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practical Wireless

REVIEWED

THE ALBRECHT AE 550 Mobile on a Budget

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'BUYER'S
GUIDE'

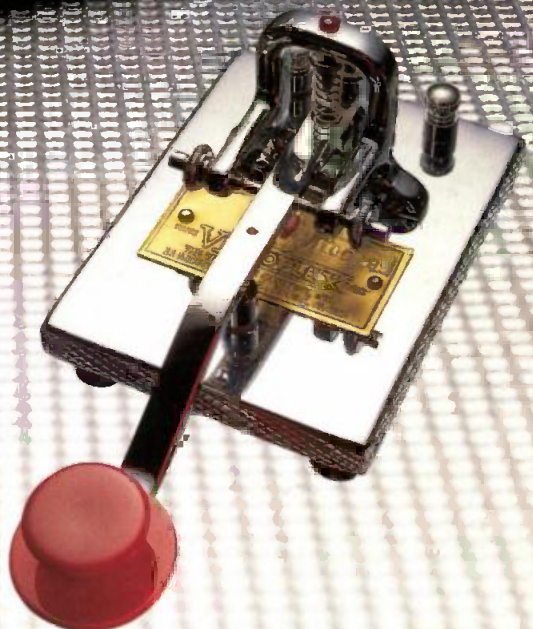


GOOD VIBRATIONS A New Key From Vibroplex

CRUISE THE CARIBBEAN Afloat with Yaesu

ANTENNAS A Vertical Wind-Up for Top Band!

NEW SERIES Ian Poole G3YWX Provides The Answers



Plus All Your Regular Favourites

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AIDS

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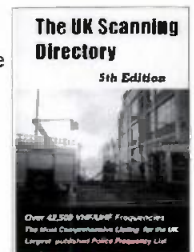
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FREE



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87.500-107.995	50kHz	WFM	760.000-1300.000	12.5kHz	FM
108.00-136.995	12.5kHz	AM			

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This sensitive "nearfield" counter is ideal for on-air frequency checking. Simply hold the counter near to the transmitter to get an accurate frequency reading. Comes complete with nicads, AC charger and aerial. An ideal frequency counter for service engineers or surveillance personnel who need an accurate handheld counter.

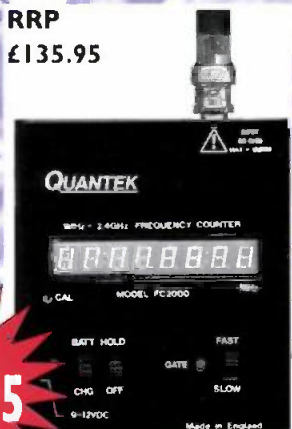
SPECIFICATIONS

Frequency range: 1MHz to 2.4GHz
 Sensitivity (Typical): 800µV @ 10MHz
 500µV @ 30MHz
 225µV @ 150MHz
 640µV @ 450MHz
 1mV @ 850MHz
 <10mV @ 1.3GHz
 <200mV @ 2.4GHz
 Maximum Input Power: +15dB (50mW), 1.26V RMS
 Input impedance: 50Ohm
 Timebase stability: +/- 1ppm 25-35°C
 Timebase ageing: 1ppm per year typical

Timebase accuracy: +/- 1 count in LSD
 Gate time: Fast 0.25 seconds for 1kHz resolution. Slow 2.5 seconds for 100Hz resolution
 Power: Internal nicad batteries 4 x AA, 700mAh or mains adaptor/charger, 240VAC input, 12VDC output, centre positive
 Size: 100 x 87 x 28mm

Specifications subject to change without notice

RRP
 £135.95



SRP PRICE
£89.95
 £5 P&P

Wireless

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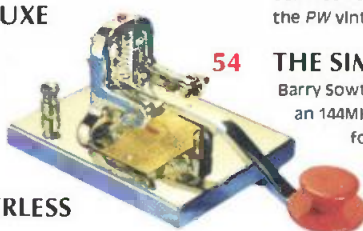
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AEA

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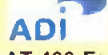
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EDITOR'S Keylines

Rob Mannion's viewpoint on the World of Amateur Radio



In the January issue of *PW* we published an item in 'News 1997' which was prepared from a press release issued by the Department of Trade & Industry's Radiocommunications Agency. And just in case you didn't read the news story...I'll reproduce it here:

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

In her Press Release statement dated 5th November 1996, Mrs Karen Scott, Head of Amateur Radio & Citizens' Band Radio Unit announced that the licence of Mr D. Randles G0WNG and that of Mrs M. Faint G0UGN had been revoked. No further details have been provided and nobody from the RA was available for further comment".

No Point!

I took the decision to publish the news item because the Radiocommunications Agency are finally beginning to realise that there's absolutely no point in issuing statements such as "A Radio Amateur in the Midlands (or wherever) has had their licence revoked". However, the RA are now at least indicating who the offenders are, and because of this I have dropped the Editorial ban I placed on the 'no information' press statements of some two years ago.

I've dropped my ban on the press statements because I feel that the RA are now realising how greatly Radio Amateurs appreciate the publicity on what they do on our behalf to enforce and protect the hobby by efficient 'policing'. And I feel that more details

of the offences, etc., will be forthcoming in future press notices.

But please don't misunderstand my motives. It is NOT a question of shaming offenders (loss of the licence is enough in this respect). However, IT IS a case of ensuring that everyone knows how seriously certain offences are regarded and publicly showing that the RA is acting positively on our behalf to guard the integrity of our ever-threatened hobby.

Good Relations

I'm very pleased to say that we have very good working relations with the staff in all of the various Departments of the RA. Despite this I feel that for the RA to expect (and to get) the full support of Radio Amateurs in general, they have to drop the 'Thou shalt only know what we wish to reveal' curtain of secrecy entirely.

The curtain of secrecy is slowly dropping and it will soon reveal an open door. It's through this opening that information, advice and co-operation will freely flow in both directions.

And in further evidence to back up my thoughts on the matter, I'm very pleased to see that both the RA (complete with senior staff) had a presence at last year's Longleat Rally. They were also at the Leicester show where many of our readers (the RA's stand was right opposite the *PW* & *SWM* stand) found help and advice available from both the RA and representatives from the licence handling sub-contractor Subscription Services Ltd.

So, when you see that the RA are present at a major show or rally...please go and talk to them. You'll find the senior staff on the stand will be pleased to see you and

help in any way they can. And from their point of view they'll be pleased to show that the RA is not an 'invisible' government department run by anonymous civil servants. Like us...they are human souls who need support and encouragement as much as we do!

Microwavers Mourning

I've no doubt that 'microwavers' will be in 'mourning' for the loss of part of the 10GHz band. More importantly (even though it's a serious loss in my mind)...is this encroachment the leading edge of the 'wedge' I mentioned in a brief comment answering a reader's ('Receiving You' December) resulting from my Editorial in the October 'Keylines') letter?

It's a long time since I've operated on 10GHz using my *PW* 'Exe' transmitter-receiver. I thoroughly enjoyed working on microwaves. Doing so took me back to my days in the Royal Navy...although my home-brewed equipment was simpler than that used in the service and it wasn't mounted on an aeroplane!

However, we can only enjoy operating privileges on microwaves if our representation is strong. That's why I will follow the RSGB's attempts on my behalf with interest.

'Other Users' have their radio 'eyes' on many of our allocations.

The loss of the 934MHz CB band, loss of part of 10GHz and increasing use of the 430MHz allocation (by 'other users') are but a few examples. So, we've got to stand together and make our feelings known. I've chosen my way, your choice is up to you...but don't forget that *PW* is read very carefully by 'those in the know' and they're interested in **your opinions**.

So, you should and must support your hobby in any way you can. The frequency 'squeeze' is well under way now and even the h.f. bands are not immune from threats.

Don't be complacent...with modern digital technology there are many companies who'd be delighted to have our h.f. bands for data and paging systems. But they're not going to get them easily if we work together to show we really care!

New Series

This month sees the start of a new series from our regular author Ian

Poole G3YWX. Entitled 'What Is A....?' Ian plans to use the new series of articles to describe and discuss various components in his informal but informative way. They're planned to provide 'bite sized chunks' of theoretical reading, in the same style and approach used in his very popular 'Specifications' articles.

Ian has chosen to start the new series by taking a look at semiconductors. And personally (remembering my own struggles with semiconductor basics years ago!) I think his choice is excellent. I say this because many people still have 'holes' (groan!...my jokes don't improve do they?) in their knowledge of semiconductors basics.

At this point I'd like to remind readers that Ian's 'Specifications' series was introduced directly because readers asked us to introduce articles on the subject. The request originally arose during a *PW* 'club talk' that **Tex Swann G1TEX** and I were providing at the North Ferriby club in North Humberside (now thankfully back in Yorkshire where it belongs!).

Readers present at the North Ferriby club and the Rochdale QRP Convention the next day made their feelings clear. They wanted a series of articles to help understand the mass of ever-growing (and often confusing) terms used by manufacturers. So, with that in mind I'll end on this subject with a reminder: We do our best to respond to what you the *PW* reader wants. However, to help us to respond to your needs, **YOUR suggestions, ideas and tips are needed and are always very welcome!**

Happy New Year

As this issue is the first on the shelves during 1997, everyone on the *PW* Editorial team would like to wish all our readers a happy new year. We hope you'll carry on enjoying the hobby and *PW* (of course!), and look forward to seeing you at rallies, shows and during clubs visits. May God bless you all in 1997.

Rob Mannion
G3XFD

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RADIO

Compiled by Zoë Crabb

1997

January 19: The Oldham ARC Mobile Rally will be held at the Queen Elizabeth Hall, Civic Centre, West Street, Oldham, Lancs. Doors open at 11am (10.30am for disabled visitors). This event will feature all the usual traders and a Bring & Buy stall. Morse tests are available on demand. Talk-in on S22 via GB4ORC, commencing at 7.30am. Mobile contact prize up to 2pm. Refreshments and free parking available. (01706) 846143 or 0161-652 4164.

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

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

February 16: The 16th Northern Cross Rally is to be held at Thornes Park Athletics Stadium, Wakefield - one large hall - just out of town on the Horbury road. Easy access from M1 junctions 39 & 40 - well signposted and with talk-in on 2m and 70cm. Doors open at 11am (10.30am for disabled visitors and Bring & Buy). Further details from Peter G0BQB on (01924) 379680, FAX: (01924) 257445, E-mail: rally@waveg.demon.co.uk Web page: <http://www.waveg.demon.co.uk/rally/>

February 22: The Tyneside Amateur Radio Society will be holding their 11th annual rally at the Temple Park Centre, South Shields. The Temple Park Centre is located on John Reid Road, approached from A194 and with excellent access from all parts. Doors open at 11am with special entry at 10.30am for disabled persons. Admission is £1 on the door. The talk-in station will be provided on S22 from 8am. There is ample parking space for visitors and special arrangements will be made for disabled visitors. There will be a Bring & Buy and all the usual trade stands. More details from Jack G0DZG on 0191-265 1718.

February 22: The 12th Rainham Radio Rally, sponsored by the Bredhurst Receiving and Transmitting Society. This is the 4th year at the new venue, which is, The Rainham School for Girls, Derwent Way, Rainham, Kent ME8 9PP. Talk in on S22 GB4RRR. Doors open 10am, (9.30am for disabled visitors and items for Bring & Buy). Admission is £1.50, under 14s free. There will be the usual mix of trade stands, Bring & Buy, many special interest groups will also be represented, ie.

RNARS, RAYNET, KRG, KEPAC, BARTG, etc. There will be plenty of off road parking, a licensed bar, food and refreshments. More details from Martin MOAAK on (01634) 365980 at any reasonable time.

February 23: The Barry Amateur Radio & Computer Rally will be held at the Barry Leisure Centre, off Holton Road, Barry. Doors open at 10.30am, (10am for disabled badge holders). There will be trade stands, a Bring & Buy, refreshments, a swimming pool and free car parking. Brian GW0PUP, Tel/FAX: (01222) 832253.

February 23: The Kidderminster Radio & Electronics Fair is to be held at the Kidderminster College, Hoo Road, Kidderminster, Worcestershire. Doors open at 10.30am to 3pm. Admission is £1. There will be traders, a Bring & Buy, Flea Market, food and drinks and talk-in on S22. John G8MGK on (01527) 545823 or mobile on (0860) 147954 or Toby G4ALT on (01562) 69652 or mobile on (0860) 902165.

***March 8-9:** The London Amateur Radio & Computer Show is to be held at the Lee Valley Leisure Centre, Picketts Lock Lane, Edmonton, London, N9. Doors open 10am to 5pm each day (disabled visitors from 9.30am). There will be a trade show, with over 100 exhibitors, Bring & Buy, RSGB Committee and book stands, on-demand Morse tests, talk-in on 2m and 70cm, special interest groups, disabled facilities, priority admission for disabled persons, bars, restaurants, ample free car parking and lectures. (01923) 893929.

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

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

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

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

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

Editor

*Practical Wireless & SWM in attendance

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Offer open until 14 February 1997.



TO ORDER SEE ORDER FORM
ON PAGE 78

The Star Letter will receive a voucher worth £10 to spend on items from our Book or other services offered by Practical Wireless. All other letters will receive a £5 voucher.

RECEIVING You

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

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

Reader's Letters

Dear Sir

You said in a recent 'Keylines' editorial that you aimed to print letters expressing all points of view on any radio subject, but surely there is a limit for any self-respecting magazine? Several of the letters in 'Receiving You' of recent issues appear to have been written by children who look upon the RSGB as a schoolmaster.

They want to change the RSGB or abolish it altogether, but they don't say what it has done wrong. But of course, the Morse test should be abolished, the RAE made easier, everyone should be free to use any band with any power, and the RSGB subscription should be reduced to a nominal amount.

Maybe it is the fault of the RSGB that these things are not happening! Real schoolboy stuff. (Apologies to those more mature types of schoolboy).

Amateur radio may be a hobby, but it does rub shoulders with the real world and if we are to common any respect from the professionals and retain our privileges, then we must have serious and capable people looking after our interests. If some people dislike being in an organisation which leans more towards a learned society than a youth club, then they would probably be happier in the CB world.

We are supposed to be engaged on self training and experimentation, not using amateur radio for saving money on telephone bills or playing 'cops and robbers'.

John A. Gaukrodger
G0STP
Devon

Non Profit-Making

Dear Sir

I cannot allow some of Dick Railton GW6RXA's (*PW* 'Receiving You' November issue) comments to go unchallenged. The RSGB is a non-profit making Amateur Radio Society where the major part of its activities are conducted by some 500 volunteers who, in most uses, do not claim their full entitlement to expenses. The headquarters staff are principally concerned with providing the administrative back-up needed by any sizeable organisation.

Contrast the fees imposed by the RA quoted in the article on Broadcasting (page 25 November *PW*). Here the costs of running a service with full time employees are reflected in the charges when the taxpayer is not expected to help.

Many of us may regret the level of commercialism now

present in the hobby. Fortunately, most amateurs join clubs and societies not for what they can get out, but for what they may be able to contribute.

Several of the committee members of the Milton Keynes & District Amateur Radio Society (my local club) were pupils of the RAE classes I run, and one is now a senior Novice instructor. The club has set-up GB2BP and a 'Y' station as its contribution to the Bletchley Park Museum, which members man on open days.

As Keeper and with the help of other members I maintain GB3MK, our 70cm repeater, and GB3TG, our 10GHz amateur TV repeater. This is at a combined school where the 'rent' is covered by some of us helping with the teaching of electronics for the National Curriculum, one morning per week for a term.

This becomes a Novice course for the children who volunteer to continue for a

further term. The Headmistress found that when she attended a head teachers' meeting, all the other were complaining of their problems with the subject, "But I have no problem thanks to you chaps".

Here is a hint for those who have the drive to offer their free services to their local school and hopefully bring more new blood into the hobby.

Dave McQue G4NJU,
Special Projects Manager
RMG
Milton Keynes

Listening & Calling CQ

Dear Sir

I read the 'Receiving You' pages every month. Some letters I agree with, some I do not. Mr Tim Cattley's letter in 'Receiving You' (*PW* November 1996) is one I don't agree with.

Looking at his call sign, it is obvious that he has not been licensed for very long. My elders always told me that a good operator spends more time listening than he does transmitting.

Has Mr Cattley never listened on 144MHz and heard 'CQ 2 CQ 2 G4XXX calling CQ on 2 and listening for a call'? This is a pretty standard way of calling.

It is also used on all the h.f. bands. I fail to see why he calls it 'Pirate Lingo'. If he cares to copy Slowscan TV, he will receive pictures bearing the text 'CQ SSTV'. Of course everybody knows its SSTV, but it is just a way to accentuate a CQ call.

The writer whose letter was criticised by Mr Cattley did provide his full name and address. If he had not, then his letter would not have

been published. So, Mr Cattley, he did have his head 'Above the trenches'!

Perhaps Mr Cattley, when the ink has dried on your licence, you will be more charitable and tolerant!
George Galloway G4KSC
Essex

A Mere Distraction

Dear Sir

David H. Wright and Tim Cattley's letters (*PW* September and November 1996) may refer to illegal two way radio, but this doesn't have a real impact on our hobby. It is a mere distraction, well away from our band edges. We should be looking much further up the dial for the real threat.

I refer to the 10m band. Over the past couple of years, with diminished solar activity, this band has all but been forgotten by most Hams, it seems. But the 27MHz operators don't have the option of 14 or 21MHz and the many other bands we have. So, if the channels get jammed, they 'go up a block'.

Just recently, whilst having a go at the RSGB 21/28MHz c.w. contest, I was having a job trying to pick out weak c.w. stations amongst S9 a.m., f.m. and s.s.b. signals at the bottom of 28MHz. And, only last month, the band was solid from 28 to 29MHz... and there was not a Radio Amateur to be heard!

It might be just that my location favours skip from Asia, where I suspect these signals come from. But if an inexpensive 'Chocolate Biscuit' radio can make it on 28MHz, then why won't the armies of expensive Black Boxes work?

This Month's Star Letter

Helping Others

Dear Sir

It was most interesting to read 'Keylines' November *PW*, and the very commendable suggestion on helping other radio hobbyists in developing countries and hope the needed help will be forthcoming. Having travelled (and lived) in some of the developing countries of Asia and Africa, and at the risk of being labelled a Job's comforter, there is one thing that bothers me.

That is, how to ensure that the Andrew Gani-Ikelama's of this world are not left empty-handed wondering what has happened to their precious bits and pieces, only to discover later that they have been diverted elsewhere. I have actually seen this happen on more than one occasion.

Richard Williams
Oxfordshire

Editor's reply: Richard's point is of course a major concern to everyone willing to send 'bits & pieces' abroad. It's this aspect of the idea which is causing the major problems...but we're working on it and hope to have news soon.

We are all too aware of the constant demand for spectrum allocations and the threat it places on our valuable bands. Having them invaded by pirates only worsens matters. So, get QRV on '10' before we lose it!

Paddy O'Reilly S79MAD
Seychelles

Important Qualities of PW

Dear Sir

For me, one of the most important qualities of *PW* is the wide range of topics that it covers. For example, I found 'Broadcasting on a Shoestring' by **Jim Lee G4AEH** in the November issue most interesting.

However, I was disappointed to find that having given Radio Caroline credit among other stations for influencing his interest in radio, the writer **Jim Lee** failed to acknowledge that the station is a regular broadcaster using the Restricted Service Licence (RSL) facilities. The latest operation being recently this year (1996) from the River Medway.

The latest edition of *The Caroline Newsheet* carried the results of a survey commissioned by that station among other RSL operators covering a variety of issues that this type of broadcasting involves. I know I am not the only amateur who is a fan of this station, which others may be surprised to know is still around.

On a different note, despite being an amateur for many years (ex G8), I am a long way from 'knowing it all' and particularly find 'Novice Natter' informative.

John Sones M0AAO
Essex

Editor's reply: With the restricted number of pages we can allow for 'associated interest' features, **John**, we're bound to lose out somewhere I'm afraid. However, **Jim G4AEH** (a professional broadcaster) acknowledged the station that played a part in changing the face of radio broadcasting in the UK and mainland Europe.

Suggested Improvement

Dear Sir

I would like to suggest an improvement in Great Britain's Amateur Radio scene, one that is a benefit to the everyday user, rather than those who are only interested in contests. Or those who are single mode or single band users, for whatever reason.

At present, there is little enough scope or encouragement for both classes of Novices and 'B' Class Licensees, in the field of onward and upward self-training. This is due to the restrictions on mode usage, as well as band usage.

What I would like to propose is that Novice 'A' be expanded to all Amateur Bands and modes, and limited to 50W maximum output. For Novice 'B' use of all Band and Modes above 30MHz and limited to 50W maximum output. For 'B' Class Licences all mode and all band usage from 28MHz and up with maximum power output as is normal for these bands.

Controversial yes it is! But the benefits to the Licence holders, to the band usage and to the UK's Amateur scene, it is great, so is the self training and what is most important of all, the self training is on air practical training.

At present, the greater majority of Amateurs in the UK are invisible due to the fact that they are either using RTTY or Packet at all times, or they lay back and await the next contest.

If we therefore change the playing field areas, there's a challenge to everyone from Novice 'B' to Class 'A' Licensees.

Finally, one the abolishment of the 12w.p.m. Morse test, that's a subject for all licence amateurs to discuss, suggest alternatives, disagree with. Arguing the pros and cons of any subject that will effect every licence amateur, on a world-wide basis, will be stimulating and boring at one and the same time. Whilst it is an acceptable fact of life that the RA will act on our behalf, it is not acceptable, even to me (and I support the

abolishment of the Morse test) that the RA can or should act arbitrarily.

So far they have not done anything other than give their support to a proposal, and since then, as is only right and proper, they are asking we amateurs for our input. If we do not take part in what has been asked of us, we have no right to criticise those who have done so, nor will we have the right to refuse to accept the decision of the majority.

Amateur radio, at least here in the UK, is supposed to be a democratic society, that includes every licensed amateur, be he or she a Novice A or Novice B, or full Class A or Class B.
J. Davies-Bolton G4XPP
County Durham

Free PW Blueprints

Dear Sir

Turning the clock back some tens of years ago, in occasional issues of *Practical Wireless*, free copies of 'blueprints' were enclosed. Many of these single or double-sided sheets featured designs for a variety of radio receivers, transmitters, test gear, etc.

For many years also, *PW* ran a 'Blueprint Service', which was usually advertised inside the cover of each month's issue. I used to have quite a collection of these sheets, but where they disappeared to over the years is anyone's guess. I would dearly love to own some of these again, even if they were only photocopies.

I was wondering if you know of any present day source of these Blueprints? Perhaps some are lurking deep inside the *PW* archives, (assuming such archives exist?), or perhaps you may know of someone who may have some? I would be extremely grateful if you could help in anyway.
Duncan J. Walters G4DFV
Nottinghamshire.

Editor's reply: We'd be very interested to hear from readers on this subject. And although archive copies of 'blueprints' exist,

reproducing them is difficult and (inevitably) expensive. Please write into 'RV' if you're interested, and what 'blueprints' interest you most.

Excellent Service

Dear Sir

I would like to compliment through your columns the excellent service I have received from R N Electronics. I bought a second-hand 144 to 50MHz transverter plus attenuator recently, there was no information regarding the units given to me, so I decided to ask R N Electronics if they could send me the relevant information.

Whilst speaking to **Alan Semark**, the Services Manager for R N on the 'phone, requesting paperwork I asked if they would service the units for me, he assured me that it would be no problem to check everything and replace the 'iffy bits'.

I sent the units to R N, had a 'phone call off them to tell me what minor bits needed replacing plus adjusting the output to my requirements, plus a good natter where my probably stupid questions were explained. A price was quoted which included postage, and, dare I say it, 'it was a pleasure to pay', so a cheque was sent by return.

All this activity took one week door to door, so now I am the proud possessor of a 144 to 50MHz transverter. If I can find suitable antennas at the Horwich Rally this Sunday, look out 'Six' here I come!

With the service I have received I would have no hesitation in buying or recommending R N Electronics products to anyone.
Peter Garde G6MCE
Cheshire

The RAE 'On Demand'

Dear Sir

I am taking the RAE this December, which I hope I

only have to do once! The point I'd like to raise is I was talking to a friend of mine who has lived in Australia and he tells me over there the amateur radio examination is 'by demand' and that you get the results the same day.

Is this true and if so, why couldn't we have the same over here? In place of the twice yearly event, with all this technology rammed down our throats it wouldn't be that difficult surely?

I do enjoy the magazine and look forward to it dropping through the letterbox every month.
Paul Collins
Peterborough

Editor's comment: I don't know if the full RAE is available 'on demand' Paul...but I've no doubt our Australian readers will soon put us right on the situation. However, I think an 'On demand' RAE is an excellent idea. Let's face it...something has to be done about the ludicrous (and ever worsening) exam situation (with regards to costs and availability). Personally I'd like to see the RAE fully under Amateur Radio control. It DOES work for the Morse test...so why not the RAE? In my opinion it would then be cheaper and much more available.

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

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



NEWS 1997

Compiled by Donna Vincent G7TZB

Badger Boards - Still Going Strong!

The *PW* team have heard that some of you have been experiencing problems in contacting **John Badger G4YZO** of **Badger Boards** to order p.c.b.s for *PW* projects. John, as previously reported, has scaled down his business and has been using a mobile telephone for his business calls.

Unfortunately, John's mobile phone has broken down and he is currently having it repaired, which explains why he has appeared to be uncontactable and no longer trading. For the time being John will be available on (0378) 296356 and for those of you with Internet access at jbadder591@AOL.com

John expresses his apologies to all those who have been trying to get in touch with him and would like to assure *PW* readers that **Badger Boards** is still going strong and very much in business.

Skyview Site

Skyview Systems of Suffolk, East Anglia, have recently launched an Internet site which carries information on their off-the-shelf and commercial weather monitoring systems. In addition to this, **Skyview** also offers a mail order service for specialist meteorological tools and air sports equipment.

Future plans for the site at www.actual.co.uk/skyview/ include demonstration software which will directly downloadable. The site also offers the user 'links' to many related aviation, weather and short wave radio sites, so why not take a look?

Power Increase

The sister station to **World Wide Christian Radio**, **WNQM 1300AM** has been granted a

construction permit by the Federal Communications Commission (FCC) in Washington DC for increased power to 50kW. The station, which has been on-air since 1947, uses the medium wave frequency of 1300kHz in Nashville Tennessee and broadcasts to over 100 churches, teachers and ministries based in middle Tennessee and other parts of the US.

Owing to the fact that the power increase requires major engineering work, no completion date has been given for the work. However, by the time you read this work should be well under way and it's expected that progression will be determined by local weather conditions and equipment availability.

Tandy Unlimited

Tandy, the high street electrical retailer, has launched a new initiative in the form of a service which allows customers to order unique and often hard to find items from a new catalogue called *Tandy Unlimited*. This new initiative forms part of **Tandy's** pledge to offer the most diverse range of electrical products, parts and accessories throughout its 348 store network.

Tandy Unlimited is available in all **Tandy** stores and all customers have to do is fill in a form selecting their goods from the catalogue, which will then be sent



to their homes direct. As well as being able to order goods using the form in-store, customers can also order by post, FAX or phone. All orders placed in this way will be fulfilled within seven days and will be subject to a £1.50 P&P charge.

In addition to all this, *Tandy Unlimited* will also enable customers to enquire about the

availability of parts not listed in the current catalogue. This is done by providing details of the items required, supplying their credit card details and specifying the maximum amount they are prepared to spend on the item.

Tandy hope that this new service will enhance their reputation as one of the most diverse electrical retailer in the UK. For more details just call into your local **Tandy** store.

Back On Air

After almost a year of being off air **GB3SW** the South Wiltshire 430MHz repeater is once again operational. The new 'box' was installed on 21 November 1996 by **Graeme Miller G3JIP** who put it all together for the repeater group.

The **GB3SW** repeater is based on a **Storno** Commercial unit which has been modified for amateur use and uses a 6 cavity

New For '97

By the time you read this, two new products will have been added to the **Waters & Stanton** range.

The first of these is the **Yupiter MVT 9000** hand-held scanner which covers from 530kHz to 2039MHz on all modes and features a dual frequency display and 1000 alphanumeric memories. The **MVT 9000** is also capable of monitoring both sides of duplex contacts and offer the users 18 different frequency steps. At the time of going to press, the price of the **MVT 9000** was unconfirmed, contact **Waters & Stanton** direct for further details.

The second new product is the **ADI AT-600** which is described as the first dual-band hand-held transceiver priced at less than £300! The **AT-600** features dual frequency display, extended receive, DTMF with CTCSS as an option. The price is expected

duplexer and an omni-directional antenna on a 36ft mast which is attached to the side of a barn. The repeater group has plans to renew the mast in the Spring and is looking for support from regular users!

If you'd like to know more or would like to be involved in renewing **GB3SW's** mast you can contact **David Lempriere G4SXQ** on (01722) 320778 or **Peter Smith G3YWT, QTHR**.

Yaesu At Bletchley Park

Late last year **Barry Cooper G4RKO** the General Manager of **Yaesu UK** visited **Bletchley Park** to present the **Milton Keynes & District Amateur Radio Club** with a **FT-790 430MHz** transceiver complete with a 25W linear amplifier. **Barry** also gave the club a talk on **Yaesu Munsen**, its origin and progress to date.

to be in the region of £290 which includes antenna, NiCad pack and charger.

To find out more on either product mentioned here contact **Waters & Stanton** on (01702) 206835.



Shown in the photograph are (l-r) **Matthew**, Des G3LCS, **Martin**, Helen, Nigel G8IFF, **Tom**, Francis, Tom G3LMX, **Linda**, Barry GURKO and George GORDG. ('novices' are shown in bold). The Milton Keynes club would like to express their sincere thanks to Barry for making the trip, especially as it was blowing a 90mph gale at the time!



Flagship Radio



Roberts Radio Ltd. has produced what's described as its 'flagship' model for the 90s. The new **R861** features a Radio Data System (RDS) with continuous coverage on short wave and has 306 memories.

The R861 offers s.s.b. (u.s.b./l.s.b.) fine tuning in 40Hz steps, an a.m. wide to narrow filter, dual conversion on a.m. and auto tuning system which provides auto scan and pre-set stations in signal strength priority on f.m., m.w. and l.w. Also featured is an adjustable sleep timer and three individual alarm timers.

Added extras for the R861 includes a portable shortwave antenna, a soft carrying pouch and a 110/230V auto-switching a.c. adaptor. The recommended retail price for the R861 is around £200.

For more details on the Roberts Radio R861 contact Roberts Radio Ltd., PO Box 130, Mexborough, South Yorks S64 8YT. Tel: (01709) 571722.

Webmaster's Toolkit

The latest CD-ROM to come from Practical Wireless, February 1997

the **Public Domain and Shareware Library (PDSL)** is the *Webmasters Toolkit*. This is a collection of utilities, graphics and documentation designed to help you maintain and improve your Web pages.

Webmaster's Toolkit includes tutorials and Frequently Asked Questions (FAQs) to help the user learn about programming and Web design. The disc files include home page templates, 380 animated GIF's, 400 back-grounds, 425 icons, 59 buttons, 209 lines and 127 arrows, editors, ImageMap utilities and conversion utilities and link validators for site maintenance.

For the experienced Web user the *Toolkit* contains files of Perl cgi-bin source code, Java applets and Active X as well as servers for Windows, Macintosh and Unix. The *Webmaster's Toolkit* CD-ROM is accessible from any operating system that has a Web browser.

For further information on the *Webmaster's Toolkit* contact the PDSL at Winscombe House,

Beacon Road, Crowborough TN6 1UL. Tel: (01892) 663298.

New Alinco Distributor

Nevada Communications of Portsmouth are pleased to announce their appointment as distributors for Alinco products. In addition to this appointment, Nevada are in the process of setting-up a comprehensive dealer network to ensure that customers will be able to purchase Alinco equipment at a dealer near to them.

One of the latest products to come from the Alinco stables is the **EDX-1** h.f. antenna tuner. The EDX-1 is a coaxial tuner with a built-in power and s.w.r. meter with a power rating of 120W and covering 1.8 - 28MHz including the WARC bands.

The retail price of the EDX-1 is **£159.95** and more details can be obtained from Nevada Communications of **189 London Road, Norht End, Portsmouth PO2 9AE. Tel: (01705) 662145.**

Year Planner

If you place a book order this

month you will receive a Free *Practical Wireless 1997 Year Planner* while stocks last. The Year Planner can be used in the shack, office or study and is designed to keep you up-to-date with the latest in amateur radio.

From time to time we'll publicise dates from the amateur radio calendar for you to add to your planner and the first of these is a change to the **Jamboree on the Air (JOTA)** date. Unfortunately the information printed on the Year Planner is incorrect. The JOTA date should in fact be **October 18 & 19th 1997** not the 25 & 26th. Apologies to all concerned for this error.

Happy New Year!

You can make my new year a 'happy one' by sending me all your new product, radio station, club, Internet news, etc., for inclusion on these pages. If appropriate don't forget to include photographs too. Send all your news to me **Donna Vincent G7TZB** at the Editorial Offices or via the Internet to: **donna@pwpub.demon.co.uk**

A happy and prosperous New Year to one and all, 73. Donna G7TZB

Low Power Calendar

Gerald Stancey G3MCK the Contests and Communications Manager for the G-QRP club has sent the 'Newsdesk' the following calendar of G-QRP club events for the coming year. Unfortunately, there isn't room here to publicise the full list of contest rules, to obtain these details please contact the *PW* Editorial Offices for a copy or Gerald Stancey G3MCK at **14 Cherry Orchard, Staines TW18 2DF** direct.

Date	Contest		
February		June	
1	1600-1900 AGCW Straight Key Party (1)	17	IARU Region 1 QRP Contest 0900-1500z WAB 144MHz (2)
7	Last day for Winter Sports Log to G3MCK	29	
15	Last day for Chelmsley Logs to G3MCK	July	
28 - 2 March	1600z CZEBRIS/2359z (Rules <i>Sprat</i> 89)	17	Last day for International QRP Day logs to G3MCK
		19 - 20	1500z AGCW DL QRP Contest (1)
March		September	
22	Somerset Contest (Rules in <i>Sprat</i> 90)	6	1300-1600 AGCW Straight Key Party (1)
31	1500-2000z Slovak ARA Contest (1)	October	
		25	Rochdale QRP Convention
May		November	
11	300-1900z AGCW-DL QRP Party (1)	16	1300-1500z AGCW - DL Hot Party (1)
6 - 9	Yeovil Fun Run/(Rules <i>Sprat</i> 90)	December	
18	Yeovil QRP Convention	26 - 1 Jan 98	GQRP Club Winter Sports. Maximum activity on all QRP frequencies, logs to G3MCK by 7 Feb 1998 D4DQP trophy & certificates.

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- Jessop **£59**
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- Tokina 100-300 EMZ **£119**

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

CLUB Spotlight

Compiled by Zoë Crabb

Special Event Station GBOHJC

Members of the Saltash & District Amateur Radio Club had a busy time at the end of August last year in running a special event station to mark the Centenary of Sir Henry Jackson's historic radio achievements in Saltash on the river Lynher. Captain Jackson RN as he was in 1896 carried out his radio experiments from HMS *Defiance* based in a number of wooden hulks moored in the river. He was the first person to send radio transmissions (Morse) between ships afloat.

The special event station operated from the 29 August to 1 September '96. Almost 400 contacts were made mostly on h.f., although the club also operated on v.h.f. and u.h.f. Appropriately, one of the early contacts was

GB3RN, the RNARS HQ station at HMS *Collingwood*, there was also a later QSO with GB2RN HMS *Belfast*.

On the Saturday morning, the club was honoured by a visit from the Saltash town Mayor Mrs Sue Hooper, accompanied by her husband and consort John. The mayor was welcomed by club chairman Kevin G7HNW and introduced to the club president and NOV holder Roland G3XLU. The chairman of the RNARS Trev Day G3ZYY who was also present was introduced to the civic party and the local press.

Following introductions to club members, the Mayor exchanged a greeting message over the air with Mike G3IZJ in Farnborough. Mike had spent his early training in the Royal Navy in HMS *Defiance* at Devonport.

The main h.f. rig was



(L to R) Kevin G7NHW, Club Chairman, Brian G7SSH, Secretary, Mrs Sue Hooper, Saltash Mayor and John, s.w.l. club treasurer video recording the occasion.

the club FT-77 which fed via a KW107 a.t.u. to a set of half-wave nested dipoles, supported between two portable masts. Most of the contacts on 3.5MHz were made using this rig.

The club were also very impressed with the performance of the TS-50 transceiver and matching a.t.u. feeding an 18 AVT triband vertical antenna loaned by a member.

Some interesting contacts

were made on 14MHz with this rig including the Ukraine, Sweden, Poland W, Siberia, Austria, Italy and the USA.

Contacts on v.h.f. were worked on the club FT-290R with 30W power amplifier to a 13-element crossed Yagi antenna mounted on a rotator. A few local contacts including some Novices were also made via the local u.h.f. repeater with a low power transceiver and mobile vertical antenna.

At the subsequent club meeting, Roland G3XLU congratulated the members on setting-up and running the special event station. New licence holders Tony MIAPB and Gordon MIAGO were commended for their enthusiasm and operating standard.

The special event station demonstrated what can be achieved by the club members working together on as a group and allowed new class 'B' licence holders to work the world under supervision.

The club would also like to express their thanks to the RNARS, Bill Legg, the curator of the HMS *Collingwood* radio

museum, Mike Matthews and Colin Squires for their help and assistance. The club would also like to apologise for the delay in sending out the QSL cards due to a problem with the printers. Cards should be in the system in the near future via the RNARS, RAFARS and RSGB bureau.

Lasting Memorial

A group of wartime airmen and airwomen together with members of the newly formed Thornaby Town Council have launched an appeal. It's for a lasting memorial to the former RAF Thornaby aerodrome and to all personnel who served there. Royal Air Force Thornaby was the home of 608 Squadron, formed in 1930 and disbanded in 1957 and the airfield closed in 1958.

The site of the airfield is now a shopping complex and large housing estate and nothing to show that an aerodrome existed on the site. The memorial is to be a statue of an airman in flying gear.

The Stockton Amateur Radio Group as part of this appeal are going to operate a Special Event Station, call sign GB2TB from the club station at The Community Centre, The Causeway, Billingham, from January 13 to February 9th 1997, on a sponsored contact basis.

Further details on the above are available from the Chairman, J. H. Saynor G4GGP, 28 Lune Road, Norton, Stockton-on-Tees TS20 1AZ, Tel: (01642) 658772.

Money Raised The 'No Funds' Way!

Last year the Cockszie & Port Seton Amateur Radio Club sent in news of their official presentation to the British Heart Foundation of the money raised by the radio club. The bulk of the money is raised at their now annual junk night with the results coming from raffles at club nights, money left over after paying for the hire of one of the local Community Centre's rooms for club

talks, 10-Pin bowling nights, etc.

The Cockszie club is unique in that as a club they have no funds at all and it is one of the clubs aims to stay that way, but at the same time, to try and raise money through various club events to their adopted club charity, the British Heart Foundation. Since this was started, approx three years ago, after one of their club members died suddenly from a heart problem, they have managed to raise in total £1470 for the British Heart Foundation. Well done!



(L to R) Bill Gordon GM8ZLI, Heather Gregory, Local Area Organiser, British Heart Foundation, Alex Wilson GM6VIU/GM0WSN, Bob Glasgow GM4UYZ and Ron Fraser GM0NTL.

The Spotlight's On Again!

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

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

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

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

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

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

Zoë

P.S. Please note, the closing date for entries is Friday 25 July 1997

We're In Locator IO88 Too!

Following the 'Club Spotlight' mention of the Sutherland & District ARC's activities under the 'Only Another 1400 Miles To Go' headline, Mr G. M. Christie GM7GMC, the RSGB's Regional Liaison Officer (RLO) for Orkney FAXed the *PW* office.

Mr Christie was anxious to remind everyone that IO88 covers 'a good bit' of Sutherland, Caithness, with its northern boundary cutting across Orkney. In his FAX he reminds us that there are some 90 Radio Amateurs in the area and there's a lot going on just across the Pentland Firth.

Now we've had the reminder from GM7GMC we replied to him asking for photographs and regular stories from the Northern Isles because it's been some time since we carried a major news item from over that short (but very rough!) bit of water. So we're looking forward to hearing from all you keen types in Mainland Orkney and Shetland and the other Islands!

Plymouth Radio Club

At its recent AGM, the Plymouth Radio Club elected a new committee and Mike Byatt M1AHF as Chairman. The committee is looking

forward to the challenges of the coming year and is working hard to compile a series of interesting club nights that will be of interest to all, especially those who are new to radio or who are recently licensed.

Ideas for the coming year include talks on construction, test equipment, packet radio, shack design and safety, plus a series of 'how to evenings' where members will share ideas and skills with the club. There will also be occasional club debates on current issues including whether the Morse should be retained and the role/membership of the RSGB.

A lot of hard work is going into the planning of the 1997 Rally, that will be held on 25 May 1997 at the College of Further Education, Kings Road, Devonport, Plymouth.

Club meetings are held every Tuesday evening at the Royal Fleet Club, 12 Morice Square, Devonport, Plymouth at 8pm. New members and visitors are always made welcome and further information can be obtained from Stephen Ramsden G7UXL on (01752) 662051 during office hours or by E-mail: lawspear@cbm.co.uk

Ynys Mon Radio Users Group

The Ynys Mon Radio Users Group operated a JOTA station at the Scout

Hall in Llangejni from 0800 Saturday through to 1700 Sunday. The event was well attended by members and visitors and the local clubs and scouts were there and participated in the event.

Many greetings were sent to different groups around the UK and worldwide. Conditions were not that good, but over 100 contacts were made.

The station call sign was GB4LSG and it operated equipment that was donated by the members, an FT-840, TS-430, IC-735 plus a KW1000 linear. The antennas were a trapped dipole and a G5RV, 144/430MHz and a CB station were also in operation.

The operators were well fed and watered by the Scouts over the whole 33 hours the stations were in operation. Also, the group would like to thank all who attended the event.

Echelford's Events

The Echelford Amateur Radio Society meet on the 2nd and 4th Thursdays of each month at The Hall, St Martins Court, Kingstone Crescent, Ashford, Middlesex at 7.30pm. Up and coming

events are: January 9 - Natter Nite, 23rd - Test Gear by R. F. Burns G3OUU and on February 13 - Getting To Grips With The Internet by Len Stuart

and Geoff Cox.

Further information is available from the Secretary Robin Hewes G3TDR, QTHR on (01784) 456513.

Change Of Venue

Following a difficult nine months, during which the Moorlands & District Amateur Radio Society was without premises, the Club Officers are pleased to report that the Society now has its own dedicated shack and clubroom. For a number of years, the Society has been privileged to occupy rooms in the Creda-Cannon Company Complex in Blythe Bridge.

However, due to a re-structuring within the Company, the Society had to vacate these rooms by Christmas 1995. Nevertheless, the Society still enjoys the hospitality of the same Company as the new shack, etc. occupies a nice and secluded part of the Company's grounds.

Furthermore, to everyone's pleasure, the Company Chairman Brian Wolfe G3MTR not only officially opened the new premises, accompanied by a Director of Personnel, but has also kindly

agreed to be the Honorary President of the Society. The new premises use a Portakabin as the basic structure (see photo), but members have done much work refurbishing it to the necessary high standard.

Members also have the pleasure of being affiliated to the Creda Social Club. It is anticipated that the highly successful RAE and Morse tuition courses will recommence in the near future. Meetings are held at 8.30pm on Thursdays at the Creda Works, Blythe Bridge, Stoke-On-Trent, Staffordshire ST11 9LJ.

The new shack undergoing refurbishment, with the Chairman Mr C. F. Beesley G40UG setting a fine example!



Practical Wireless In A Pot!

Elaine G0WTO tackles her first transmitter construction effort. She's building a one watt 'Oner' rig into a soap box, aided by G3LRQ who won the 1996 WACRAL Conference Competition, featuring 1W 'Oner' transmitters in



unusual containers, with his TX in a Marmite jar!





Semiconductor?

This month Ian Poole G3YWX begins his new series 'What Is A...?' by looking at semiconductors.

It is almost 50 years since the first transistor was invented. Since then semiconductor technology has grown by an enormous degree, affecting the lives of virtually everyone on the planet.

Computers, portable radios, cellular phones, satellites, electronic watches and a host of other items in daily use have all been made possible by semiconductor technology. In the field of radio, semiconductors have revolutionised the components and techniques used.

In this series I hope to uncover some of the mysteries of how some of the common devices work, and what some of the more unusual devices do. I will be looking at Gunn diodes, GaAsFETs as well as devices like HEMTs and PHEMTs. However, to start I want to take a look at the foundation of this revolution, and look at the semiconductor materials themselves.

Conductors And Non Conductors

There are two main classes of material as far as electrical theory is concerned, conductors and non-conductors. From their names it can be gathered that conductors will conduct electricity freely, whereas non-conductors act as insulators preventing the flow of an electric current.

An electric current is made up of the flow of electrons. This means that for a current to flow, the electrons must be able to move freely within the material.

In some materials, electrons are moving freely from one atom to the next. And by placing a battery or other source of potential difference across a conductor the electrons can be made to drift in one direction or the other.

Metals are all conductors of electricity, and a number of other substances also conduct it to varying degrees. However, there are many other materials which do not allow electrons to move and these non conductors include most plastics, ceramics and many naturally occurring substances like wood.

Semiconductors

As the name suggests a semiconductor is neither a true conductor nor an insulator, but half-way between. A number of materials exhibit this property, and they include germanium and gallium arsenide, but the most widely used is silicon.

Pure silicon is a good insulator, but when a very small amount of impurity is added its electrical properties change. To see what happens it's necessary to look at an atom of silicon. It can be seen from Fig. 1 that the atom consists of a nucleus with three rings or orbits containing electrons, each of which has a negative charge.

The nucleus consists of neutrons which are neutral and have no charge and protons which

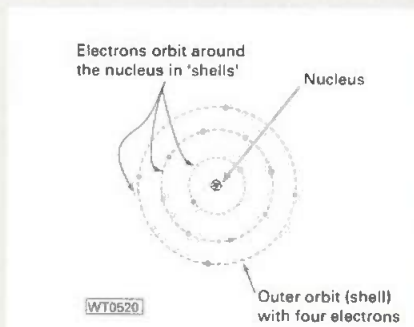


Fig. 1: A silicon atom.

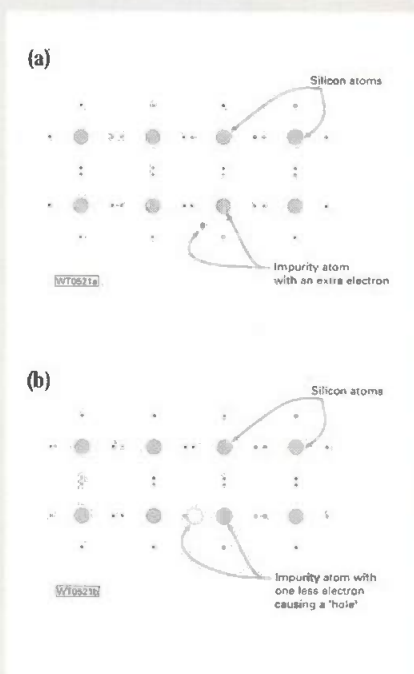


Fig. 2: Crystal structures, Fig. 2a shows the structure of N-type semiconductors and Fig. 2b of a P-type structure.

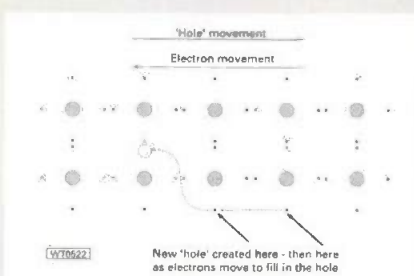


Fig. 3: Movement of holes.

have a positive charge. In the atom there are the same number of protons and electrons so the whole atom has no overall charge.

The electrons are arranged in rings with strict numbers of electrons. The first ring can only contain two, and the second has eight. The third and outer ring has four.

The electrons in the outer shell are shared with those from adjacent atoms to make up a crystal lattice. When this happens there are no free electrons in the lattice, making silicon a good insulator.

Germanium has a similar structure. It has two electrons in the inner most orbit, eight in the next, 18 in the third, and four in the outer one. Again it shares its electrons with those from adjacent atoms to make a crystal lattice without any free electrons.

Dramatically Changed

The properties of silicon and germanium are dramatically changed if very small amounts of impurity are added. If atoms having five electrons in the outer ring are added to the matrix they enter the crystal lattice sharing electrons with the silicon.

However, as they have one extra electron in the outer ring, one electron becomes free to move around the lattice. This enables the current to flow if a potential difference is applied across the material. As this type of material has a surplus of electrons in the lattice it is known as an N-type semiconductor. Typical impurities which are often used are phosphorous and arsenic.

It's also possible to place elements with only three electrons in their outer shell into the crystal lattice. When this happens the silicon wants to share its four electrons with another atom with four atoms.

However, as the impurity only has three, there is a space or a hole for another electron. As this type of material has electrons missing it's known as P-type material. Typical impurities used for P-type material are boron, and aluminium.

It is easy to see how electrons can move around the lattice and carry a current. However, it is not quite so obvious for 'holes'.

Movement occurs when an electron from a complete orbit moves to fill a hole, leaving a hole where it came from. Another electron from another orbit can then move in to fill the new hole and so forth as shown in Fig. 3.

The movement of the holes in one direction corresponds to a movement of electrons in the other. Hence an electric current is produced.

The level of doping governs the number of holes or electrons which are available. In certain applications these high levels of doping are required, and they are often referred to as P++ or N++ semiconductors.

PW

Next Time

That's all for this month. Next time I will move on to describe the basis of many semiconductor devices, the PN junction.

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73 from Dave G4KQH, Technical Manager.

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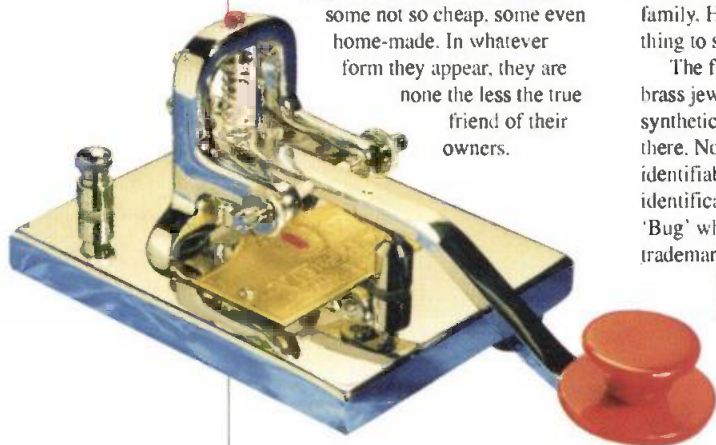
By John Goodall GOSKR

John Goodall GOSKR reviews the latest product from Vibroplex...in the form of a deluxe Morse hand key.

Modern technology is moving rapidly towards a totally digital age for most radio communication methods. So, it's rewarding to see a new 'mechanical' item of radio hardware appear on the scene for the keen Morse buff...like me!

Straight Morse keys have been around since the good old days of Samuel Morse himself. The old pump handle is still the trusty friend of many a radio operator, both amateur and professional.

Traditional keys come in a host of shapes and sizes. Some cheap, some not so cheap, some even home-made. In whatever form they appear, they are none the less the true friend of their owners.



And although Horace Martin is not a name that readily springs to mind in connection with Morse Code, somehow I feel it should. Way back in 1890 he sought a way to relieve telegraph operators of a stress syndrome of its day...namely 'Glass arm'.

'Glass arm' or 'Glass elbow' was a condition suffered by many operators and it arose through constant pounding of the good old pump handled key. To overcome the problem Horace Martin developed the Vibroplex 'Bug' which became an instant hit.

Highly Engineered

Since the early days, Vibroplex have produced some of the finest, highly engineered Morse hardware ever seen. However, never before have they stepped out of line with their own tradition, until now.

Vibroplex have now produced a good old pump handle, a straight hand key. But this is no ordinary straight key, it bears all the finest qualities of the Vibroplex stable.

The Hand Key Deluxe, the model I've had the

chance to review, has the appearance of the rest of the Vibroplex Deluxe family. Heavy chrome being the first thing to strike the eye.

The familiar heavily chromed brass jewelled bridge, the bright red synthetic knob and shoulder are all there. Not forgetting the most identifiable part of the company, the identification plate bearing the red 'Bug' which is both hall and trademark.

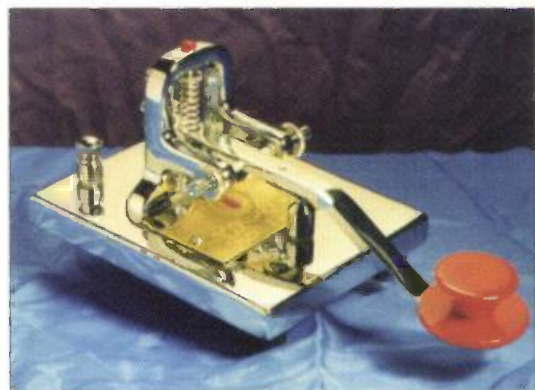
The chromed heavy metal base measures 88 x 114 x 12mm. Towards the rear edge are placed the two chromed brass screw terminals.

Familiar Bridge

Forward from the terminals is the familiar 'bridge', with its single red jewel midway on the upper surface. Beneath this imitation jewel, which serves no real purpose, is placed the tension adjustment for the key.

The arm of the key is some 150mm in length, 10mm in width and 4mm in depth. It's cranked downwards towards the front of the arm, much in the manner as another well known straight key manufacturer.

Disappointingly the pivots for the arm are not jewelled, but consist of a simple 23mm long pin through the width of the arm. The pin having tapered ends to fit snugly into the adjustable pivot mounts. These being supported from the 'bridge', and having adjustment screws with locking collars. At the rear end of the arm is found the gap adjustment screw and locking collar.



On the underside of the arm, the precious metal coated contact can be found. This is usefully located on an adjustable mounting, making the contact between this and the base fixed contact, highly positive.

The knob and shoulder are surprisingly comfortable and once the gap and tension have been set, the key operated very smoothly on air. However, the single adjustment screw did prove to be a small problem when adjusting the operating gap, but once set, was fine.

I found that the key had a little more bounce than most, probably due to the shape and thickness of the arm. This in no way detracted from the superb way it performed on air, and the tireless feeling when used over a long period.

Excellent Key

Altogether, I think that it's a thoroughly excellent quality key from a well known stable. And the Vibroplex Hand Key Deluxe would be an asset to any amateur or professional shack.

The review model was priced at £199 plus £7.95 P&P and there's a lower priced standard model. The lower priced model has a 'crackle finish' base, instead of heavy chrome and sells at £169 plus £7.95 P&P.

My thanks go to Eastern Communications for the loan of the review model. For further details on this and other Vibroplex products contact Eastern Communications at Cavendish House, Happisburgh, Norfolk NR12 0RU. Tel: (01692) 650077.

PW

A Transformerless Chatterbox



By Doug Gibson G4RGN

Doug Gibson G4RGN describes a modification to the modulation circuitry on PW's popular 'Top Band' 'Chatterbox' a.m. transmitter receiver project.



Keen 'Topbander' Doug Gibson G4RGN with his version of the PW 'Chatterbox'.

Six years after the original publication of George Dobbs G3RJV's 'Chatterbox' in PW in August 1991, it's still proving very popular among a.m. 'Top Banders' and always performs well.

A few would-be constructors however, have been put off by the need to manufacture the modulation transformer. While others have been horrified by the use of a ferrite-cored component, which was designed for use at 20kHz plus in switch-mode p.s.u.s!

The new version of the transmitter I'm describing has been designed to overcome the problems mentioned. At the same time the best features of the original Chatterbox are retained.

Eliminating The Transformer

By eliminating the modulation transformer, the audio response has

been made level at all audio frequencies. This is so that the builder can incorporate any necessary 'tailoring' in the microphone circuitry.

Some builders of the original circuit have experienced audio instability and distortion when operating the 741 at high gain with low output microphones. To overcome this, the new version has an in-built pre-amplifier, enabling the 741 to be run at a low gain setting.

In my modification the p.a. drain supply is derived directly from the output pin of the modulator chip. This is of op-amp design, and so has its output voltage set at half supply volts in the static condition. **Therefore, to deliver the required 12V to the p.a. supply to the modulator chip has to be 24V.**

The modulator voltage will swing from +2 to +22 on 100% modulation, giving the required 8-9W carrier and 30W p.e.p., with good linearity. And fear not - 24V p.s.u.s can be had at rallies much more cheaply than 12V versions!

Modulator Up-Rated

The modulator chip has been up-rated from a 2030 type to a 2040 and needs to be mounted on a 4 x 2in finned heatsink, as it now dissipates some 15W. Additionally some of the original component values have been changed in order to optimise the conditions of the new circuit.

Spare Space

The elimination of the transformer has left some spare space on the p.c.b. so that anyone who has an original board could modify it with a little hard wiring to the new design. Although care would be needed in keeping the microphone amplifier input circuit out of harm's way!

On air tests have brought good signal reports, comparing favourably with the original design. And apart from an increase in power consumption, the new version appears not to have any disadvantages.

PW

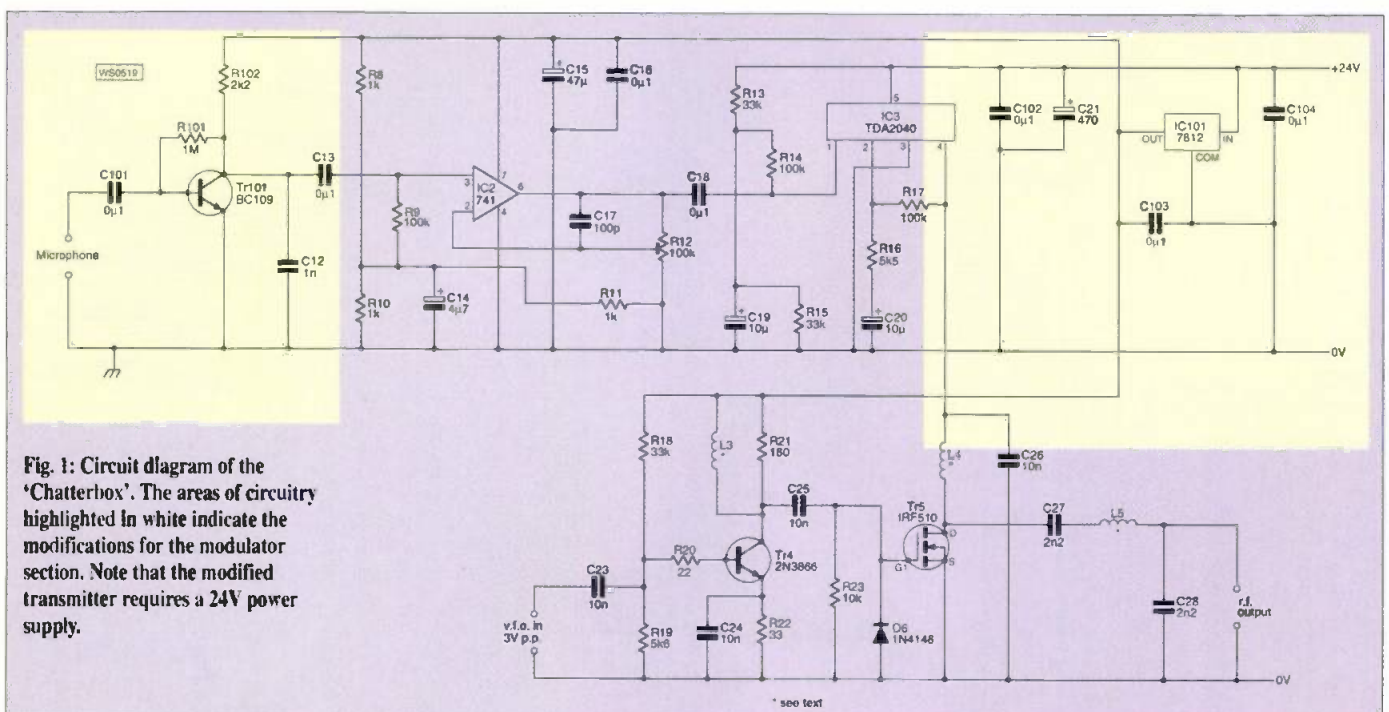


Fig. 1: Circuit diagram of the 'Chatterbox'. The areas of circuitry highlighted in white indicate the modifications for the modulator section. Note that the modified transmitter requires a 24V power supply.

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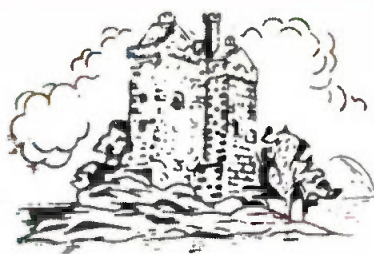


IC-706



T-7E

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Carrying On - The Practical Way

By Rev. George Dobbs G3RJV

The Rev. George Dobbs G3RJV has obviously enjoyed working with 'bargraph' type of i.e.d. indicators. And this month he describes a novel bi-directional tuning meter with a bargraph display for monitoring forward and reverse transmitter power.

I don't want to lecture you this month! And without going into the complex arguments of the purposes and validity of standing wave ratio meters in amateur radio, all I need to say is that some form of meter which measures forward and reverse current when tuning an antenna is more than useful!

Like many radio amateurs of the period, my original method of tuning an antenna to a transmitter was to use a series bulb. It was a case of tune for 'maximum smoke' and go!

The first time I laid my hands on a cross needle v.s.w.r. bridge, it was like a housewife's first discovery of 'clingfilm'. I knew what I was going to use in future.

Since that first time I have made many s.w.r. meters. Most of them based on the classic design by Warren Bruene of Collins Radio.

For me the Bruene circuit has now lost its place to the bi-directional wattmeter described by David Stockton GM4ZNX. David's circuit appeared in the Winter 1989 issue of *Sprat*, the G-QRP Club journal.

The GM4ZNX circuit can be used as an accurate bi-directional wattmeter if used with calibrated meters. Although I have one well calibrated version, I have several versions with pairs of cheap meters arranged to show forward and reverse power as a tuning aid.

Last month I showed the use of a 10-l.e.d. bar indicator for

voltage measurement. Such indicators are ideal for quick relative readings and added to a bi-directional wattmeter head, the result is a simple and convenient way of tuning a transmitter.

The Circuit

The circuit shown in Fig. 1, is the complete i.e.d. tuning meter. The portion of the circuit around T1 and T2 is the Stockton Bridge, with the right side of the circuit, around the

forward voltage drop. (The BAR28 type is easy to obtain).

In practice you can use 50Ω load resistors made up from two 100Ω resistors in parallel. For QRP applications 2W resistors will serve this purpose.

The r.f. sensing portion of the unit is built in a screened box. Feed-through capacitors (1000pF types) then take the d.c. signals to the indicator section. (a suitable layout for the r.f. sensing part of the unit is shown in Fig. 2). The symmetry of the layout is achieved by using the input and output sockets for the coaxial cable link on one side of the circuit and insulated stand-off terminals for the other coaxial link.

"I find" said 'e, "things very much as 'ow I've always found, "For mostly they goes up and down or else goes round and round".

Patrick Reginald Chalmers

Bar Driver Chips

The indicators are built around two LM3914 10-segment bar i.e.d. driver chips. The LM3914 lights up to 10 l.e.d.s (in bar mode) or one of 10 l.e.d.s (dot mode) in response to an input voltage. The chip contains a voltage divider and 10 comparators that turn on in sequence as the input voltage rises.

Potentiometers, R5 and 6 set the maximum reading of the segments. They could be single units or dual-gang potentiometers, perhaps front panel mounted, to give easy adjustment. My prototype just used two pre-set potentiometers to adjust for individual applications.

The fixed resistors R8 and 9 sets the voltage range of the chip. The value of 47kΩ suits measurements in about the 2 to 20W range in conjunction with R5 and 6. Should higher ranges be required, replace R8 or 9 with a preset, say 100kΩ, and adjust to requirements. The ideal is to set the value of R8/9 such that R5 and 6 can give the required power range.

In this application the LM3914 is used in the bar mode by connecting pin 9 to the positive line. The resistors R6 and 7 control the i.e.d. current and could be altered to give a brighter or dimmer display.

The 4.7μF capacitor, C3, on the power line is included to prevent i.e.d. flicker but may not be needed.

two LM3914 chips forming the indicator.

The arrangement around T1 and T2 is a balanced 4-port hybrid coupler. If the r.f. leads are kept short and the layout is symmetrical a good balance between forward and reverse sensing is easy to achieve. This is what I call a sophisticated circuit. (It's simple and it does the job very well!).

Primary windings of T1 and T2 consist of a short length of RG-58 (or similar) coaxial cable passing through the centre of the cores. (This represents a single turn). The outer braid of the coaxial cable is grounded at one end to form a Faraday screen.

The secondary windings use 22s.w.g. enamelled, or pvc covered, wire wound to fill about three-quarters of the core. **The phasing of these windings is critical** so connect them with reference to the grounded end of the coaxial cable winding, as shown in diagram.

Original Design

The original design for the circuit I'm describing used a special core mix made by Salford Electrical Instruments. The resultant cores gave a very wideband response but are not easy to obtain.

Satisfactory results can be had using FT50-61 ferrite cores. Diodes D1 and D2 can be germanium types but the best results will be had when using Schottky diodes with their low



The G3RJV prototype forward and reflected power indicator unit.

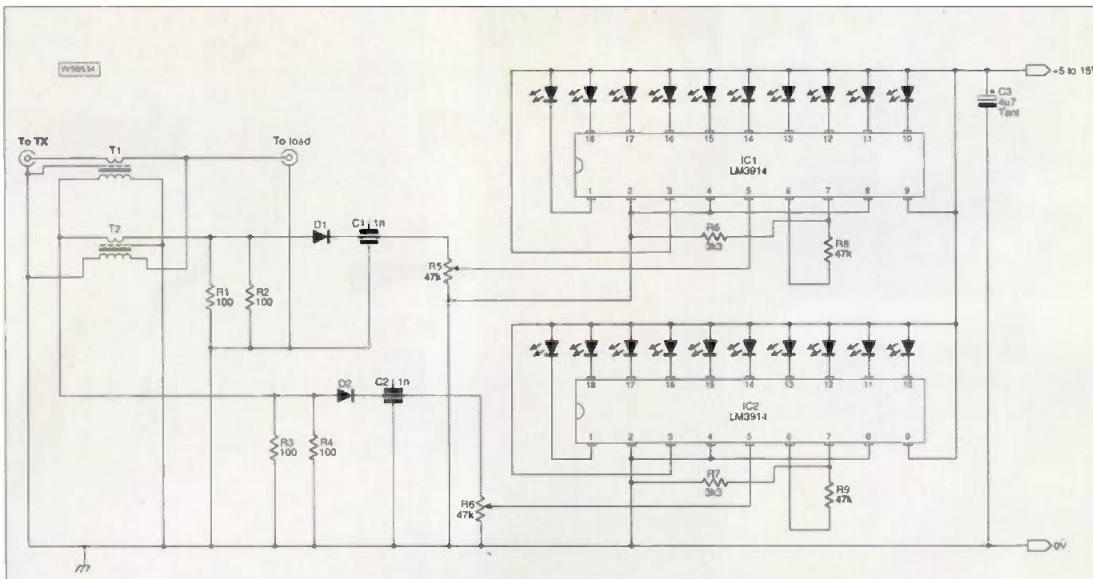


Fig. 1: Circuit of the forward and reflected power indicating unit using 10-segment bar graph indicators. The project was originally developed by GM4ZNX and published in the G-QRP journal *Sprat* and originally employed traditional moving coil meter movements (see text).

Finally, individual l.e.d.s could be used as indicators but the purpose made 10-segment displays look better in my opinion.

Using Veroboard

I built my version of the indicator circuits using Veroboard. The final layout of my prototype is shown in the photograph, Fig. 3.

The only sections of the track that need to be cut are those between the pins of the LM3914. Use a spot cutter or small twist drill.

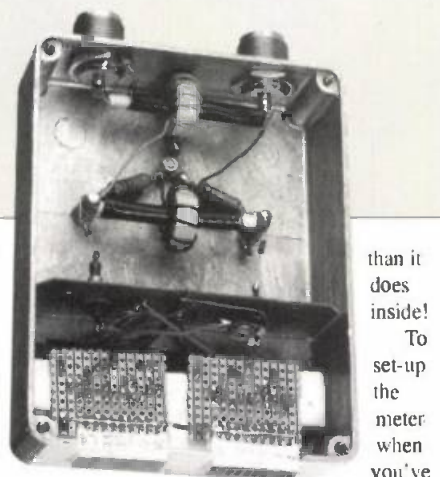
Observe the usual precautions when working with Veroboard. It's very easy to 'bridge' the copper tracks with solder. The tracks should be cleaned before soldering begins.

When building the project, I soldered the cathode pins of the

LM3914 direct to the edge of the Veroboard at right angles to the board. The anode connections are made by linking all the anode pins and bringing a lead down on each side of the display as can be seen in Fig. 3. (I used a green display unit for the forward reading and a red display for the reverse indication).

George Cheats!

My prototype, using separate resistors R5 and 6 was somewhat of a cheat. I already had a version of the Stockton bridge which used two small edgewise meters. So I removed the meters, enlarged the holes in the box and used the 10 segment displays in their place. It looks more tidy outside



than it does inside!
To set-up the meter when you've built it,

connect a dummy load to the output and apply an r.f. signal at the level required for full scale reading. Next, adjust the preset R5 to light all the green l.e.d.s on the indicator.

Then reverse the meter. Connect the r.f. signal to the output and put the dummy load on the input connector. This time adjust the preset R6 to light all the red l.e.d.s indicators.

Although using the 10-segment display is hardly accurate, it's very simple to tune up a transmitter with the unit. Remember that the response is logarithmic.

In practice the logarithmic response is no problem, in fact it's an advantage. This is because the reverse reading can be seen rather better at the open (low) end of the scale.

The fastidious constructor could even put calibration points above each l.e.d. if the preset is to remain at one point for a particular application. And although I'm not planning to provide 'shopping lists' for this column, I've done so this time to encourage you to have a go. Try one...it's a really versatile little instrument!

Fig. 3: George G3RJV's prototype. The photograph illustrates how the r.f. sensing section is isolated from the indicator unit and how detected r.f. is fed through via decoupling capacitors. The Veroboards carrying IC1 and 2 can also be seen with the associated bar-graph l.e.d. displays just visible at the bottom of the case (see text).

Shopping List

The r.f. sensing Circuit:

T1 and T2 = FT50-61 Ferrite Toroid. Primary coaxial link, Secondary 12 turns 22s.w.g. enamelled (or pvc covered) wire.
D1 and D2 = BAR28 Schottky diodes, C1 and C2 = 1,000pF Feed-through Capacitors, 4 x 100Ω 2W (R1 - 4) resistors

Indicator Circuit:

Uses 2 x LM3914 Bar l.e.d. Driver (IC1 and IC2) 2 x 10 Segment Displays (Kingbright Bargraph) Maplin order code : BY65V (Red) YG33L (Green).
R5 and 6 - 47kΩ or 100kΩ dual linear, R6 and 7 = 3.3kΩ
R8 and 9 = 47kΩ
Optional: 4.7μF tantalum capacitor (see text).

PW

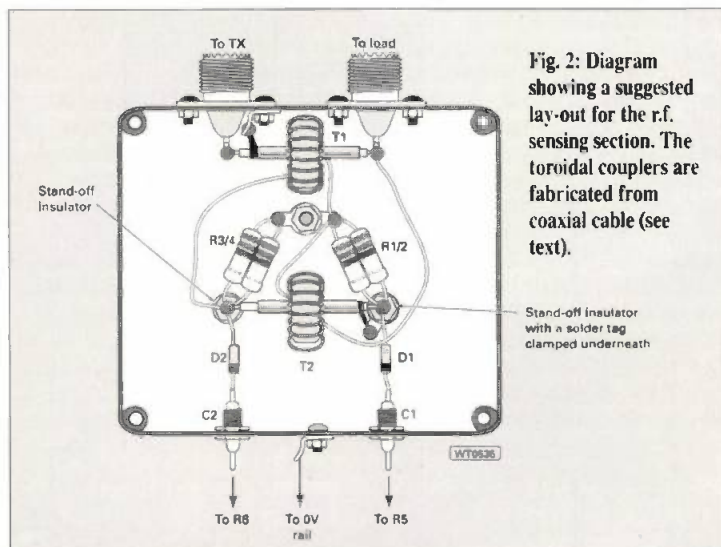


Fig. 2: Diagram showing a suggested lay-out for the r.f. sensing section. The toroidal couplers are fabricated from coaxial cable (see text).

Practice Makes Perfect...?

By Richard Pigg G4MHW

Richard Pigg G4MHW, as a keen c.w. operator and surrounded by his collection of keys, shares a few thoughts on Morse code and his valiant attempts to achieve higher operating speeds and asks for your expert help!

Heading Photo: You'll rarely hear Richard Pigg G4MHW on the microphone (he's a 'Morse Man'). But when he is 'on the mic' he does it in a big way and it's usually plugged into a 3.5kW medium wave broadcast transmitter with the benefit of 200 foot high masts! (On this occasion Richard was broadcasting a commentary during the arrival of HM The Queen at Newcastle Quayside in 1986 for the 'Tall Ships' event in 1986).

Look around my shack and you'll see more Morse keys than microphones. There's a Hi-Mound straight key and from the same stable...a mechanical bug.

I bought the mechanical 'bug' quite cheaply in poor condition and gave it new life with a bit of 'tender loving care' (TLC). You can't get that in aerosol cans like WD40, but it's just as useful!

Sitting in a grey metallic box like the battleship it came from, is an excellent Navy key. From the other two services are a tough but 'fiddley' key from an Army tank and a useful stand-by straight from the RAF.

Pride & Joy

My pride and joy is a Vibroplex Original, a present from my wife. But if you visited my shack, you'd find a large lump of 'Blu-Tack' stuck to the end of the dot arm to slow the key down below its minimum designed speed. And that's what this article is all about.

You will gather that I am an enthusiast of the code, but I must admit it has been a long hard struggle to get to my present speed. The required 12w.p.m. for the test wasn't too bad, but I've set my sights on 30w.p.m. and I'm now wondering if I'll live long enough to get there!

At the moment, with a following wind and the sun shining, I can sometimes make 20w.p.m. This is after years of daily practice, or more accurately, nightly practice.

Even so, there are times when my brain seems to switch off for no apparent reason. Then I lose several words, finding it hard to pick-up the thread again.

Write Every Letter

Most people learning Morse will write down every letter they hear. And it's possible to do this up to about 20w.p.m. without being conscious of what the message is about.

To find the meaning, the operator has to read back what he has just written down. But there comes a point, around 25w.p.m., when signals are coming in too fast to write them down. It's then necessary to develop

the ability to both translate the Morse and store in the brain a clear record of what the message is.

What's involved in the higher speeds is some kind of mental change of gear and I'm sure that many of us need help in this department. However, if this problem has never bothered you, please stay with me, I need your help!

Over the years I have read a great deal about Morse code in books and magazines. But I have to say that I have never read one single thing that has helped me to receive the code without 'mental drop out' or to increase my speed.

Practice Makes Perfect?

'Practice makes perfect' say some, but unless you know exactly what to practice you'll be unlikely to improve! The only useful advice I've ever had was from an army signals instructor whom I met all too briefly. He told me "Don't write a letter down until you hear the next one".

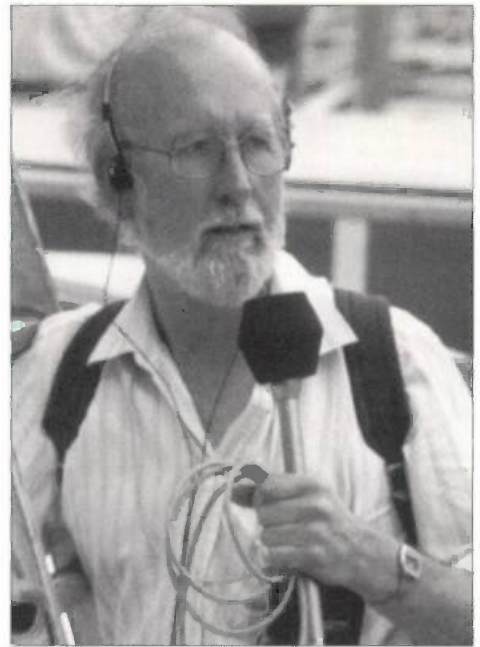
Now some questions: Why is it that some lucky people can, within a year of taking a 12w.p.m. test, rattle away at 25w.p.m. or more, when others who slave away practising every night seem to get nowhere?

And why do some operators have the ability to receive Morse all in their heads, while others are lost without some paper to write on?

I currently have two friends whom I am encouraging to take the Morse test. When I began my personal quest for increased speed, I resolved to analyse what I did, and to note the mental processes involved. I thought I'd be able to help my friends in their learning.

After years of practice, I'm really none the wiser. I don't know how I've increased my speed (slightly) and I really can't help my friends!

So, please, there must be some experts out there who know the secrets and are able to pass them on. So, let's have some instructional articles or at least some tips on the right way to practice for an increase in receiving speed.



No Expert

You'll realise by now that although I'm keen...I have no claims to be an expert. But I do try hard to make my Morse readable.

It may be a paradox, but slow Morse is often faster than fast Morse. Someone who sends badly at 20w.p.m. will waste time on mistakes and repeats, whereas sending well at 16w.p.m. will get the message across the air in a shorter time.

Listening around the bands it's obvious that some operators have not been taught too well. Frequent errors that crop up are the sending of AR for 'End of transmission', SK for 'End of work' and BT or TV for the 'Separation of Break sign'.

When printed in instruction manuals, these letters should have a bar printed above them thus: AR SK BT. This indicates that they should be transmitted as one symbol with no space between the letters. It really does have a different sound, and it is the sounds that people are trying to learn.

I mention the problems because they can cause confusion to someone who is receiving Morse when odd letters like TV and SK start appearing in their text. In any case, Morse is difficult enough for most of us, but well worthwhile. So if we're doing it at all, let's get it right!

Now, let's look forward to some words of wisdom from the real experts. Come on keen c.w. types...give us the 'nitty-gritty' on the dits and dahs and show us the mental approach to crack the code. In the words of Peter Sarstead's song, 'I want to look inside your head'. It's appropriate to end in Morse, so... Di dah di dah dit. Di di di dah di dah!

PW



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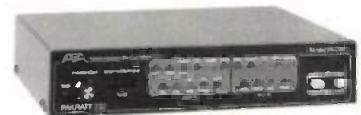
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Winding-up Top-Band

By Denis Payne G3KCR

Denis Payne G3KCR has developed ways of shortening antennas using delta windings. Now, using those methods, he describes how to make a 'Top-Band' vertical that will fit in a garden.

After my previous article, 'Multi-Delta Antennas' published in the August 1995 issue of *PW*, the question of Top Band (1.8MHz) antennas for small gardens was brought to mind. However, all my previous experiments had been with frequencies from 7MHz upwards.

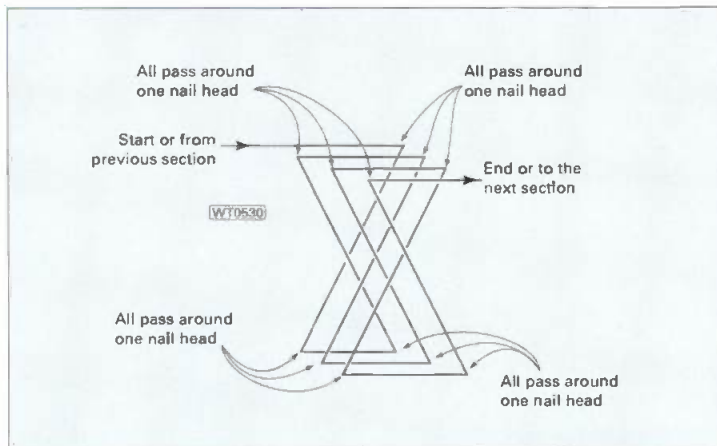
Could the principle I described then be applied for longer wavelengths? After several experiments the answer was yes. And it turned out that a quarter-wave vertical antenna is easy to build.

I described the basic principle of the delta antenna in the original article, but the challenge is to reduce an antenna's length by folding the element wire without cancelling out the radiation. This is achieved by forming a series of equilateral triangles, and was illustrated in the August 1995 issue of *PW*.

First Step

As the frequency is lower, the lengths involved are much longer so, the first step of course was to find a frame on which to build the antenna. And importantly I've also found that the size of the triangles is important, they need to be larger with longer wavelengths (lower frequencies).

So, I decided to build a wooden frame, for the antenna. But to be mechanically practical, the frame mustn't be too large and for the windings it had to be as large as practically possible. A compromise was decided upon, and the wooden frame I built was constructed from



16x38mm prepared wood.

I used a pine softwood for the framework, but a hardwood if available, is an alternative for long term weathering, although it would be more expensive. I used two lengths of wood, three metres long, for the frame sides, and a further two metre length was cut up to make cross bracing. The overall layout is shown in the illustration of Fig. 1.

As this isn't a woodworking exercise, there's no need for clever joints when making the frame. The bracing pieces were just nailed to one side (this I call 'the back') of the long sections, leaving the 'front' of the long parallel frame for the winding.

Winding Formed

The winding was formed using 60 metres of pvc insulated single core wire (0.6mm diameter), and is wound around 30 wire nails, 25mm long. There are 15 equally spaced along each side each side of the frame.

Fig. 2: The winding detail (shown 'exploded' for clarity) of one section of the loading coil. There are 11 sections like this and three with one extra winding on each section.

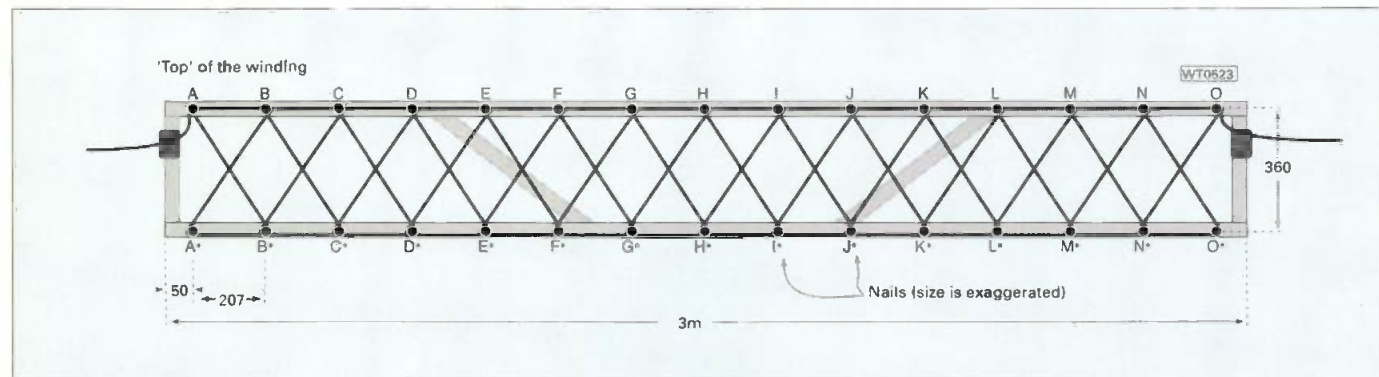
Starting at one end of the frame, the first nail is 50mm from the end and 10mm in from the side of the frame. Maintaining the same distance in from the side, the others are spaced 207mm apart. This will leave a gap of 360mm between the rows of nails.

The method of winding the wire around the nails is important. Start at one end, which will be the 'top' of the winding, leave a tail of wire of about 150mm and follow the method shown in Fig. 2.

The first winding is three turns around nails labelled A, A*, B and B*. The second windings are on nails B, B*, C and C*, then follow along the frame in the same manner.

Don't be put off by the amount of

Fig. 1: Overall layout of the framework and windings (shown horizontally). See Fig. 2 for winding the loading coil.



wire and the illustration. After following the method for the first section, and finding it to be simple, the remainder of the winding can be completed within twenty minutes.

There is a total of fourteen sections of the winding. The first eleven, from the top, have a triple cross-over as shown on Fig. 2, but the remaining three sections (at the 'bottom' of the winding) have four cross-overs.

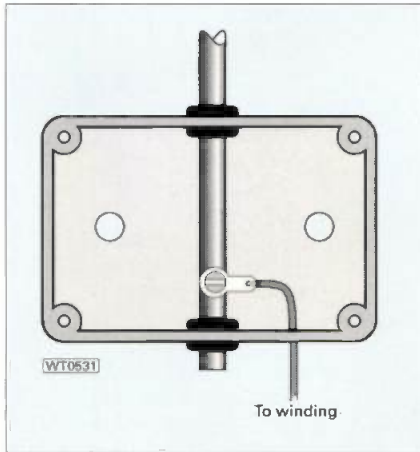


Fig. 3: Details of the insulated box and connections to the 2m long top element.

On completing the winding, leave a 150mm or so length tail at this end. This end of the winding will be the bottom of the antenna, and the feed point for the 50Ω coaxial cable.

You should note that almost any size of insulated wire can be used, but different sizes may change the resonant frequency. You would have to correct the different resonant point by the simple method of putting more or less wire on the lower sections.

For those interested, the reason for the resonant frequency change is the natural inductance of the wire changes, which in itself would change the frequency. But in addition the capacity to ground of the antenna would also be different which again alters the resonant frequency.

Top Section

To the top of the wooden frame I added a two metre length of 6mm diameter alloy tube. And in spite of the fact I've used a wooden frame, this element must be insulated from the frame, and connected to the top of the wire winding. Lengths of alloy or copper tube are available from most DIY stores in two metre lengths.

Almost any form of insulation will do to isolate the top element from the frame. One suggestion is to use a small plastic box. I used the type available from Maplin (stock number LL12N). Drill through the sides of the box to take the alloy tube, and two holes in the bottom for fixing.

The alloy tube can then be glued into the box, and the wire fed through

a small hole in the box and connected to the tube. See Fig. 3 for details. The diameter and length of this tube is not critical, as any difference in length can be corrected by tuning, but that comes at a later stage.

The last item needed to complete the antenna is a two-way connector block, also fitted inside a plastic box, and fixed to the bottom of the frame. This is used for connecting the coaxial 50Ω feeder to the winding and the earth rod. See Fig. 4 for details. I used a one metre long earth rod close to the base of the antenna, but in general the longer the better.

Mounted Clear

The antenna should be mounted clear of any large metal structures. And most certainly **not on the side of a metal mast.**

I used a pair of mast mounting brackets that have 460mm arms. These were fixed to the wall of the garage

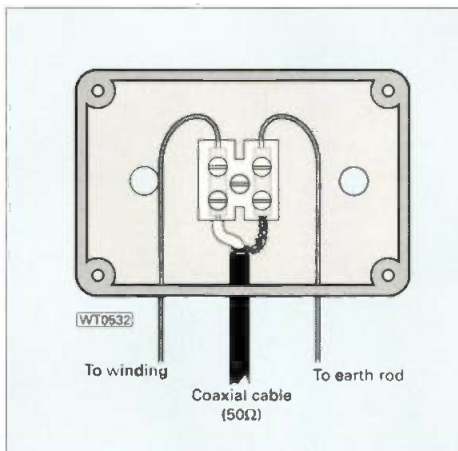


Fig. 4: Details of the feedpoint connections. A good ground connection is important for this antenna

which allowed most of the antenna to be above the garage roof. This means drilling two holes in each bracket for the wood screws into the frame.

Tuning & Adjustment

The tuning and adjustment can be carried in several ways. The simple way is to use a grid dip oscillator (g.d.o.), coupled to the terminal block by a two turn link. Check the accuracy of the g.d.o. using a receiver.

Another alternative is to use a Noise Bridge and a receiver, with the bridge connected directly to the terminal block and set to 50Ω. The enthusiast (like myself) who spends most of their time on antennas could use one of the various antenna analysers available.

Having found the resonant frequency of antenna, it may require

some correction to bring it into the part of the band you intend to use. To do this, all you need to do is to add wire to the lower section to lower the resonant frequency, or subtract wire to raise it.

The length to be added or subtracted is approximately 320mm per 10kHz change. The final check of course is to connect it to your transceiver and measure the s.w.r. at various points across the band. Until you are happy with the s.w.r. I suggest using only the lowest power that gives an adequate reading on your s.w.r. meter.

Results Pleasing

The results I had with this antenna were, considering the size of the antenna, pleasing. My best QSO during five evenings of tests was with Sweden, using 35W on s.s.b.

The s.w.r. readings I measured on my antenna across the band are shown in Fig. 5. The total inductance of the antenna winding was 156μH, measured on a low frequency bridge, and the radiation resistance in the centre of the band was very close to 50Ω.

It may be of interest to know that a quarter-wave vertical antenna, for 'Top-Band' with the same overall size, would require a base loading coil of about 250μH, and the radiation resistance would be less than 1Ω.

The wire used in this antenna, when straight, would have a calculated inductance of 144μH. The inductance calculation was calculated for low

frequency, and was only to compare with the measured value of the finished winding.

A Bonus

There's a bonus for operators not interested in Top Band, it's possible to use the same size frame, top section, and nail positions to construct an antenna for 3.5MHz. Although, at present, I don't have definitive winding details.

But never mind the band - get wound-up on it. See you there!

PW

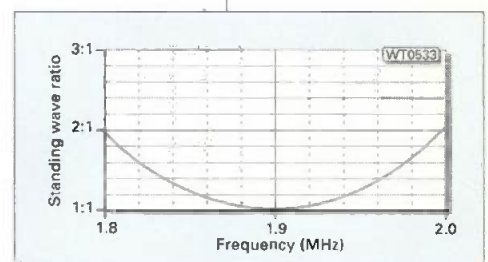


Fig. 5: The s.w.r. figures for Denis G3KCR's prototype antenna.

Those Trying Transformers!

By Geoff Billington G3EAE

Geoff Billington G3EAE agrees that understanding the theory and techniques can be difficult, but goes on to explain just how you can successfully tackle those 'trying' transformers with a practical approach!

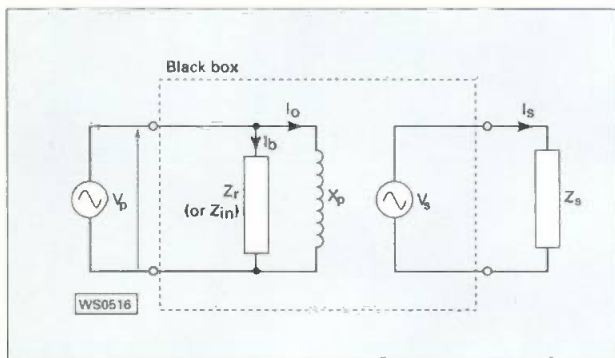
I agree that understanding transformers can be difficult. And to look into this subject in detail, you really need to work with mutual inductance and induced e.m.f.s and to be able to deal with equations using the 'j' notation.

If, however, you are prepared to restrict yourself to 'ideal' transformers, they can be dealt with much more simply. In a nutshell, this is the 'practical' approach I'm aiming for.

An 'ideal' transformer consists of a pair of tightly coupled windings with negligible resistance. They're usually wound on a core of suitable (usually iron based) material, designed to intensify and channel all the loops of magnetic flux (field lines) produced by the currents in the windings.

In an ideal transformer, it's assumed that no energy is wasted on the core itself. These topics are explained in text books, but are not examined in this article. It's also assumed that the coupling is perfect (all the magnetic flux passes through all the turns). The core provides a 'magnetic circuit' from which no flux should escape.

Fig. 1: Looking at a transformer using the 'black box' approach (see text).



$$V_s = \left(\frac{N_s}{N_p}\right) \times V_p$$

$$\left(\frac{Z_{in}}{Z_s}\right) = \left(\frac{N_s}{N_p}\right)^2$$

$$Z_r = \left(\frac{N_p}{N_s}\right)^2 \times Z_s$$

$$I_b = \left(\frac{V_p}{Z_r}\right)^2 = \frac{V_p}{\left(\frac{N_p}{N_s}\right)^2 \times Z_s}$$

Practical Transformers

In fact, no transformer is perfect, but practical transformers can approach the ideal. And for this there are three simple formulas which are frequently used to describe the transforming action.

The formulae are based on alternating voltages, currents and on impedances, in terms of the 'turns' ratio (N_s/N_p) where N_s and N_p are the number of secondary and primary turns respectively.

For voltage transformation a source of alternating voltage (V_p volts r.m.s.) is connected across one winding (called the 'primary'). An alternating voltage of V_s volts r.m.s. then appears between the ends of the other winding (the 'secondary' winding).

The ratio of these voltages is equal to the turns ratio. $V_s/V_p = N_s/N_p$. This is the most important of the three formulas because it is the only one which always holds for an ideal transformer. The other two rules can only be applied if the impedance of the secondary load is low as will be explained shortly.

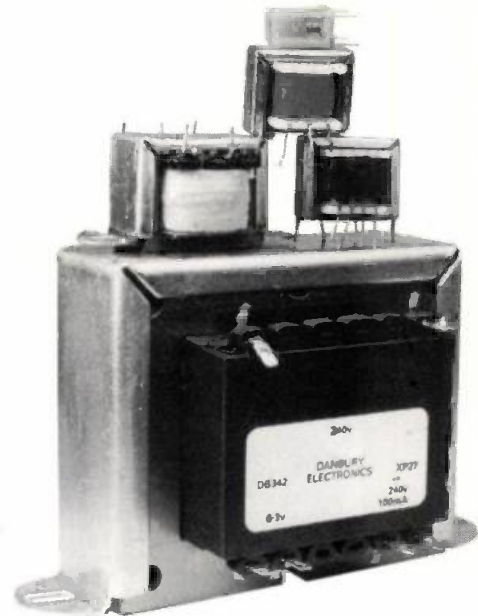
A word of warning! Although, in theory, the roles of primary and secondary windings could be interchanged, in practice this might prove disastrous in some circumstances.

Current Transformation

The formula for current transformation is $I_s/I_p = N_p/N_s$ where I_s and I_p are the (r.m.s.) secondary and primary currents. Note that the turns ratio is inverted when compared to the voltage formula.

If the voltage is stepped up, the current will be stepped down. This makes sense if you start thinking about power output and input.

It's clear however, that the current formula does not always work. For instance, - if you leave the secondary of a transformer open circuit, I_s must be zero, but I_p is not - there will still be a primary current drawn from the supply. The simple current ratio



Transformers come in all shapes and sizes. In his article Geoff Billington G3EAE sets out to change your outlook on the essential theory and techniques behind the 'good old tranny'.

formula certainly doesn't predict this happening!

In fact, when no current flows through the secondary, the primary winding simply behaves as a pure inductance. As a result, it draws a current which is one quarter of a cycle out of step (90° phase shifted) with the supply voltage and therefore dissipates no power.

Impedance Transformation

Now let's take a look at impedance transformation. And here the relation between Z_s , the load connected across the secondary winding and Z_{in} , the impedance presented to the supply is: $Z_{in}/Z_s = (N_p/N_s)^2$. Once again this breaks down completely if we try to apply it to the case of an open circuit secondary, when Z_s approaches infinity.

(In fact, neither the impedance nor the current formulas can be accurately applied unless Z_s is suitable small).

Equivalent Circuit

What's needed is an equivalent circuit to represent our transformer. Fortunately, a dedicated investigation of transformer action shows that an ideal transformer can be correctly represented by a 'black box' as in Fig. 1. (The lines show the apparent contents of the 'box' as they might be determined by external measurements.



The output of the secondary winding may be pictured as being due to an internal 'generator' which always maintains a voltage of $V_s = (N_s/N_p) \times V_p$. The input impedance, Z_{in} can be represented by two parallel impedances as shown.

One impedance is $(N_p/N_s)^2 Z_s$ as given by the formula. This is often termed the 'reflected impedance' (Z_r) of the secondary load, Z_s . The other is X_p , the reactance of the primary winding.

As the two impedances act in parallel, it's the smaller impedance which is the more significant. And it's the larger impedance which has the least effect of the resultant value.

If the secondary is left open circuit, Z_s is effectively infinite. This means that the reflected impedance $(N_p/N_s)^2 \times Z_s$ is also infinite and so $Z_{in} = X_p$ (the input impedance is equal to the inductive reactance of the primary winding).

Conversely, if $(N_p/N_s)^2 \times Z_s$ is much less than X_p . The primary impedance, X_p , can be neglected and Z_{in} will be very nearly equal to the reflected impedance, $(N_p/N_s)^2 \times Z_s$, as predicted by the formula.

Combining Formulas

Also, it's not difficult to show that by combining the voltage and impedance formulas, the transformation formulas for currents can be obtained. Thus, if a transformer is to obey the simple transformation rules, there must be sufficient turns on the primary to ensure that X_p will be considerably larger than any possible value of the reflected impedance.

The 'sufficient turns' condition may alternatively be contained by restricting Z_s to values which are small compared to the reactance of the secondary winding. However, in designing a transformer, either of these conditions could be used as a guide to determine the actual minimum number of turns required.

It's also true (though not so obvious) that if Z_s is a complex impedance with both resistive and reactive components, each of these will be scaled by the factor $(N_p/N_s)^2$ to give the components of the reflected impedance.

The Hard Part!

The hard part of the article is an attempt to give a brief justification of the black box diagram starting from first principles. So let me begin in an easy fashion!

A flowing electric current always produces a magnetic field (magnetic flux). In normal transformer use, currents usually flow in both the primary and secondary windings and both contribute to the magnetic flux

in the core. If the transformer is well designed, nearly all the flux will be contained in the core and the flux will pass through all the turns of both windings.

It is a basic fact of electromagnetism that if the flux passing through a loop of wire alternates (or changes) it produces an alternating (or varying) voltage between the ends of the wire*. If we apply this to a transformer with an open circuit secondary an alternating current flows through the primary winding, producing an alternating flux in the core.

***Readers who have some familiarity with mutual inductance and induced e.m.f.s should refer to the final section of the article.**

The alternating flux in turn produces an alternating voltage in each turn of both windings. The voltage generated in either winding is simply the voltage per single turn multiplied by the number of turns in each winding.

Load Connected

Now, suppose that a load is connected across the secondary, giving a current flow. This would change the magnetic flux...if it were not for the fact that the primary current instantaneously 'adjusts itself'.

The primary current 'instantly adjusts' so that the combined effect of primary and secondary currents keep the amplitude and phase of the alternating flux unchanged. It thus keeps the volts-per-turn unchanged and ensures that the voltage across the primary remains identical to the supply voltage.

The volts-per-turn are always equal to V_p/N_p . This holds for any turn of wire around the core. It follows that V_s , the voltage appearing across the secondary is obtained by multiplying the volts per turn by the number of turns on the secondary. $V_s = N_s(V_p/N_p)$ or $V_s/V_p = N_s/N_p$. And this holds, whatever the load.

To summarise the argument: If the secondary load is changed, both primary and secondary currents adjust their amplitudes and phases to maintain the amplitude and phase of the flux alternations unchanged. (So that the primary voltage is always identical to the supply voltage).

The current which is drawn by the primary (when the secondary is open circuit) is sometimes the 'magnetising current'. The statement may then be expressed as: The combined magnetic flux due to I_p and I_s is always identical to the flux produced by the magnetising current.

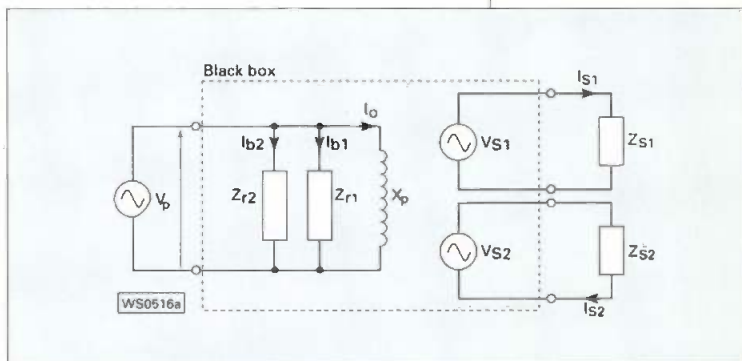
Component Current

Let's have a look at the components of the primary current. And I'll suppose that the secondary is initially open circuit and then a load is connected across it.

To begin with, only the magnetising current I_0 flows from the supply. When the load is connected, a current I_s flows through the load and through the secondary winding.

The a.c. source continues to supply I_0 unchanged. But in addition it supplies a new component current I_b , the 'balancing current'. This flows in the opposite sense to I_s and completely neutralises its field, so that the flux in the core continues its alternations unchanged in amplitude or phase, exactly as when there was only the magnetising current I_0 flowing.

You should bear in mind that if Z_s



is small enough, I_s will be large and so will I_b . Now, it's possible to apply all this to the equivalent circuit of Fig. 1!

Once I_p enters the 'black box' in Fig. 1, it may be imagined to split into its components, the magnetising current I_0 flowing through X_p , whilst I_b flows through the reflected impedance Z_r . And providing there are sufficient turns on the primary X_p will be large so I_0 will be small and I_b will be almost identical to the input current I_p .

Flux & Turns

The magnetic flux produced in the core by one of the windings is proportional, both to the current and to the number of turns, i.e. to the current measured in 'ampere turns'. As the balancing current flowing through the primary exactly cancels the magnetising effect of the secondary current, it follows that: $N_p \times I_b = N_s \times I_s$.

As I mentioned earlier, it can usually be assumed that I_0 , the magnetising current component of I_p

Fig. 2: Looking at a transformer with multiple secondary windings with the 'black box' approach (see text).

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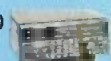
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AMCOMM ATU.....	£55	KENWOOD TH-28E.....	£149	MFJ PACKET CTRL.....	£159	YAESU FT-767GX 2/70/6 FITTED.....	£995
DRAE WAVEMETER.....	£15	KENWOOD TS-940S.....	£875	NEVADA MS-1000.....	£199	YAESU FT-890.....	£749
EDDYSTONE 770U.....	£110	KENWOOD TS-930SAT.....	£639	REALISTIC PRO-2036.....	£179	YAESU FT-101.....	£170
EDDYSTONE 770R.....	£110	KENWOOD TS-820S.....	£299	ROBERTS R-827.....	£149	YAESU FT-77FP.....	£299
EDDYSTONE 770.....	£110	KENWOOD TR-820S.....	£199	SIGNAL R-532.....	£139	YAESU FRG-9600.....	£265
EDDYSTONE EC-10II.....	£180	KENWOOD TS-120V.....	£289	SIGNAL R-535.....	£299	YAESU FRG-9600SW.....	£285
GLOBAL AT-1000.....	£50	KENWOOD TS-430 + PSU.....	£499	SIGNAL R-537.....	£89	YAESU FRG-9600SW.....	£299
ICOM ICR-100.....	£299	KENWOOD TS-680.....	£575	UNIVERSAL M-8000.....	£575	YAESU FRG-7 DIGI.....	£199
ICOM ICR-100.....	£325	KENWOOD SP-940.....	£79	YAESU FRG-100.....	£375	YAESU FRG-7700.....	£225
ICOM ICR-100.....	£365	KENWOOD SP-230.....	£79	YAESU FRG-100.....	£349	YAESU FRT-7700.....	£50
ICOM ICR-100.....	£399	KENWOOD SP-120.....	£59	YAESU FT-101.....	£179	YAESU FRC-7700.....	£50
ICOM ICR-7100.....	£859	KENWOOD MC-60.....	£59	YAESU FT-290.....	£189	YAESU FRA-7700.....	£50
ICOM ICR-7100E.....	£799	KENWOOD LP-30.....	£15	YAESU FT-290.....	£199	YAESU FRG-8800.....	£375
ICOM ICR-7100E.....	£899	KENWOOD R-1000.....	£285	YAESU FT-290.....	£225	YAESU FRV-8800.....	£89
ICOM ICW-21E.....	£225	KENWOOD R-1000.....	£265	YAESU FT-690.....	£249	WELZ ATU.....	£50
ICOM IC-32E.....	£189	KENWOOD TS-700G.....	£249	YAESU FT-790.....	£245	YUPITERU MVT-8000.....	£249

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Those Trying Transformers!

Continued from page 35

is very much smaller than I_b (in which case I_p and I_b are almost identical). So I_p may replace I_b in the above equation and $N_p \times I_p = N_s \times I_s$ to a good approximation. This justifies the relationship $I_s/I_p = (N_p/N_s)$ - providing the inductance of the windings is large enough.

Reflected Impedance

Let's now have look at the reflected impedance. As we know $V_p/N_p = V_s/N_s$ and $I_b \times N_p = I_s \times N_s$ it's easy to show that $V_p/I_b = (N_p/N_s)^2 \times (V_s/I_s)$, i.e. the numerical value of the reflected impedance = $(N_p/N_s)^2 \times Z_s$ ohms. Knowing the numerical value of the reflected impedance is not often sufficient, and the resistive and reactive components are usually required.

I stated earlier that when Z_s is a complex impedance, it can be shown that both the resistive and reactive components will be scaled by $(N_p/N_s)^2$ to obtain the resistive and reactive components of Z_{in} . The reason for this is that V_p and V_s must be in phase as the volts per turn are identical in both windings.

The currents I_b and I_s are also in phase (see later). The phase angle between V_p and I_b is therefore the same as the phase angle between V_s and I_s . This means that their resistive and reactive components must be in the same ratio in both cases: both must be scaled by the same factor.

A word of explanation here. In the transformer windings, I_b and I_s must flow in opposite directions in order to cancel. However, when flowing through the secondary load, the direction of I_s relative to V_s is reversed compared to when it's flowing in the secondary winding, so the phase relation between V_s and I_s are identical to that between V_p and I_b .

In the case of transformers with multiple secondaries, (the 'black box' approach is illustrated in Fig. 2) the a.c. source will supply a balancing current for each secondary winding. The supply will 'see' all the separate reflected impedances in parallel with X_p .

Imperfect Coupling

If the coupling between primary and secondary is less than perfect, i.e. if there is some 'leakage flux', a more formal approach involving mutual inductance is required. There's no longer a simple relation between V_s and V_p and the turns ratio. Also there's an inductive component to Z_{in} , the 'leakage inductance', which remains as a residual reactance even when the secondary is short circuited.

Avoid Confusion

For the sake of those readers who have some familiarity with the topics I've mentioned, a few more words of explanation might help avoid confusion.

For example, you may wonder why the 'voltage appearing across the secondary' is not referred to as the 'e.m.f. in the secondary'. The reason is because in the more formal treatment of transformers and mutual inductance it has been found convenient to represent the secondary winding by an equivalent circuit consisting of an e.m.f. induced by the primary current acting in series with the inductive reactance of the secondary winding.

If the e.m.f. is defined in the way described, it's not the same thing as the voltage appearing between the ends of the winding - unless the secondary happens to open circuit.

The simple method I've employed here is perfectly correct and quite fundamental. The voltage appearing across the winding depends only upon the alternating magnetic flux in the core and what gives rise to the flux is immaterial.

I set out to disperse some of the mystery behind transformation. And hopefully...you won't find those transformers so trying now!

PW

Manners

My original letter to PW entitled 'Good Manners' was published in 'Receiving you,' July 1995. My comments regarding both manners and etiquette seems to have opened a small 'can of worms'...on the air and by way of written reply! (and I'd like to thank all those who have made their views known).

The subject of manners and Etiquette has been dealt with several times over the years, mainly by the late Jack Hum G5UM. So if some of what follows sounds familiar...it's thanks to Jack, the acknowledged 'Gentleman of the Airwaves'.

Manners are of course open to a certain amount of interpretation by the individuals. But some words and phrases were drummed into us (weren't they?) at an early age by our parents and teachers as being 'de rigueur'.

Please & Thanks

If you were to walk into a shop and ask for a certain item, you would begin or end the request with the word 'please'. And upon the satisfactory outcome of the sale you would say 'thanks very much' or something to the same effect.

So, if you've been listening to an interesting QSO for a while and you think you might be able to add to the conversation, you would ask to join in by saying 'break, please', wouldn't you? Also, I remember reading (probably one of G5UM's articles) that it is a good idea to leave a pause of about three seconds between 'overs', just in case someone wishes to call in.

Try this experiment: time how long it takes to say 'break please, (plus your call sign)'. I've just tried it and it took just two seconds. So a polite break with full call sign shouldn't cause any undue disruption to the conversation.

'Break please G1HBE' sounds much nicer than that aggressive or mumbled single-worded 'break'!

If you have ever tried to call into an interesting QSO with some useful information, but both participants were using the 'hair-trigger' technique with almost no pause (and sometimes very tight squelch), you'll know the value of the three seconds pause.

In A Net

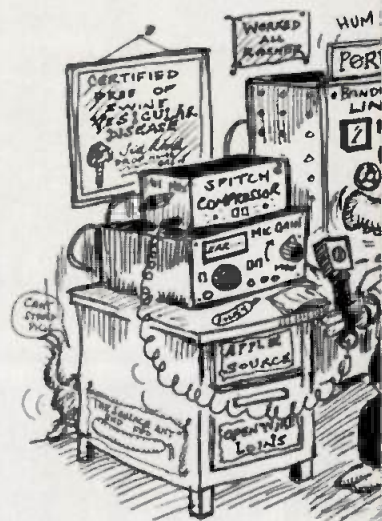
When there are several operators working in a 'Net', it can take quite a long time for your turn to come around. This leads to the temptation to make the most of your 'over'.

Before you know it, you have been waffling on for ten minutes or more, most of the time spent trying to remember what you had planned to say. So, it's best to make notes of the other participants' queries and comments in order to deal with them efficiently when it's your turn.

Remember, while you're 'umming and erring', the others are impatient for their turn. So, don't hold onto the microphone if you have nothing to say.

Nets usually try to use the same frequency every time. How often have you said 'QSY to the usual' instead of giving the frequency? All your Net members know what 'the usual' is, but casual listeners don't!

So why not announce the QSY frequency and save new listeners a time wasting search? I'm not sure if there is a stipulation in our licence conditions about changing frequencies, but it makes sense to say where you're going; it can prevent two QSOs ending up on the same channel.



G5UM '96

Please!

Andrew Howlett G1HBE originally wrote a letter to PW's 'Receiving You' pages on good manners when operating and the resultant feed-back and general reactions have prompted the following suggestions. So read on! (please).

Beacon Bother

Beacons and those using them can get into some 'manners please' bother too, so it's worthwhile taking a look at frequency allocations. The two metre beacon sub-band extends (in theory) from 144.805 to 144.990MHz, although our RAYNET service operates up to 144.875MHz on occasions.

Some people monitor very weak foreign beacons 24-hours per day. They employ pen recorders and high gain beams to keep an eye on the day-to-day changes in propagation over long paths.

Long-term listening to beacons may seem like an odd thing to do. But bear in mind that we owe much of our knowledge of v.h.f. propagation to these enthusiasts, some of whom hold records going back over many years.

Can you imagine the frustration caused by QSOs that appear right on top of, or very close by, the beacon being investigated? And just because you've never heard a beacon on that frequency doesn't mean there isn't one there - the distant ones are very weak and unlikely to be detected at all on f.m. equipment.

So the next time you're checking the s.w.r. of your antenna, remember that the group of frequencies around the band

... 'Hogging the channel'

centre are 'taboo' as far as transmission goes. You'd be better advised to find a clear simplex channel around 144.800 or 145.200MHz.

Working Mobile

Repeaters can be extremely useful devices for those in poor locations or those working mobile 'on the road'. But if you're chatting on your local repeater and you are not mobile, you should always give way to any mobile station who may call in.

After all, repeaters were designed with mobile stations in mind, and the mobile operator might 'lose the box' at any moment. How do you know the station is mobile? Well, they called in with their callsign/M of course!

It's bad manners to hog anything, and this applies to repeaters too. The problem seems to be at it's worst during the morning and evening rush-hours, when the repeaters are populated by the same crowds, day-in day-out.

Hogging The Channel

The amateurs 'hogging the channel' tend to be friends, familiar with each other's operating techniques and favourite subjects. Under these conditions, a multi-way QSO can soon degenerate into a quickfire 'wisecracking' session during which anyone travelling through the area is discouraged from calling in. It's not deliberate, but it is rather thoughtless.

Waiting for the repeater's 'pip' gives strangers a chance, and of course that is its intended function. Completely inexcusable is the practice of deliberately holding onto the repeater when it's obvious that someone is asking to use it.

Holding on seems to occur when the regular evening users (usually not mobile) settle down for a long chat about some subject or other on what they have come to regard as 'their' box. This is regardless of the fact that the stations in question could make a simplex contact if they tried.

What often happens is that up 'pops' another station, usually a Novice or a new licensee, and asks if they can briefly call a friend, only to be completely ignored by the first two stations. If the 'novice' is brave enough to persist, they're often given the 'no break' treatment. Not only is this a shameful display of bad manners, it's childish in the extreme.

Nuisance Operators

Unfortunately, there are people out there who delight in spoiling things for others and these include the nuisance operators (the scratchers, the raspberry blowers and the swearers). What these poor individuals want (apart from a brain transplant) is attention.

The 'scratchers & blowers' are just waiting for you to respond to their bait, whether that bait is a rude comment or raspberry. **The worst thing you can do is give them what they want - this means they have succeeded, and they will carry on as long as they keep getting a reaction.**

After a while of no response, the nuisance operators will get bored and clear off. **So don't talk to these people...not even to tell them to go away. And you should certainly not swear at them or threaten them with violence, as this puts You on their level. Remember you're a Radio Amateur!**

What kind of image do you want in the public's mind (or tabloid press!)? How about headlines that could read:

'RADIO HAM IN BASEBALL BAT ATTACK'

Possible headlines as that above could be disastrous for our hobby. Count to ten and ignore the taunts!

Tuning In

While we're on the subject of swear words, perhaps it's worth reminding ourselves that when we're in QSO, anyone can be tuning into our transmissions. Including women and children.

Do you use foul language in public? What about in front of your children, or at the school gates? And I'm sure that the vast majority of us would answer a firm 'No' to those questions.

However, some amateurs seem to think that peppering their utterances liberally with all manner of oaths and curses is quite in order, not realising that young novices could be listening (or perhaps they don't care one way or the other). **Is this you?**

It's one thing to be among 'mates' at work. But it's quite another to broadcast your dubious vocabulary to the world.

Amateur Radio is only a hobby, and there must be an element of fun along with the self training, but good manners and decent behaviour cost nothing. So there we are....that's my personal view on manners and etiquette of the air.

If my view reads as though it's a little 'straight-laced' then so be it. But if we don't want to see our hands heading down the same route as some of those operating on the 27MHz CB band, then we must all look at our own behaviour. Let's give it a whirl.

PW



Green Light For Budget

The Albrecht AE 550 144MHz FM

By Rob Mannion G3XFD

My new car has many advantages over the previous vehicle. However, it's got one real disadvantage in that as it's relatively new...there's very little space to fit Amateur Radio equipment.

So, once I took delivery of my new car I started to look around at the various ways that my existing 70 and 144MHz rigs could be fitted so I could operate them with safety. That's when I heard about an interesting budget-priced

transceiver available from Martin Lynch. The transceiver in question has been recently introduced into the UK and marks a milestone in the Amateur Radio hobby by introducing Albrecht - a new name into the UK from their base in Germany. However, before you're misled, I should point out that the actual rig itself is made in Korea.

As prices inevitably rise, I think we're going to see many more items of Amateur Radio equipment being manufactured in countries such as Korea, the Philippines,

just how long it will be before all the major Japanese manufacturers actually assemble their products outside of Japan. They're already doing it with the hi-fi products and general electronics...so how long is it to be before we see well-known maker's stamping 'Made In Thailand', etc., on the backs of their transceivers?

The Albrecht may be a 'badged' imported transceiver...but this in no way detracts from what's on offer. So, let's see what is on offer in this neat little transceiver.

Heat & Natty

Quite frankly I was quite taken with the AE 550 when I first saw it...the neat, natty and simple presentation appealed to me immediately. It's the sort of transceiver (at the right sort of price) that you can place anywhere.

Unfortunately, the photographs we've taken cannot do justice in representing the actual physical dimensions of the rig (it only measures 140 x 124 x 41mm!). You can gauge the size of the unit from the comparative size of the coin beside the transceiver heat sink. (Another clue as to how small and neat the AE 550 is...can be seen by looking at the standard sized microphone socket on the front panel).

In fact it can easily sit in the palm of my (admittedly quite large) hand. Despite my hand being larger than normal I think that's quite an achievement for a budget-priced transceiver (the price normally rises in inverse ratio to the physical size!).

Although it's not an expensive transceiver the manufacturers have

included a full specification unit which will undoubtedly interest readers. The specification includes a double superhet with a first i.f. of 21.40MHz and the usual 455kHz

second i.f.

Audio output from the internally mounted loudspeaker is quoted at 2.5W (see specifications). Unusually for a lower priced transceiver there's also an external loudspeaker socket included as standard.

The quoted frequency coverage of the AE 550 is from 144 to 146MHz. Frequency tuning 'steps' are provided as follows: 5, 10, 12.5, 20 and 25kHz. Ten memory channels are available.

The transmitter employs reactance modulation to provide the f.m. signal. Power output is claimed to be a full 25W, with a low power facility which can be selected from the front panel. (The manufacturers don't mention what the lower power level is but we measured it as being 1W output on the review transceiver).

On The Air

During my 'on the air' tests I tried the AE 550 in the 'odds & ends' cum glovebox between the driver's and front passenger seat on my car. The antenna I used was a little magnetic-mount quarter-wave whip.

I was immediately struck by the 'sharp' receiver on the AE 550. It's extremely sensitive, so much so that I was picking-up alternator whine from the engine as it ticked over. This also suggests to me that the f.m. receiver is not fully 'limiting' but in practice I don't see it being a problem.

Reports on my transmitted audio were very good, but on receive I found that I was able to give far better reports because of the receiver's sensitivity and the good received audio. This was undoubtedly because of my relatively poor basic whip antenna

The weekend I had the AE 550 coincided with a 'lift' on 144MHz and from a relatively high spot for coastal east Dorset anyway!) I worked into France, Belgium and Holland. Reports received were consistently good, and even though the AE 550 has only a 21MHz first i.f. it coped very well indeed...even

Are you looking for a compact budget-priced 144MHz rig for the car? If so, you may well be interested in the Albrecht AE 550 transceiver that Rob Mannion G3XFD has recently tried out.

Singapore and Taiwan. And indeed, Taiwan is already well in front with its experienced specialised equipment manufacturers.

And as time goes on, I wonder

Get Mobiles!

Mobile Transceiver

though every single channel seemed to have at least three stations working on it!

I had a few successful QSOs via repeaters in the Southampton area. And I had no difficulty whatsoever with good reports from all stations I worked.

But when I consulted the manual again to write my review I was puzzled. I saw that to access a repeater (once you've selected the necessary frequency split for transmit and receiver)...the operator has to press TC control on the front panel to provide the necessary tone burst.

So, either the manual supplied with the Albrecht AE 550 is wrong, and the tone burst is switched on automatically when you transmit, or I was 'piggybacking' on other operator's tone bursts or catching the repeater before it switched over*. But whatever happened (I've no doubt other operators - those with two arms anyway- won't find it a problem to operator the TC control when necessary!

* *The manual is correct*

General Impressions

My general impressions of the Albrecht AE 550 are that it offers excellent value for money. It's very well presented, simple to operate and has some delightfully easy-to-operate control switches (although small they're very positive in action, providing a soft 'click' as the do so).

The relatively large (bearing in mind the small size of the transceiver) l.c.d. display is clear and easy to read. The display is also illuminated by back-lighting.

All the translucent push-button controls are illuminated in a soft green colour which is pleasing to the eye and relaxing. The larger rotary controls are also indirectly illuminated by having softly illuminated rings around the periphery of the control - thus showing you where the control is by the 'shadow' effect. Very clever!

The manual - although informative - has some hilarious typographical and translation errors.

They'll amuse you, but the booklet still does the job!

And be warned... don't think you're going mad if the English language version of the manual suddenly turns into a German language version. It's just that you will have picked it up...upside down and the wrong way round.

The German version is up-side down compared to the English version, with its front cover being the back cover of the English manual. Unusual and economical in style but in the spirit of the transceiver itself.

So, what do I think? Is the AE 550 a good buy in the budget-priced bracket? In answer I've got to say yes. It's easy to use, delightfully simple in concept and incorporates many features you'd expect in a much more expensive transceiver.

There's no need to worry about leaving this transceiver in the car. Just disconnect the antenna lead and power supply and put it in your jacket pocket as you leave the car. It really is quite small!

My thanks go to Martin Lynch & Son of 140-145 Northfield Avenue, Ealing, London W13 9SB. Tel: 0181-566 1120, FAX: 0181-566 1207, who can supply the Albrecht AE 550 for £199.95 plus £10 P&P. PW

Manufacturer's specifications

General

Frequency Coverage	144.0 - 145.995MHz ✓
Frequency step	5, 10, 12.5, 20 and 25kHz (user selectable) ✓
Modulation type	F3E (f.m.) ✓
Operating voltage	13.8V ± 10%
Memories	10
Antenna impedance	50Ω (SO239 socket) ✓
Dimensions	140 × 125 × 41 (w × d × h)

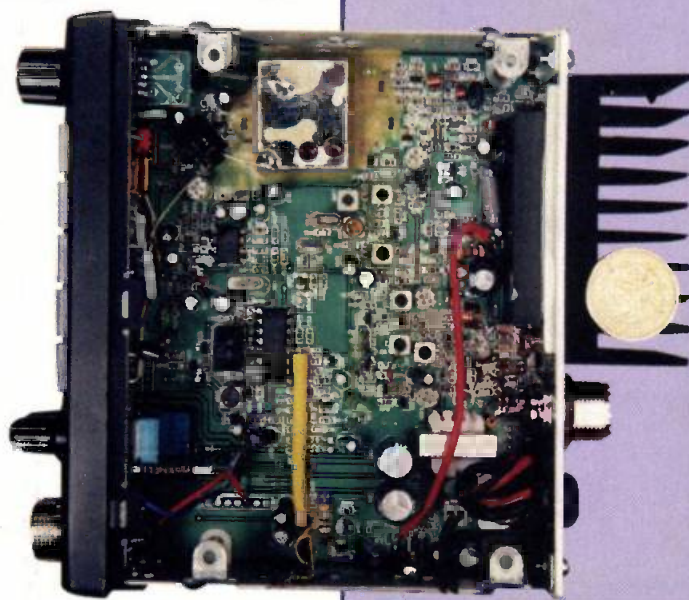
Receiver

Receiver type	Double superheterodyne
Frequency (i.f.1)	21.4MHz
Frequency (i.f.2)	455kHz
Sensitivity	0.22μV for 12dB SINAD ✓ (at 145MHz ±5kHz deviation) 0.3μV (for 20dB noise quieting) ✓
Squelch sensitivity	0.1μV ✓
Squelch gap	10dB
Audio output	2.5W @ 10%t.h.d. into 8Ω ✓

Transmitter

Power output	25W (@13.8V) (23W)
Modulation	reactance method (F3E)
Max Deviation	±5kHz ✓
Tone burst deviation	±4kHz ✓
Spurious emissions	>60dB down on carrier ✓
Microphone	Electret condenser

The ✓ after a measurement figure means that, when checked on our test equipment, the rig matched (within measurement limits) the quoted specification.



The £1 coin placed on the heat-sink provides a good size comparison.



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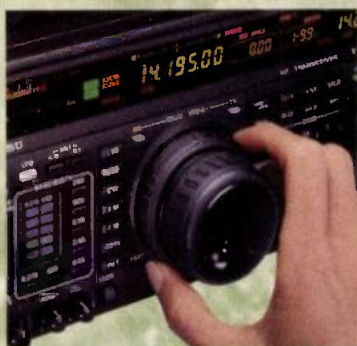
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Cruise The Caribbean

By Rosemary Whelan

Rosemary and Bob Whelan G3PJT cruised the Caribbean with Yaesu, and here Rosemary tells the tale through non-amateur radio eyes.

When Bob asked me rather casually in February 1997 if I would like to go on a cruise for our annual holiday that year I was somewhat surprised. A cruise didn't really sound like the sort of holiday he would like at all.

Bob then added that he thought the southern Caribbean would be rather nice in June. And thus the idea of going on the Yaesu DX Caribbean Cruise 2 was introduced.

The 1995 Yaesu cruise started in Aruba (P4) and visited Dominica (J7), Barbados (8P), Martinique (FM) and Curacao (PJ2). The cruise was advertised as a 'holiday with a radio theme' and included all of the usual cruise features, entertainment, scuba diving, shore visits, shopping, etc. for more 'normal' humans too!

The cruise ship was the SS *OceanBreeze*. And, as Yaesu is the principle sponsor of the RSGB Islands On The Air (IOTA) programme, Roger G3KMA and Gill were planning to go too and this finally made up our minds. Radio operation took place from the ship /MM R2 and from each of the islands visited.

Boarded Ship

On the Sunday we boarded the ship at Oranjestadt, the capital of Aruba. The evening welcome party was hosted by Chip K7JA.

Pairing the combination of amateur radio with the cruise

programme meant that this could be a real family holiday. The radio amateurs (37 of them) able to get their daily 'operating fix' while the rest of us were able to enjoy all the benefits of cruise hospitality.



The experience of the operators ranged from the very experienced 'old hands' to the recently licenced like Margaret KA7RYG, who had her first ever QSO from Aruba.

There was an amateur radio station on board which was available at all times when the ship was at sea, including through the night! For those who felt they had to ...! And believe me some had to!

At dinner on the first evening we met Gary KI6T, and Glenn WR60, father and son and who run a 'ham' radio store near Sacramento. Gary said that he got the DXCC bug by the age of 14!

We finally sailed late after an evening of free drinks, courtesy of the captain. Despite the heat Bob WICW, and Ellen W1YL, spent the night operating on 7 and 14MHz. But with little success as conditions were poor.

On Course

Monday dawned as a hot, but rather dull day, which found us on course for Dominica, complete with several flying fish and sea birds.

Roy AC6CQ, showed Bob how to use a hand-held Geo-stationary

Positioning System (GPS). When Roy put in the coordinates and times of Aruba and Dominica the GPS predicted that we would arrive in Dominica early on the Tuesday morning.

During the day Roger and Bob gave lectures on IOTA. Rusty W6OAT, presented a talk on operating practices and the management of 'pile-ups'.

Some of the places we were to visit could cause a pile-up to form on the bands. This can be a bit un-nerving to the inexperienced operator.

I went to the wine tasting lecture, whites and reds, from Chile to the Philippines, what to see and what to buy and where to shop. A lot more interesting than radio in my opinion!

Some of the party again operated for most of the night on 7MHz and experienced great propagation world-wide.

Dominica is a verdant, mountainous, island very dependent on the banana trade. The operating location was at a beach club on a long beach of dark sand.

It was hot and humid and it even rained for a very short period. The sea was very warm, about 28°C. The stations were set-up right on the beach, field day style.

Propagation conditions were poor with 14 and 18MHz closing towards late morning, but between about 2 and 3 o'clock the bands improved. Bob operated mainly on 14MHz and after working a string of 'W' stations Ray G3RGD, called in.

I soon realised that propagation must be poor when I saw some of the party, including Roger G3KMA, taking a swim in the sea. A group of us took a bus down to Roseaux. This involved a drive down the western side of the island with spectacular scenery.

At the end of each afternoon during the cruise we had a lecture. On Tuesday, Gordon WB6NOA, gave a talk on trans-pacific propagation.

Gordon illustrated his talk with propagation recordings, even the call.

Setting-up the antennas ready for operation at Dominica.



The Yaesu Way



QSO of **WB6NMT** who whistled the contact because he had forgotten his key. Gordon, the owner of Radio School, has probably helped more people become radio amateurs than anyone else on earth. With 100,000 copies of his instruction tapes being sold!

Cruising To Barbados

On Wednesday, we arrived in Georgetown, Barbados. The cruising 'feeling' was getting to us and it was becoming harder to get up in the morning.

Bob had discovered that the early breakfast bar was just above our cabin. So I persuaded him to nip up and get me a cup of fresh coffee before I got up.

Carlyle Bay was the site for that day's operation. It's a beautiful beach and the stations were quickly set up in a diving and beach resort club.

Judging by how quickly the radio amateurs went down for a swim or a trip on a glass bottomed boat trip propagation must be even worse than it was before. Bob tells me he only worked three stations all day.

Lunch was the highlight of the day. This was due to the appearance of 10 local 8P6 operators and someone comments that this was probably the biggest group of 8P calls in one place ever.

The evening lecture was on programming the Yaesu FT-1 HT hand-held. We learned it's possible using the serial port that Yaesu are fitting, to load up the memories. This allows the dealer to customise the radio for every user. The radio can then even be controlled with a joystick or mouse. (This is also possible on the FT-11/41/51 series and the FT-470-530 series).

We also heard that software products such as the DX Desktop & Virtual Microphone are appearing. The probability of integrating the two so that it becomes a plug in card in your PC was also debated.

Our Thursday stop was the resort Hotel, La Ballifriere, on the south side

of Martinique. It was really first class with a pool and a private bay and beach.

The amateur radio stations were set-up under some sunshades in the garden of the hotel, under some very



large trees. The antennas were perched on the edge of a low cliff with a south easterly take-off.

Conditions seemed to be a bit better. Roger was fortunate to have been issued a special call **TOOKOTA**, which caused quite a stir on the bands.

Around the middle of the day Bob had a reasonable run on 18MHz with several European stations calling in, and **G3RGD**, **G3ZEM** and **G3JOHN** were all good G signals. Bob managed to operate a few short periods.

One of the problems with a group is that the operating periods are short. Therefore Bob felt that with conditions so poor if you got an opening then you should share it with the others, especially the less experienced.

Slide Show

On returning to the ship we were treated to a slide show on the **YK0A CQWW CW** operation from Damascus. The show was in two parts, the first on the amateur radio side and the second on Syria and Damascus. This was one of the

most interesting presentations I had seen for a long time.

Rusty observed that Syria was nothing like he had expected. He felt like apologising for his pre-conceived 'western' views.

The contest station was set up in the Telecommunication HQ. The Syrians plan to make the room available for other contest groups and to encourage amateur visitors.

Much of the credit for the success of the effort must go to **Omar YK1AU**. It's hoped that as a result of the DXpedition there

will be more YK activity.

The second part of the presentation was a more general view of Syria. We could see that Damascus is a city of wide open boulevards, clean and reasonable modern. And the ancient civilisations, the ruins all largely unknown to western visitors, were spectacular.

Syria clearly has a fantastic potential for tourism as the Middle East settles down. Western dress is normal and everyone met-up in the hotel bar for the planning sessions.

After dinner we went back to the Shack and found that the 3.5MHz band was open to Europe. Herman got into the DX group at the top end of 3.5MHz and passed the microphone over to Roger and Bob.

Chip **K7JA** adjusting the Moonbounce antennas during the Barbados radio operations.

Chip **K7JA**, Roger **G3KMA** (on mic) and Milton **NX3D** handling a 'pile-up'.



Cruise the Carribean

Equipment Used

On The Ship

HF - Two Yaesu FT-1000 h.f. transceivers with automatic remote antenna tuners. Shakespeare 7m Marine verticals antennas mounted on the flying bridge about 2m above the water line. 50MHz - Yaesu FT-650 with a Ringo vertical at 22m

On The Shore

HF - Three Yaesu FT-900AT h.f. transceivers. Antennas Cushcraft R5, 18MHz mono-band vertical and an AEA Isoloop. 50MHz - Yaesu FT-650 with a 3-element Yagi 144MHz moonbounce - Yaesu FT-736 with 1kW amplifier. Antennas 2 by 10-element yagis. Also used for some satellite operation with 430MHz 2 by 12-element Yagis.

A number of UK stations were worked with reasonable reports both ways, though tropical static was heavy. We were called and worked by a number of South Americans as far south as CE8 and LU. (Good DX by any standard).

Unfortunately we were chased off the channel. Apologies to any Gs who would have liked to work us. We didn't manage to get on 3.5MHz again.

Radio Olympics

The Friday was an 'at sea day' as we retraced our track back towards the Netherlands Antilles. It was also the morning of the 'Radio Olympics' events to test the competitive skills.

Our first 'game' was the Sea-W pile-up (audio Morse). Everyone was issued with a party tooter and drew a callsign out of the hat.

The game was to see how many calls you could 'work' in 10 minutes. To make things a bit more interesting a large number of loud horns were also issued to the non-amateurs in the group. These were QRM.

The final result was a tie between Jim K1ZX and Rich K8RWL, however Jim withdrew when it was discovered that he had sent his call incorrectly to everyone. Bob came second in this game, holding up the European end.

The next game was antenna building. Teams of two built an antenna from wire and insulators to resonate on 28460. (where else?). Roger and Bob got something wrong because theirs came out at 24860!

Our final game was the ASCII, sending c.w. from the 'throne'. Points were awarded for accuracy and style.

The style judges were Gill, Suzy N6GLF, and the ship's sound and vision engineer. And as Glenn WR60, had bribed the judges before he started to send then the outcome was never in doubt! This ended a

great morning and one which had caused great amusement.

Highlight of the afternoon was a visit to the ship's hridge where we were shown round by the navigating officer. The Magellan GPS is used these days but I was quietly pleased to hear him admit that he checked it every hour using the old methods and plotted the course on a chart, 'just to be sure'.

The ship had started life as the Shaw Savill Line's *Southern Cross*, and was built in Belfast in the 1950s. The quality of the workmanship was very evident on the bridge and all of the original equipment was in perfect working order and was tested every cruise as emergency back up. This was just as well as we were crossing one of the deepest parts of the Caribbean at 5040m deep!

Later in the afternoon Bob went to hear Chip talk about DXing with a 'quiet sun'. However, he stopped by the Shack and found one of the operating positions was vacant.

Bob fired up on 18MHz c.w. and found that he had hit a good European opening. G3PLP and G3NOF (one of PW's keen Dixer's) were really quite outstanding signals.

We arrived early in Curacao on the Saturday. Operations were from the Holiday Inn with a superb pool and beach.

We set-up the equipment, again right on the sea edge with with the 18MHz antenna off-shore so to speak. Conditions sounded rather better on 14 and 18MHz with quite a few US stations audible, many of whom were preparing for US Field Day. Propagation was a searchlight pattern, with very strong signals over limited area, continuously moving around.

Many of the us took advantage of the Hotel bus to visit the shopping in the centre of Williamshurg. It made a change!

The 50MHz band was still dead and in order to create some interest Gordon offered \$100 to the first station to work him. Unfortunately no-one heard him or if they did we didn't hear them. So the \$100 was safe as Curacao represented the end of the radio operations

Farewells And Impressions

The farewell party was held in one of the cafes on board and was attended by the captain, whose father is a radio amateur and the ship's sound and vision engineer who was a VE3. All had put up with some pretty strange requests and gone out of their way to make our cruise one to remember.

A theme holiday of this type can be very enjoyable. There was plenty of opportunity to participate in all the many activities of the cruise.

You didn't have to stick with the radio programme. In fact many who had been on the first cruise in 1993 'mixed and matched' according to location, conditions and the attractions on offer.

Propagation conditions were, in general poor. But on several nights conditions from the ship were very good. The performance of the 7m whip was quite exceptional, and just goes to show how low loss marine systems can be.

The FT-1000 and FT-900 worked very well. As did the verticals on shore. The 18MHz band was the best. However, the v.h.f. results were mixed. 50MHz was the big disappointment, having a total blank.

Thanks To Yaesu

Acknowledgement and thanks must go to Yaesu for the impressive organisation of such a large group and especially for the licences. Many thanks also to the Yaesu team, Chip, Mike, Janet and Susan and Brian and Cheryl from Landry and Kling, to the captain and crew of the SS *Oceanbreeze*, the telecommunications minister in Dominica, who interrupted a cabinet meeting to authorise the J7 operation personally, to the authorities in Barbados, Martinique and Curacao for smoothing our path.

Well done Yaesu. It's nice to see one of the companies putting so much back into amateur radio, see you on the next one!

PW



Tim N8DEU playing the ASCII game on board SS *Oceanbreeze*. Many PW readers will remember the ship when she sailed from Southampton as the Shaw Savill Line's *Southern Cross*. (see text).

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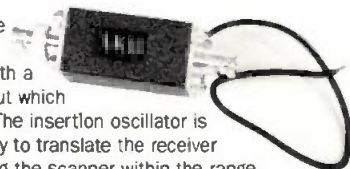
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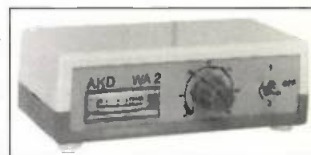
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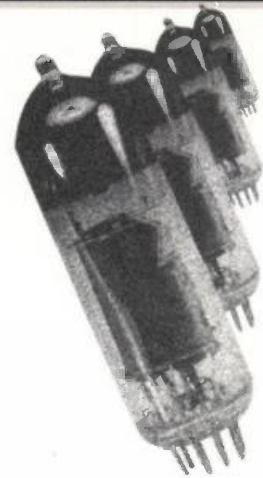
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Walve & intage



By Ben Nock G4BXD

Stand to attention! This month it's Ben Nock G4BXD's 'duty' to man the PW vintage 'wireless shop' where as usual he takes a keen interest in older amateur radio and military equipment.

Here we are again and a very happy new year to you all. I hope you got all that you asked Santa for, and that you keep those new year promises. I'm aiming to keep mine!

Further to my mention of the Arnhem Airborne museum in my August 1996 column, I visited the commemorations there in September. And along with meeting a number of veterans who operated wireless sets mainly 68 and 22 sets in the battle, there was a fine collection of military vintage vehicles. The vehicles, some Dutch and some English were brought together for the event.

The sort of event held in Arnhem, and similar shows here in the UK, provide an opportunity to see radio sets mounted in the likes of the famous Willys jeeps. as in Fig. 1. The owner of the vehicle usually has a quite good installation and they give a fine example of how these sets were used.

Unusual KW

Now I'm going to look at an unusual example of an old friend from the KW range of sets. The range included for example the Vanguard, the Viceroy, the Atlanta, the Vespa and perhaps the most famous, the

KW2000 which all served the radio amateur for many years.

One unusual version of the KW2000 - called the KW2000CA - came to light recently. And I can only assume, by its particular arrangement, Fig. 2, that it was designed for communication use in Embassies, and Consulates, point-to-point communication, etc.

Incidentally... as I do not have a copy myself I would be very interested in seeing a circuit diagram if anyone has one.

Looking internally similar to the Amateur Radio version, the KW2000CA is different in that it's fixed frequency 4 channel crystal controlled model. The crystals for the frequency selection and the sideband generation are held in temperature controlled ovens.

The required single sideband suppressed carrier is generated at 455kHz and is then mixed with a couple of crystals to give u.s.b. or l.s.b. at 2MHz. Next it's mixed with a further crystal to give an output on the wanted frequency.

Four crystal positions are available, each position on the wavechange allowing tuning of a different segment of the spectrum. When I acquired this set it was crystallised and was tuned up for use around 2.4, 3.4, 5.8 and 7.4 MHz.

Each frequency position selects a separate set of tuned coils in the r.f. and driver



Fig.2: Ben G4BXD recently discovered this unusual transceiver, the KW2000CA, a 'special' four-channel crystal-controlled version of the well known Amateur Radio KW2000 transceiver (see text).

stages. The separate p.a. (for each channel) tuning capacitors can be seen in the photograph, Fig. 3.

The nice thing on the KW2000CA is that the p.s.u. plug at the rear is the same as that on the 2000 and Vespa. And having a spare Vespa p.s.u. I tried the set out...with good results.

The crystal tuning does limit the transceiver's appeal on the amateur bands but fitting an external v.f.o. would not be too great a problem. Another thought I had was to use it on packet. Crystal the set up on an h.f. BBS station

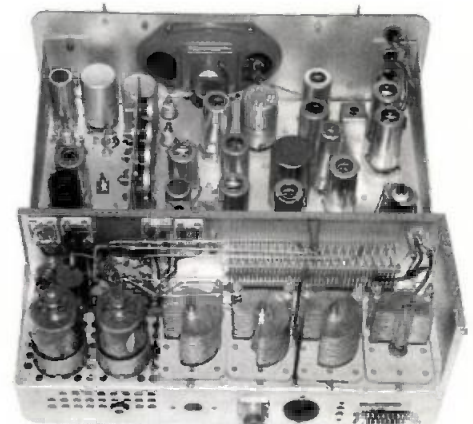


Fig.3: Inside view of the immaculate-looking KW2000CA transceiver. (Note the four individual variable capacitors for p.a. stage tuning).



Fig.1 : Arnhem...52 years on. An American Willys 'Jeep' with a Wireless Set 22 fitted.

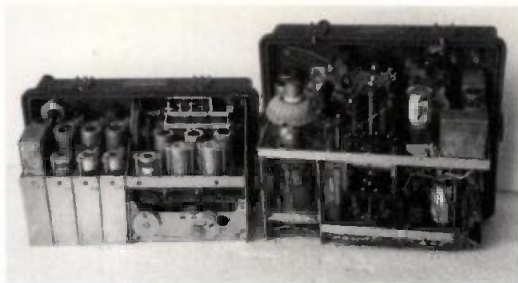


Fig.6: Inside Ben's 'mystery Marconi' transmitter (right) and receiver (left).

and away you could go. Still, if one comes along at the right price, it might be worth playing with regardless of future use.

Little Black Boxes

It's on to little black boxes now. But I'm not talking about the usual, non-descript Japanese plastic sets this time but information on small (almost clandestine) types of transceivers.

Firstly I've had a request from **Martin Wills G3ZZS**, regarding an elderly item of equipment from a now silent key. The transmitter, Fig. 4, which looks as if it should have had a matching receiver, is complete with its p.s.u., but no maker's markings or model numbers are visible.

Using a 64EX4 valve in the p.a. stage and two other smaller valves, the set is c.w. only. It looks like it covers 1.5 to 20MHz from what I can make out in the photograph. The p.s.u. seems to run of either a.c. domestic mains, or a 6V d.c. supply. (The transmitter measures approximately 11 by 4 inches).

If you have any thoughts on the set, both Martin and I will be interested to hear from you.



Fig.4: Martin G3ZZS's unusual transmitter unit - Ben thinks it looks a little like the 128 set. Can you help identify it for him? (See text)

Send to me and I'll forward it on.

Unusual Marconi

Next I have an unusual little Marconi set, Fig. 5, and this time it's one of my own finds. The numbers TVS431 are on the transmitter and RP46 on the receiver. Although the set came with an 807 in the p.a. slot, it was obviously wrong and it seems that a better fit, larger top cap, is the 2E22 valve (on the right in Fig. 6).

I have no information whatsoever on the Marconi set. So, again, if you have any knowledge, I'd like to hear from you. The picture shows the transmitter on top of the receiver, the matching p.s.u. is missing, so if anyone has one of these...I'll be interested (I'll say no more!).

Interesting Museum

I've now got details of another interesting military museum for you to visit. For those of you not already flagged out from the previous tours, it's located at Overloon, situated just off junction 7 on the A73 between Nijmegen and Venlo in the east of Holland.

The Overloon museum includes many vehicles, uniforms, planes and radios to see. There's also a very well laid out 'Japanese jungle-warfare' set to see.

The Nationaal Oorlogs-En Verzetsmuseum. (War and Resistance) site is situated in very picturesque woodland. The setting makes it so that you do not know what's lurking behind the next tree!

The bigger items, tanks, etc., are out in the trees, with a couple of buildings housing the less robust hardware. I think it's well worth the trip and a good day out if the weather's fine.

Hallicrafters Lookalike

Les Turton G0WLV, sent me a nice picture of a Trophy 6 receiver, Fig. 7, that he's seeking details on...and it's very much a Hallicrafters 'lookalike'. In fact, it looks very much like the Hallicrafters 'Sky Buddy' and 'Marine' with a similar shape, control layout, etc.

So, if anyone has any history, circuit or information on the Trophy 6 set, we would both be interested in hearing from you. Again, please write to me for onward transmission to Les.

Commonly Asked

As well as being asked where enthusiasts can buy certain items, another commonly asked question is "Where can I get information from". In answer...I'll do my best to help.

To start off, for those interested in enemy Second World sets, **Chevet Supplies Ltd.**, of Blackpool, are doing a two volume set that details some of the German, Italian and Japanese sets of the period. For information, contact them on (01253) 751858, or FAX on (01253) 302979.

And for those interested in a British line of communication receivers, and in particular valved receivers, of a bygone era, the **Eddystone Users Group (EUG)** offers a monthly magazine and a plethora of well informed members whose advice can always be sought. The contact for the EUG is **Graeme Wormald G3GGL**, and he can be reached on (01299) 403372.

And Finally

And finally...going back to my previous comment on where to buy old gear, the rally scene does seem to be getting quite poor as far as this goes. There may be several reasons but one, the relatively high cost of tables at some events, may be putting some off taking along what is in effect 'junk' to such events.

For example, there was a rally in the south west English midlands late last year, at



Fig.5: A Marconi 'mystery' transmitter and receiver set. Can you help G4BXD identify this unit? (See text).

£17.50 a table. The event was held in a smelly cow shed and might well have put sellers off what would otherwise have been a decent 'do'.

I know rally organisers want to show at least 'a break even' if not a profit, but I think they may be 'killing the golden goose'. If you get your table price right, and more sellers with small items to sell, may well be tempted to turn up.

So that's the lot...and it's time to 'fall out' till next time. As usual, I can be contacted either via the **PW** offices, or at **The Radio Room**, 62 Cobden St, Kidderminster DY11 6RP, or now, even on the **WorldWide Web**, 106312.1035@compuserve.com

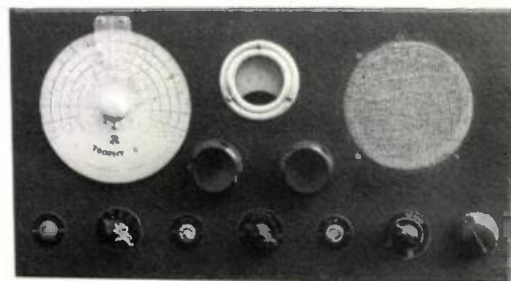


Fig.7: The Hallicrafter 'lookalike' 'Trophy 6' receiver owned by Les Turton G0WLV (see text).

Cheerio from Ben, see you in May.

Due to the fast turn around of popular secondhand items, readers should check on availability of advertised stock. In other words...if you spot something you fancy...don't delay or you could miss it!

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The Simple Two



By Barry Sowter G3NAP

Although he lives in 'Mount Nod' - a delightfully-named area of Coventry, Barry Sowter... complete with appropriate callsign G3NAP certainly isn't asleep! He's come up with a simple and effective 144MHz antenna ideal for c.w. and s.s.b. use.

It became necessary for me to erect a temporary antenna for s.s.b. or c.w. operation on the 144MHz band. So, for just £10, a horizontally polarised bi-directional antenna giving a little more than 3dB gain was constructed.

You may think that 3dB gain is not very much. But if you were using a half-wave dipole and wanted to increase your signal by that much, you would have to double your power. That could cost you a lot more than £10, especially if a new power supply was required!

Consider the following: This antenna has near omni-directional coverage, in other words, no rotator is required. It's simple to build. It's easy to erect. It's unobtrusive (no complaints from the neighbours). Little or no maintenance is required. What more can you ask of a simple antenna?

Three Half-Waves

In essence, the antenna is a centre fed dipole, three half-waves long, constructed from two aluminium elements and a commercial dipole centre, as shown in Figs. 1 and 2. When cutting the elements to length, care must be taken to measure from the dipole centre.

The dimensions given are accurate enough for the antenna to

work on. But if precision is required, and you decide to cut the elements oversize and trim, you must remember that the antenna will resonate on two frequencies.

Being three half-wavelengths on the 145MHz band, the antenna is also a half-wave dipole on one third of that frequency. So if it's cut for 145.000MHz, the antenna will also resonate at 48.333MHz. A dip meter will show only the 48MHz resonance with any clarity, so the frequency you measure must be multiplied by three for the two metre band.

There is space of over one inch between the terminals in the type of dipole centre shown, which makes it necessary to fix the coaxial cable securely in place to maintain the element length. The use of a clamp and two self tapping screws is probably the easiest way of achieving this.



Barry Sowter G3NAP's 'temporary' replacement antenna, shown at his 'Mount Nod' QTH in Coventry, proved so useful it became permanent! It also has the advantage of looking very much like a basic Band II broadcast receiving antenna.

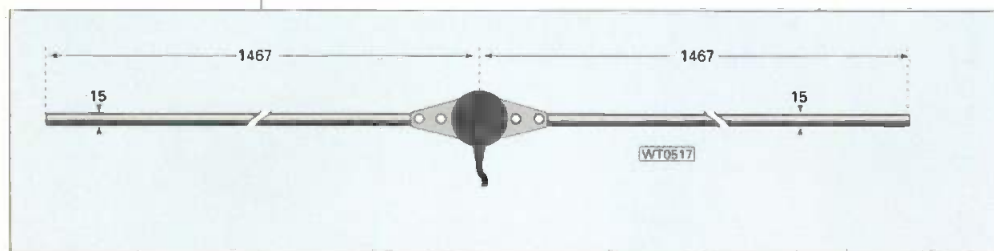


Fig. 1: Diagram illustrating the dimensions for the simple 144MHz antenna.

be constructed as shown. But to be extra sure and for the sake of interest, you may wish to cut the elements oversize and trim them, after assembly. Also, the dimensions are correct for 145MHz exactly and would be different if centred on another frequency.

In practice however, tuning on the antenna is quite flat across the whole band and it will work well enough using the quoted dimensions whatever frequency you

Setting-Up

Having positioned the antenna on a mast, the only setting-up procedure is to check for s.w.r. and to trim the coaxial cable. A s.w.r. of 1:1 can be expected at the centre frequency with very little fall off right to the band edges.

My original reason for putting up the dipole was that an eight-over-eight Yagi array, which had been in position for several years, fell down and was deemed to be scrap. Obviously, I then needed a temporary antenna until other arrangements could be made.

But the 'temporary antenna' proved tenacious! I found that the performance of the dipole was so interesting and surprising that it's been in use ever since. Fed with just 10W, it has worked into fourteen countries so far using both tropospheric and Sporadic-E layer propagation.

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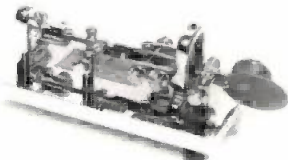
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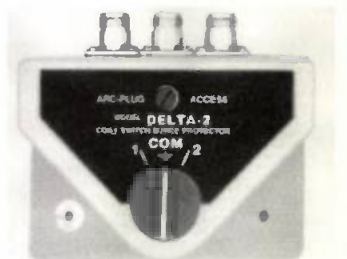
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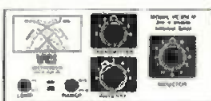
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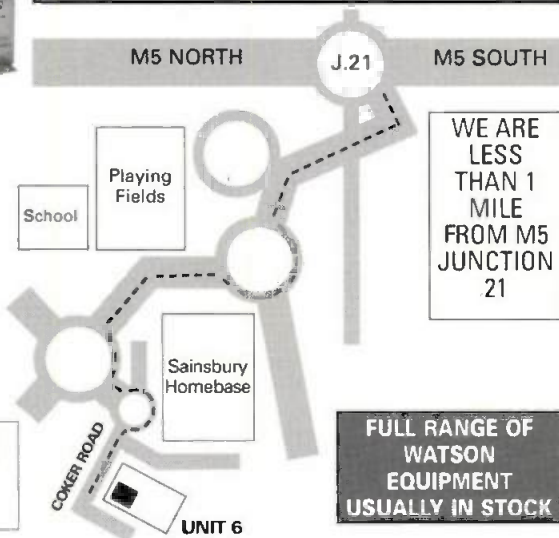
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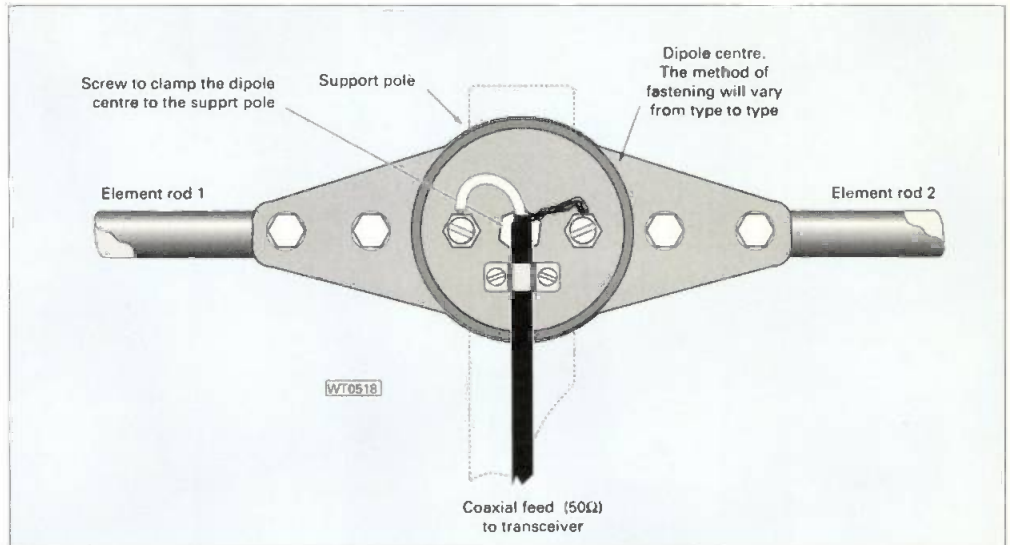
Best DX

The best DX I've managed with the antenna has been into Naples in southern Italy and into Yugoslavia by Sporadic-E and Norway in a tropospheric 'lift'. In flat conditions, it yields nearly as much as the big antenna did, although at reduced signal levels.

My QTH by the way, is not a really good one as there's rising ground in almost every direction. So living in 'Mount Nod' isn't really a big advantage.

It would be possible to discuss the antenna at great length, as is always the case with antennas. And no doubt much would be said about matching and balance in the process.

In this case, the cable I've used is the same 50Ω coaxial cable that fed the old antenna, even though the impedance should be nearer 75Ω.



Also no balun or any other balancing system has been used. Despite that, the cable and antenna system as it is gives a good match at the transmitter.

So, what started out to be a 'quick fix' to cover for a fallen

beam antenna has proved to be a very interesting and useful project. And if you need a quick fix or a low cost solution to an antenna problem, or need a low profile antenna, why not give it a try?

PW

Fig. 2: Close up view of dipole centre (see text reference impedance).

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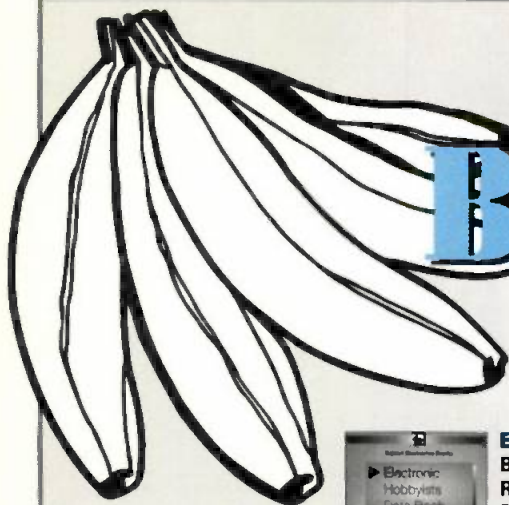
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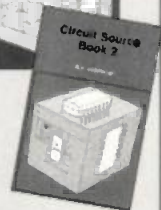
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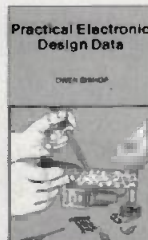


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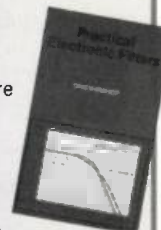


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BITS & BYTES

Mike Richards G4WNC brings you his monthly update from the computing world and starts off with 'finger printing'.

First this month I'm going to start with Finger printing and no, I've not started on the wrong subject! This application of computing has a lot of potential both in commercial and amateur radio.

The system of finger printing, as it's been developed so far, can operate on any signal that puts-up a steady carrier during its transmission, i.e. a.m. and f.m. signals. From an amateur radio viewpoint the system's main application is for tracking and eliminating interference from illegal transmitters.

In the US the system has been used by repeater groups to bar certain transmitters from access to repeaters. This is a very practical and comparative simply way to overcome what is normally a very thorny problem. So, how does the system work?

The application I've looked at is the one produced by **MoTron** in the US and is based around the use of a dedicated board that fits into a standard IBM PC expansion slot. The plug-in card links to an f.m. receiver's discriminator and the voltage at this point is sampled, digitised and stored.

The leading edge of the transmission is then captured, stored and displayed on the PC. The system can also store many other parameters such as peak deviation, DTMF data and spectrum occupancy information. All this information is then put together to build the individual fingerprint for the transmitter.

Once you have all the information it is then comparatively easy to build a link between a repeater and the PC to check whether or not a particular station is to be allowed access to the repeater. You could also adapt the system and set it up to look out for particular stations and raise some form of alarm.

This system could be a handy,

but expensive way of looking out for friends on the calling channel. Nevertheless the system looks to be very powerful and may well appeal to repeater groups in the larger cities.

If you are interested and want more information the only supplier I'm aware of is **MoTron Electronics** in the US they can be contacted by 'phone on (541) 687 2118 or FAX: (541) 687 2492. If you have Internet access they have an interesting web site at <http://motron.com>

AMTOR Tutorial

Continuing in my line of tutorials on digital communication systems, this month I'm going to take a look at AMTOR. Although many past users of this system have now moved on to PACTOR, it's appropriate to take a close look at this system as many of the fundamentals are carried forward into PACTOR.

very poor reliability due to its susceptibility to interference.

It is RTTY's simplicity that let it down because there's no way that the receiving station can tell whether or not the received data is correct. As a result, bursts of interference will be treated as valid data and included in the resultant message.

What also frequently happens is the interference is seen as a shift character and the message suddenly turns to all numbers instead of letters. Anyone who's used RTTY in anger will be familiar with this problem.

As you can imagine, trying to get a message through under poor conditions could be extremely frustrating and limited RTTY's commercial usefulness to very reliable radio links. What was desperately needed was some form of automatic error correction that



Units like these are available for receiving and transmitting AMTOR.

Although known as AMTOR amongst the amateur radio fraternity a very similar system known as SITOR has been in regular use in maritime radio systems since the 1970's. As with many digital systems the names SITOR and AMTOR are acronyms for **Simplex Teleprinter Over Radio** and **AMateur Teleprinter Over Radio** respectively.

Let's start with some background to the development of AMTOR and why, indeed, it was needed at all. Although good old RTTY was well established and simple to operate, it suffered from

would give some immunity to interference and give some assurance that a relatively error-free message would get through.

This was the key to the development of the commercial SITOR system which was subsequently adapted by **Peter Martinez G3PLX** to produce the system we now know as AMTOR. I remember buying and using one of the very early AMT-1 boards. Although all the timings and interactions of this mode can get quite complicated, the basic principles are really very simple.

Fig. 1: FEC Message Sequence

Original Message = hello readers

FEC Transmission = h~e~l~lH0E rLeLaOd eRrEs~A~D~E~R~S

Note: For clarity I've shown the repeated message in capitals and used ~ to represent the idle characters.

Automatic Repeat reQuest

Let's start with what's known as Mode A or ARQ (Automatic Repeat Request). The AMTOR equipment or software takes the message to be sent and breaks it up into groups of just three letters at a time. These are then sent to the transmitter and, when complete, the system switches back to receive to await a confirmation of the receipt signal from the distant station. If all is received okay, the transmitter then sends the next three characters and so on until the complete message has been sent.

It's the repetitive bursts of data that give AMTOR its characteristic chirrup-chirrup sound. If you've followed me so far you're probably wondering how on earth does the receiving station know if the message has been received without error.

The secret lies in the use of a special telegraph alphabet. Whereas RTTY uses the 5 bit International Telegraph Alphabet number 2 (ITA2), AMTOR uses a completely new 7-bit alphabet that conforms to CCITT Rec. 476. The special feature of this alphabet being that each character uses a combination of 3 spaces and 4 marks.

The use of a 3:4 ratio is specifically to provide a simple, yet effective, form of error correction. The process is very simple and goes like this.

At the receiving end of the radio link each character is checked to see if it has this 3:4 ratio, if it does it's accepted, if not it's discarded and marked as an error. The distant station will then send a repeat request to indicate that the sending station needs to repeat the last block. It's really that simple, but in practice it's proved to be remarkably effective.

I've used AMTOR for many years, my first introduction being

back in the 1980's when I built an AMT-1 unit to connect to my Ohio Superboard (6502 based) computer! I had many very successful contacts with this set-up and used to delight in turning the transmit power as low as possible to keep the link alive. I was frequently amazed by the overall reliability of the system and was able to reliably work into Argentina with just a few watts.

Although all this switching from transmit to receive sounds very longwinded in practical systems it all happens very quickly. In fact the original systems were designed to link to the international Telex network that operated at 50baud. This was achieved by increasing the data rate to 100baud to allow time for the distant end to acknowledge receipt.

Forward Error Correction

The second AMTOR mode is known as Mode B of FEC (Forward Error Correction) and was designed specifically for broadcasting messages to lots of stations. In the amateur radio world FEC is used primarily to put out CQ calls.

The FEC mode uses the same alphabet as ARQ but clearly can't rely on receiving an acknowledgement from each receiving station! Instead this mode sends each three letter

group twice, the second transmission being delayed by three characters as shown in Fig. 1.

At the receiving station the AMTOR equipment again checks for the 3:4 ratio and tries the second group if it hits an error. Although this is not as good as mode A, it's still significantly better than RTTY.

Another important point about the make-up of AMTOR signals is the use of synchronous data, as opposed to the asynchronous system used for RTTY. So what's the difference?

In an asynchronous system each transmitted character is wrapped-up with a start bit at the front and a stop bit at the end. This makes it very easy to join a transmission part way through but is very wasteful as 2.5 bits serve no useful purpose.

With a synchronous system, such as AMTOR, each character is sent one after the other with no start and stop bits. This does make the mode slightly more difficult to monitor, but is very much more efficient.

Another important characteristic of synchronous signals is that data needs to be sent all the time. As there are obviously gaps in everybody's typing the AMTOR system inserts a couple of Idle characters known as alpha and beta to fill in the gaps.

I hope this brief explanation of AMTOR has helped you to see it's uses.

Audio Spectrum Analyser

Just as this month's 'Bits & Bytes' was going to press I came across a brand new program that will interest all PC users that have a SoundBlaster system. The program is called SbFFT by Kevin McWilliams KW5Q and is a spectral display and filtering program for SoundBlaster 16 and compatible systems.

The program looks to be very impressive and features bandwidths of 2, 4, 8 or 16kHz and can display spectral resolutions of 1 to 16Hz. You can also define a wide range of filters and set the parameters graphically using the mouse. As if all this wasn't enough, it's being distributed as copyrighted freeware!

I'll cover the program in more detail in a later column but, if you want to locate it on the Internet, the file name is [sbfft1.zip](#).

That's all for this month. Don't forget if there's anything you'd like me to mention in this column send your letters, ideas and suggestions to me **Mike Richards G4WNC, 'Bits & Bytes', PO Box 1863, Ringwood, Hants, BH24 3ZD.** E-mail: mike.richards@diat.pipex.com or visit my Web site: <http://dialspace.dial.pipex.com/mike.richards/>

END

Bits and Babanis

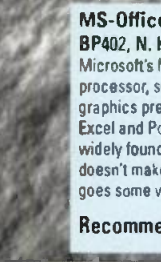
As we work on this magazine it's not yet Christmas, and by the time you read this the shops will be selling Easter eggs. But many of you may have had a computer from Santa (although I bet he made you pay for it), and if you're new to them, just where do you start? As almost every new computer is likely to be an IBM PC or 'clone' I've picked out six books that I think will complement your new 'toy'. You may also be toying with the idea of going on the 'web' or Internet, but what is it? What can it do? And to help I've found a book that goes part way towards answering those questions as well. **G1TEX**



MS Works for Windows 95 explained

BP405, P. R. M. Oliver and N. Kantaris. Microsoft Works has always been the forgotten smaller 'brother' of MS-Office. But it actually has more components, it's a word processor, the database is built-in and there's also Microsoft Draw. In addition, a communications (serial port) program is included in the suite of programs. Learn how to use and integrate the various components of Microsoft Works within the 170 pages.

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MS-Office one step at a time

BP402, N. Kantaris and P. R. M. Oliver. Microsoft's MS-Office suite of word processor, spreadsheet calculator and graphics presentation tool. Microsoft Word, Excel and Powerpoint may be the most widely found Windows programs, but that doesn't make them easy to use. This book goes some way to redressing the balance.

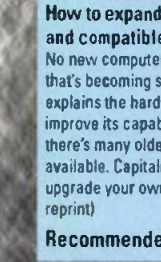
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Access 95 one step at a time

BP408, N. Kantaris and P. R. M. Oliver. Add Access 95 database program to the MS-Office 95 suite of programs, and you've created MS-Office Professional. This book, of 115 pages, takes you through creating, updating and querying data in a database form with the Windows 95 Version of Microsoft Access.

Good database starter book. £5.99.



How to expand, modernise and repair PCs and compatibles

BP271, R. A. Penfold. No new computer from Santa - just the old one that's becoming somewhat 'tired'. This book both explains the hardware you have and how to improve its capabilities. With the rush to upgrade, there's many older but perfectly working 'bits' available. Capitalise on these cheap items to upgrade your own PC, but cheaply. (160 pages 6th reprint)

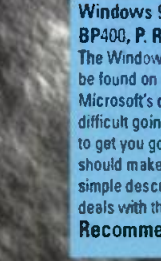
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The Internet and World Wide Web explained

BP403, J. Shelley. One hundred and thirty pages of easy explanations of the many new terms to be encountered when you start looking at the Internet and World Wide Web (WWW). Starting from the simple idea of a computer network, this book leads you through what to expect and what software you'll need to get going on the WWW.

Excellent starter book. £5.95.



Windows 95 explained

BP400, P. R. M. Oliver and N. Kantaris. The Windows 95 operating system is likely to be found on your new system, but somehow Microsoft's documentation is just a bit difficult going. What you need is something to get you going on getting going. This book should make it easier in its 170 pages of simple descriptions of how Windows 95 deals with things.

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VHF REPORT

David Butler G4ASR has details of significant changes to both the 50 and 144MHz band plans. There's also reports about band conditions and news from other European countries.

First up I'll take a look at what's been happening recently on the v.h.f. bands. Nigel Booth, a s.w.l. from Norwich, has sent in a report about the 'lift' in conditions on the 144MHz band during October.

Nigel describes his station as very modest, consisting of a Steeplestone MBR7 receiver and an antenna made from wire wound helically onto a section of plastic pipe. Not surprisingly with this set-up he can only hear local stations but on October 24 he heard PD0RMD, PD0RYV and DC2JWR.

Nigel asks whether this was tropospheric propagation or perhaps Sporadic-E (Sp-E). Well, Nigel the answer to that question is that it was most definitely tropo.

The distinguishing features of tropospheric propagation and Sporadic-E are completely different and I'll take a brief look at some of them. Simply put, a lift in tropo conditions will enable you to hear distant stations, up to 1000km or more, that you don't normally hear.

The strength of semi-local stations (inter-UK for example) will also be increased. However, with Sp-E (at 144MHz) you will only hear DX stations located well in excess of 1000km, normally 1500-2000km.

Under normal circumstances you will never hear stations less than 1000km from your QTH. Another feature to note is the length or duration of the opening.

Sporadic-E events may last tens of minutes, sometimes two or three hours if you're really lucky. Tropo openings on the other hand can last many hours extending sometimes for weeks at a time.

The time of year is also very important. You will never hear a Sp-E opening on the 144MHz band in October. Normally, it will only occur during the months of June and July. Tropo openings can occur at any time of the year, usually when a high pressure weather system is situated over the top of the UK.

The good tropo conditions that I mentioned last time as occurring between October 22-24 developed again at the end of the month and continued into the first few days of November. Lee Adams G4RKY (JO01) reported hearing the beacon stations DB0FAI (JN58), EA1VHF (IN73) and HB9HB (JN37) on the

144MHz band during the evening of October 30.

On November 1 Lee heard OK1AFQ/P and OK1KVK/P (both in JO60) and OK1AGE/P (JO70). Unfortunately, the good tropo conditions declined with the approach of the IARU Region 1 144MHz contest on November 2-3.

There were still a few DX stations being worked from the UK but generally conditions were not ideal. Among the stations noted were HB9RDE (JN37), F6DRO (JN03) and F6HYE/P (JN36). Propagation picked up again on November 16 with the station of GW7SMV (IO81) hearing HB9RDE and some nearer continental stations all peaking 59.

Conditions on the 50MHz band during November were generally depressing. There was however one Sp-E opening on November 10, an unusual event so late in the season.

The 50MHz band was open between 1000-1400UTC to stations located in ES, I, OE, OH, OK, OM, SP, S5 and 9A. Some minor auroral openings were noted on November 13-14 but very little DX activity was spotted. The event on November 13 did reach the 144MHz band allowing GM stations to work into DL and PA.

Last time I mentioned that trans-equatorial (t.e.p.) openings had been observed on the 50MHz band in the UK on September 28-29 and October 16. (I've subsequently been informed that 7Q7RM worked G1KTZ, G3IMW, G3ZYY and G6ION in the opening on September 28. All stations being located in the south-west of England).

Following on from those reports I have received news that CX8BE (Montevideo, Uruguay) made t.e.p. contacts on October 22 with WP4ARJ (Puerto Rico) and TI5NLE (Costa Rica). In Australia VK2BOD reports that their Sp-E season has started again with contacts being made in early November with stations in ZL2 and ZL3. It's good to see that there's still some life left in the band even at the bottom of the solar cycle.

International Conference

At the Region 1 International Amateur Radio Union (IARU) conference held during October 1996 a number of important changes were

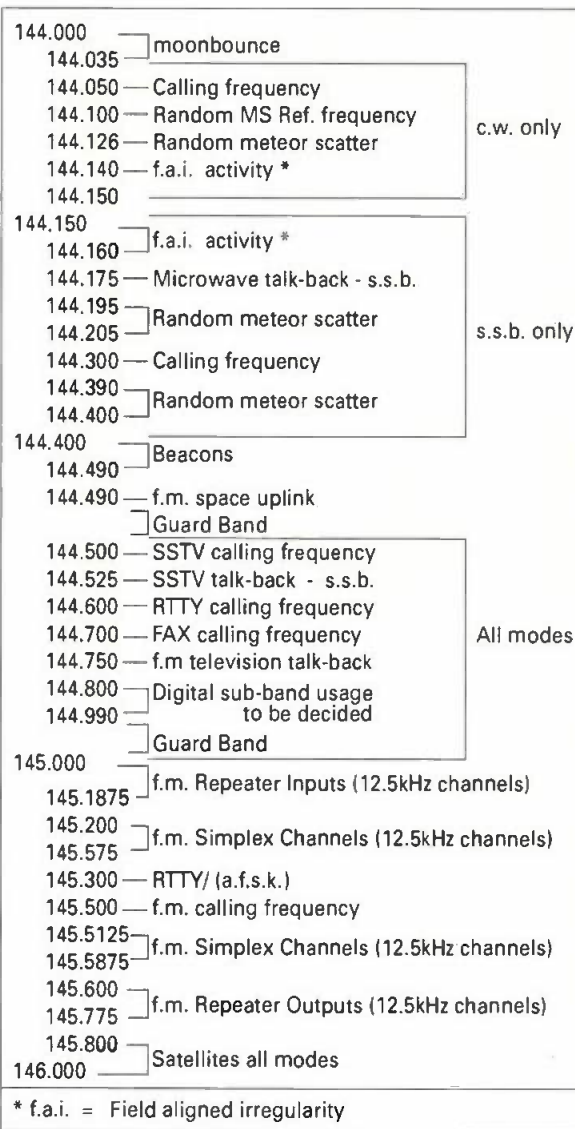


Fig. 1: 144 - 146MHz Band Plan (see text).

made to some of v.h.f. band plans. (Region 1, by the way, covers Europe, Africa and a large part of Asia).

The use of the 50MHz band for repeater operation in the UK has been very slow to get off the ground possibly due to constraints made by the primary user of the band. To speed the process the RSGB

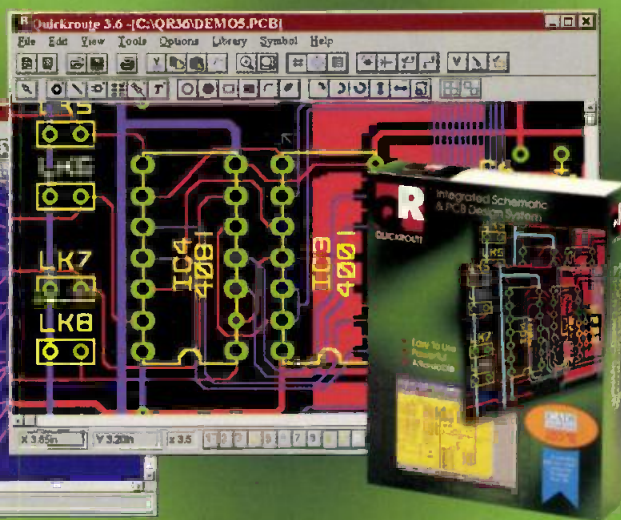
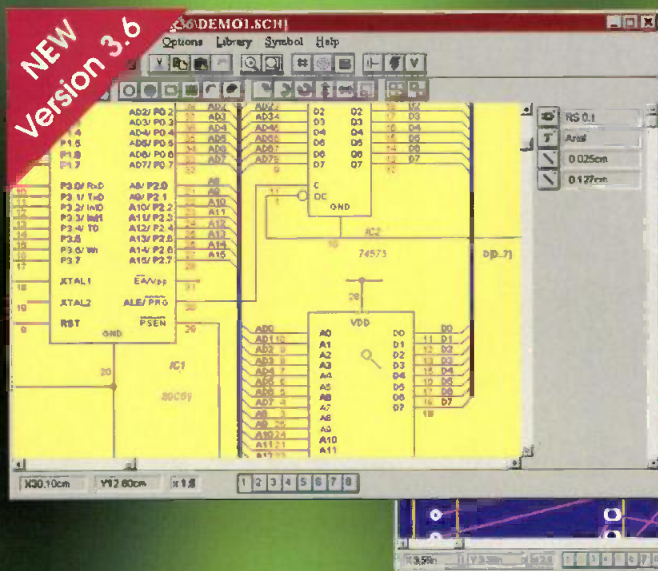
proposed that, in the UK, the repeater output frequencies should be some 500kHz lower than the agreed IARU plan.

The conference accepted the change allowing repeater inputs to lie between 51.210-51.390MHz and outputs between 50.710-50.910MHz. A change to the 50MHz band plan, affecting all of IARU Region 1, was to



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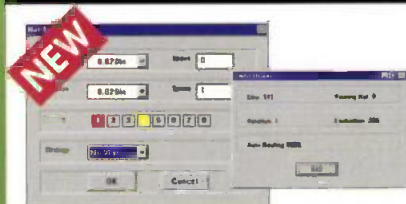
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replace the national s.s.b. calling frequency on 50.200MHz with a centre of activity based on 50.150MHz. The aim of this move is to encourage operators to move away from the 50.110MHz international calling frequency.

As an aside it should be noted that the whole question of s.s.b. calling frequencies is problematical. In the USA, for example, the **Six Metre International Radio Klub, SMIRK**, have just agreed to recommend that their national calling frequency be moved from 50.125 to 50.200MHz to match that in Europe! My personal view is that moving a national calling frequency to within 40kHz of an international calling frequency is going to create even more chaos than already exists.

Another change that was agreed at the IARU conference was to move the c.w. and s.s.b. meteor scatter calling frequencies to one solitary reference frequency on 50.200MHz. I better not publish my views on that decision!, but as I'll be covering the new 50MHz band plan in greater depth in the April issue I would like to hear your views on all these recommendations. Please provide your input to me by the date shown at the end of this column.

Band Plan For 144MHz

As shown in Fig. 1, the 144MHz band plan has been subjected to significant change. The sub-band 144.000-144.035MHz is now earth-moon-earth (e.m.e.) exclusive and can be used for both c.w. and s.s.b. moon-bounce contacts.

The beacon band has been reduced by 30% and will be placed adjacent to the weak signal DX section, where they are probably most useful. The beacons are expected to move during the middle of this year and will now lie between 144.400-144.490MHz. Almost 200kHz of bandwidth has been allocated to a new digital sub-band to be established between 144.800-144.990MHz.

The plan is to start the move in mid-1997 and have it completed by the end of the year. The RSGB proposal incidentally was to place the digital sub-band between 144.500-144.700MHz but this was not agreed.

The changes to both beacon and digital sub-bands has created a 300kHz all-mode section between 144.500-144.800MHz. Existing specialist frequencies have been

retained (SSTV, RTTY, FAX) and a new one for s.s.b. television talk-back on 144.525MHz has been added.

Although the exclusive satellite allocation, 145.800-146.000MHz, remains unchanged some additional frequencies have been allocated for operation with manned spacecraft. An uplink frequency on 144.490MHz has been allocated for communication with the Space Shuttle and the planned International Space Station. Although the allocation is at the top of the beacon band it was the only frequency that could be used within the three IARU world regions.

One of the biggest changes to be made is that a true 12.5kHz spaced channel system for f.m. repeater and simplex operation in the 145MHz band will be implemented. The changeover will commence on January 1 1997 and is expected to be completed by January 1 2000.

Generally speaking only two items need changing in your existing f.m. equipment. Your transmit deviation must be altered and this is simply accomplished by adjusting a pre-set potentiometer somewhere inside the rig. (It must be easy because thousands of packet radio stations did this when first setting up their packet radio stations!).

The second item that needs changing is the receive i.f. bandwidth filter. This will take much more effort and in my opinion is unlikely to be carried out by the majority of stations. However, if you can put up with some adjacent channel interference, most current f.m. transceivers will remain usable without any receiver modification.

Tone Systems

Two other Conference decisions worth noting were associated with the application of tone coded access and a new channel numbering system. The use of a continuous tone coded squelch system (c.t.c.s.s.) as an alternative or an addition to the standard 1750Hz tone access for v.h.f. and u.h.f. repeaters will be encouraged. The aim of this is to reduce inadvertent interference by users to repeaters using common input frequencies.

A list of standard c.t.c.s.s. frequencies have been adopted so that compatibility between repeater systems in different countries can be maintained. The principle of c.t.c.s.s. is that in addition to the normal voice

modulation a sub-audible tone is also continuously transmitted.

A user, maybe located between two repeater service areas, will therefore only activate the particular unit which accepts the users c.t.c.s.s. tone. The current system of channel numbering for n.b.f.m. and digipeater channels on the 50, 144 and 430MHz bands (e.g. S22, RB1) will be replaced by a new uniform designation system.

The letter 'F' will be used in the 51MHz band, 'V' in the 145MHz band and 'U' in the 430MHz band. I'll give more details of this next time.

National Changes

A number of national societies have recently reported changes that have been made to their v.h.f. and u.h.f. bands. In October 1996 all Bulgarian (LZ) radio amateurs were granted access to the 50MHz band.

Bulgarian radio amateurs are allowed, on a secondary basis, to operate between 50.100-50.150MHz with an output power of 5W. The negotiations for this authorisation were carried out by **Rumen Getchev LZ1MS**, who is both the Bulgarian Vice Prime-Minister and President of the national society (BFRA).

The Italian society (ARI) has also recently obtained changes to their 50MHz permits. All licence classes, including no-code v.h.f. operators (IW) can now operate on the band.

Additionally the band, previously a 12.5kHz slot centred on 50.156MHz, has been changed to a full 1MHz between 50.0-51.0MHz. The output power has been raised from 10 to 300W and no restrictions have been made to antenna size or gain. Repeaters, robot stations and packet radio BBS are not allowed however.

Previously there were very few operators in Romania (YO) with a permit for the 50MHz band but the good news is that all YO operators have now been granted permission to use the band. They will be allowed to operate between 50.0-52.0MHz, any mode but power restricted to 20W e.r.p.

In June 1997 the situation will be reviewed when it is expected that some restrictions will be removed. According to the Austrian society OVSV operators on the 50MHz band are now allowed to use up to 100W p.e.p. into a horizontally polarised, directional antenna.

Vertical and omni-directional antennas are not permitted in Austria. Some previously restricted

areas around the capital Vienna have now been eased resulting in increased activity from this location.

Gert PDOHCV (JO31) passes on the news that all Dutch Novice licence holders (PD) now have new frequency allocations within the 144 and 430MHz bands. They are allowed to run 25W output between 144.110-144.130 (c.w.), 144.440-144.490 (c.w. and s.s.b.) and 144.992-145.795MHz (c.w. and f.m.).

Unfortunately, the 144.440-144.490MHz allocation now clashes with the new beacon allocation! On the u.h.f. band they are allocated 430.00-432.500 (c.w., s.s.b., f.m.) and 433.392-433.583MHz (f.m.).

Apart from Novice licensees all Dutch operators are now allowed to use up to 400W p.e.p. on the 144 and 430MHz bands. Previously they were restricted to 120W p.e.p., this being the power incidentally that they are allowed to use on all bands from 1.3GHz and up.

Incidentally you may be interested to know that in liberalised Denmark holders of the highest licence class can now run up to 1kW output on all bands from 1.8 to 430MHz. From 1.3GHz and up they are restricted to 250W output.

QSL Bureau

In his letter s.w.f. Nigel Booth asks how he can send QSL cards to v.h.f. stations when he doesn't know their address and is not a member of the RSGB. The rule regarding non-members of the RSGB is that licensed UK amateurs may send stamped addressed envelopes to their sub-manager for collection of their cards, but they may not send cards for distribution.

I'm not sure what facilities the **International Short Wave League (ISWL)** have for outgoing QSL cards, so the only option for Nigel is to send the cards direct. For stations located in the UK it's a simple matter of looking up the address in a recent edition of the RSGB *CallBook*.

If the station is located outside of the UK then it's necessary to obtain a copy of an international callbook. A local h.f. DX'er or radio club may be able to help you here.

In Nigel's specific case he was looking for the addresses of **PD0RMD** and **PD0RYV** who, being newly licensed Novice operators, would probably not appear in any recent listings. Are there any Dutch readers of this column who can help?

I should at this stage remind listeners that their QSL reports should contain sufficient information to be of genuine value to the transmitting amateurs concerned. Don't forget the common courtesy of enclosing a self addressed envelope (s.a.e.) and some form of return postage such as an international reply coupon (IRC) or a one Dollar bill.

Deadlines

That's it again for another month. Don't forget to start making your list of locator squares, counties and countries that you have worked on the v.h.f., u.h.f. or s.h.f. bands.

Entries for the 1997 table can be for any mode and although intended for direct point-to-point terrestrial QSO's you can include contacts made via satellite as long as they are entered as a separate listing. Please forward any news, views, comments or photographs to reach me by **Saturday 1 February 1997**. Send them to me at **Yew Tree Cottage, Lower Maescoed, Herefordshire HR2 0HP**.

You can also contact me via packet radio @ **GB7MAD**, the UK DX Cluster @ **GB7DXC** or E-mail via **davebu@mdlhr1.igw.bt.co.uk** Alternatively you can telephone me on (01873) 860679.

END

HF FAR & WIDE

Leighton Smart GWOLBI delves into his postbag to find out what you've been up to on the h.f. bands.

Well here we are, into a brand new year. And I send greetings for a happy and prosperous new year to all readers!

I'm hoping that 1997 will show an increase in sunspot activity. Some reports I've read have suggested that the new cycle started back in late summer, but others have stated that mid-1997 will see the cycle beginning.

Whatever the case may be, I'm sure that h.f. devotees will be anxiously awaiting an increase in propagation this year. And although as our reporters logs indicate, there's still DX to be had...it just means that you have to look a little harder for it sometimes!

Here's The News!

And here's the news! To start off I've culled from the pages of the RSGB's *DX Newsheet*, information of 3.5MHz activity from Swaziland.

John 3DA0CA is operational daily from 0300UTC on 3.511MHz listening 1kHz up. John uses a 'sloper' antenna and 500W output.

Next, a report that FT5ZG has arrived on Amsterdam Island on the 20th of November, and will be active from there for an entire year. No band details were given, but if you hook up with him, the QSL goes to F5RQQ.

Some 'Top Band' news in that Larry TZ6VV in Mali is now operational on 1.8MHz. He's active at 2300UTC Monday, Wednesday and Fridays on 1.833MHz±, listening 2kHz up. (QSL to AA0GL).

And finally there's news for those waiting for cards from ZV0MB and ZV0MV from Trinidad and Martin Vaz islands (Brazilian Islands). The pair made 2100 contacts during their 40 hour operation, and there will be some delay with the QSLs. Hopefully you may have received them by now. But if not...you have been advised so please be patient!

Your Reports

Your reports this month start with

Carl Mason GW0VSW in West Glamorgan. He's been 'doing a bit of both' on 3.5MHz, for a change, utilising the microphone a little more.

Carl's s.s.b. contacts here, using 90W into a simple G5RV dipole, include OZ1KW (Denmark) and YO3LEA (Romania) both at around 2300UTC. While his c.w. (again at 90W) netted him EV6M in Vitebsk at midnight, and UA9FQY (Asiatic Russia) at 1840UTC.

The 7MHz Band

It's up to '40' now to read the 7MHz band report from **Ted Trowell G2HKU**. He says that "conditions have improved with the darker evenings" and the report certainly backs this up.

Ted's 70W c.w. reached out to VK8AV in Alice Springs, and OY2H (Faroe Islands) at around 1500UTC. While at around 1800 he contacted 5N3/SP5XAR (Nigeria), EA9PB (Ceuta & Melilla, N. Africa), and VO1HP (Newfoundland).

I now extend a warm welcome to new reporter **Larry Stringer G4GZG** of Essex. He works mainly c.w. using around 100W output and a centre fed 33m (86ft) dipole.

Larry's huge log lists contacts on 7MHz with JR5DBO (Japan) at 1905, BY4AA (China) at 1935UTC. Then he logged EZ8AI (Turkmenistan) at 2008, VK8AV (Australia) at 2008, EM1U (Antarctica) at 1949, and 7Z500 (Saudi Arabia) at 1727UTC.

Now it's on to **Charlie Blake MOAIJ**, who by now may have sorted out 'antenna business' with the local authority in Milton Keynes. Fingers crossed, Charlie!

Still in the s.w.l. mode for the time being, Charlie's log includes s.s.b. reception of KG4QD (Guantanamo Bay). This station was in contact with YV50GB in Venezuela at 0509UTC, (QSL via WA4VQD).

Also logged was HR2GVM

(Honduras) working PA0ZH at 0613, VK2CP (Australia) in contact with DL8LBP in Germany at 0638UTC. Charlie also heard PY2RIK (Brazil) working ZL2BU in New Zealand at 0533, and TI3VLM (Costa Rica) in contact with IK5ORP in Italy at 0510UTC.

The 14MHz Band

Space is very limited this month, so it's straight up to the 14MHz band. This is where it's "not been good" according to the regular report from **Oon Mclean G3NOF** down in picturesque Somerset (Yeovil).

Don's very long 14MHz list

VQ9IE (Chagos Island) at 1544, and AA4NC/CY0 (Sable Island) at 1202UTC.

The 18MHz Band

Just enough space for a very brief look at the 18MHz band now. Carl GW0VSW lists s.s.b. contacts with 7X5JF (Algeria), CU3DJA (Azores Islands) and 9K2NG (Kuwait City), while Ted G2HKU on c.w. hooked up with 9L1KA (Sierra Leone), HK7AAG (Colombia), and K4EF (USA).

Finally for this month, Don G3NOF has listed amongst others, s.s.b. contacts with

KL70TH/Aeronautical Mobile) flying over Newfoundland) at 1433 and FG5HR (Guadeloupe) at 1429 (QSL to F6BUM). Then he worked HC8N (Galapagos Island) at 1749, and V2J38DF (Antigua and Barbuda Islands) at 1438UTC.

Time To QRT

Well, that's all I have space for this month folks and

it's time to go QRT! Thanks again for your information, logs and comments. Alas, space is my only limitation, but I do what I can to fit as much as I can in, so that you all get an equal 'share'! How about some photographs so we can 'put a face to the name' eh?

As usual, I appreciate your reports to the address below, by the 15th of the month. All the best DX for now, and cheerio! Your reports to me: **Leighton Smart GWOLBI, 33 Nant Gwynn, Trelewis, Mid-Glamorgan CF46 6DB, Wales. Tel: (01443) 411459.**

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VK2XG		HOPE TO CU AGN
G. GRAY		(AUSTRALIA)

QRP reaches Australia.

includes his s.s.b. contacts with A61AN (United Arab Emirates) at 1126 and CP6CU (Bolivia) at 0934. He also worked SU3YM (Egypt) at 1649 QSL via Box 545 Port Said, 42111. Then he reports a 30 minute chat with VK6ACY in Australia, at 0800, plus 8P9Z (Barbados) and 9K2NG (Kuwait) at around 2100UTC.

I received a **six page log** from new reporter **Sean Gilbert G4UCJ** in Milton Keynes this month! We extend a warm welcome to Sean, who works exclusively 'on the key'. His log includes contacts with around 50W output into a simple G5RV antenna.

Sean worked KP5ZL (Puerto Rico) at 2216, FY5YE (French Guiana) at 1951, and EX8DX (Khrgyzstan) at 1228UTC. Also logged were J38DF (Grenada) at 1133, 9M2ZA (Malaysia) at 1716, 4K70GF (Azerbaijan) at 1028,

END

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3W in 24W out	TARP2SB	TARP4SB	TARP6SB	£76.00	£101.00
5W in 30W OUT	TARP2SC	TARP4SD	TARP6SC	£76.00	£101.00
10W in 35W out	TARP2SD	TARP4SD	TARP6SD	£76.00	£101.00



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FOCAL POINT

Graham Hankins G8EMX has news of a permanent ATV station at Bletchley Park, an ATV expedition to Skegness, microwave pictures that cross water and of a balloon that went up over Belgium.

My 'Introduction to Amateur TV' feature in the December 1996 issue of *PW* has produced several enquiries. Please keep them coming and I'll answer the common questions in April's 'Focal Point'.

Billed as 'Britain's Best Kept Secret', Bletchley Park Cryptology Museum is home to the re-built 'Colossus' - the world's first large electronic valve code-cracking computer. Yes, the original 'Colossus' preceded the American ENIAC machine by two years.

You can discover amateur TV inside Faulkner House, towards the far end of the Bletchley Park site. The **Milton Keynes and District ARC** has provided 1.3 and 10GHz facilities with monitors, camera and vision mixing available. Licenced visitors to the ATV station can access repeaters **GB3TV** (24cm) and **GB3TG** (3cm) and try out the Dual Tone Multi-Frequency (DTMF) repeater control unit.

My thanks to the museum staff for permission to the photo, **Fig. 1**. Bletchley Park is open on alternate weekends - for dates and events 'phone (01908) 640404.

Portable Expedition

Now to an expedition which operated portable ATV from a site near the east coast. The team, from Telford, had set-up on a hill about 12 miles west of Skegness.

Marty Vincent G3UKV had been working 10GHz s.s.b. phone to Ireland and **Dave Hall G8VZT** was aligning his 10 and 24GHz ATV dishes. Dave had worked 10GHz for many years, telling me proudly: "During 1993 I sent the first ATV pictures on 10GHz from Anglesey to Dublin".

Completing the team were **Jim Wakenell G8UGL**, **Tony Colton G0UJE** and **John Rawson G4ZJY**, 'driving' the 24cm (1270MHz) ATV station, camcorder and 2m (144MHz) talkback rig. The local 1.3GHz ATV repeater **GB3TN** (Fakenham) was being monitored and soon **Len Tomlinson G8ONX** appeared in vision with some 'shack shots', then colour pictures of his garden and antennas. A 28-element home-brew

loop-yagi was carrying the ATV, driven from a Solent transmitter and p.a.

Then on came **Adrian Howman G0FVF**, displaying his home-built 10GHz antenna with plastic bucket 'radome' for weather protection! Adrian cleared the repeater to be replaced by **Robert Scarfe G4TUK** in Norwich with more video from an Astex transmitter.

Everyone put out first-rate colour pictures and clear sound while we just sat back and watched TV!

Sea Ducting

Now for some news of more 'sea ducting' across to Holland. **Peter Johnson G4LXC** and **Trevor Wooding G0VUN** set-up their ATV gear for a weekend of microwave trials from Joss Bay, near Margate.

During the Saturday afternoon pictures and sound on 1.3 and 10GHz duplex were being exchanged between Kent and Holland. At the Dutch end were **Richard PE1OUP**, **Frank PE1EWR** and eventually (another) **Peter PE1DCD**. Picture quality varied between P1 (just detectable) to P5 (ideal), with a total loss of signal when ships interrupted the path.

Peter G4LXC comments: "We enjoyed over three hours of duplex ATV with PE1DCD/P, who was running 20W on 24cm and 800mW on 3cm. Good pictures were received from **PE1PSJ/P**, who was running only 300mW on 3cm".

By mid-morning the next day, PE1DCD/P had been contacted again and more two-way duplex ATV was enjoyed on 10GHz with P1-P5 pictures. At 1330UTC **Hans PE1ECO/P** sent 3cm pictures which were almost immediately up and running at P5.

Peter G4LXC was using two dishes so a duplex contact was possible with **Hans PE1ECO/P** and **PA3FXY**. Was this due to 'ducting' again? **Peter** observed: "My 3cm transmitter was running 22mW and seemed to disappear first, when ships passed. But I noted that higher power signals of 300 to 800mW did not completely cut off. Maybe the extra power produces a scattering



Fig. 1: The ATV station GB2BP at the Bletchley Park Museum.

effect around an intervening hull"? An average ship is about 10 - 20 metres high. The current theory is that a vessel blocks the low power signals and would indicate that the duct extends no more than a few metres above the surface.

To establish single or multiple ducts, **Peter** plans a return to Joss Bay, saying: "On the next trip I will position two stations. One will be at 10 metres, the other at 20 metres to see if there are any major differences - there might even be more than one duct!"

Aeronautical ATV

Now to portable or is it aeronautical mobile ATV?, from **Jean-Marie ON6FA**. **Jean Marie's** letter starts: "Hello Graham, thank you very much for your interest about our ATV experiment. *Practical Wireless* is a well-known magazine here in Belgium.

"For its 25th anniversary, the **Radio-Club du Borinage**, callsign **ON6RM**, has successfully achieved an ATV transmission from an hot-air balloon despite not very good atmospheric conditions. The balloon lifted off from 'Site du Grand-Hornu', Belgium, carrying 1W of 1255MHz f.m. PAL ATV transmission with 5.5MHz f.m. audio, feeding an Alford Slot antenna. In the basket, operating, was **Claude ON4CN**.

"The flight had authorisation for a maximum altitude of approximately 500m, but mist limited our height to only 210m. The balloon managed to keep airborne for 42 minutes, coming to a soft landing at Saint-Waast, North France.

To round off **Jean-Marie** says: "This experiment has been possible thanks to a special authorisation delivered by the Belgian Institute of

Post and Telecommunications". Many thanks for that report **Jean-Marie**.

New Zealand News

Michael Sheffield ZL1ABS packeted me a message from New Zealand: in which he says:

"Hi Graham, a new MK7 Teletext (16 page) EPROM has been fitted to the **ZL1UX** ATV repeater. These new pages list the Waikato area v.h.f. and u.h.f. repeaters and beacons, another page lists the other three ATV repeaters in New Zealand - **ZL1BQ**, **ZL2WA** and **ZL3AC**.

Michael concludes: "**Wayne Griffin ZL1UJK** says that his MK3 Teletext board supports two EPROMS, has a 5V regulator onboard and is intended to be used with an external RGB coder".

There's good news from **Mike Dixon G3PFR**, **RSGB Microwave Manager**. Following the 1996 IARU conference, the 430-440MHz UK band will be retained for the present. **Mike** points out that it is the CEPT/ERO who decide to retain the full 10MHz of the 70cm band, not the IARU as stated in October's 'Focal Point'.

All this has squeezed out the 'A to Z' for this month. So, until next time please keep those packet messages coming to @ **GB7SOL.#29.GBR.EU** or by letter to me, **Graham Hankins G8EMX**, 11 Cottesbrook Road, Acocks Green, Birmingham B27 6LE.

END

BUYERS GUIDE

AMATEUR RADIO

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

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

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

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

MODEL	COVERAGE	MODES	POWER OUT (W)	POWER SOURCE	CHARGER SUPPLIED	SIZE (HxWxD MM)	WEIGHT	MEMORIES	SPECIAL FACILITIES	RRP £approx	REVIEWED IN PW	MODEL
Alinco												
DJ-G5	V, U	F	5, 3.5, 1	B	✓	128x57x275	350g	100	C, D, E	440.00	Sept 95	DJ-G5
DJ-S41	U	F		B	x	100x55x288	185g	20	C, D	149.95	Nov 96	DJ-S41
DJ-190	V	F	5, 3.5, 1.5	B, E		151x57x27	300g	40	D	199.95	May 96	DJ-190
DJ-191	V	F	5, 3.5, 1.5	B, E	✓	151x57x28	300g	40	-	249.95	Dec 95	DJ-191
DJ-180	V	F	6, 2	B, E	✓	132x58x	-	10	D, E	199.95	Feb 93	DJ-180
Icom												
IC-T7E	V, U	F	4, 3	B, E	✓	122x57x29	320g	70	C, D	329.00	June 96	IC-T7E
IC-W31E	V, U	F	5, 7?	B, E	✓	125x57x31	340g	100	C, D	425.00	Oct 95	IC-W31E
IC-2GXE	V	F	7, 2.5, 1	B, E	✓	125x57x35	355g	43	-	255.00	-	IC-2GXE
Kenwood												
TH-22E	V	F	5, 3, 2.5	B, E	x	116.5x56x24.5	290g	40	D	254.95	Mar 94	TH-22E
TH-28E	V	F	5, 2.5, 0.2	B, E	x	115.8x49x37.8	330g	40	D	319.95	-	TH-28E
TH-42E	V	F	5, 3, 2.5	B, E	x	116.5x56x24.5	290g	40	D	289.95	-	TH-42E
TH-48E	U	F	5, 2.5, 0.2	B, E	x	115.8x49x37.8	330g	40	D	369.95	-	TH-48E
TH-79E	V, U	F	5, 3, 2.5	B, E	x	129.5x56x24.5	320g	80	AB, D, M	479.95	Dec 94	TH-79E
Yaesu												
FT-10R	V	F	5, 2.8, 1, 0.1	B, E	✓	57x99x30	325g	30	C, D, K	249.00	Nov 95	FT-10R
FT-11R	V	F	5, 1.5	B, E	✓	102x57x25.5		150	E	299.00	-	FT-11R
FT-23R	V	F	6, 2	B, E	✓	126x55x32		40		199.00	-	FT-23R
FT-40R	U	F	5, 2.8, 1, 0.1	B, E	✓	57x99x30	325g	30	C, D, K	289.00	-	FT-40R
FT-41R	U	F	5, 1.5	B, E	✓	102x57x25.5		150	E	369.00	-	FT-41R
FT-50R	V, U	F	5, 2.8, 1, 0.1	B, E	✓	57x99x30	325g	112	C, D, E, K	339.00	Aug 96	FT-50R
FT-51R	V, U	F	5, 1.5	B, E	✓	119x56x21		120	D	489.00	May 95	FT-51R
FT-530	V, U	F	5, 3, 1.5, 0.5	B, E	✓	134x55x33		82	C, E	449.00	Apr 93	FT-530
MOBILE												
Alinco												
DR-M06	H	F	10, 1	E	x	40x140x115	760g	100	C, D	339.95	Dec 94	DR-M06
DR-130	V	F	50, 5	E	x	40x140x155	860g	20	C, D	289.95	-	DR-130
DR-150	V	F	50, 25, 10	E	x	40x140x129	800g	100	C, D, E	359.95	June 95	DR-150

Keys

Coverage

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

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

Modes

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

Power Source

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

Special Facilities

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

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

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

Don't forget the PW Post Sales Department can supply back issues from **1992 - 1996** or photocopies of articles prior to 1992.

Back issues are available for **£2.30 including P&P** or photocopies for **£1.50 including P&P**.

To order call the **Credit Card Hotline** on **(01202) 659930** or use the **Order Form** on **page 78** of this issue.

BROADCAST

ROUND-UP

As well as taking a look at the broadcast bands this month, Peter Shore has also been trying out the new Roberts Radio, the R861.

A brand new radio receiver has been launched in the UK by the Roberts Radio company. The R861 is aimed at people who want a travel set and are prepared to pay a serious sum of money for a piece of kit that offers ease of operation, portability and good performance.

The new receiver costs just under £200 in this country. But I think that if you are looking for a set that is going to last for a good number of years, you'll have problems bettering an investment in this model.

However, some qualification of my statement is needed. The R861 has continuous coverage from 150kHz, the lowest broadcast frequency, to 29.999MHz, at the very limit of short wave. There is also f.m., which includes Radio Data System - or RDS.

When you tune to an f.m. station using RDS (which includes nearly all the UK's f.m. transmitters, plus an ever increasing majority of continental radio stations), the large digital display on the set provides the station's name, like 'BBC R1' or 'Jazz fm'. And if you listen using the miniature headphones that come with the radio, you'll enjoy stereo reception on f.m.

A key feature of the R861 is the 300-plus memories. Most are devoted to short wave, and many of them have been pre-programmed in the factory to key frequencies of the world's leading international broadcasters.

The designers of Robert's Taiwanese-built receiver have divided the memories into pages, just like the Sony ICF-SW55 and SW77. Nine frequencies are contained in each page, and you can turn the pages by pressing a couple of buttons on the keypad below the digital display.

Many Features

BBC World Service has three pages of frequencies stored in the R861's memory, then there are other important frequencies of broadcasters from **Radio Austria** to the Vatican. Each of the memorised frequencies can be altered as frequencies change, and there are many spare memory positions so that the user can store their own

favourite frequencies, together with a name that will appear on the display when it's selected.

There are many other features on the R861, including the usual clock/timer/sleep/alarm function. In addition, there's a clever system that converts the clock to the local time in one of 42 countries and cities around the world so if you travel, you don't have to spend ages reprogramming the set's clock to local time to be able to use the alarm every day. Add to that selectable sideband mode, adjustable r.f. gain and narrow and wide filter selection for a.m. listening, and you have a package that seems to offer a great deal.

But of course the best designed set is no use at all without associated good performance. I have had the opportunity to try the R861 out over a number of weeks, and simply using the telescopic whip antenna, I've found it pulls in even the weakest broadcast signals (you can also connect an external antenna, or use the 'fishing-line' antenna that comes with the receiver). So, I judge its sensitivity as good, and its selectivity seems to be just about right too for general broadcast listening.

Overall, the Roberts R861 - available now at around £200 - seems like a good buy for a state-of-the-art f.m. and short wave receiver.

Station News

On to station news now and **The Voice of Malta** is back on the air from transmitters in Russia. English is on the air daily, except Friday, at 1900 for an hour on 7.44 and 7.39MHz to Europe. There is also a transmission to Asia on Sundays only at 0130 on 17.57 and 15.55MHz.

Vietnam has shuttled from its summer time frequency to its winter time one. The Hanoi-based station, **Voice of Vietnam**, is now on the air on 15.01MHz, replacing 12.02MHz, at 1600, 1800, 1900, 2030 and 2330 UTC to Europe, plus a transmission to Asia at 1000 and 1230 on the same 25 metre band channel. All programmes are thirty-minutes long.

For a taste of life 'down under', try **Radio Australia**. The station recommends these times and frequencies to listeners in Europe: 0000-0400 on 15.51; 0000-0500 on 17.75; 0100-0830 on 17.88; 0600-0800 on 15.53; 0800-1100 on 21.725; 1100-1300 on 11.66; 1430-1600 on 11.66, 9.85 and 7.15; 1500-2000 on 9.615; 1800-2100 on 7.33 and 2100-

0000 on 11.855.

Channel Africa continues with its international broadcasting operations, although the station's long-term future is not fully assured. English, beamed exclusively to Africa, is on the air at:

0300-0355 on 5.955 and 3.22MHz; 0400-0455 on 9.585; 0400-0555 on 5.955; 0500-0555 on 11.90; 1500-1755 on 9.685 and 7.155 and 1600-1655 on 15.24.

Radio Bulgaria can be heard with English to Europe: 2000-2100 on 9.70 and 7.335MHz and 2200-2300 on 9.70 and 7.39MHz. The station starts each broadcast with a news bulletin, followed on weekdays by 'Events and Developments' and then a variety of feature programmes, with folk music, travel news and a cultural review. Radio Bulgaria's DX programme is on the air in the 2200UTC transmission each Sunday.

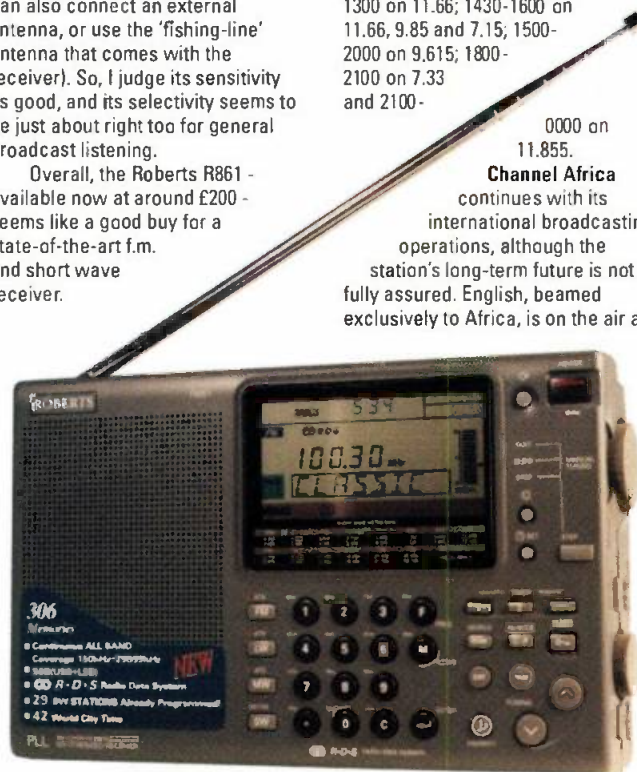
Back On Air

There have been reports that **Voice of Nigeria**, the external arm of **Radio Nigeria**, is back on the air. The station is said to have inaugurated three new transmitters supplied by a Swiss firm - presumably ABB - and a further two are due to be installed.

Try looking for the station on 7.255MHz at 0455-0700, 0900-1100, 1500-1700 and 1900-2100. Voice of Nigeria is located at **Broadcasting House, PMB 40003, Falomo, Ikoyi, Lagos, Nigeria**.

Transmission Problem

Voice of Israel was having problems with its 0500UTC transmission on 7.465MHz, but the transmitter fault which caused the difficulties are now reported to be cured. This same transmission is heard on 17.545 and 9.435 MHz. Try English at 1500-1530 on 11.605 and 9.39MHz and at 2000-2025 on 15.64, 9.435, 9.365 and 7.465MHz.



The R861 is the latest short wave receiver from the Roberts Radio company.

That's all for this month, so I'll wish you good listening until the same place in the next edition of *Practical Wireless*.

END

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ECC35	8.50	PD500	6.00	6BQ7A	2.00	12BH7A	10.00
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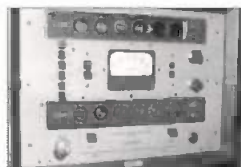
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Yaesu FT-757GX, 0-30MHz transceiver, manual, good condition, £425. Yaeu FP-707 p.s.u. with built-in ex. speaker,

good clean condition. £70. John. Devon. Tel: (01752) 482188. Yaeu FT-767GX, h.f., all-mode 6m (50MHz), 2m (144MHz), v.g.c., £750 o.v.n.o. with manuals. Tony, Sheffield. Tel: 0114-237 5565.

Exchange

Aiwa NSX 999 hi-fi, under eight months old, played only a few times, cost, £550. swap for Icom IC-R71E receiver in immaculate condition only, please help me find one. Chris, North Wales. Tel: (01492) 875849.

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Barograph in good working order, also Collins 51S1 receiver. Geoff G4ECF, QTHR. Tel: (01483) 570033.

Cabinet/Enclosure for a.m. Eddystone receiver, model EC 958/12, 7in high front panel, i.e. 4U. David, Warks. Tel: (01788) 574099.

Circuit and details for Lowe SRX30RX. Tel: Southampton (01703) 552247.

Circuit diagram for ex-Navy Murphy h.f. TX RDF, no: AP 100333. Tel: Warks. (01788) 811295.

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Eddystone 770R MkII in mint condition, your price, will collect. Mike Burlington, E. Sussex. Tel: (01892) 852817.

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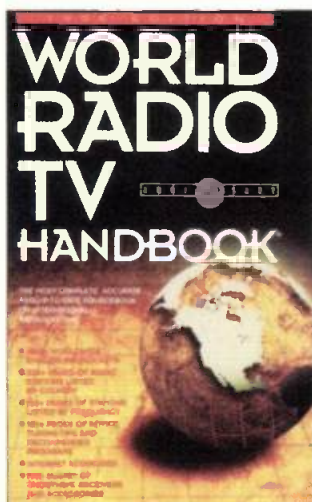
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Beat those Freezing February Blues with our selection of fireside reading.

As technology progresses, the challenge of operating on the Amateur Radio microwave frequency allocations becomes even more attractive. And as there are some excellent books on the subject we've looked some out to encourage you to go 'mad on microwave' yourself! So, take a look at what's available to help you explore this fascinating part of the radio spectrum.

The ARRL UHF/Microwave Experimenter's Manual

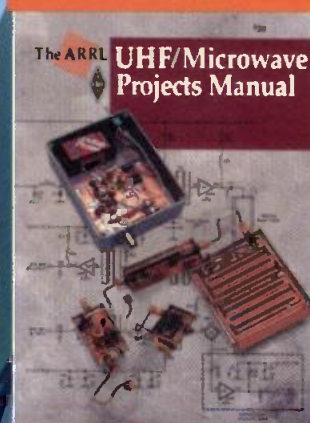


If you're just getting interested in the possibilities that Amateur Radio microwave operating can offer you, this book offers an excellent starting point. Along with covering the basics it provides a brief history of microwave operating (with an American bias of course, but none the less fascinating for that) before offering theory, practice and practical project. However, although there are some projects in this book...those that are included are aimed at helping you to experiment and use the knowledge gained in reading the book.

Covering everything from antennas, components and design - with a very great deal in between - this book provides an excellent reference source, along with a source of ideas in itself. It's also very readable, which in a technical book is a recommendation in itself.

The ARRL UHF/Microwave Experimenter's Manual is available for **£14.50** plus P&P.

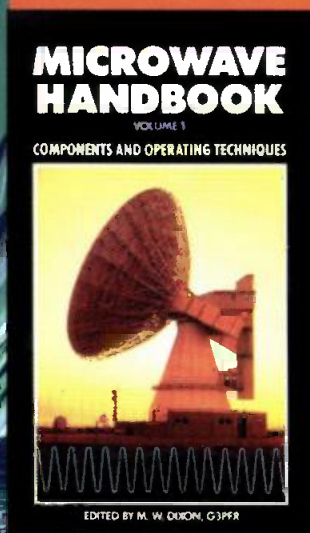
The ARRL UHF/Microwave Projects Manual



This recently published book from the ARRL has already been introduced to *PW* readers in a previous 'book profile'. But we've got no hesitation in reminding you that it's available because together with the ARRL UHF/Microwave Experimenter's Manual already mentioned on this page, it will provide a superb source of ideas and projects.

So, we at *PW* recommend that you consider buying this with *The ARRL UHF/Microwave Experimenter's Manual* books as a pair to 'launch' yourself off into microwave operating using both books as a foundation to your UHF/Microwave library. At only **£14.50** it's an affordable addition to your library too.

Microwave Handbook - Volumes 1, 2 & 3



This series of books has proved popular, especially for those who prefer the 'British' style of approach to technical textbooks. The layout, style and general approach is typically that of all RSGB books and all British readers will feel very much at home reading them.

Whereas the series could have been published in one massive volume, the RSGB took the decision to issue the books in a set of three. The result is three volumes, each consisting of around two hundred well bound and produced pages, which are convenient to handle and use and provide a most comprehensive library on the subject of microwave Amateur Radio.

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Prices for the *Microwave Handbooks* are **£10.50** for Vol. 1, **£15.75** each for Vol 2 & 3 or why not buy all three for the special price of **£32**?

Profiles

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Packet Radio Special

Discovering the world of Amateur Radio packet operation. Readers often ask us what books we've got on packet radio operation. So, if you're keen to have a go or to learn about the techniques here are some interesting titles to check out for your bookshelf.

Packet Radio Primer

PACKET
RADIO
PRIMER

Dave Coomber, G8UJZ
Martyn Croft, G8RZU



This book looks very American in style and presentation...but it's not! Dave Coomber and Martyn Croft, the authors, have made strenuous efforts to provide the reader with an easy-to-read first book on packet radio operation. And if you're interested in the possibilities of the mode their efforts will inform and amuse you - the use of the occasional cartoon helps in this respect.

Packet radio - although it is totally absorbing for those involved in the subject - is not an easy aspect of Amateur Radio to write about. But in this 'primer' the authors have explained data communication, how it works, the packet station, nodes and the network writing messages and getting files.

All in all *Packet Radio Primer* provides a very helpful guide for the beginner and for anyone needing an easy-to-read explanation of packet and the variations the mode offer, along with advice on how to use the systems. And with a price tag of just £8.95 it's affordable too!

Your Packet Companion

Your
PACKET
COMPANION

Steve Ford, WB8IMY



If you're a complete beginner, with no idea of what packet radio is, this book must surely be the one to start with. In effect it's a very concise 'idiot's guide' to the mode.

In its 168 or so pages the author, **Steve Ford WB8IMY**, has done what many others have forgotten to do - he explains it simply and in a very straightforward manner! Readers who can remember the truly excellent 'Common Core' *Basic Electricity*, etc., series will appreciate this slim volume.

Packed with good diagrams and explanations Steve even shows (in diagrams) a typical packet pathway and what happens enroute. Although of course it is very 'American' in approach, any reader interested in finding the very basics of the mode before proceeding further won't be disappointed.

A highly recommended 'starter' book for your library, available for just £5.95.

Practical Guide To Packet Operation In The UK

Practical Guide
to
Packet Operation
in the U.K.



BY
Mike Mansfield
G6AWD

Mike Mansfield G6AWD's book has established itself over the last few years and still proves popular. In ring-bound loose-leaf format it should prove useful to anyone actually working on setting-up a packet radio station.

Within its 'workshop manual' style text and in an information packed style and presentation this book has proved its worth. With sections covering packet levels, setting-up, basic command settings, radio connections (Amateur), packet satellite operation, AMTOR, CLOVER, PACTOR and Internet to Packet gateways, this book would really be justified in calling itself a 'User's Manual'.

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"Yeah, it's Mil Spec tough like a commercial HT."



"Easy to operate, small, great price!"

"Yaesu did it again!"

For the foremost in top-performing, durable, dual band handhelds there is one choice. The FT-50R. Manufactured to rigid commercial grade standards, the FT-50R is the only amateur dual band HT to achieve a MIL-STD 810 rating. Water-resistant construction uses weather-proof gaskets to seal major internal components against the corrosive action of dust and moisture. And, the rugged FT-50R withstands shock and vibration, so throw it in with your gear!

Dynamic and exclusive features set the FT-50R apart, too. Wide Band Receive includes 76-200 MHz (VHF), 300-540 (UHF), and 590-999 MHz*. Dual Watch checks sub-band activity while receiving on another frequency, then when a signal is detected, shifts operation to that frequency. Digital

Battery Voltage displays current operating battery voltage. Digital Coded Squelch (DCS) silently monitors busy channels. Auto Range Transpond System™ (ARTS™) uses DCS to allow two radios to track one another. And, the FT-50R is ADMS-1C Windows™ PC programming compatible, too. To round out the FT-50R, it has four battery savers, and super loud audio—remarkable in an HT this size.

A reliable companion where ever you go, the FT-50R is one tough little dual bander with all the features you want!

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FT-10/40R
Ultra Compact Handhelds
VHF or UHF. Similar to FT-50R including MIL-STD 810, and other exclusive features.