B licence?

Because we are recent licensees we are not necessarily 'wet behind the ears' or ex CBERs, and although we may have been s.w.l.s for many years, it does not follow that we are aware of all the services that the RSGB provide.

I personally, after several objectionable comments from some G3s, and G4s only talk to people I actually know, or use Packet, which means I only contact the people I wish to. Maybe if G3BEC would get off his high horse, be more helpful to new amateurs, the ex CBERs would stop winding him up.

I must add that I know a young man who

has been an avid s.w.l. for many years, he would like to become an amateur, but is put off by the fact that many older licensees will not talk to new licence holders. I rest my case.

**S. Spencer  
North Yorkshire**

**Dear Sir**

I have just finished reading the December issue of *PW*. And I have to say I feel insulted by Mr Clark's letter regarding ex CB users and can only see that he has tried CB and found there is not the same standard of operation on these bands.

I also found the CB band has become messy and full of idiots so I took the RAE and passed. I enjoy building my own aerials and enjoy even more using them as well as operating so you can't say I am just an operator like many do. Mr Clark seems to think that he has done things the right way and it looks like he thinks that it is the only way in to amateur radio.

I therefore wonder if Mr Clark has anything against novice callsigns for instance if they weren't s.w.l. first. I only hope that Mr Clark may see newcomers to the hobby in a wider scope and doesn't tar everybody with the same brush, CB on both 27 and 934MHz as well as s.w.l.s and v.h.f. listeners are all ways into amateur and just because we all didn't do it his way that doesn't make our callsigns worth any less than his.

One of my interests is direction finding

which is more help in tracking down these idiots than griping about the problem. It's not the people who do evil, it's the people who let them do it.

It's a simple process to find someone's 'phone number (if they're not ex directory) once you know their callsign. I withheld my details as I didn't want to be operating correctly by using my callsign only to find some clown has my 'phone number and address. It's not very fair is it?

**George Kinder  
Surrey**

**Editor's comment: We try to obtain a fair 'balance' of letters when a controversial topic is raised in 'Receiving You'. However, this is only possible when we receive letters 'for' and 'against' a particular argument or supposition.**

## PW 'Elmer' Award

**Dear Sir**

Thank you for the second place which I was awarded in the 1994 *PW* Elmer Award. The letter and log book came as a very welcome surprise as I did not know that I had been nominated!

It was only after having read my *PW* that I found out who nominated me so I will be buying my mother a bunch of flowers and a box of chocolates to say thank you to her as well.

Please pass on my best wishes to all the team at *PW* for Christmas and the New Year and thank you again.

**Robert Snary G4OBE  
Senior Novice  
Instructor For Greater  
London  
Middlesex**

**Editor's reply: It was our pleasure Robert. Congratulations! And, please don't forget readers...Elaine Richards G4LFM who edits our 'Novice Natter' column is waiting for the 1995 'Elmer' nominations. Let's be hearing from you!**

## Croak For Help

**Dear Sir**

Reference your 'Croak For Help' in 'Keylines' in December *PW*. What a sad story, however, I'm sure the problem will resolve itself quite satisfactorily, as you will see!

If all else fails, you might do well to sponsor a Donna Vincent Admiration Group - that ought to keep her in toad mugs for a while, not that the OM or XYM will be pleased about it. You could even work a toad mug in with "I love *Practical Wireless*" on it (apologies to RSGB).

**Ray Stoiwold 2E1CQL  
Northampton**

**Editor's reply: Many thanks to Ray 2E1CQL and all the other readers who wrote in reply to my 'Croak For Help'. We've now sent the mug fragments to a pottery in Wales and they've promised to make an even better version. We hope to publish a photograph of the two mugs (one new!) together in a forthcoming 'Keylines'. Thank you again readers.**



## RSGB Subscriptions & Morse

**Dear Sir**

May I be permitted to reply to your correspondent Mr Taylor, ('Receiving You,' December 1994).

If that gentleman cares to re-read my original letter, he will see that I did not question other people's incomes, in fact, the only income I referred to was my own.

What I did question was the assertion, even in today's economic climate, that it is not possible to afford £32 per annum. I realise there may be many reasons why one does not join the RSGB, but please, let us not hide them behind pleas of poverty.

Concerning Morse, I wonder whether those having so much difficulty are not really interested in using the mode after they have passed the test. Anything seems difficult and irksome if approached in a disgruntled state of mind.

Finally, having for over 40 years been assisting the amateur fraternity, both professionally and on a volunteer basis, it would perhaps be unfair to Mr Taylor for me to enter into a debate over the definition of a radio amateur.

Perhaps two phrases will give food for thought: 'Don't expect something for nothing' and 'Put more into the hobby than you take out'.

**E. G. Allen G3DRN**  
London

## Come on Folks!

These are **your** pages, let's see some photographs along with your letters - they make the items more interesting. We'll return them safely and award an extra £5 voucher too!

## Voucher & GB2SM

**Dear Sir**

I am writing to thank you for the quite unexpected gift of a voucher for the Star Letter which you were kind enough to print in the December issue of *PW*.

I was very pleased to read that GB2SM has been saved from extinction - it just shows what can be achieved by a combined and determined assault on the 'Plutocracy'!

Referring to the letter in the same issue from Mr Parkin G8PBE, I would like to say that I also remember the contribution made to home construction by Mr John Scott-Taggart. I think that Mr Parkin is slightly at error to refer to WHS as the anonymous contributor to *Popular Wireless*, it was in fact W.L.S., although I did not know that it was the later Howard Thomas G6QB and I am grateful to Mr Parkin for that information.

Continuing, a bit out of 'phase', I believe the receiver capable of reception on two separate parts of the spectrum at the same time, was in fact designed by the staff of *Popular Wireless* and I think, although I am not absolutely sure, it was called the 'Jubilee' to commemorate the 25 years reign of H M King George V and Queen Mary. I do not recall that it used a 'special' valve invented by J.S.T.

Well, that's all for now, so I will end by wishing all at *PW* a very Happy Christmas and a successful New Year.

**R. P. Neave G4DAN**  
Essex

**Editor's comment:** We hope you enjoy using your voucher Mr Neave and we'll have more news on GB2SM soon.

## Radio 'Hams'

**Dear Sir**

I have just got back from the 'colonies' where I have been doing some research in North Carolina and Kentucky, and also taking in the 'Fall' colours.

I found the following little ditty while doing some investigating and browsing through a NASA database: "At one time entertainers used to make make-up from ham fat, and thus became known as 'Ham Fat Actors', which was shortened to Ham actors. The name stuck.

With the advent of radio, the name was applied to those who improvised equipment from whatever they could scrounge, so they could manage to get on the air on a non commercial basis. 'From that day to this we, as radio amateurs, have been known as Hams'.

There's also a reference source: *How to be a Ham*, 3rd edition, W. Edmund Hood, Published by TAB books.

**Michael Stott G0NEE, KB5MPO, ex G8BGU**  
Northumberland

**Editor's comment:** Welcome back to the UK Michael. Now we know, and who to blame for the next 'colonial war'! Did you enter the USA via Boston and stop for a (tea) party by any chance?

## Repeaters On 50MHz

**Dear Sir**

I note in the December 1994 *PW* a reference to 50MHz repeaters in the review of the Alinco DR-M06SX.

The current situation is that seven groups have sent us a full proposal. Although mobile operation on this band is now allowed, the Radiocommunications Agency have not yet agreed to 50MHz repeaters. I hope that the matter will be dis-

cussed with the RA soon.

Our provisional plan calls for all the proposed UK 50MHz repeaters to be on different radio frequencies but to use a common UK CTCSS frequency of 103.5Hz.

Access will be by CTCSS only, i.e. no tone burst. The subtone to be continuous during transmission. We hope that other European countries will use a different national tone to avoid

mutual interference.

**Dave McQue G4NJU**  
Special Projects  
Manager and vice  
Chairman RSGB RMG  
Milton Keynes

**Editor's comment:** Thanks for the information Dave. Readers interested in 50MHz and proposed repeater operations will be kept up to date via 'VHF Report' which is collated by David Butler G4ASR.

## G3MPD - Request For Information

**Dear Sir**

Reference G3MPD - Request For Information - which you published in *PW* December 1994. May I, through your columns, thank all those who came forward with information regarding the above call sign, which turned out to be G13MPD.

The call sign G13MPD was only active for two or three years from 1958 and, sadly, is now a 'Silent Key'. His family has been traced through the good offices of G18AYZ to whom I am especially grateful.

**L. D. Davey-Thomas**  
Chairman of Poldhu Amateur Radio  
Club  
Cornwall

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.



## Winter Short Wave

The International Short Wave League's (ISWL) *Guide To English Language Short Wave Broadcasts To Europe (Winter Schedules 1994/1995)* is now available from the ISWL Headquarters in Cheshire.

The ISWL guide is in the form of a 44-page A4 sized booklet and has been written in a way that makes it comprehensive, practical and it reflects the current state of the English language programmes that are available on the short wave bands. The information in the guide is presented in time order (GMT/UTC) with aligning programme times; Country and station names; frequencies and programme details. All frequencies are given in kHz.

The *Guide To English Language Short Wave Broadcasts To Europe (Winter Schedules 1994/1995)* can be obtained by sending £1.50 (IRCs or postage stamps acceptable) to **The ISWL, 10 Clyde Crescent, Wharton Winsford, Cheshire CW7 3LA.**

## Can You Help?

**Colin Cadby** has a **Sony radio/cassette model No. CF-420L** with a broken tuning cord. If you have any information on the CF-420L that would help Colin to repair the tuning cord, please write to him at **'Arley', 82 Stevens Road, Pedmore, Stourbridge, West Midlands DY9 0XW.** He's willing to pay any reasonable expenses for information offered.

Does anyone know where **Horace Underwood G7RZI** can get hold of a **Microwave Modules MM2 Morse Talker?** Horace is a Registered Blind person who has recently passed his Morse test and wishes to carry on with his studies. He has been told that the MM2 would be a great help to him but local enquiries have failed to find one. If you can help then please contact Horace at **3 Dunlin Close, Pheasant Wood, Thornton-Cleveleys, Lancs FY5 2R.**

## Alinco Reduction

**Waters & Stanton Electronics** have announced that due to improved prices from the Alinco factory many of the equipment prices from the Alinco range have been reduced. To obtain full details on the price reductions and for information on the range available readers are invited to send a s.a.e to **Waters & Stanton Electronics, 22 Main Road, Hockley, Essex SS5 4QS.**

## Draw Winner

**Mr M. McGeechan of Glasgow** was the lucky winner of the £50 Prize Draw from the December 1994 issue of *Practical Wireless*. If you place an order for books from this issue your name will automatically be entered into the prize draw (see Book Service pages in this issue for more information).

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

# NEWS '95

## Lynch's Lunch Club Celebrates Four Years

They catered for 800 and still ran out of food at 'Lynch's Lunch Club' on Saturday November 26 1994! Visitors taking up the invitation to join Martin Lynch on the occasion of the fourth anniversary of the Amateur Radio Exchange Centre in Ealing could have been forgiven for mistaking it for a 'lunch club' as all the free food was eaten!

During the day the Northfield Avenue shop was full to overflowing. One intrepid visitor was seen enjoying his food while sat in the 'official' Amateur Radio Exchange Reliant three-wheeler car parked on the forecourt.

Many people took the opportunity to meet and make old friends and take an interest in the ultra-modern equipment on sale, including Dick Ganderton G8VFF, Editor of *Short Wave Magazine*, accompanied by Peggy his wife. Rob Mannion G3XFD, Editor of *Practical Wireless* was seen chatting to readers and taking an interest in the display of vintage amateur radio equipment on show in the shop.

With visitors coming from all over the UK and some from abroad, the catering side of 'Lynch's Lunch Club' was kept very busy. The food and drinks were organised and overseen by Martin's wife Jennifer, and the catering team leader say that next time they're going to cater for 1000 visitors!

The event was fully supported by Alinco, Icom UK Ltd., Kenwood UK Ltd., and Yaesu UK Ltd. The group were in celebratory mood as it was Yaesu UK's first birthday, and of course the occasion demanded a cake which duly disappeared in the same direction as the rest of the food! Then the group turned their hand to fundraising for the BBC's Children In Need Appeal. And, by raffling the 'freebies' normally given away at rallies and major shows, they raised £215!

Fortunately parking is easy in Ealing. However, if the Amateur Radio Exchange Centre is planning many more of these events ... Martin will need to start looking for another (larger) shop!

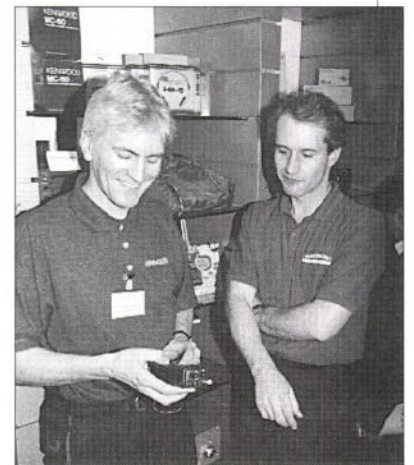
**Dave Wilkins G5HY (left)** of Kenwood UK Ltd., discussing the latest technology used in hand-held transceivers with **Graham Tingey**, the resident Service Engineer at Martin Lynch's Ealing shop.



**A brief rest - but she's still smiling - Jennifer Lynch (right) and Liz, one of her catering team members prepare yet more glasses for the hordes of visitors on the open day held on November 26.**



**Martin Lynch's Amateur Radio Exchange Centre open day raised £215 for the BBC's Children In Need Appeal. Here, Barry Cooper G4RKO (above left) from Yaesu UK Ltd., assisted by Jeff Stanton G6XYU representing Alinco, draw some of the prizes for the fundraising event.**





## Cushcraft Winner

Regular readers of *Practical Wireless* will remember the competition that we ran in the August 1994 issue giving you the chance to win the Cushcraft A3S HF Beam Antenna reviewed by Clive Hardy G4SLU and Rob Mannion G3XFD. The competition generated a lot of interest with many guessing the answer correctly.

All the correct answers were put in the Editor's biscuit barrel and a winner drawn. The lucky recipient of the Cushcraft Antenna was the **Rev. T. J. Walker G0TWE** from **Lincoln**. There were also five runners-up who will all receive a Waters & Stanton 20% discount vouchers redeemable against antennas from the Cushcraft range.

Our congratulations go to the Rev. Walker and our thanks to Waters & Stanton Electronics for donating the prizes.



**Editor Rob Mannion G3XFD receiving the Cushcraft prize antenna from Jeff Stanton G6XYU (Mr. Cushcraft Antennas UK 1995).**

## Live Show

Live '94, The Consumer Electronics Show celebrated its second second year with over 186 000 people attending Earls

Court during the week of September 20 - 25 1994. The Amateur Radio Village bought together Icom UK, Lowe Electronics, Martin Lynch, PW Publishing Ltd., The Radio Society of Great Britain, Trio-Kenwood UK, Waters & Stanton and Yaesu UK in an aim to promote radio as a hobby.

There were many major prizes to be won on The Amateur Radio Village stand at Live '94, donated by the dealers. The following is a list of who won what:

Winner	Prize	Donated By
P J Holt G8YJQ	IC-281H	Icom (UK) Ltd.
J Irlam G3JBT	HF150	Lowe Electronics
A Rowe G6AVP	Kantronics KPC3	Martin Lynch
J F Porter G4AGN	PW Subscription	PW Publishing Ltd.
C Barker G4USG	PW Subscription	PW Publishing Ltd.
K Blanshard 2E1CRE	PW Subscription	PW Publishing Ltd.
J Pearlless G3JPJ	PW Subscription	PW Publishing Ltd.
P J Clark G4PGS	PW Subscription	PW Publishing Ltd.
J Binning G3AJS	PW Subscription	PW Publishing Ltd.
J R Groves G7SNR	TH-22E	Trio-Kenwood UK
M Chapman G4ZKE	DJ-580E	Waters & Stanton
S M Gambles G4GI	FT-416	Yaesu (UK) Ltd.

## On Course With Lake

Alan Lake will be running an intensive short Radio Amateurs Examination course at the **Arnold & Carlton College, Mapperley, Nottingham**. The course starts on **January 12 1995** and will prepare students to take the RAE in May 1995.

If you are interested telephone **(0115) 938 2509** for more details. Don't worry if you miss week one of the course, just make sure that you sign up in time for week two!

## Anode Valves

Plymouth based Anode Electronics specialise in supplying domestic radio valves and spares from the early 1930s to the late 1960s. They are a small established business that has been founded upon old fashioned prompt and personal service.

Anode Electronics have a wide range of stock including over 5000 valves, components, dial bulbs, valve bases and coil formers, which changes regularly. They can also offer service and historical information from a library covering over 4000 models.

Anode have over 36 contacts in 17 different countries from which they can source valves, etc. However, they are unfortunately unable to supply lists or catalogues but they do offer a return of post quotation. More information on the full range of services offered is available from **Anode Electronics, 80D Hyde Park Road, Plymouth PL3 4RQ. Tel: (01752) 673356.**

## Agency News

The Radiocommunications Agency (RA) have announced details that in future the revocation of amateur and CB radio licences issued under the Wireless Telegraphy Act 1949 will be published where it's deemed appropriate.

Up until now the RA hasn't been able to inform the radio community when a licence has been revoked. This has been because licence details have always been regarded as confidential. The amateur radio and citizens' band radio licences will therefore be amended to include a note to say that the Secretary of State reserves the right to publish the name of a licensee if the licence is revoked.

The Radiocommunications Agency have also announced that the three year contract for distributing the amateur and CB licences has been awarded to Subscription Services Limited (SSL) in Bristol.

## Thanks To Amateur Radio

Martin Lynch of The Electronics Hobbies Exchange Centre is currently importing and distributing a new Amateur Radio publication called *Thanks To Amateur Radio*, which is written and published by Stan Gülich SM7WT.

*Thanks To Amateur Radio* is described as a publication that is actually about the hobby and the people involved and is intended to explain to the general public what amateur radio has to offer society. The 323-page A5 sized book contains chapters covering topics such as: Famous people who

are radio amateurs, Contest operation, Operating modes, DXpeditions and Services offered by Radio Amateurs.

Stan Gülich's book is sold in 38 countries around the world. If you would like a copy of *Thanks To Amateur Radio* it's available for **£16.95**, (if you mention that you read about the book in *PW*, UK mainland postage will be free) direct from **Martin Lynch, The Electronics Hobbies Exchange Centre, 140-142 Northfield Avenue, Ealing, London W13 9SB. Tel: 0181-566 1120.**

## Stop Press - Late News

Just as this issue of *PW* was going to press we received news of a new Yaesu hand-held transceiver that South Midlands Communications have added to their range of products.

The new FT-51R is a dual band hand-held transceiver covering the 144 and 430MHz bands. Other features include full duplex operation, spectrum 'scope, message paging and auto sub receiver muting.

The FT-51R is currently being offered by SMC at the introductory price of £449. More details can be obtained direct from **South Midlands Communications, S.M. House, School Close, Chandlers Ford Industrial Estate, Eastleigh, Hants SO5 3BY. Tel: (01703) 251549/255111.**



# For Everything In Packet Radio, There Is Only One Make To Choose From



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## PK-232MBX



Probably the best selling Data Controller in the world, the PK-232MBX is the Radio Modem to choose if you want all modes, including Morse Code, Baudot, (RTTY), Ascii, Amtor/Sitor 476 & 625, Pactor, HF & VHF Packet, B&W Fax tx/rx, Navtex & Amtex. As with the PK-900, the PK-232MBX now includes "SIAM" and is compatible with the popular TCP/IP networking protocol via KISS mode.

RRP £329.95

## PK-12



The very latest replacement for the PK-88, the tiny PK-12 not only comes with more features, but its cheaper too! The PK-12 is a 1200 baud VHF packet controller ideal for those of you who are looking at getting started in digital communications. Full-featured mail drop facilities including internal lithium battery back-up.

RRP £139.95

## IsoLoop 10-30



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This high-Q, high efficiency antenna is perfect for Amateurs (and professionals), living in areas with antenna restrictions. The IsoLoop is a compact (only 35") diameter, rugged low profile design, allowing 150 watts of RF anywhere between 10 and 30MHz. Efficiency ranges from a staggering 96% on 28MHz to 72% on 14MHz and because of the high-Q design, TVI is reduced still further over "conventional" antennas. The IsoLoop includes 50ft of control cable and a new improved antenna controller.

RRP £399.95

## PK-900



When you're ready to step up from the best selling PK-232MBX, then take a look at the PK-900. Dual simultaneous ports, switchable via a single keystroke, will still allow the user to receive two signals at the same time. Internal firmware includes SIAM - Signal Identification & Acquisition Mode, automatically identifying the incoming mode of transmission - takes out the guess work! Add the optional 9600 baud modem and you're satellite ready!

RRP £479.95

## PK-96



Whilst others are still having a five course lunch waiting for 1K of data to transfer, you can enjoy the incredible speed of using a new PK-96 and find yourself with hours of free time on your hands! The PK-96 takes over from where the old PK-88 left off. It comes standard with 1200 baud AFSK tone signalling, as well as 9600 baud G3RUH compatible direct frequency modulation, making the PK-96 an ideal high speed terrestrial, or satellite data controller.

RRP £199.95

## PC-Pakratt for Windows



Operate the entire range of AEA controllers from one package. Run two controllers at once, run other programmes on your PC (in Windows), whilst controlling your data controller. Additional features include separate windows for mailbox operation, QSO Logging, file transfers and more.

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### SWR-121 V/U

As above, but Range: 120-175, 200-225, 400-475MHz  
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The ultimate high speed keyboard keyer  
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### AEA FAX 111

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# Repeaters - The UHF Side

*Tex Swann G1TEX provides an insight into u.h.f. repeaters and looks at the similarities and differences between them and their v.h.f. counterparts.*

This is the second article about the many amateur repeater stations that cover the country. And this time I will turn to those in the 430MHz band.

Having dealt with 144MHz voice repeaters on page 26 of the November 1994 issue of *PW* I won't labour it too much. If you're unsure of exactly how repeaters work, I recommend that you read that for more information.

Basically the repeater's job is to take a small signal (say from a hand-held rig) and retransmit it again at a higher power level, on a different frequency. This allows two users with low powered transmitters to communicate over a wider area than they could without a repeater.

However, there are some important differences between v.h.f. and u.h.f. repeaters. In the 144MHz band there are only eight repeater channels. The 430MHz band differs in that there are twice as many repeater channels, and the repeater offset is completely different.

The u.h.f. repeater 'listens' on frequencies between 434.600 and 434.975MHz (25kHz spacing). These channels are known as RB0 - RB15. The output frequencies for the u.h.f. repeaters are 1.6MHz **below** the input frequencies. If you have a look at the frequency chart **Fig. 1**, you'll find the details.

**Fig. 1: Repeater Channels frequencies.**

Channel Number	Input MHz	Output MHz
RB0	434.600	433.000
RB1	434.625	433.025
RB2	434.650	433.050
RB3	434.675	433.075
RB4	434.700	433.100
RB5	434.725	433.125
RB6	434.750	433.150
RB7	434.775	433.175
RB8	434.800	433.200
RB9	434.825	433.225
RB10	434.850	433.250
RB11	434.875	433.275
RB12	434.900	433.300
RB13	434.925	433.325
RB14	434.950	433.350
RB15	434.975	433.375

Set your f.m. rig to use a repeater, dial in, or set up the **output** frequency of your local repeater, and then set your rig to repeater shift (+1.6MHz). Some newer rigs automatically select repeater offset when tuned to a repeater channel.

So, your rig's now transmitting on the repeater's input channel. For example, our local repeater (GB3SD) on RB14 'listens' on 434.950MHz to my transmitter. As I speak, the received audio (my voice) is used to modulate the repeater's transmitter on 433.350MHz.

Many u.h.f. repeaters need a short (500ms) burst of 1750Hz audio tone (known as the tone-burst) to start it up from 'cold'. Though there are many repeaters that need only a clean signal on their input frequency to come into operation.

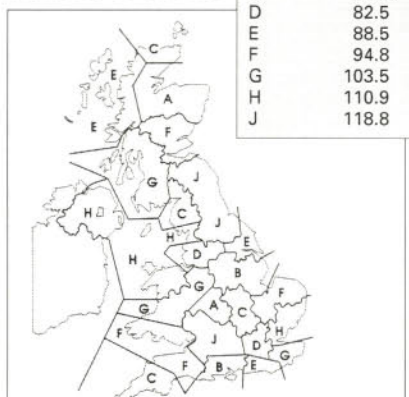
In line with v.h.f. repeaters, the use of **Continuous Tone-Coded Sub-audible Squelch (CTCSS)** tones is being phased-in on u.h.f. repeaters. The CTCSS tone used, is one of nine low audio frequency tones in the range 67.1 - 118.8Hz.

The CTCSS frequencies, outside the 'normal' (300Hz to 3kHz) audio pass band of most transceivers, hold open the repeater and shouldn't be heard by you. Any repeater that has the CTCSS facility will add one of the letters: A, B, C, D, E, F, G, H, or J after its Morse call sign transmission.

**Now that you know what they are and how to use them, look out for the *PW* 430MHz Repeater Data Card to be given away free, courtesy of Yaesu (UK), with the March 1995 issue of *Practical Wireless*.**

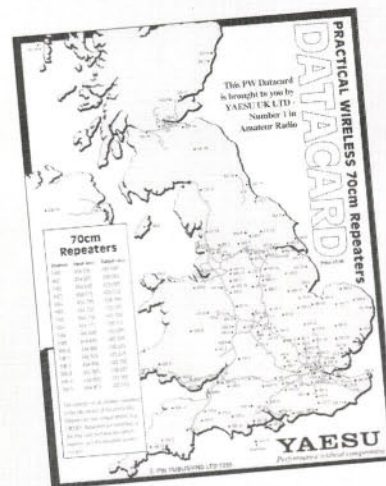
**PW**

**The plan to be used when a repeater uses CTCSS access (reproduced by courtesy of RSGB).**



Tone Area	CTSS Tone (Hz)
A	67.1
B	71.9
C	77.00
D	82.5
E	88.5
F	94.8
G	103.5
H	110.9
J	118.8

## FREE WITH THE MARCH 1995 ISSUE OF PRACTICAL WIRELESS



### PW 70cm DATACARD

Inside the March issue of *PW* you'll find a **FREE** updated 70cm (430MHz) repeater datacard. Many readers have asked if there were any of the old 70cm datacards still available so we decided it was time to produce a completely new and revised card. The new 70cm Datacard has been updated, is bigger than before and is a convenient size and sturdy enough for carrying around in the car. It's also easy to see when pinned up in your shack. If you enjoy mobile operating and often venture into unfamiliar areas, a quick glance at the Datacard will show you the nearest 70cm repeater together with its frequency and callsign.

The March 1995 issue of *Practical Wireless* is on sale from **Thursday February 9**. To avoid disappointment and ensure that you get your copy of **New 70cm Repeater Datacard** make sure you place an order with your newsagent for the UK's best selling magazine for amateur radio enthusiasts.

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The *PW* 70cm Datacard has been fully sponsored by Yaesu UK Ltd.



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## Radio Amateur And Listener's Data Handbook

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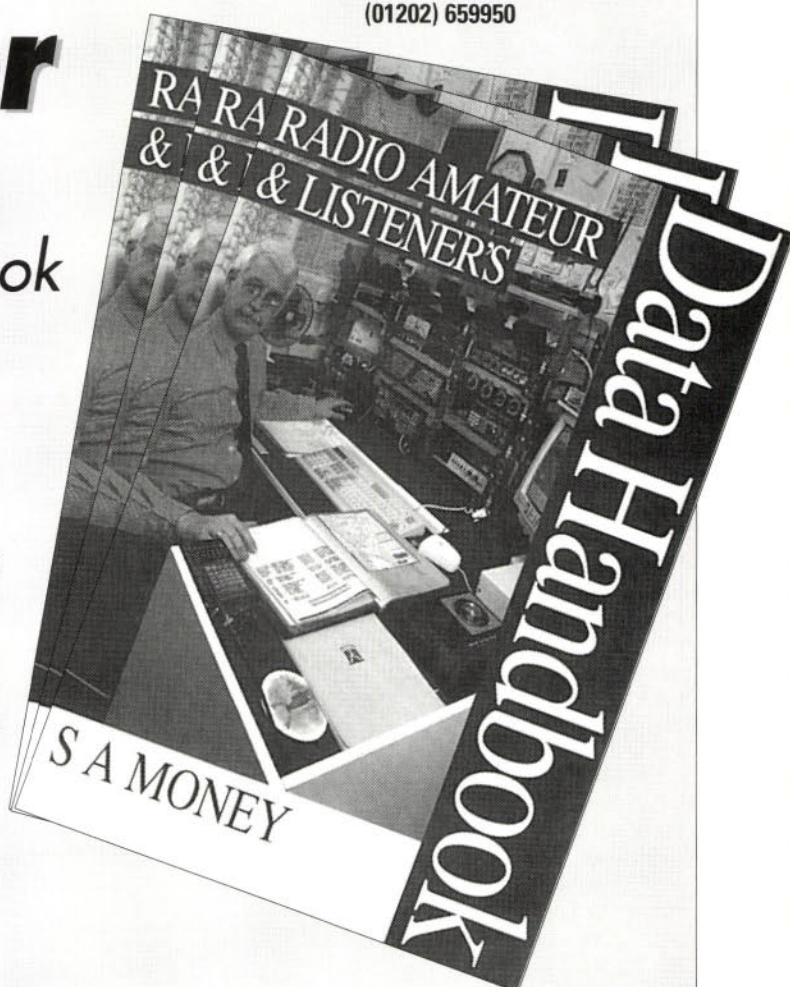
The original Newnes *Radio Amateur and Listener's Pocket Book* was a best seller. Now Steve Money has completely rewritten and expanded it to include new chapters on broadcast listening, instruments and interference.

*Radio Amateur And Listener's Data Handbook* is a unique collection of useful and intriguing data for both the traditional and modern radio amateur as well as the high-tech listener. Familiar radio topics are covered - abbreviations and codes,

symbols, formula and frequencies - while the newer features of the hobby radio world - decoding, airband, maritime, packet, slow scan TV, etc. are also dealt with.

This is a book that all readers of *PW* will find useful and we are pleased to be able to offer readers the opportunity to buy the book at the special pre-publication price of **£12.95 plus £1.00 P&P (UK) £1.75 (overseas surface).**

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### CONTENTS:

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## Learning By Post

**William Mactear** has written asking about correspondence courses for the RAE. He lives in the Outer Hebrides and, unfortunately, Lewis Castle College don't run an RAE course.

Well, The Rapid Results College have been running for many years now and they offer a correspondence course for the RAE. You can contact them at **Tuition House, London SW19 4DS. Tel: 0181-947 7272** between 9am and 5pm.

Unfortunately William, the days when any Marine certificates gave you exemptions to the RAE are long gone, so you will have to sit the exam. I'm not sure how you go about taking the exam if there are no colleges nearby.

My advice is to contact the RSGB as they are likely to have the most information regarding sitting the exam. I'm sure they have been dealing with problems like this for many years.

Disabled readers should also contact the RSGB, because I have heard of arrangements being made to take some parts of the exam at home under supervision. You should either write to or telephone: **The RSGB, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE. Tel: (01707) 659015.**

Alternatively, I'm a great believer in your local (or nearest) radio club - see this month's 'First Steps'. There will be people there who know where the nearest college will be or who to contact. Talk to them, you'll find details of all local radio clubs in the latest edition of the *RSGB Call Book*.

# NOVICE *Natter*

*For Radio Beginners of all Ages.*

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

Elaine Richards G4LFM looks at postal RAE courses, awards, Citizen Band radio and in 'First Steps' encourages you to support your local radio

## Worked All Britain Awards

Did you take part in the Worked All Britain (WAB) Lifeboat Award? Well, they had a great number of s.w.l.s who took part and gained the award. These are as follows: **A. Davies, A. Gutteridge, A. Harvey, A. Tideswell, Biem C. Lap, C.W. Bunn, D. Foster, D. Howes, D. Smith, D.J. Ridley, D.W. Alexander, E. Ridgeway, F. Whitehorn, F.M. King, G. Hudson, G. Ridgeway, H. Etherington, J.C. Nicholls, J.W. Honbold, L.J. McKenzie, ONL 4003P, Bartlett, R. Akhurst, R. Guest, R. Lewery, T. Peterson and T.P. Edwards.** All those who took part raised £1000 for the Royal National Lifeboat Institution (RNLI).

Dennis Sartin from the WAB says he'd like to hear your ideas and views of the Lifeboat weekend, so if you took part let him know. You can write to **Dennis GW6JNE, Shortwave Liaison Officer at 7 Penrhos Crescent, Rumney, Cardiff CF3 8PB.**

## Ever Tried Citizens' Band?

I've been pleasantly surprised to receive two very positive and sensible letters regarding CB. **Noel Amis** and **Barry Spencer** have both written pointing out how and why CB can be a good place to start your 'career' on the airwaves.

Noel, who lives in South Essex, doesn't use CB - yet. He's studying for the Radio Amateur's Examination (RAE) by Correspondence Course. Unless he can find a college who are running the exam (he has his name down but is the only one so far, which means it will probably be cancelled) Noel says that he will be joining the CB ranks.

Noel's had a listen around the CB section of the band and feels that it provides a relatively inexpensive means of communication. He also feels CB is of benefit to the house-bound, the disabled and others who don't feel able to get out in the evening to meet people.

If you know of a college in the Romford area that will be running the May 1995 RAE exam, please drop me a line

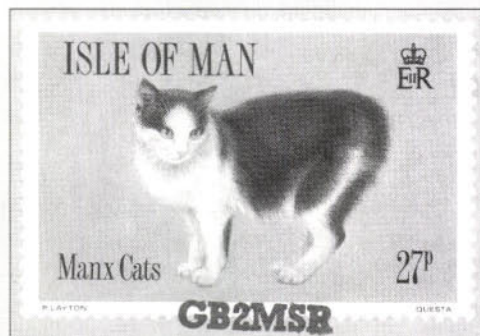
## Jamboree News

I've heard from **Denys Philip Hall** and the Isle of Man Scouts about the Jamboree On The Air (JOTA) station, **GB2MSR**, they set up. Scouts from the 1st and 5th Douglas troops took part and they managed to pass greetings to scouts in the UK, Canada, USA, Netherlands, Norway and Sweden.

Amateurs from other countries were contacted including one in Puerto Rico. The Isle of Man Scouts managed to contact 46 Scout and Guide Jamboree stations and 42 other UK stations, with over 200 greetings messages being exchanged.

The group seem to be well sponsored by local business. The Isle of Man Post Office donated the QSL cards that will be sent to all the stations they contacted and to any s.w.l. who sent in a report. Also the Isle of Man Steam Packet Company, Manx Airlines and the Isle of Man Bank at Parliament Street all donated prizes to be given by the RSGB for their competition held in *D-I-Y Radio* magazine.

My thanks to Denys (sat behind the mic) for the information. Well done one and all for your hard work.



**Three legs and no tail!**



**The JOTA station GB2MSR in action.**



and I'll pass it on to Noel. It would be a great shame if he couldn't take the RAE after the effort involved in studying.

Barry, on the other hand, is Secretary/Treasurer for the Borders CB Group. He feels that CB has a part to play in the overall radio spectrum and that it can fill a need before the Novice or full RAE are attempted.

He's also found that in trying to help sort out other Cbers problems he's picked up quite a bit of information that would be useful for the RAE, and thinks he might have a go next year. Barry finds that there are many like himself who enjoy CB and don't need to ruin it with swearing, music or other unpleasant habits.

I would still be interested in hearing more about which CB radios are considered to be the best to use and other useful information, so please keep writing. If you don't like CB, then please be tolerant. As a subject it will only ever be a small part of this column, along with being an s.w.l., packeteer, Novice, A or B licensee or anything else of a radio topic that arises.

## Address Change

Many radio amateurs, especially new licensees are members of DX clubs. One well known DX club is the British DX Club and they have recently changed their address. You should now address all correspondence to: **British DX Club, 126 Bargery road, Catford, London SE6 2LR.**

## Who's Doing What?

I'd still be interested to hear from any Novice groups. How's the course going, how many of you have passed, who's going for the May 1995 exam, what bits are you getting stuck on? Drop me a line with any information or questions I'm always pleased to hear from you.

*That's all I've got room for this month so, until next time keep sending your letters. I'd especially like to hear from you if you've got anything you'd like featured in 'First Steps'.*

## Your Worst Christmas Present?

Now, if you've already bought the *Seek You* CD and enjoyed it, my apologies - if you got it for Christmas, ooops!

I've been loaned (I hope) a copy of *Seek You*, a CD of amateur radio songs by the Ham Band, a Country and Western group. There are 14 tracks with songs entitled like 'I'm not climbing up the tower any more', 'The trip to Dayton' and 'Seventy Threes'.

It plots the story of **Andrew G3WZZ** and his girlfriend (and later wife) Lisa and how she becomes a radio widow. Well, I'm not a Country and Western fan to start with, so I'm probably not the best person to be given this disc.

I'm sorry but I didn't enjoy it. Some of the words were quite good, others made me want to curl up and die with embarrassment. Still, as I said before I was probably not the right person to listen to it.

I've seen *Seek You* on sale at rallies, so if you get a chance have a listen and decide for yourself. It's certainly a different idea, perhaps the gift for the radio amateur who has everything? It's produced by **Last Resort Records, Mollestien 53, DK-8000 Aarhus C, Denmark.**

## First Steps

### Support Your Local Club

Are you a regular attendee at your local amateur radio club? If not, you really ought to join if you want to get the most from the hobby.

Even if you are a member, do you give your time or assistance back to the club? All too often the answer to both these questions is no. So why should you join and get involved?

If you look around at the range of clubs across the country you will find that the secret to the success of the best clubs lies in a strong active membership. If you've not been to many club meetings you probably have conjured up a picture of a regular meeting, probably weekly, with the secretary and chairman providing local news and a guest speaker followed by drinks in the bar. All very nice but this is only the tip of the iceberg as there's lots more available from most clubs.

One of the most important benefits of club membership is access to a wide range of expertise to help you with technical or operational problems. The only word of warning I offer here is to make sure you actually get an expert and not just someone who thinks they're an expert!

The best way around this problem is to ask one of the club officials to recommend someone to help with your problem. Through this route you can often get access to sophisticated test equipment that would not be available any other way.

Another great benefit of joining your local radio club is that you will have the opportunity to get involved with and try out new activities at a very low cost. If, for example, you're thinking of setting-up a Packet station, you can find someone who's already active and spend some time with the mode before you part with your hard earned cash.

If you like a challenge you can also try getting involved with a contest. Whilst I appreciate that contests can appear to be a waste of time, club contest stations can be really good fun.

By far the best are the field days where you have to put together a whole team of people to transport and assemble a comprehensive multi-band station at a remote (often very remote) site. In addition to the basic radio kit you need to have food and accommodation for all those attending.

These contests often last for a couple of days, so they also become a form of endurance test, especially if the weather turns bad. At the end of it you will have increased your radio skills and made a few friends as well. I was a member of Flight Refuelling Amateur Radio Club for many years and have many fond memories of our contest efforts.

To achieve any of this you first have to join a club and then be prepared to ask questions and volunteer willingly when requests for help go out. If you do this with enthusiasm your efforts will be rewarded many times over. It really is worth the effort to join a club.

*Elaine G4LFM*



## Saltee Exhibition

Between June 10 and 14th 1994 the **Grantham Radio Club** activated the special callsign of **EJ2SI** from Saltee Island off the Irish Coast. Ten members from the Grantham club led by **Alan GORCI** made the trip to Saltee, together with their equipment which included two h.f rigs, antennas, laptop computers, lights, chargers etc.

**The operating site of EJ2SI.**



Alan had hoped that the trip would amount in 1000 QSOs being made however, this number was far exceeded with a final total of well over 2000. The club were fortunate enough to be granted permission for the EJ2SI station to be operated by Novice operators **Pete 2E1ALF** and **Jim 2E1AWI** who both conducted their QSOs very well. It's thought that the operation of EJ2SI by Pete and Jim marks the first time that Novices have been allowed to operate outside the UK.



At the time of the Expedition to Saltee the Grantham Radio Club only had 25 members and the fact that 60% of the expedition team had very little or no h.f. operating experience, GORCI reckons that the club has achieved something to be proud of. Alan would like to thank everyone who helped with the expedition including **Declan EI6FR** and **Mick EI6GF** for supplying the background information on Saltee Island.

# CLUB Spotlight

*Send your information to the 'Club Spotlight' newshounds  
Donna Vincent and Zoë Shortland at the PW Offices.*

## Origins of Ilford

In January 1994, the **Ilford Group RSGB** celebrated 25 years of meetings at its 'temporary' location in the workshop of its Chairman **Jim Hooper G3PCA**.

The Ilford Group's origins go back to the pre-war days of amateur radio. There has always been a large number of amateurs in the area, so the formation of a club was almost inevitable. At present, the Ilford Group has around eight members who regularly attend meetings.

However, in the 1930s, the membership was very different. Meetings were held in a function room in the local Town Hall. On one occasion a lecture was held by the famous radio experimenter John Scott Taggart. This meeting, as was expected, attracted over 300 people to the venue!

The Ilford Group enjoyed this highly successful period until the outbreak of the

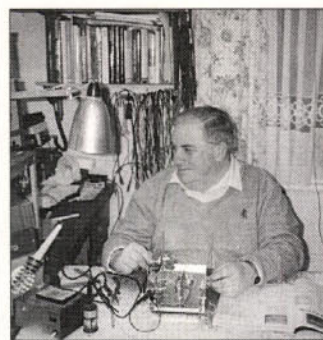
Second World War when all amateur operation was suspended and membership soon declined. The Ilford Group then lacked a permanent meeting place, so members held meetings at their own homes.

However, when amateur operation was re-established after the war, the club was revived and ready to enter what is now described as the 'golden age' of amateur radio.

In June 1951 Fred Ruth G2BRH offered the Ilford Group a new venue. This was at Fred's shop, which sold components and bicycle spares in the High Road, Ilford. However, in November 1966, disaster struck. A compulsory purchase order was placed on Fred's shop and the site was earmarked for re-development.

So, after the loss of the shop, meetings moved to Fred's home in Chadwell Heath, Romford. The Ilford Group continued to meet here until Fred's death in early 1968.

Later in 1968 it looked cer-



**Chairman Jim Hooper**  
**G3PCA home-brewing.**

tain that the Ilford Group would have to disband. Jim Hooper G3PCA then stepped in with the offer of his own workshop, a converted box room, for the club to use. The first Thursday in January 1969 saw the group meeting at its new 'temporary' location, which has remained temporary for the past quarter of a century!

The Ilford Group RSGB still remains as committed to home construction of equipment as it has done in the past. The Group proves that amateur radio is both educational and fun, just as it should be, and the Group are all looking forward to the next 25 years!

The Ilford Group ensures that although they may be surrounded by larger, better off groups, they are certain that they have more fun than all of them put together!

So, if you fancy joining in the fun, you can contact the club's secretary **Gary Milton** **GOCUQ** on **0181-514 4801**.

## Low Power In Wales

**The GW QRP Club** was formed in June 1994 by **Leighton Smart GW0LBI** and **Dave Griffiths GW0JUI**. The aim was to create a QRP grouping within Wales which would encourage interest in low power amongst Welsh radio amateurs. It's intended that the club be of an informal nature, ie. no subscriptions, merely a grouping of QRP enthusiasts brought together

by a common interest.

There has been a reassuring increase in interest in QRP amongst many of the members. Some are trying QRP operating for the first time and are thoroughly enjoying the challenge. Membership is free, as are the club's awards. The only expenses are postage costs.

The GW QRP Club has four awards at present, produced by **Gerald GWORQP** (GW QRP Nr 11). These are: The Worked All Wales QRP Award, The Worked All Wales Milliwatt Award, The Worked All Europe QRP Award

and finally The Worked British Countries QRP Award.

For the Worked All Wales Award, amateurs must send a list of contacts confirming low power contacts with all eight Welsh counties, with log details, signed and verified by another radio amateur, plus a 12 x 10in s.a.s.e. Powers used must be 5W or less for the QRP award or 1W or less for the Milliwatt Award.

For the Worked All Europe QRP Award, amateurs must send a list of contacts with at least 25 European countries, worked with 5W or less, signed and verified by another amateur and an s.a.s.e. The Worked British Countries Award requires QRP contacts with Wales, Scotland, N. Ireland, Isle of Man, Guernsey, Jersey and England.

To find out more you can get in touch with **Leighton Smart GWOLBI** or **Dave GW0JUI**.

## Language Of The Ladies

The **British Young Ladies Amateur Radio Association** (BYLARA) was set up in April 1979 to further YL operating in Britain. And in doing so, promote friendship, stimulate interest and, in particular, encourage good

operating techniques courtesy to all operators at all times.

Since its formation, BYLARA has established several YL activities, and most of these are listed in the *BYLARA Newsletter*, which is

produced quarterly in spring, summer, autumn and winter.

For further information, you can get in touch with the club's secretary **Maureen Ritson G7FYV** on **0191-237 1963**.



# PW SUBS CLUB

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**For this month's Subscribers' Club offer we've put together a book package that no amateur bookshelf should be without.**

The first book in the package is the *Radio Communication Handbook* 6th Edition, edited by Dick Biddulph G8DPS of the Radio Society of Great Britain. This new and updated version has been virtually re-written and is packed with diagrams, photographs, ideas, projects and the latest amateur radio techniques.

The *Radio Communication Handbook* is a complete handbook, reference manual and project book rolled into one. The best innovation for 'home-brewers' featured is the inclusion of p.c.b. templates at the back of the book for the projects published in the book. The fact that the templates are at the back make it much easier to photocopy them when you're making your own p.c.b.

Rob Mannion G3XFD thoroughly recommends that you get hold of a copy of the *Radio Communication Handbook* as he found it an excellent read and thinks you will too!

The latest version of the *RSGB Amateur Radio Callbook & Information Directory* edited by Brett Ryder G4FLQ of the RSGB is the second book in this month's Subs Club package. This 508 page book contains an information directory with details of specialised clubs, country lists, repeater details, band plans and various reference material.

The callbook has over 60 000 callsigns and includes Novice and Irish Republic listings. The RSGB have, for the first time, incorporated a new section that gives lists of surnames and initials of listed amateurs followed by callsigns. The same method has also been adopted to allow you to find callsigns under postcode areas.

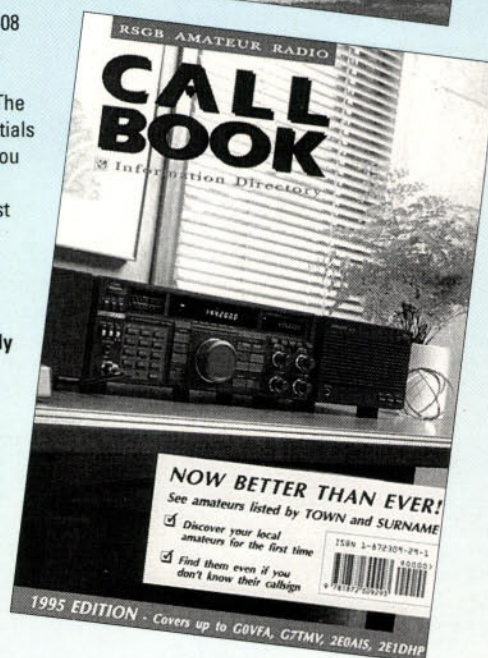
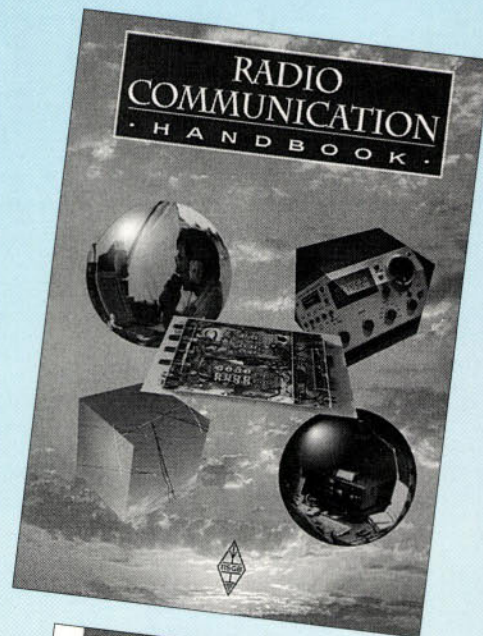
The *RSGB Amateur Radio Callbook & Information Directory* has got to be one of the most useful publications available for the radio amateur.

The *Radio Communication Handbook* and *RSGB Amateur Radio Callbook & Information Directory* would normally cost £32 including P&P, if bought as a package, but Subscribers' Club members can get their copies for **£26 including P&P (UK, overseas readers please apply for price).**

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*John Goodall GOSKR has tried out the newly introduced QRP Plus transceiver from Index Laboratories in the USA. And it certainly seems to have introduced some added enjoyment in the GOSKR shack!*

# Adding The Technology

**T**he glitter and tinsel season is over for another year, upset tummies and hangovers are all now behind us. However, the festive season came very early for me, in fact it arrived in October in the shape of a new transceiver from the USA.

Advertising blurb on various transceivers has never really interested me, apart from my occasional envious comment 'that would look good in my shack'! One new rig however, had really taken my fancy, and that was the QRP Plus from the Index Laboratories in America.

The QRP Plus arrived packaged in a strong cardboard box measuring only 230 x 220 x 165mm. Once inside the box, I found the QRP Plus itself was indeed very well protected from what seems the obligatory rough delivery handling.

Once the packaging was removed I found a compact piece of equipment. I was very impressed from the beginning.

## Neatly Finished

The QRP Plus is neatly finished in a case constructed from 2mm pressed aluminium, fabricated from two U-shaped sections. One, the base having the front and rear panels, and the top, having the two sides.

The top of the case is where the transceiver's internal 90mm diameter 8Ω speaker is located. The front panel is 140mm wide and 110mm high, and having a front to rear measurement of 180mm.

The measurements I've given are from the front of the tuning knob to the rearmost point of the rear mounted SO239. So, you can see it's small indeed by anyone's standard.

The neatness and simplicity of the QRP Plus rig's front panel is truly amazing. And, the simplistic approach is enhanced because there are only eight controls to get to grips with.

The large tuning knob, 50mm in diameter, is similar to that on most base-station transceivers. With the joint use of this knob, and one or more of the four panel, push-to-make buttons, the tuning knob has several important functions.

## Front Panel

On the front panel, directly above the tuning knob, is the large (nice and clear) l.c.d. display, measuring 66 x 20mm. The frequency displayed is shown to 100Hz resolution, although tuning is actually done in 10Hz steps.

To the left of the tuning knob (from top to bottom) the controls are: a two position switch labelled **Normal** or **20dB attenuate**; the **Fast** and **Memory** buttons (you press both to store a



frequency in any one of the 20 memories). There's also a 3.5mm stereo type headphone socket and finally a small neat dual purpose **Relative Power/Signal meter**.

Also on the front panel and to the right of the tuning knob (starting at the top) there's a three position switch. Position 1 is normal transceiver (labelled **XCVE**). Position 2 is **RIT**. Position 3 is **Split**.

Directly below the three position switch are the **Reverse** and **Bandwidth** buttons. (Both these buttons have to be pressed to vary the speed of the inbuilt keyer). And finally, there's the combined rotary **On/Off Volume** control.

On the transceiver's rear panel there's a d.c. power input socket; chassis fuse holder; SO239 antenna socket and a 3.5mm stereo jack socket for the keyer paddles. There's another 3.5mm stereo jack socket for microphone, a 3.5mm mono jack socket for straight key, rotary controls for side-tone (volume only) and microphone gain and c.w. output power.

## Power Supply

I could not wait to put this little transceiver to the test and I quickly chose a suitable power supply. The basic power requirements for the QRP Plus are 12V d.c. at a minimum of 1.5A.

For review purposes, I hooked the QRP Plus up to a fully charged 12V 7A lead acid gel battery. Then it was just a case of connecting up my

dummy load and set off finding how to drive the machine.

Getting to know the controls on the QRP Plus was very straightforward. And I think the transceiver would be ideal for use in some remote part of the country (perhaps on holiday?).

When switched on, the first display to appear on the l.c.d. screen of the QRP Plus (on the review model) were the figures 0237. This then rapidly changed to the last used frequency.

The 0237 figures indicated by the transceiver's display turned out to be a factory installed security device. With the figures displayed by each rig being different, it's in fact the serial number of that particular transceiver. I certainly like that little gimmick!

I soon got to like the QRP Plus. In particular I found that the feel of the tuning knob, with its finger recess for fast tuning, was positive indeed.

## General Coverage Receive

One of the major points I found in favour of the QRP Plus, was the non-advertised general coverage receiving facility. It turned out to be a sensitive receiver covering from 1.8 to 29.7MHz.

I decided to compare the receive of the QRP Plus with that of my own Yaesu FT-707 transceiver and Kenwood R1000 general coverage communications receiver. And in fact...the QRP



## Manufacturer's Specifications

### Receiver

Type	Single conversion superhet
Intermediate frequency	50MHz
Filters	6-pole crystal ladder filter at i.f., s.c.a.f. digital filters at audio frequencies.
General coverage	Continuous 1.8 to 29.7MHz
Amateur bands only	1.8 to 29.7MHz

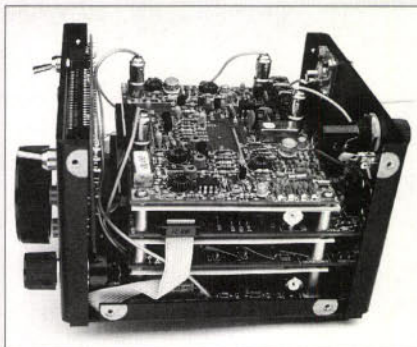
### Transmitter

Modes	A1 (c.w.) A3J (s.s.b.)
Power output	Variable from 0 to 5W
Microphone	Electret type

### General

Speaker	8Ω 90mm internal unit
Dimension	140 x 110 x 180mm
Weight	2kg

**An internal view of the QRP Plus transceiver clearly showing just how much transceiver there is in such a small package.**



## Numerous Contacts

I was like a kid with a new toy as I clocked up numerous, mostly Europeans, c.w. contacts on 3.5, 7 and 14MHz. I must however, mention the very first contact I had with the QRP Plus and the sheer pleasure it gave me.

The pleasure came when I heard the prominent G-QRP Club member **Gus Taylor G8PG** calling CQ within the c.w. QRP portion of the 7MHz band. Reports of 559 were exchanged both ways, with a distance of some 482km (300 miles) between stations.

I didn't think that was a bad QSO on 3W! Incidentally, the c.w. output power of the QRP Plus is variable up to almost 10W.

After numerous c.w. contacts I decided it was time to try the miniature microphone that Waters and Stanton had so kindly included with the rig. The bands were not in a very good condition but on 18MHz I found a WA2 station from New Jersey calling "CQ G - stations".

I must have had a momentary lapse of insanity, thinking I could return the WA2's call with the mighty QRP Plus. I had already heard him say he was using 1.5kW...into a multi-element beam 20m up!

But, surprise, he replied to my call "Will the G0??? QRP station please try again". You could have knocked me down with a feather! True his beam was doing most of the work, but the 5W s.s.b. signal **was** making the trip to New Jersey.

A few days later a friend **Roger Palmer G0TYX**, complete with various dipoles and bits of wire, picked me up together with the QRP Plus. We headed off into the wilds to operate mobile and the results were certainly impressive.

## Useful And Versatile

After using the rig extensively, I think that the Index QRP Plus is a very useful and versatile piece of equipment. And even without an a.m. facility it's good value for money.

The unit weighs in at just over 2kg (just over 4lbs), the weight of a couple of bags of sugar. This makes it very portable and increases versatility.

In fact when I supposedly return this excellent rig, I hope they don't look too closely into the box on its return. What they'll find could be just two bags of sugar!

My thanks go to **Waters & Stanton Electronics** of 22 Main Road, Hockley, Essex SS5 4QS. Tel: (01702) 206835/204965. FAX: (01702) 205843, who can supply the QRP Plus for £649.

PW

**After seeing a copy of the G0SKR review, Jeff Stanton G6XYU of Waters & Stanton Electronics sent us the following comment:**

John Goodall G0SKR, in his review mentions the fact that we have not advertised the general coverage receive facility of this transceiver. He is quite correct about this feature, but there is a limitation in that only lower sideband mode is available below 10MHz and only upper sideband above 10MHz. However, this would probably not worry most users.

**Jeff Stanton G6XYU**

the **Memory** button. It's as simple as that.

Changing to the factory reset memories is just as easy. You just hold in the **Memory** button and power up.

To confirm the mode that's selected on the QRP Plus, is (like everything else about the rig) very simple. All you have to do to check, is to hold in the **Bandwidth** button.

With the **Bandwidth** button held in, the display changes from frequency to a read-out showing the state of the switched capacitor audio filter (s.c.a.f.) digital filter on the right of the display. Meanwhile, on the left either **SSB** or **CW** is displayed.

The mode is altered simply by keeping the **Bandwidth** button depressed and pressing the **Fast** button to toggle between the two. As I've said...this little rig is a real dream to operate!

## The Filter

Having mentioned the s.c.a.f. digital filter I might as well tell you a little bit about the device. It's an incredibly versatile audio filtering system, having a bandwidth fully variable in 100Hz steps from 2.4kHz down to 100Hz.

If something as simple as the s.c.a.f. digital filter was fitted to **all** sets, life on the crowded bands would be so much more pleasant! Surely...if Index, who are normally known for medical equipment, can do it - so can the larger manufacturers - or can they?

## Built-In Keyer

The built-in keyer speed can be varied simply by depressing and holding the **Reverse** and **Bandwidth** buttons together while turning the tuning knob. It's turned clockwise to increase the speed and anti-clockwise to lower the speed.

The keyer speed is variable in 5 words per minute (w.p.m.) steps from 10 - 45w.p.m., with the speed being displayed on the l.c.d. screen. With that done...everything was ready for me to get the little gem on the air.

Plus proved to be far more sensitive than my FT-707 and about equal to my R1000.

I carried the tests out with both my Butternut HF6VX Vertical multi-band antenna, and my 33m end fed long wire clothes line. (That's what I tell the neighbours it's for anyway!)

Initially, I found that I had to use both hands to operate the front controls of the QRP Plus. However, after a little bit of practice, I found I could operate comfortably with one hand.

Well, I now had the QRP Plus powered up, antenna, paddles and key all coupled up, so I was ready to have a look around the bands. But before I report on the performance, let me first give a brief run down on how to drive the transceiver.

After switching on using the rotary **On/Off** volume control, with the volume set at an acceptable level, to select the band, I then had to hold in the **Memory** button while turning the tuning knob. And, once it arrived at the band required I had to release the **Memory** button.

Having set the band, I continued to turn the tuning knob, which now varied the frequency. The frequency is displayed very clearly on the large, six segment l.c.d.

If I had required general coverage tuning, I would not have to depress the **Memory** button. All that's needed is to simply continue turning the tuning knob to the required frequency.

The normal tuning rate of the QRP Plus is about 5kHz per turn of the tuning knob. But, turning the tuning knob while holding in the **Fast** button, speeds things up to around 100kHz per turn.

## Internal Memories

The factory set internal frequency memories are approximately at the start of the QRP section of each band. However, they can be user-programmed to any frequency.

My own choice of frequencies were set simply by holding in the **Memory** button while tuning to the frequency I required. All that's then required is to press and hold the **Fast** button while pressing



# W

## Valve & Vintage Special Switching On And Warming Up

Rob Mannion G3XFD introduces PW's 'Valve & Vintage' special, recalling the days when he listened to the BBC's 'Navy Lark' and 'Journey Into Space' on his valved set, before discovering those mysterious 'amateurs' on 40 metres.

Welcome to our annual 'Valve & Vintage' special. Many PW readers will remember the little ritual of 'switching on and warming up' in the days when all wireless sets were valved and needed to 'warm up' as they hummed into action. Well, this 'special' themed issue is just for you, if you (like me) remember those days with fond memories.

Mind you, even though our recent reader survey shows that many of our readers remember and enjoy reading about wireless in the 1950s, 1940s and even as far back as the early 1930s, there are newcomers who are interested. To prove the point, I've got two 16-year olds in my school radio club who delight in making valved projects.

Two of the most avid 'V&V' collectors I know are only in their late 20s! And - this may surprise some of you - there's now a large number of people collecting 'vintage' transistorised radio receivers! Time rushes by doesn't it?

So, if like me you remember listening to Radio Hilversum's 49m band Sunday programmes with Eddy Staartz, the BBC's 'Navy Lark' and many other delightful programmes, hopefully you'll enjoy our themed issue. And again, if you like me first discovered amateur radio via those mysterious portions of the tuning dial marked 'amateurs' (especially 40 metres)...on the family's valved long/medium and short wave equipped receiver, some fond memories will be stirred.

It seems inconceivable nowadays that a youngster would get really excited on getting their first radio. But for myself and many others, that first 'wireless set' opened up new horizons, provided great enjoyment and started off a lifetime's interest. Long may your receiver's filaments glow and your power supplies hum!

G3XFD

# Valve & Vintage Special

To celebrate our 'Valve and Vintage' special, Ron Ham takes a look back at the half century he's been involved in radio and television, and recalls how it all started with a home-built 'one valver'.

Last year we commemorated the 50th Anniversary of D-Day, so I devoted the bulk of the past year's 'Valve & Vintage' to a number of the military wireless sets in use at the time.

During that period many of you wrote to me with queries and comments. You asked about the style of equipment and other questions about valved sets in general.

Although I cannot supply parts or manuals, I trust that my replies to your letters helped toward solving your immediate problems.

### Working In Radio

As a theme for this extended 'Valve & Vintage' the Editor suggested that I tell you about my working

years in the world of radio. Therefore, in order to please 'himself' and readers, I will insert answers to some of those other points you raised as I go along.

In 1939 I believe that my future life in radio was determined by three important things that happened to me between the ages of 10 and 14. Perhaps the enthusiasm for the subject really began when I was eight and spent hours playing with my electric train set.

But, the enthusiasm was definitely there at 10, when the train gave way to a simple wireless set. From then on I thought of little else except wireless and how it worked.

By the time I left school, at 14, I was already working Saturdays for a large cycle and wireless dealer and had my own workshop at home complete with test-meter, soldering

iron and an assortment of radio parts.

### Powered By Flagcells

Firstly, my electric train was powered by three 1.5V flag-cells. These were (a large, round, heavy duty dry cell with two screw terminals on top) wired in series to get the 4.5V required to run the engine.

Like many others in the town, our home had direct current (d.c.) mains. So, it was not possible to use a step down transformer to run the train from the public supply.

This taught me the practical difference between alternating current (a.c.) and d.c., how to wire batteries in series and parallel and the need for good clean connections around terminal posts at all times.

### Wireless

Secondly, I was given all the parts, a circuit and sufficient instructions

to build a one valved wireless set. A selection of components and valves used in home-brew receivers are shown in Fig. 1. Note the first *Practical Wireless* blueprint in the background.

From my one-valved set I learnt that two volts low tension (l.t.), derived from a 'wet' accumulator was required to light the valve's filament and 120V from a 'dry', high tension (h.t.), battery was necessary for its anode.

I also learnt that, irrespective of size, a 'wet' cell, will only produce 2V and a 'dry' cell 1.5V. I discovered of course that the larger the cell's physical dimensions the greater its capacity and longer its working life.

The remains of a high-tension battery, made up of about 80 dry cells connected in series (80 x 1.5V = 120V), can be seen in Fig. 2. This relic was discovered by John Tye (Dereham) when clearing the ground behind his workshop last September.

Originally the carbon rod in the centre of each cell had a brass cap

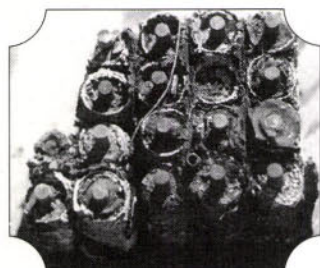


on which was soldered the linking wire. Throughout the Second World War, batteries of all types were in very short supply and one of my jobs was to repair any multi-cell 'drys' that arrived open-circuit through damage.

Repairs meant removing the cardboard cover from the battery and, with a voltmeter, trace through the series chain of cells until the break (or breaks) was found, resolder the connections and re-pack the battery in its outer.

Returning to my first 'wireless' - the sound from my one-valver (sometimes called a 0-V-0) came through a pair of S.G. Brown's high impedance headphones (2000Ω impedance).

The little breadboard receiver was my pride and joy. And I can honestly say that of all the complex equipment that I've handled since, nothing thrilled me as much as that receiver.



**Fig. 2:** The (sad!) remains of a once very common multiple cell h.t. battery used to power pre-Second World War receivers found by John Tye (see text).

## Strange Noise

Some of you may remember that strange 'crinkly' noise in the headphones which occurs briefly, before a signal, when a battery set is switched on. This is due to the expansion of the filament until it reaches working temperature.

Valves for battery sets are directly heated meaning that the filament itself emits the electrons. These are attracted by the high positive voltage on its anode (often called the plate and marked 'P' on some valve holders).

An indirectly heated valve, common in mains operated sets, takes much longer to warm up. This is because it has a heating element (heater) inside a cylinder (cathode) which, in turn, emits the electrons from a special chemical coating.

## Direct Current Mains

In a book, (I think it was *Wireless For Beginners*) borrowed from the library was the explanation of how my wireless enabled me to hear speech and music from stations around the world.

I was brought up listening to my father's wireless (a 'Universal' Philips Super Inductance) that was switched on and off only when he was at home. The word 'universal' meant that the set could work from a.c. or d.c. mains.

By the way, such a set would not work on d.c. if the mains plug was in the 'wrong' way round. In later life I answered several service calls because of this, especially when two-pin plugs were used. The universal set may have been disconnected and moved for spring-cleaning and when reconnected the plug was inserted the opposite way.

Collectors take note! Although I have not seen one for decades, some sets were manufactured, pre-1939, to work on d.c. mains only. It's best to remember that d.c. is polarised negative and positive whereas a.c. is alternating between positive and negative and back again at 50 times per second (50Hz).

## Personal Elmer

Between the ages of 12 and 14, I frequently assisted my own personal 'Elmer'. I helped in the maintenance of traffic lights,



**Fig. 1:** A typical selection of valves and components available when Ron Ham built his first 'one valver' receiver in 1939 (from the Amberley Chalk Pits Vintage Wireless collection).

charging more than 100 civilian and military accumulators and projecting pictures with 16 and 35mm machines at various functions.

No textbook or technical college could have given me such a grounding for the future. From the traffic light standard and control box I met relays, the Edison screw lamp and a variety of switches.

Very often, before an accumulator could be charged it had to be topped-up with distilled water. Then the green corrosion cleaned from both of its red and black (positive and negative) terminals before they were greased to make sure that they would screw down tightly onto a connector.

By early 1945 I had left school and was working full time for the

cycle and wireless dealer. My employer knew who had been teaching me for the previous three years and, guess what, gave me the responsibility of his charging plant!

From then on the first part of my day was devoted to the accumulators. The rest was taken up between unpacking and making ready new sets for sale and assisting in the radio workshop.

Also, I had to keep a frequent eye on the plant to check the charging current and do a specific gravity test. This meant sampling electrolyte with a hydrometer, on any suspect cells.

Customers usually changed their accumulators twice per week and we always had around 80 on charge. In addition to wiring them up 'doing the accs.' also meant



**Fig. 3:** The 'War Time Civilian Receiver' (arrowed) among the collection at the Amberley Chalk Pits Wireless Museum.



keeping their name tags readable, making sure their stoppers were refitted securely after charge and having them clean and ready for collection at the right time.

## Large Stock

Our firm was established pre-war and consequently had a very large stock of valves. This eventually proved to be very useful, as there was an acute shortage of new sets at the end of the war.

Despite the shortage, because of our valve stock the manufacturers were able to help. They supplied us with a few extra sets which, although new and complete, were minus valves.

The famous 'Wartime Civilian Receivers', arrowed **Fig. 3**, were among the sets that I valved-up and tested. In addition to the 'Civvy', the firm stocked sets made by Bush, Cossor, Philips and Pye and the workshop repaired any make that came in. By 1945 the mains table and bedside sets and radiograms that were sold in the mid-1930s were coming in for repair.

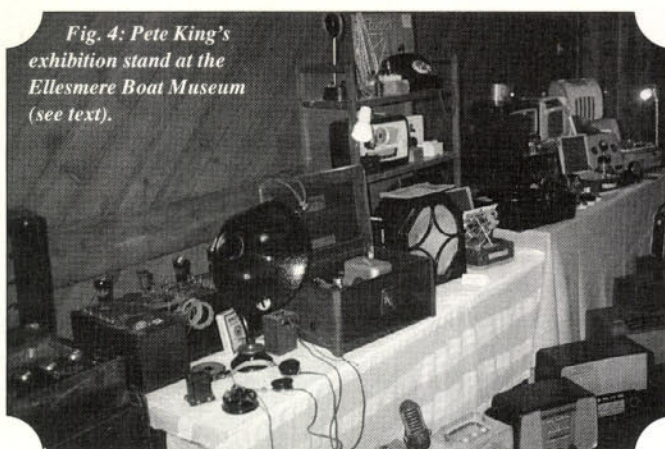
At that time petrol was severely rationed. So, it was not unusual to collect table models or a 'gram chassis for repairs, and return it after, on the carrier of a trades-bike (butcher's boy fashion!).

Accumulator sets were generally serviced in house, because most of their troubles were in the battery connections. A typical call would result in cutting back the ends of the h.t. and l.t. leads and fitting new pins and spades respectively.

## Long Wire Aerial

The majority of sets in those days were fed from a long wire aerial. This was often strung between a 6m high pole, at the end of the garden and the eaves of the house.

The aerial download entered a



**Fig. 4: Pete King's exhibition stand at the Ellesmere Boat Museum (see text).**

ground floor window frame via a lead-in tube. It was then connected to one pole of a double-pole, double-throw, china-based isolating switch, screwed to the inside window ledge.

The lead-in tube was often a 0.5in diameter Ebonite pipe fixed through a hole in the window frame. Through this went a brass rod with a threaded terminal at each end.

The aerial download was terminated on the outside end of the rod. A small hole was also drilled in the window-frame to let the earth wire through. This was connected between a copper rod in the garden and the other pole on the isolating switch.

Separate wires from one end of the switch went to the respective A&E (Aerial and Earth) sockets on the set and the opposite pair of switch lugs were coupled together.

In practice the switch blades, pivoted in the centre, connected the A&E to the set in one direction and shorted the aerial to earth in the other. People were advised to 'isolate' their radio at night, or when away, or whenever there was a risk of lightning.

Most sets were installed in the corner of a downstairs living room. This was often between the fireplace and the rear window.

Customer's complaints of crackles or poor reception were sometimes traced to the aerial and earth system. Such faults were

caused by the weather and were mainly due to worn insulation on the download letting the bare conductor rub against the wall and loose or corroded terminals on the lead-in tube and the earth rod.



**Fig. 5: Keen collector Bob Smallbone of Bognor Regis (see text).**

Another fault was 'sloppy' contacts on the isolating switch blade assembly after years of regular use.

Although the long wire type of domestic antenna was almost phased out by the mid-1950s, their relics, such as garden poles, stand-off insulators on the wall and egg insulators hanging from the eaves can still be seen today. And... isolating switches, lead-in tubes and earth-rods are now collector's items.

## Valuable Experience

Towards the end of the 1940s I was employed as a radio engineer with a larger firm where I gained valuable experience. In fact we serviced and installed all types of domestic radio and television sets and occasionally mobile transmitters and receivers.

However, in 1953 I moved to Storrington in West Sussex. Where I became half partner in an old established radio and electrical business and by the time I retired in 1981, we had seen many changes.

The servicing profession had seen the end of accumulators, and the introduction and demise of the all-dry valved portables. There was also the introduction and expansion of v.h.f. Band II f.m. broadcasting, Bands III 405 lines v.h.f. television, and the start of Band IV and V u.h.f. 625 line television.

My colleagues and I also saw the replacement of the valve by the transistor. This particular development in 'solid state' caused the electronic revolution from which we enjoy so much today.

## Government Surplus

At the end of Second World War most of us young engineers were interested in the large number of

military sets which kept appearing on the surplus market. We were keen to see the technology used and that's when we realised that 'wireless is wireless' whoever it's made for.

One fascinating piece was the ex-RAF R1116 battery operated communications receiver. Like all the surplus equipment it was cheap, costing around £5.

The R1116 set was years ahead of its time. It was a double superhet with 1.7MHz and 100kHz i.f.s and has direction finding (d.f.) capabilities. Last July in *PW*, I devoted 'Valve & Vintage' to the R1116 which jogged many of your memories.

My thanks are due to **Ron Davies** (Penarth), **H.G. Drake** (Yeovil), **James Farquhar** (Haddington, Scotland), **John Hoare** (Wantage), **G.W. Lamb** (Carlisle), **Doctor Godfrey Manning** (Edgware), **Wyn Mainwaring** (Manordeilo, Wales), **Roy Merrall** (Dunstable), **T.F. Packer** (Goginan), **Tom Pattinson** (Washington, Tyne & Wear), **Osborne Postle** (Whitby), **Colin Robertson** (Knebworth) and **Al Seed** (Bebington) for telling me that the 4-pin valve (AM ref. 10E/9829) in the front end is in fact a diode (VU33).

The diode in question is connected in parallel with the r.f. input. It's there to protect the receiver's front end when the T1115 transmitter was switched on.

A number of you kindly sent me circuits which I have passed on to the Vintage Wireless library at the Amberley Chalk Pits Museum, (incidentally, *The Short Wave* section of *PW* carried a three-page article about the R1116 in July 1960).

As it appears to be of such interest, photocopies of the article mentioned by Ron - 'Obtaining Peak Performance From The R1116 and 1116A' by A. W. Mann, from pages 225 - 227, July 1960 *PW*, are available from the Broadstone office for £1.50 inc P&P. **Editor.**

## The Collectors

Many of the sets that the collectors among you are now seeking were once the 'bread and butter' repair work of the retail trade. Such sets discovered, after a few decades, in lofts, garages and garden sheds may be too far gone for restoration to electrically- safe working order.

In my opinion, if you find such a





Fig. 6: John Weller (left) and John Narborough looking at a vintage receiver (inside view shown in Fig. 7).

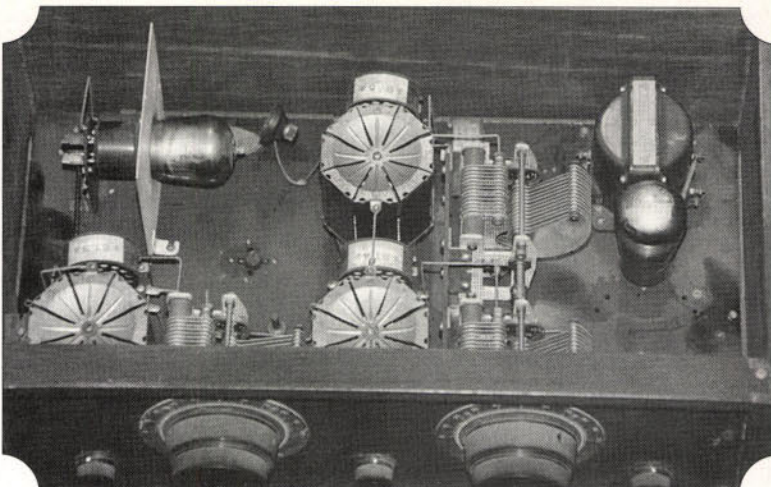


Fig. 7: Inside view of the vintage receiver seen in Fig. 6. Now you can see what they were admiring!

receiver personally I think it's best to cut the mains lead at the set end. Then give the cabinet a good clean and polish and use it for display purposes only.

Having said that, if you do decide to carry out repairs to any mains equipment you must be aware of potentially lethal voltages and get proper advice if you are not sure.

Some of the items that have been collected and restored by David Rudram (Worthing) are shown in Fig. 3 and by Pete King (South Wirral) on his exhibition stand, Fig. 4, at the Ellesmere Port Boat Museum.

Like Dave and Pete, Bob Smallbone (Bognor Regis), Fig. 5 and John Narborough (Lewes), right in Fig. 6, have sets going back to the 1920s. These keen enthusiasts display them at various functions during the year.

However, let's take look inside of the set, Fig. 7, that John is showing Ron Weller, left in Fig. 6, at the Amberley Museum Vintage Wireless day last September. It has a logo (trademark ?) that looks like 'LK' and a plate.

The plate says, "Patent Licensmaerkke Export Til Amerika Forbudt" each side of which are the letters RCA and RBF. Any ideas on the mystery, readers?

As you can see in Figs. 6 and 7, John's early receiver has two slow-motion drives for the variable capacitors. It's a fine example of 1920s wireless design.

## Very Rewarding

Servicing older and 'vintage' equipment can be very rewarding and provide a great deal of pleasure - and frustration at times! And, don't forget that your problems can be shared...for there's almost certainly a reader out there who can help.

Keep writing and I look forward to reading your memories, calls for assistance and general interest in the world of warm cabinets, glowing valves and dusty chassis. You can write to me at: 'Faraday', Greyfriars, Storrington, West Sussex RH20 4HE.

PW

# Nine Service Points

I don't have enough room to be precise about dates, changes in circuit design and chassis layouts, but I'll list, in general terms, nine service points that should help you repair older receivers. The points are based on the workshop checking of a typical set of the mid 1930s to mid-50s era, where many common factors appeared.

Most of the sets coming in for repair were mains operated and had been in daily use for years. Mains sets, with five, or more, valves, generated a lot of internal heat which attracted mounds of dust.

Over the years the dust penetrated into every corner of the chassis, speaker and cabinet. So, the first job, with vacuum cleaner and dusting brush to hand, is to give the whole set a good clean. After this its general condition can be assessed.

- 1: Check the on/off and wavechange switches and volume and tuning control shafts for free movement. Make sure that the large nuts securing all controls to the chassis are tight and that the spring washers behind them are effective and not cracked.
- 2: One job I hated was repairing dial cords. However, broken or not, see that the associated spindles, pulleys, pointer guide bars and tuning capacitor bearings are lubricated and running smoothly.
- 3: Look for any corrosion around the ends of components, inside valve holders and on the valve's pins. Examine the ends of large and small electrolytic capacitors for signs of a 'messy' discharge. Electrolytics are used for h.t. smoothing and in the cathode circuit of the output valve. Any capacitors in this state must be replaced with new ones of the correct capacity and working voltage.
- 4: Check the mains lead and all internal wiring for perished insulation. This is especially important where cables pass through the chassis or where connections are made inside the set and in the plug top.
- 5: Remember, when removing valves from their sockets to grip the base firmly and not the glass envelope. Prior to 1940, Philips used a range of side contact valves which fitted snugly into a large and deep holder. These, when new, were a tight fit and difficult to remove. Personally, I liked them because the valve seemed to 'snap' in and really make good contact. (The Germans used a different type of side contact valves in their Second World War equipment but I cannot recall them being used in any Allied equipment). Other makes of domestic sets, including some Philips models, fitted valves with the British 4, 5 and 7 pin bases and later came the international octals. **Beware**, if you have to change a faulty octal valve holder, make sure your spare is the right one! This is because, although they may look the same, there's a 'mechanical' difference (valve base spigot and pin orientation) between the international and the Mazda octal bases.
- 6: Inspect the screened leads around the volume control and some valve caps because a perished 'inner' can short to its screening and stop the circuit working. Make sure that the volume and tone control tracks are clean and that the wipers are making good contact.
- 7: The output transformer normally has two windings. These are the primary which is wired between the h.t. rail and the anode of the output valve and the secondary, which is coupled to the voice-coil on the loud-speaker cone. If all the valves light up (bear in mind though that some valves, especially the 1.5V filament types are very dim and have to be viewed in a darkened room) and there's no sound from the speaker you're likely to find the primary winding of this transformer is open circuit. If extension speaker sockets are fitted, look for a 'mute' arrangement. This, often in the form of a small insulated screw on the socket, disconnects the internal speaker while the extension is running. In the wrong position it will give the same 'dead set' symptoms as a faulty transformer.
- 8: Distorted sound can be caused by a faulty output valve or 'positive on the grid' due to a leaky audio coupling capacitor (about 0.05µF). The purpose of this component, wired between the anode of the driver valve and the control grid the output valve, is to block the d.c. volts present at the driver's anode but let the audio signal pass through. A faulty cathode bias resistor or bypass capacitor can cause low volume and contribute to audio distortion.
- 9: Typical superhet valve line ups were mixer/oscillator, i.f. amplifier, det/audio driver, output and rectifier. The 1st valve was often a triode-hexode, the 2nd an r.f. pentode, the 3rd (as described) a double-diode-triode, the 4th an output pentode. The two diodes in the 3rd valve (often a double-diode-triode) were used to rectify the a.g.c. and the amplified r.f. signal, while its triode section was the audio driver. The rectifier was either half-wave for a.c./d.c. receivers or full-wave for a.c. only sets. The former had a series heater chain and in the latter the heaters were wired in parallel and connected across the dedicated heater winding on the mains transformer.



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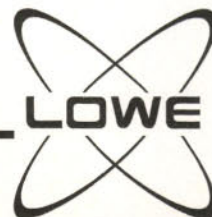
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# THE WORLD

## SPEED THRILLS

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The new Kantronics KPC9612 is fast becoming the new standard in TNCs and when you see what it can do you'll know why! This is the only dual speed, dual port TNC on the market. It will let you connect two transceivers to it for working on two bands, or two frequencies on the same band if you prefer. One port is 1200 baud and the other can be configured to 4800, 9600 or 19k2 as standard! If you are already on Packet, imagine doing what you are doing

## Don't forget our Second Hand List FaxBack service.

Dial 01629 580008 from your fax machine and follow the voice instructions.

We've also launched a great new service for customers equipped with computers and modems. You can now reach us via the Internet. We've got separate e-mail addresses for orders and enquiries. Leave the appropriate message at [orders@lowe.demon.co.uk](mailto:orders@lowe.demon.co.uk) or [info@lowe.demon.co.uk](mailto:info@lowe.demon.co.uk). Please make sure you leave your full postal address and daytime phone number as replies by e-mail may not always be practical!

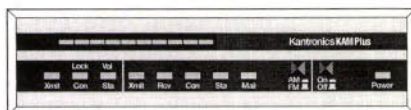
## New V7.1 upgrades for KAMPLUS and KAM Expansion Boards

That's right the new V7.1 upgrades are available at last, promising new, easy functionality of all TOR modes, including AMTOR, PACTOR and the ever growing GTOR. The upgrade allows identical changeover commands for all three modes and uses the same mark and space tones and introduces TOR Standby.

TOR standby allows access to your mailbox in any of the three modes and allows other stations to link to you in AMTOR, PACTOR or GTOR automatically. The mode in which you are linked is displayed in the linked message on your screen.

The KAMPLUS is available now with all the new features but if you have an older KAM you can still upgrade via the KAM Expansion board.

Finally, you may be interested to know that there is now a book about GTOR. Called GTOR: The New Mode, it is nearly 100 pages of collected published articles and a full description of the GTOR protocol - just the thing for the more inquisitive who likes to know what is going on in the background or those that really like to know their subject!



KAMPLUS £399.00 KAM Expansion Board £95.00 V7.1 Upgrade £35.00 GTOR: The New Mode £15.95

## Lowe takes away the pain of mobile operating!

These days so many cars are just not conducive to operating mobile! Fewer and fewer places to mount a radio and when you do find someplace, someone breaks in and nicks it! Many people today are using handhelds in their vehicles which presents two problems - how do you operate it safely and where do you put it? Trust Lowe to solve the problem!

The QS200 is a superb little gizmo that everyone will want to buy for two reasons - it is so good and it is also so inexpensive! Just look at the picture. The QS200 holds the radio in a convenient place on the dash where you can still see the display and operate the major controls be it a handheld transceiver or a scanner. The QS200 mounts into the vents of your car dashboard with no drilling or cutting and your handheld just slots into it using its belt clip - fits in seconds and you can remove your handheld just as fast when you want to take it from the car - beats any quick release mount! Get one now while stocks last!



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# W The Forgotten Genius

*Stephen Poole steps back in time to unravel the mysteries surrounding Edwin Armstrong and his discoveries in radio.*

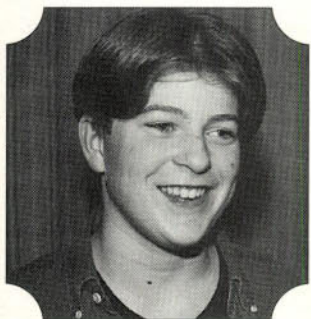
**E**dwin Armstrong was born on December 18 1890 and from an early age he wanted to become an inventor. This was sparked off by a gift of the 'Boys Book of Inventions' from his father, and he soon developed a passion for radio. Very few things drew his attention away from this, only tennis and a liking for fast cars, an interest which he developed when he was older.

After graduating from high school, Armstrong went on to study at Columbia University. At Columbia, Edwin was very fortunate to study under Professor Michael Pupin, who was famous for inventing the loading coil used in long distance communications.

## Investigating Devices

While in his junior year at Columbia University, Armstrong began investigating devices for better radio reception. It was while working on the 3-element vacuum tube (triode) in 1912, that he devised a circuit which could amplify signals repeatedly. Edwin called the circuit the regenerative or feed back circuit.

Edwin also found that at its highest amplification the circuit he'd devised was not only a receiver but an oscillator as well.



*Stephen Poole, aged 15, is studying for his GCSEs and also his Novice Licence hoping eventually to get his full licence like Dad, Ian G3YWX.*

Unfortunately for Armstrong, de Forest challenged his ownership of the idea in the courts. And after 14 years of court battles it ended in victory for de Forest.

However, the judgement was not accepted by the scientific community and they credited Edwin with the discovery. Later Edwin Armstrong received the Franklin Medal in recognition of this work.

## Army Signal

Almost as soon as America entered the First World War, Armstrong signed up with the Army Signal corps and became an officer. One of the problems faced by the artillery was that of locating enemy aircraft.

Armstrong pondered the location problem and to him, the solution seemed to lie in recognising the high frequency radiation given off by the ignition system of the aircraft. So, he eventually decided to use the heterodyne principle, which was already well established.

Edwin Armstrong used this twice in the set. The first time he used it to change the signals to a 'supersonic' transitional frequency where they could be amplified and filtered more easily. The second time he used it to convert the signals to an audio frequency.

Armstrong named the circuit the supersonic heterodyne receiver, now more commonly abbreviated to the superhet. The circuit has become the basis for virtually all of today's radio receivers. But this time no challenges could be made about the ownership of the idea and Armstrong patented the invention in 1920.

In the same year as he patented his invention, Edwin sold the rights to Westinghouse for the bargain fee of \$335 000. But he retained the royalties from amateur use.

## Super Regenerative

In 1921 Armstrong patented his next invention, the super-regenerative set. This used a technique for overcoming the biggest problem of the superhet which was that in early days it tended to erupt into unwanted oscillation. Soon the Radio Corporation of America (RCA) snapped up the invention.

Even with Armstrong's understanding of radio, he couldn't find a way to conquer the problem of static interference on f.m. This was a problem he had studied with Professor Pupin without success. Everyone thought that narrow band f.m. was useless and even mathematical calculations seemed to support this.

Undeterred, Armstrong took a totally new view and instead of reducing the bandwidth to reduce interference he increased it. This worked and gave a reduction in static interference.

A demonstration of the reduction in static interference was given after Armstrong himself had paid for the transmitter and receiver in November 1935 at the frequency of 110MHz. He obtained a signal-to-noise ratio of 100-1 as opposed to 30-1 from the very best a.m. stations.

But this is where his biggest troubles began. First of all the radio industry showed very little interest so he offered the system to RCA, but they rejected it and told him of their intentions to investigate electronic television which would use the same frequency as f.m. radio.

## New Friend

At last a new friend was found, this time in New England. Soon f.m. broadcasting took off and



*Inventor Edwin Armstrong fought long and hard to have his work recognised.*

over 150 applications were made for f.m. transmitting licences and many companies applied to make receivers. RCA offered Armstrong a \$1 million single payment and no royalties, but Armstrong refused.

Then the problems started again, the Second World War came and afterwards the frequency band was moved. Power was cut to a tenth of the pre-war level and because of this it made 50 f.m. transmitters and about 500 000 receivers redundant. The RCA refused to recognise Armstrong's patency and several other companies followed suit.

## Legal Proceedings

In 1948 legal proceedings were taken against RCA by Armstrong and five years later against another 20 smaller companies. In the end it became too much for him and Armstrong committed suicide in January 1954.

His wife fought on and settled for the million dollars Armstrong had refused. Shortly after \$10 000 000 of outstanding royalties were collected.

Just before his death Armstrong gave a \$50 000 donation to Columbia University to research into the failings of law courts on matters of technical dispute. These matters of 'technical dispute' had harassed him for most of his life.

PW



# W Baird's Beams

John Logie Baird with his pioneering 'Telechrome' two beam colour television tube in August 1944.



Scotland's 'forgotten' genius John Logie Baird is best known for his work with early 'mechanical' TV systems. However, television historian Ray Herbert G2KU remembers that just over 50 years ago, Baird demonstrated a two beam colour TV tube, which in effect is still in use today!

Any suggestion that the first electronic colour television tube employing multiple cathode ray beams (the system in use today) was designed, built and demonstrated by John Logie Baird, for so long associated with 'mechanical' television, would probably be met with disbelief. However, it's true and he called it the 'Telechrome'.

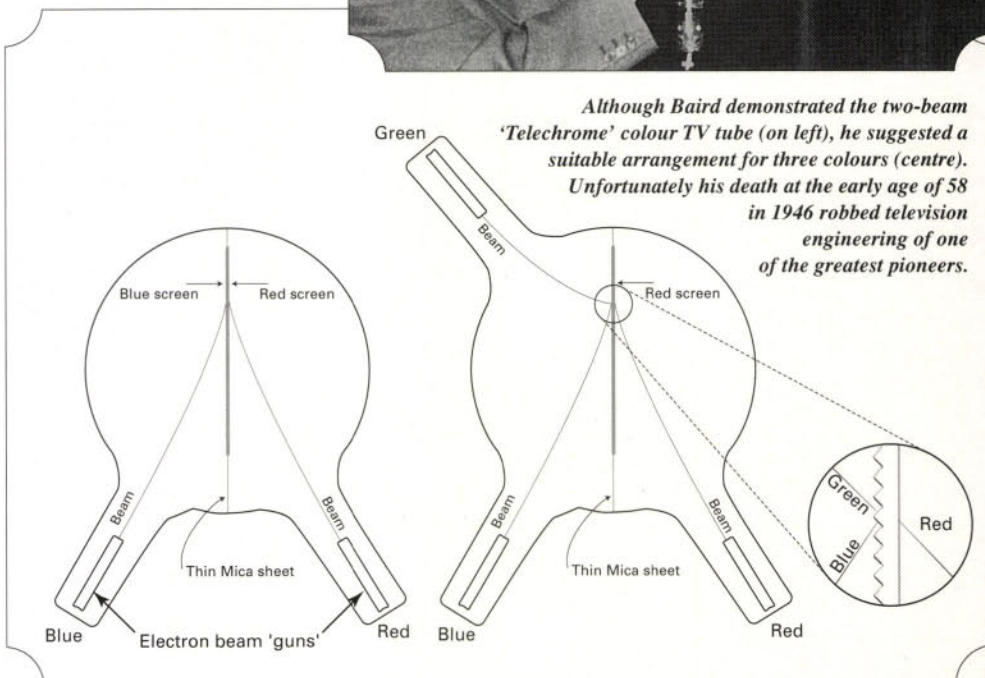
Just over 50 years ago on August 16 1944, just prior to the liberation of Paris by the Allied Forces, a small group of journalists assembled in a converted stable. The old stable served as a laboratory adjacent to Baird's rambling Georgian house in Sydenham, on the outskirts of London.

The assembled group in the old stable in Sydenham witnessed the first demonstration anywhere in the world of a wholly electronic colour television process using a high definition of 600 lines. It was virtually the same standard as the BBC were to adopt 23 years later.

## Remarkable Feat

Baird's colour TV demonstration was a remarkable feat bearing in mind that he had just one full time assistant and only meagre workshop facilities. John Baird's company had gone into voluntary liquidation at the outbreak of war and he had no regular employment.

The colour TV experiments were funded from his savings supplemented by a consultancy fee provided by Cable & Wireless. This was provided for the specific purpose of ensuring that this important work did not have to be



Although Baird demonstrated the two-beam 'Telechrome' colour TV tube (on left), he suggested a suitable arrangement for three colours (centre). Unfortunately his death at the early age of 58 in 1946 robbed television engineering of one of the greatest pioneers.

abandoned for lack of cash.

Baird had produced a basic form of colour television in 1928 and ten years later at the Dominion Theatre in Tottenham Court Road, 3000 people witnessed his high definition pictures in colour, transmitted from a studio at the Crystal Palace. Never before had colour television been demonstrated in a theatre or indeed transmitted by radio link - a double first for Baird.

## Telechrome Tube

The 'Telechrome' was in effect a double-ended cathode ray tube with a 255mm (10in) diameter clear mica disc situated at the centre. One face had a blue-green fluorescent coating, the other orange-red. The transparent screen enabled the observer to see

superimposed images which made up a picture in colour.

No stranger to the art of improvisation, John Baird overcame the difficulty of obtaining specialised glassware by adapting a mercury arc rectifier bulb to his needs. The cranked arm being replaced with conventional cathode ray tube electrode assemblies.

A smaller Telechrome tube was produced with one electron beam perpendicular to the screen thus simplifying the scanning arrangements. This tube has survived and is on display at the National Museum of Photography, Film and Television in Bradford, Yorkshire.

## Makeshift Studio

The colour TV pictures originated from a makeshift studio in one

corner of the laboratory. There were no colour cameras at that time, so John Baird used the well tried 'flying spot' arrangement.

The 'flying spot' technique involved scanning the subject in sequential horizontal lines with a brilliant spot of light obtained from a high intensity projection tube. Panchromatic photocells detected the level of reflected light.

Excellent stereoscopic results were obtainable by modifying the scanner (camera) arrangements in the studio so that alternate left eye, right eye perspectives were televised. The viewer needed to wear coloured spectacles.

Unfortunately, John Logie Baird died in 1946 at the early age of 58. His untimely death left his colour TV work unfinished and, as it turned out, largely unrecognised.

PW



# W Testing - In The Wink Of An Eye!

*Do you remember those fascinating 'Magic Eye' tuning indicator valves? Gerald Donington G4LNO does and he's built an interesting capacitor testing circuit employing an indicator valve which you can build and use....in the wink of an eye!*

**H**ow many of us at some time or another have thought it would be nice to test a suspect capacitor or one off an old board or even a new one bought at a rally, at its working voltage? In other words, testing a 50 $\mu$ F capacitor at 50V working.

My 'Magic Eye' tester is not an entirely original circuit. The project evolved from information I gathered after reading an article 'A Simple Insulation Tester Using A Magic Eye Tuning Valve', published in *The Radio Constructor* by G. A. French in October 1959.

After building the unit I must say that it's one of the most useful pieces of test equipment I've ever built. It also gave me the idea for testing at working voltage as opposed to the usual ohm meter test at 1.5 or 9V maximum.

## Valve Available

The valve used in the 'Magic Eye' tester is still available and you should be able to buy one for approximately £3. The valve's price compares favourably with a meter movement (either new or a surplus

type from a rally).

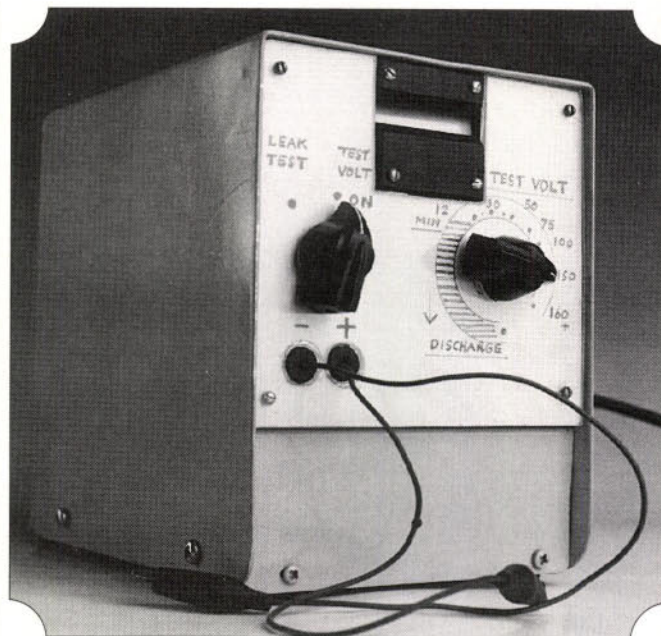
Incidentally, the valve has an advantage over the meter movement. This is because even if the capacitor connected to the probes still has a high voltage charge in it - no damage will result!

You'll also need a mains isolating transformer with two secondary windings. The secondary windings should provide 200 to 250V h.t. following rectification and a 6.3V a.c. winding for the valve heater.

Other components you will require include a few high wattage resistors and a rectifier suitable for the h.t. voltage. Many items, such as the valve holder and a smoothing capacitor of around 32 $\mu$ F or a 16 + 16 $\mu$ F in the same can is best, plus a few other bits and pieces you'll probably have in the 'junk box'.

If you have an old valve type large reel tape recorder of the 1960-1970 era you're in luck! They were often fitted with a 'Magic Eye' record level indicator and you'll be able to salvage most of the other bits you need from the tape recorder itself!

Basically, the insulation testing unit is a power supply to give a d.c. voltage to the anode of the 'magic



eye'. The supply goes via a dropping resistor to screens and to R6, a 2M $\Omega$  potentiometer.

In operation R6 provides a variable voltage to the capacitor under test (as the control is fitted with a double-pole on/off switch it also provides the 'leak test' switch). In other words you set R6 to 50V for capacitors rated at up to 50V working.

## Simple To Build

The capacitor tester is simple to build and I have not provided details on a case or lay-out as this will be a matter of personal choice.

I've no doubt you'll make it fit whatever case and suitable chassis you have to hand.

A printed circuit board approach is not necessary - unless you want it that way! Personally, I found that tag strip and point-to-point wiring was easier.

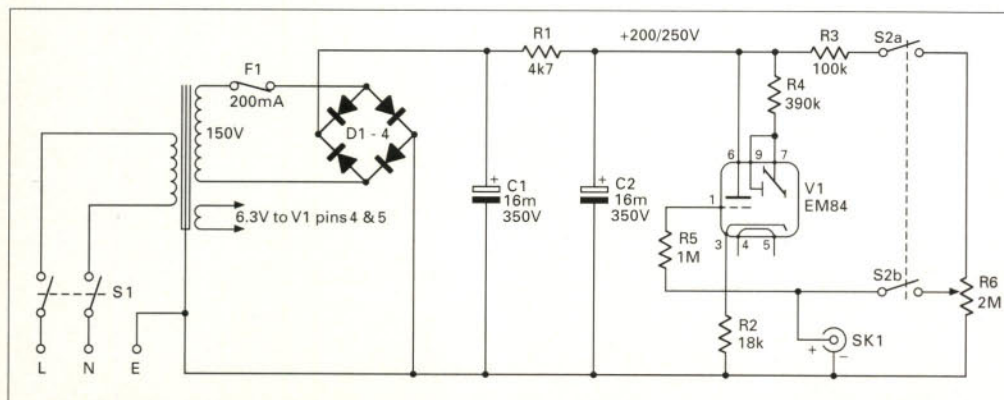
And, I also find it makes construction simpler if you use different coloured wires to switches and other components. Red is used for h.t. potential, orange for lower voltage h.t., two pair twisted brown or green for heater wiring, yellow for near earth potential and black for all earth 'ground' connections. If you lose track....it's easier to trace the wiring with this method.

The placing of components is not important and apart from the 'Magic Eye' valve, they can be placed anywhere suitable. However, the valve should be placed (see photograph) where it can be seen clearly.

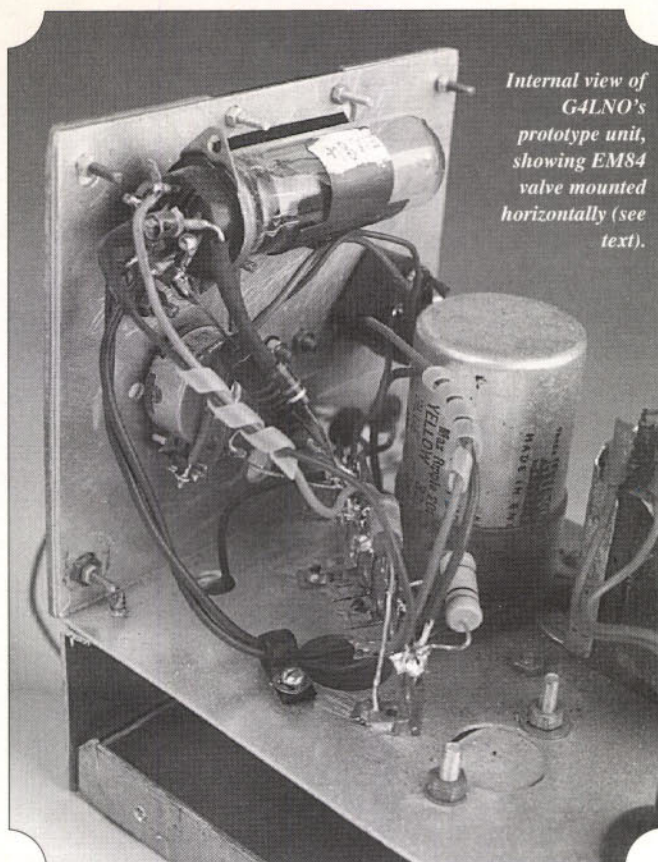
The 'Magic Eye' valve can be fixed in position with (make sure they're not too tight) spring tool clips. The valve base (a B9A type) will hold the valve in place quite tightly but you may need a small bracket just to be sure.

The valve will not stay level  
(when mounted horizontally)

*Fig. 1: Circuit of the 'Magic Eye' capacitor testing unit using the EM84 valve.*







Internal view of G4LNO's prototype unit, showing EM84 valve mounted horizontally (see text).

without the use of the spring type tool clips. However, there's nothing to stop you mounting the valve vertically and viewing the 'eye' closing and opening vertically instead of horizontally.

When you've completed the unit and the wiring is checked, you can calibrate the main control, R6. Calibration of the variable resistor is simple and it only requires a multimeter, switched to d.c. volts.

Place the meter leads on the capacitor test probes and move R6 round to a few positions and mark off the useful voltage reference points. These can be entered onto a card to be fixed behind the control knob and pointer.

The calibration method may seem a bit crude, but it's good enough for the job. Don't forget that the unit carries out a test to check whether the capacitor is 'good' - it does not provide a precise measurement.

## Capacitor Connected

When the tester is switched on, and with no capacitor connected and the leads not shorted, the 'Magic Eye' will be open. This means that there should be a dark gap between the two fluorescent green bars.

Capacitors to be tested must be out of circuit. If they are tested

where they are mounted, one end must be completely disconnected from the rest of the circuit.

On connecting a capacitor, the 'Magic Eye' will instantly close and then slowly open up as the capacitor charges. The larger the capacity the slower this will be. If the capacitor is good, the gap on the 'eye' will be fully open.

For the next stage in testing the capacitor you should then switch S2 to leak test (in effect turning R6 fully anticlockwise until S2 'clicks' off). If the 'magic eye' gap stays open it's good. However, if the gap closes instantly the capacitor is very leaky or almost short circuit.

If the 'magic eye' gap never opens the capacitor is short circuit. And, if the gap won't close when you first connect up, the capacitor is open circuit or already charged up.

You will find that with small value capacitors, for example, decoupling types 0.1µF (100nF), the gap will not open very wide and closes very quickly. But you'll soon get the feel of it and very soon wonder how you managed without it, or perhaps like me you'll change every capacitor in sight!

Looking at the diagram, Fig. 1, you will see that the grid, pin 1 will be at a positive potential via R6, according to its setting. With S2 closed, this will have the effect of

opening the gap to its widest.

When you connect a capacitor, current will flow into it and make the positive volts fall (unless the capacitor is already charged), thus making the gap close. As the capacitor charges the positive volts rise and the gap will slowly open again.

Opening S2 removes the positive voltage from source and isolates the leakage path through R6. The charge now in the capacitor should hold the 'Magic Eye' gap open if the capacitor is good.

The time the 'Magic Eye' gap remains open will rely on the value of the capacitor. But it will eventually drain away due to the natural leakage. I've found that 12V is about the lowest level you can use, but at this voltage and below, can usually be done with the ordinary multimeter.

## Test Completed

When the test is completed and before disconnecting the capacitor, switch S2 back to the h.t. supply and turn R6 down to zero volts. This procedure will discharge the capacitor nice and slowly, so it will be safe to handle without the chance of the sudden tingle we all know is waiting for the unwary!

In use, I've found my 'Magic Eye' unit to be a wonderful piece of gear for finding the intermittent faults. (You know....those which only seem to start when you have equipment running a while and things warm up). Building the tester is well worth the effort and nearly all the bits for mine came out of my junk box...perhaps yours could too?

PW

## Shopping List

### Resistors

4.7kΩ	1	R1, 1W carbon or wirewound
18kΩ	1	R2, 1W rating, carbon or wirewound
390kΩ	1	R4, 1W rating, carbon or wirewound
1MΩ	1	R5, 0.5W rating, carbon or wirewound

### Variable resistor

2MΩ	1	R6, 1W rating, log or lin with ganged double-pole switch
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### Capacitors

#### Electrolytic 350V d.c. working

16µFd	2	C1, 2
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### Semiconductors

#### Diodes

1N4005	4	D1 to 4 (or suitable bridge rectifier)
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### Miscellaneous

Suitable chassis, case. B9A valve holder, EM84 indicator valve, mains transformer (Maplin XP27E valve h.t. transformer suitable), bridge rectifier - alternative to separate diodes - (Maplin WQ58N suitable), test probes, mounting hardware, knobs, etc., to suit.

### The EM84 Valve

The EM84 indicator valve is available from Colomor Electronics Ltd., at 170 Goldhawk Road, London W12 8HJ, Tel: 081-743-0899, FAX: 0181-749-3934 or RST Mail Order Co., Langrex Supplies Ltd., 1 Mayo Road, Croydon, Surrey CRO 2QP, Tel: 0181-684-1166, FAX: 0181-684-3056.



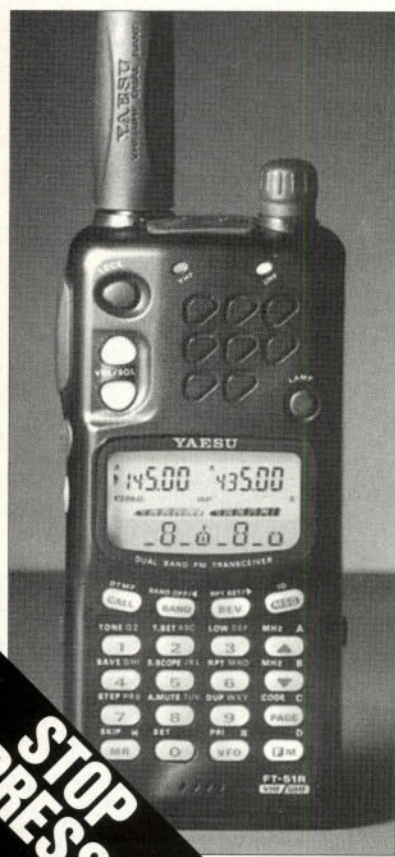
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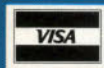
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# W Reflecting On Collecting

*Ben Nock G4BXD is an enthusiastic collector of valved and vintage military 'wireless' equipment. He's taken a little time off to reflect on collecting and to explain just why he thinks it's so fascinating.*

**T**his year sees the 50th anniversary of the end of The Second World War. This dramatic period in world history affected everyone and everything in the world, if not immediately then subsequently.

Nothing was more influenced by the War than the science of wireless communications. This area of science was taken from virtually the end of spark gap age to the multi-valved transceiver, airborne radar and microwaves within five years.

I think that all the advances brought about by the war would have happened anyway, man's urge to explore, develop and enhance can never be stopped. However, what may have taken decades to achieve in peace time, was accomplished in the course of those five years of war.

## Standard Receiver

In the five years of the Second World War the standard receiver of the British Armed forces went from, basically, a tuned radio frequency (t.r.f.) receiver to a multiple conversion superhet.

Equipped with stable variable frequency oscillators, a.m., f.m., c.w. and RTTY modes, multiple valves, miniaturisation and rugged construction enabled sets to be used literally anywhere. Wireless equipment could be found in tanks, bombers and on the backs of men charging into battle.

The Second World War with its period of surging development, the range and diversity of equipment produced and the history itself all go together to make the hobby of collecting military wireless equipment a fascinating subject for me. I have that 'feeling' of owning something that had such a part to

play during that dramatic period which makes the collecting an enjoyable task.

Like many youngsters starting in the hobby of amateur radio, I started at the age 16. And, like many others I acquired an R1155 and a 19 set as a matter of course.

These sets can still be found today, providing a good start to your collection of historical wireless equipment.

## Backbone Of Communications

The R1155 was the backbone of the wartime RAF communication. I think it's probably the nicest looking receiver of the war time gear.

Fortunately, the R1155 receiver is not that heavy, not too large and it has a very readable dial and frequency scale. The receiver has a beat frequency oscillator (b.f.o.) and enough knobs to look the part, and more importantly, the circuit diagram is easy to come by.

Many sets from the Second World War period had poor dials, which were very cramped and hard to read. Many had no way of controlling r.f. gain, so copying modern single sideband (s.s.b.) was very difficult.

There are ten versions of the R1155 about. They are all basically the same, but some cover the 1.8MHz band which in my early collecting days was the place to be. Basically speaking, the R1155 covers 75kHz to 18.5MHz, with a gap between 1.5 and 3MHz on the non 1.8MHz versions.

The only point to watch when you buy an R1155, especially if you have to build your own power supply, is that the case of the receiver is not at d.c. ground potential.

The unusual arrangement on

the R1155 means that you have to ensure your d.c. for the h.t. supply from the power supply does not have the negative side connected to the case or chassis. In other words it's 'floating above ground'.

You can still earth the chassis of the p.s.u. One side of the heater supply and the receiver itself can be connected to the mains earth with no problem, but just ensure that the negative d.c. connection for the h.t. is not earthed.

## Well Known Animal

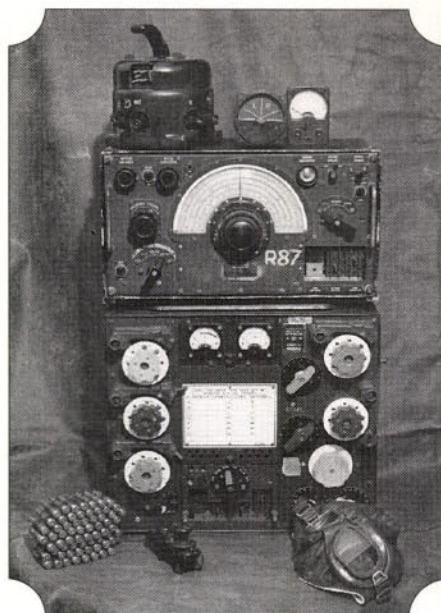
Depending upon the amount of damage done by the well known animal (in the amateur radio world) 'Modifae Everythinginsitus' the R1155 should work very well. It has good r.f. gain, good enough selectivity and a good output.

As there's no loudspeaker audio output in the R1155, most home-brewed p.s.u.s usually housed an audio amplifier valve, although these days I would suggest a single integrated circuit (i.c.) audio amplifier. However, there is of course sufficient output from the set though for headphones for those purists amongst us!

## Matching Transmitter

The R1155's matching transmitter, the T1154, is a bit of a beast. It's not to be recommended for the beginner to try and fire up.

The power amplifier (p.a.) stage needs 1.5kV, you need a big heater



*The R1155/T1154 combination. The receiver is on top, along with the 'J' aerial switch (round object on top) and 'bathtub' Morse key. This was complete with locking ring that would hold set on transmit while aircrew bailed out of a stricken aircraft.*

supply and a sturdy table to support the transmitter's weight. Additionally, a lot of effort is needed in securing either the original components of the matching set-up or fabricating your own p.s.u., leads, etc.

Having said that, the T1154 is probably the most picturesque of all the military sets around. This is due in no small part to the coloured knobs, and the transmitter looks good in a living room let alone the shack (I should know!).

## Famous Set

The famous 19 set, known to almost all radio amateurs, is again a very interesting set to start a collection with. Its 2 to 8MHz coverage is a bit limited for listening use but it will of course cover the 3.5 and 7MHz bands.

As its frequency coverage just clips the top of 1.8MHz, many 19 sets have been 'tweaked' to cover the band completely. If you acquire one of these sets then many folk have the circuit diagram and thus it's usually fairly easy to get the thing working, at least on receive.

There are three versions of the 19 set around. These include a MkI that only covers 2.5 to 6.5 MHz, and the MkII and III covering the



full frequency stretch.

The 19 set power supplies seem in short supply these days. But even if you have one it's not normally used as the rotary transformers (dynamotors) make a lot of noise! It's better to build a mains power supply (p.s.u.).

The MkIII with its r.f. gain control is quite capable of resolving s.s.b. Of course, it will only transmit a.m. or c.w., but it's quite useable on the bands even today. And in fact many can be heard working on the Saturday morning 3.5MHz military wireless nets.

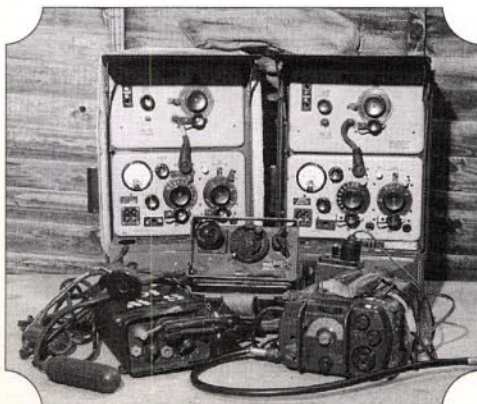
## Problem Bits

There is the problem of obtaining all the matching leads, plugs, headsets, microphones, connection boxes, 'bits and bobs' of course. Rallies can be scoured for these bits, but they are rarely seen these days, and you would be best advised to scan the collecting magazines and obtain what you need from other collectors.

In use, the operation of the 19 set is quite straightforward. The tuning lacks the feel of a good slow motion drive but you must remember how long ago it was produced. You'll also find sets with the control labelled in Russian, made in Canada, these were destined for our then Russian allies use.

The 19 set had two transceivers in the one box. These consisted of the normal h.f. transmitter-receiver and a v.h.f. transceiver operating on around 230MHz.

The small vertical thumb wheel on the 19 set front panel (or slot if the wheel is missing) just to the left of the upper large multi-pin connector was the v.h.f. tuning wheel. However, you're more likely to find this section of the set missing and a p.s.u. built in its place.



*Other sets available for the collector include the WS18 (rear), WS38 MkII (centre), WS38 MkIII (front right) and the WS88 (front left). All are relatively small and lightweight, and all but the 88 set use large octal valves. The 88 set uses 15 miniature valves.*

## Many Others

There are of course many other historic military sets to collect. Other 'collectables' include those such as the 22 and the 62 (both similar to the 19). Then there's the 18 and 68 sets (man-pack sets covering 6 to 9MHz).

Then there are the well known 'Command' series. These comprise numerous receivers all identically boxed covering different bands as used in B17 bombers. The transmitters use a pair of 807 (12V heater versions) in the final p.a., and are slightly bigger than the receivers.

I must not forget of course the 'big boys', the AR88s, the CR100s and the R107s. They're all large and heavy but very nice sets to play with - even by today's standards.

I believe there's satisfaction in restoring one of these sets to its former glory. The satisfaction comes both in the achievement of the electronic work involved and in the knowledge that a little piece of history has been returned to its original state, ready to be used once again.

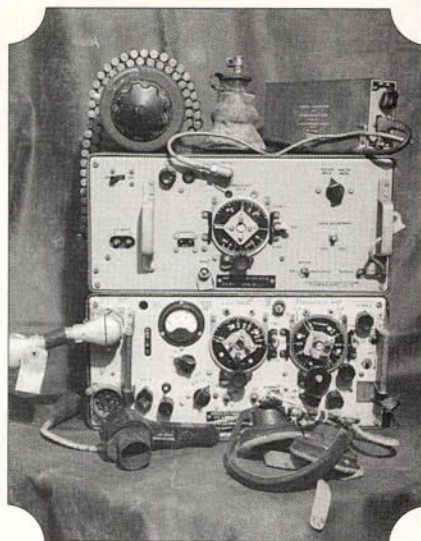
## Look Inside

I would suggest to beginners that they have a look inside any sets they're thinking of purchasing. Some are laid out quite straightforward but others can be a real nightmare to restore.

On some historic military equipment the wiring looms being difficult to trace and repair. There can appear to be miles of brown cloth covered wires, rubber insulated, which cracks and breaks away at the slightest touch as it has perished due to age.

I suggest you always carry a small screwdriver with you when attending rallies. This is because it's

*The WS19 MkIII and the additional linear amplifier (top). The 19 set runs one 807 in the p.a., the linear runs another two 807s. Above the linear amplifier is the 19 set crystal calibrator used to check set alignment, variometer a.t.u. on the left.*



always worth just opening up the set to see just how much damage has been done by the dreaded 'Modifae Everythinginsitus' animal.

Look out for things like the wrong meters, easily identifiable if there's no mention of 1944 or such on the dial plate. Fortunately, these can easily be replaced as many meters of the right age are around at rallies. Knobs can be found in the junk boxes usually hidden under most stalls.

But beware of parts such as missing transformers, i.f. cans, or aerial coils, especially roller coasters, if they have been removed. Finding the right coil, or roller coaster can be near impossible, and you'll most likely have to fudge something to get the set working but even then it may not look quite right.

My personal collecting of historic military sets has only really been in earnest for the last six years or so, although I've always played with old stuff right from my early days in the hobby.

## Starting A Collection

If you're starting a collection these days, you'll have to be a little less choosy about the state of the equipment purchased. This is because many sets have gone through the hands of the previously mentioned 'Modifae Everythinginsitus' animal.

Unfortunately, the 'modifys' was very keen on adding knobs, drilling and changing holes to this and that. They would also place speakers on the front panel, build very poor power supplies inside the sets after ripping out parts of the innards. (Where they find all those scrappy transformers beats me!).

You will have to accept the sets in a less than perfect condition unless you are willing to pay a lot of money. Perfect sets will demand a high price. But surely it's better to

say you own a piece of history, all be it with an extra hole or two, than not to do so in the first place?

Many sets can be picked up at rallies, having been passed over by the serious collector. And, when you've collected two or three imperfect sets, you can then set about transforming them into one set of much better quality.

During the course of the restoration you'll gain valuable knowledge in construction techniques. At the same time you will learn electronic design and the historical importance of your collection in world history.

## Try And Specialise

It's probably better to try and specialise in some particular area, RAF, Navy, Army, USA sets, etc., unless you really do have unlimited space.

There are a lot of post war sets about these days, the British Clansman and Larkspur equipment are just two examples. Post Second World War equipment also lends itself to a specialised collection, though these sets do not carry such a high nostalgia factor.

Above all, the hobby of collecting should be an enjoyable. Though if the bug does bite you should be prepared for the occasional moment of regret, even hatred...like at a rally recently where I missed a set I have been after for years by a matter of ten minutes!

I am unable, due both to upbringing and the laws of what can be published, to express my thoughts on the rally incident! So, be warned...the collecting bug can be a rampant vicious animal, it's no place for those of weak character.





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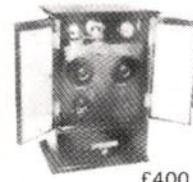
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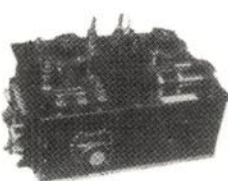
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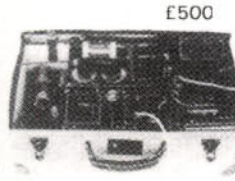
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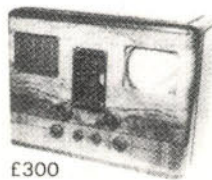


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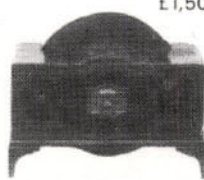
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# W

# Closed For The Duration

*Patrick Allely  
GW3KJW tells you  
how amateur radio  
was affected by the  
Second World War.*

A study of amateur radio journals for the years immediately proceeding the Second World War show that although some correspondents were acutely aware that there was an imminent danger of war, the majority of the amateur population did not share this view. Many carried on with what was then called the 'amateur radio game' making test calls and seeking contacts with other radio amateurs throughout the world.

Contrary to what today's newer enthusiasts may believe, by the late 1930s amateur radio was a well established hobby. Contacts were being made between continents on a daily basis, there were no restrictions on the erection of large antenna systems, and there were many stations capable of running high power.

Despite popular belief that everything was home-made, commercial shortwave receivers were readily available and it was possible to buy ready-made transmitters for the amateur bands. The only restriction of what was available to the amateur was the cost of the product - a situation which remains to this day.

## Potted Account

A potted account of the immediate pre-war years may give some insight into what was happening. I'll start in 1936 when Italian troops occupied Addis Ababa and the Spanish Civil War broke out.

In 1937 Japan attempted the conquest of China. On March 13 1938, Germany annexed Austria and with the threat of war the British navy was mobilised on September 28. The following day, Prime Minister Neville Chamberlain signed the Munich Agreement, the other signatories were Daladier, Mussolini and Hitler.

Neville Chamberlain returned



*The closure of amateur radio stations was quickly followed by the seizure of equipment.*

from Munich saying it was "Peace in our time". During 1939, the year of the phoney peace, saw great swathes of the Earth being grabbed by ambitious nations. In March of 1939 Germany annexed Bohemia and Moravia and part of Lithuania was ceded to Germany.

In April, Italy seized Albania. In May, Germany and Italy signed a pact, whilst the British Government signed a defensive agreement with Turkey and an Anglo-Polish treaty was signed in London.

In August a German-Soviet pact was signed, Holland mobilised and the British fleet was again mobilised. On September 1 Poland was invaded by German forces, Great Britain and France mobilised and on the September 3, Great Britain declared war on Germany.

## Amateur Radio

What was happening in the amateur radio world during the period of war breaking? The big news in March 1937 was that G5BY had worked across the Atlantic on 56MHz, his output stage consisted of two Eimac 35Ts and he was using a 500W modulator.

In the same month Southall

Radio Society had a club lecture on Television. The following month an interesting article appeared in *Short Wave Magazine* describing the 4316-A valve which could deliver 6.5W out at 500MHz.

The 1937 NFD was won by District 16 (Southern England) using the callsign G5JZP, (the oblique stroke 'I' was not incorporated in the callsign as it was understood). Remember that at this time all suffixes contained only two letters. In 1937 Senatore Marconi died and his obituary was prominent in all radio journals.

In 1938 a snippet appeared in *Short Wave Magazine* stating that 'much of the drivel being talked on 7Mc(MHz) has now spread to 3.5Mc 'phones who used to set an example in telephony operation'. In the same year Eddystone produced a ten valve superhet which was priced at £45 nett, the only extra required being a loudspeaker!

The amateur radio journals featured the Berlin Radio Exhibition of 1938. They paid particular praise to the metal radio valves being produced by Telefunken.

In the October 1938 issue of *Short Wave Magazine*, the editor Austin Forsyth G6FO expressed his apprehension of the political

crisis. This was just prior to the Munich agreement, and in his editorial was the paragraph "In common with all right-thinking men and women the world over, our heartfelt wish is that by the time this issue reaches your hands, Europe will once more have found herself in the sunshine of lasting peace".

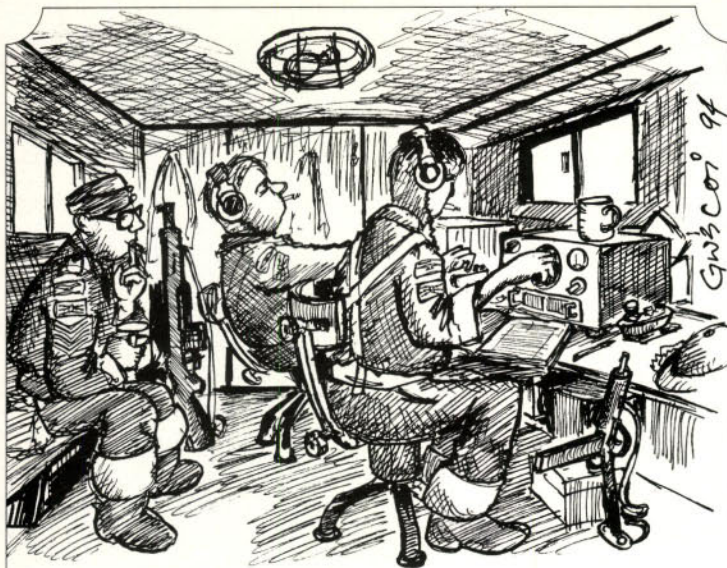
Austin Forsyth's editorial in the November 1938 of *SWM* issue was farsighted. He was proposing the idea of an Emergency Communication System whereby radio and amateur operators could handle some of the less important public traffic thereby relieving the burden carried on the GPO lines.

The *SWM* editorials followed the shambles of September 26 - 30th when telephone connections had been subjected to delays of up to 12 hours due to the priority of government traffic. Austin suggested that a radio network for second-class traffic would be cheap and of obvious strategic value.

## Wireless Reserve

During 1938 the Civilian Wireless Reserve (CWR) was formed, a core of trained wireless operators ready to answer the demands of military





*The Army recruited amateur radio enthusiasts as professional operators.*

service if needed. For this they were paid £2 per annum and were given a free crystal.

The Royal Navy Wireless Auxiliary Reserve (RNWAR) had been formed some six years earlier but did not offer any pay. And in January 1939, Jubilee Works of Clapham were advertising a 15W all-band transmitter, a.m. and c.w. with built-in mains power supply for the princely sum of 10 guineas (£10.50).

At this time, there was pressure from the amateur fraternity to raise the permitted power to 250W. Although from the details given of various stations, it's patently obvious that many amateurs were operating with illegal power.

There was also a moan in 1939 about the bad habit of adding 's' to 73 making the phrase 'best regards's'. (Habits have not changed over the decades!).

In April 1939 the Government rejecting conscription, expanded the Territorial Army (TA) on a voluntary basis. Radio amateurs not already attached to the Royal Navy (RN) or Royal Air Force (RAF) organisations, were encouraged to get in touch with the Royal Corps of Signals, which needed officers and other ranks.

In June 1939 the American Hallicrafter Company introduced their Skyriider S-21 Superhet receiver which covered 25 - 67MHz. The price in the UK was £20.

Also in the Summer of 1939 **G8KD** of Sheffield formed and organised a Radio Section of the Sheffield Special Constabulary for emergency radio communications. And on the short wave commercial bands, reports of jamming were increasing, although with the cessation of the Spanish Civil War certain jamming stations ceased their activities.

## Question Time

At Question Time in the House of Commons in July 24 1939, The Right Honourable Mr. Bartlett MP (Independent Bridgewater) asked the Postmaster General "what steps were being taken to use the services of amateur wireless operators in the time of war. And if he was aware that, with little expenditure, a 24 hour service could be maintained even in the event of a main breakdown of the grid electric supply".

The Postmaster General, Major Tryon replied, "It has been decided, after consultation with the Government departments concerned, that it will be essential to close down wireless telegraphy stations used by experimenters. I understand that steps have been taken by the Admiralty and the Air Force to enrol a number of suitable wireless experimenters for special wireless duties in emergency. They have been given the opportunity of joining the Royal Navy wireless reserve and the RAF civilian wireless reserve so that their skill shall not be wasted".

As far as amateurs were concerned, the spirit of amateur radio was as strong as ever. Despite the political machinations by the various governments, enthusiasts still spoke to each other as if nothing was happening. Even up to the September 1939 journals, it seemed that amongst amateurs, there was no general thought that a war was about to happen. But the Cabinet obviously knew better.

On August 31 1939, the Postmaster General, Major George Tryon issued a notice in a supplement to the *London Gazette* withdrawing the licences for the establishment of amateur wireless telegraph sending and receiving stations. Simultaneously a second notice was published withdrawing

the licence of the 'artificial aerial' experimenters.

Bear in mind that this was done the day before the Germans invaded Poland. It proves that although Great Britain was unprepared in many ways, obviously the intelligence agencies thought they knew what they were doing.

## Equipment Seizure

The closure of amateur radio stations was quickly followed by the seizure of their equipment. This was not, (as I believe) because they constituted some form of security risk, but rather that the authorities had the

instant use of sensitive receivers capable of receiving on the shorter waves and fitted with b.f.o.s for the reception of Morse signals. The transmitters, many of them high powered, were also seized and put to good use.

The outbreak of hostilities meant the call up of the reservists. The RNWAR were taken into the Navy, whilst the CWR were taken into the RAF where they became the lowest of the low - AC2s, but after very rapid training quickly received the cherished sparks badge as W/Ops, and just as quickly found themselves billeted in a hotel somewhere in France.

One early hero was **G3IY** who at the age of 18 years and in the CRW, was awarded the Military Medal. He was with the first batch of reservists and was transported to France on September 4 1939.

The Army took amateurs into the Royal Corps of Signals. At the same time a number of amateurs, too old, or unfit for military service, volunteered to be Voluntary Interceptors of the Radio Security Service.

The Voluntary Interceptors managed to recover their own receivers and performed an invaluable service listening to, and trying to identify signals, which they, as experienced amateurs, were able to hear in amongst the welter of other signals and interference.

Other radio amateurs were sent to Bletchley Park, some as instructors, others as operators. They all gave their best, making a successful transition from amateur to professional operating.

## For The Duration

Although amateur radio was finished for the duration of the war

in Great Britain, the radio magazines were still published, and the *T & R Bulletin*, much later to become *RadCom*, attempted to keep track of the members of the RSGB. Information was published every month of the amateurs who had been called up and into which service they had been enlisted.

It's fascinating to see the early lists of the licensed amateurs who held the rank of AC2 in the RAF, all these men were later promoted, some ending the war as high ranking officers. The *T & R Bulletin* in the early 1940s was packed with service information, and sadly the notices of the deaths on active service of many amateurs, quite rightly these obituaries were entitled 'The Roll of Honour'.

As the war progressed, the call signs of Canadians, Americans and various European amateurs in the allied forces were also published. It was a way of amateurs keeping in touch without being able to go on the air.

Although war broke out in 1939, amateur radio did not finish. Radio magazines reported on the signals heard, the Americans were active until December 8 1941 when they were closed down following the Japanese attack on Pearl Harbour. However, the neutral countries had no restrictions placed upon them.

I came across one report of a German station working, or appearing to work American amateurs during 1940. There are many reports of German amateurs working on the amateur bands in the early war years, and I wonder why they were allowed to continue to operate.

There was also a Prisoner of War Fund run by the RSGB, amongst many other funds, formed specifically to provide comforts for RSGB members taken prisoner. Contact, if by post only, was maintained to the extent of 'News from the Kriegies' being published, this being the letters received from the prisoners.

There is no doubt that some of the tobacco sent out to the prisoners via the Red Cross was used as bribes to obtain various radio bits and pieces. From these components radio amateurs in the Stalags were able to construct receivers and the occasional transmitter.

There must be thousands of individual stories concerning the activities of radio amateurs in the early war years, but the collation of these is an impossible task. Suffice to say, the presence of a core of experienced amateur radio enthusiasts was of great benefit to the country at a time when it was most in need.



# W One Valve Miracle

*Jim Allardyce VK4DJA enjoys 'basic amateur radio' and shares the experience he gained in building a simple one valve transmitter described in the July 1992 Practical Wireless.*

I hope the enclosed circuit and other details of my 'One Valve Miracle transmitter' will be useful to other readers of *Practical Wireless*. But before describing it, I'd better set the scene.

The story started as I was going to Australia in 1983. I decided to sit for my amateur radio licence so that I could be in touch with my son from 'down under'.

I'm now 78 years old and I have made several solid state transmitters and destroyed many output devices! So, I thought about building a valved transmitter, as it would be a little more difficult to 'blow up'.

At a flea market I purchased an old valved television for 50 cents. There were 14 valves and a circuit diagram neatly folded in the back. This purchase gave me a power supply and lots of resistors, etc.

When I saw the one valved transmitter circuit in *Practical*

*Wireless* July 1992 issue, I decided to experiment. It turned out to be quite an interesting exercise!

The circuit was published in part 2 of 'Mobile And Portable Operation - On A Shoestring' by G3XFD. The author's idea was to encourage others to try mobile/portable operating with a very basic rig. So, I had a go!

## First Circuit

The first circuit I built used a 6GV8 TV output valve using the pentode section. It was built on a breadboard and worked, but not too well.

I decided to use a more powerful valve, so I used an EL36 (or 6CM5 equivalent) a type often found in TV receiver horizontal deflection circuits using the *PW* design. It worked very well (too well). I turned up the load and it shot up to over 40W!

With my limited experience I was amazed at the output. I checked my power meter with my Icom 735, but it was all in order.

## Transmitter Keying

I found that originally, the transmitter keying was unstable, not only at 40W, but at lower levels too. And, to overcome the problem I tried everything I read about to improve the keying.

After experimenting, I noticed with several changes of L2 the problem became better or worse until I used an oscillator coil from an old Krieslar valved radio. With this joined to the coil in series, the c.w. note is now perfect and the output is stable.

So, by trial and error, I have a one valve 'Miracle'. I've enjoyed using the transmitter on 3.5MHz...and all for the cost of an old TV set!

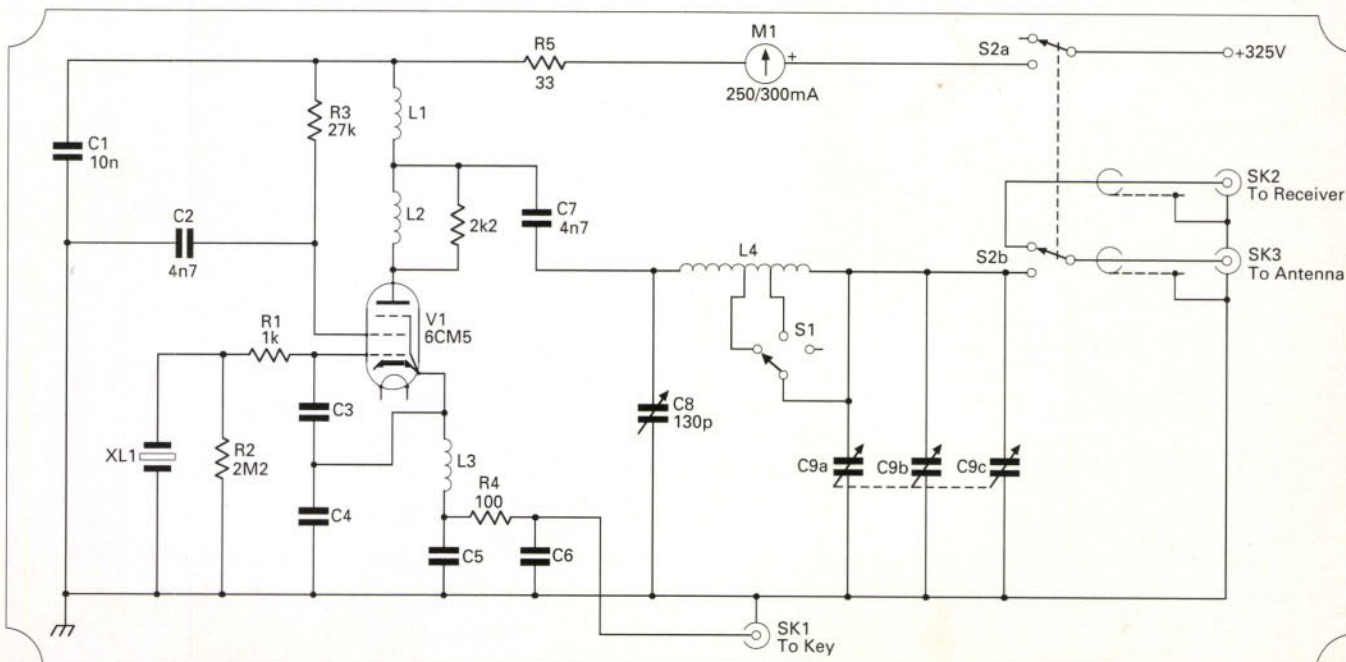
PW

## Editorial Note

I'm pleased to hear that Jim Allardyce VK4DJA successfully built and enjoyed using his one valved c.w. transmitter. (The circuit originally appeared in *PW* in October 1958). With the help of school radio club members, I've built several of these 'breadboard' fashion in less than hour to demonstrate how effective they can be. Incidentally, this type of simple transmitter was extensively used for clandestine purposes in the Second World War. However, nowadays on the air it's essential that this transmitter is used in conjunction with an efficient low pass filter to reduce the harmonic output. Additionally, to improve keying (bearing in mind you're switching the oscillator on and off) a crystal with good 'activity' is required. Keying can also be improved by careful adjustment of antenna loading. In practice I've found that this will mean loading the transmitter to approximately 20% less than the maximum output available from the valve being used.

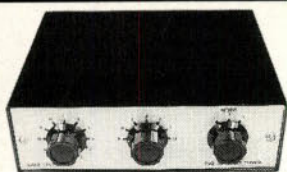
Finally, the circuit will work with many valves including: 6CH6, 6BW6, 6L6, 6V6, 807, N78, EL91, etc. (Photocopies of the 1992 articles are available from the *PW* Post Sales Department for £1.50 each including P&P). G3XFD.

**Fig. 1: Circuit of Jim VK4DJA's (he also holds G4YWL) version of the simple transmitter. The valve he used is better known as the EL36 in Europe. Full constructional details and power supply information are provided in the original articles (Part 1 published in June, Part 2 in July 1992).**





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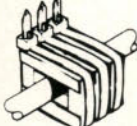
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# W Collector's Corner

Have you just caught the vintage wireless 'collecting bug' or recently inherited an old valved radio? Rob Mannion G3XFD passes on some advice to help you get your new interest off to a good start.

Collecting vintage wireless equipment is a growing hobby. And in fact, we've now got a new collector in the PW office in the shape of Donna 'Toad' Vincent!

In between working hard on PW production and studying for the RAE Donna recently inherited a mid 1930s HMV battery portable wireless from an elderly relative. When the set arrived in the office we immediately contacted Charles Miller, Editor of *The Radiophile* for advice and help.

As Editor of *The Radiophile* and an acknowledged expert on vintage wireless, Charles was able to help us immediately with technical and circuit information. The magazine by the way is a fascinating read, packed with servicing information, tips on maintenance, set profiles and anecdotes. It's a subscription only magazine and is

published six times a year (£18 UK, £24 overseas). Further details from Charles at 'Larkhill', Newport Road, Woodseaves, Stafford ST20 0NP. Tel: (01785) 284696.

There's no doubt about it, collecting vintage wireless equipment can really 'take over' your life! If your interest takes off you might consider becoming a member of the **British Vintage Wireless Society (BVWS)**.

We regularly receive a copy of the BVWS *Bulletin* in the PW office. It's always an interesting read and recently the magazine included an interesting supplement telling the story of the Burndept Company.

Annual membership to the BVWS costs £15 (UK), £17 (Europe) and £20 (World-wide). Further details direct from: **Gerald Wells, Membership Secretary BVWS, 23 Rosendale Road, West Dulwich, London SE21 8DS. Tel: 0181-670-3667.**

*Radio Bygones* is the subscription only magazine Edited and published by Geoff Arnold G3GSR. Geoff's magazine is of general historical interest and covers a wide area from the early days up until the 1950s and 1960s. A UK subscription costs £17 and Europe £18. Geoff also Edits *Morsum Magnificat*, aimed at the Morse enthusiast which also covers historical wireless.

Further information on both

publications (each published six times a year) from G. C. Arnold Partners, 9 Wetherby Close, Broadstone, Dorset BH18 8JB. Tel: (01202) 658474.

Eddystone radio enthusiasts are a keen lot and very enthusiastic collectors! In fact they're so keen that they have their very own 'club'. The Eddystone User Group (EUG) is now managed from the Eddystone

Radio factory in Birmingham! *The Eddystone User Group Newsletter* is a loose-leafed A4-sized newsheet filled with news, specialised information, readers' adverts, hints and tips...just for the huge band of Eddystone enthusiasts. A year's subscription to the EUG (£10 UK, £11 Europe) and further details are available direct from: **Eddystone User Group, C/O Eddystone Radio Ltd., Alvechurch Road, Birmingham B31 3PP.**

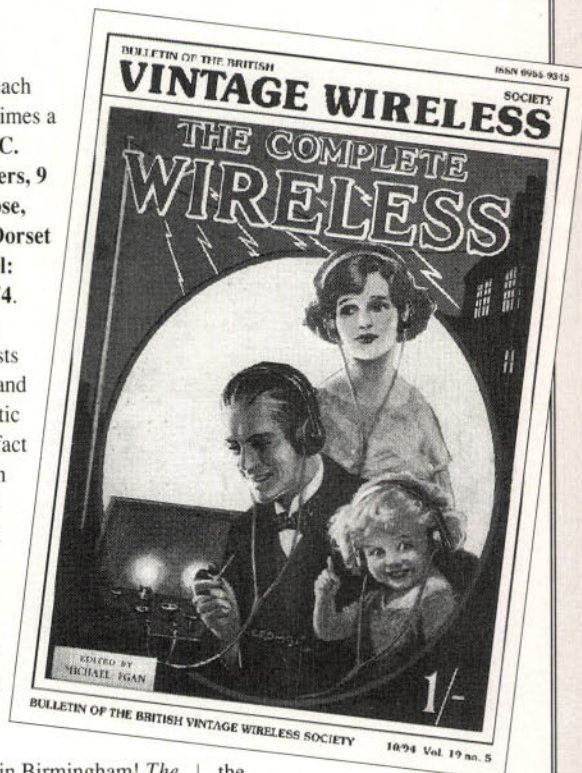
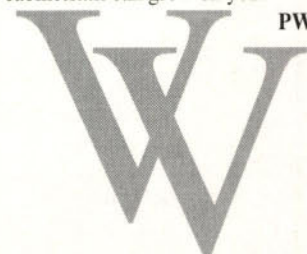
Finally, (as I'm always suggesting!) the radio enthusiast should never neglect their library. And, for the vintage wireless enthusiast the Institution of Electrical Engineers (IEE) in association with the Science Museum have published an interesting series of books dealing with the historical side of electricity, electrical engineering and wireless in great details. In fact, they have now published 20 books in the series. The latest to hand in the PW office is *The Early History Of Radio From Faraday To Marconi*, written by the late Gerald Garratt G5CS (formerly of

the Science Museum).

Gerald Garratt, is perhaps better known as the founder of the famous GB2SM Science Museum amateur radio station. However, his book is an excellent source on the early history of wireless and provides a large number of references for the dedicated researcher to follow up. The books aren't cheap (this volume costs £19 for a 96 page book) but the illustrations are first class and the research is impeccable.

Further details from the **Marketing Officer, IEE, Michael Faraday House, Six Hills Way, Stevenage, Hertfordshire SG1 2AY. Tel: (01438) 313311.**

Enjoy your collecting, it's great fun, and like dust on wooden cabinets...it can grow on you!





# Examining An Image Problem

Murray Ward G3KZB opens his RAE casebook to look at a question of 'second channel' which caused problems for recent exam candidates.

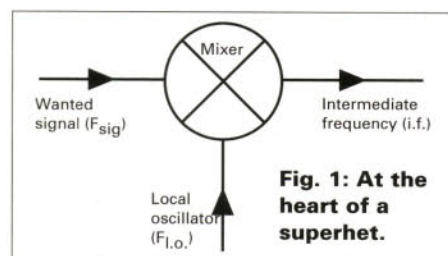


Fig. 1: At the heart of a superhet.

After the December 1993 Radio Amateurs' Examination, the examiners said that 'In a practical example of second channel interference, candidates did not recognise this as image frequency response at the receiver.'

Second channel, or image frequency, interference only occurs in a superheterodyne (superhet) receiver. So first, let's look at how a superhet receiver works.

At the heart of a superhet is the mixer (Fig. 1). Feeding into the mixer are the wanted radio frequency (r.f.) signal from the antenna ( $F_{sig}$ ), the local oscillator ( $F_{LO}$ ) produced 'locally' (in the receiver).

Coming from the mixer is the intermediate frequency (i.f.). For the purposes of this article I'm going to ignore anything other than the i.f. When you tune the superhet, the local oscillator changes in frequency. But the i.f. stays the same.

The signal from the antenna into the mixer is called the r.f. But it's worth remembering that the local oscillator and the i.f. are themselves at radio frequencies.

Now to the business of mixing: Let's suppose that you want to listen on 29.3MHz ( $F_{sig}$ ). And our superhet has an i.f. of 10.7MHz.

Adding:

$$F_{sig} + i.f. = F_{LO} \\ (29.3 + 10.7 = 40.0)\text{MHz}$$

So our l.o. frequency ( $F_{LO}$ ) is exactly 40MHz. I've shown this as a frequency graph in Fig. 2. The frequency of the wanted signal is 10.7MHz **below** the frequency of the local oscillator:

$$F_{LO} - i.f. = F_{sig}$$

As well as the frequency you want, there is unfortunately another, unwanted, frequency that will mix with the local oscillator to give the i.f. This unwanted frequency is known as the second channel or image frequency.

In our example the image frequency is the intermediate frequency **above** the local oscillator frequency.

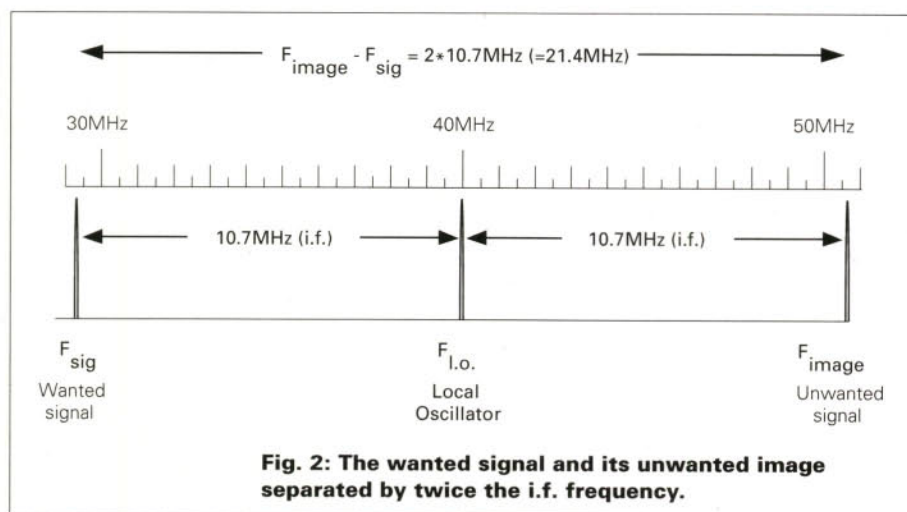


Fig. 2: The wanted signal and its unwanted image separated by twice the i.f. frequency.

$$F_{LO} + i.f. = F_{image} \\ (29.3 + 10.7 = 40.0)\text{MHz}$$

The wanted signal and its unwanted image are always separated by twice the i.f. There are two ways to show this. The first way is by using a diagram as in Fig. 2. The second method of calculating the image frequency is by algebra. We write down the two equations and subtract the bottom one from the top one:

$$\begin{array}{r} F_{LO} + i.f. = F_{image} \\ - (F_{LO} - i.f. = F_{sig}) \\ \hline 2 * i.f. = F_{image} - F_{sig} \end{array}$$

Let's use this to check our calculation:  
 $2 * 10.7 = 50.7 - 29.3$

In Fig. 2, I've shown  $F_{LO}$  higher in frequency than  $F_{sig}$ . You could draw a similar diagram with  $F_{LO}$  lower than  $F_{sig}$ . And You would find that, as before, the wanted signal and its unwanted image are separated by twice the i.f.

So, it doesn't matter whether the i.f. is above or below the frequency of the wanted

signal:  $F_{image}$  is always twice the i.f. away from wanted signal.

## Some Tricks

Now let's look at some of the tricks designers use to avoid the problem of second channel interference in receivers.

You saw that it happens in the mixer stage of a superhet receiver. And you found that the image (or second channel) frequency is always separated from the wanted frequency (the one you are trying to listen to) by twice the i.f.

To avoid second channel interference, you must stop the image frequency getting into the mixer. The diagram, Fig. 3, shows what designers do to achieve this:

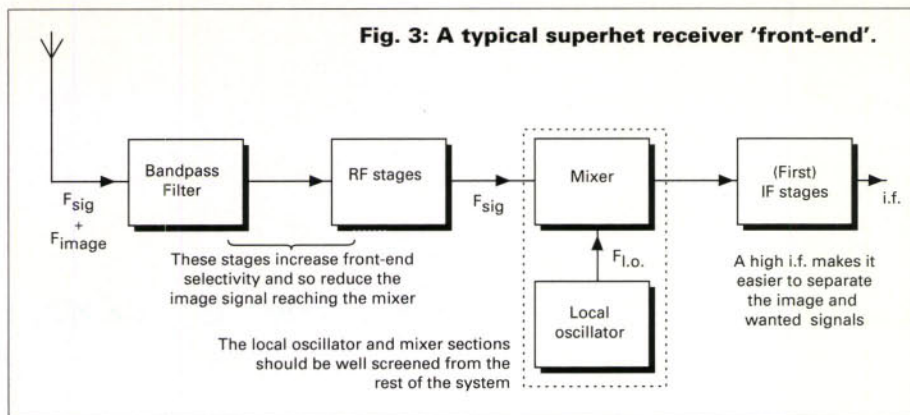
- a band-pass filter (called a preselector on some older receivers) at the antenna input,
- one or more stages of r.f. amplification,
- good screening so that the image frequency does not leak in via the wiring.

Many new receivers use a high i.f. The further apart, in frequency the wanted and image frequencies are the easier it is to separate them.

A modern communications receiver is likely to be a double superhet (it could be a triple, but let's not get too complicated). A



**Fig. 3: A typical superhet receiver 'front-end'.**



double superhet has two i.f.s. Selectivity (that is the ability of the circuit to respond to the frequency we want and reject all others) is provided by the second i.f. which is low compared with the first. In fact, a high first i.f. has two advantages: it minimises the risk of second channel interference; and the designer can, more easily, provide continuous coverage over a wide frequency range.

## Four Questions

Having given you the information, now let's look again at four questions in the RAE style, dealing with the problem.

**Q1** When a superhet is tuned to 3.5MHz, its local oscillator is running at 4.0MHz, the second channel frequency is

- (a) 500 kHz
- (b) 1.0MHz
- (c) 3.0MHz
- (d) 4.5MHz

**Q2** Image interference in a superhet can be minimised with

- (a) a narrow i.f. bandwidth
- (b) a stable local oscillator
- (c) a high i.f.
- (d) a wide dynamic range

**Q3** A superhet has an i.f. of 10.0MHz. When receiving a signal on 29.0MHz, the frequency of the local oscillator is 39.0MHz, the image or second channel frequency is:

- (a) 49.0MHz
- (b) 58.0MHz
- (c) 68.0MHz
- (d) 87.0MHz

**Q4** Second channel (image) interference is caused by:

- (a) abnormal propagation conditions
- (b) overdriving the transmitter power amplifier
- (c) deficiencies in the receiver
- (d) strong transmissions on adjacent frequencies

No cheating now, here are the answers below!

PW

Answers:  
Q1 (b), Q2 (c),  
Q3 (a), Q4 (d)

**January 22:** Oldham Amateur Radio Club are holding their mobile rally at the Queen Elizabeth Hall, Civic Centre, West Street, Oldham, Lancs. Doors open at 11am, 10.30am for disabled visitors. The event features many traders with a variety of items and a Bring & Buy. Talk-in on S22 via GB4ORC. Refreshments will be available from 11.30am. There will be a Mobile Contact Prize and certificate for the furthest mobile contact with an operator on his way to attend the rally, up to 2pm. Free programme draw and parking. **0161-652 4164** or **(01706) 846143**.

**January 28:** The Lancastrian Radio & Computer Rally is being held at the University of Lancaster. There will be all the usual traders, refreshments, a bar and Bring & Buy. There is excellent access to this rally, five minutes from either Junction 33 or 34 on the M6. Admission is £1. Doors open at 10.30am for the disabled and 11am for everyone else. Further details from **Sue** on **(01524) 64239**.

**February 5:** The South Essex ARS Radio Rally is being held at The Paddocks, Long Road, Canvey Island, Essex, (The Paddocks is located at the end of the A130). Doors open at 10.30am. Bring &

Buy, trade stands and home-made refreshments are available. Talk-in on S22. Admission is £1. Free car parking. **Roger GOLTO** on **(01268) 693786** or **Ken** on **(01268) 755350**.

**February 12:** The 4th Northern Cross Rally is being held at Rodillian School on the A61 between Leeds and Wakefield (near Jn. M1/M62). Doors open at 11am (10.30am for disabled visitors and Bring & Buy). £1 entry. There will be the usual dealers and groups, a bar and refreshments plus a Morse test on demand with two passport photos. Talk-in on 144 and 430MHz. **Dave Gray** on **0113-282 7883**.

**February 19:** The RSGB VHF Convention is being held at Sandown Park Exhibition Centre. Further details can be obtained from **G3MVV** on **(01277) 225563**.

**February 25:** The 10th Rainham Radio Rally is to be held at the Rainham School for Girls, Derwent Way, Rainham, Gillingham, Kent ME8 0BX. It's very easy to find from Jn. 4 of the M2 motorway the A278 or from the A2 from Rainham. Doors open at 10am, 9.30am for disabled visitors. There will be the usual trade stands, plus a few new ones selling computers. Many special interest groups will be represented, ie. RAYNET,

RNARS, Packet, KRGroup and Kent TV Group. There is also a talk-in on S22 by GB4RRR, a Bring & Buy, licensed bar, and snacks and refreshments also available with somewhere to sit and eat. Admission is £1, children under 14 free. Further information from **Martin G7JBO** on **(01634) 365980** any reasonable time.

**\*March 11/12:** The London Amateur Radio & Computer Show will be held at Lee Valley Leisure Centre, Picketts Lock Lane, Edmonton, London N9. Doors open at 10am to 5pm each day. There will be a trade show, lectures, Bring & Buy, on-demand Morse tests, disabled facilities, bars, restaurants, special interest groups and ample free parking. For further information you can contact **Steve White G3ZVW** on **0181-882 5125**.

**March 12:** Wythall Radio Club will be holding their annual Radio Rally at Wythall Park, Silver Street, Wythall (near Birmingham, on the A435, just two miles from Junction 3 on the M42). Doors open at 10.30am to 4pm. There will be the usual traders in three halls, a marquee, a bar and refreshments and a Bring & Buy stall run by the club. Talk-in on S22. Admission only £1. **Chris G0EYO** on **0121-430 7267**.



# Specifications

## - The Mysteries Explained

This month Ian Poole G3YWX introduces and discusses some of the problems associated with overload.

**S**ensitivity is one of the most important aspects of receiver design. Obviously if a set is not very sensitive then it will not be able to pick up the weaker and more interesting signals. However, sensitivity is not the only aspect of front-end design which is important.

The way in which a set copes with strong signals is equally important. It's not uncommon for broadcast stations to generate a millivolt or more onto a good receiving antenna.

Similar situations occur in contests when the amateur bands erupt with a host of strong signals. These strong signals may be only a few kHz away from a weak station which is being sought. The difference in strength between them may be 90dB or more, i.e. a ratio of 1 000 000 000 in terms of power!

Designing a set to pick-up the weak stations without the strong stations affecting is not an easy task. It's a challenge for receiver designers to design a receiver which can pick-up weak signals. And it's an even greater challenge for them to design a set which can pick-up weak signals in the presence of very strong ones slightly off channel.

### Front End Distortion

The intermediate frequency (i.f.) selectivity will reject the signals it 'sees' as being off channel. However, if distortion occurs in the front-end it's possible that signals which mask out the wanted signals may be generated. These cannot be rejected by the i.f. as they can be on the same frequency as the wanted signal.

The strong signal performance of a receiver is very important, and there are many specifications associated with this aspect of performance. However, before investigating the specifications, it's necessary to look at the root causes of the problems, which I will do this

month. In the next few issues I'll take a look at the specifications.

### Non Linearity

An ideal amplifier should give an output proportional to its input. Problems start to arise when very strong signals enter an amplifier and the output cannot handle the large signals.

As a result the output will limit and the signals become compressed. Unfortunately this brings a number of problems with it, including intermodulation, cross modulation and blocking.

When compression occurs a number of effects are noticed. One effect is that harmonics are generated.

Another effect of compression is that the amplifier starts to act as a mixer because of the non linearity. This happens because the level of the strong signal will determine the amount by which the amplifier is driven into compression, and this affects the level of the other signals.

In any circuit where the instantaneous level of one signal affects the level of another, some degree of multiplication or mixing occurs. Although these effects on their own may not cause problems, the combined effects of harmonics mixing together most certainly does.

For a harmonic of a signal to cause a problem it would have to fall on the frequency being received. For this to happen the interfering signal would have to be at a frequency of  $1/2$ ,  $1/3$ ,  $1/4$ , etc., of the wanted frequency depending on the order of the harmonic. Even when the interfering signal is at half the received frequency, the r.f. tuning is likely to reject the signal so that it cannot enter the amplifier and cause a problem.

### Mixed Products

Mixed products are unlikely to cause problems. Take the example

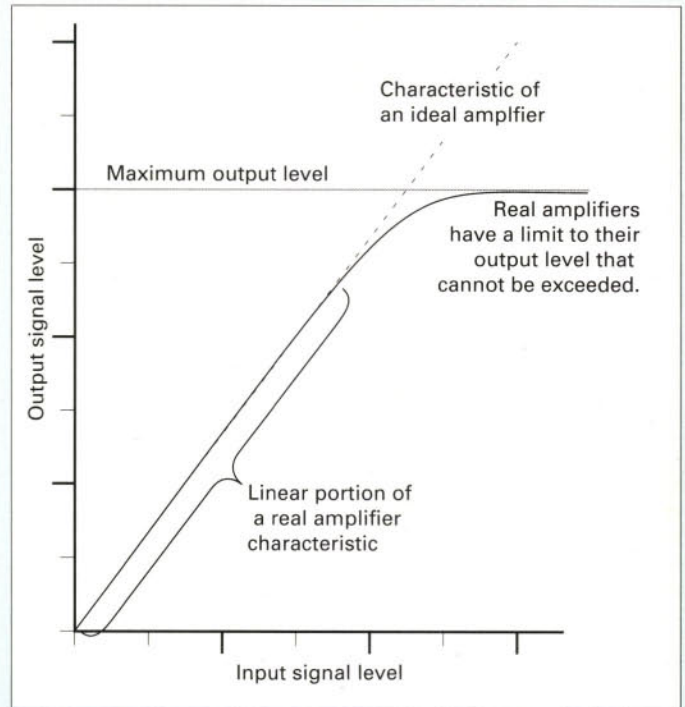


Fig. 1: Characteristic of an r.f. amplifier.

of a signal on the 10MHz band. If there are two signals close to the band at 10.1 and 10.2MHz they could mix together and give rise to signals at 0.1MHz and 20.3MHz. Again these are unlikely to cause a problem.

The problems arise when harmonics of the signals mix together. Take the example of the 10MHz band again. The second harmonic of one signal could beat with the fundamental of the other.

In this case 20.2 would beat with 10.2MHz to give a sum frequency at 30.4MHz. This would not cause a problem, but the difference product would appear at 10MHz which could easily be picked up.

The problem outlined is known as a third order effect as it is a product of  $2f_1 - f_2$  (third order intermodulation). Similarly the fifth order effect  $3f_1 - 2f_2$  (fifth order intermodulation) would give rise to a signal at  $30.3 - 20.4 = 9.9$ MHz. In fact by taking the various combinations a whole host of intermodulation products or signals are generated.

Obviously this can be a major problem when a number of large signals are present on the band. It can mean that a great variety of new signals will be generated and it can also lead to an increase in the general noise floor.

In this way it can be seen that the large signal handling capacity of the radio is just as important as its sensitivity. It also proves that adding preamplifiers should **only** be undertaken with care. Even then a switch should be provided so that it can be taken out of the circuit when there is any chance of strong signals causing overloads.

*That's all I have space for this month. Next time I will take a look at some of the specifications associated with intermodulation.*



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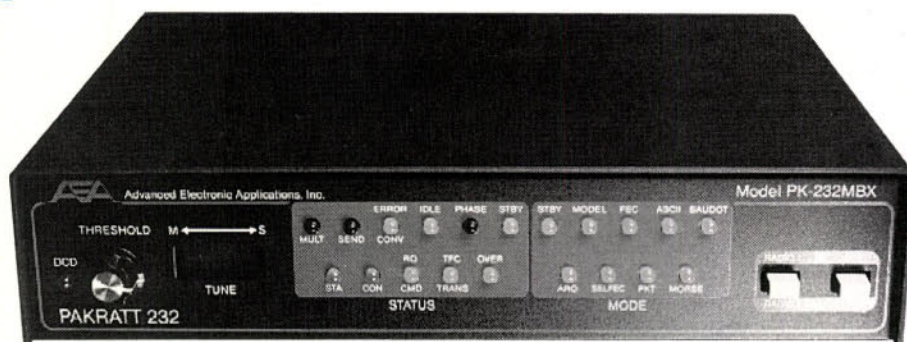
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# ALL THIS and Packet too!

Roger Cooke G3LDI looks at the updated PK-232MBX multi-mode controller from AEA.



Since the inception of AEA's PK-232 TNC, there have been quite a few improvements. In this new form the multi-mode TNC comes complete with a variety of cables. There's a serial cable with DB25 connectors, two separate radio connector cables and a package to help set up the TNC. It also has a comprehensive operating manual.

All you have to do is supply the radio and a computer. Most computer and terminal program combinations should work, providing there's a serial port and a suitable terminal program available for the computer. In fact the unit may even be run from a 'dumb' terminal.

There are customised programs, available, should you wish to purchase them. For the PC, there is *PC-PAKRATT 2 with FAX*, for the Apple Macintosh *MACRATT with FAX* and for the Commodore 64/128 you can purchase *COM-PAKRATT with FAX*.

There are newer programs available such as *PK-Gold*, that is very easy to use with the original PK-232. For Windows users on IBM PCs there's now *PC-PAKRATT For Windows*.

The PK-232MBX is similar to the older model PK-232 with a black with blue panels, cabinet. On the front panel, there are: a DCD indicator, a threshold control to optimise the input (not many TNCs have this facility) and a bargraph tuning indicator for ease of tuning on the h.f. bands. Then there's a panel of 11 l.e.d.s for Status indication, and a further nine l.e.d.s for Mode indication.

To complete the front panel controls there are two switches, one to switch radios and the other is the power switch. The PK-232MBX is capable of operating either h.f. or v.h.f. packet and it's possible to change to either band from the front panel. However, simultaneous operation is not possible.

The rear panel holds the power socket, two radio (v.h.f. and h.f.) sockets, a connector for an oscilloscope monitoring and a frequency shift keying (FSK) output socket. There are also external modem connectors for a Morse key - positive or negative keying, an RS232 outlet and finally an AFSK adjustment control.

The following modes are available: AX.25 packet, h.f. 300Baud - or - v.h.f. 1200Baud Packet Maildrop operation Baudot and ASCII RTTY, AMTOR/SITOR, CCIR Morse Code and PACTOR

The PK-232MBX also, in addition to the amateur modes, has the ability to send and receive black-and-white weather FAX pictures. It can also receive other modes such as Time Division Multiplex (TDM), NAVTEX (marine broadcasts) and bit-inverted Baudot RTTY. These capabilities, together with Signal Identification and Acquisition Mode (SIAM) make the new PK-232 an ideal unit for the s.w.l.

## The Demodulator

Preceding the demodulator is an 8-pole Chebyshev 0.5dB ripple band-pass filter. The pass band used is automatically switched by operating mode. Both centre frequency and bandwidth are selected to suit, down to a bandwidth of only 200Hz on c.w.

On transmit the modulator is a low-distortion AFSK sinewave function generator, giving phase-continuous AFSK. The output level is adjustable with a 600Ω load design.

A look under the lid reveals a high quality printed circuit board. The main Z80 processor and 32k of RAM plus EPROMs are socketed. Though some of the standard logic chips are soldered direct to the board. The l.e.d. indicators are mounted on a stand-off daughter board.

## Into Operation

The Americans have a saying applicable when putting a new piece of equipment into operation. 'If it don't work, adopt the 'RTFM' (Read The Flaming Manual) technique'. I can advise adopting this method. Working to a tight schedule with a lot of on-air testing to do, I put the TNC on the h.f. BBS, to see how it would work. It didn't!

I spent a considerable amount of time, re-setting parameters countless times with exactly the same result. Then I read the book! I discovered that you have to switch v.h.f. off in order to make it work on h.f.!

After my difficulties, I spent more time reading the book. I also had another problem. It would not work in KISS mode running under BPQ, so I had to put it in HOST mode and run it without BPQ on COM2.

Once the parameters had been set correctly, I left the unit running at 300Baud on the BBS on 14MHz. **Jim G4BDW** also runs a PK-232MBX, so we spent several evenings trying out the various modes of operation, using the *PC-PAKRATT 2* program.

Once again it pays to spend time reading the manual that comes with the program. Running *PC-PAKRATT 2* was fairly straightforward. Once the TNC parameters had been loaded and saved, it was a simple matter to run any mode from within the program.

When the program is first run, you're prompted to set-up the various modes. The screen colours can be set for personal preference. However, I found the defaults somewhat pale.

There's also a very useful program, *TESTPC2* that comes with the software. This tells the user what IRQs are free, and what COM ports are available. This could save some frustration in the first instance.

## The Handbook

The handbook that is supplied with the unit has a stiff cover, but is in effect a ring binder. Because of this the book will lie flat quite easily.

With over 100 pages the handbook contains lots of information, from the installation of the TNC, the wiring to the computer and radio, setting parameters, etc. to operation in each of the modes. A full description of the parameters is included and there is a components listing together with a circuit diagram.



The user would be advised to do some reading on each mode before attempting operation, because the basic principles should be known beforehand. Reading the TNC handbook in conjunction with the program manuals should reduce the problems.

There is a full description of the operation of the MAILDROP, a personal mailbox system (PMS). The system has the usual PMS command structure and 18k of RAM to store messages. This RAM space cannot be increased and once used up, a message 'No free memory' is displayed on the screen.

## Operation

Some tests were carried out with Jim G4BDW (all on h.f.) using all modes, starting with packet. The packet operating screen was brought up, but it was not immediately apparent how to connect to another station. The system starts up in Converse mode.

Referring to the handbook again, showed that pressing the F4 key, then typing the call in the box was the way to connect to another station. After you've become accustomed to the various commands, available from the help screen, it's easy to use. The display looks a bit like YAPP, with a 'send' window at the bottom and the receive window at the top.

## Morse Mode

Jim and I started the c.w. Morse mode tests at 20w.p.m. The keying sounded quite clean and copy was 100%, so we increased the speed in 10w.p.m. increments. Copy was fine up to and including 70w.p.m. At 80w.p.m. we found errors creeping in and by 90w.p.m. copy was very poor.

## AMTOR Mode

The AMTOR mode was next. Jim and I found this difficult when following the book, as it assumes a certain amount of prior knowledge of this mode of operation.

If you're a beginner, do some reading before using this mode to learn the principles first. After a few parameters had been set, we established communication. Operation was fine, and there were no problems at all.

## Vintage Mode

The next mode we tried really was a vintage mode. I'd not used RTTY in 25 years. The unit uses AFSK rather than pure FSK, but again it sounded very clean.

I must admit I enjoyed using the mode. I even worked a station in Russia on 14MHz to see how it behaved with QRM. There were no problems at all, and operation was very easy.

A new mode I'd not used it before was PACTOR, and I found it very interesting. In PACTOR mode the PK-232MBX behaved very well, and I'll have to use it 'in anger' to ascertain the full potential of this mode. In use PACTOR sounds like AMTOR, with a long

PACLEN. I used the unit on 14MHz, where there are several BBS already operating.

## SIAM Mode

Now onto the SIAM mode. This mode is intended for the s.w.l. and allows tuning in a digital signal, and the controller identifies it for you. If you have a transmitting licence, you can then assume the mode by pressing 'return' (or Enter) and two-way communication is then possible.

I used the SIAM mode and let the unit guess what mode Jim G4BDW was using. It took a little while, but after seeing 'ASCII 110Baud' on the screen, I pressed 'return' and was immediately accessed. This makes a useful adjunct for the s.w.l. who may not know what mode is being received. Though a few hours spent listening to the different digital modes and you can soon identify each mode.

## FAX Mode

Finally I tried FAX. I used the PK-FAX program that is available. I spent some time reading about it, then I set the TNC parameters and tried it on the air.

I discovered one tip to save time, and that was to set the baud rate to 4800 prior to using PK-FAX. It defaults to this speed to start with. I then tuned around the h.f. spectrum and found several FAX stations.

However, I was disappointed, both with the time taken for a picture to form on the screen, and the definition of the picture. I began to suspect my set-up and tried various system configurations, only to find that I had them correct in the first place.

Eventually the map I received could just about be identified, but the writing was almost totally illegible. Perhaps using a printer capable of producing finer graphics would show an enhanced result?

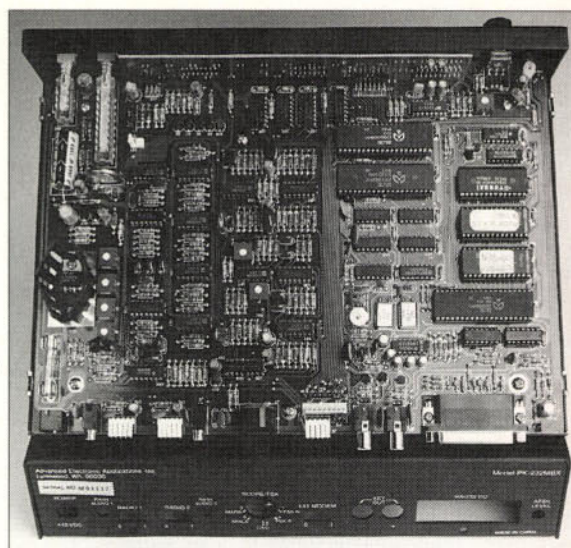
I hadn't tried FAX mode before and was a little disappointed at the result I got with my system. But I did try transmitting a file in FAX on a 'dead' 21MHz band, and the system seemed to work without any trouble.

## Overall Impressions

There are a lot of things that I've not mentioned. They include the ability to produce foreign and extended alphabets in Baudot, RTTY, AMTOR and Morse.

The PC-PAKRATT 2 program is 'mouse aware'. You can set either UTC or local time on the TNC. You can 'Shell' to DOS, work packet meteor scatter and many more modes. However, space precludes me from covering every aspect of this multi-mode controller.

Using PC-PAKRATT 2 program with the TNC does make using all modes very simple. I have no hesitation in recommending this



combination as a middle of the road system. Mine is now performing on the h.f. port of GB7LDI with no problems at all.

Any criticisms are minor niggles really. I found it very irritating to take off the jumper to disable the battery in order to return to default parameters, but then I was doing quite a lot of tests.

I was working to a fairly tight deadline so my patience was slightly thin. But once the parameters have been set, they shouldn't need altering again. I also found it annoying that I had to set v.h.f. 'OFF' and 'HBAUD 300' every time.

To the user's advantage, the price has just been reduced. So now, it's even more of a bargain.

My thanks go to **Martin Lynch** of **140-142 Northfield Avenue, Ealing, London W13 9SB. Tel: 0181-566 1120**, who can supply both the PK-232MBX - priced at £329.00 and the software, PC-PAKRATT 2 at £29.95.

PW

**After seeing a copy of the G3LDI review, Martin Lynch G4HKS sent us the following comments.**

Thank you for letting me see a copy of Roger's review of the PK-232MBX, and for the opportunity to comment on it. I was very surprised that Roger had such poor results when using the FAX mode.

In the years since the PK-232 was introduced, the unit has been upgraded in every way. The unit is universally used by radio amateurs, short wave listeners, and commercial operators alike. Hands up all those who, during the 'Gulf War', spotted a 'Comms' tent operated by the Americans with a wall of PK-232 units.

The PK-232MBX should appeal to the listener more than ever, provided a PC is available. I feel that in comparison to the more expensive stand-alone decoders, the PK-232MBX offers incredible value for money.

**Martin Lynch G4HKS.**



# Antenna Work

## Barbecued Loop Tuner

Over the years I've built a variety of 'magnetic' loop antennas, which I like to mount remote from the rig. However, this remoteness brings with it a problem of tuning the loop antenna and keying the transmitter safely. This would normally need two people, or very long arms!

I decided that some form of reversible motor tuning was required to make tuning easier. I scouted around for a suitable low voltage motor/gearbox combination that was cost effective. There are several options available, but all were expensive, complicated, or both.

Finally I settled on the combination shown in below. The 6:1 reduction drive is available from Cirkit or Maplin. The Barbecue spit motor I got from a large DIY store. You should be able to get them for about £4 or so, possibly even cheaper at this time of year.

I removed the section that was designed to hold the single 1.5V 'D' cell. This left the contacts coming out of the motor. You will need to make a suitable r.f. filter for the feed to the motor, as it can generate quite a bit of hash.

The type of motor I used has a square shaft and so provides some form of coupling. I ended up soldering a safety pin (with the cover taken off) to the end of the reduction drive shaft. It fitted into the square hole beautifully.

With a long run of cable I found about 5-6V was needed to overcome the losses in the cable. A secondary feed from the shack

## Improved Seal For 'J-Pole' Antenna

In recent issues of *PW* there have been designs for 'J-pole' antennas (§) but the designs each had, I feel, one major fault. That fault is in the joining and sealing of the coaxial cable to the elements of the antenna.

Have a look at the drawing, **Fig. 1**, where I've detailed the method I've been successfully using for several years. The antenna elements are the same as in the various designs. At the designed feed point I use two short sections of thinner copper pipe. The copper pipe I use has a bore just big enough for the coaxial cable to pass through.

Solder both pieces to their respective elements and tin the tubing at point A. At point B drill a 2mm hole in the side about 10mm back from the lip of the tube. Tin the tube around this new hole.

I use a flexible electrical pull through tape, and patience, to get the coaxial cable through. Cutting the outer insulation, I separate and trim the earth braiding of the coaxial cable. Fold the braid back and solder after wrapping thin tinned copper wire round at point A.

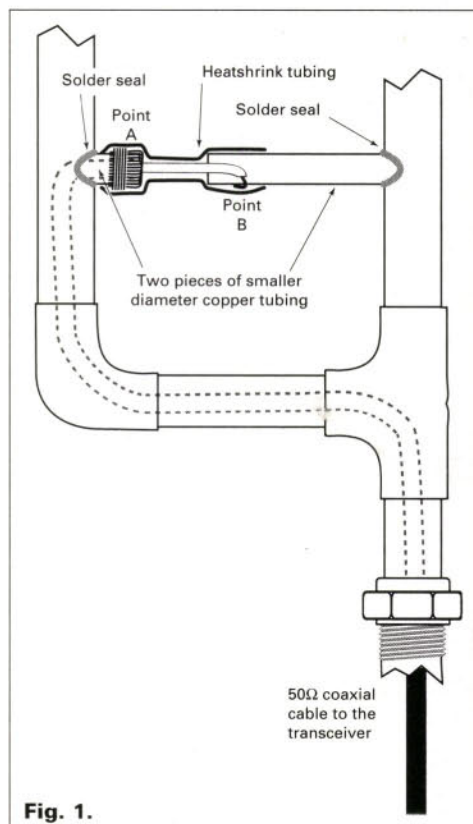
Slip a section of suitable heatshrink tube over the longer tube before trimming the inner of the coaxial cable and put it into the tube and solder the wires at Point B on the longer section of tube. You could use self-amalgamating tape as an alternative to the heatshrink tubing.

With the 'J-Pole' design of antenna there is no need to insulate the antenna from the supporting pole. So I use a screw connector to fasten the antenna to a short vertical steel tube. This steel tube can be clamped to the mast with the cable exiting from the steel tube.

**L. Nelson-Jones G4JDW**  
Dorset

### § Further reading:

'Antenna Workshop' a 'J-Pole' antenna by David Butler G4ASR p57 *PW* Jan. 1995  
'VHF Antenna Ideas For The Novice' by Dick Pascoe G0BPS p28 *PW* Sept. 1994  
'Slim Jim 2-Metre Aerial' by F. C. Judd G2BCX p899 *PW* April 1978



**Fig. 1.**

p.s.u. through a double-pole double-throw switch allowed tuning in both directions.

The tuner capacitor and motor reduction drive were enclosed in a plastics food container that I

sealed with silicone bathroom sealant. I've used this method on loops from 800mm to 4m in diameter without problems for over three years.

An added advantage of using a d.c. motor is that a rise in the generated signal noise from the motor can be heard as the loop comes into resonance. Then only a short period of transmission is needed to check for lowest v.s.w.r.

Since using this method I've worked into Russia with only 1.5W using the 4m loop supported some two metres above ground.

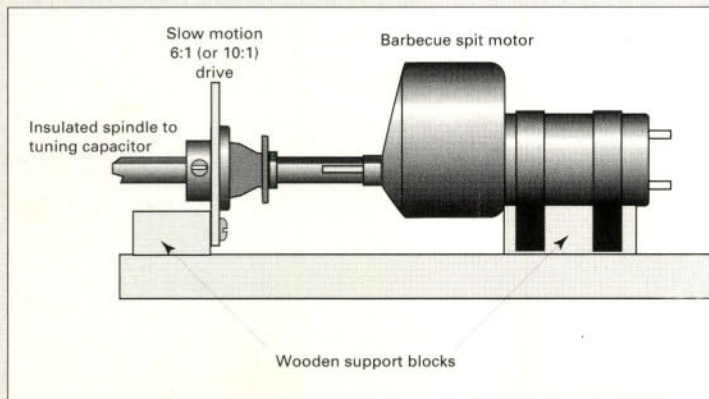
**Jonathon Brown G4JGL**  
Beds.

## Shack Alarm

I recently put up a passive infra red (p.i.r.) controlled floodlamp to deter potential 'do-badders'. Our area has been subject to a spate of 'borrowings' from houses and gardens recently. As many of the 'visits' appear to take place when most people are asleep, I decided to add an alarm to the circuit that would sound when the lamp came on.

Wanting to do it the simplest way possible meant that no extra wiring had to be added outside of the house. I looked through several magazines before deciding that a current sensing system seemed to offer the best solution to the problem.

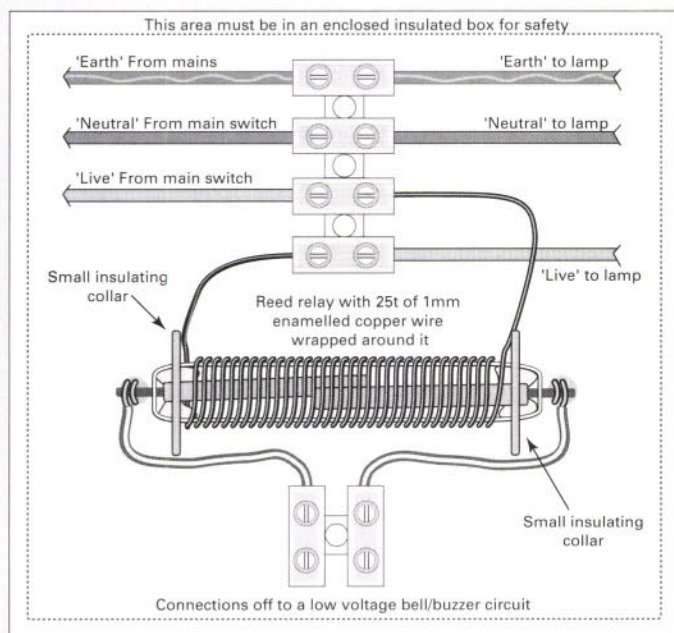
When a 250-500W lamp first





# rkshop

Six readers show us their ideas in this 'What A Good Idea' session of *Antenna Workshop*.



comes on there is an immediate current of about 20A flowing. This current settles down to about 1-2A after a very short time. So a safe and sure current sensing relay was needed.

Bare reed relays are available to wind your own coil around the body. The following drawing should show you how I set up the system. The circuitry shown is mounted in an insulated junction box within the house. About 25 turns of 1mm enamelled copper wire is wound around the glass body of the reed switch.

To reduce the possibility of the enamelled wire coming into contact with the low voltage lines controlling the alarm, two insulating material collars have been added. In the drawing the reed switch has been drawn out of proportion to make the method clearer. (**Obviously care must be taken with this wiring as potentially dangerous voltages exist within the boxed area.**)

Patrick Walton  
Manchester

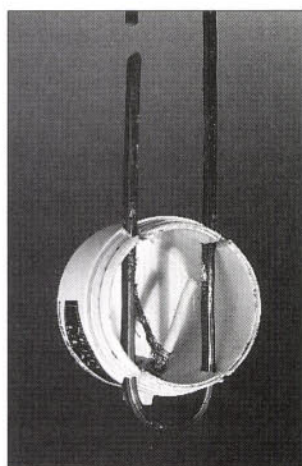
## Potted Antenna

In the course of experimenting with 'Slim Jim' antennas for the v.h.f. and u.h.f. bands I was stuck for a box to cover the connections with. Then I hit upon the idea of using those small pots that hand and face creams come in.

Slots are made to suit the size of wire being used. Using a small saw cut the slots down through the screwtop section just deep enough to allow the top to be screwed on. The photograph shows the method. I used square section very heavy gauge wire for my u.h.f. antennas.

For the coaxial cable entry a hole, made through the bottom of the pot is good enough. The cable itself can be held tightly in place to the side of the pot with cable ties.

G. J. Pass G1VBT  
Middlesex



## Coil Taps

I have been making all sorts of loading coils and tuning units recently and a problem I came up against quite often was making connection to the coils. Simply laying the wires together and soldering them didn't produce a good joint, even if it is easy. And, what about end connections?

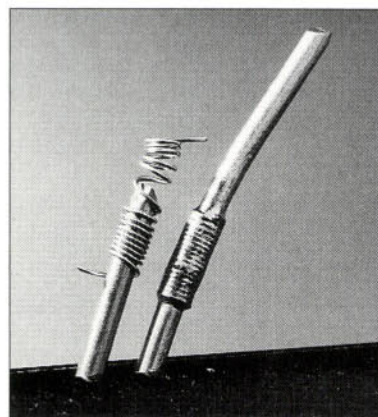
Then I hit upon the solution. I use 3mm copper wire for the high powered coils and sometimes for connection to the ends. The photograph shows a completed extension butt-joint and the partially made up one.

The secret is to wind thin (about 0.5mm) tinned copper wire around a 3mm drill shank. A coil length of about 10mm is adequate for a butt joint. Then you should put the ends of the 3mm wire into the coil and solder the whole area.

To make a tapping joint, where two 3mm copper wires run parallel for a short section, I use a 5mm drill shank to wind the thin copper wire coil on. If this is slightly squashed then two 3mm wires should just pass through before soldering to complete the job.

With care, two different sizes of coil wires may be butt-joined by winding a thin copper wire coil with two different diameters. The completed joints are not mechanically strong, but in electronic terms they are superb.

Pieter Balkstra PA0FBI  
Holland



## Cheap Spacers

Open wire feeder may be easily constructed using 1.5mm (16s.w.g.) copper wire and the polythene insulation recovered from short lengths of UR76, or other thick coaxial cable. These short lengths were left over from a variety of experiments over the years.

Begin by cutting the coaxial cable into lengths about 300mm long and strip off the outer insulation. Then remove the braiding carefully. This may be used later for 'earthing' straps with other pieces of equipment.

Now the inner conductor must be removed. Using a very sharp knife carefully trim about 20mm of insulation from one end. You should try not to nick the wires as this may make removing the conductor difficult.

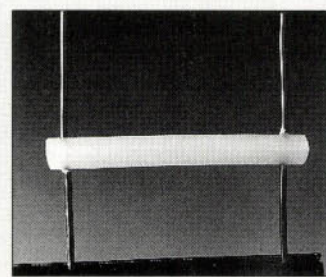
Trap the exposed inner conductor in a vice so that it's held tightly. With a twisting action gently pull the rest of the insulation off the inner conductor.

You should now have a length of insulation without any strands of copper wire through the middle.

Cut the resulting length into short sections about 60mm long. I use a 1.5mm drill to make holes through the insulation about 5mm in from each end. The holes drilled should be a good tight fit for the wire. You should use the correct size drill to suit the wire used.

You should now have 50mm spacers for the copper wire similar to the short length shown in the photograph.

Gordon Lawes G3PLT  
Weston-Super-Mare





## J. BIRKETT

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Mike Richards G4WNC takes his monthly look at what's happening on the computing in radio scene.

Recently I've been sent a utility program by **Brian Monkton** of Blackpool. If you've spent any time accumulating shareware programs, like Brian, you'll know that the main problem is the dreaded disk-based manuals.

For many programs the manuals comprise long unwieldy documents that seem to refuse to align with your paper length or printer width! Brian got fed up with the problem and decided to do something about it.

The result was a very efficient and compact program called *TextBook*. This seems to include all the tools you need to quickly make sense of text files. The program should run happily on any IBM PC compatible with an 80 column display.

*Textbook* is extremely economical and only uses 100k of memory even when handling a massive 4Mb document. Brian has used his programming skills to make the program as versatile (and green) as possible.

One of the main features of the program is its ability to re-format the document so you can print double-sided. This is particularly appropriate to printers with sheet feeders and enables you to convert an otherwise scrappy document into a very neat format.

As if all this wasn't enough, *TextBook* also includes A5 formatting and the inclusion of headers, footers and page numbers to give a really professional finish. The A5 option was particularly good as the program did all the hard work - all you had to do was fold-up the A4 sheets at the end of the print run to produce a smart A5 manual.

In its standard form *TextBook* comes with printer drivers for HP-Laserjet and Deskjet printers. However, the program includes a printer driver editor to help you can create a special driver to suit virtually any printer.

Having played around with the program, I can recommend it as an essential tool for all users of PC

shareware. *TextBook* can be obtained from **Brian Monkton, 43 Ambleside Road, Blackpool, Lancashire FY4 4SH**. The price is just £8.95 inclusive of P&P and future support. My thanks to Brian for donating the review copy.

## Systems Working Well

My CompuServe and Internet systems have been working well this month, with readers E-mailing me with everything from welcome messages to hot tips on where to look for software.

I've also uploaded my Interference FactPack to both networks. It can be found in the SWL section of the CompuServe HAMNET libraries and at the Demon FTP site on the Internet.

To find the Internet files you will have to FTP to <ftp.demon.co.uk/pub/swl/>. One of the great things about these networks is that they are not computer specific and you will find programs and support for many different computer systems.

**Mark Lewis and Charles Putney** have identified the following Internet sites as being particularly good for amateur radio software:

**FTP Sites**  
<ftp.cdrom.com>  
<ftp.ucsd.edu/hamradio>  
<ftp.cs.buffalo.edu/pub/hamradio>  
[oakland.edu/pub/hamradio](http://oakland.edu/pub/hamradio)  
 World Wide Web Pages  
<http://www.mcc.ac.uk/otherPages/AmateurRadio.html>  
<http://galaxy.einet.net/galaxy/Leisure-and-Recreation/Amateur-Radio.html>

If you're a new CompuServe user I would strongly recommend that you get hold of the CompuServe Information Manager CIM and Navigator packages. These programs completely transform access to the network and save their initial cost very quickly through much reduced time on-line. They also make the whole system much easier to use.

Unfortunately, Internet users don't have the luxury of such refined software and generally have to gather together a collection of programs to make the system more friendly. This is an area where I may be able to help.

I have spent many hours searching around and configuring software to try and get the results I want. Having now got close to my goal, I'm putting together a new FactPack to provide guidance for those that are new to or just getting started on the 'Net'.

## Software Help

**Mark Singleton** has E-mailed me asking if I can guide him to some amateur call logging software that will run under Windows 3.1. Mark has a DOS system that will just about run with Windows but suffers the occasional crash.

What Mark really wants is a program that's designed for the Windows environment. Can anyone help? If so please write or E-mail the address at the foot of the column.

## Good News

Good news for those of you with CDROM drives fitted to your machines. The Public Domain Software Library (PDSL) in Crowborough are now UK agents for the Walnut Creek range of CDROMS.

The Walnut range comprises of a very comprehensive set of CDROMs for PCs, MACs and UNIX based computers. Of particular interest is the QRZ! Ham Radio compilation.

In addition to providing a good selection of shareware radio related programs the QRZ! CDROM contains some comprehensive Callbook Information. The current version contains full callbooks from the following countries: US, Canada, UK and Italy. One particular advantage with this callbook implementation is that all the searches run from the CDROM so, you don't eat up valuable space on your hard disk.

The manufacturers have also included Usenet Ham

Radio news archives extracted from the Internet and a fascinating set of SoundBlaster compatible WAV files for TNC testing. The current price for the CDROM is £19.00 inclusive of VAT and P&P.

For more details contact **The Public Domain Software Library Winscombe House, Beacon Road, Crowborough, East Sussex TN6 1UL. Tel: (01892) 663298.**

## Special Offers

The following special offers are available to 'Bits & Bytes' readers. Although I try to turn the orders round in a day or two, you should allow up to two weeks for delivery.

- 1 JVFAX 7.0** - FAX and SSTV transmission and reception for IBM compatible computers.
- 2 HAMCOMM 3.0** - RTTY and c.w. transceive facilities for IBM compatibles.
- 3 NuMorse** - A comprehensive Morse tutor that runs under Windows 3.1.
- 4 FactPack 1 Interference** - Help for solving interference problems.
- 5 FactPack 5 On the Air with JVFAX & HAMCOMM**. If you've got the programs but have got stuck trying to get the best out of them, this should help.

To receive any of these offers just send a self addressed sticky label plus 50p per item (or £1.50 for four or £2.00 for all five). If you're ordering JVFAX/HAMCOMM or NuMorse you will also need to send a blank formatted 720k disk for each program or just one 1.44M disk for the three programs.

**Good computing! Don't forget to send all letters to 'Bits & Bytes' - Mike Richards, PO Box 1863, Ringwood, Hants BH24 3XD. CompuServe 100411,344 Internet Mike@decode.demon.co.uk**

E N D



*This month David Butler G4ASR has news of increased f.m. activity on 50MHz and also reports on tropo and auroral openings.*

You may remember that a few months ago I carried out a review of the Alinco DR-M06SX 50MHz f.m. transceiver. Anyway, while testing it out I discovered there was a reasonable amount of f.m. activity on the 50MHz band.

Following the review, I stored the f.m. telephony simplex channels in the memory of my Kenwood TS-690S. There are 10 channels with 20kHz spacing from 51.410 to 51.590MHz and the f.m. calling frequency is 51.510MHz.

## Local Activity

Now I was set up, or so I thought, to discover all the local activity on 50MHz f.m. Strangely, I didn't find very much traffic on these channels.

The activity seemed to be on odd-ball frequencies such as 51.250 or 51.850MHz. At least that's what I found being used in the Midlands. (It may well be different in other parts of the country of course).

So the answer is, don't just look on the allocated simplex channels. Set your transceiver to scan other frequencies in the top half of the band.

However, before I forget to mention it - don't forget I'm talking about local f.m. traffic not DX type contacts. The reason why I say this is because when the band is open, usually via Sp-E in the summer, f.m. DX can be found elsewhere.

Under DX conditions however, the f.m. is normally in the s.s.b. narrow-band section. Of course it shouldn't be there if operators follow the band plan but that's another story!

Personally, I think operators should follow the band plan. For one thing, I would have been able to discover the local f.m. activity much quicker.

Secondly, some modes such as f.m. and s.s.b. (for example) are incompatible. That's the main reason why

band plans were first devised. However, I digress!

## Contacted Novice

One of the locals I contacted on f.m. was Novice **Len Brown 2E1COI**. Len lives in Worcester and is very active on the band.

Len uses a Kenwood TS-430S, at 28MHz, to drive a Spectrum Electronics transverter. This is set-up to give 3W r.f. into a 4-element Yagi.

Incidentally, Len made both the transverter and the antenna himself. His regular contacts are with stations located in Wolverhampton and Birmingham.

There's a pocket of f.m. fixed and mobile activity to the west of Nottingham according to **Martin G6ABU**. Another station **G7LIJ**, reports that there's also quite a fair bit of fixed station activity in south-east England.

**Steve Richards G8LGX** is one of those active from Kent. He has ditched all his 144MHz gear (brave chap!) and has got equipped for 50MHz f.m. operation. He's running 50W into a vertical half-wave dipole at 5m above ground. He mentions that he regularly monitors 51.510MHz.

## Horizontal Polarisation

One observation that I made was that all stations I contacted were using horizontal polarisation. Everyone was using a directional Yagi and a rotator.

It may have been that I simply couldn't hear the low-gain vertically polarised stations with my horizontal Yagi. So, if you're thinking about getting active on 50MHz f.m., it's worth sparing some thought about the antenna system.

Theoretically vertical polarisation should be the norm as per operation on

the 144MHz band. However, as I've discovered there's also a fair amount of activity on horizontal polarisation. It will be interesting to see how this develops.

One 'mode' that does require vertical polarisation is mobile operation. However, there seems to be very little mobile activity at the present time.

**Adrian Deane G7KCG** reports that he's quite active from his car. He uses a Yaesu FT-690 MkII driving (pardon the pun!) a 30W amplifier.

The antenna used by G7KCG/M is a base loaded shortened quarter wave vertical fixed to a magnetic mount. Adrian mentions that it works very well and in conjunction with **Peter G7ETZ** he has carried out comparisons between full size and shortened antennas.

Peter G7ETZ observed about one S-point (6dB) difference between the full size quarter-wave antenna and the loaded version. Adrian reckons that for local contacts it doesn't seem to make much difference.

From his home QTH in Stroud, Adrian says he can make f.m. contacts into Bristol. Contacts on the 144MHz band into the same area are very difficult because of local hills. It would appear therefore that terrestrial communications in hilly areas may be better on the lower frequency bands.

## Mobile Installation

**Trevor Day G3ZYY** also has a permanent 50MHz mobile installation in the car. However, he reports that he has hardly worked anyone on f.m. except by prior arrangement. (On the other hand Trevor's QTH in Cornwall is probably not over populated with radio amateurs!).

The system at G3ZYY consists of an Icom IC-505, a Tokyo Hy-Power linear

running 60W and a seven-eighths wavelength vertical antenna. This antenna is actually designed for the 144MHz band, but it works very well on 50MHz without any additional tuning.

Trevor gets a v.s.w.r. of around 1.2:1 with his 144 antenna on 50MHz. As he says, why buy an expensive dual-bander when a 144MHz vertical does the job just as well?

Trevor suggests that to stimulate f.m. activity, an experimental repeater should be installed in the top half of the band. Personally I think this idea has its merits.

However, the use of repeaters on the 50MHz band has not yet been authorised by the Radiocommunications Agency (RA). But I understand that seven UK groups have already provided repeater proposals to the RSGB Repeater Management Group (RMG).

## One In Europe

According to my records there's only one 50MHz repeater in the whole of Europe. It's located in Norway and operates on 51.800MHz. The input frequency is 600kHz lower on 51.200MHz and it requires a 1750Hz tone burst to activate it.

One UK station that has used the Norwegian repeater is **Philip Yates G7BZD**. He reports that he was the first G station to work through it when he contacted LA2PH in June 1993.

Philip and his wife **Sue 2E1ACC**, have also made some f.m. simplex DX QSOs during the summer Sp-E season. They were running 2.5W from a Yaesu FT-690 MkI into a 3-element Yagi, and contacts have been made into Scandinavia.

## Excellent Tropo

Reports are still coming in about the excellent tropo



conditions that occurred between October 12-15. Stations reported DX on all bands from 50MHz through to 10GHz.

**Simon Falconer G7GUO** (IO91) reports that on October 13 he heard DL9YA0 accessing GB3HZ his local 430MHz repeater. The German station, located in JO31, was only running 30W f.m. into a small beam!

Simon also mentions that he connected directly to a Belgian packet radio node on 439MHz. He was running 20W into a 19-element Yagi and was surprised to get his signals that far. This was because his antenna had an extremely high v.s.w.r. due to it being used well outside its designed frequency range.

Not everyone was able to make the most of the conditions. **Ralph Sachs G2CZS** (JO01) reports that he heard none of the SP or OK stations being worked to the west of him. Despite this, operating on the 144MHz band he did manage to work into DL, OZ and SM.

As I've already mentioned, conditions were excellent all the way up into the microwave region.

**Richard Girling G4FCD** (IO92) first noticed an enhancement in conditions on the 10GHz band from October 11.

Richard received the ON4RUG and PI7EHG beacons at good strength from 0600UTC, but there was very little activity. However, in the following days he made some excellent contacts. These included QSOs with four Swedish stations over 1000km away. Richard's last contact was at 2104 UTC on October 15 when he worked DC8UG at a distance of 645km.

## Microwave Activity

Let's look at some microwave activity now and **Neil Underwood G4LDR** (IO91) tells me he uses a G3WDG design transverter to produce s.s.b. and c.w. on the 10GHz band. He first noticed the lift on October 9 when the GB3SEE and GB3MHX beacons became audible.

Three days later on October 12 Neil worked PA0EZ (487km) following this up with a contact over 1118km with SM6ESG on October 13. Conditions on the following day were poor according to Neil but on

October 14 the DX was back.

The best contact of the day was with DF9LN on s.s.b. at 658km. The photograph, **Fig. 1**, shows Neil at a recent Microwave round-table event. These meetings are held about six times a year at various venues throughout the UK. The aim is to promote and help operators to become active on the microwave bands.

Another station to take advantage of the good conditions was **G4BCH**. He went out to operate portable from a QTH near Ventnor on the Isle of Wight. He was using a low power narrow-band system running only 700mW into a 460mm *Practical Wireless* dish. (These dishes were produced many years ago for use with the *PW'Exe'* 10GHz wide-band transceiver project).

The G4BCH log included contacts with five German stations, four over 600km and two stations in Holland. Pick of the bunch were contacts with two Swedish stations both over 1100km away. He was delighted to establish a new British record when he worked SM6HYG over a distance of 1178km. And all thanks to a *PW* dish!

A new European record was also established during this period. The station SM6HYG worked F6DKW over a distance of 1218km. Congratulations to all concerned.

## End Of November

The tropo conditions were also very good towards the end of November. During this time there was an area of high pressure centred over the British Isles and extending into central Europe.

Conditions seemed to be as good as that experienced in October. On November 28 the stations of **G3LQR** and **G4KGC** worked OE5VRL/5 on the 10GHz band.

At my QTH (IO81) I worked 18 stations on the 144MHz band that were more than 1000km away. The best DX, at 1520km, was HA/DL1MAJ (JN87) operating from a mountain top in Hungary.

The RAF Club station **G6RAF**, operated by **Reg Wooley GW8VHI** was also busy. Reg managed to work HA/DL1MAJ on the 430MHz band for DXCC country number 25. Really tremendous going Reg, well done!

## Auroral Activity

We're now approaching what is traditionally the best period of the year for auroral activity. Aurora can occur at any time of the year but peaks around the equinoxes in late March and September.

In 1993 I recorded one event in February and nine in March. Last year, 1994, was much better with 14 events in February and 12 events in March.

Will this year be better? You'll only find out if you actually participate! So to help you here's a few of my tips.

But first I must get back to basics. Signals propagated via aurora are essentially weak (because of the non-optimum geometry) and therefore all communication is carried out on s.s.b. or c.w.

So, if you don't have this type of equipment you might as well forget it. Secondly, it's useful to note that it occurs very often on the 50MHz band, fairly frequently on the 144MHz band and only a few times in the year on the 430MHz band.

Next, you must know when an event is likely to occur or when it's actually in progress. Using an auroral calendar is helpful but doesn't catch every event. (It's useful as a long term planner though).

What you probably want is something that tells you an event is just starting or is already in progress. I make extensive use of TV video signals in the Band I (48-49MHz regions) for this purpose. There are many of these stations situated throughout Europe.

The slightest whiff of an aurora and Band I starts 'hissing'. Then I move up to the 50MHz band and higher as the event intensifies. I cannot stress enough the capability of being able to receive signals in the 48-50MHz region of the spectrum.

If you don't have 48-50MHz receiving equipment then the other alternative is to log into the DX Cluster network. In this way you can let other stations throughout Europe spot the DX for you.

## Beams Northwards

Another method is to keep your beams pointing northwards and monitor the band regularly. Personally, my preference is to do all three, and have a



**Fig. 1: Neil Underwood G4LDR, is a keen and well known microwave operator (see text).**

magnetometer to indicate changes in the magnetic field!

When auroral signals are first heard I find it best to peak up on a strong Scottish station. From the Midlands they appear on a beam-heading of around 30°. Then I move my antenna up to 30 degrees further east to look for DX signals from central Europe.

If it's a good event my beam-heading could be as much as 90° from north. Of course if you only want to work S9+ GM stations then keep beaming north! Good luck in the openings and don't forget to tell me what you heard or worked.

## Deadlines

It's deadline time again. And I'm sorry there's no room to squeeze in the reports about the e.m.e. contest or the ionospheric scatter that I promised last month.

Hopefully, I'll find room for the e.m.e. reports next time. But please don't let that stop you from making your reports! As usual send them to me at: **Yew Tree Cottage, Lower Maescoed, Herefordshire HR2 0HP or via packet radio @ GB7MAD or the DX Cluster system. Alternatively you can telephone me on (01873) 87679.**

**E N D**



*Paul Essery GW3KFE starts off with some useful advice....don't forget that there's more than one mode to use on the air!*

I'll start off this month with some timely advice - don't forget, there's more than one mode! If you need a country which is available daily on c.w. while you operate 'phone only, then the moral is rather obvious!

And of course, you need to know what's coming up. To this end a subscription to the *RSGB DX News Sheet* and maybe also to *The DX Bulletin* (PO Box 50, Fulton CA, 95439-0050, USA) is worthwhile.

While on the subscription tack, I hear that **John Forward G3HTA** has been persuaded by the RSGB to pick up the threads of the late Geoff Watts' DX lists. I can't think of anyone better qualified to take the job on - thank you John.

### Band Conditions

Band conditions have been somewhat up-and-down. But of course activity has a bearing on 'conditions'. Perhaps you've noticed how people can work over 100 countries on 28MHz on a 'dead' band, just because it is CQ WW Contest weekend!

### Your Reports

Time for your reports now, and unfortunately it's been back to the 'bandage work's for **Ted Trowell G2HKU**, so the letter from Minster came a bit early this time.

On 1.8MHz, Ted made 'phone contacts with ON7BW as usual, while on the key he managed GD3FXN, OS4ATW, HB9ANJ and JW0I, all on his HF6 antenna.

Ted used the c.w. mode on 7MHz and the G5RV antenna connected G2HKU to VK2ZC, HI3JH, ZL1MH, ZA1NA.

On 10MHz, with the help of the G5RV, G2HKU keyed to 9K2MU, IK/DL6PE/1P0X(Seborga) TA7/KU0J, and SV9/GM3YOR while a drop from 70W to 5W produced DL3KUD/CT3.

Ted's operations on 14MHz using the G5RV again,

brought him ZA/OK1TN plus lots of North Central and South Americans. While his 18MHz work yielded 9U/F5FHI for a new one via the HF6, plus various parts of the American continent including N70TS in Wyoming.

Back on the G5RV, Ted's 21MHz operations accounted for KR0Y, XE2MX, SV9/DL3YUO, J68BS, EA8BWP, and JW0I, while a drop to 5W was enough for J68WX and DL3KUD/CT3.

Up on 24MHz the HF6 used by G2HKU inhaled the signals from CR9WAG and K2TQC; which leaves 28MHz for RA9WE, WA4WKY and W1HMD. Finally, I hope Ted, will be up and about again by the time you read this.

### Islands On Air

I've heard from **Neville Cheadle G3NUG**, who writes to mention that as 1994 was the Islands On The Air (IOTA) 30th anniversary, the IOTA committee have produced an Anniversary Booklet. This is accompanied by a glossy 1994 IOTA Directory, thanks to sponsorship by Yaesu UK.

Yaesu have also made available to IOTA a complete station in a small bag, including the new FT-900 transceiver. In addition they donated a 144MHz rig which when raffled at the Convention, produced the funds for an FT-747. This has been loaned out to 4K4BEU, who hopes to activate many islands through his work as a helicopter pilot.

Copies of the two books, essential to any IOTA fan, can be obtained direct from: **Neville Cheadle G3NUG, Further Felden, Longcroft Lane, Felden, Hemel Hempstead, Hertfordshire HP3 0BN**. Good value at a price of £11 for the two.

Back to the mail now, and to **John G3BDQ**, near Hastings. John's 1.8MHz c.w. yielded a dozen East Coast W/VEs, plus TF3DX and CT3/DL3DXX; and on sideband seven Americans, plus a brace of EA8 signals.

Turning to 3.5MHz,



**Regular 'HF Bands' reporter Ted Trowell G2HKU, pictured in his shack, has been active for many years - as witnessed by the 'vintage' photograph of Ted in early days.**

G3BDQ worked ZA/OK1XV and 5U2MT. Up on 28MHz, a high flux and a major sideband contest all came together on October 28/29, so John mentions the following as the pick of the crop: C56DX, J6DX, CE6EZ, VE3UWC/4U, 7Q7ZZ, 9J2SZ, TU4EI, 5U2MT, 9G1MR, 9G5TL, 9Y4SF, S92SS, D3X, CX3C, L4D, ZP6SGP, and 5N0MVE. Some 'dead' band!

Finally, John took a look at 21MHz which resulted in c.w. contacts with Z21SS, 9U/F5FHI in Burundi. There was also V31ND, plus sideband to YB/YC, FY5GJ, C07JC, and PJ7/KA9FOX.

Now I turn to the report from **Don G3NOF** in Yeovil. Don mentions an 18MHz contact with KA1PE who has heard many of the net buoy signals which infest 1.8MHz.

Interestingly, G3NOF reports he's found conditions by and large better of late, though still patchy. His 14MHz sideband was exchanged with BZ5HAE, FH5CB, J6DX, TJ1AG, VE3MJQ/9X5 and 5H3DC.

Up on 18MHz Don worked C56/G0MRK, HK0TCN, J6/DL3KDV, Z21CS, and 9G1MT. The 21MHz crop was C6AFT, C56DX, FM5DN, H5ANX, J37K, V44NK, and VP2E. At 24MHz the band gave C91AI, P49T, TU2XZ, V29NR and 9G1BJ, leaving 28MHz clear for AP2JZB, FJ5AB, FM5CD, J6DX, P40E, 3D8DB, 5Z4FW, 9J2FR and 9G5TL.

### Welsh QRP Club

**Leighton Smart GW0LBI** writes from Trelewis in South Wales to let us know how the GW QRP Club are progressing. At the end of the first six months of operating they have 28 members, and with luck there should be a club net up and running soon.

Further details are available direct from **Leighton Smart GW0LBI, 33 Nant Gwyn, Trelewis, Mid Glamorgan, Wales CF46 6DB**. Don't forget an s.a.e. - the club hasn't got much in the 'kitty' yet!

### QSL Addresses

Thanks go to G2HKU for the following QSL addresses. Any QSLs for CR9WAG go via DL8KWS; those for EY8AM via DF3DL; those for J68AC via WA2USA; those to J28CI go via Box 1891 Djibouti; any to J28FX go via F5MGZ; those to J68WX go via WX9E; and finally any for 9K2MU should travel via WA4TJK.

That's all for this time. Send all your letters, photos and news please, to me at **PO Box 4, Newtown, Powys SY16 1ZZ**. I hope Santa brought you some nice 'new ones' or something for the station. Alas, he got stuck in my chimney!

**E N D**



*In his monthly trip around the broadcast bands, Peter Shore looks at the continuing expansion in international broadcasting and brings you the latest program schedules.*

This month I've got news of developments in Central Asia and East Africa. Since early November, Radio France International (RFI) has been broadcasting between 1600 and 1730UTC to East Africa in English.

Using two frequencies, 9.485 and 11.70MHz, the RFI station is targeting audiences in Uganda, Kenya and Tanzania. They are providing with round-ups of French and world news, reviews of the French press and correspondents reports, together with a half-hour of news and features about East Africa.

Meanwhile, BBC World Service launched its new Central Asian service on November 30 1994. Broadcasts from Bush House in Azeri and Uzbek can be heard for the first time. Uzbek has a half-hour slot at 1700 on 6.095, 9.585 and 11.925MHz, while Azeri is on the air, again for 30 minutes, at 1900 on 5.995, 9.575 and 11.925MHz.

## Happy Birthday

*Practical Wireless* wishes a very Happy Birthday to Radio Canada International (RCI) which will be celebrating its 50th anniversary on February 25. Experimental transmissions began on Christmas Day, 1944, from Sackville, but the service was officially inaugurated by the Prime Minister, Mackenzie King two months later.

At first the RCI station - an offshoot of the Canadian Broadcasting Corporation - aimed its programmes at Canadian troops fighting overseas. But it quickly grew to bring Canada into closer contact with other countries.

Today RCI broadcasts in English, French, Spanish, Creole, Arabic, Russian and Chinese. Listeners in Europe can tune to RCI at: 0600-0630 on 9.76, 6.15 and 6.05; 1430-1500 on 17.82#, 15.325, 15.315#, 11.935, 11.915 and 9.555; 1745-1800 on 17.82, 15.325, 13.61, 11.935 and 5.995 (Monday to Friday); 2100-

2230 on 17.82, 15.325, 13.69, 11.945, 7.26 and 5.995MHz (# indicates transmission Monday to Saturday only).

## Last Transmission

There is less celebratory news for staff working at the Voice of America's (VoA) short wave transmitting station at Bethany in Ohio state. The station made its

1300 WWCR Avenue

Nashville, TN 37218 USA

15.690 MHz  
7.435 MHz  
17.535 MHz  
12.160 MHz  
5.935 MHz

**WWCR**

World Wide Christian Radio

last transmission on November 14 1994 and workers at the station were made redundant.

In addition, VoA is reducing transmissions in languages where there is duplication with the Radio Liberty and Radio Free Europe operation. This includes Armenian, Azeri, Bulgarian, Estonian, Georgian, Latvian, Lithuanian, Romanian, Russian, Slovak, Slovene and Uzbek. So, if you are in the market for a short wave transmitter or two, contact the US government!

## Schedule News

By the time you read this, Kol Israel, the Voice of Israel, may be off the air. A report on WWCR's *World of Radio* programme suggested that there is a possibility - unconfirmed by any other source - that all short wave services from the Jerusalem-based station may cease. Keep your ears to the airwaves to see what happens. The WWCR's DX programme airs on Sunday at 0500 and can be heard on 7.345MHz.



English schedule is: 0300-0330 on 12.015 and 7.295 (Wednesday, Thursday); 0330-0400 on 7.295 and 12.00 (Monday, Friday, Saturday, Sunday); 0910-0940 on 7.295 and 12.00; 1200-1230 on 7.295 and 12.00 (Thursday, Saturday); 1200-1230 on 7.295 and 12.015 (Monday, Wednesday); 1445-1615 on 7.295 and 12.00 and 1940-2010 on 7.295 and 13.65MHz

Reports from Africa say that after an absence of about five years, Zimbabwe is back on the short wave dial. Try tuning to 3.306 and 3.396MHz where relays of ZBC Radio 2 have been noted in the early to mid European evening (around 2000UTC).

Private broadcaster Radio Miami International is on the air around the clock in English and Spanish, with occasional French and German programmes on 9.955 from a 50kW transmitter. If you hear them QSL cards are issued by the station and the address to write to is **WRMI, 8500 SW 8th Street, Suite 252, Miami, FL 33144, USA.**

The latest schedule of Radio Yugoslavia in Belgrade lists English at: 0100-0130 and 0200-0230 to North America on 6.195; 1330-1400 to the Pacific on 11.865; 1930-2000 to Europe on 9.72 and 6.10 and 2200-2230 to Europe on 6.185 and 6.10

The Democratic Voice of Burma, relayed from Norwegian transmitters, is on the air at 0030-0130 on 9.66 and 1430-1500 on 15.18MHz.

Radio Bulgaria's current schedule includes English to Europe at 1900 on 7.305 and 9.70MHz and at 2200 on 7.10 and 9.70MHz. Both transmissions are one hour long.

As well as a 15 minute news bulletin from Radio Bulgaria, there are regular features including on Thursday *Lifestyle* which looks at how ordinary people cope with day-to-day life in the country. On Saturday *Rocking Chair* looks at Bulgarian rock, pop and jazz and takes a tour of the country's youth subculture including favourite hangouts and entertainment for the younger generation.

Polish Radio Warsaw is broadcast by satellite as well as short wave. Eutelsat II F3 at 16° East carries the station on the TV transponder at 11.080GHz and the audio subcarrier at 8.28MHz.

For conventional listening, tune into English at: 1200-1255 on 11.815, 9.525, 7.27, 7.145 or 6.135; 1500-1555 on 9.525 or 7.285; 1700-1755 on 7.285, 7.27 or 5.995 and 1930-2025 on 7.285, 6.135 or 5.995MHz

Radio Ulan Bator's latest

**E N D**



*In his bi-monthly look at the ATV scene Andy Emmerson G8PTH delves into repeater group newsletters.*

Repeater group newsletters are a most valuable source of news and I am most grateful to the various groups' secretaries for sending them through to me. If you're wondering why your repeater group doesn't get mentioned in this column ... it's probably because I don't receive your newsletter!

First off, I've an interesting enquiry from reader **John Berridge**. John writes:

"The programmes of the US Apollo moon landings earlier this year made me think exactly how the TV signals were transmitted from the moon to the earth.

What lighting was used and which frequency? What was the power at the moon surface, who held the camera?

I didn't see either man using it. Why were there no shadows to the men and why wasn't the fine moon dust kicked up as the gravity is so low?

Isn't the moon gravity one-sixth of earth's? How were the voice transmissions done? How was telephony transmitted from the lander, and sent on to us?

This week a book is printed and claims to show the entire moon landing was filmed in a special effects studio - I'm waiting to see that book."

Well, John you've got no shortage of questions there but I unfortunately have a slight lack of answers at this end. I've started the research and hope to print some of the answers next time. If any readers have ideas, let's hear from you as well.

## Kent Television

**Ian Vincent G4MLY**, secretary of the Kent Television Group (KTG), writes:

"We are at last getting somewhere with setting up an ATV repeater in north Kent. Thanks also for the coverage in your columns

which we greatly appreciate.

We were present at Conference for Amateur Television (CAT 94) and thoroughly enjoyed meeting everybody. We were kept busy answering questions on the repeater and on our home-brew projects, which were on display.

Sales of donated small items raised £10 and a new member was enrolled. A good day was had by all and we look forward to next year's event".

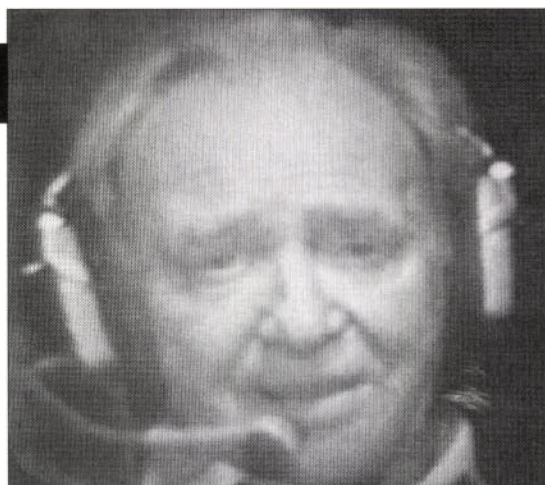
The good news on the repeater front is that following successful site tests, the KTG committee has decided to go ahead with establishing the Kent Television Group repeater on the Isle of Sheppey.

A letter of intent has been sent to the RSGB Repeater Management Group via the BATC, in the hope that KTG will be given the go-ahead to submit their application in full. The understanding is that the application could take at least six months to be cleared.

During the vetting period the KTG committee will be preparing the site. Due to a more stringent repeater specification, new filters will need to be constructed and tested. The KTG group will be experimenting with new antennas to give improved east and west coverage.

During the summer once again enhanced conditions aided the appearance of several continental stations on the KTG repeater, Walt ON5NY was one, who says he is often able to see the repeater. Other welcome visitors were Jean F1ESA and Jeff F5RZC, both from the Pas de Calais region.

The KTG committee visited the proposed repeater site on September 3 and met the site owner to discuss how and where the repeater will be accommodated. The antennas will rise above the apex of the roof, putting them close in height to the ill-fated water tower site,



**Mike North, a BATC member for many years, is seen here in a screen shot taken by Dave Hooper EI2HR. Note Mike's boom-mike headset and the transmit/receive switch mounted on one earpiece. The contact was not DX, just a short one across Dublin.**

which is very close by.

There is a possibility that either bow-tie or flat plate antennas may be used pointing east and west. **Chris G8GHH** has suggested that bow-tie or flat plate antennas be installed on the existing site at Herne Bay so that they get a good test.

In the latest Kent repeater group newsletter is an anonymous (not surprising!) report as follows:

"A commercial 13cm ATV converter purchased in Germany produced some interesting pictures on August 28 & 29th. The unit, which is directly coupled to a 44-element loop yagi, tunes between 2300 and 2600MHz.

When beaming west I was treated to some excellent aerial views of the Notting Hill Carnival. Although unidentified, I suspect the pictures came from a Metropolitan Police helicopter".

## Southampton Club

The Southampton Club for Amateur Radio Television (SCART), is in the process of building a 1296MHz television repeater at Park Gate, near Southampton. The callsign allocated is GB3AT, according to **Alan Daw G1APD**.

Alan will be pleased to give further information to anyone interested. You can ring Alan on (01703) 476029.

## Electro-Mechanical

The GaAsFET pre-amp previously manufactured by

G4BVK under the Aztex Electronics banner is back in production, now from Electro-Mechanical Assembly of Dorset. It's designed to fit between your receive antenna and your receiver, and offers a gain of 17dB with a noise figure of only 1dB.

The gain is flat across the 1270/1296MHz band and has an 8dB roll-off at around 700MHz to help reduce broadcast TVI. The pre-amp has a highly stable design based on the ATF10135 GaAsFET, uses surface mount technology components, and it's boxed and aligned.

The d.c. supply can either be fed via the coax or external and the unit is built to your requirement. Switching for r.f. is not provided. A 430MHz version is said to be available in the near future.

The price of the GaAsFET pre-amp is £67.00 plus £2 P&P and is available from **Electro-Mechanical Assembly, 18 Mandeville Close, Wyke Regis, Weymouth, Dorset DT4 9HP. Tel: (01305) 778575.**

**That's it for this time. I wish you all a prosperous and productive new year, with lots of amateur television activity (and hopefully lots of reports from you to me for this column!). Send your letters and reports to 71 Falcutt Way, Northampton NN2 8PH.**

**E N D**



# ARCADE

## The PW Shopping Arcade

Welcome to the *Practical Wireless* 'Arcade'. In this section of the magazine, you'll be able to find all those important services 'under one roof' - just like the shopping arcades you see in the High Street.

Let your eyes 'stroll through' the Arcade every month and you'll find all departments open for business including: The Book Service, PCB Service, Binders and details of other *PW* Services. Make a regular habit of 'visiting' the Arcade, because in future, you'll have the chance of seeing special book offers and other bargains. And don't forget, this Arcade is open wherever you're reading *PW*!

## Services

### Queries:

Practical Wireless,  
PW Publishing Ltd., Arrowsmith Court,  
Station Approach,  
Broadstone, Dorset BH18 8PW.

We will always try to help readers having difficulties with *Practical Wireless* projects, but please note the following simple rules:

- 1: We **cannot** deal with technical queries over the telephone.
- 2: We **cannot** give advice on modifications either to our designs, to commercial radio, TV or electronic equipment.
- 3: All letters asking for advice **must** be accompanied by a stamped self-addressed envelope (or envelope plus IRCs for overseas readers).
- 4: Make sure you describe the problem adequately, with as much detail as you can possibly supply.
- 5: Only one problem per letter please.

## Back Numbers

Limited stocks of many issues of *PW* for past years are available at £2.00 each including post and packing. If the issue you want is not available, we can photocopy a specific article at a cost of £1.50 per article or part of article. Over the years, *PW* has reviewed many items of radio related equipment. A list of all the available reviews and their cost can be obtained from the Editorial Offices at Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW for a large stamped self-addressed envelope.

## Binders

*PW* can provide a choice of binders for readers' use. Plain blue binders are available, each holding 12 issues of any similar A4 format magazine. Alternatively, blue binders embossed with the *PW* logo in silver can be supplied. The price for either type of binder is £5.50 each (£1 P&P for one, £2 for two or more). Send all orders to PW Publishing Ltd., FREEPOST, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.

## Constructional Projects

Components for *PW* projects are usually readily available from component suppliers. For unusual or specialised components, a source or sources will be quoted.

Each constructional project is given a rating to guide readers as to the complexity.

**Beginner:** A project that can be tackled by a beginner who is able to identify components and handle a soldering iron.

**Intermediate:** A fair degree of experience of building radio or electronic projects is assumed, but only basic test equipment will be needed to complete any tests and adjustments.

**Advanced:** A project likely to appeal to the experienced constructor. Access to workshop facilities and test equipment will often be required. Definitely not for the beginner to attempt without assistance.

## Mail Order

All items from *PW* are available Mail Order, either by post or using the 24hr Mail Order Hotline (01202) 659930. Payment should be by cheque, postal order, money order or credit card (Mastercard and Visa only). All payments **must** be in sterling and overseas orders **must** be drawn on a London Clearing Bank.

# DAYTON

## There's A Great Vintage Collection Waiting For You At The Dayton '95 HamVention!

Come Fly With *PW* To The Biggest Amateur Radio Show In The World - Explore The Giant Flea Market And Discover Vintage Wireless In The USA



With over 1000 stalls, the Dayton HamVention flea market has something for everyone. Rob Mannion G3XFD spotted this beautiful old 'Zenith' Console wireless for sale at the bargain price of \$50. Even though it was a giant set, the Delta Airlines 'pack & dispatch' department (actually at the show, literally only yards away) could have sent it home for him...for a very reasonable price. Whatever your interest, whether it be the latest hand-held transceiver or vintage communications receiver, you'll thoroughly enjoy Dayton. It's not just an amateur radio event...it's a show for the whole family.

Although many couples join us, your partner doesn't have to enjoy the hobby to appreciate the *PW* HamVention trip. There's so much to see, so much shopping and great company to be had on the holiday of a lifetime. And it only costs £650 per person (based on sharing a twin-bedded room).

You can join Rob Mannion G3XFD and the *PW* party when our 1995 holiday starts on Tuesday April 25 at Gatwick when we fly out to Cincinnati. After transfer by coach to Dayton we'll be staying for six nights at the Englewood Holiday Inn. There's a good choice of eating places nearby, the Hotel has a good swimming pool and is very close to the HamVention itself.

We've arranged a visit to the world famous United States Air Force Museum and there's also an optional shopping trip to see Cincinnati and the famous 'Skywalks'.

The £650 includes return flight, meals on the flight, transfers to and from Cincinnati Airport, six nights at the Holiday Inn, HamVention ticket, Air Force Museum excursion, all local taxes and the new UK Airport Tax of £10. (We'll be pleased to arrange sharing of a twin-bedded room if you're travelling alone).

For further details on the *PW* 1995 HamVention Holiday please contact our professional tour organiser Andy Garside of Gulliver's Groups & Incentives at Fiddington Manor, Tewksbury, Gloucestershire GL20 7BJ. Tel: (01684) 293175, FAX: (01684) 290093. Alternatively you can call Rob Mannion on (01202) 659910 (between 1 and 2pm only please) to discuss the holiday.



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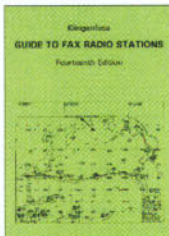
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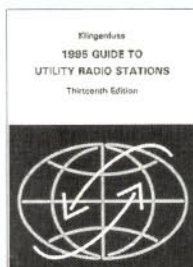
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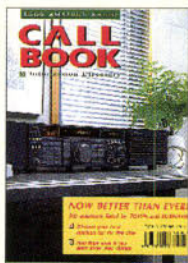
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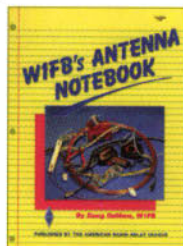
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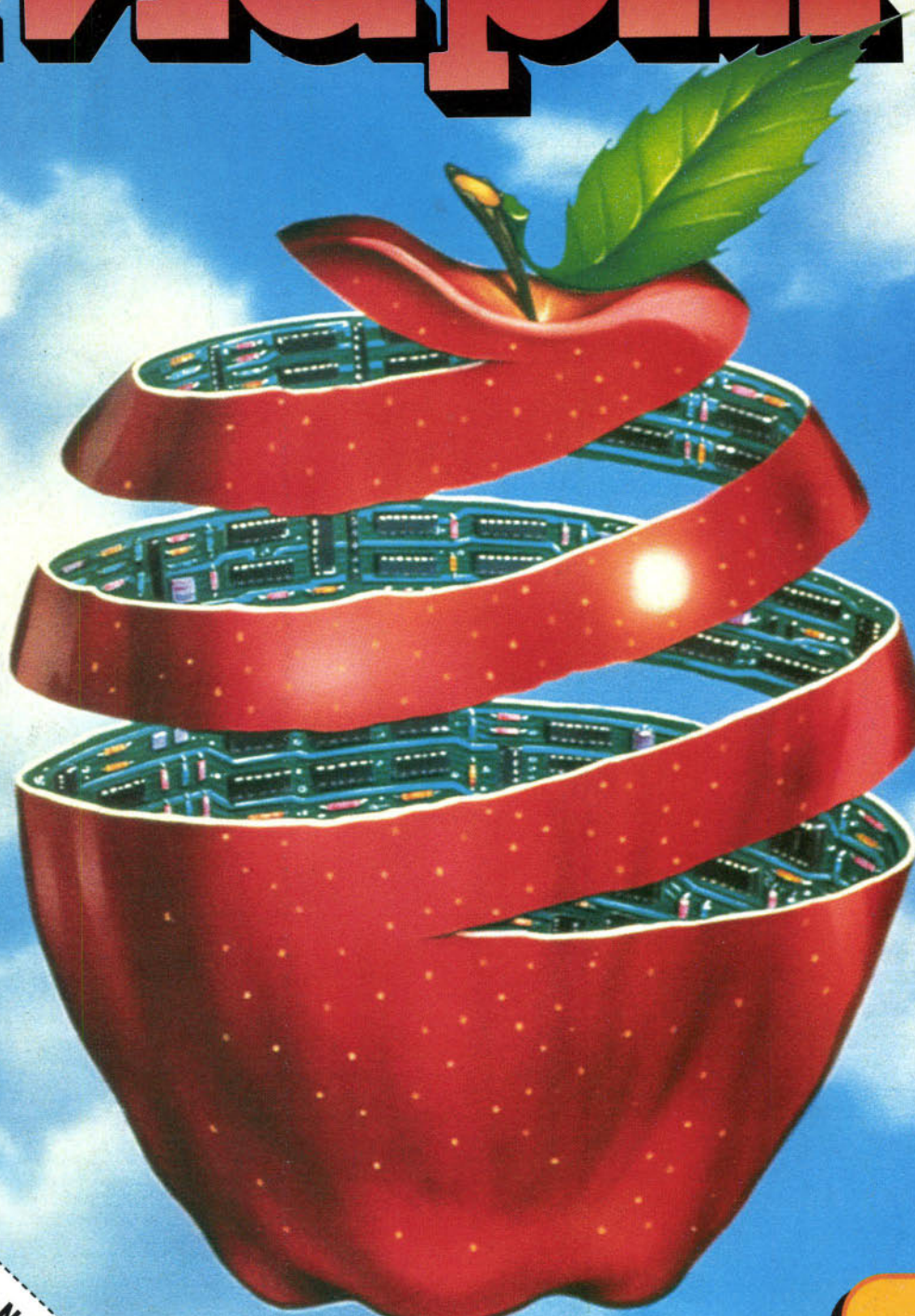
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