

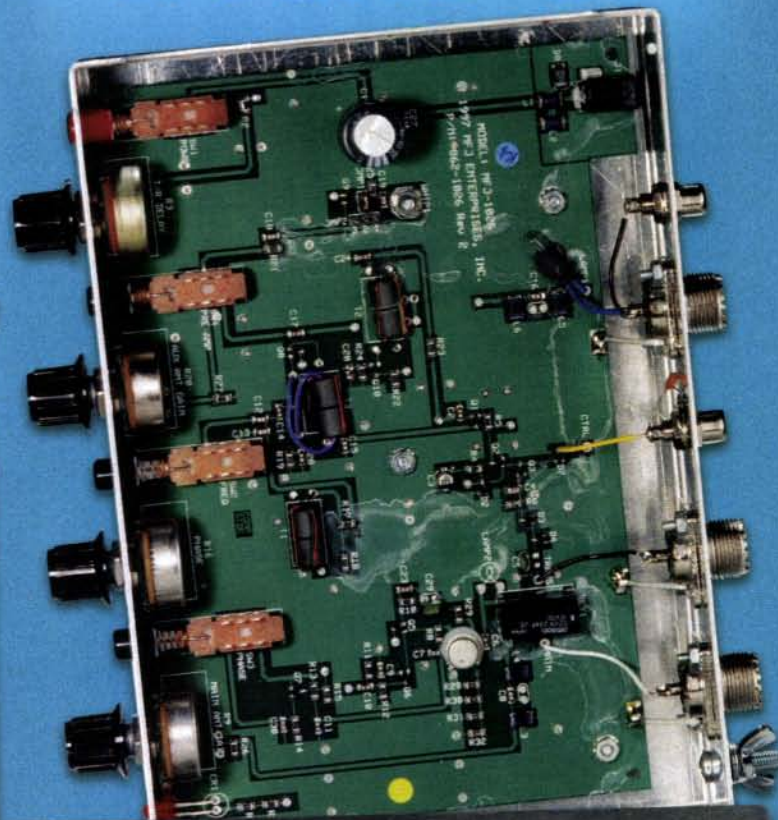
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PW

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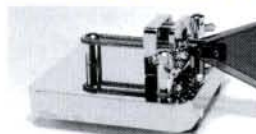
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15 SPECIAL PRIZE COMPETITION

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 Tec kits in our
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17 RADIO BASICS

This time Rob G3XFD
 describes the construction of a
 traditional tuned radio frequency
 receiver.

20 YOUR 'TICKET' TO SUCCESS

We 'round-up' the RAE courses that
 are taking place throughout the
 country.

23 ANTENNAS IN ACTION

Tex Swann G1TEX presents eight
 pages of antenna action for all you
 enthusiasts.

34 SO THANK YOU MR MARCONI, GRANDAD, CLIVE & THE VICAR ...

Peter Norman G0PKS says 'thank
 you' to all those who he considers
 helped him to get on the air.

38 THE ALINCO DJ-C5E DUAL-BAND HAND-HELD

Dick Pascoe G0BPS found out that
 'good things do
 come in small
 packages' when
 he reviewed
 the latest in
 miniature
 transceivers.



41 READER SURVEY

Let us know your opinions on PW
 and you could win a HORA C408
 u.h.f. Hand-Held transceiver.

45 SOURCES, 'SINKS' AND ELECTROMOTIVE FORCES

Geoff Billington G3EAE looks at the
 theory behind an aspect of Amateur
 Radio that confuses many enthusiasts.

52 CARRYING ON THE PRACTICAL WAY

George Dobbs G3RJV describes a
 project, which is based on the
 TA7310 integrated circuit.

56 ATTACKING THAT NOISE PROBLEM

Jack King G4EMC tries out
 the MFJ-1026 noise
 cancelling signal
 enhancer in a
 bid to tackle
 his QRN
 problems.



62 VALVE & VINTAGE

Phil Cadman G4JCP has plenty to
 delight all you valve enthusiasts
 this month.

67 RADIO SCENE

Regular reports from
 all your favourite
 columnists including
 Chris VK3CE's
 quarterly report
 from Australia.



REGULARS

9 KEYLINES

10 LETTERS

12 NEWS

47 RADIO DIARY

48 SUBSCRIPTIONS

54 BOOK PROFILES

75 BARGAIN BASEMENT

80 BOOK STORE

83 COMING NEXT MONTH



67 RadioScene

All the regular band
 reports from your
 favourite authors.



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FTOP 10

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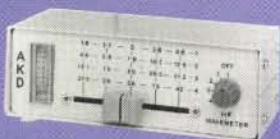
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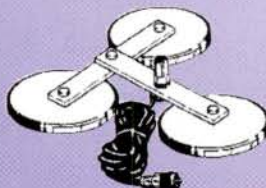
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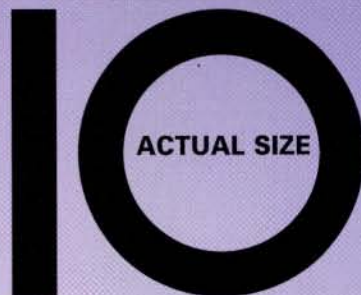
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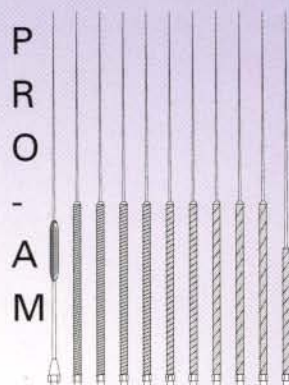
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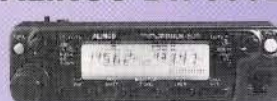
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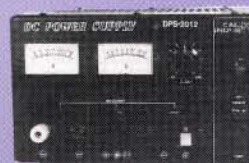


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As in previous years, a special GSW Club Carriage Card will be available to anyone who either travels to or works the station. A GSC will be sent on receipt of an incoming GSW, or reception reports. You can GSC via the bureau or direct to: David Beech GSWX HG 106788, GSW, Club Carriage GSC Manager, Newwood, London Road, Louth, Lincolnshire LN11 9DA.

Full-time staff at the October Mike Fiske event, selected as Honorary 1983/84 GORNG award winner, said that Jim's election "put all our concerns regarding our lack of representation in the Pacific Road, Inc. Board of Directors" (which is LULU Financial) "on the agenda." Jim's new hardware shop, Lowe Electronics, is the author of a new book, *HCRA as a New Source from a Telecom Perspective*, and is also a frequent contributor of articles on the subject of telecommunications and commercial speech.

The CQW is a "must-read" for managers with

The price of the C408 is just £99.95 and is available from all branches of **Lawes Electronics**.

A copy of the new **Conselelectronics** full colour product catalogue is available free from **Waters & Stanton PLC**. The A5 sized 17-page catalogue includes: **Price of other items: £999.95** www.conselelectronics.co.uk

evil

In addition to this, the VR-60 has the provision for an external speaker microphone to be used as well as a PH (powerover) protection facility. This is powered by two AA cells.

link

The magnificently finished trophy is made of polished test plate and is inscribed "327K - 1st" on the bull head with a commemorative pin mounted on the plinth. The inscribed plaque on the engraved name of the winners and details a prize. It is to be awarded each year to the winner the "National" club magazine section of the

In presenting the award to outgoing Danish Ambassador to the UK, Sir Arthur Scargill, was accompanied by new Labour MP for Leeds Central, Sir Ian Austin. Scargill's family enjoy a £100,000-a-year pension and a £135,000-a-year salary. Scargill's family also enjoy a £135,000-a-year salary. Scargill's family also enjoy a £135,000-a-year salary.

The time has co

published in the team and everyone to spend some time at the centre of this issue. Armed with your

...ome for us to conduct a f

magazine and on behalf of anyone working on the magazine. I am sorry for the inconvenience in completing the survey and returning it to the address for information everyone was given.

full survey on

to a full survey
of the Editorial
policy I ask you
to fill in the
form in the
address given.
Working on *PW*

9

Letters

COMPILED BY ROB MANNION G3XFD

STAR LETTER

Editor's Plight & GEE

Dear Sir

I see in the Editor's 'Keylines' editorial (July issue) the reference to criticism from certain quarters of his presentation of some circuits in G3XFD's 'Radio Basics' series. Although I have never been aware of the points raised these are probably the penalty achieved by many an editor.

In over 50 years of reading various radio/electronic magazines including all the *Practical Wireless* magazines, I have seen such criticism crop up at lower levels, in the case of Amateur Radio club magazines, by members prepared to criticise the (usually unpaid) editor but not prepared to submit any ideas themselves. Someone once said "You can please some people some of the time...", etc.!

However, I write to comment on the excellent article on the Second World War GEE radio navigational system by Brian Kendal, presenting the principles of a wartime aid in a simple and yet coherent and interesting manner. Any collectors of Second World War equipment and other interested readers may like to know that the equipment used in the GEE system sometimes still appears at radio rallies. It consists of plug-in front-ends containing tuned r.f., mixer and local oscillator stages, the R1355 (not R1155) 7.5MHz i.f./video unit and the Indicator type 62.

Basically there are four front-ends, the RF24, 25 and 27 in the range 25-85MHz, the RF24 and 25 lower frequency units using SP61 valves with a Yaxley type switch changing frequencies in discrete steps and the higher frequency RF26 and 27 using EF54 and EC52 valves with three gang tuning capacitors. However, I have a RF61B with the same mechanical plug-in format which may have been a prototype, using SP61s but with three separate tuning capacitors in the three stages. These r.f./i.f. indicator combinations plus a p.s.u. were used by amateurs for the early TV receivers, the six inch green screen VCR97 cathode ray tube giving the earliest (one) colour TV, and the r.f. units were often modified for 28 and 144MHz converters.

It's interesting that a similar hyperbolic navigational system was LORAN (Long Range Aid to Navigation) seen in USA APR/APN4 equipment and available as surplus. I believe that this system was upgraded and continued for some time after the war on commercial airlines.

Similarly, OBOE, mentioned in the article, was a beam guidance system used in a bombing capacity. Two ground beams guided an aircraft to a target and at the point of interception of the two beams the bombs were unloaded. This system was, however, restricted by only being able to guide one aircraft at a time - although the aircraft involved could be used as marker bomber. To overcome this, G-H was introduced, where the aircraft transmitted pulses to two ground stations and then measured the duration and separation of the pulses received by the aircraft after transmission by the ground stations. Like GEE and OBOE it was fairly close range but allowed many aircraft to access it simultaneously, its penalty being that like other radio/radar signals transmitted by aircraft they could be intercepted by the enemy and used to locate it.

Norman Smith
Stoke-on-Trent

Editor's comment: More fascinating insights to Second World War technology Norman - thank you. Many people I meet at club talks remember - as I do - that their first TV pictures were seen on 'green screens' (the VCR97). I actually saw the Queen's Coronation in 1953 on a TV made from a R1355 unit - complete with green state coach and horses! And I also understand (from his book *Most Secret War*) that the late Professor R. V. Jones suggested the 'R' prefix for the unit (suggesting it was a standard RAF communications receiver) rather than the video unit it was. It was a clever ploy - confusing the enemy and others ever since!

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.

Amateur Radio Amateurs

Dear Sir

Are there any other 'amateur' Radio Amateurs as fed up as I am with professional radio electronics and computer engineers lording it over the pure hobbyist in Amateur Radio? I

recognise the situation has been exacerbated by the apparent need for professional involvement in relation to repeater and packet nodes, etc., on professional communication sites thus creating a 'guru' status for local amateurs.

With regard to 'class distinction' (August 1998 *Keylines* editorial), we have a local GM???? professional radio engineer who is looking forward to the abolition of the Morse test and favours the introduction of multi-layered licensing based on technical ability, thus going from what some would consider the bottom of the Amateur Radio pile to the top.

How can we get the 20% (RSGB statistics) of professionals to take up gardening or some other non work related hobby in their spare time? This would let the non-professional get on with and enjoy 'amateur' radio without encountering superior attitudes?

Jim Stewart GM4DHJ
Scotland

Is The Future....?

Dear Sir

A recent issue of *PW* carried a picture of a Kachina PC receiver, asking 'Is this the future of Amateur Radio?' A report in another magazine carried the shattering news that the *ARRL Handbook* will soon only be available on CD and some comment on the Winradio.

I do not propose to replace or extend my computer system in order to be able to read one book. My handbooks are read using an 'organic computer' of unknown maximum capacity (though it is estimated that no human has ever used more than 10% of its potential), an optical interface, a warm fire and a comfortable chair, and when I can no longer read them that way, I shall simply not buy any more.

I have followed the advice I gave a new s.w.l. a few months ago and purchased a manually operated, small, easy and likeable receiver. As I get older, I shall undoubtedly enjoy listening to it in that same chair. I do not view a computer screen front panel as 'likeable', however good the presentation, and it is only with considerable amounts of filtering and screening that the noise is kept out of the receiver front end. Electrical noise now surrounds most houses to the point that shielded feeders to beyond the 'noise zone' are recommended for serious listening.

The physical effects of operating computers at work for long periods are now well known and measures taken to alleviate them. I do not believe it necessary, to have fun with radio

Thanks From Successful Students

Dear Sir

May I, through your excellent magazine, pass on to **Bert Hammett G3VWK** and his wife **Cheryll 2E1ADQ** the sincere thanks and admiration of Sandra, Bob, Derek, Owen, and myself for the enthusiasm and skill by which they changed five people of various backgrounds into five students who readily took and passed the RAE in May of this year.

Had it not been for Bert and Cheryll we would have been unable to succeed. Our situation reflects one of the subjects in 'Keylines' (August 1998), regarding access to the RAE. Truro College has the usual policy of minimum numbers before running a course so had it not been for Bert and Cheryll opening up their home every Tuesday night throughout the winter, with additional sessions if required, I doubt if the hobby would have been about to receive an increase in numbers. Their determination to enable access to the RAE is most commendable, and if it wasn't for people like them doing it informally the hobby would suffer.

No matter how the RAE is structured in the future (another aspect mentioned in 'Keylines') training for it has to be obtained. Could not the RSGB formalise or co-ordinate training? It would be more difficult than running the Morse test but could ensure that one class is available in each area and would mean that prospective amateurs are not turned away or have to rely on long serving members opening up their homes. Well done Bert and Cheryll, thanks again!

Mike Dickinson (licence application in post)
Cornwall

or enjoy reading a technical article, to subject myself to a similar regime at home. My s.w.i. friend remarked "Isn't it wonderful that such a small instrument can bring in so much information from around the world." I suggest that so long as people like him get that much fun from one simple pursuit, the answer to that cover question is **no**, and that many people will continue to use methods and equipment appropriate to their communication **needs**. Those needs may not include a number crunching typewriter!

Peter J Brent G4LEG
West Sussex.

Editor's comment: First time I've heard of the brain being called an 'organic computer' Peter. I only wish I could 'access' and 'upgrade' mine! However, to me the traditional book is sacred - like you I enjoy a sit down and read...especially after sitting in front of a computer v.d.u. all day. Long may the book read!

What - No 'Top Band'?

Dear Sir

I read with interest **Dick Pascoe G0BPS's** 'Antenna Workshop' in *PW* for April. I was rather disappointed though, that all of the antennas he mentioned seemed to ignore the existence of 1.8MHz 'Top Band'. Surely, with the history of Amateur Radio as it is, there must be a plethora of information regarding lower frequency antennas. I for one need some good information on antennas for 1.8MHz - can I be the only one?

Please Dick, can we have some words on 'Top Band' antennas? Incidentally, I wonder if there's any chance of us ever getting access to even lower frequencies again? I'd love a dabble on, say, 620m!

David Perry G4YVM
Salisbury

Editor's reply: Your plea will be passed on David, and readers are encouraged to write directly to our authors and Tex Swann G1TEX (who compiles 'Antennas In Action') suggesting future ideas.

Callsign G2BNG

Dear Sir

As a regular reader of the *PW* magazine, I wonder whether you, or any readers, could help me trace any information concerning, what I believe to be, my late father's Amateur Radio Callsign: **G2BNG**, which was issued during the 'Artificial Aerial' days and given then by the Post Office. I did have documentation from the then GPO, but have unfortunately misplaced them. I also had a QSL card with my late father's address at the time:- **53 Shardeloes Road, Lewisham, London SE13**, bearing the callsign **G2BNG**, this I have also mislaid.

My father did apply after the Second World War for renewal of his licence and because he was a Radio Mechanic in the RAF, all he had to do, I believe, was to carry out the Morse test to obtain his licence again. Anyway, he decided not to reapply due to other commitments at the time.

I contacted the RA with reference to this callsign as I wished, as my father's next of kin, to permit a friend of mine (a current 'A' licensee) to adopt this callsign. I was informed that providing the necessary forms were completed, that this would be no problem, providing that I put in letter form that, as next of kin, I gave my permission for this reallocation.

The necessary forms were duly completed and sent off. To my friend's amazement, and myself, she was told that my father had never held that callsign

and that due to the Data Protection Act, the person that held or still holds the callsign could not be divulged. To me, this is a complete mystery, one of which I hope you can be of assistance.

The only other piece of information I have, is that a close friend of my father, **G2HP** also now a silent key, was living in the near vicinity and a member of the Old Timers Club. I do not wish to get involved with the Data Protection Act, but it would be nice to know whether this callsign was ever allocated at all. Trusting readers can put my mind at rest I thank you for any help you can provide.

Mr E. C. Thew
London.

Editor's reply: It's over to you readers. Can you help?

Novice Licence

Dear Sir

In reply to the letter entitled 'Novice Licence' by **R. E. Jones GW4FCV**, in July *PW*.

I agree, the novice licence is/was one of the most significant advances over the past few years. It enables those who are not sure, or the younger generation, to 'dip their toes in at the shallow end' and examine our hobby. However, this is all it does and all it was intended to do. The Novice has access to 50MHz, 430MHz (if only part of the bands) and, with 5wpm, some of the h.f. spectrum.

There has to be something set aside to tempt them into taking a full RAE and obtaining a Class A or B Full licence. I, myself, along with many others, have recently taken the RAE in order that I may operate on all bands below 30MHz. Why should this privilege automatically be given to a Novice anyway? I suppose you may as well give access to h.f. for all Class B licences as well.

Letters Received Via The 'Internet'

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

EVERYONE HAS AN OPINION - SEND YOURS TO PW AND WIN A VOUCHER TO SPEND ON ANY PW SERVICE

news

COMPILED BY DONNA VINCENT G7TJB

Callsign Number Plates



On Thursday July 16 at the Grand Assembly Rooms in York, the Driver Vehicle Licensing Agency (DVLA) held a special one day auction of personalised vehicle registrations. Unlike their normal sales of classic numbers, this one was a pilot scheme for selling apparently 'ordinary' numbers to potential buyers who had previously expressed an interest in buying them.

Included were almost 250 numbers that corresponded to the Amateur Radio callsigns of people who had completed an RSGB survey and then followed it up by replying to a letter they were sent by the DVLA. The minimum price for each number was £330 which, by the time the buyer's premium, assignment fee and VAT had been added, meant that most people who bid were sold their numbers for £496.83. Surprisingly, several Radio Amateurs were outbid for their callsigns by registration number dealers who were also at the sale.

Roger Hall G4TNT

If you would like to know more about the sale, how the callsign registrations came to be entered and why Roger Hall G4TNT **didn't get to buy his 'number'**, make sure you see the October issue of *PW* for the full report.

Alinco DX-70 Stolen!

On the morning of Sunday 19 July **Chris Yates EI7AAB** awoke to discover that his **Alinco DX-70 multi-mode h.f. & 50MHz transceiver**, Serial no: **1076** had been stolen from his home near Dublin. However, the thieves did leave the power supply lead, a.t.u. and s.w.r. meter behind. If anyone can offer any information which could lead to the recovery of this Alinco rig could they please contact Chris, QTHR. **Tel: 00 353 87 239 4961.** (Please note Irish STD code).

World Radio TV Handbook Changes

Now in its 53rd Year, the *World Radio TV Handbook* publication licence has been acquired from **BPI Communications Incorporated** by **WRTH Publications Ltd.**, who are a new company specifically established to continue the publication of this important work of reference. The previous Amsterdam editorial offices have now been closed and all operations have been moved to Milton Keynes in the UK.

The previous editor of the *WRTH*, **Andrew Sennitt**, has decided to pursue a career as a freelance telecommunications consultant and as a result, a new editor has now been appointed. **David Bobbett**, has over 25 years of experience in telecommunications and the publishing world and has been a short wave listener since his early teens.

David has previously edited *Ham Radio Today* and *Radio Communication* as well as other telecommunications titles. As a telecommunications journalist he has also written extensively on a wide variety of broadcasting topics and is actively involved in the radio scene both as an s.w.l. and a licensed amateur radio operator.

The content of *WRTH* will substantially remain the same, although regular readers may want to look out for the new cover design, which now incorporates the universally known *WRTH* acronym for the first time. The *World Radio TV Handbook* is available from the *PW* Book Store for details see pages 80 and 81.

Prosecution Notice

The **Radiocommunications Agency** have recently informed the Newsdesk of the following prosecution:

"On July 7 at Thames Magistrates Court, Terence George Croft a licensed radio amateur pleaded guilty to the charge of unlicensed use of wireless telegraphy apparatus contrary to section 1 of the Wireless Telegraphy Act 1949 (WT Act) and possession of restricted CB apparatus contrary to section 7 of the WT Act. He was fined £30 for each offence and his radio apparatus which had been seized by Radiocommunications Agency staff was ordered forfeit by the court".

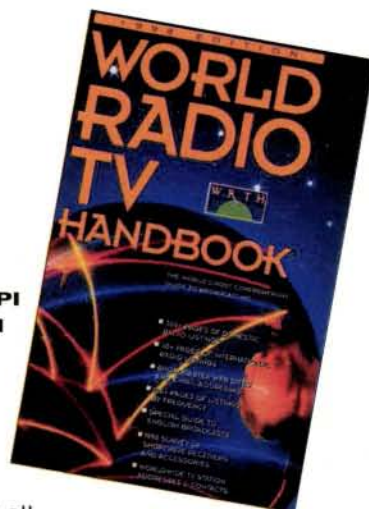
Book Review

Jo Williams, *Short Wave Magazine's*, new Editorial Assistant has been looking at a new publication which traces the history of early methods of communications, here are her thoughts:

Faster Than The Wind - The Liverpool to Holyhead Telegraph
Frank Large.

If you're interested in early forms of communication, that is before telephones, FAXes and E-mail made it all so easy, then *Faster Than The Wind* will definitely satisfy your appetite!

Focusing its attentions on the history, construction and uses of the Liverpool to Holyhead telegraph, *Faster Than The Wind - The Liverpool To Holyhead Telegraph* is an intriguing mixture of both history and guide book in one. As mentioned in the Post Script at the rear of the book, it's probably the intention of the author that you visit these Telegraphs with book in hand, in order for you to get



Haydon Goes Europe-Wide

Members of **Mike Haydon's** emporium have recently returned from one of the largest 'Ham' Radio Shows in Europe that they have ever exhibited at. Over 35,000 people graced the Friedrichshafen three day radio show and sales of Haydon's Q-TEK range of antennas were booming.



Customers from all over Europe visited Haydon's stand and a lot of interest was shown in Yagi antennas for 50MHz, as this band is being opened in Germany later this year due to their

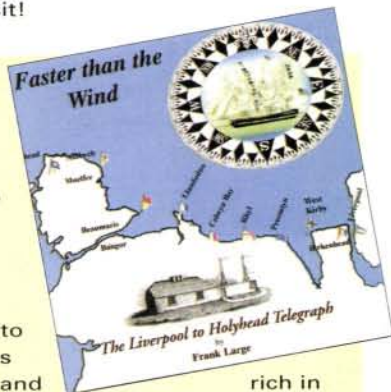
diminishing old TV allocation. Overall Haydon Communications say it was a superb show and definitely one they would recommend as well worth a visit!

a real feel of life as a Telegraph operator in the mid-1800s.

The book also discusses even earlier forms of communication spanning from circa 200-118BC to 1907AD. It covers from the smoke and fire signals that the Greeks used through the use of torches and alphabet tablets used by the Greeks and the Romans (circa 200-118BC) to the Electrical Telegraph in 1907.

Some examples of chapter content include 'The People of the Telegraph', 'The Workings of the Telegraph' and 'Vocabulary: Coding and Operation', showing that the book covers an extensive area all culminating in a look at 'The Coming of the Electrical Telegraph'.

Faster Than The Wind does not skimp on illustrations either, in fact it is as



rich in diagrams and pictures as it is in written explanation. Frank Large uses a wealth of different types of illustrations in order to aid understanding.

In conclusion even if you were not interested in the use of Telegraphs before reading of this book, then you will be by the time you have finished it! Copies of *Faster Than The Wind - The Liverpool to Holyhead Telegraph* are available from **Avid Publications, Garth Boulevard, Higher Bebington, Wirral Merseyside L63 5LS. Tel/FAX: 0151-645 2047 for £8.95 plus £1.50 P&P.**

QSL Communications

QSL Communications who are based in Weston-Super-Mare cater for all aspects of Amateur Radio and are in fact approved agents for many of the major equipment manufacturer's including Alinco, Kenwood, Icom and Yaesu. The proprietors, **Graham G4TJB** and **Jayne Patterson** have been in business as QSL Communications for the past 15 years and have been based at their present location for the past 11.

Graham, who has been licenced since 1983, (incidentally he has just purchased his callsign number plate) started QSL from his garage in Birmingham after he'd ordered a selection of QSL cards and decided that he could set-up his own card business. From that point on the business has gone from strength-to-strength and is now housed at **Unit 6 Worle Industrial Centre, Coker road, Worle, Weston-Super-Mare BS22 6BX** in a building covering 1250 square feet!

A small selection of the products that QSL have on offer are pictured here and include:

The **BA-6200 dual-band antenna** offering 6db gain on 144MHz and 8db gain on 430MHz which retails for **£59.95**.



The **RC-ECH RG58A/U SO239 snail to PL259 plug** retails

at **£9.99** and fits the **RB-400** hatch-boot mount costing **£14.69**.

There's also the **RC-5MB RG188A/U**



SO239 snail to PL259 plug 5m long mount for use with the **RB-400** which costs **£16.99**.



The **RK-01 power cord**, costing **£5.99**, is

designed to fit Alinco, Icom, Kenwood, Standard and Yaesu equipment



Other equipment in the QSL range includes a selection of antennas such as the **NL-770R 144/430MHz mobile antenna** and the **NL-2C 144MHz 7/8 mobile antenna**. These cost **£24.95** and **£25.95** respectively. For a wider picture of what QSL Communications can offer you why not pop along and see Graham and Jayne or call them on **(01934) 512757**?

Receiving You!

Please remember that when sending letters to PW, which are intended for consideration for inclusion on the letters pages to mark them as such!

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WASHINGTON, D.C. (UPI)—The U.S. Supreme Court on Monday rejected a bid by the federal government to force the National Labor Relations Board to accept a new, more powerful role in overseeing the labor movement.

That indistinguishability is a profound real growth experience" are the last words I measured and the glass, I the ergonomic science of the drink. It is the perceived the "holistic" and the "magical" experience that is the

Watson Power

Five new models have just been introduced to the **Watson** power supply range. All have been completely redesigned and now have clear and distinctively marked front panels and all fully comply with CE legislation.

The new models are as follows: The **W-3A** 3A continuous, 5A peak fixed voltage power supply; the **W-5A** 5/7A peak fixed voltage power supply; the **W-10AM** 10/12A variable power supply with V/A meter; the **W-25AM** 25/30A



variable power supply with meters and finally the **W-30AM** 30/35A variable power supply with meters. The price of these meters range from **£22.95** up to **£119.95** inc. VAT.

To find out more you're invited to contact **Waters & Stanton PLC, 22 Main Road, Hockley, Essex SS5 4QS. Tel: (01702) 206835, FAX: (01702) 205843.**

Changes at Chester

The Chester & District Radio Society have recently changed their meeting place. The new venue is **Burley Memorial Hall, Waverton, Chester** with meetings being held from **8pm on Tuesday evenings** (with the exception of the 2nd Tuesday in the month).

The club, who are now in their 51st year, will be taking a break for the summer during August but will resume again on 1 September. For more details contact **Niels Foster** **GOONQ** on **(01244) 347930**.

Prize Winners' Gallery

Radio Amateur in the 'Fowler Family'.

Secondly, congratulations go to **Roy Quantick G3UGL**, a retired Airline pilot who is now the proud owner of a **Garmin GPS III** 'personal navigation' unit. Roy is really pleased with his prize, (which he won by entering our April



Pictured here
are the latest *PW* competition
winners.

First in the 'gallery' are **Bernard and Joy Fowler** who were the lucky recipients of the **Pioneer Hi-Fi System** from the **Subscribe & Win** draw as run in the Jan, Feb and April issues. Bernard and Joy are both licensed and hold the callsigns **2E1FYX** and **G7MHT** respectively, although Bernard is currently awaiting is 'B' Class callsign. Behind the camera is their Son Glyn who holds the callsign **G0WST** and is the longest serving



competition) as as
he holds a Flight Navigators
licence has quite an interest in
knowing exactly where he is!

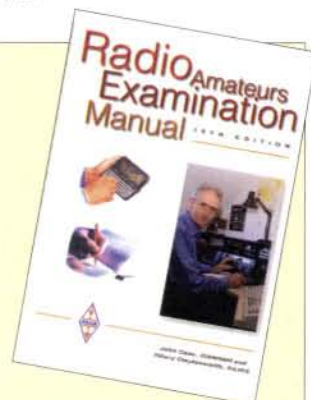
And last but by no means least is **Steve Elliott GOWEX** who won the **Yaesu VX-1R** dual-band transceiver. Steve says he has never won anything before, despite several attempts and therefore the news that he was about to become the owner of one of smallest and most sought after radios came as quite a surprise!

The *PW* 'team' would like to thank **Yaesu UK** and **Waters & Stanton PLC** for donating the prizes and also to pass on congratulations to our lucky winners.

New Book

Just in time for all you budding RAE students the RSGB have completely revised and reprinted the *Radio Amateurs Examination Manual*. The revisions take into account the changes to the RAE syllabus that took effect from May of this year and also now incorporates a selection of sample questions, which were originally published in *How to Pass the RAE*, together with a complete sample paper from City & Guilds to help familiarise candidates with the examination format.

The *RAE Manual* has also been given a new look and is now produced in a larger format, just slightly smaller than A4 which should make it easier to read and understand. The syllabus topics included are: Licensing conditions, Transmitter interference, Electromagnetic compatibility, Propagation and antennas and measurements. Copies of the *RAE Manual* are available **now** from the *PW Book Store* priced **£12.75 plus P&P**.



SPECIAL PRIZE COMPETITION! WIN! ONE OF TWO TEN-TEC KITS!

In last month's *PW* Clive Hardy G4SLU built and reviewed the Ten-Tec RF Ground Counterpoise 1251 and SWR/Wattmeter 1202 kits. The Ten-Tec kits were supplied by Phil Godbold G4UDU of Adur Communications and Phil has now very kindly donated the completed units as prizes.

So, to be in with a chance of winning one of these useful accessory items (first correct answer out of the 'hat' will win the 1251 and the second the 1202) all you have to do is 'arm' yourself with a copy of last month's Ten-Tec review (back copies of *PW* August are available from our Post Sales Dept. for £2.30, call (01202) 659930 to order) and re-read Clive's thoughts and findings and then answer the questions on this page.

Simple isn't it? So go on then ... what are you waiting for?



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- Q1:** Name the road, with country music connections, where Ten-Tec, USA, have their factory.
- Q2:** What did Clive G4SLU say was the first and major construction task when building the counterpoise kit?
- Q3:** The SWR/Wattmeter 1202 has two independent circuits - what are they?

Answers:

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Q2:

Q3:

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.....

.....

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☐ If you do not wish to receive future mailings as a result of entering this competition please indicate here.

Send your completed entry coupon to **Ten-Tec Competition, Practical Wireless, PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW**. The Editor's decision on the winner is final and no correspondence will be entered into. Please do not include other correspondence in with your entry (photocopies are acceptable). Entries to reach us by **Friday 25 September 1998**.



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5W CW RF output (adjustable) on 160 to 20M bands, about 1W on 10M. Plug-in band filter. Very clean signal. Use with Rx and linking module for transceive. TX2000 Kit: £24.90 (with one band filter). Extra band filter kits: £6.90 each. HA23R hardware pack (pictured lower left): £16.90.

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ASU8	RX Antenna Selector/Attenuator	£27.90	ST2	Morse Side-tone/Practice Oscillator	£9.80
CSL4	Internal SSB & CW Filter for our RXs	£10.50	SWB30	SWR/Power Indicator, 30W 1-200MHz	£13.90
DCS2	"S Meter" for direct conversion RXs	£10.90	XM1	Crystal Calibrator 8 intervals + ident	£16.90
CBA2	Counter Buffer (fit to Rx to feed DFD5)	£5.90	(optional hardware packs are available to suit many of the above kits, please enquire)		



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HOWES KITS contain good quality printed circuit boards with screen printed parts locations, full, clear instructions and all board mounted components. Sales, constructional and technical advice are available by phone during office hours. Please send an SAE for our free catalogue and specific product data sheets, or you can browse this information on our Internet Website (URL at top). UK delivery is normally within seven days.

73 from Dave G4KQH, Technical Manager.

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COMPONENTS AND AMATEUR RADIO
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Robin G3NFF

Geoff G4ECF

This month to help you take a few more steps further in the practical learning process I'm going to describe the construction of a type of receiver once very popular in valved form - brought up-to-date as far as possible by using transistors. It's simple and straightforward to build but I can tell you, it takes skill to get the best results 'on-the-air' but you'll learn a great deal and enjoy the process very much indeed!

But before I launch into the description, circuit details and instructions for the tuned radio frequency receiver (t.r.f.) receiver I'm going to acknowledge some of the feedback from readers regarding coil construction. Many of you found coil winding difficult and the formers required caused confusion, so in this project (as you'll need to wind several coils) I've decided that we're going to make the formers ourselves by using paper!

Paper Formers

You may be surprised at the suggestion of using paper formers for coils - but in fact they've been used for many years. All you need is a little patience, a sheet of A4 paper, a standard sized round bodied pencil and some adhesive (I used Pritt Stick adhesive which comes in a handy tube applicator).

To start, just cut a strip 30mm (2in) wide from the short side of the A4 sheet if you have the standard typewriting 'weight' (70 to 80g). If it's thinner than this cut your strip from the long side.

The technique is to gently but firmly roll the paper onto the pencil body - not too tight or you won't be able to slide it off afterwards - to form a tube. Before you start rolling the tube it's best to apply the adhesive to the last 30mm of the paper so that it automatically sticks as you roll it up.

If you have any difficulty (I managed it easily) you can always recruit a nearby Blue Peter enthusiast to help! Then

release the tube and leave to dry for an hour or so. It's best to push the centre of the roll back into position if it starts to 'telescope' outwards as you release it from the pencil.

The Coils

Winding the coils is a simple process. Place the former back onto the pencil (use the sharpened end to limit the possibility of deforming the paper tube) and you're ready to start once you've got hold of some 0.315mm diameter enamelled wire.

If you're not sure what diameter the wire you have to hand is - don't worry! Providing your wire is not much thicker than standard sewing cotton thread it will do the job okay, the only problem could be that the frequency

coverage (my prototype covers 3.650 to 7.8MHz approximately using a 'standard' Polyvaricon miniature tuning capacitor) could be different. But your radio will work!

For the (t.r.f.) coil, L1, you should wind 60 turns of wire side-by-side, neatly but not too tightly. Start your winding from the left or right - holding the wire tail under your 'free' thumb and wind away from the thumb.

Make a centre tap at 30 turns (to provide input for the antenna signal) by making a loop, twisting the wire around itself - just like a little 'pigtail' - and then continuing the winding.

I anchor the start of the wire temporarily by using a tiny blob of beeswax from old capacitors. When the job is done you can seal the winding with melted candle wax - applied by dripping the melted wax (melted by the soldering iron) onto the coil.

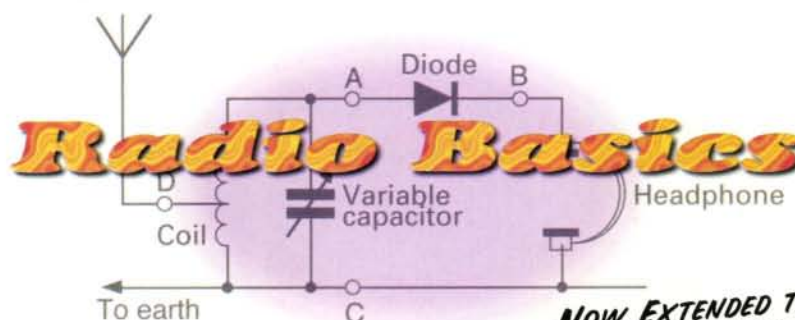
The main detector stage coil is a little more complicated but still straightforward. So, please don't be discouraged!

The main winding (A in) L2 also consists of 60 turns but

coil consists of 10 turns spread over three-quarters of the main winding. Again, start the winding at the left or right and wind in the same direction as the main winding. Make sure you can identify the windings, and then seal them with wax.

The Circuit

The circuit, Fig. 1, shows the simple lay-out of the t.r.f. receiver minus the audio



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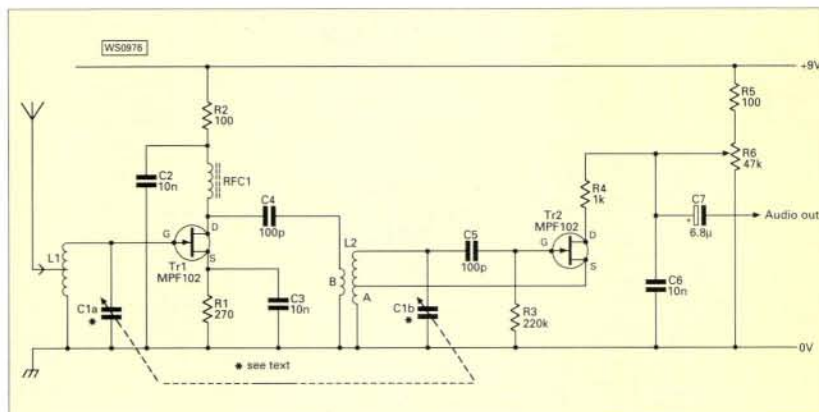


Fig. 1: Circuit of the two transistor tuned radio frequency receivers using MPF102 field effect transistors. The receiver is designed to work with the audio amplifier module project described in the June issue of PW.

this time a loop for a 'tap' should be made at 20 turns. This 'tap' on the coil provides part of the feedback circuitry for the regenerative detector.

If possible you should use slightly thinner wire for the coupling winding on L2 (this is shown as 'B' on L2). The reason it's referred to as B is because it's wound over the top of the first winding. This

amplifier stage. There's no amplifier provided because, as previously mentioned, this project will use the audio amplifier featured on page 16 of the June issue of 'Radio Basics'. So, if you've not built it yet, get busy!

When built, the signal pathway in the circuit in Fig. 1 is as follows: With the antenna connected and an earth in

Radio Basics is continued on page 18

This month Rob Mannion G3XFD describes the next stage of the learning process - a traditional tuned radio frequency receiver. Well known in 'grandfather's day' it's still capable of good results in the 1990s also providing valuable 'hands-on' experience and a lot of pleasure!

Interested?

Want to join in with 'Radio Basics'? You can - if you send in an s.a.e. with a 50p stamp requesting the free 'Radio Basics' Information Sheets 1 & 2 to Donna Vincent G7TZB at the Editorial offices. Also available are reprints of G3XFD's original 'Getting Started the Practical Way' 5-part series which was first published in 1986. If you require this please enclose a cheque (payable to PW Publishing Ltd.) or Postal Order for £2.50.



place, the incoming signals in the range (approximately) of 3.6 to 7.8MHz are amplified by Tr1, an MPF102 field effect transistor (f.e.t.). The radio frequency choke (r.f.c.) offers a high impedance pathway to the amplified r.f. which then finds an easier route and is coupled via the 100pF* capacitor to the input winding on L2 transferring its energy in doing so.

*Nominal value only - experiment with values from 100 to 750pF for best results.

One side of C1 tunes the r.f. stage and the other side tunes the regenerative detector stage. The incoming signal is 'regenerated' by passing through the circuit many times providing feedback similar to what can be heard when an amplifier is too close to a speaker in the same circuit!

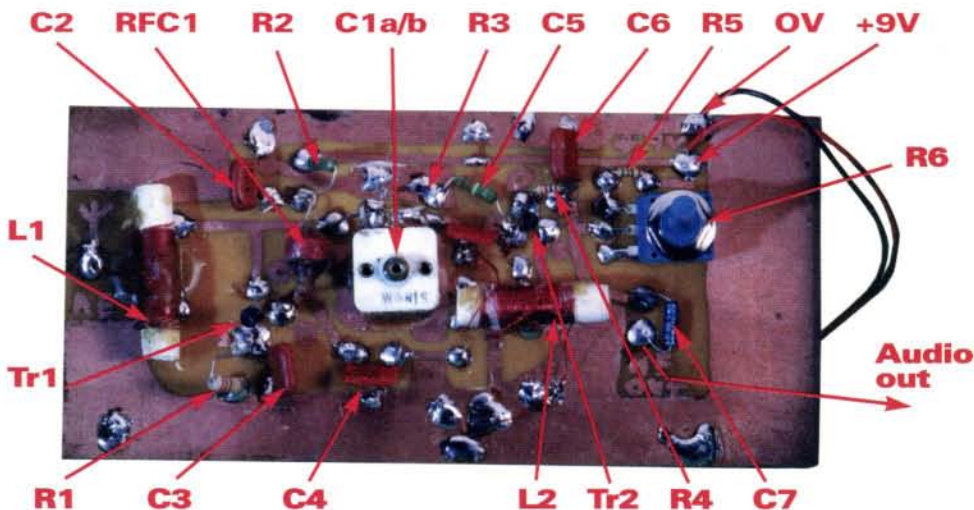
In this case you can control the 'stage gain' by (very!) careful adjustment of the 47kΩ variable resistor. As it's adjusted you can hear the circuit 'plop' in and out of oscillation. For short wave amplitude modulation transmissions (a.m.) you adjust the control to the critical point just before oscillation. For c.w. and s.s.b. reception you let it enter oscillation.

Audio output is via the 6.8μF (this capacitor can be of any value between 2 and 20μF - depending on what you've got to hand. With the 'Basics' amplifier I found either 6.8 or 10μF worked well). There's just enough output to run a very sensitive

pair of good quality headphones - but the amplifier provided excellent output from a large hi-fi extension loudspeaker.

Building The Project

You should start building the project by making the p.c.b. and then etching it - after you've carefully checked your copy of my hand-drawn lay-out. It's a very simple process and as you become more familiar with the technique you will learn the short-cuts!



The large area of unetched copper on the right of the in the photograph of Fig. 2, (which shows the etched design ready for component placing) is where I mounted the audio amplifier module. Incidentally, when large areas of unetched copper track are required on a p.c.b. it's best to 'mask' it with pvc tape. This stops the etchant from dissolving the copper laminate and also makes a neater job (and saves etch resist!) than can be achieved using an etch-resist pen.

Assemble the detector stage (Tr2) first and connect the antenna (earth connected to the 'ground' or chassis side of the project) to the 'B' winding end

of L2. Make sure the 100Ω resistor in the 'Drain' circuit of Tr1 is out of circuit and that the 100pF (nominal) capacitor is also out of circuit.

When listening (using the add-on amplifier) you should hear a loud plop and hiss at various points as you tune across the band and come across signals.

If you don't hear anything - check your antenna and coil connections. There's little to go wrong and provided you've used a heat-sink when soldering the MPF102, you

values as high as 1MΩ. Experiment and learn!

Great Fun

Although, in the form as presented, this receiver is only a training and learning exercise it can be great fun to build and use. It receives broadcasting stations from all over the world and on 7MHz ('Forty metres') I heard many c.w. and s.s.b. stations. On Sunday 5th July I heard great 'DX' from local station G0DDI (next village to me!) calling 'CQ TVI Test' and

Fig. 3: Annotated photograph of the completed project ready for use with off-board amplifier. Note that the L1 (antenna tuning coil) paper former is held by wax just above the board surface. To prevent possible r.f. 'feedback' L2 must be mounted (at right angles to L1) as shown and stabilised by melted wax. The control knobs on the polyvaricon and reaction control are removed for clarity. (See text for suggested values for nominal 100pF coupling capacitor, C4, and 220kΩ resistor R3).

should soon be on air.

You'll note that once you've found a good signal and got the adjustment just right you'll have to re-adjust at the next frequency. That's normal for this type of receiver!

If all is okay you can place the 100Ω resistor for Tr1 in circuit and connect the 100pF capacitor in place. This couples the (amplified) r.f. to the

detector stage. You should now hear a great improvement in signal levels.

Try experimenting with different values for the 100pF (up to a maximum of 750pF for best results). Additionally, the 220kΩ resistor in the gate circuit of Tr2 is a nominal value can be adjusted in value. Improvements can be quite marked - try 470kΩ and

despite the fact the t.r.f. is prone to overload his strong signals were resolvable on s.s.b.

You'll need a lot of patience and practice to tune and adjust the receiver as presented. However, if you want to, you can build it with a sturdy metal-framed two-gang variable capacitor with slow motion tuning control and a good quality 47kΩ variable resistor. Built this way it will be more stable in action for long term use and provide many hours of fun and exciting listening - and you'll be surprised at the receiver's sensitivity although selectivity is not so good!

Built in the 'Basics' fashion the receiver will teach you a lot and then you'll be prepared to build the next project - a 'Converter', which turns an ordinary car radio into a sensitive short wave receiver with a beat frequency oscillator (b.f.o.) for c.w. and s.s.b. listening.

So, until next time - good building and happy listening! **PW**

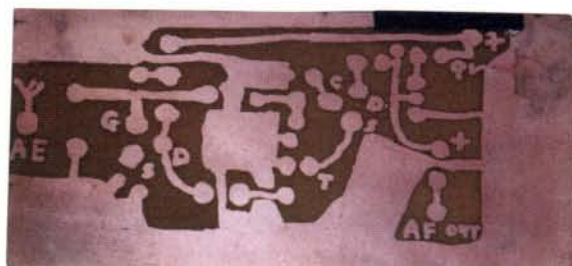


Fig. 2: The 'home-brewed' p.c.b. design for the receiver project. The pvc masking tape (top right) is left in position to illustrate how you can cover larger areas and save on etch resist. Make your own copy of this design by using a combination of etch resist (from a 'Dalo' pen or equivalent) and masking tape - but make sure you allow room for the components you are to use by 'placing' them temporarily as you draw.

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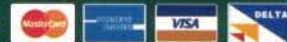
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It's that time of year again! Yes - it's time for all you 'would-be' Radio Amateurs to get yourselves enrolled on a Radio Amateurs Examination course and get studying for that all important licence. To help you find a course in your area we've put together a list of all the RAE, Novice RAE and Morse courses that we've been told about and to make it easy the list is laid out alphabetically by college or centre (please note that the addresses given are not necessarily the 'home' of the various clubs but the location for the course).

Of course, the PW list is not exhaustive and there are many courses that are not mentioned here. For details of other courses that are running this year contact the **City & Guilds at 1 Giltspur Street, London EC1A 9DD. Tel: 0171-294 2468 or FAX: 0171-294 2400.**

For more information on becoming a Radio Amateur contact the **Radio Society of Great Britain on (01707) 659015** or if you have a query regarding licencing, etc., then please get in touch with the **Radiocommunications Agency (RA) on 0171-211 0211**. The RA can also supply a range of leaflets of the services they provide, to find out more contact their **Information and Library Service on 0171-211 0502/0505.**

So, what are you waiting for? Look at our list, pick a course, get enrolled, start that studying and who knows your name may be among the next batch of new licensees!



Your 'Ticket'

21 Willow Walk, Culverstone, Meopham, Kent DA13 0QS.

Len Buck G0DLR will be running an RAE course starting on **Friday 5 October** running through until the May 1999 exam. Arrangements have been made for students to sit the exam at the **North West Kent College of Technology, Dartford**. If you're interested in joining Len's course, you should write to him at the above address or call him on **(01732) 823483**.

Bexley College, Tower Road, Belvedere, Kent DA1 6JA.

An evening RAE course will start in **September** running through to the May 1999 examinations. The course tutor will be **Colin Turner** with the course covering Morse, transmitting theory, licence regulations and operating procedures - no previous radio knowledge is necessary. To enrol telephone the **Guidance & Admissions Centre on (01322) 404000 or 404001**, leaving your name, address and telephone number so an enrolment form can be sent to you.

Bedford & District ARC, HQ, Ravensden Church End, Bedford.

A Novice RAE course will start in **September** and will run through to examination time. Contact **Steve Down G3USE on (01234) 270738** or **Nick Ward G400Q on (0831) 310870**.

Bradford & Ilkley Community College, Great Horton Road, Bradford, West Yorkshire BD7 1AY.

Ralph Turner G3VRX will be tutoring an RAE course starting in early **September** on **Tuesday** evenings between **6 - 9pm**. Enrolment is taking place during the first week in **September**. For more details call **(01274) 753371**.

Colchester Radio Amateurs, Room 22, St Helena School, Sheepen Road, Colchester.

RAE and NRAE courses start on **8 September** at **7pm** at the above address. Further details from **G3FIJ on (01206) 851189**.

City of London ARS, Elephant & Castle Area, London.

An evening RAE and Introduction to Morse course starts early **September** running through to the May '99 exam. For more information call **Tony Hearn G1UFX on 0171-928 3481**.

East Cleveland ARC, Jubilee Hall, Gurney Street, New Marske, Nr. Redcar.

Enrolment for this Novice RAE course is on **4 September** with the course running

on Friday evenings thereafter. Contact **Alistair G4OLK on (01642) 475671** for more details.

Flight Refuelling ARS, Wimborne, Dorset.

The **29 September** sees the start of an RAE course for FRARS members, although newcomers will be welcomed. Full details from **Ian Brotherton G2BDV, Course Administrator on (01202) 886887**.

Glenrothes & District ARC, Balwearie High School, Kirkcaldy.

An RAE course will be on offer on **Monday** evenings, **7.30pm** and a Morse course on **Tuesday** evenings, **7pm** from late **September**. Both courses are open to beginners and advanced candidates and enrolment for both is **28 September** from **7 - 8pm**. Contact **Ken Horne GM3YBQ on (01592) 265789 (after 7pm)** for more details.

Hastings Electronics & Radio Club, Hastings & St. Leonards-on-Sea, East Sussex.

From October the Hastings club will be running RAE and NRAE courses. For the RAE course contact **G. Parsons M1ABB, Gull Cottage, Briar Close, Fairlight TN35 4DP. Tel: (01424) 813040**. For the Novice course details contact **D. Mephem G4ERA, 8 The Close, Fairlight, East Sussex TN35 4AQ. Tel: (01424) 812350**. The courses will be held at the respective addresses.

Hastings College of A & T, Archery Road, St. Leonards-on-Sea, Sussex TN38 0HX.

A NRAE course will be running from **September** at this college. For more information call **(01424) 442222 Ext. 279** or E-mail: **dgrandfield@hastings.ac.uk**

Herefordshire College of Technology, Folly Lane, Hereford.

An RAE course starts early **September** at this college. Those interested in joining should call **(01432) 352235**.

Leeds College of Technology, Room H2, Cookridge Street, Leeds LS2 8BL.

An NRAE course lasting 10 weeks starts on **16 September** and an RAE course lasting 20 weeks starts on **2 December**. Enrolment for both courses is **7-9th September**. Contact course tutor **Michael Schonborn on 0113-243 0381 Ext. 2043**.

Llandovery College Amateur Radio Society, Wales.

RAE courses covering everything from 'basic electronics' to Amateur Radio are on offer every **Thursday** in **Wales**. Details from **Peter 2W1FAJ, Eileen**

The PW RAE C

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Merton College, London Road, Morden, Surrey SM4 5DX.

David Bowman G0MRF is the course tutor for an RAE course running at the above college from September. The course fee is waived at this college for those in receipt of specific benefits such as retirement, disability, unemployment, etc. Details from the college on 0181-640 3001.

Murray Park Community School, Murray Road, Mickleover, Derby DE3 5LD.

An RAE course starts on 23 September and the tutor will be Frank Whitehead G4MLL. For further details either contact Murray Park School on (01332) 515922 or Frank direct on (01332) 515922.

Newbury Technical College, Newbury.

On Thursday 10 September an RAE course starts and will run from 7 - 9pm on subsequent Thursdays (Course no: 99018A). In addition to this, a 12w.p.m. Morse course will start on Tuesday 5 January 1999 from 7 - 8.30pm (Course no: 99208B). Contact Newbury College on (01635) 35353 or Ray Oliver G3NDS on (01672) 870892 for more details.

Newstead Woods School, Avebury Road, Orpington, Kent.

An RAE course will begin on Monday 14 September at 7.30 - 9.30pm running through until the May 1999 exam. To enrol on this course please write to Bromley Adult Education College, Church Lane, Prince's Plain, Bromley BR2 8LD or phone 0181-462 9184. To find out more contact the course tutor Alan Betts G0HIQ on (01689) 831123.

North Cheshire Radio Club, Morley Club, Moberley Road, Morley Green, Wilmslow, Cheshire.

Enrolments and commencement of NRAE and RAE courses takes place on Sunday 13 September at 7.30pm at the Cheshire club. Further details from Gordon Adams G3LEQ on (01565) 652652.

North Trafford College, Talbot Road, Stretford, Manchester M32 0XH.

An RAE course will begin on 7 September and run on Monday evenings from 6 - 8.30pm through until the December exam (this is for re-sits in December). There will also be an RAE course running on Wednesdays afternoons. Enrolment takes place from 1

- 3rd September inclusive or any Wednesday afternoon in July & August. For more information please contact John Beaumont G3NGD, North Trafford College, Talbot Road, Stretford, Manchester M32 0XH. Tel: 0161-886 7077 or Admissions on 0161-886 7000.

Oldham ARC, Moorside Conservative Club, 633 Ripponden Road, Oldham.

An RAE course is starting on Thursday 17 September at 7.30pm at this location. For more information call 0161-652 4164.

Plymouth Rado Club, Royal Fleet Club, Morse Square, Devonport.

Starting on the first Tuesday in September an RAE course will run in the Plymouth area. Enrolment for this course is on the 4 & 18th August from 7.30 - 9pm at the above address. More details are available from G7NHB on (01752) 343177.

Redborne Community College, Ampthill, Bedfordshire.

Enrolment details for this RAE course are available from Nigel Reynolds on (01525) 404412. Course information from Steve Down G3USE on (01234) 270738.

Rugeley Adult Education Centre, Taylors Lane, Rugeley, Staffs WS15 2AA.

Brian Smith G4EQC will be tutoring this RAE course, which starts in September on Tuesday evenings from 7 - 9pm. All are welcome, no previous knowledge is required and external candidates are welcome. More details are available from Brian on (01543) 683030 or the college on (01889) 578738.

Sawston Village College Community Centre, Cambridge.

Peter Buchan G3INR is tutoring an RAE course which starts in September. For more information please call (01223) 834492.

South Normanton Alfreton & District ARC, New Street Community Centre, South Normanton, Alfreton, Derbyshire.

An NRAE course starts on 7 September and is open to all. The course instructor Andy Gilbert M0APH can be contacted on (01246) 582501 for more details, as can Russell Bradley G0OKD on (01773) 863892.

South Notts College, Greythorn Drive, West Bridgford, Nottingham.

An RAE course starts on 16

September and will run on subsequent Wednesdays from 6 - 9.30pm in preparation for the May 1999 exam. If you're interested please contact the course tutor Alan Lake G4DVW on 0115-938 2509.

Swindon Technical College.

On Monday 21 September an RAE course starts and will run from 7 - 9pm (Course no: UFF30S). Contact Swindon College on (01793) 498300 or Ray Oliver G3NDS on (01672) 870892 for more details.

Tile Hill College, Tile Hill Lane, Coventry CV4 9SU.

Morse and RAE courses will be starting in September on Thursday evenings at the above centre. More details can be obtained from Mike Dixon G4GHJ, Student Services, Tile Hill College, Tile Hill Lane, Coventry CV4 9SU. Tel (01203) 694200 Ext. 337.

Warrington Collegiate Institute, Winwick Road, Campus, Warrington, Cheshire.

Enrolments take place on 3, 4 & 5th September for an RAE course starting on Thursday 17 September at 7.30pm. For more details contact either the college on (01925) 494494 or from Gordon Adams G3LEQ on (01565) 652652.

Welwyn Hatfield ARC, Welwyn Garden City, Herts.

Starting in September a 30 - 36 week RAE course will run from 7.30 - 9.30pm leading to the May 1999 exam. Contact David Rogers G1LLW on (01707) 331583 for further details.

The Widnes & Runcorn ARC, The Beacons, Simmons Lane, Frodsham, Cheshire.

RAE & NRAE courses will be taking place from early September. Enrolment takes place on Friday 4 September from 7.30pm. Further details can be obtained from course tutors Dave Bibby G1PIX on (01928) 591401 or Dave Wilson G7OBW on (01270) 761608.

Yns Mon Radio Users Group, Llangefini Scout Hall, Wales.

A 32 week RAE course starts on Friday 11 September from 7 - 9pm. For more details contact Tony Anziani GW4ZWN on (01407) 832197.

course Round-Up

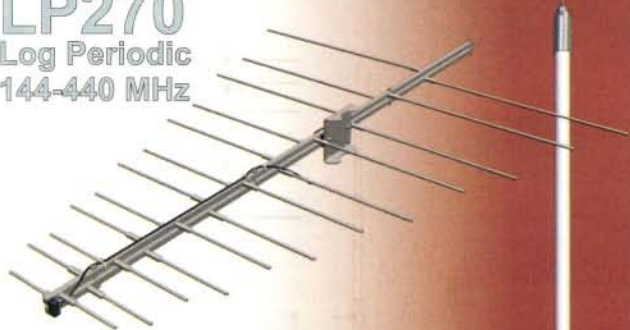




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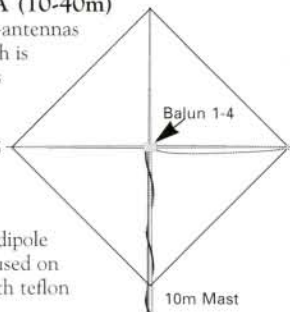
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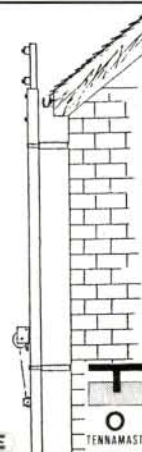
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antennas in action

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

New From G2DYM

There's a new antenna suitable for reduced-space locations from G2DYM. Called the 'E-Type' the inductively shortened antenna comes in a variety of lengths (from 17.5 to 35m) to suit different bands and available space. For more information on the 'E-Type' antenna contact **R. Benham-Holman G2DYM**, at 'Cobhamden' Beerdow, Upplowman, Tiverton, Devon EX16 7PH, or Tel: (01298) 361215.

Cushcraft R6000

I've had some news from Waters &



Stanton Electronics about the new Cushcraft R6000 vertical antenna they can supply. The R6000 antenna covers bands from 14 to 50MHz with the minimum number of traps for maximum efficiency. At only 5.5m high, the R6000 operates without ground radials allowing it to be pole or roof mounted. For more

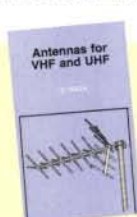
details contact Waters & Stanton Electronics at 22 Main Road, Hockley, Essex SS5 4QS, Tel: (01702) 206835 or FAX: (01702) 205843 for more details

GPS Antenna

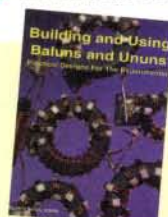
A new compact GPS receiving antenna from **Procom** of Denmark is



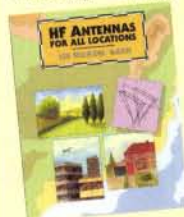
Antenna Impedance Matching £15.50



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HF Antennas For All Locations £14.65



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Vertical Antennas £8.95

available from **Communication Technical Services Ltd.** With a typical gain of 27dB and 5m of RG174 coaxial cable the antenna can be placed at the optimum point on the roof of the vehicle. The low-profile antenna is securely held in place by a magnetic mount, making it secure under almost all circumstances. For more details of this, or any other Procom antennas contact Communication Technical Services Ltd. at Unit 15, The Gatwick Metro Centre, Balcombe Road, Horley, Surrey RH6 9GA, or tel: (01293) 822602, FAX: (01293) 822612.



Chelcom Webwise!

Chelcom is the latest antenna, manufacturer to put their antenna products up, on the world-wide web, for everyone to see. If you have internet access try pointing you web-browser at their address of: <http://www.chelcom.com> If you're not internet friendly yet write to Chelcom at **Riverside House, Homecroft Drive, Cheltenham, Glos GL51 9SN**, Tel:/FAX on (01242) 680653.

Like A Comet?

If your looking for an antenna or

antenna accessory from the Comet range of products then you might like to send for the 1998 issue of the Nevada catalogue to browse through. There are three pages of antennas, vehicle mounts, duplexers and low-pass filters in the catalogue.

There are many more items of interest to radio hobbyists within the catalogue so get hold of a copy now from



Nevada, 189 London Road, North End, Portsmouth, Hants PO2 9AE, Tel: (01705) 662145, or FAX: (01705) 690626. For those of you with internet access, try <http://www.nevada.co.uk>

Books

Rob Mannion G3XFD has profiled six antenna related books on pages 54 and 55 of this issue so I'll leave it up to him. However, just as a taster, he says that *The Radio Amateur Antenna Handbook*, (All About) *Vertical Antennas* and *HF Antennas For All Locations*, are all 'highly recommended'. And that *Building & Using Baluns & Ununs* and *Antenna Impedance Matching* are both 'useful reference sources'. For the beginners Rob found that *Antennas For VHF & UHF*, is 'an ideal beginner's book'.

contents

News & Intro	23
Antenna Workshop	24
<i>Ray Fautley G3ASG</i>	
DX-Buster Antenna	28
<i>Roy Ratcliffe GW3KZW</i>	
Tex Topics	30

welcome to AiA!



Welcome to this month's 'Antennas in Action'. Once again I've reduced the amount that I have taken for 'Tex Topics', this time so that Ray Fautley G3ASG can expand on using a calculator in π -matching problems. However, I've managed to have a look,

on your behalf at the usual mixture of books and antennas! The antennas I've looked at, a commercial three-element folding antenna for 144MHz and a log-periodic for 105-1300MHz, are described in 'Tex Topics'.

I know that as I write this it's supposed to be the middle of summer, and many of you may be reading this on a beach somewhere else but, don't forget that we still need the shorter ideas for publication so, get writing! Each month, any reader's trick, tip or good idea published will win a copy of *More Out Of Thin Air*, or a voucher to spend in our Bookstore.

G17EX

antenna workshop

Pi-matching

**Ray Fautley
G3ASG shows
you how to
calculate the
values for π -
section
matching using
your Calculator**

A previous article on antenna matching in the October 1997 *PW* described a procedure for matching whatever impedance appeared at the shack end of the feeder from your antenna to the 50 Ω required by the transmitter. That type of matching network is usually referred to as an 'L' match because the circuit looks like a letter L, although admittedly not the right way up or right way round!

The L match is not the only method used for such matching. Another way is to use a ' π ' section network, so-called because the circuit configuration (Fig. 1) of the three matching reactances X_4 , X_3 and X_2 resembles the shape of the Greek letter ' π '. This time it is the right way up!

Mostly, the π network is remembered as the anode tuning and matching circuit for valve power amplifiers, where it performed both functions. In that case it was to match the output load resistance of 50 Ω to the very much higher value of the optimum anode load resistance for the valve, which could be as high as several thousand ohms.

Study of the design equations below shows the appearance of yet another symbol, 'Q'. You should remember(!) that Q is a measure of the 'goodness' of a tuned circuit, i.e., the higher the Q of a tuned circuit, the greater its 'goodness' or selectivity (or even its 'stiffness' as it used to be called long ago by the Admiralty Handbook of 1938).

So, how does the Q factor get involved with matching problems? From the work done on power amplifiers it was shown (well, sometimes it was!) that if the anode tuned circuit was very heavily damped, due to a resistive load applied to the amplifier's output (giving the tuned circuit a low value of Q), the transfer of power from the valve to the load (where it was needed) was greater than if it was lightly loaded. However, a lightly loaded (higher Q) tuned circuit provided greater selectivity, which in turn reduced the amplitude of valve generated harmonics.

So, we have to strike a compromise between high Q attenuating harmonics and low Q providing high power transfer. The best compromise has been found to occur when Q is in the range of five to 15. For low power and amateur transmitters a Q value of 12 is commonly used.

As with the L network matching circuits, we have two cases to deal with. First for where the parallel equivalent of the resistive part of the measured antenna impedance R_p is greater than the required load resistance R_L . For this case use Design Procedure 1. The second case is for R_p less than R_L , where we use Design Procedure 2.

Before we start the design of the network it's necessary to establish which of the two design procedures is needed. So, to begin by measuring the impedance at the

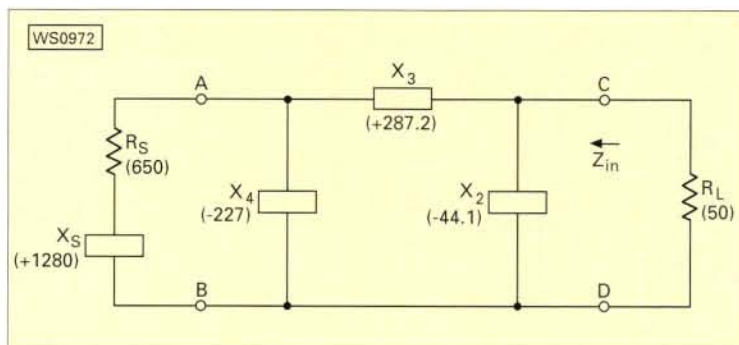


Fig. 1: When the load is a pure 50 Ω the network of X_2 , X_3 and X_4 will be needed to match the source impedance of (650+j1280) Ω for maximum power transformation.

shack end of the antenna feeder at the desired frequency of operation. If the impedance is given as a series combination made up of R_S and X_S , it must first be converted to its parallel equivalent values of R_p and X_p .

When you have calculated the equivalent parallel impedance figure then, if R_p is greater than the load resistance R_L (50 Ω), use Design Procedure One. If, however, R_p is less than R_L , use Design Procedure Two.

Let's first find the parallel equivalent (R_p and X_p) of a series combination (R_S and X_S):

Determine R_p

$$R_p = \frac{R_S^2 + X_S^2}{R_S}$$

Determine X_p

$$X_p = \frac{R_S^2 + X_S^2}{X_S}$$

Choose a value for Q (say 12)

Determine X_1

$$X_1 = \frac{R_p}{Q}$$

Determine X_2

$$X_2 = -\frac{R_p \times R_L}{\sqrt{(Q^2 + 1)} - \frac{R_p}{R_L}}$$

Determine X_3

$$X_3 = +\frac{(Q \times R_p) + \frac{R_p \times R_L}{-X_2}}{(Q^2 + 1)}$$

Determine X_4

$$X_4 = \frac{(-X_p)(X_1)}{X_1 - X_p}$$

Once again a worked example is the best way to get to know how to do it yourself

Example One

For example one let me assume that on measuring the impedance at the shack end of the feeder connected to an antenna at a frequency of 3.65MHz, that the impedance comprises 650 Ω resistance (R_S) in series with +1280 Ω reactance (X_S). The problem is to design a π matching network to convert this impedance to a pure resistance (R_L) of 50 Ω at 3.65MHz.

Procedure One

The following steps are what I call Design Procedure One. First convert the given series values of R_S and X_S to their equivalent parallel connection values, R_p and X_p .

Determine R_p

$$R_p = \frac{650^2 + 1280^2}{650}$$

Determine X_P

$$X_P = \frac{650^2 + 1280^2}{1280}$$

where $R_S = 650\Omega$ and $X_S = +1280\Omega$

First R_P using the electronic calculator.

```

6 5 0 [x] + 422500
1 2 8 0 [x] - 2060900
+ 6 5 0 0 3170.615
    
```

So $R_P = 3171$ (near enough)

Now for X_P , with the calculator.

```

6 5 0 [x] + 422500
1 2 8 0 [x] - 2060900
+ 1 2 8 0 1610.078
    
```

Giving $X_P = +1610$

As R_P (3171Ω) is greater than R_L (50Ω) this is a problem to be solved using Design Procedure One.

We'll use a value of 12 for Q
Determine X_1

$$X_1 = -\frac{3171}{12}$$

Now use your calculator to work out X_1 , to save space I'll omit this step, but you should have arrived at a value for X_1 of -264.3 in round figures.

Determine X_2

$$X_2 = -\frac{3171 \times 50}{(12^2 + 1) - \frac{3171^2}{50}}$$

On the calculator you would see something like:

```

3 1 7 1 [x] 3171
6 3 0 [-] 63.42
3 1 7 1 [x] 3171
6 3 0 [-] 158550
+ 3 0 0 12 [x] + 145
- 6 3 0 [-] 943.491
[=] 44.0850
    
```

Don't forget to negate (make minus) this number you have just calculated. So $X_2 = -44.1$ (again, near enough)

Determine X_3

$$X_3 = +\frac{(12 \times 3171) + \frac{3171 \times 50}{+44.1}}{(12^2 + 1)}$$

Again back to the calculator

```

3 1 7 1 [x] 3171
1 2 [-] 38052
6 3 0 [x] 50
3 1 7 1 + 158550
4 4 . 1 - 3595.238
+ 3 8 0 5 2 41647.238
1 2 [x] 144
+ 1 145
4 1 6 4 7 . 2 3 8 3 3 3 +
1 4 5 2871.222
    
```

Giving $X_3 = +287.2$
Determine X_4

$$X_4 = \frac{(-1610) \times (-264.3)}{(-264.3) - (-1610)}$$

Again as this is quite simple I'll miss out this step with the calculator, and so finally $X_4 = -227$ (again this is accurate enough for our needs).

Now follows the dreaded check on the arithmetic! If we disconnect the load resistance R_L from the network, the impedance looking into the network from terminals C and D (see arrow marked ZIN in Fig. 1) should be a pure resistance of 50Ω .

As another exercise (another time?) you could calculate the impedance looking into the network from terminals A and B with the feeder disconnected. If everything is correct, the answer should be equal to R_P in parallel with minus X_P , which is negative, because it has to tune out the positive reactance of X_P . (That's if you like this kind of work!)

Now let's return to the check looking into the network from terminals C and D (Fig. 1). First evaluate the effective parallel reactance of X_P and X_4 , we'll call it X_5 . This will be:

$$X_5 = \frac{X_P \times X_4}{X_P + X_4} = \frac{(+1610) \times (-227)}{1610 - 227}$$

A little work with the calculator gives us a figure of -264.3 for X_5 .

Next, convert the parallel network of R_P and X_5 to its series equivalent. Start with the effective series resistance, R_S .

$$R_S = \frac{R_P \times X_5^2}{R_P^2 + X_5^2} = \frac{(3171) \times (-264.3)^2}{(3171^2) + (-264.3^2)}$$

The steps on the calculator are fairly simple so, I'll omit them for space reasons. But you should find that

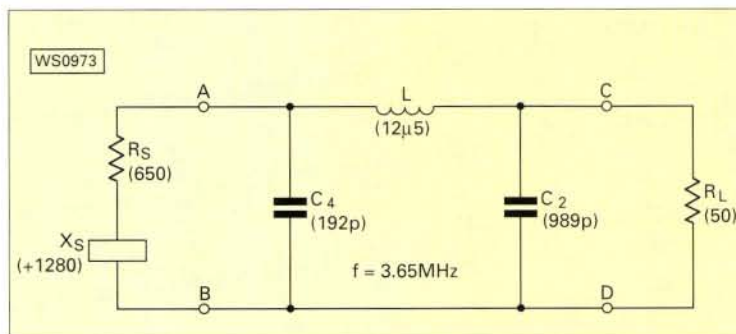


Fig. 2: When the impedances of Fig. 1, are changed to component values (for use in the 3.5MHz band) the circuit looks more familiar.

your figure for R_S comes to about 21.8Ω .

Now to work out X_6

$$X_S = \frac{R_P^2 \times X_5}{R_P^2 + X_5^2} = \frac{(3171^2) \times (-264.3)}{(3171^2) + (-264.3^2)}$$

Calculator

Again the steps on the calculator are fairly simple so, I'll omit them for space reasons. But you should find that your figure for X_S at -262.5 (notice the negative sign).

The next step is to add the series reactances X_S and X_3 , call the result X_6 .

$$X_6 = X_S + X_3 = (-262.5) + (+287.2) = 24.7$$

Which is fairly easy to carry out on the calculator. So, $X_6 = +24.7$ in round figures.

Finally, we have to change the series network of R_S and X_6 to its parallel equivalent.

$$R_P = \frac{21.8^2 + 24.7^2}{21.8} = 49.97$$

After you work with the calculator, you should find the effective resistance of R_P as 49.8Ω (near enough to our target of 50Ω ?).

The 'nearly last' bit is to evaluate the effective parallel reactance.

$$X_P = \frac{21.8^2 + 24.7^2}{24.7} = 43.94$$

As the previous example, it's fairly simple, giving an effective reactance for X_P of $+43.9\Omega$.

The really last thing to do is put the just calculated X_P in parallel with X_2 . Well, if you put $+43.9\Omega$ in parallel with -44.1Ω , which as it's fairly close to nothing (I know it isn't really, but it is close) you won't be far off resonance! QED!

Arithmetic Verified

Having verified all the arithmetic, it remains to give X_2 , X_3 and X_4 actual component values for use at the design frequency of 3.65MHz.

We'll start with X_2 . The reactance value calculated is -44.1Ω . As the reactance is negative we know that the component will be a capacitor. From the basic formula for capacitive reactance:

$$X_C = \frac{1}{2\pi f C}$$

and a simple bit of transposition:

$$C = \frac{1}{2\pi f X_C}$$

with f in Hertz and C in Farads. We can simplify the calculations necessary by making the equation suitable for f in MHz and C in pF (much more practical units). If, at the same time, all the constants in the equation are combined into a single number we get:

$$C = \frac{159155}{f \times X_C} \text{ pF}$$

Now we put our reactance value and required frequency into the equation.

$$C_2 = \frac{159155}{3.65 \times 44.1} \text{ pF} = 988.76 \text{ pF}$$

On your calculator you should have calculated your first component, the capacitance value for X_2 , as 989 pF . This capacitance we'll call C_2 .

Next, use the same method to find the value of the capacitance that is... X_4 .

$$C_4 = \frac{159155}{3.65 \times 227} \text{ pF} = 192.62 \text{ pF}$$

CONTINUED ON PAGE 26.....

antenna workshop

On your calculator you have calculated the value of your second component, C4, which you should have found around a value of 192pF.

Finally we have to find the value of inductance for X3.

From the formula for inductive reactance:

$$X_L = 2\pi f \times L$$

and transposing:

$$L = \frac{X_L}{2\pi f}$$

With another bit of mathematical magic we get:

$$L = 0.159155 \left(\frac{X_L}{f} \right) \mu\text{H}$$

which has f in MHz and L in μH with just one number for the constants.

Putting our values for X_L and f in the above equation:

$$L = 0.159155 \left(\frac{287.2}{3.65} \right) \mu\text{H}$$

2	8	7	.	2	=	287.2
3	.	6	5	=	78.6849	
x					78.6849	
.	1	5	9	1	5	5
=					159.155	
=					12.5231	

finally giving the inductance value required as 12.5 μH .

The really, really final touch is to put the component values onto the network circuit as in Fig. 2. But is it really final?

Another Check?

What another check? I hear you say. Well, after all this work it would give us confidence if we could make one last test. The inductance, which is connected across (i.e. in parallel with) the two capacitances in series - well, look at Fig. 2 again - should resonate fairly close to the operating frequency of 3.65MHz. Does it? To find out, first determine the effective value of C2 and C4 in series.

$$C_S = \frac{C_2 \times C_4}{C_2 + C_4} \text{ pF}$$

If we put in the values for C2 and C4:

$$C_S = \frac{989 \times 192}{989 + 192} = 160.79 \text{ pF}$$

Calculator

Use your calculator to evaluate the above equation and you should find the effective capacitance as 161pF.

Now we must find the frequency at which 161pF and the inductance 12.5 μH resonates. Using the formula for resonance:

$$f = \frac{1}{2\pi \sqrt{L \times C}}$$

where f is in Hertz, L is in Henries and C is in Farads.

Simplifying the arithmetic again we get:

$$f = \frac{159.155}{\sqrt{L \times C}} \text{ MHz}$$

with f in MHz, L in μH and C in pF.

Putting our numbers into the equation:

$$f = \frac{159.155}{\sqrt{12.5 \times 161}} \text{ MHz} = 3.5478 \text{ MHz}$$

Using the calculator you may start finding the square root of the bottom line of the equation before **inverting** this figure and **multiplying** it by the top line. So:

1	2	.	5	x		12.5
1	6	1	=		2012.5	
=					44.86089	
=					0.022291	
x	1	5	9	1	5	5
=					159.155	
=					3.5477445	

Then we get a frequency of 3.55MHz, close enough to the design frequency of 3.65MHz. That really is the end - at least for that example!

Second Procedure

Now it's time to look at the second procedure and this time we find out how to evaluate the components required to match an antenna system which has a resistive component **less** than the 50 Ω we want to transform it

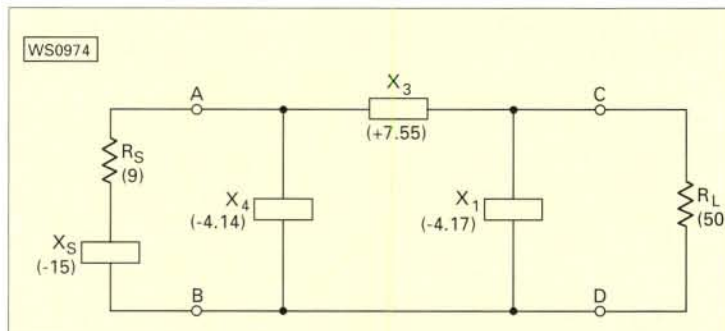


Fig. 3: Looking similar to the network of Fig. 1, this is to match the load (50 Ω) to a much lower value of source impedance of (9-j15) Ω .

into. This time we're moving on to use Design Procedure Two

Having first determined the effective parallel equivalent of the impedance at the shack end of the feeder connected to the antenna and found it to be less than 50 Ω we continue as follows. (Equations for converting a series combination of R_S and X_S to their parallel equivalents R_P and X_P are shown in the first part of the article.) Fig. 3 shows the π -network needed.

Choose a value for Q and, again I will use the figure of 12. Determine X_1

$$X_1 = -\frac{R_L}{Q}$$

Determine X_2

$$X_2 = -\frac{R_P \times R_L}{\sqrt{(Q^2 + 1)} - R_P}$$

Determine X_3

$$X_3 = +\frac{(Q \times R_L) + \frac{R_P \times R_L}{(Q^2 + 1)}}{(Q^2 + 1)}$$

Determine X_4

$$X_4 = \frac{(-X_P)(X_2)}{X_2 - X_P}$$

Now, the inevitable example!

Second Example

Let's now look at a second example. At the shack end of the feeder connected to the antenna, the impedance is measured as 9 Ω resistance in series with -15 Ω reactance (called R_S and X_S) at a

frequency of 28.8MHz. Determine the π network components necessary to convert the antenna system to a 50 Ω resistance.

Convert the given series values of R_S and X_S to their equivalent parallel values of R_P and X_P .

$$R_P = \frac{R_S^2 + X_S^2}{R_S}$$

$$X_P = \frac{R_S^2 + X_S^2}{X_S}$$

where $R_S = 9\Omega$ and $X_S = -15\Omega$

$$R_P = \frac{9^2 + (-15)^2}{9}$$

On the calculator to work out both R_P and

$$X_P = \frac{9^2 + (-15)^2}{-15}$$

First take R_P . Using your calculator. Turning again to the calculator for an evaluation of the formula

9	x	+		81
1	5	=		-15
=				225
=				306
=				34

Which gives $R_P = 34\Omega$ Now for X_P .

9	x	+		81
1	5	=		-15
=				225
=				306
=				-15
=				-20.4

So $X_P = -20.4\Omega$. Let $Q = 12$. Determine X_1

$$X_1 = -\frac{50}{12}$$

Let's use the calculator for evaluating

Pi-matching

this equation
Giving $X_1 = -4.17$
Determine X_2

$$X_2 = -\frac{34 \times 50}{(12^2 + 1) - \frac{50}{34}}$$

Have a go on your calculator to arrive at your solution, so, $X_2 = -3.44$
Determine X_3

$$X_3 = +\frac{(12 \times 50) + \frac{34 \times 50}{3.44}}{(12^2 + 1)}$$

Have a go on your calculator to arrive at your solution, so $X_3 = +7.55$

Determine X_4

$$X_4 = \frac{(20.4) \times (-3.44)}{(-3.44) - (-20.4)}$$

Have a go on your calculator to arrive at your solution, giving $X_4 = -4.14$
The network with the derived values is shown in **Fig. 3**. But just to verify these values we'd better do our check on the arithmetic for this example.

Antenna Disconnect

This time we'll disconnect the antenna feeder from the network and measure the Z_{IN} looking into the network from terminals A and B. (Fig. 3.) This impedance should work out to be 9Ω resistance in series with $+15\Omega$ reactance. Again, the reactance should be positive so as to resonate with the -15Ω of the antenna system.
First work out the series equivalent of the parallel connection of R_L and X_1 .

Putting in the values for R_L and X_1 :

$$R_S = \frac{R_L \times X_1^2}{R_L^2 + X_1^2} = \frac{50 \times (-4.17)^2}{50^2 + (-4.17)^2}$$

Again, we use the values for R_L and X_1 , though slightly differently:

$$X_S = \frac{R_L^2 \times X_1}{R_L^2 + X_1^2} = \frac{50^2 \times (-4.17)}{50^2 + (-4.17)^2}$$

The results are that $R_S = 0.345\Omega$ and $X_S = -4.14\Omega$

Now add X_S to X_3 . Call the answer X_A

$$X_A = X_S + X_3 = (-4.14) + (+7.55) = 3.41$$

Putting in X_S and X_3 values:
So, $X_A = +3.41$. Giving us 0.345Ω resistance in series with $+3.14\Omega$ reactance.

The next step is to convert this series network into its parallel equivalent. Call this parallel network R_B and X_B .

Find R_B .

$$R_B = \frac{R_S^2 + X_A^2}{R_S} = \frac{0.345^2 + 3.41^2}{0.345} = 34.05$$

Again we use the values for R_S and X_A in the formula:

$$X_B = \frac{R_S^2 + X_A^2}{X_A} = \frac{0.345^2 + 3.41^2}{3.41} = 3.44$$

Working these out gives the results that $R_B = 34.05\Omega$ and, $X_B = +3.44\Omega$. The next step is to find the effective value of X_4 in parallel with X_B . Let's call the value X_C so that:

$$X_C = \frac{X_4 \times X_B}{X_4 + X_B} = \frac{(-4.14) \times (+3.44)}{(-4.14) + (+3.44)} = 20.35$$

Putting in the values for X_4 and X_B :

(use your calculator font for evaluating equation 56)
Which gives $X_C = +20.35\Omega$. The final step is to find the series equivalent of the paralleled R_B and X_C . Call the series resistance and reactance, R_D and X_D .

$$R_D = \frac{R_B \times X_C^2}{R_B^2 + X_C^2} = \frac{34.05 \times 20.35^2}{34.05^2 + 20.35^2}$$

Put in values for R_B and X_C :

Once more we turn to the calculator for evaluating the equation and I will step through it as an aid to helping you to understand how to use your calculator. So,

$$\begin{array}{r} 34.05 \\ \times 20.35 \\ \hline 414.1225 \\ \times 20.35 \\ \hline 14100.871 \\ + 414.1225 \\ \hline 14514.9935 \\ \div 20.35 \\ \hline 713.525 \\ \div 20.35 \\ \hline 8.961326 \end{array}$$

$R_D = 8.96\Omega$ (very close to 9Ω).

$$X_D = \frac{R_B^2 \times X_C}{R_B^2 + X_C^2} = \frac{34.05^2 \times 20.35}{34.05^2 + 20.35^2}$$

Put in values for R_B and X_C :
Use your calculator for evaluating this, giving $X_D = +14.99\Omega$ (even closer to 15Ω !) Positive, of course, to cancel out the -15Ω of the antenna system.

That concludes the calculations to find the values of the reactances necessary for correct matching. It remains to determine the component values for use at the example frequency of 28.8MHz .
Starting with C_4 :

$$C = \frac{159155}{f \times X_C} \text{ pF}$$

Putting in the values:

$$C_4 = \frac{159155}{28.8 \times 4.14} = 1334.83 \text{ pF}$$

I'll let you use your calculator for evaluating, but you should have a result for the value of C_4 at around 1335 pF .

"The inductance, which is connected across (i.e. in parallel with) the two capacitances in series should resonate fairly close to the operating frequency of 3.65MHz. Does it?"

Now for the inductance L :

$$L = 0.159155 \left(\frac{X_L}{f} \right) \mu\text{H}$$

With the values for X_L and f :

$$L = 0.159155 \left(\frac{7.55}{28.8} \right) = 0.042 \mu\text{H}$$

Once again use your calculator for evaluating to give inductance L is $0.04\mu\text{H}$.

The last component to evaluate is C_1 . Putting in the reactance for X_1 and the frequency of 28.8MHz into:

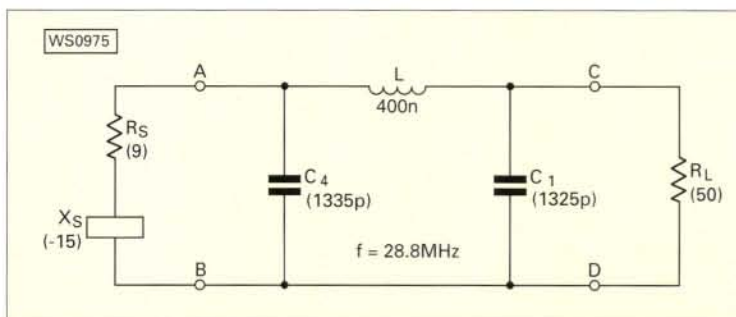
$$C_1 = \frac{159155}{28.8 \times 4.17} \text{ pF} = 1325.23 \text{ pF}$$

Giving C_1 a value of 1325 pF .

That brings us to the end of the calculations. It just remains to put the values you've calculated into the π -match circuit as shown in **Fig. 4**, the actual component values for matching the antenna system at the design frequency of 28.8MHz .

Do have a go yourself! Just use some imaginary R and X values and get calculating the component values for one of the amateur bands!

Fig. 4: When the impedances of **Fig. 3**, are changed to component values (for use in the 28MHz band), again the circuit looks more familiar.



■ DOWN ON THE ANTENNA FARM, HUGE ANTENNAS ARE POSSIBLE, AND ROY GW3KZW SHOWS YOU HOW TO 'GROW-ONE' FOR THE 80M BAND! AND, IT'S SCALABLE IF YOU HAVEN'T GOT THE SPACE.

The DX-Buster

Here's a 'brute' of an antenna for the 3.5MHz band, described by Roy Ratcliffe GW3KZW, and it really is 80m long! So, for once we can say this is an 80m antenna for the 3.5MHz band. Have you got room for one in your garden?

The antenna I'm about to describe is an antenna for 'winkling' out the DX on the 3.5MHz band, but please note that, as presented, this isn't a project for the faint hearted - or those with a postage stamp sized garden!

The antenna was devised after many frustrating hours of experimenting with a variety of antennas, inverted 'V' antennas, verticals, etc., which the books said would work DX. However, from my QTH the antennas worked nothing and, as low band DXing is the main interest, something had to be done to improve matters.

After some thought I decided to try a delta or full-wave loop (300/f)m to determine the wire length. Although this usually produces a wire length slightly too long to

resonate at the 'target' frequency, this would be taken care of later. The wire was erected in the well known 'delta' configuration with the apex at approximately 20m and the feeder (coaxial cable) connected into one of the bottom corners.

Half-Wave Long

The coaxial (inner conductor connected to the sloping wire) was cut to be half-wave long (at 3.75MHz again). But please note, you must not forget the velocity factor of the coaxial cable when calculating lengths. The formula is: $(300/2 \times f) \times V_f$ in metres, where f is the working frequency (in megahertz) and V_f is the velocity factor of the cable used.

From manufacturer's data sheets, the nominal velocity factor for typical solid dielectric coaxial cable seems to be about 0.66. For a typical coaxial cable I mean such as RG58 and RG213 type of coaxial cable. Put more simply, the length of the coaxial feeder I used was $(300/2 \times 3.75) \times 0.66$ or some 26.4m long.

Strength Tested

The wire used to create the loop, had been tested for strength at the outset. I found that in terms of performance there was no observable difference between 'solid' or stranded wire used to form each single loop. The single loop unit was clearly the best antenna I had tried, particularly in its favoured directions of east/west. Then came the inevitable question (as ever), how do I make a good antenna better?

After a few moments head

scratching, I had the idea of a two-element antenna, i.e. driven element and reflector. The idea began to take shape and, the decision was taken to 'go for it'. The tower I was using, had a scaffold pole extension at the top rising to a little under 18m high.

The extension pole was lengthened a little and, was fitted with a crossbar pole approximately five metres long at the top. Both ends of the crossbar were fitted with a pulley and a loop halyard. From past experience, a single length halyard was discounted (when they break you're stuck).

Tuning Operations

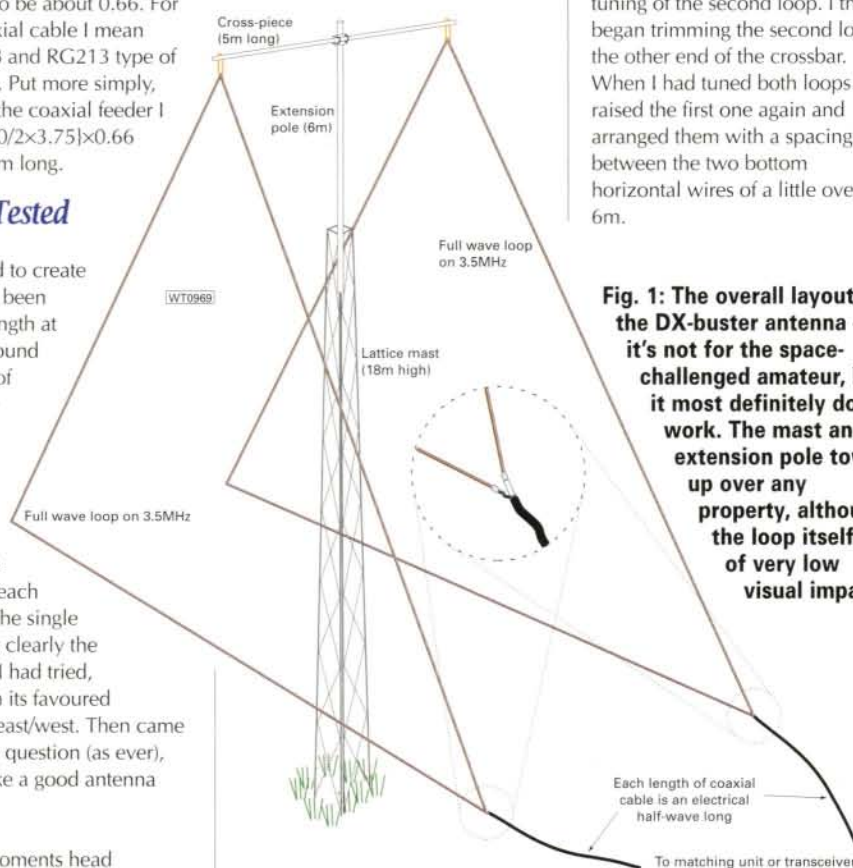
The antenna wire was next passed through an insulator which was then attached to the halyard and raised to begin the tuning

operations. The tuning operation was by checking resonant frequency, then snipping off wire (at the feed-point), in short lengths as needed to give resonance at 3.75MHz. During these tests I ignored the s.w.r. figure, as the feed-point impedance of a single full-wave delta loop is approximately 100-120Ω, which gives an s.w.r. of about 2:1 and is quite normal.

It's desirable to have a helper while engaged on these adjustments, as there is likely to be a fair amount of lowering and raising of the wire. As my XYL is licensed, I had the helper and, even better, an interested one at that. So, with the willing helper I completed the tuning procedure on the first loop.

This first loop was lowered to the ground so as not to influence the tuning of the second loop. I then began trimming the second loop at the other end of the crossbar. When I had tuned both loops I raised the first one again and arranged them with a spacing between the two bottom horizontal wires of a little over 6m.

Fig. 1: The overall layout of the DX-buster antenna - it's not for the space-challenged amateur, but it most definitely does work. The mast and extension pole tower up over any property, although the loop itself is of very low visual impact.



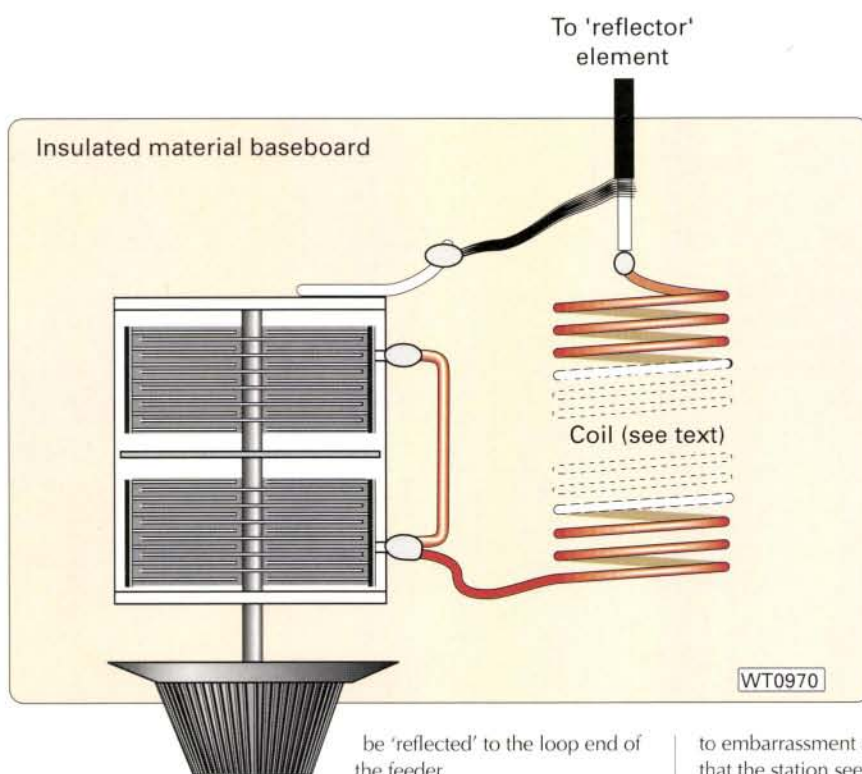


Fig. 2: A tuned circuit to create the phasing unit may be made up of a coil of about 12 μ H and 175pF capacitance. A suitable start point for the coil could be 20 turns of 1.25mm enamelled copper wire on a 38mm diameter former with a winding length of about 30-35mm. (See editorial comment in separate panel).

As A Reflector

In order to function as a reflector, one of the loops needs to be approximately 5% longer than the driven element. This is where the half-wave feeders come into play. Whatever is connected to the transmitter end of the feeder will

be 'reflected' to the loop end of the feeder.

The 'reflection' effect is exploited by connecting an inductor across the bottom end of the feeder in order to effectively lengthen the undriven element so, forming a reflector. The inductor was 'adjusted' by using a variable capacitor to adjust the effective inductance. This tuning arrangement could be switched between the two feeders in order to reverse the 'direction of fire'. See the separate box for the circuit to try as a tuning circuit.

Tuning Circuit

The tuning circuit was adjusted to its optimum point by tuning into a station, putting and varying the capacitor for a maximum 'dip' on the S-meter. Then switching to the other feeder produced a markedly stronger signal. From this test the two directions of the switch were marked. The third position of the switch connects the two loops in parallel, which produces almost all round coverage.

One of the characteristics of the antenna, particularly when in directional mode, and one that led

to embarrassment at times, was that the station seemed 'deaf' to 'G' stations. Many UK amateurs couldn't be heard when they were trying to break-in when DX was being worked. Quite a number of stations didn't understand that antennas with low radiation angles are poor for 'local' contacts, sometimes leading to accusations of 'standoffishness', although at other times of course, this 'deafness' was a boon.

The antenna gave an excellent account of itself, with VK and ZL

contacts being commonplace, along with regular contacts with Japan. And in the winter months of December - January, W6 & 7 were regularly worked via a long path and some of the Pacific islands. During the course of numerous contacts with 'G' stations the antenna aroused much interest and descriptions were requested along with the suggestion that a description should be published.

Due to personal circumstances which forced a move of QTH, this antenna is no longer in use and is sorely missed. But, it's my intention to install it, or something similar at the new QTH - as soon as possible.

For anyone that would like to join the 'big guns' on 3.5MHz, this antenna is 'hugely' recommended.



"During the course of numerous contacts with 'G' stations the antenna aroused much interest and descriptions were requested along with the suggestion that a description should be published".

Editorial Comment:

A suitable start point for the coil could be 20 turns of 1.25mm enamelled copper wire on a 38mm diameter former with a winding length of about 30-35mm. This will produce a coil with an inductance of about 12 μ H and, by using a capacitor with a mean value of about 175pF (400-500pF maximum) capacitance, you can adjust the circuit for the correct setting.

You could try any other combination of coil and capacitance giving the same value of 2100(μ HpF) as this combination of inductance and capacitance is resonant around 3.5MHz. Please remember that any coil you use should be made up from a fairly thick copper wire to reduce losses.

Space-Challenged

For those of us that are a little more space-challenged (most of us) without an area large enough area to try out the DX-Buster antenna for 3.5MHz, why not try scaling it for other bands. I've made a full-wave delta loop for the 50MHz band and it's very manageable in size.

To turn my delta loop antenna for 50MHz into a DX-Buster version for the band, would need a support pole only about three to four metres high to put the horizontal runs above head height. By scaling the various sizes you could create a similarly functioning DX-Buster antenna for other bands.

G17EX

tex topics

antennas in action

As space is somewhat limited this month, let me stop rambling and 'get going'. **Rob Mannion G3XFD** passed over to me an E-mail from **Bob Adlington M0BOB** asking for some advice about how to improve his system. Bob says his present h.f. antenna is an half-sized G5RV running diagonally (at a height of some 6.5m) from the apex of his roof to the opposite corner of the garden, which is only eight metres wide and 12m long.

Bob goes on to say his contacts are mainly into europe and he wonders if readers have any ideas how he might improve his setup. For those of you with E-mail access, how about dropping him a line to: **M0BOB@mcmail.com** but, if you don't have E-mail yourself, you could drop me a line in the office and I'll forward it to him, on your behalf.

A New Book

Now let me describe a new book from **Joe Carr K4IPV**. Hot off the press from Newnes, comes *Antenna Toolkit*, an A5 sized book of antennas and design information for various antennas. With over 200 pages, the book is copiously illustrated making it easy to read and find a topic on any of the antennas.



There are 11 chapters dealing with topics such as Antenna basics, Wire, Connections, Grounds and all that, Doublets, Marconi and other unbalanced antennas, Limited space antennas, Wire arrays, Impedance matching, and getting a good ground. There's also a chapter on 'Simple antenna instrumentation and measurements'.

Last but not least, although the book seems expensive at £25 (From the PW Bookstore), mounted in an envelope inside the back cover is a CDROM containing a suit of computer programs, suitable for an IBM PC or clone running Windows (3.1 or 95). The suite of programs, *Antlers 2* make many antenna, coil and tuned circuit calculations much easier by taking out the hard work involved.

There are two other programs on the

CDROM, but with minimal support. The two programs are a copy of *MiniNEC* and *VOACAP* which is basically a propagation predictor as used by the *Voice of America* team when trying to decide which frequencies to use through out the day, to reach other areas of the globe. An excellent book for all levels of use.

Moonraker Halo

I've been playing with a **Halo Loop** antenna from **Moonraker** for the 50MHz (6m) band recently. The Halo



Fig. 1 The Moonraker Halo Loop antenna seen from below.

type of 'bent' half-wavelength antenna has been around for some time (I first saw a 144MHz version on a car in reading in the late 1960s). But this is the first time I've seen one for the '6m' band.

The antenna is normally mounted in the horizontal plane, **Fig. 1**, where it is shown at the top of the pole I use.

Although it is horizontally polarised, the antenna is unusual in that it gives almost omnidirectional performance, although not as good all-round as a vertical antenna would be. To match the 50Ω impedance of the coaxial cable feed a Gamma-match line is used, **Fig. 2**. Although this matching method can give a good match and low s.w.r. when adjusted, it is a little narrow-band in operation, **Fig. 3**.

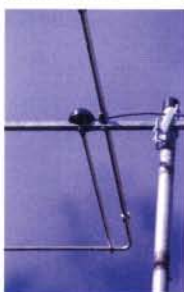


Fig. 2: A Gamma-match bar allows a good match to be made over part of the 50MHz band.

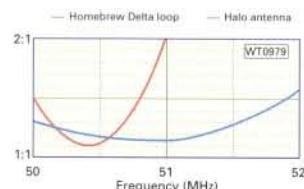


Fig. 3: Comparing the s.w.r. curves for the Halo Loop antenna against a full-wave delta loop antenna with a π -match unit.

The Halo antenna from Moonraker (priced £24.95) didn't quite have the signal gain of the home-brew delta loop antenna (matching curve also shown in **Fig. 3**) it gave much better all round performance. A very useful antenna that could be fitted in the roof space of even a small house (or even inside a small flat) to allow 50MHz operation.

Log Periodic

Another antenna I've been trying out recently is the **Scanmaster LP1300**

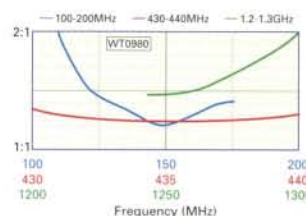


Fig. 4: The Scanmaster LP1300 has an adequately low s.w.r. over the 144, 430 and 1200MHz bands.

(105-1300MHz) Log Periodic antenna from **Nevada**. Looking like an arrowhead the Scanmaster LP1300 is reputed to cover from 105 to 1300MHz. So I tried it out!

Firstly I checked the antenna, over as much of its claimed bandwidth as I could, for the matching and s.w.r. The results are shown in **Fig. 4**. I used my MFJ antenna analyser to measure ('guesstimate') the matching between 105 and 175MHz, checking with a transmitter between 144-146MHz.

As you can see in the s.w.r. curves of **Fig. 4**, the antenna matches quite well in the 144, 430 and 1200MHz bands. There was a pronounced 'dip' in the s.w.r. curves around the 144MHz band, but over the whole of the 430MHz band both low s.w.r. and gain were very good. The front-to-back ratio was very pronounced also in this band. In the 1.2GHz band the s.w.r. and matching were beginning to fall off again, although still adequate for the average user, I doubt it would satisfy the avid '1.2GHz user'.

One advantage of the Scanmaster LP1300 was that the gain/s.w.r. seemed to be reasonably flat over the complete lower portion of the 1240-1300MHz band making the antenna useful for both ATV and 'normal' narrow-band modes higher up in

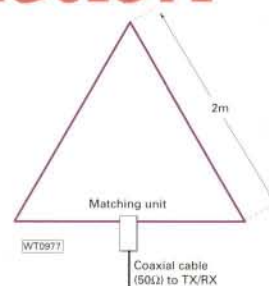


Fig. 5 A simple full-wave delta loop antenna for the 50MHz band.

frequency. At £99, the antenna makes a useful addition to the antenna farm for cross-band work with only one antenna.

Other Antenna

The other antenna s.w.r. curve shown in **Fig. 3**, is a simple delta-loop antenna that I made for the 50MHz band. The antenna **Fig. 5**, was created when I needed a 50MHz antenna quickly and cheaply so, the dimensions are not that accurately calculated, the loop itself is almost exactly six metres round, but it works. The matching box shown in the drawing of **Fig. 6** was also empirically derived ('guesstimated') and could be improved. But it also works, so why change it!

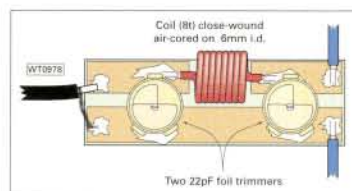


Fig. 6: And an equally simple antenna matching unit for the delta loop.

The matching unit is to match the 50Ω coaxial cable to the 100-120Ω input impedance of the delta-loop and should be adjusted for lowest v.s.w.r. mid-band. As shown in **Fig. 3**, the lowest s.w.r. isn't quite as low as for the halo loop from Moonraker, but it is much flatter, being acceptably low over the whole of the band. This wide band matching is due mainly to the matching unit being at the antenna feed point and so being a true 'Antenna Matching Unit'.

Well I'm afraid I've run out of space again. I'll see you in the next issue of 'Antennas-in-Action'.

Tex **aa**

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PW9/98

So Thank You Mr Marconi, Grandad

Peter Norman
GOPKS explains
why he was
'late' getting
on-air, as well
as passing on
thanks to those
who helped
him along the
way.

Although I've had my licence for a few years now, I didn't make my first appearance on the bands until Easter 1995. Why? Well, there's a number of reasons really. Some of my reasons I think sound feeble and others are to do with promises I made myself, about how I was going to operate (most of which went by the board....). Anyway, I thought it might be nice to share some of my thanks and tributes with the readers of PW.

Making It Possible

So, thank you Mr Marconi, for making it all possible. Yes, I know he wasn't the only one and that great inventions are rarely the work of one man, but evolve from the work of various hands working along the same lines. But for the non-scientists amongst us, it's Marconi's name that is synonymous with radio.

All those stories about the early trials and tests have a romantic air to them, though I don't suppose for one moment they were so easy. I suppose it has, something to do with sepia prints. What's more, talking about Marconi leads me neatly to... My Grandad.

I mention my Grandad, because I have his old Marconi CR100, which used to sit on a desk by his armchair (it was a strong desk!) and with which my brother and I were allowed to fiddle to our hearts' content. Yes, fiddle with it and enjoy the pops and crackles emanating from the elegant, round, black, diecast Eddystone speaker that sat on top, borrowed from the S640 in the hall (I've got that too!).

Proper Sheds

What's more, Grandad was a great one for sheds. No, I don't mean skeds, **I mean sheds**, those wooden ones at the bottom of the garden. He had two large sheds and one smaller one, not to mention an old, wooden telephone kiosk and some spare telegraph poles (he had worked for the GPO!).

Grandad's sheds were certainly not of the average variety. His were **proper sheds** of painted corrugated iron and recycled wood, with doors that almost fitted on a good day with a following wind.

Well, his sheds were stacked full of old defunct radios, or rather, I should say that they were stacked with wireless sets from the 1930s and 1940s. On his allotment was another shed devoted to wind-up gramophones and brittle old '78s' of Stanley Holloway, Caruso, Gracie Fields and the like.

If only I had them now I could make a fortune. Which brings me to Clive....

Which Clive?

So, which Clive might that be? Of India? Surely not. Clive Dunn of *Grandad* and *Dad's Army* fame? Not this time, although I do have my Grandad's *Home Guard Training Manual* with instructions for knocking out a tank!

I speak of **Sir Clive Sinclair**, he who has wrought great change. For at the time, (I am referring to the early sixties here), adverts started to appear for the 'Micro-6', the

'Micromatic' and the 'Micro-FM'. I still have my 'Micromatic' - a match box marvel of modernity of its time.

I wonder how many other 1960s teenagers have still got a copy of Sir Clive's book on sub-miniature receivers? I still haven't got **any** of mine to work!

Along the same lines, *PW* published a design for a solar-powered transistor receiver, also of match box dimensions. Unfortunately, the sun did not shine on my particular example either. This seems to be a recurring theme - my inability to make technology work for me the way I want it to.

Take, for example, the *PW* Clubman. This was a lovely modular design by **J. Thornton-Lawrence GW3JGA** and it was going to be my breakthrough in home-brewing. Although I say it myself, my version, with all the options, was absolutely beautiful, black case and blue front panel with white lettering (to match the CR100 of course). The only snag was.....my version didn't work!

I think looking back, it had something to do with the fact that I used 0.15in pitch Veroboard instead of 0.1in (or vice

"If anybody wants a set of parts.....I've got some!"

So thank you



Dad, Clive & The Vicar...

versa) and so had to re-design the i.f. strip and the i.f.t.s didn't match the holes properly and I didn't have the right test gear and....but what good are excuses? If anybody wants a set of parts.....I've got some!

The Vicar

Over the years I've tried to keep up with developments and have continued to buy *PW* and *SWM* and it was in the latter that I came across The Vicar. Those in the know will have little trouble in guessing that I refer to none other than the **Rev. George Dobbs G3RJV**.

Over the years, George, if I might make so bold, has taught me that technology does not have to be mind boggling. The title of his original *SWM* series tells you this: 'Plug in your soldering iron and start here', or one in my cuttings book which appeared in another mag, 'Work the States from under £20.....£10....or even £5'.

It's G3RJV's writing above all others that encouraged me to carry on regardless and take the RAE and pass the Morse. So, thank you very much George and the G-QRP Club.

Kit From Heathkit

At this point I must add another rambling thank you, as I think I was one of the last people to buy a kit from **Heathkit** before they left the Amateur Radio market. I put together an HW-9, expensive it was too, having to send to the States to get the accessory pack for the WARC bands.

And of course, the HW-9 did not work, thanks to those inevitable dry solder joints in which I specialise and which are hard to trace! I had to ask someone to get it going for me. It put me off for quite a while, but then I happened to pass a shop in town trading in old wireless sets and the like.

There, sitting in the shop window, was a KW2000A. This was it and money exchanged hands.

New problems arose however, I had geared myself to low power working only and this was a different order. A flurry of building ensued to produce suitable ancillary gear.

Eventually, I acquired a Shure 444 microphone. And then it was time for the plunge. Sadly, nothing seemed to want to come out of the back and up the open wire feeders to my horizontal wire loop.

I telephoned a local amateur who advertises in the back of the magazines and although he was really helpful, he did not sound all that hopeful about the KW. (He also pointed out that insects have antennae, radios have aerials and 'best 73s' is a nonsense - no need for 'best' as 73 is already plural!).

I was sitting in my cupboard, (yes, really I was!) on Saturday afternoon listening to a contest on 3.5MHz. I heard OT5A calling CQ and I thought, "that's a strange call". It's not on my lists, what the heck, so I called him and Practical Wireless, September 1998

to my alarm and astonishment, he answered.

Apparently, I was his 433rd contact, so I thought I'd better give him 001. I was stunned and shocked for an hour afterwards.

Why I had suddenly managed to get out I don't know. So, imagine my surprise when a few days later I managed to work 4U/KC0PA, located in the Western Sahara, also on 3.5MHz, without being on the list, he gave me 33. I was very proud.

Local Net

The following Wednesday, I stumbled across the local Net

and lo and behold, it transpired that the wife of one of the chaps used to work with my wife. One thing led to another and I went along to the club, which leads me onto my last specific 'thank you'.

A local amateur wanted to borrow a QRP rig to take to Canada for six months. In return, he would be happy to loan his base station rig. So, I mentioned that I would be happy to let my HW-9 go on holiday abroad for a while.

In the end, the HW-9 stayed at home, but this local chap, who had never met me and knew

practically nothing of me, loaned me his rig anyway! The gear was moved to an attic room and an indoor helical antenna pressed into service.

Actually, the antenna was busy holding up the plaster of the ceiling, but by dint of finally getting round to repairing the plaster, the antenna, sorry, the aerial could be removed to the garden and a kind of top-fed half lambda sloping helical created. (I wonder if there is such a thing, if not, I hereby claim proprietorial rights and shall call it the AOG - well, yes I know it is an Act Of God, (but also an Attic Or Garden), pretty neat heh?).

An earth was connected to the rising water main to the

cold water tank that shares the shack. It's an interesting design feature I feel, and hopefully if stations I

work hear the sound of running water in the background, they might imagine that I am sitting by a raging torrent in some exotic mountain location!

So, there was a frenzy of activity again and then much puzzling over trying to find a suitable phrase for foreign QSLs. There was also the thrill of working across the Atlantic for the first time to Boston, knowing that the school rugby team was in town at the time on tour!

Then came the astonishment of working VE3SZO/P on Easter Monday after he had driven across a frozen lake to get to his log cabin to use his solar powered rig into a cubical-quadrant antenna. Isn't it strange how we return to our beginnings, albeit perhaps in a modern format?

For many, such contacts are no doubt commonplace, but for those of us just starting out on the great adventure, it is all very new and exciting. This is why I say thank you to all those who, unwittingly and unknowingly, have helped me over the years.

PW



Shed devoted to wind-up gramophones ...

"Why I had suddenly managed to get out I don't know"

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DR-M06T 6mtr ~~£219.00~~
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DR-430 70cms, 35W ~~£259.00~~

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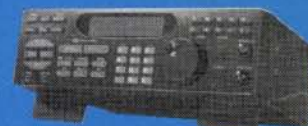
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FINANCE EXAMPLE

All examples do not include PPP.

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The Alinco DJ-C5E

Good things Do Come In Small Packages!

Following on from his review on the Alinco DJ-C1 and C4 'mini' transceivers last year, we set Dick Pascoe G0BPS the task of looking at the newly introduced dual-band DJ-C5E version. Read on to find out what he thought

"The addition of a speaker changes the C5E rig from a 'complex toy' into a 'real radio'..."

At this time last year I had just returned from the south of Germany after the annual DARC Rally in Freiderichshafen on the edges of the Bodensee, or as I call it - Lake Constance. This is a particularly nice part of Germany that I love. Not only are the views spectacular but the people are great too.

At that time I took the Alinco DJ-C1 144MHz transceiver and the DJ-C4 430MHz transceivers with me on the trip.

Firstly, all of the good things I said about the C1 and C4 rigs are still good. The better news is that someone must have listened to my comments about the downside of those rigs as these have now been put right on the DJ-C5E.

Where Is It?

The first thing that strikes you about the DJ-C5E upon opening the box is 'where is the rig'? It must qualify as the smallest dual-band rig in the world (unless you know better of course!) it measures just 58 x 95 x 15mm deep (each measurement was taken at the extremity of the rig and excludes the antenna).

If you doubt the size of this rig get a ruler and draw a box from the measurements given, on paper (not just the fascia size but the depth too) that will show you just how small the rig is.

The two earlier Alinco DJ models weighed in at just 75g each, which included the modern Lithium-ion battery. The new DJ-C5E weighs in at just a little more, at 85g including the battery and the antenna meaning that it weighs little more than a standard PP3 battery!

Functions & Features

The front panel of the DJ-C5E is uncluttered, clear making all functions easy to read. The only change from the DJ-C1/C4 is that there is now a **Band selection** button next to the yellow **Function** button. This also provides the 'bell' on/off facility to enable the bleep sound as the keys are pressed.

The switch that provided the **VFO/Memory** change-over became the 'memory write' when used with the Function button. Twenty memories are available which I know is not as many as some rigs but remember its size!

The **Monitor** button switches out the 'squelch'. Another nice feature of the radio is that the squelch control allows settings from 1 to 5.

As is often found with rigs of this type the word 'squelch' is displayed on the screen as '59L 3' for the setting at '3', well if you squint a little it will look almost right!

The use of Function and Monitor button locks/unlocks the frequency control. The step function that controls the frequency stepping is done by the dreaded Function button again with the standard use of the button calling up the predetermined 'call' frequency.

I set the call frequency for my favourite chat frequency where I know

As G0BPS discovered even with the Lithium-ion battery inside the DJ-C5E weighs little more than the standard PP3 battery (see text).



that the locals sit. One call frequency is available for each band.

The frequency is controlled by both the Band selection and the two **Up** and **Down** buttons, which when held down put the rig in scan mode. As mentioned the Band button does the band selection with the Function button enabling the bell facility.

Repeater offsets are easy to set on the DJ-C5E. All you do is just press Function, then **RPT** in the band selected and the offset is shown. This is changeable to any frequency required such as the USA by entering the repeater function, the offset, and pressing the RPT button until the positive or negative offset is shown.

Changing the offset frequency is just as easy. Pressing the Function plus RPT button shows the offset, by pressing the Up/Down buttons this can be changed. Of course any of these can then be entered into a memory for use when abroad.

By holding down the Function button whilst the frequency is displayed the CTCSS tones can be displayed and changed. My local repeater uses 103.5Hz and this was very easy to set up.

Another useful feature is the provision of 'tone decode' as well as 'tone encode' When these are activated, signals with the matching encode will open the squelch.

Others signals only give a busy signal on the display and nothing is heard. I like this, it proved very useful.

The display on the DJ-C5E is still the same at 25 x 7mm, as on the C1/C4 models, but as I said before this is more than adequate. The PTT is still the same large bright yellow button on the side of the rig with a slightly raised edge for protection.

One other feature that I liked was the ability to be able to see the channel numbers instead of the frequency. Switching on the rig whilst holding down the VFO/Memory button enables/disables this useful function. I think this is ideal for friends travelling together using the same simplex/repeater frequencies.

Clear Changes

Now to the changes that have been made on the DJ-C5E from the C1 and C4 models. There are in fact two clear changes that have been made to the earlier models apart from cramming two bands into one tiny case!

The first is obvious, the addition of a speaker changes the C5E rig from a 'complex

toy' into a 'real radio'. I commented in my previous article "But, as with everything there is a down side and on these rigs it is the lack of a speaker, the supplied small earpiece must be used at all times". I also commented that I got used to the earpiece quite quickly. The new speaker gives us a maximum of 60mW into 8Ω, which sounds little but in the average environment is quite enough when held near the ear.

The other change is to the antenna. The DJ-C1 and C4 had a length of wire as the antenna. The new one has a stronger fixed springy wire encapsulated in plastic, which is almost like a real full sized antenna and it appeared to work well too!

At first glance the 'second generation' DJ-C5E appears to be identical to its 'parents'. A closer look tells us quickly that this is not so. The DJ-C5E, C1 and C4 do look like toys but there are in fact complex, well thought out transceivers.

These little transceivers are easy to use, simple to set up and don't need a computer course to get going. In fact everything comes to hand easily.

One other part that often lets down any transceiver from the Far East is the manual, with phrases occasionally being found that make little sense. The DJ-C5E manual has either been written by a fluent English speaker or a native 'Brit'.

It's excellent, with clear, easy to follow instructions albeit in a very small package of just 21 pages which measures just 130 x 85mm.

The audio output of the DJ-C5E when used in a quiet environment is ample, however, if used in busy rally situation the additional speaker microphone may be needed.

The additional speaker microphone is fitted to the top of the rig next to the 'transmitter on' i.e.d. A small 2.5mm stereo socket is provided here.

On-Air Performance

So, how did the Alinco DJ-C5E fare on-air? The first to see the DJ-C5E in the shack was **Alan G4YFP** who had also played with the previous models. He was entranced with the huge number of facilities found in such a small package. After his comments and obvious liking of the rig I had to do a double check that it was still in the shack when he left!

Stan G6ZNW had also seen the previous versions and liked them. I gave him the 'C5 to play with and asked him what he thought. He told me he had liked the earlier version and now that a speaker had been added it was much more usable, but he asked "where was the other one?"

When I told him there wasn't another one, and this was a dual-bander his reply was "That is truly amazing, that is **so** small yet the buttons are big enough to work, the smaller they get, **more** often the more awkward they



DICH GOBPS LIKED THE ALINCO DJ-C5E SO MUCH THAT HE BOUGHT ONE!

"It weighs little more than a standard PP3 battery"!



are to work".

Tony G4WIF asked me what happened when they went wrong, "Hopefully they don't" I replied. We agreed that if there was a problem it would be very difficult to fault find and repair.

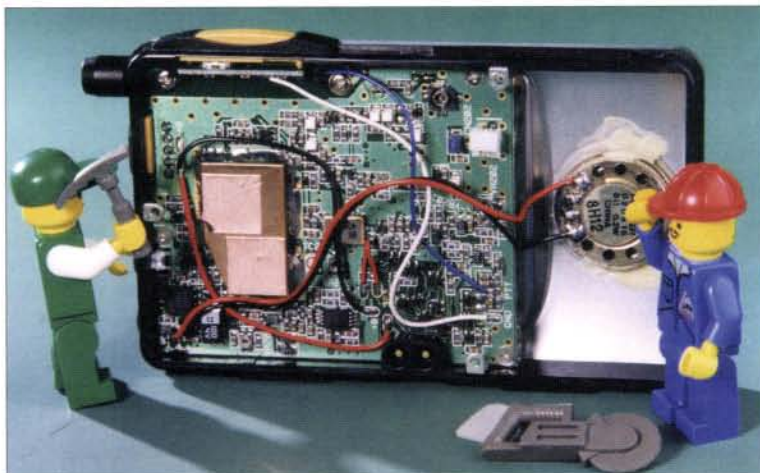
Norman DL6NEE told me "It's impossible to believe that such a small package contains such a complex rig". **Sheldon GW8ELR** said "where is the s.s.b. switch? it seems to have everything else"!

Manuela DF7QK said "It's so small, really interesting for ladies, with good sized buttons for big or tiny fingers. It's so much easier to handle than those big ones"

Edwin PB0AOL said with a chuckle "It's too big to fit the credit card machine but still very nice, very small for a dual-band rig".

Chris G3TUX commented "Intuitive little rig, seems quite remarkable". While **Marcia, 2E1DAY** said "Neat, fits into top pocket or handbag. Discrete and less chance of being stolen". **Sylvia 2E1CYL** comments were "Lovely, handbag/pocket sized rig. Also fits jeans or skirt pocket too. The audio is really excellent".

Vincenz EA3AD offered the following comment on the DJ-C5E: "Incredible! Very portable, audio is good and what a nice compact rig" and **Toni EA3EAT** said "not only looks like a credit card but feels like one too, Very nice" **Roger G4TNT** said it was,



Given that **Dick GOBPS** and **Tony G4WIF** agreed that if there was a problem with the DJ-C5 it would be very difficult to fault find and repair owing to it's small size... maybe these appropriate sized helpers could be called upon!

"Marvellous, I would have bought one of these if I had seen them before buying my little Yaesu. These are much better".

So, the bottom line is that, I spent a week in Prague at the home of **Petr OK1CZ** whilst on holiday with **George G3RJV** & **JoAnna Dobbs** and my wife **Daphne**. We all used the DJ-C5E and loved it.

Petr was disappointed he had already bought his tiny Yaesu and immediately asked about importing these into the Czech Republic. **George** and **JoAnna's** comments were "Adequate receiver and at that size you don't need any more do you" and "it fits in my skirt pocket"! respectively.

Later on in our visit we drove from Prague to southern Germany for the huge Freiderichshafen Amateur radio rally. Almost everyone I showed the Alinco DJ-C5E rig to loved it. I spent the weekend with the rig passing from hand-to-hand as I manned the **G-QRP** club stand.

There is however, one point that disappointed me on with the Alinco DJ-C5E. Other versions including the US version also have Air Band (a.m.) and Marine band receive.

Why is Air Band and Marine not available on the British version? This may be a dealer option available here later. **(Editorial comment: Airband receive of 118 -136MHz a.m. is possible on the 'E' model with a simple modification. Also possible is extended f.m. coverage of 136 - 173.995MHz and 420-460MHz or within the lock-up range of the p.l.l. For details on these modifications contact Nevada direct).** If this does happen it will make this tiny rig hugely popular. And why, with such a tiny transmit power output is a licence required for it?

Would I Buy One?

So, would I buy one of the tiny DJ-C5E rigs for my own use? Well, I was so impressed with the specification, the size and the improvements from the DJ-C1 and C4, made by fitting a speaker, an almost 'proper' antenna and making it dual-band in such a small package that I did buy one! I am delighted with my purchase and hopefully it will give me good service for many years.

PW

Manufacturer's Specifications

General

	144MHz	430MHz
Frequency coverage:		
European:	144.00 - 145.995	430.00 - 439.995
USA:	118.00 - 173.995	420.00 - 449.995
	(118.00 - 136.00 MHz a.m. RX on USA model)	
Current drain: RX	- 30mA	- 40mA (Squelch on)
TX	- 240mA	- 300mA
Rated voltage	3.8V	
Dimensions:	56 x 94 x 10.6mm (without projections)	
Weight:	85g (including battery)	

Transmitter

Modulation:	F3E (FM Reactance Modulation)
Output power:	300mW
Spurious	-60dB

Receiver

Receiver system:	Double conversion superheterodyne	
Intermediate frequency:		
(European)	1st - 20.8 MHz	
	2nd - 450 kHz	
Sensitivity:	Max -16dBu	-15dBu
Audio output power:	Max 60mW into 8Ω	
Microphone impedance:	2KΩ	

Optional extras include:
Speaker microphone, Earphone microphone, wall charger, car charger.

My thanks go to **Nevada** of **189 London Road, North End, Portsmouth, Hampshire PO2 9AE. Tel: (01705) 662145, FAX: (01705) 690626** for the loan of the Alinco DJ-C5E which is available from them for **£189.95**.



Win a Hora C-408 UHF Hand-Held Transceiver!

Yes... this Hora C-408 QRP hand-held (kindly donated by *Waters & Stanton plc*) could be yours because every completed survey form stands an equal chance of winning the prize!

So, in return for your information and comments on the survey form which will be used to help us bring you an ever-improving read each month - you could be the lucky winner. Good luck and thank you for your time!

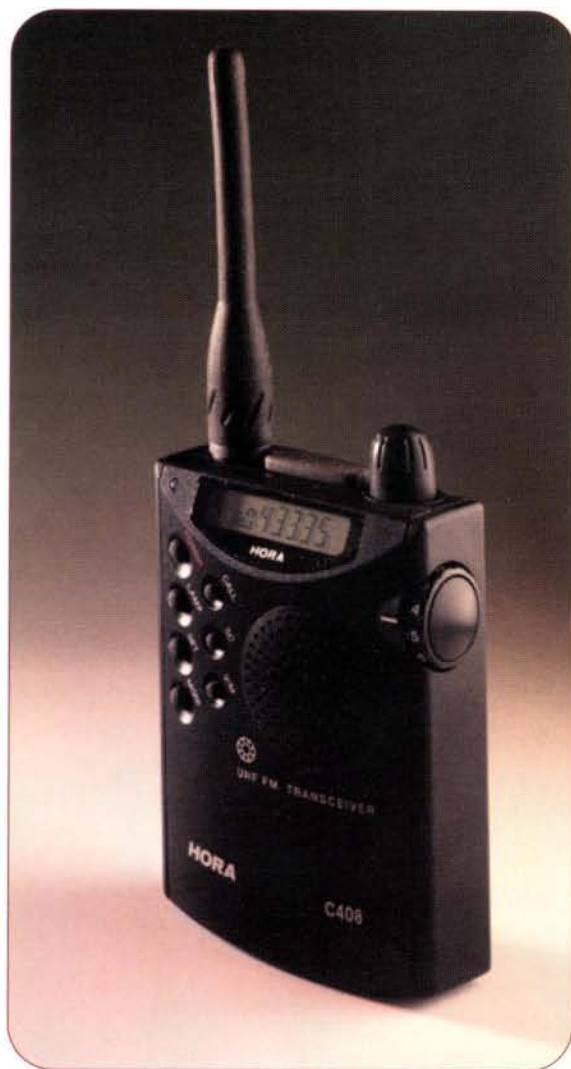
Rob Mannion
Editor, Practical Wireless

This survey has been compiled and produced with the help of ICD Marketing Services Limited, a company specialising in this field. It is designed to provide us with a complete picture of the people who read our magazine and to help us focus our efforts on meeting the needs of all our readers.

It is important that we involve as many of our readers as possible, so please spare us a few minutes of your time to complete this survey. The questions are straightforward and you are under no obligation to answer them; some questions are about you and, if appropriate, your partner.

Any information you provide will be treated with great care. It will be processed and held by ICD and will always be safeguarded under the terms and conditions of the Data Protection Act.

Your answers will be used, both by ICD and ourselves, for analytical and marketing purposes and may be passed on to other organisations. They may wish to send you details of products and services that are likely to be of interest to you, based on your answers. If you would prefer not to receive these offers, please tick the space at the end of this survey.



1998 Readership Survey

1. Please give your name in the way you should be addressed.

Mr ☐ Mrs ☐ Miss ☐ Ms ☐ 4 ☐ Other ☐ 5 ☐

Surname

Forename

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County

Postcode

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2. Marital Status

Single ☐ Married ☐ 2 ☐ Divorced ☐ 3 ☐

Widowed ☐ 4 ☐ Living with partner ☐ 5 ☐

3. Your date of birth

4. Partner's date of birth

5. Are you: Male ☐ Female ☐ 2 ☐

Section 2. About You & Practical Wireless Magazine

1. How many issues of PW do you usually buy in a year?

1 ☐ 2-4 ☐ 2 ☐ 5-7 ☐ 3 ☐

8+ ☐ 4 ☐ Every issue ☐ 5 ☐

2. When did you first buy PW?

Within the last 12 months ☐ 2 years ago ☐ 2 ☐

3 years ago ☐ 3 ☐ More than 3 years ago ☐ 4 ☐

3. How do you obtain your copy of PW?

By subscription ☐ Home delivery ☐ 5 ☐

Casual purchase ☐ 2 ☐ Newsagent ☐ 6 ☐

From an amateur radio dealer ☐ 3 ☐ On firm order ☐ 7 ☐

From a friend ☐ 4 ☐

4. How many other people usually read your copy of PW?

None ☐ Three ☐ 4 ☐ Six ☐ 7 ☐

One ☐ 2 ☐ Four ☐ 5 ☐ Seven + ☐ 8 ☐

Two ☐ 3 ☐ Five ☐ 6 ☐

5. How many copies of the following magazines do you usually read or buy per year?

	None	1-3	4-6	7-9	10-12
Electronics & Wireless World	01 <input type="checkbox"/>	08 <input type="checkbox"/>	15 <input type="checkbox"/>	22 <input type="checkbox"/>	29 <input type="checkbox"/>
Ham Radio Today	02 <input type="checkbox"/>	09 <input type="checkbox"/>	16 <input type="checkbox"/>	23 <input type="checkbox"/>	30 <input type="checkbox"/>
Monitoring Times	03 <input type="checkbox"/>	10 <input type="checkbox"/>	17 <input type="checkbox"/>	24 <input type="checkbox"/>	31 <input type="checkbox"/>
Radio Active	04 <input type="checkbox"/>	11 <input type="checkbox"/>	18 <input type="checkbox"/>	25 <input type="checkbox"/>	32 <input type="checkbox"/>
Radio Communications	05 <input type="checkbox"/>	12 <input type="checkbox"/>	19 <input type="checkbox"/>	26 <input type="checkbox"/>	33 <input type="checkbox"/>
Short Wave Magazine	06 <input type="checkbox"/>	13 <input type="checkbox"/>	20 <input type="checkbox"/>	27 <input type="checkbox"/>	34 <input type="checkbox"/>
Others	07 <input type="checkbox"/>	14 <input type="checkbox"/>	21 <input type="checkbox"/>	28 <input type="checkbox"/>	35 <input type="checkbox"/>

6. Do you own a home computer?

Yes ☐ 1 ☐ No ☐ 2 ☐

7. If yes, which type (e.g. IBM PC compatible, Macintosh, etc..)?

386 ☐ 1 ☐ 486 ☐ 2 ☐ Pentium ☐ 3 ☐

Pentium II ☐ 4 ☐ Mac ☐ 5 ☐ Other ☐ 6 ☐

8. Do you have an e-mail address?

Yes ☐ 1 ☐ No ☐ 2 ☐

If yes, what is it?

9. Do you hold an Amateur Radio transmitting license?

Yes (Class A) ☐ 1 ☐ Yes (Class B) ☐ 2 ☐ Yes (Novice A) ☐ 3 ☐

Yes (Novice B) ☐ 4 ☐ No ☐ 5 ☐

10. How much do you spend on your radio hobby in an average year? (Including QSL expenses, books, equipment, rally visits, etc).

Under £50 ☐ 1 ☐ £50-£100 ☐ 2 ☐ £101-£250 ☐ 3 ☐

£251-£500 ☐ 4 ☐ £501-£1,000 ☐ 5 ☐ Over £1,000 ☐ 6 ☐

11. Have you ever bought anything from an advertisement in PW?

Yes, accessories ☐ 1 ☐ Yes, antennas ☐ 2 ☐ Yes, books ☐ 3 ☐

Yes, components ☐ 4 ☐ Yes, major equipment ☐ 5 ☐ No ☐ 6 ☐

12. How many Rallies/Amateur Radio shows do you visit each year?

None ☐ 1 ☐ 1-2 ☐ 2 ☐ 3-4 ☐ 3 ☐ 5+ ☐ 4 ☐

13. How do you rate your expertise in radio and electronics?

Beginner ☐ 1 ☐ Average ☐ 2 ☐ Experienced ☐ 3 ☐

14. What radio related societies, clubs or specialised groups do you belong to?

AMSAT ☐ 1 ☐ G-QRP ☐ 4 ☐ RIG ☐ 7 ☐

BARTG ☐ 2 ☐ RAYNET ☐ 5 ☐ Local club ☐ 8 ☐

BATC ☐ 3 ☐ RSGB ☐ 6 ☐

15. Are your other hobbies and interests technical or non-technical?

Technical ☐ 1 ☐ Non-Technical ☐ 2 ☐

16. Do you read magazines about these hobbies?

Yes ☐ 1 ☐ No ☐ 2 ☐

17. How interested are you in the following regular features in PW? (1 = not interested, 10 = very interested)

Advertisements	01 <input type="checkbox"/>	Keylines Editorials	13 <input type="checkbox"/>
Antennas in Action	02 <input type="checkbox"/>	Military Radio	14 <input type="checkbox"/>
ATV & SSTV	03 <input type="checkbox"/>	News (general)	15 <input type="checkbox"/>
Aussie Oracle (Australian report)	04 <input type="checkbox"/>	Radio Diary	16 <input type="checkbox"/>
Beginner's Series (radio basics)	05 <input type="checkbox"/>	Radio holiday features	17 <input type="checkbox"/>

continue ►

Computing related features 06 ☐ Reader's letters 18 ☐

Competitions 07 ☐ Reviews - accessories 19 ☐

Constructional-major equipment 08 ☐ Reviews - major equipment 20 ☐

Constructional-minor equipment 09 ☐ Scene USA (American report) 21 ☐

Electronics In Action 10 ☐ Valved equipment 22 ☐

HF Operating 11 ☐ VHF Operating 23 ☐

Historical Radio 12 ☐

18. On a scale of 1-10, how do you rate the technical content of PW? (1= not technical enough, 10= too technical)

19. In recent years, PW has provided a free pull-out 'year planner' in the January issue. Do you find it useful?

Yes ☐ 1 ☐ No ☐ 2 ☐

20. If you would like to see more 'Data Cards' provided free with PW, what would you prefer?

Callsign Prefix (International) Data 1 ☐ HF Bands plans ☐ 4 ☐

Component identifier information, etc 2 ☐ Repeater data cards ☐ 5 ☐

General data cards ☐ 3 ☐

21. How do you rate the overall design and lay-out of PW?

Poor ☐ 1 ☐ Fair ☐ 2 ☐ Good ☐ 3 ☐ Excellent ☐ 4 ☐

22. What subjects covered in PW interest you the most?

Adverts ☐ 1 ☐ News items ☐ 6 ☐

Antennas ☐ 2 ☐ Reviews ☐ 7 ☐

Broadcast ☐ 3 ☐ Scanning ☐ 8 ☐

Constructional ☐ 4 ☐ Utility ☐ 9 ☐

Feature articles ☐ 5 ☐

23. What amateur radio related subjects not covered by PW would you like to see covered in PW?

Advanced articles ☐ 1 ☐ Historical ☐ 6 ☐

Beginners articles ☐ 2 ☐ Less technical matter ☐ 7 ☐

Current radio developments ☐ 3 ☐ Listeners logs ☐ 8 ☐

Frequency details ☐ 4 ☐ More technical matter ☐ 9 ☐

General interest ☐ 5 ☐

Other (please state)

24. How important do you consider constructional projects to be in PW?

Very important ☐ 1 ☐ Not so important ☐ 4 ☐

Fairly important ☐ 2 ☐ not interested in construction ☐ 5 ☐

Not important ☐ 3 ☐

25. If you are interested in the constructional projects in PW, how often do you build anything from a design published in PW?

Never ☐ 1 ☐ Seldom ☐ 2 ☐ Sometimes ☐ 3 ☐

Often ☐ 4 ☐ Always ☐ 5 ☐

26. Do you think £2.20 is a fair amount to pay for PW?

Yes ☐ 1 ☐ No ☐ 2 ☐

27. How much more would you pay for:

	Nothing	20p	50p	£1
Cover gifts	01 <input type="checkbox"/>	04 <input type="checkbox"/>	07 <input type="checkbox"/>	10 <input type="checkbox"/>
More features on your interests	02 <input type="checkbox"/>	05 <input type="checkbox"/>	08 <input type="checkbox"/>	11 <input type="checkbox"/>
More pages	03 <input type="checkbox"/>	06 <input type="checkbox"/>	09 <input type="checkbox"/>	12 <input type="checkbox"/>

28. Can you say briefly, how you would like us to improve PW?

More competitions ☐ 1 ☐ More special offers ☐ 2 ☐

More pages ☐ 3 ☐ Other ☐ 4 ☐

Section 3. About You

LEISURE / MOTORING

1. Please write below the three magazines which you buy most regularly in order of preference and indicate whether bought at a newsagent, or on subscription (and whether you would consider taking out a subscription).

	N/agent	Have Subs.	Cons Subs.
1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. From the interest areas detailed below please indicate whether you currently subscribe or would consider subscribing to an appropriate quality publication magazine (Please tick all that apply):

	Have Subs.	Cons Subs.		Have Subs.	Cons Subs.
Angling	<input type="checkbox"/>	<input type="checkbox"/>	Golf	<input type="checkbox"/>	<input type="checkbox"/>
Antiques	<input type="checkbox"/>	<input type="checkbox"/>	Hair & Beauty	<input type="checkbox"/>	<input type="checkbox"/>
Bicycles & Cycling	<input type="checkbox"/>	<input type="checkbox"/>	Home Interests	<input type="checkbox"/>	<input type="checkbox"/>
Birdwatching	<input type="checkbox"/>	<input type="checkbox"/>	Humorous	<input type="checkbox"/>	<input type="checkbox"/>
Boats & Yachting	<input type="checkbox"/>	<input type="checkbox"/>	Men's Interests	<input type="checkbox"/>	<input type="checkbox"/>
Business	<input type="checkbox"/>	<input type="checkbox"/>	Mother & Baby	<input type="checkbox"/>	<input type="checkbox"/>
Camping/Caravanning	<input type="checkbox"/>	<input type="checkbox"/>	Motorcycling	<input type="checkbox"/>	<input type="checkbox"/>
Car/Motoring	<input type="checkbox"/>	<input type="checkbox"/>	Personal Computing	<input type="checkbox"/>	<input type="checkbox"/>
Classical Music	<input type="checkbox"/>	<input type="checkbox"/>	Personal Finance	<input type="checkbox"/>	<input type="checkbox"/>
Computer Games	<input type="checkbox"/>	<input type="checkbox"/>	Pets	<input type="checkbox"/>	<input type="checkbox"/>
Consumer (Which?)	<input type="checkbox"/>	<input type="checkbox"/>	Photography	<input type="checkbox"/>	<input type="checkbox"/>
Cookery	<input type="checkbox"/>	<input type="checkbox"/>	Politics	<input type="checkbox"/>	<input type="checkbox"/>
Country Pursuits	<input type="checkbox"/>	<input type="checkbox"/>	Regional Interests	<input type="checkbox"/>	<input type="checkbox"/>
Crafts	<input type="checkbox"/>	<input type="checkbox"/>	Religious	<input type="checkbox"/>	<input type="checkbox"/>
Crosswords & Puzzles	<input type="checkbox"/>	<input type="checkbox"/>	Retirement	<input type="checkbox"/>	<input type="checkbox"/>
Current Affairs	<input type="checkbox"/>	<input type="checkbox"/>	Rock Music	<input type="checkbox"/>	<input type="checkbox"/>
Do It Yourself	<input type="checkbox"/>	<input type="checkbox"/>	Rugby	<input type="checkbox"/>	<input type="checkbox"/>
Family Issues	<input type="checkbox"/>	<input type="checkbox"/>	Science & Technology	<input type="checkbox"/>	<input type="checkbox"/>
Films & Entertainment	<input type="checkbox"/>	<input type="checkbox"/>	Style & Fashion	<input type="checkbox"/>	<input type="checkbox"/>
Fitness/Health	<input type="checkbox"/>	<input type="checkbox"/>	Teenage Pop	<input type="checkbox"/>	<input type="checkbox"/>
Food/Drink	<input type="checkbox"/>	<input type="checkbox"/>	TV Video & Radio	<input type="checkbox"/>	<input type="checkbox"/>
Football	<input type="checkbox"/>	<input type="checkbox"/>	Water Sports	<input type="checkbox"/>	<input type="checkbox"/>
Gardening	<input type="checkbox"/>	<input type="checkbox"/>	Weddings	<input type="checkbox"/>	<input type="checkbox"/>
Geography	<input type="checkbox"/>	<input type="checkbox"/>	Women's Interests	<input type="checkbox"/>	<input type="checkbox"/>

3. Which of the following newspapers do you read?

	You	Ptnr		You	Ptnr
Daily Mail	<input type="checkbox"/>	<input type="checkbox"/>	Guardian	<input type="checkbox"/>	<input type="checkbox"/>
Daily Star	<input type="checkbox"/>	<input type="checkbox"/>	Independent	<input type="checkbox"/>	<input type="checkbox"/>
Daily Telegraph	<input type="checkbox"/>	<input type="checkbox"/>	Mirror	<input type="checkbox"/>	<input type="checkbox"/>
Express	<input type="checkbox"/>	<input type="checkbox"/>	Sun	<input type="checkbox"/>	<input type="checkbox"/>
Financial Times	<input type="checkbox"/>	<input type="checkbox"/>	Times	<input type="checkbox"/>	<input type="checkbox"/>

4. Which of the following do you enjoy on a regular basis?

	You	Ptnr		You	Ptnr
Antiques/Fine Art	<input type="checkbox"/>	<input type="checkbox"/>	Football Pools	<input type="checkbox"/>	<input type="checkbox"/>
Betting	<input type="checkbox"/>	<input type="checkbox"/>	Further Education	<input type="checkbox"/>	<input type="checkbox"/>
Bingo	<input type="checkbox"/>	<input type="checkbox"/>	Gardening	<input type="checkbox"/>	<input type="checkbox"/>
Books	<input type="checkbox"/>	<input type="checkbox"/>	Going to the Pub	<input type="checkbox"/>	<input type="checkbox"/>
Competitions	<input type="checkbox"/>	<input type="checkbox"/>	Photography	<input type="checkbox"/>	<input type="checkbox"/>
Cookery	<input type="checkbox"/>	<input type="checkbox"/>	Religious Activities	<input type="checkbox"/>	<input type="checkbox"/>
Crosswords/Puzzles	<input type="checkbox"/>	<input type="checkbox"/>	Sewing/Needlecraft	<input type="checkbox"/>	<input type="checkbox"/>
Current Affairs	<input type="checkbox"/>	<input type="checkbox"/>	Theatre/Arts	<input type="checkbox"/>	<input type="checkbox"/>
Do It Yourself	<input type="checkbox"/>	<input type="checkbox"/>	Voluntary Work	<input type="checkbox"/>	<input type="checkbox"/>
Fashion	<input type="checkbox"/>	<input type="checkbox"/>	Wines	<input type="checkbox"/>	<input type="checkbox"/>

5. Do you enjoy reading romantic fiction? (e.g. Mills & Boon)

	You	1	Partner	2
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. How many cars are there in your household?

	1	Two	Three +	3
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7. For your private car(s), in which month did your car insurance cover begin? (Please write in month e.g. S E P T)

You:	Month:	Partner:	Month:

YOUR HOME

8. What type of home do you live in?

	1	Semi-detached	2	Terraced House	3
Detached House	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flat/Maisonette	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9. Is your home:

	1	Privately Rented	2	Council/Housing Ass.	3
Owned	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10. Are you planning to move home in the next 12 months?

	1	No	2	Possibly	3
Yes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

11. If yes, will you be arranging a mortgage?

	1	No	2	Please tick if first time buyer	3
Yes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

12. Are you considering any of the following home improvements?

	1	Fitted kitchen	2	Loft conversion	3
Double glazing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

13. If you have household insurance, in which month do you

renew your cover? (Please write in month e.g. S E P T)

Home Contents Insurance	

Buildings Insurance	

14. Do you make international telephone calls from home?

	1	Occasionally	2	Never	3
Frequently	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

15. Do you have or are you considering a mobile phone on any of the following networks?

	Have	Cons		Have	Cons
Cellnet	<input type="checkbox"/>	<input type="checkbox"/>	Orange	<input type="checkbox"/>	<input type="checkbox"/>
Mercury One-2-One	<input type="checkbox"/>	<input type="checkbox"/>	Vodafone	<input type="checkbox"/>	<input type="checkbox"/>

16. Do you have, or are you considering any of the following computer purchases?

	Have	Cons		Have	Cons
PC with Windows	<input type="checkbox"/>	<input type="checkbox"/>	Modem	<input type="checkbox"/>	<input type="checkbox"/>
Internet/E-mail	<input type="checkbox"/>	<input type="checkbox"/>	CD-ROM	<input type="checkbox"/>	<input type="checkbox"/>

MONEY & INVESTMENTS

17. Are you considering changing your Bank or Building Society current account?

	1	Possibly	2	No	3
Yes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

18. Do you currently, or would you consider telephone / direct banking?

	Already do	1	Would consider	2
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

19. Do you / your partner have any of the following credit cards?

	1	Charge Card	2	Store Card	3
Credit Card	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gold Card	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

20. Do you pay your monthly credit card balance in full?

	You	Ptnr		You	Ptnr
Always	<input type="checkbox"/>	<input type="checkbox"/>	Rarely	<input type="checkbox"/>	<input type="checkbox"/>
Usually	<input type="checkbox"/>	<input type="checkbox"/>	Never	<input type="checkbox"/>	<input type="checkbox"/>

21. Do you have or are you considering any of the following investments or financial provisions? (Please tick all that apply)

	Have	Cons		Have	Cons
Deposit Account	<input type="checkbox"/>	<input type="checkbox"/>	Stocks/Shares	<input type="checkbox"/>	<input type="checkbox"/>
Life Insurance	<input type="checkbox"/>	<input type="checkbox"/>	Will	<input type="checkbox"/>	<input type="checkbox"/>
Pension Plan	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>

22. Would you consider professional help in arranging your personal finances?

	1	No	2	Unsure	3
Yes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

23. Do you foresee the need for a personal loan?

	1	Possibly	2	No	3
Yes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

24. If you have a mortgage or loan, would you be interested in ways of reducing your monthly repayments?

	Yes	1	Possibly	2
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SHOPPING

25. Have you in the past or would you consider buying goods by mail / over the telephone?

	1	Music	4
Fashion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Books	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Garden Products	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

26. Do you buy American whiskey?

	You	1	Partner	2
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

27. If you smoke please write in the name of the cigarette brand you and / or your partner smoke most often.

You	

Partner	

Important: Please sign below that you are a smoker aged 18 or over.

Your signature	

Partner's signature

GENERAL INFORMATION

28. What is your occupation?

	You	Ptnr		You	Ptnr
Director	<input type="checkbox"/>	<input type="checkbox"/>	Public Sector	<input type="checkbox"/>	<input type="checkbox"/>
Manager	<input type="checkbox"/>	<input type="checkbox"/>	Professional	<input type="checkbox"/>	<input type="checkbox"/>
Self-Employed	<input type="checkbox"/>	<input type="checkbox"/>	Armed Forces	<input type="checkbox"/>	<input type="checkbox"/>
Skilled Worker/Trade	<input type="checkbox"/>	<input type="checkbox"/>	Student	<input type="checkbox"/>	<input type="checkbox"/>
Manual Worker	<input type="checkbox"/>	<input type="checkbox"/>	Housewife/Homemaker	<input type="checkbox"/>	<input type="checkbox"/>
Office Worker	<input type="checkbox"/>	<input type="checkbox"/>	Retired	<input type="checkbox"/>	<input type="checkbox"/>
Shop Worker	<input type="checkbox"/>	<input type="checkbox"/>	Unemployed	<input type="checkbox"/>	<input type="checkbox"/>

29. What is your approximate family income each year?

	1	£25,000-£29,999	6
Under £5,000	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
£5,000-£9,999	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
£10,000-£14,999	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
£15,000-£19,999	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
£20,000-£24,999	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

30. Please write in your children's date(s) of birth, starting with the oldest, and indicate whether male or female.

	Male	Female
Child 1	<input type="checkbox"/>	<input type="checkbox"/>
Child 2	<input type="checkbox"/>	<input type="checkbox"/>
Child 3	<input type="checkbox"/>	<input type="checkbox"/>
Child 4	<input type="checkbox"/>	<input type="checkbox"/>

31. Is anyone in your household affected by any of the following?

	You	Ptnr	Other
Asthma	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Diabetes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hayfever	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hearing Loss	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mobility problems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

32. If you have private medical insurance, when do you renew your cover?

(Please write in month e.g. S E P T)	Month:



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Sources, 'Sinks' and Electromotive Forces

Geoff Billington G3EAE looks at the theory behind those puzzling sources 'sinks' and electromotive forces (e.m.f.s) that can confuse many enthusiasts.

Whilst teaching electrical and introductory alternating current theory, I became rather worried about the concept of an electromotive force and some of its implications. For instance, I was often confused by the fact that the voltage across an inductor is often, but not always, treated as an e.m.f.

Eventually, I sorted things out to my own satisfaction. The readers may think that this is a quibble - it isn't - and no more will be said about it until the end of the article.

A Simple Question

So, I'll begin then with a simple question: When is a potential difference due to an e.m.f.?

To answer...I'll start off with an obvious case. Everyone will agree that some sort of 'electromotive force' must exist inside a cell (battery). However, things are not quite so obvious when we come to 'back' or 'negative' e.m.f.s. So, to clear things up we need to think about energy sources and energy 'sinks' in electric circuits.

Sources & Sinks

A cell is an **energy source**, and it supplies energy to a circuit. A resistor is an **energy sink**, it removes electrical energy from the circuit which it converts into heat.

In Figs. 1 and 2, the 'box' contains either an energy source or an energy sink. And you can find which one by using a voltmeter and an ammeter as shown.

In Fig. 1, the ammeter shows current flowing out of the terminal which the voltmeter identifies as positive. The box therefore contains an energy source, perhaps a battery.

In Fig. 2, the ammeter shows current flowing into the terminal identified as positive. This box contains an energy sink, perhaps a resistor.

However, the box in Fig. 2 could equally well contain a 'reversed' cell which is being charged by the current and is exerting a reversed, or back, e.m.f.

Unfortunately we're unable to use these two meter readings to tell us which of these two possibilities is actually the case. A nega-

tive source is equivalent to a sink and however different in other respects their behaviour may be, a negative source and a sink are identical in so far as they both extract electrical energy from the circuit.

Note that the word 'negative' is used here in its mathematical sense: a negative source removes circuit energy.

Electromotive Force

Let's now look at the electromotive force (e.m.f.) due to a conductor. To help the explanation, the diagram, Fig. 3,

shows an inductor, switch and resistor connected in series to a battery of e.m.f. 'E' volts. The switch has recently been closed and the current at the present instant is 'i' and is increasing towards its final value. (see Fig. 3).

Suppose that the voltage across the inductance at this instant is 'V' volts, where the sign of 'V' is as yet undetermined.

According to the textbooks, 'V_L' is a 'back e.m.f.', i.e. an e.m.f. which opposes the current.

The voltage equation is therefore written: (1).

$$E - V_L = V_R$$

(or $E - L (\delta i / \delta t) = iR$. If you want it in its full glory).

Exactly the same result is obtained if the inductor is regarded as an energy sink. The

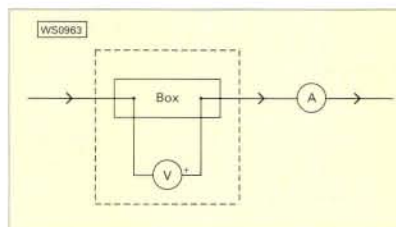


Fig. 1: The ammeter shows current flowing out of the terminal which the voltmeter identifies as positive. The box therefore contains an energy source, perhaps a battery (see text).

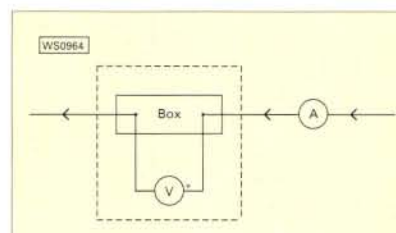


Fig. 2: The ammeter now shows current flowing into the terminal identified as positive. This box contains an energy 'sink', perhaps a resistor (see text).

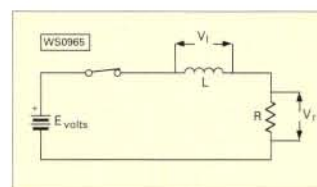


Fig. 3: An inductor, switch and resistor connected in series to a battery of e.m.f. 'E' volts. The switch has recently been closed and the current at the present instant is 'i' and is increasing towards its final value (see text).

August 14: The Cockenzie & Port Seton Amateur Radio Club are holding their 5th Annual Radio Junk Night at the Cockenzie & Port Seton Community Centre, South Seton Park, Port Seton, East Lothian. Open from 1830 to 2130. Bring along your 'junk' and sell it yourself. Tables will be provided on a first come first served basis (no charge for the table). A raffle will be held at approx. 2100. Refreshments will also be available, and there is access for any disabled visitors. Entry fee is £1 for all persons. All money will be donated to the British Heart Foundation. Further details from **Bob Glasgow GM4UYZ @ GB7EDN** or telephone on **(01875) 811723**.

August 16: The 9th Great Eastern Radio & Computer Rally is to be held at Wallington Hall, Nr Kings Lynn. Doors open at 1000 (0945 for disabled visitors). The event will feature Amateur Radio, computer and electronic component exhibitors, a Bring & Buy, and lots more. Food and drink is served all day. Talk-in on S22. There is also ample free parking. For further details or trader information, contact **Ian G0BMS** on **(01553) 765614**.

August 16: The 3rd Cardiff Amateur Radio & Computer Fair will be held at The Star Sports & Recreation Centre, Splott, Cardiff. Doors open 1030 till 1500. **Stuart Robinson GW0WMT** on **(01222) 613070**.

August 16: The Stroud Radio Society Rally will be held at Archway School, Stroud, Glos. Doors open 1030 (1000 for disabled visitors). There will be a talk-in on S22 and admission is £1.50. There will also be a Bring & Buy. **Stuart G0GNM** on **(01453) 752411** or **Steve G7EUV** on **(01453) 758032**.

August 23: The Telford Rally will be held this year at the Telford International Centre. There will be major dealers, a flea market, Bring & Buy, all in purpose built exhibition halls with good disabled access and plenty of space to move around. There will be catering, Morse testing and good local attractions including the



famous Ironbridge Gorge Museum. **Jim G8UGL** on **(01952) 684173** or **Tony M0AMP** on **(01743) 235619**, E-mail: **zeroamp@hotmail.com**

August 30: The Galashiels and DARS are holding their Open Day and Rally in the Volunteer Hall, St Johns Street, Galashiels, Scottish Borders from 1100 to 1600. There will be traders, refreshments, Bring & Buy, etc. **Jim GM7LUN** on **(01896) 850245** or packet @ GB7JED.

August 31: The Huntingdonshire Amateur Radio Rally Annual Bank Holiday Monday Rally is to be held at Emulf Community School, St Neots, Cambridgeshire (near Tesco Superstore on A428). Doors open 1000 to 1400 and admission is £1. There will be hot and cold refreshments available and a hall and car boot sale on hardstanding. Talk-in on S22. **David Leech G7DIU** on **(01480) 431333** (between 0900 and 2100).

September 6: The Bristol Computer & Radio Rally will be held at the Brunel Centre, Temple Meads Station, Bristol. Doors open 1030 until 1600 (from 1015 for disabled visitors). Admission is £1, accompanied children under 12 go in for free. There will be a large Bring & Buy, under £30 bring & Buy, refreshments, 150+ tables, table hire at £15 each and parking opposite in the NCP for £1. **Muriel**

Baker, 62 Court Farm Road, Whitchurch, Bristol BS14 0EG, or telephone on **(01275) 834282** (24 hour answerphone).

September 6: The Coleraine & District Amateur Radio Society will be holding their annual Radio Rally at the new venue of the Bohill Hotel & Country Club, located a short distance outside Coleraine on the main road to Bushmills and the Giants Causeway. Doors open at 1200 and admission is £1.50. Further information from **John M10AAZ** on **(01265) 54930** or by E-mail **john@mi0aaz.force9.co.uk**

September 6: The Annual Wight Wireless & Computer Rally will be held at the National Wireless Museum, Arretton Manor, Newport, Isle of Wight. Admission is free and so is the parking. **Douglas G3KPO** on **(01983) 567665**.

September 6: The Bury Radio Society's 14th Annual Rally will be held at the Castle Armoury (TA Centre), Castle St., Bury. Doors open 1030 (1000 for disabled visitors). Talk-in on S22, Morse tests, Bring & Buy and all the usual traders. Further information and booking forms from **Alan G0RFE** on **(01706) 621263** or via E-mail: **g0rfe@zen.co.uk**

September 12: Reddish Rally is to be held at St Mary's Parish Hall, Reddish,

Stockport. More information from **John G4ILA** on **0161-477 6702**.

September 12: The 4th Northampton Radio & Computer Rally is to be held at the heart of the Shires Shopping Village Showground on the A5, just two miles north of Weedon, with easy access. Rally opens at 0900. There will be a Bring & Buy, organised by the Northampton Radio Club. Bring the family as they can spend the day in the 'ole worlde' village. Refreshments and toilets are on site. Admission is only £1. Contact **Steve M0ARZ** or **Paul G0HWC** on **(01604) 632478**.

September 13: The 1998 BARTG Rally will be held at Sandown Exhibition Centre, Esher, Surrey. Doors open 1030. Attractions include free parking, Bring & Buy, many trade stands, a licensed bar and catering. *DataStream 98* forms an integral part of this Rally. *DataStream 98* will consist of a series of lectures looking at various aspects of amateur radio data comms. More info. from **Alan Hobbs G8GOJ**, 83 St Peters Street, South Croydon, Surrey CR2 7DG, 0181-688 2564 (evenings) or <http://www.bartg.demon.co.uk/rally.htm> or E-mail: **rally@bartg.demon.co.uk**

September 13: The Milton Keynes & District Amateur Radio Society are holding their Annual Rally and Boot Sale in Bleckley Park. More information from **Dave White G3ZPA** on **(01908) 501390**.

***September 13:** The 13th Lincoln Hamfest will be held on the Lincolnshire Showground. This is on the A15 just five miles North of the City. Talk-in on 70cm. There is extensive parking available on the day and overnight on the 11/12th for caravans and tents. There will be many trade stands, a Bring & Buy, Flea Market and Car Boot Sales. Morse tests will be available by arrangement, there is also catering and a licensed bar. Admission is £2, (free for those 14 and under). **John & Sue** on **(01522) 525760** or **John** (mobile) on **(0385) 738976**.

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

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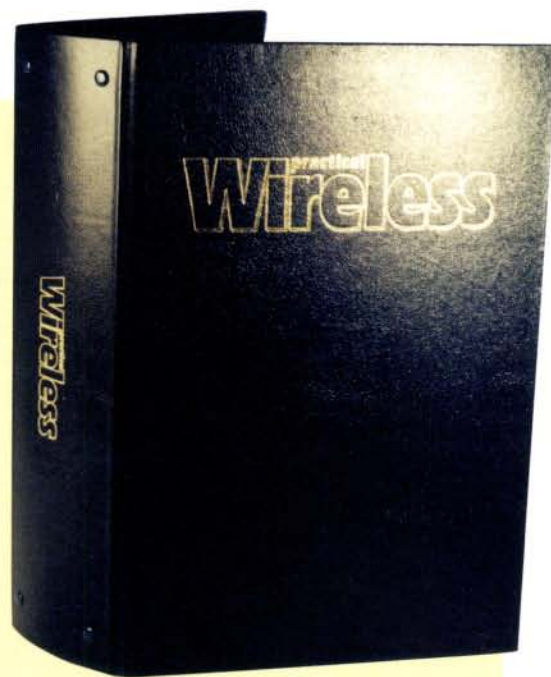
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**This month
the Rev.
George Dobbs
G3RJV
describes a
little receiver
based on the
TA7310
integrated
circuit which
he says is
"The chip that
came too
late".**

**"Where I reap thou shouldst but glean"
The Song of the Shirt**

Thomas Hood 1799 - 1845

Centre
photograph:
A 7MHz receiver -
built with the
"Chip that came
too late"!

Carrying on the Practical Way

In my early days enjoying Amateur Radio, the hobby was one of 'gleaning'. Looking through the rich harvest of government surplus and gleaning out items which may be of use, or made of use, to the hobby. Practically everything in my first station was surplus or recycled.

"Oh dear" younger readers are saying, "here he goes on a 'those were the days approach' again!" However, in fact, the very reverse is true, because I think that Amateur Radio **could still be a hobby based upon gleaning from a richer commercial world!**

Admittedly there are no longer vast stocks of government surplus waiting for our use, but it's an electronic age. The world is full of low-priced electronic equipment. Complex, multi-function chips are designed for cheap production of tens of thousands of consumer electronics items. In amongst all of this we need to sort out those items which can be pressed into Amateur Radio service.

Excellent Example

An excellent example of something which can be found with the 'search and glean' approach is the NE602 (and NE612) chip. Designed for cellular phone usage and produced in huge numbers, this little chip has formed the backbone of many Amateur Radio projects for the home constructor.

Sometimes when looking at designs for QRP receivers and transceivers in recent years, I have hoped to see one that does not use an NE602!

The block diagram of the NE602, **Fig. 1**, shows what a useful chip it is for simple amateur radio construction. A small 8-pin DIL device contains a balanced mixer, and oscillator capable of oscillation to around 200MHz and a built-in voltage regulator.

As it stands the i.c. has all the hard work of a direct conversion receiver and a couple of them make a simple superhet receiver. The mixer is not the best performer in the world...but it's adequate for many applications.

The bad news is that the NE602 is now being phased out and shortly will not be a current device. They will soon become difficult to obtain although the NE612 may survive a little longer.

The phasing out of the NE602 has prompted many constructors and designers of equipment for amateur construction to look around for suitable replacements. Not least me - the NE602 has often been featured in this column!

Hidden away on a Japanese QRP Web page, I found reference to the TA7310P, a device that appears to be very similar. It contains a balanced mixer, an r.f. oscillator and an audio preamplifier in a 9-pin, in-line package.

I did a little investigating but failed to produce much information about the device.

Then I rang **Peter Thomas G7JAB** at **JAB Electronic Components** and received bad news and good news!

The bad news is that the TA7310 is no longer a currently produced device, the good news is that there still appears to be plenty of them around. Peter has quite an adequate stock, as do some of the component stockists for the service industry. The device was used in several common CB transceivers and is stocked as a replacement.

So, although it's not worth offering a full-blown project, it is a chip that may appeal to the experimenters who read this column. The lack of real information on the device is not helpful but I am able to offer readers a simple receiver circuit which they might like to try or use as the basis for their own designs.

Receiver Project

The diagram, **Fig. 2**, shows the circuit of the little 7MHz receiver project I built with one of the TA7310s I obtained. This is a low component count direct conversion receiver. Let us begin with the audio end of the TA7310.

The coupling in and out of the audio pre-amplifier requires the use of two matching transformers. One between the mixer output at pin 6 and the pre-amplifier input at pin 7 and the other on the audio output at pin 9.

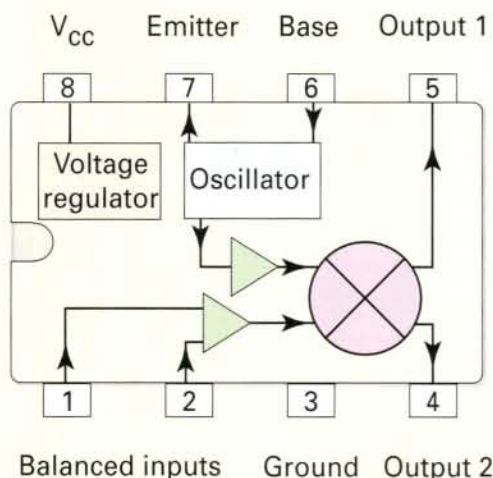


Fig. 1: Block diagram of the NE602/NE612 i.c. (see text).

WT0950



The coupling is not the problem it might appear to be as these are gleaned items. On my prototype they are the two audio transformers commonly found in cheap Japanese 'a.m.' radios.

The driver transformer for the typical push-pull transistor amplifier in the cheap receivers and the output transformer do exactly what we want here. However, commercial transformers are available. The LT44 can serve as T1 and the LT700 as T2, both are available from Maplin.

The oscillator portion of the TA7310, located around pins 1 and 2, uses an inductively coupled feedback circuit. It's the 'tickler coil' idea from the old Armstrong type oscillators.

In practice I found that the ratio of turns on the TOKO KXNK4173AO provided enough feedback to maintain stable oscillation on the 7MHz band. By keeping this part of the circuit as close to the pins as possible,

and using a polystyrene capacitor for the 47pF in the tuned circuit (and perhaps for the 560pF coupling capacitor) it should be stable enough for a useful receiver. The core of the inductor will pull it on to the band.

The receive input goes to pin 4.

The circuit here uses minimal input tuning with one tuned

circuit. Another TOKO inductor, the KANK3334, is used with its coupling coil providing an input to match a 50 Ω antenna.

Naturally, a better band-pass filter could be used and this would give better input filtering. It would also be useful to add a simple attenuator on the input. (This could be a 1k Ω linear potentiometer).

Although the circuit in Fig. 2 **does provide** a very simple receiver, the overall gain is under 40dB, which is hardly enough for a successful direct conversion receiver. However, using a pair of 'Walkman' type cassette player headphones, 7MHz signals can be heard with a reasonable antenna. But ideally some extra gain is required so I added an audio amplifier.

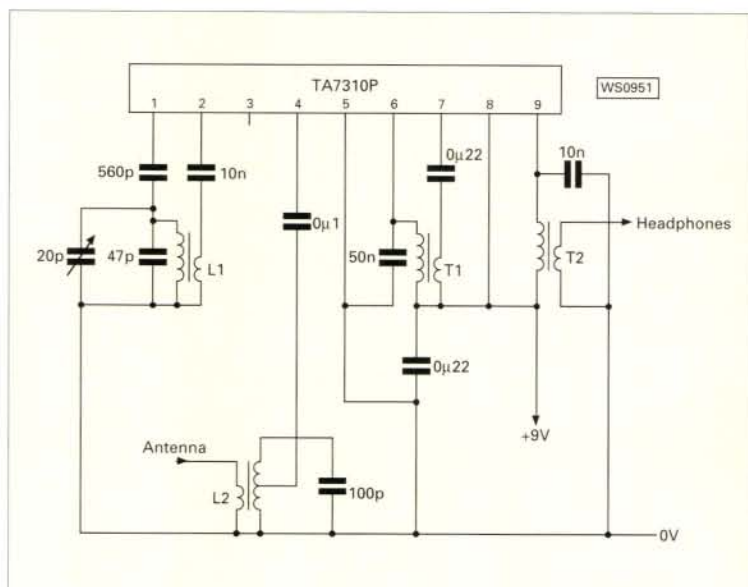


Fig. 2: Circuit of the basic 7MHz receiver project using the TA7310P i.c. (see text).

Cheap & Cheerful

The diagram, **Fig. 3**, shows a 'cheap and cheerful' audio amplifier based on the LM386. The output from the TA7310 is modified to provide an input to the audio amplifier.

A 1k Ω resistor replaces the output transformer with capacitive coupling to the amplifier circuit. This additional audio amplification raises the overall gain enough to make a useful receiver for amateur band use.

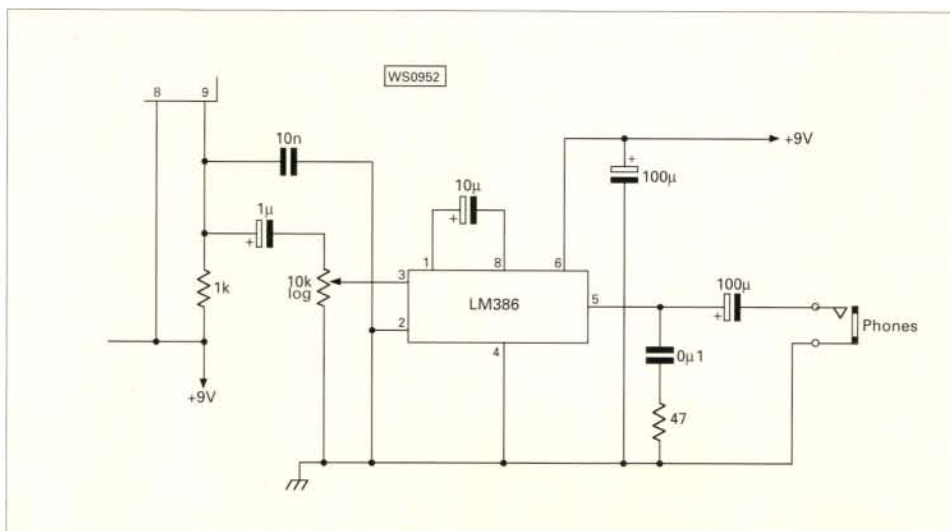
The TA7310 has 'arrived' really too late to become a device for future designs but readers may enjoy experimenting with yet another little device gleaned from that vast electronic world. So...keep looking out for those useful items!

PW

The TA7310 i.c. is available from:

JAB Electronic Components,
PO Box 5774, Great Barr, Birmingham B44 8PJ.
Tel: 0121 - 682 - 7045.

Fig. 3: Suitable add-on audio amplifier for the (low a.f. output) 7MHz receiver.



There's still time to work on your antenna, try out new ideas and designs. How about building that vertical antenna you've been thinking of this year? To help, the PW team have selected a choice of books on the antenna - in all its forms - to provide you with practical and theoretical help.

Book PROFILES

It's Still Antenna Time!

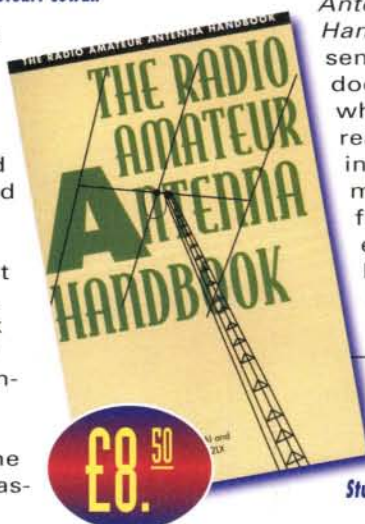
The Radio Amateur Antenna Handbook
William Orr and Stuart Cowan

The 'Orr & Cowan' books are justly well-known and appreciated by Radio Amateurs throughout the world. Their book on cubical quad antennas for instance - has become a minor classic and is itself to be recommended.

But before reading up on the more specialised antenna project, design or idea - Orr and Cowan have provided much more information - *The Amateur Radio Antenna Handbook* - in a conveniently-sized booklet. Thoroughly practical, although of course the 'Tower and lots of real estate' approach reflects its American origins, the authors in their usual 'no nonsense and let's get on with it' style take the reader step-by-step through DX antennas, antenna location, performance and the 'famous' s.w.r. meter, towers and rotators, all about baluns, popular vertical antennas, cubical quads, delta quads and other loop anten-

nas, horizontal and sloping wire antennas, h.f. beams, v.h.f. beams.

The Radio Amateur Antenna Handbook is a sensible book, it does not overwhelm the reader but instead it's more likely to fire you with enthusiasm. **Highly recommended.**



Vertical Antennas
William Orr & Stuart Cowan

Following on from their general coverage *The Amateur Radio Antenna Handbook*, Orr and Cowan have produced another 'companion' book taking an in-depth look at the vertical antenna. Bearing in mind that many Radio Amateurs have very limited space for antennas - the authors have produced many ideas which will prove suitable for use in British gardens.

In their usual style the authors first discuss the 'real life vertical antenna' before

going onto the 'radio ground' and how it effects antenna operations. Other chapters include Practical Marconi Antennas, antenna matching devices, ground-plane antennas, phased vertical arrays, multi-band vertical antennas and finally there's a chapter entitled 'Antenna Round-up' ...ideas on how to make your antennas work better.

If you're tempted to have a go at vertical antennas - there's plenty of information, ideas, projects and guidance in this book just for you. **Highly recommended.**

Antennas For VHF & UHF
Ian Poole G3YWX

Well known to *PW* readers, **Ian Poole G3YWX** is a talented teacher and instructor who has unveiled the mysteries of our complex technical hobby in an easy-to-read and informative style for many years. In this slim book, produced to the usual Babani style and standard, the reader will find a very great deal to interest them. Ian has tackled the fascinating subject of v.h.f. and u.h.f. antennas in his usual way.

Suitable for beginner and the not-so-experienced reader alike the author leads the reader through basic concepts (theory, how it works, etc.), feeding the antenna, the dipole, the Yagi (this section is particularly



er form in this issue or telephone Michael or Shelagh on [01202] 659930.

helpful), the cubical quad, vertical antennas, wide band antennas, antenna measurements, practical aspects, frequencies and channels. Very readable and informative and - in particular - the section (in antenna measurements) on using the 'dip' meter will prove very helpful to readers following the 'Radio Basics' series.

Antennas For VHF & UHF is an **ideal beginner's book. Highly recommended.**

HF Antennas For All Locations *Les Moxon G6XXN*

This RSGB-published book has been available for some years now and can really be considered as a combined practical manual and textbook. In this, the second edition, the author goes into great technical detail how antennas work, on waves and fields, feeders, propagation, practical considerations, designs, ideas.

Now completely revised and extended the book also car-

ries comprehensive chapters dealing with 'Making The Antenna Work' (An excellently produced chapter), antenna construction and erection, plus a section dealing with the - sometimes vexed - question of choice for the individual: 'What Kind of Antenna'?

An in-depth technical read with much practical advice and many projects and ideas. **Highly recommended.**

Antenna Impedance Matching

Wilfred Caton

This ARRL published book is most certainly aimed at those in the hobby who enjoy delving deeply into the highly complex technicalities of antenna matching and who also enjoy mathematics. Written by a former professional antenna engineer and produced in a softback format and in the usual ARRL style but using an unfamiliar typeface, this book is profusely illustrated with diagrams and charts. Chapters include: Impedance matching techniques, Matching over a band of frequencies, Matching solutions (including five narrow band examples followed by six broad-band examples), making an overlay tracing box. There are also four pages of 'Errata' (corrections, up-dates

and further explanations) and a repeated 'contents' page. **A useful reference Source**

Building & Using Baluns & Ununs

Jerry Sevick W2FM

As the title suggests this book is aimed at providing an eminently practical approach to making and using your own balanced-to-unbalanced (baluns) transformers and unbalanced-to-unbalanced (ununs) transformers. This is not primarily a 'theoretical' book although of course theory is covered) but can be considered as a well illustrated (primarily by photographs) guide to making successful baluns and ununs.

Chapters include: an introduction, when to use them, history and design, Amateur Radio use, baluns for antenna tuners, using with the G5RV antenna,

the unun, introduction, use, dual ratio types, multimatch and ununs for Beverage antennas, short ground-mounted verticals and loading coils. An interesting read which also conveys the complex nature of the devices in an effective way.

Packed with ideas and practical projects. *Building & Using Baluns & Ununs* is an **excellent Reference and practical projects source.**

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Attacking That N

The MFJ-1026 Noise Cancelling Signal Enhancer

Jack King G4EMC - despite his appropriate callsign - suffers from very high noise levels at his home in Kent. So...the editorial team thought he was 'Just the chap to try out a unit, that would offer a possible cure for the problem'!

"I found that I could get signal enhancement"

Some while ago, at the Picketts Lock Show in London I was chatting to the Editor, asking if *PW* was considering reviewing the new MFJ-1026 QRN eliminator. His reply was that he had not planned to at that time - but somehow I got the job!

The reason I asked the question in the first place was due to the increasingly high QRN and QRM levels experienced at my home. The problems come not only from 'atmospheric noise' but also industrial developments and increased computer activity from local banks and building societies. Other problems are generated by neighbouring switch mode power supplies on all the latest home entertainment devices, etc. And added to these are the effects from high voltage power lines not too far away.

Medway Valley

My location in the Medway Valley is almost on

the highest point locally, overlooking Maidstone to the South East. But the site is well below the hills surrounding the Medway Valley itself.

By comparing my problems with those of my friends on the other side of town and others further away, I seem to be receiving a lot more noise on all bands. The problems are present from 1.8 to 14MHz.

For example, on 1.8MHz the noise level is - S9+8. On 3.5MHz it's at S8, on 7MHz it's between S7/8 and on 214MHz it's up to S6. Tests (switching to a dummy load) have proved that the majority of the noise comes in via the antenna socket. So, that's why I really wanted to know if the MFJ device would help before shoving my hand deeper into my limited resources!



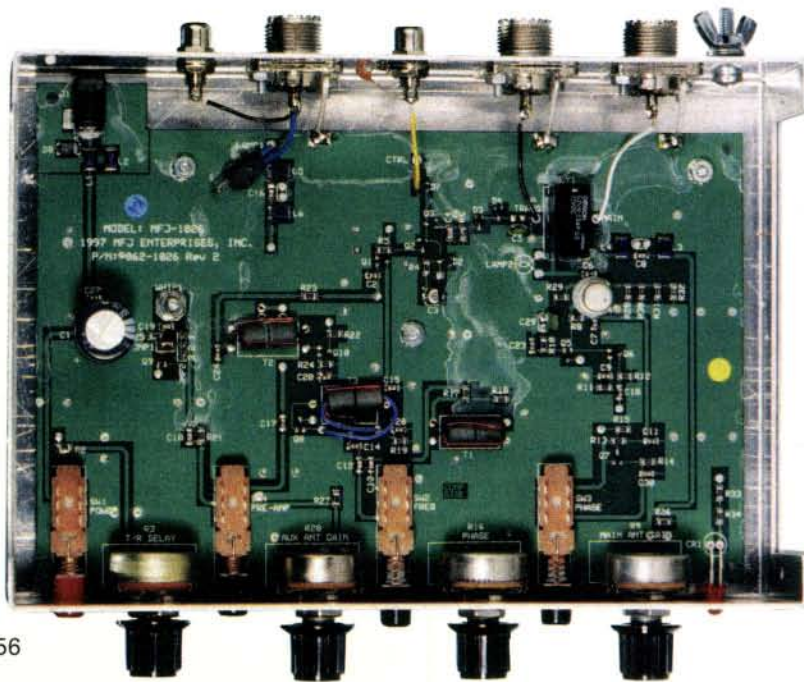
The MFJ-1026 Arrives

The MFJ-1026 Noise Cancelling Device duly arrived, and following the advice offered by all other reviewers - I read the accompanying manual over and over again. It's good advice!

The next stage, running out a random length antenna, was achieved by stringing a wire from the upstairs shack down to and round the garden fence, and plugged into the back of the MFJ unit. Power was applied and some practice attempts to null out background noise, etc., (as recommended in the notes) were made.

At the first few attempts, I was somewhat disappointed to find that the results were not quite what I had expected to get after having read the advertising, as little or no difference to the aural noise level was achieved. Then I began to think that perhaps it was a case of 'hyped publicity', or 'Medicine Show' exuberance or over-exaggeration. However, not having experienced

Internal view of the main p.c.b. The stains (centre right) on the main board were present when the unit was received and are probably caused by the post production p.c.b. 'washing' process.



Noise Problem

such a device before, I was not sure what to expect.

I mainly wanted to see how the MFJ-1026 worked in improving signals on the h.f. bands, particularly 3.5 and 7MHz. But despite a lot of knob twiddling, it did not seem to be doing very much with the background noise, using the supplied telescopic whip antenna and its pre-amplifier. Neither did it seem to be effective in decreasing any perceived computer noise in the shack generated by my old 386 power supply unit running the GB7MA1 TCP/IP hub or my other computers.

Reading the instruction manual again, I then opened the case to find the shorting jumper to activate the external wire antenna. This then isolates the whip, but amplifies the signal from the auxiliary

This was achieved with the auxiliary antenna gain set to maximum, pre-amplifier turned on, the phase knob fully anti-clockwise, and the phase button set to normal, and with the main antenna gain set to equal the auxiliary antenna setting.

By watching the S-meter drop, and by listening to the loudspeaker, I found it was possible to virtually 'remove' the incoming signal's audio from the speaker, and then by pressing the phase button to invert the signal, it then became much clearer and stood out over the remaining background noise.

Trying to repeat the process on the 3.5MHz band with higher noise levels was not so simple, but with practice it was possible! However, as an experiment, I repositioned my trap dipole as an inverted Vee antenna, which seems to have improved the situation to some extent...although more testing with the antenna in this configuration will be necessary!

Some Help

Having had the unit on test over a number of weeks, I unfortunately found that the 1026 was not the answer to all my interfering noise problems but it did provide some help. Perhaps, it's that my QTH is not now in a suitable position regarding amateur operation on h.f. bands! If that's the case....asking the MFJ-1026 to eliminate such powerful interference is probably asking too much from it, as it stands.

However, I did find on occasions that the little device could, with some careful adjustment, enhance signals out of the background noise, and improve readability by a considerable extent. Perhaps after all it's a case of 'practice makes perfect'?

My thanks for the loan of the review unit go to **Waters & Stanton PLC of 22 Main Road, Hockley, Essex SS5 4QS. Tel: (01702) 206835, FAX: (01702) 205843** who can supply the **MFJ-1026** for **£139.95**. *PW*

For more details on the full MFJ product range check out the Waters & Stanton Web site at: <http://www.waters-and-stanton.co.uk>



antenna. (I was a little surprised that this adjustment was not provided with an external switch).

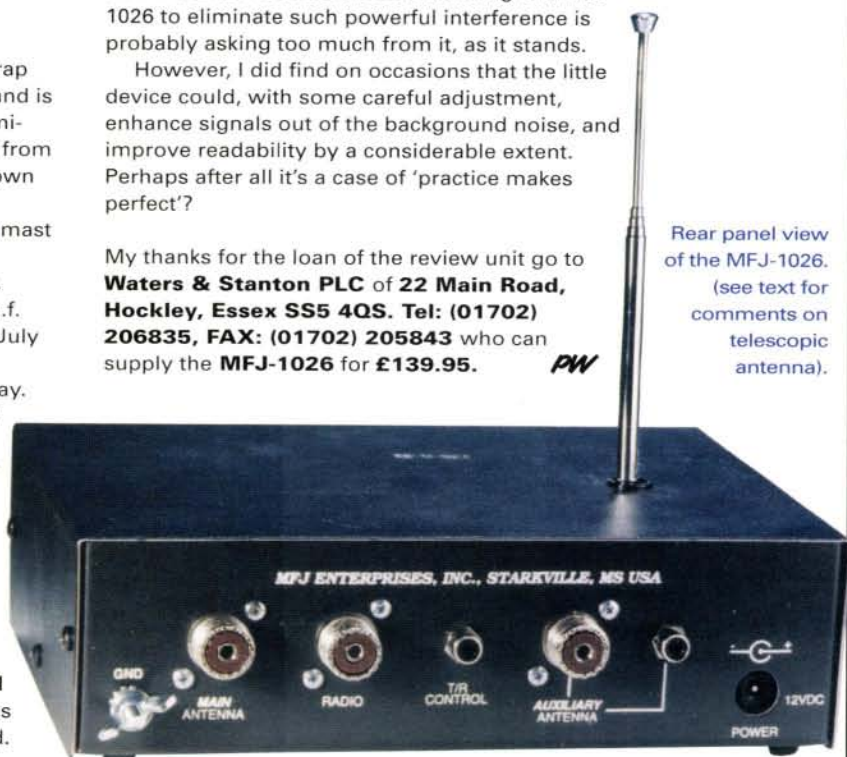
The G4EMC Antenna

The main h.f. antenna here at G4EMC is a trap dipole, which runs more or less East/West and is supported only at roof top height of my semi-detached house at about 8m above ground from a mast of approximately 14m high lower down the garden.

The antenna then slopes down to a stub mast of around 5m in height in the front garden. Greater height over the roof is not possible, without causing problems in lowering my h.f. beam. (See 'Old Antennas Never Die' - *PW* July 1997, page 24)

The reference antenna was some 6m away. (Probably too far, but there are no hard and fast rules laid out for its best position). Actually, in practice a good deal of trial and error may be required to attain the best results. And because my report is of course based only **on how I found things**, the finding may not coincide with results that other users may achieve - especially if they've got more 'real estate' to play with!

After a little practice, I found that **I could get signal enhancement** on some stations that were not very strong on the 7MHz band.

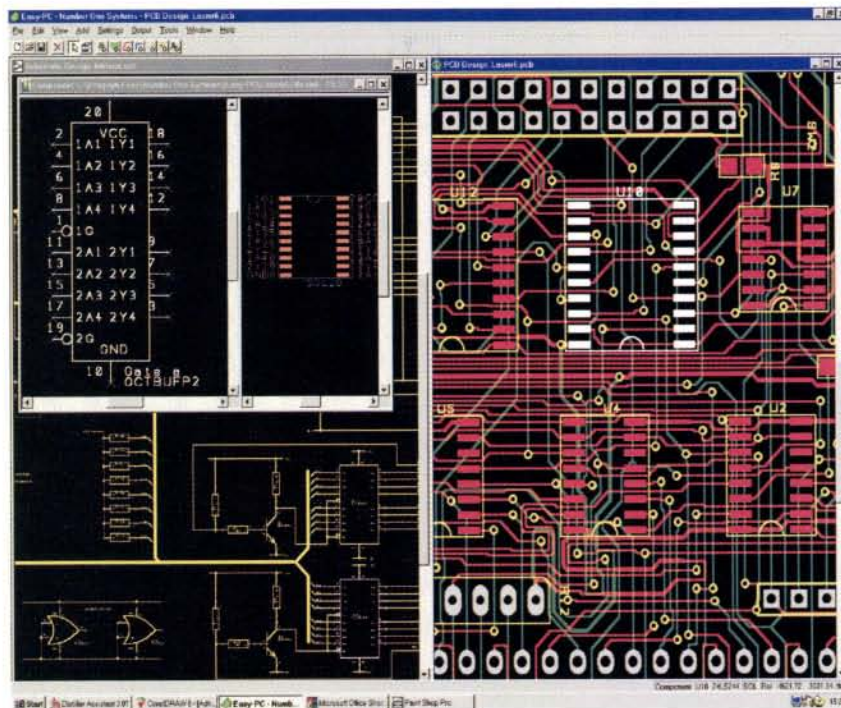


Rear panel view of the MFJ-1026. (see text for comments on telescopic antenna).

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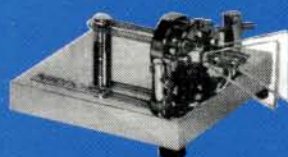
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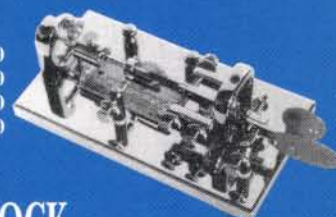
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Valve & Vintage

The voice with the soft 'Black Country' accent and the fact there's a still warm soldering iron on the counter of PW's vintage 'wireless shop' tells us that it's Phil Cadman G4JCP's turn to look after the 'customers' this time.

presence of several hundred volts across them.

Fitting a lamp instead of a fuse isn't such a good idea when using silicon - as opposed to valve - rectifiers. The high switch-on surge currents will weaken the lamp filament causing it to blow prematurely, maybe even on the first switch-on.

If you come across such a lamp whilst repairing or restoring a piece of valved equipment it would be a good idea to replace it with a proper fuse. Unless, of course, you are simply doing a cosmetic restoration or the accuracy of the restoration is paramount.

Can You Help?

The request on my World Wide Web page asking for information about **D. G. Long's** 'Savoy' radio ('Valve and Vintage', June 1996) has finally borne fruit. **Jed** (via the Internet) e-mailed to say that he recalled repairing a Savoy radio in the 1960s.

So, it seems that Savoy did indeed manufacture radio sets. Regrettably, I have no other information about the Savoy company or their products, so if anyone knows more please write to me.

Just as one mystery radio was being identified along came another. This time it was **Mr. K. E. Leach** who wrote enclosing photographs of a set, **Fig. 1**, he'd rescued from being dumped.

The style is reminiscent of an early Cossor Melody Maker but Jed (who I E-mailed copies of the photographs to) made the observation that it might be a home constructed set, possibly a John Scott-Taggart design. The only name on the set is 'Castle' and Jed supposes that to be the name of the cabinet maker rather than the set's manufacturer.

Having checked what little literature I possess on Scott-Taggart's designs (**Charles Miller** profiled him in 'Valve and Vintage' in the January and April 1997 issues of *PW*) I tend to agree. The style places it firmly in the late 1920s to very early 1930s. Does anyone recognise the set or can anyone shed light on its origin?

Transmitter Project

Twelve months ago I featured an a.m. transmitter project. The main purpose of the transmitter was to 'rebroadcast' Band II v.h.f. stations on the long or medium waveband. Thus allowing older radios to receive, for example, BBC Radio 2, 3 and 4.

Recently I received a letter and several photographs from **Keith Waters** of Oxford. Keith has built a medium-wave version of the transmitter which he feeds into a restored and modified R1155 receiver. But rather than use a separate v.h.f. set to drive the transmitter, Keith installed a Maplin v.h.f. tuner (kit) within the transmitter enclosure. This has produced a useful stand-alone unit, see photographs **Fig. 2**, that can provide Band II f.m. reception on any medium wave radio.

Also in the September 1997 issue I asked if anyone had used modern miniature r.f. chokes in valve radio equipment. In his letter, Keith told me that he had used the Maplin 1mH type (WH47B) and found it to be quite okay. It would seem that modern miniature r.f. chokes **are satisfactory** but only for low power applications. (the 1mH choke mentioned is physically very small and only rated at 300mW).

Keith tells me he did initially have a

Greetings and hello from September's friendly neighbourhood 'Valve and Vintage' proprietor! This time I thought I'd let your soldering irons cool down a little and show you what some valve enthusiasts have been doing these past few months.

But first, a leftover from the transmitter and receiver revamps I covered in my two previous columns. There's also an interesting new query...so let's get busy!

Like a 'good boy' I always, as a rule, install appropriate fuses in all the equipment I construct and use. But did you know that manufacturers used to fit

miniature lamps instead of h.t. fuses in low-power valve equipment?

Typically, a low-voltage lamp rated at about 150 to 200% of the expected h.t. current would be wired in series with the h.t. centre tap (or the earthy end of the h.t. secondary winding) and the equipment chassis.

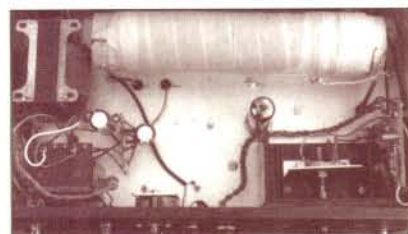
The lamp served a dual purpose. Most importantly, it would behave as fuse and blow if a short circuit occurred on the h.t. line. Under normal conditions the lamp would simply produce a dim glow. Any change in h.t. current, due to a fault or other problem, would cause a corresponding and (hopefully) noticeable change in the lamp's brightness.

These days I'd never recommend using lamps as fuses. Modern miniature lamps - and lampholders - may not take kindly to the

Fig. 1: The 'mystery' receiver rescued by reader Mr Leach (see text).



Fig. 2: Keith Waters' Band II converter unit (lower Photograph) which is used in conjunction with an R1155 (see text).



problem with the transmitter 'motor-boating'. This he traced to the 100 μ F electrolytic across the h.t. supply - removing it cured the problem!

It seems that under certain circumstances the triode amplifier section and heptode mixer section can form a low-frequency oscillator - causing the typical 'motor boat' like sounds). Reducing the value of the h.t. decoupling capacitor seems to help in these situations. Reducing the value of the coupling capacitor between the two sections (C7 in the original circuit) might also help.

Valve Audio Rules!

Two books about valve audio amplifiers were profiled in the July issue of *PW* (pages 30 and 31). They were *Valve Amplifiers* by Morgan Jones and *Valve and Transistor Audio Amplifiers* by John Linsley Hood.

Valve and Transistor Audio Amplifiers features many well-known valve amplifiers dating from the 1940s through to the 1960s. The author also covers some valve preamplifiers and a few power supplies...useful for anyone who wants to experiment with valve or transistor designs and likes to 'borrow' ideas from the present and past.

In contrast, *Valve Amplifiers* keeps well away from solid-state devices except for their use in power supplies and bias circuits. Morgan Jones also features famous valve amplifiers from the past but concentrates on just three examples. The author then describes, in detail, a contemporary ten-watt amplifier of his own design.

But the main purpose of the book is to introduce the mechanics of valve amplifier design to anyone who wants to design (and build) their own amplifier. Sensibly, the author has kept any mathematics to a minimum and provided plenty of worked examples and the emphasis is on the practical aspects of the design process.

However, our readers' should be warned about the addictive nature of valve audio! A friend of mine, **Paul Webb** of Wombourne in Staffordshire, was until a few years ago quite unacquainted with valve amplifiers. Having spoken with me about the virtues of valve amplifiers and having read *Valve Amplifiers* from cover to cover, he's now totally convinced of the supremacy of valve audio amplification. This conviction has recently resulted in him designing and building the amplifier shown in **Fig. 3**.

The amplifier is an all-triode single-ended design with type 845 output valves. These produce some 15 to 20W of audio per channel. The 845 is a 100W dissipation directly-heated triode, which is slightly under-run in this amplifier; each has a mere 900V on its anode and is biased to draw around 80mA of h.t. current.

The amplifier's associated power supply, which is situated out of shot below the amplifier, is of a similar size but considerably heavier. Realising the absurdity of using such an amplifier to drive headphones, Paul had previously constructed an entirely separate, self-contained headphone amplifier, see **Fig. 4**.

The second amplifier is also an all-triode design, albeit the output valves are 6L6G beam tetrodes connected as triodes. The power output is a shade under 1W per channel. Interestingly, the 6L6Gs can be switched to operate as tetrodes whereupon the audio power output increases to 4W per



channel, sufficient to drive a pair of sensitive loudspeakers.

If you contemplate building any piece of valve equipment which is to run a significant amount of power then do take into consideration the sheer physical size and weight of the equipment. Also, carefully consider the insulation and safety aspects of high voltages - over 900V in this case.

And make sure you provide adequate ventilation! Paul's amplifier dissipates over 300W (**Continuously**). In particular, the two output valves dissipate over 100W apiece - 72W at the anode and 32.5W at the filament (10V at 3.25A).

Fig. 3: Paul Webb's valved hi-fi amplifier (see text).

Build A Prototype

You should also always be prepared to build a working prototype. Paul's headphone amplifier suffers from one problem which we did not anticipate. Because it's a headphone amplifier it has to be very quiet. The h.t. supply is very well smoothed and the valve heaters are fed with d.c. rather than the usual a.c. Yet there is a noticeable 'hum' when listening with headphones!

We quickly traced the hum to magnetic induction between the mains transformer and the output transformers. Such small magnetically-induced voltages are not normally a problem but they certainly are in the case of headphone operation.

So, if you're contemplating using headphones extensively with a home constructed valve receiver pay extra attention to h.t. smoothing. Even more importantly, check the position of the mains transformer (and smoothing choke, if there is one) and output transformer **before** you start drilling holes.

Oops! Nearly crashed into the bottom of the page. I'd better say cheerio until it's my turn 'in the shop' again. Please send your comments, letters and stories of hopeless valve addicts to me either via the *PW* offices, via E-mail to phil@oldpark.demon.co.uk or direct to: **21 Scotts Green Close, Scotts Green, Dudley, West Midlands DY1 2DX.** *PW*

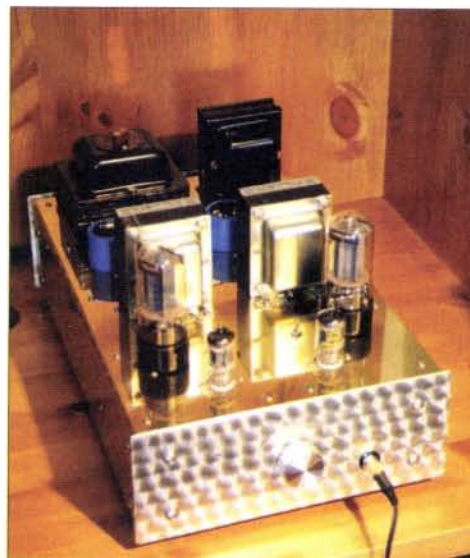


Fig. 4: A low power headphone (yes headphone!) amplifier. See text for further details.

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VHF REPORT

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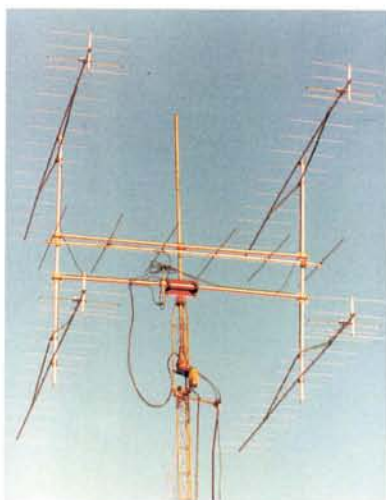
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THIS MONTH DAVID BUTLER
G4ASR TAKES A LOOK AT YOUR
LETTERS AND HAS REPORTS OF
TREMENDOUS SPORADIC-E
OPENINGS ON THE VHF
BANDS.

There was DX galore on the 50, 70 and 144MHz bands during June. I've reports of Sporadic-E (Sp-E) openings to the Middle East, Asia and Africa and surprisingly these were on the 144MHz band! On the 70MHz band the first two-way contacts have been made with Slovenia (S5) and on the 50MHz band there were brief transatlantic openings to South America, North America and the Caribbean area.

Those of you who have been reading this column for a number of years will recall that

Some antennas at the
QTH of David Butler
G4ASR. Can you can
spot the 6-element
70MHz Yagi!



I always reckon that the Tuesday after the first weekend in June is invariably good for Sp-E propagation on the 144MHz band. To put some faith to my assertion the first reported 144MHz Sp-E opening of the season occurred on Tuesday June 3 and what an opening it was.

This was no single-hop event to middle Europe but the 'full monty' to Greece (SV), Crete (SV9) and Israel (4X)! Yes, I am talking about the band where the casual operator thinks all 'traffic' is made via an f.m. repeater and anything over 100km is DX. This was on the 144MHz band and many of the contacts were up to 3600km away!

The first of a series of openings started around 1110UTC with PA0PVW first hearing a 4X station operating with c.w. on 144.298MHz. Stations in DL, ON and PA then had brief openings for the next two and a half hours to Malta (9H) and to the expedition station SV9/DC9KZ on the island of Crete. Around 1215UTC the Sp-E opening extended into south-east England with stations (mainly in IO91 and JO01) working SV10H (KM18), SV7ADJ (KN20) and SV9/DC9KZ (KM35).

The real DX though was provided by the stations of 4X4MO (KM72), 4Z5BS (KM71) and other Israelis who were worked on s.s.b. between 1241-1244UTC. Later on, around 1330UTC, another event saw stations in northern England (IO93/94) working into Bulgaria (LZ) and Romania (YO).

According to David Dibley G4RKG (IO91) the station of G4FUF (JO01) contacted three 4X stations, although nothing was heard of them at his QTH. David did manage to work SV9/DC9KZ at 2800km and heard SV7ADJ (KN20). He mentions that the SV9 station was heard calling CQ for some time without getting many replies, suggesting that the footprint in the UK was very localised.

Neil Whiting G4BRK (IO91), located near Swindon, didn't hear anyone to the north or west of his QTH calling the DX, so

he thinks he was around the limit of the propagation. Neil reports that SV9/DC9KZ was audible for 10 minutes and peaked to 59 for about 30 seconds.

Neil was very pleased to contact the SV9/DC9KZ expedition station as the 2866km contact was his furthest ever on the 144MHz band. He also heard an SV1 station earlier but signals were too weak to identify the full call sign.

Geoff Grayer G3NAQ (IO91) made two contacts with the SV9 station as he heard the expedition group calling for some time without getting a reply. Geoff was only running 60W output and received an S9+ report showing that the path loss can be very low during Sp-E openings.

Geoff reckons that the propagation from SV9 was a double E-layer refraction with a chordal-hop between the two reflection points. He supports this theory as the distance involved is too short for conventional two-hop Sp-E.

Chordal hops are shorter than those involving a ground reflection and they allow propagation above the normal maximum usable frequency (m.u.f.). He didn't hear any single-hop contacts being made to highly populated areas in northern Italy where one would expect the intermediate ground reflection point to be. Finally Geoff states that the 4X4 stations (around 3500km away) were definitely well above the single-hop distance associated with Sp-E propagation.

Other Sp-E openings on the 144MHz band occurred on June 5, 6, 11, 12 and 18, although most of these were of very short duration existing for only a few minutes. The exception to this though was the event on June 11 which lasted for well over two hours and was quite widespread throughout much of England and Wales.

Turning first to the opening on June 5. This occurred between 1440-1450UTC with only the stations of I8MPO (JN70) and IT9IPQ/9 (JM78) being reported in southern England. A short opening on the following day, June 6, occurred around 1600UTC and saw contacts being made by stations on the south coast and the Channel Islands into Malta (9H) and Sicily (IT9).

The Sp-E opening on June

11 was however considerably better. It was first reported in western Europe around 1800UTC with stations in DL, HB9, ON and PA working DX such as EA7GTF in southern Spain, EA9CW in Ceuta, north Africa and 7X2DS in Algeria, also in north Africa.

A few minutes later the opening spread into the Channel Islands, southern England and south Wales with the s.s.b. stations of CN8HB (Morocco), EA9MH (IM85) and EA7/G4XEN (IM87) being much in demand. This opening lasted for nearly one hour, fading out just before 1900UTC. At this point during a Sp-E opening it's very easy to fall into the trap of thinking that the opening has finished.

Quite often, as was the case with the Sp-E opening event, the m.u.f. rises and falls during the period of E-layer enhancement and the band will open up on a number of discrete occasions. The next such event commenced at 1915UTC and lasted for approximately 25 minutes.

The station of EA9MH and stations from southern Spain (IM66, IM67, IM77) were heard working into central England (IO82, IO92) at this time. One station, EB9DZP (IM66) was even heard using f.m. on 144.320MHz! A number of stations located to the east of the country (JO01, JO02) found that they had propagation into Portugal, contacts on s.s.b. being made with CT1GCO (IM57), CT2GF and CT4QP (IM59).

Further openings on the 144MHz band also took place between 1955-2005UTC and 2020-2040UTC. The Sp-E 'cloud' was relatively static and contacts were again made into CT and EA. In the latter opening, stations situated as far north as IO93 were able to make contacts into these countries.

On the following day, between 2025-2032UTC, there was an opening from southern England to EA9IB (IM85). On June 18 around 1310UTC a few stations in south-east England managed to contact IW9ERJ/IH9 (JM56) operating from the island of Partelleria, mid-way between Sicily and Tunisia.

SLOVENIAN FIRSTS

Excellent news has been reported following the release of the 70MHz band on June 13 to Slovenian Radio Amateurs. Last month I posed the question "Who will be the first UK operator to work S5 on the 70MHz band". Well the answer to that is David Wickens G6WZA (IO80) who made the first G-S5 contact at 1329UTC on June 18.

David reports that he was

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in the shack 'fiddling about' when he decided to listen to the 70MHz band having heard good activity on lower frequencies. Almost immediately he heard an s.s.b. station on 70.200MHz. The callsign sounded odd but after a few seconds he identified the station as S57A (JN65).

So, David called S57A and was rewarded with the first two-way contact between both countries. David mentions that he uses a Yaesu FT-290R driving a Spectrum Communications transverter and a 25W Spectrum amplifier into a home-made 4-element Yagi.

A few minutes later, at 1335UTC, **Bill McDowell GW6ZMN** (IO81) achieved the second contact with Slovenia. Bill had actually tried to make contact on the previous day having heard S57A calling on 70MHz. At that time S57A could hear UK beacons on the 70MHz band but no other activity. (Maybe one of the penalties of locating beacons away from the centre of amateur activity.)

Around 1230UTC on June 18 GW6ZMN heard S57A calling on the 50MHz band and attempted a test on 70.200MHz. Nothing was heard at this time but approximately one hour later the station of S57A was heard on the s.s.b. calling frequency and the first GW-S5 contact was established.

Bill mentions that he uses a Yaesu FT-706 transceiver (at 144MHz) driving a 25W **R.N. Electronics** transverter into an 80W Pye A200 solid-state amplifier. The antenna he uses is a Sandpiper dual-band Yagi, 3-elements on 50MHz and 4-elements on the 70MHz band.

Interestingly both G6WZA or GW6ZMN were totally oblivious to the fact that they had made the first contacts with S5 until I telephoned them for these reports. Congratulations to both stations for making these excellent contacts.

Further s.s.b. contacts by S57A included G0IUE (IO91) at 1338UTC, EI7GL (the first EI-S5 contact) at 1340UTC, G3NAQ (IO91) at 1342UTC and G4YTL (IO91) at 1343UTC. **Derek Thom G3NKS** (IO81) was alerted by telephone to the opening at 1400UTC but although hearing nothing from S57A he did hear the new Slovenian beacon S56A.

The new personal Slovenian beacon, nominally on 70.030MHz, (70.0293MHz

at G3NKS) was peaking 559 at 1415UTC and faded out at 1500UTC. The beacon owner, Mario S56A, reports that it runs 1W output into a 2-element Yagi beaming towards the UK.

Boris Celik S57A reports in an E-mail that he is only running 5W output from a home-made 28/70MHz transverter and a 4-element Yagi made from a modified TV antenna. At his QTH there is a cable television system and there are plenty of surplus antennas that can be used as 70MHz beams. For those that want to QSL direct his address is **Grcna 81, 5000 Nova Gorica, Slovenia**.

On the following day, from 0850UTC on June 19, John GW3MHW was hearing signals via Sp-E propagation right up to the low frequency end (88MHz) of the f.m. broadcast band. He then set up his c.w. transmitter for automatic CQ calls with spaces for receiving. At 1105UTC John was answered by S57A with 559 signals being exchanged.

After the contact was completed further c.w. QSOs by S57A were made with the stations of G3NKS (IO81), G3VWH (IO82), G3LVP (IO81) and G3IKR (IO82). The stations of S58J (alenka.jezersek@siol.net) and S59F (ivan.nanut@siol.net) are both looking for a second hand 70MHz transverter to enable them to be active on the band. If you can help then send them an e-mail. (N.B. It's usual for a contingent of S5-amateurs to attend the Weinheim v.h.f. convention in September so transportation/payment may not be much of a problem.)

THE 50MHZ BAND

With the risk of sounding repetitively boring I can again report that conditions on the 50MHz band have been excellent. During June (well I could say any month during the summer!) the band was open for long periods via Sp-E propagation to most European countries. Many European operators were unfortunately causing mutual interference on 50.110MHz, so for all of you without v.f.o.s I'll now report on the real DX that you may have missed elsewhere on the band!

Looking first to the West I can report that the transatlantic path between the UK and North America was open on at least six days during June. Although most openings were to the USA and Canada it was very

pleasing to note contacts being made with stations in Puerto Rico on two occasions.

The first of the 50MHz openings occurred on June 4 with the stations of KP4EIT (FK68) and WP4O working CT1DNF at 1130UTC. A little over two hours later KP4EIT was heard by G3KOX (IO91), G4UPS (IO80) and other stations in southern England, GJ, GU and GW.

Jamie Ashford GW7SMV (IO81) contacted him at 1407UTC and reckons he may have been the first GW to do so during this new solar cycle. This opening was fairly brief but conditions were also quite good to South America later in the evening.

Several stations located in southern UK heard the Brazilian station PY5CC (GG54) calling CQ around 2045UTC. Although his signals were peaking S6 no contacts were made. Another chance to contact Puerto Rico came on June 24.

Jim Smith G0OFF (IO90) reports that KP4EIT was heard at his QTH between 1430-1515UTC although signals were weak for most of the time. Jim worked him at 1444UTC and thinks KP4EIT only contacted stations located in the south and south-east part of the UK. **Peter Taylor G8BCG** (ex-H44PT) heard the Puerto Rican station whilst he was mobile in Cornwall (IO70) but regrettably couldn't work him.

Transatlantic openings to North America via multi-hop Sp-E occurred on June 6, 10, 19 and 27. There may well have been more but these were the more significant events although most were fairly brief and geographically selective. Despite the opening on June 6 being of short duration the signals were very strong.

Darren Moody G0HVQ (IO81) for example heard VE1PZ (FN85) peaking 599 around 1330UTC over the 4300km path. Although I didn't receive any reports for an opening on June 10 the station of **Arnie Arnott VE1IW** (FN84) did hear the GB3MCB beacon located in Cornwall (IO70). It was copied quite strongly between 1800-1810UTC but despite many calls on 50.110MHz no contacts were made. (An interesting debating point is that if someone can hear a low power beacon elsewhere on the band why move to 50.110MHz which more often than not is occupied by local European stations. Why don't you call anywhere and operators will find you?).

On June 19 the band opened up late in the evening (as normally would be the case for the UK-USA path via Sp-E). At 2210UTC the station of VE1YX was heard in Jersey and

a few minutes later propagation moved into southern England.

Although the 50MHz band wasn't open to North America from the UK on June 23 a number of USA stations did work into central Europe. The station of WT8R reported c.w. contacts with DJ3TF, OK1DDO and SP6GZZ between 1530-1600UTC. Probably the best transatlantic event of the month occurred on June 27.

Bob Mobile WA1OUB (FN43) worked 9 European countries, CT, DL, EA, EI, G (11 stations), GD, GM (3 stations), GW (2 stations) and PA between 2110-2320UTC. His best DX was DL7AV (JN58) at 6185 kilometres.

Now I'll take a look at openings in a southerly direction into deepest Africa. Again, I may not have captured all of the events but the following should give you a good idea of what passed you by!

The station of 9G1BJ (IJ99) in Ghana had excellent propagation into the UK on June 5 between 1800-1845UTC. His list included G3FPQ, G3KOX, G3WOS and G4CCZ (all in IO91), G4FUF (IO01) and many more throughout much of England. Conditions on June 7 were particularly good with the stations of TR8CA and TR8XX (Gabor) putting very strong signals into the southern part of England from 0720UTC.

Neil Carr G0JHC reports that by 0800UTC the propagation had extended further north to his QTH (IO83) and he was able to work the station of TR8XX. A few hours later, just before 1100UTC, 9G1BJ was heard working stations in IO91/JO01 and in the afternoon at 1644UTC the station of 3C5I (Equatorial Guinea) gave **Geoff Brown GJ4ICD** (IN89) country no.163 on the 50MHz band.

Alan Isaachsen 3C5I also had two openings into the UK on June 14, the first at 0830UTC and another later in the day between 1820-1850UTC. Some of the stations known to have contacted 3C5I included G3NVO (first G station), G0JHC, G3FPQ, G3OIL, G3WOS, G4CCZ, G4HBA, G4IGO, GW4EAI and GW4LXO.

At the end of the month, on June 28, Ron 7Q7RM (Malawi) had a good opening throughout much of southern, central and northern England. He was heard between 1700-1730UTC as was the low power beacon 7Q7SIX (KH75) on 50.003MHz.

Finally, I'll point the beams towards the Middle-East (and beyond) and report on what's been heard from that direction. First up is news that A45ZN (Oman) had an opening into the UK on June 2 at 1130UTC and

contacted G3HBR (IO93) for his first G-station.

Later in the day, at 1600UTC, the station of UN3G (MN83), located by the Chinese border in Kazakhstan, worked G4HBA (IO80) and other stations. At the beginning of the month Erol TA7V (KN90) in Turkey reported that he had obtained a 50MHz permit and would be active between June 1 to September 31. He is using the 5-element Yagi left behind by the YM7PA expedition last year. By June 2 Erol had made 143 QSOs in 25 countries (but not the UK). However, **Geoff Crowley GM7SJC** did report working TA7V on June 27. Other DX stations worked from the UK during June included EK6AD (LN20), OD5RAK and OD5SB (Lebanon), JY4MB (Jordan), Omani 4L5O (LN21) host of the 4L6PA expedition to Georgia in 1996 and 4X4FR, 4X4IF/4X (KL79), 4X6ON and 4Z5JA (Israel).

ITALIAN PREFIXES

I get the distinct impression from your reports that some of you think that the different Italian prefixes count as separate DXCC countries. Let me make it quite clear that the like of IB0, IX1, IN3, IV3, IA5, IZ5, IL7 and IC8 although interesting as prefixes (and some are valid for the Islands On The Air award, IOTA) **all count as Italy**.

The island of Sicily (IT9) is **NOT** a separate DXCC country and neither are its associated islands, ID9, IE9, IF9, IG9 and IH9. **What does count** as a separate DXCC country is Sardinia (IS0) and its islands, IM0.

However, there is some justification to the confusion as Italian v.h.f. licensees (IW) in mainland Italy (JN61/JN63) and on the island of Sardinia (JM49/JN40) appear to use the same prefix. As evidence of this are the stations of IW0GDC (JN63, Italy) and IW0UIQ (JM49, Sardinia). Confused? I'm not surprised!

After I made some enquiries about the confusing Italian prefixes (on the **UK Six Metre Group Web Page**) Sergio IKOFTA came up with an explanation. He reports that all v.h.f. licensees on Sardinia use the series IW0UAA-IW0UZZ and that other series are used for the mainland (IW0) area. So, pay very careful attention to the callsign when working an IW0 station as you may actually be working a new DXCC country.

DEADLINES

Sorry I haven't mentioned everyone who sent in a report this time but I've run out of space again! Don't forget that in the next few months the 50MHz

band will be open to Southern Africa and South America via trans-equatorial propagation. Guaranteed!

Please let me know what you've been working. Forward any news, views, comments or photographs (especially) to the address and by the date given at the top of the column. A simple telephone call is all it takes.

**THANKS FOR YOUR LETTERS
AND GOOD LUCK WITH THE
DX. SEE YOU AGAIN NEXT
MONTH.**

73 David GAASR

HF FAR & WIDE

**LEIGHTON SMART GW0LBI,
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TRELEWIS,
MID-GLAMORGAN,
CF46 6DB,
WALES**

TEL: (01443) 411459 (9AM - 6PM)

**LEIGHTON SAYS THAT YOUR
REPORTS SHOW THAT 28MHZ
IS STARTING TO LIVEN UP AT
LAST!**

Quite a few of our reporters have mentioned that the 28MHz band has been active this month, with a couple of new reporters sending in logs and comments. It seems that there is a general lack of occupancy on this very effective band; **Angie Sifton G0HGA** mentions that she has noticed that while the 27MHz CB frequencies are full of foreign signals, the 28MHz band appears to be dead flat, with no signals apparent at all!

I think your observations means just one thing Angie...the band **is open**, but there simply isn't anyone transmitting there! Incidentally, 28MHz has always been one of my favourite bands, because it's a band full of surprises when it opens and you never know what's going to be thrown up there.

Even now, when Sporadic-E (Sp-E) is the major form of propagation on 28MHz, bringing in stations from around a maximum of 3200km distant, now and then a real rarity will pop-up out of the blue.

I remember listening to the usual European stations via SP-E one summer, when suddenly up came a station from Zimbabwe at S7 signal strength! Whether this was due to 'F' layer

propagation or perhaps double-hop sporadic 'E' I don't know, but needless to say he must have worked every single European country in about 30 minutes!

The old adage 'If the band looks flat, put out a CQ' must surely apply here eh?

DX NEWS

Some DX snippets from the pages of the RSGB's *DX Newsheet* now. There's news that Dave K8MN will be on the air from Tanzania on 1.8 - 50MHz in late August for three years as he takes up a new post there. His callsign is not known as yet, but QSL via WA8JOC.

Keen slow scan TV (SSTV) enthusiasts should look out for Mac 6Y5MC in Jamaica who is regularly active with this mode (QSLs should be sent to WA4WTG). Also look out for Murtada 9K2MU in Kuwait who is also active with SSTV on 21 and 28MHz (QSLs for Murtada should go to WA4JTK).

In the Central African Republic Alex TL5A is now active on all bands, including 1.8MHz (QSLs should go via PA3DMH). In Antarctica, VK0TA has been transmitting from Davis Base, often on s.s.b. at 2315 on 14.122MHz.

Francesco IK0FVC says that the 1A0KM (Sovereign Military Order Of Malta) **was indeed a 'pirate'**, and that he will announce any legitimate 1A0KM operations in advance in future.

Finally, Ted NH6YK will be active again in August as KH4/NH6YK while visiting his XYL who is stationed there. He'll be active on h.f. and 50MHz (QSLs to go to his home call address).

The *DX Newsheet* is a weekly up-to-date publication for h.f. enthusiasts edited by

Fig. 1: Jean-Michel Simonet 5N9NJM operates a mobile station in Nigeria, using a Hustler vertical antenna and 100W of s.s.b. and has been making many contacts all over Europe and beyond on the 14MHz band (see text).



Chris Page G4BUE, and is packed with information on up-and-coming DX operations. Details of subscriptions to *DX Newsheet* can be obtained from **RSGB Headquarters Lambda House, Cranbourne Road, Potters Bar, Hertfordshire EN6 3JE**.

PROPAGATION REPORT

On to the monthly Propagation Report from **Don McLean G3NOF** now. Don says: "The h.f. bands have been patchy over the past month, although strong Sp-E has been noted on all bands. As usual, 14MHz has been the most consistent, with north Americans heard from 1100 until the early hours with best conditions from 1700 onwards. South America came in at around 2000 onwards, with some Asian signals noted between 1500 and 1800UTC.

"On 18MHz, a few long-path signals from Australia and New Zealand were heard between 2200 and 2300, with Asian stations coming in from 0800 to 1700, although this varied on some days. North America came through from 1100 to the early hours, with some south Americans at their best from 2000 onwards. This band seemed to be at its best from 2200, and usually closed around 0100UTC.

"The short-path to Asia on 21MHz was sometimes open between 1500 and 1700, with a few African stations coming through between 1600 and 1800. North Americans were patchy between 1200 and 1800. The band closed at around 2200. On 28MHz, I have only heard a few signals from Africa and south America, mostly between 1400 and 1700, otherwise the band was poor for DX".

RadioScene

YOUR REPORTS

From your reports, most of our contributors seem to have been active on the higher bands of late. However, **Sean Gilbert G4UCJ** in Milton Keynes did a little operating on 7MHz and managed to work NP4Z (Puerto Rico) at 0122, TI1C (Costa Rica) at 0144, and AZ4F (Argentina) at 0153, using 30W of c.w. from an Alinco DX-70 and a simple half-sized G5RV dipole.

THE 14MHZ BAND

A 'Letter from Africa' now! And on behalf of everyone involved with the column I give a warm 'HF Far & Wide' welcome to **Jean-Michel Simonet 5N9NJM**. Jean-Michel tells me that he operates a mobile station in Nigeria, using a Hustler vertical antenna (see Fig. 1) and 100W of s.s.b. has been making many contacts all over Europe and beyond on the 14MHz band.

Jean-Michel's report shows his contacts with IT9RZR (Italy), C21NJ (Nauru), HS1GUW

(Thailand), G0MPR, A71BY (Qatar), 4S7DA (Sri Lanka), LZ2PG (Bulgaria), 9H1AL (Malta), and ZD7JP (St. Helena Island). Jean-Michel says he'd like to ask PW readers to turn their beams towards Africa, as he'd be more than pleased to work a few of you, so get those antennas swung around!

Next we go the report from QRP enthusiast **Carl Mason GW0VSW** in Skewen, West Glamorgan, who has been bashing away with a mean 4W. Carl says he managed a total of 168 QRP contacts during the CQWW Contest in just 12 hours of operating.

Using the 4W of c.w. into a half-sized G5RV dipole, Carl's log shows contacts with DL/EA8CN (Canary Islands) at 0930, NP4FW (Puerto Rico) at 2146, CX9DX (Uruguay) at 2344, and OH8KTW (Finland) at 1110UTC. A switch to 4W of s.s.b. however, gave him contacts with ZB2AZ (Gibraltar), at 1014, CU2DX (Azores Islands) at 1905, and TF/DL6DQW/P (Iceland) at

2231UTC.

Still with QRP operation **Eric Masters G0KRT** in Worcester Park, Surrey offers a single 14MHz QRP contact in the form of DL1AXB, for a two-way low power contact, both using c.w.

Next on the 'active list' comes **Charlie Blake M0AIJ** of Milton Keynes, who as usual has been transmitting from both mobile and fixed stations this month. His mobile log shows 14MHz s.s.b. 5A1A (Libya) at 1000, TK/PA3GIO/P (Corsica Island) at 1103, GM0PNS on the Isle of Pabay at 1007, and XK3NJ commemorating the 125th anniversary of the Canadian Mounted Police.

Charlie's fixed station contacts on 14MHz include GM3VLB/M on the Isle of Skye, and EA6AEI (Balearic Islands) at 1417. Charlie says that he's lost a couple of rare contacts due to the bad behaviour of some amateurs, especially in 'pile-ups'.

What would have been a nice contact for Charlie, with JT1X in Mongolia, was made impossible by stations continuously calling the DX station even when there was a contact taking place. "This sort of thing has made me give the h.f. bands a bit of a rest"! he says.

Well, in reply Charlie, I'm sorry to say that every hobby includes some who refuse to show courtesy to others. The pity is that they spoil it for others in their 'quest' to get what they want. We can only hope that these people 'grow up' and use their equipment properly and show a bit of common courtesy to others on the bands. If we all did that, Amateur Radio would be an even better hobby than it is now wouldn't it?

Gripe over...and now back to the reports where I read that Don McLean G3NOF in Yeovil dug out some interesting stuff on 14MHz this month. His log shows s.s.b. contacts with FM5BH (Martinique Island) at 2309 QSL via F6HEQ, FG5FC (Guadeloupe) at 2226 QSL to F6DZU, YB0JWA (Indonesia) at 1501, Z21CS (Zimbabwe) at 1644, and 4S7SW (Sri Lanka) at 1741UTC (QSL via ON6TZ).

THE 18 & 21MHZ BANDS

A welcome to new reporter **Bev West GW0OSQ** in Pontypool in Gwent. In his first comments Bev tells me that 18 and 28MHz are his favourite bands at the moment.

Bev is a keen QRPer, and using a G5RV dipole and just 10W of s.s.b. on 18MHz, Bev hooked up with ES1QD/0 on the island of Muhi, JA9HDH (Japan), VO1XC (Newfoundland), BV5BG (Taiwan), and 5X1T (Uganda) during the daytime, while 2000

hours brought in BY5QE (China), as well as AP2AGJ (Pakistan) and JA1JRK for a second Japanese contact.

On the 21MHz band, we welcome another new reporter, **Andy Hosking 2E0APD** who has also been rather busy! Using just 3W of c.w. and a mobile whip antenna mounted on a balcony, Andy lists his contacts with K9FHJ (USA) at 2114, OK1DPB (Czech Republic) at 1003, PY2EXF (Brazil) at 1928, 4Z9AHI (Israel) at 2040, ZS1AAQ (South Africa) at 1604, KP4TNT (Puerto Rico) at 2108, and finally N4DR (USA) at 2126. "I hope this proves what can be done with low power when conditions are good" he says. Well, you said it Andy, well done!

Editorial comment:

Congratulations Andy...what an achievement. It just shows what can be done. And on behalf of the PW editorial team I congratulate you - we're all very pleased for you. G3XFD.

Back to Nigeria now, where Jean-Michel 5N9NJM reports mobile contacts on the 21MHz band with PA6V (Netherlands), VU2AVG (India), VQ9RU (Chagos Island), G4WXJ, G3EDM, and KH2RU (Guam).

Staying with 21MHz, s.s.b. 'mobileer' Charlie M0AIJ hooked-up with YC8VIP/QRP and YC0LBK (Indonesia) at around 1300, as well as YF7XND (East Malaysia) at 1440UTC.

Don G3NOF lists (amongst others), s.s.b. contacts with TU5DR (Ivory Coast) at 1824 (QSL via PO Box 796, Daloa, Ivory Coast), VK8AN (Australia) at 1602, and 5N1ISC (Nigeria) at 1642UTC.

THE 28MHZ BAND

Up to 28MHz now, and over to Sean G4UCJ again, who reports 28MHz as being open quite a few times this past month. His log shows 30W c.w. contacts with OH0BCI (Aland Island) at 1013, 5B4/RW3JT (Cyprus) at 1103, PS7ZZ (Brazil) at 1937, and EA9AZ (Ceuta, north Africa) at 1103UTC.

Now over to a letter from **Joseph Tabone** in the island of Gozo, Malta GC (George Cross) who has been operating **9H4GRS**, the station of the Gozo Amateur radio Society. Joseph says that he's been working QRP side-band on 28MHz for quite some time, as he's very interested in QRP 'phone operation. Using around 5W, Joseph's log for May/June includes contacts with WP4DL (Puerto Rico), V51SG (Namibia), WD4HXN (USA), ZD8T (Ascension Island), 9Q5TR (Zaire - now the Republic of Congo) all around 1700 - 1800, EX8MDA (Kyrgyzstan) at 1347, and 4S7BRG (Sri Lanka) at 1400UTC. Joseph is right when

LEIGHTON GW0LBI SAYS THAT THE 28MHZ BAND IS AT LAST LOOKING LIVELY!

PW LISTENING & OPERATING WATCH LIST

All Times in UTC

Charlie Blake M0AIJ listens and operates: 0500 - 0700 on 7.061MHz s.s.b. with an NRD 525 receiver & sloping wire antenna.

Steve Locke GW0SGL operates: 1100 - 1500 most days around 14.180MHz s.s.b. using a Kenwood TS-940.

George Woods G3LPT (Suffolk) operates: an open net on 29.570MHz n.b.f.m. every weekday morning except Monday at 0930.

Don McLean G3NOF operates: 1030 Saturdays on 3.685MHz on the ISWL Net, or 1030 Sundays on the Yeovil Club Net 3.665MHz s.s.b. using a Kenwood TS-950 & trapped dipole antenna.

John Wheeler G0LUE monitors: 28.5MHz s.s.b. every evening between 1700 and 2200 regardless of conditions using an Icom IC-706 and a 2-element TET triband beam antenna.

Leighton Smart GW0LBI operates: Some weekday evenings at around 2100 - 2330 on 1.949MHz s.s.b. using a Yaesu FT-747 transceiver at 5/30W and a long wire Marconi antenna.

Rob Mannion G3XFD listens and operates: (weekdays & weekends) 1800 - 1830 on 3.7MHz 100W s.s.b., & 3.530MHz QRP c.w. using an Alinco DX-70 transceiver, home-brewed 'OXO' 500mW transmitters and other QRP equipment and a long wire antenna. Also at 2300 on either 3.530, 3.560 or 7.025MHz (c.w.) or 3.7MHz s.s.b. (All operation dependent on PW workload and travel commitments!).

Sean Gilbert G4UCJ operates: around 0700 to 1100 and 2100 to 0000 seven days a week on 7 and 14MHz using FT-307 and Alinco DX-70 transceivers at 5/25W output and a G5RV dipole antenna in the loft space.

T. Ibbitson G0VTI operates: each evening between 1900 - 2000 on or around 7.020MHz c.w., or 14.035MHz c.w. using a Ten-Tec Scout.

he says "Not bad for a 'dead' band eh"?

Back to Bev GW0OSQ now, who says he uses a home-built cubical-quad antenna on 28MHz which cost him just £10 to make! Bev offers a single s.s.b. contact on 28MHz in the form of 5X1T (Uganda) with just 8W.

For his 28MHz log Carl GW0VSW also offers a single s.s.b. contact with 9K2ZZ (Kuwait) at 1755UTC.

Don G3NOF has been having a look at 28MHz this month, and with his 3-element beam antenna he hooked up with CP6EB (Bolivia) at 1605, ZD7VC (St. Helena Island) at 1800, 7Q7DX (Malawi) at 1801UTC, and 9Q5TR (Congo) (QSL via 4Z5DP).

Looks like 28MHz is starting to come alive, albeit rather quietly! Let's hope that the coming months provide more spectacular DX as we slowly head towards the next sunspot peak. I also hope that more people actually start using the band before the powers-that-be cast their

covetous eyes over the band!

SIGNING-OFF

That's it for this time around. Keep a watch out on the higher bands over the next few months, not forgetting the under-used 24 and 28MHz bands, as signs are that they may be producing some good long-distance traffic if the trend continues. The best thing about these bands is that it's possible to work some rare DX with the simplest of antennas, as our reporters show.

THANKS TO ALL REPORTERS FOR YOUR TIME AND EFFORT FOR THE COLUMN, KEEP UP THE GOOD WORK, AND GOOD OPERATING! AS USUAL, KEEP THOSE REPORTS AND INFORMATION WITH FULL DETAILS OF TIMES, FREQUENCIES, POWER INPUT, MODE AND ANTENNAS USED (AND PHOTOS!) COMING IN. CHEERIO FOR NOW.

73 Leighton GWOLBI

RADIO 'SCAPE

REPORTS & INFORMATION TO ME PLEASE.

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MIKE RICHARDS G4WNC LOOKS AHEAD TO THE THOSE AUTUMN EVENINGS IN THE SHACK AND OFFERS SOME GOOD ADVICE ON UP-GRADING YOUR COMPUTER.

With the summer holidays coming to an end now's a great time to starting gearing-up for a interesting winter in the shack. It's also a very good time to get yourself a PC if you don't already have one.

It's also an ideal time to upgrade if you've been struggling with an outdated PC. You'll usually find that the PC suppliers offer lots of special deals at this time of year to try and keep their businesses ticking over during the post holiday slump.

When choosing your PC make sure you get the fastest you can afford and also go for a large hard disk (6.4Gb plus). You need a PII Pentium (unless something else has arrived since I wrote this!).

If you can, try and get a 300MHz or faster processor. You'll also no doubt want to get on the Internet to get your hands on all that wonderful radio related software. For this you either need to go for a 56k modem or maybe go for the real speed of ISDN2 - there should be some tempting offers around in the autumn. So, have a good look around before you buy - remember that an ISDN2 based service will always be better than a fast modem.

If you already have Internet access then you might like to try designing your own PC on-line. Yes you really can do this.

Most of the major mail order computer suppliers run their own Web sites where you can see all the available models. However, some companies take this a step further and provide a range of basic combinations to suit various budgets. They then give you the option to customise these combinations so that you can build your ideal machine.

Once you've chosen your ideal PC you just hit a key to submit your selection and you'll be presented with a new screen showing the new price. Having used the system myself I can say this really is an excellent way to build your ideal PC, but still hit your budget.

If you want to try a few sites here's a couple with good reputations that I've tried recently, <http://www.dan.co.uk> or <http://www.mesh.co.uk> If you want to find more sites, take a look at one of the

major PC magazines or use one of the Internet search engines to find UK computer manufacturers.

ANALYSIS SOFTWARE

One or two readers have written to say that the excellent *Spectrogram v4.12* has disappeared from the [ftp.funet](http://ftp.funet.fi) site. If you're having troubles you should be able to find it on the excellent US winsite archive.

The location is:
[ftp://ftp.winsite.com/pub/pc/windows95/sounds/gram412.zip](http://ftp.winsite.com/pub/pc/windows95/sounds/gram412.zip)
If you come across any other good audio analysis software please drop me a E-mail so I can pass on the good news.

SSTV THE EASY WAY!

At the beginning of this column I mentioned that a lot of good radio software can be found on the Web. One package that caught my attention recently is the excellent *W95SSTV* by Jim Barber N7CXI and Bill Montgomery VE3EC. As you can probably guess from the name this is a slow scan TV program designed to run on Windows '95! In fact it will run on Windows '95 and Windows NT.

Before you get too excited let's take a look at the systems' requirements. As far as the processor is concerned the minimum required is a 486DX66 with at least 8Mb of RAM and a 16-bit sound card. You can apparently use some 8-bit cards but not all work properly (e.g. SoundBlaster Pro).

On the video front you will need at least 640 x 480 pixel resolution with high or TruColor. The recommendation is that the card should use VESA local bus or PCI. That's about it for the system but like all modern Windows based applications fast processors, lots of memory and big hard disks make everything work so much better.

To get a copy of the shareware version of *W95SSTV*

try the home site at <http://www.siliconpixels.com> or maybe

ftp.funet.fi/pub/ham/fax_sstv/w95sstv/ You can either download the program as a single 3.8Mb file or as three smaller files if you want to load the program onto a different PC.

Installation is well structured using the standard Windows '95 set-up systems to ensure that the program can be completely removed should you decide you no longer want it. One of the interesting features of the *W95SSTV* program is that it uses your computer sound card both for reception and transmission of SSTV signals. This really simplifies the connections down to just simple screened cables for the audio input and output.

You can even avoid having to make a connection to the ptt line by using the VOX facility on your transmitter. This all makes *W95SSTV* great for those that want to try SSTV without making any major changes to their station - so, there's really no excuse for not giving this fascinating mode a try.

Once the software is up and running and you've made the necessary connections you just need to go through a simple set-up procedure. This is well described in the Release notes file and centres mainly around adjusting the Windows '95 volume control settings. Whilst doing this it as well to turn-off your rig's VOX facility or you'll find you're transmitting test signals all over the place!

To complete the set-up process you will need to find a SSTV signal and by far the best time and place for this is on the 14MHz band at around 14.230 or 14.233MHz on a Sunday morning. The final stage is to set the volume settings to match the program's requirements.

With all the settings complete you can now tune around and find some

The image editor from the *W95SSTV* program.



RadioScene

interesting signals to receive. The easiest way to do this is to set W95SSTV to Auto-RX, as it will then automatically synchronise and start decoding the picture. An alternative is to use the Quick Restart. This immediately stops all other tasks and switches the program to receive mode - great if you want to quickly sample a picture that's already under-way.

Whenever you try a new mode like SSTV it's very important to spend some time listening before you attempt to transmit. By following this principle you will make sure you understand the mode and the way its used. If you just barge in you will probably end-up annoying other users and making yourself generally unpopular!

Once you've picked-up the operating standards you can get ready for your first transmission. Because SSTV is all about sending images you first need to find yourself a suitable picture.

The W95SSTV program provides a lot of help in finding a suitable picture through its built-in image processor. This is a simple but very useful extra that contains all the basics for getting going.

To start you will need to get a basic graphic for the background to your CQ image. If you know anyone with a digital camera or maybe a scanner you could put together a photo of your shack, home, local town, etc. This can then be imported into the image processor in W95SSTV.

Next you need to use the image processor to add the words 'CQ CQ' and your callsign. It really is dead easy. With this complete you just save the final image and use it

over and over as your main CQ screen.

You can, of course, use the same process to make all sorts of different messages. If you want to convert to the registered version of the program all you have to do is send \$50US to one of the international agents. For those in the UK **Roger Wilkins G3XFA** is the man to contact and he's available via E-mail at RTWilkins@compuserve.com

SPECIAL OFFERS

If you'd like a copy of Hamcomm/JVFX, etc. I've arranged a very special offer with the **Public Domain and Shareware Library** (PDSL). They have put together a library set of all five disks for just £12, all inclusive.

Using PDSL also makes ordering simpler as they accept all the usual credit cards so you can order by 'phone - you don't even have to write a letter! Please direct all orders and enquiries about this disk set to PDSL, **Winscombe House, Beacon Road, Crowborough, Sussex TN6 1UL. Tel. (01892) 663298** and request library volume: **H008739abcde**.

The software is only available as a set of five disks as follows: IBM PC Software (1.44Mb disks): **Disk A** - JVFX 7.1, HAMCOMM 3.1 and WJFX 3.2; **Disk B** - DSP Starter plus Texas device selection software; **Disk C** - NuMorse 1.3; **Disk D** - UltraPak 4.0 and **Disk E** - Mscan 1.3 and 2.0.

THAT'S ALL I'VE GOT ROOM FOR THIS TIME, SO CHEERIO FOR NOW AND PLEASE KEEP YOUR NEWS, VIEWS AND REPORTS COMING TO ME.

73 Mike G4WNC

The W95SSTV main screen.



AUSSIE ORACLE

LETTERS AND REQUESTS FOR TOPICS YOU'D LIKE COVERED TO ME PLEASE.

CHRIS EDMONDSON VK3CE, BOX 1 YARRA ROAD, WONGA PARK, VICTORIA 3115, AUSTRALIA

E-MAIL: vk3ce@tbsa.com.au

THIS TIME CHRIS EDMONDSON VK3CE SETS OUT TO EXPLAIN WHY HF COMMUNICATIONS ARE SO WIDELY USED IN HIS PART OF THE WORLD.

G'Day and greetings once again from 'Down Under'. Before I utter another word, I must warmly thank all of those who took the time to send E-mail messages or to write after my first column appeared in the July issue. Your comments were very much appreciated and the quantity of mail came as a very pleasant surprise indeed.

It's the end of July as I write this and we're stuck in the grips of our ghastly Winter weather, so yesterday the XYL and I loaded the kids in the car and headed for a picnic luncheon in the sunny Dandenong Ranges. Chilly indeed at only 21°C, but not a cloud to be seen in the sky, so all was well with the world...!

We lunched, looking out over a magnificent view of the beautiful Yarra Valley and the distant mountains of the Great Dividing Range, not far from an English couple who had come to Australia 20 years ago for a one-month holiday. Two years later they moved here permanently. I doubt they've stopped smiling since...!

Isn't it good to see the h.f. bands coming back a bit to what they **should** be? I've worked quite a few Europeans over the past few weeks, but none of them anywhere near where one of the 'harmonics' is holidaying at present, just outside Munich. (But beware, she's on her way to the UK about the time you read this!) Sadly, absolutely **no** interest has been shown in Amateur Radio by this one, so we talk daily via the Internet.

INTERNET OR AMATEUR RADIO?

Ah, the Internet is no doubt the key to Amateur Radio's eventual demise, right? No, I don't think it has to be that way.

I feel there's absolutely **no** skill required to use the Internet, no thrill of accomplishment when you stretch the bounds just that little bit further, no tingling sense of

anticipation or the satisfaction of excitement of having finally achieved a goal. But I'll let you in on a little secret ... here it is a **very** useful tool for the DXer. In most ways, though, it's pretty sterile. I think we'll leave it to the computer 'nerds', eh?

Thousands of amateurs around the globe do use the Internet for all manner of things though. There are lively discussion groups, news groups aimed at specific interests like satellites, DX openings, equipment modifications and so on.

In fact, almost everything you could wish to use as an adjunct to operating your radio station. But as I said, as an entity in its own right, it has absolutely none of the 'magic' of wireless. What a dreary thing it really is!

Perhaps those people who so fear the Internet should embrace it too, for that is probably the best way to deal with its very real menace to our hobby. Know your 'enemy'!

OUR WORLD OF RADIO

So, what's happening in our world of radio? Well, lots, as always. But before I look at that, I really should continue what I started last time around - a snapshot of the Amateur Radio scene here in Australia.

This time I'll deal with h.f., firstly by talking about h.f. **outside** the amateur service. I told you last time about the large h.f. antennas which generally flap around behind my car, a four wheel drive Subaru WRX.

In the interests of science and for yet another equipment review, I've just swapped the eight-footer, which usually sits on the back of my WRX for a magnificent 12-footer, almost 4m long, this thing is wonderful for wiping out fluorescent tubes at filling stations. What a shame most Aussie 'servos' use shrouded lamp fittings these days!

I'm afraid the main reason for antennas like these rarely attracting a second glance in this Sunburnt Country may have gone through to the keeper in the sub-editing department at PW last time around. You see, in the July issue, the caption accompanying the photograph incorrectly explained that it was Australian law which meant that antennas like these are a common sight. (**Editorial comment:** A slip of the editorial keyboard caused this, sorry Chris. Donna G7TZB).

Not so! It's the vastness of the land which makes large h.f. antennas relatively commonplace, although in fairness, they're more often seen on large lorries (when I say large, I mean it, in some places they're up to 80m long, with a big prime mover hauling up to

CHRIS VK3CE TELLS THE FASCINATING STORY OF AUSTRALIAN HF



Chris VK3CE is the Editor of *Radio and Communications* and if you've seen this copy you will have noticed that Rob G3XFD is writing a return column giving Australians the 'low-down' on Amateur Radio from 'up-here'.

three long trailers, we call them road trains for obvious reasons), plus interstate passenger buses or four wheel drive vehicles. We live in a place where nothing but h.f. will regularly get through.

It's very hard to explain the extraordinary vastness of the Australian land to people who have everything literally at their fingertips. So, let me try again....!

Let's say you decide to install a 144MHz repeater to serve your local community. You live in a rural area on the western seaboard with a major population centre of 2000 residents only 300km away.

Fortunately, you have a nice high mountain range close by and the highest point of the tallest peak soon sports a large solar array, a couple of 'deep cycle' batteries, a small mast for the antennas, and an old refrigerator to house the equipment, which includes a 100W amplifier to extend the repeater's range. The area gets plenty of sunshine, so power really isn't much of a problem.

You fire up your repeater for the first time and discover to your delight that its coverage extends more than 160km (100 miles) in all directions other than down. Clearly, it's going to be a **very** busy repeater, right? Well, not necessarily - not if it's in the north-western VK6 area, anyway, where I understand one of the local repeaters has only **one** licensed amateur living within its normal 160km range!

If I were to load my family into the car and set off for that far-off point I suppose I could

cover 1000km per day if I really tried hard. I would be driving for four full days and still face half a day in the driver's seat to get within spitting distance the place. In the process, I would have driven almost a third of the way to the UK. Yes, Australia really is **big**...

Only two means of wireless communication are in any way practical in the outback these being h.f. or satellite. Telephone lines reach only the towns and follow the highways of this nation.

Isolated communities have relied for decades on h.f. communications. Some farms are so large that it's even used to communicate from the boundaries back to the homestead.

Entertainment is something that we all

take for granted. I live in Melbourne, a major city of more than three million people. My children watch the cable TV, crisp digital satellite TV or our six free-to-air channels.

I listen to broadcast radio a lot. It's always 'chugging' quietly away in the background as I work.

But large areas of Australia cannot even receive a single medium wave (m.w.) or f.m. broadcast station during the day and can only get crackling reception from the nearest m.w. broadcast station several hundred or even a 1000km away at night.

Equally, personal communications in a place like Australia can be something of a challenge. In all honesty, I don't think I'd choose to live somewhere that was far out in the outback (what if the children were to get sick, and what about effective schooling?) but a surprising number of people do and most of the vehicles plying the red roads out there have h.f. whips on them. Satellite telephony has been an option for quite a few years, but it remains relatively expensive, which renders it a choice selected by few.

Many older people head for the 'bush' when they retire, with either no communications gear in the car or a simple CB radio. But, this is not really the ideal gadget to rely on out in the wilderness.

We know that 27MHz a.m. or s.s.b. will only really be of much use at night, unless the band is wide open in which case you could wind-up talking to anywhere. And their

alternative, u.h.f. CB on 477MHz, is pretty much worthless once outside towns. You need to go down **much** lower in frequency to ensure reliable cross-country communications during the day.

Yet we regularly hear of people whose cars experience mechanical breakdown when they're way out in the bush and only by their carrying a large quantity of water in the car have they been saved from almost certain death by dehydration, as some roads may only see one or two vehicles a day ... if that.

There is no way on Earth that I'd head for the Aussie bush without a formidable armoury of radio gear, a couple of 20 litre fuel churns, spare fan belts for the car (make sure it's a reliable one at that), a good amount of water and food, ropes and a spade to dig my way out of sand, some very good maps, a compass and a GPS receiver. In fact, half that stuff lives in my car all the time!

FLYING DOCTORS

Exactly 75 years ago this year, Australia saw the introduction of the **Royal Flying Doctor Service** (RFDS), which today has a fleet of 38 aircraft regularly plying the land. The flying ambulances are used to evacuate people too ill to be treated at their homes and take regular medical teams to small communities in all states of the country.

As h.f. communication, initially via pedal-powered radios, was used from the earliest days to communicate with the RFDS it seemed natural that radio would play an important role in overall communications in Australia. There is a large number of duplex h.f. frequency pairs used for telephony in Australia, plus many so-called 'outback chat channel' allocations from just over 2MHz, and these frequencies are in heavy demand indeed right around the country.

The RFDS runs one of the two major public-access h.f. networks and our national telecommunications carrier, Telstra, runs the other. I have held an Outpost Station Licence for almost ten years.

My call sign in this service is VJV33 and with it I can use an approved 100W h.f. radio to call for emergency assistance, place telephone calls, or just talk to other vehicles or homesteads around the country. I have even heard aircraft in flight using these channels. The 2.02MHz frequency is frantically busy any night of the week and during the day you'll find school classes being conducted all the way from frequencies in the 3MHz range up to 10 or 11MHz.

Can you even begin to imagine a school classroom so huge that the only way the teacher can talk to the students is via an h.f. radio? Tune-up around 5MHz any weekday and you'll hear the treble voices of children warbling to their teachers on a busy upper side band (u.s.b.) channel.

FULL CIRCLE

So, we've now come full circle and get back to the big black h.f. antenna on my car. I've operated mobile h.f. for quite a long while now. It was 25 years ago this year that I first tried attaching a tank whip to roof racks on my car (and managed to shorten it by about 6in when I drove under a 1500V power line used by Melbourne's trams, but that's another story...).

I was not ever really all that happy with the strength or durability of commercially-made h.f. whips but, try as I might, I couldn't home-brew an antenna which offered the sort of frequency coverage that I wanted. Of course, to add insult to injury, you'd need five separate antennas just to cover 3.5 (80), 7 (40), 14 (20), 21 (15) and 28MHz (10m).

Then, about 10 years ago, I was driving through town and saw a very large truck with a really huge h.f. whip mounted up-front on the 'roo bar' (which I suspect you may know better as a bull bar) parked at the side of the road. It was the first time I'd seen one of these things close up, so I pulled over and wrote down the manufacturer's name.

A search of Australian telephone directories finally turned up the name I was looking for, **Terlin Aerials**. The company was based several thousand kilometres away, in Perth, Western Australia.

Not only did I have a personal interest in the Terlin Aerials antenna, but I figured it could be of interest to the readers of my magazine *Radio and Communications* (then called *Amateur Radio Action*). What I had seen had all sorts of weird frequencies marked on it such as 2020, 5515, 5820 and so on. What were these for? I remember wondering.

When I introduced myself over the 'phone, I asked if the company made antennas for Amateur Radio use. "Amateur what?", came the reply. It turned out the company was making 10 antennas a week for the RFDS and similar channels and they'd never even heard of the amateur service!

So, I FAXed a long list of frequencies to Terlin, starting from 1.825MHz and working up from there. The Terlin antenna worked a treat, and I was able to work any part of any h.f. band from the car, simply by moving a 'wander

RadioScene

lead' from one tap to another.

The equipment review appeared a couple of months later, and this was duly followed by a 'phone call from one of our subscribers in the USA asking: "Is this thing really that good?" I answered that it was the best mobile h.f. antenna I'd ever used, so the caller said he'd order a dozen or so to see what amateurs over there thought of them.

Well, I still own antenna Number One all these years later and **Outbacker**, as the company's now called, took another 5000 amateur h.f. antennas to Dayton this year. None of them came home... not one.

So, I guess the bottom line is that h.f. communication in Australia is a bit different to what you'd find in Europe. The bands are clear and quiet, and working mobile is a lot of fun.

THAT'S ALL FOR THIS MONTH, NEXT TIME (DECEMBER PW) I'LL TALK ABOUT WHAT YOU CAN FIND ON THE HIGHER BANDS AND LOOK AT HOW MUCH COMMERCIAL GEAR COSTS OUT HERE (YOU MAY BE SURPRISED!). ALL THE VERY BEST TO YOU AND YOURS, PLEASE FEEL FREE TO WRITE TO ME AT ADDRESS GIVEN AT THE HEAD OF THE COLUMN.

73 Chris VK3CE

BROADCAST

REPORTS & INFORMATION TO ME PLEASE.

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PETER SHORE BRINGS YOU THE LATEST NEWS AND VIEWS FROM THE WORLD OF INTERNATIONAL BROADCASTING INCLUDING THE NEW SCHEDULES OF WHEN AND WHERE TO LISTEN FOR YOUR FAVOURITE PROGRAMMES.

The political landscape of West Africa may well change dramatically in the coming months. The death of **General Abacha**, (and the more recent death of **Mashood Abiola**) who led the military government that has held power in Nigeria for the last four or so years, and the release of political detainees, means that democracy could soon be restored to the former Commonwealth country.

If this happens, the plethora of clandestine radio stations beaming pro-democracy programmes to Nigeria may cease operation. So, if you want a chance to hear them before they leave the airwaves, here is a summary of what's on when.

Radio Nadeco, which represents the National Democratic Coalition of Nigeria, beams from WWCR in Nashville, USA. It has a weekly English-language programme on Wednesday at 1930 until 1945UTC on 15.685MHz. You can contact the station at **514 10th Street NW, Suite 600, Washington DC 20004, USA** or check out their Internet site at www.nadeco.org/radionadeco.htm

Radio SNBS (Save Nigeria Broadcasting Service) also beams from a commercial US station, this time WGTG in Georgia. It's on the air each Sunday at 1930-2000UTC on 9.40MHz in English and Nigerian languages. You can write to Radio SNBS at **PO Box 202, Boston, MA 02131, USA** or check out their web site at www.nagdhr.com

Voice of Oduduwa comes from WHRA in Maine, USA each Monday at 2100-2200UTC in Yoruba, one of the Nigerian vernacular languages. Tune in on 15.46MHz, or write to **Yoruba House, 7600 Georgia Avenue NW, Suite 405, Washington DC 20012**; web site address: www.yorubanation.org

Radio Kudirat is operated by London-based National Liberation Council of Nigeria. It beams from South Africa on transmitters hired from Sentech (which also transmits **Channel Africa**, **BBC World Service** and other international broadcasters) with a daily service at 1900-2000 in English and a variety of other languages on 11.54 and 6.205MHz. Both can be heard with reasonable reception in the UK. Radio Kudirat can be reached at **PO Box 9663, London SE1 3LZ**

The **Voice of Free Nigeria** (VoFN), another US-based station, operates on Sundays at 1900-2000UTC on 11.715MHz. It's

thought that the transmitter is in a North African country. The VoFN station can be found at **PO Box 441395, Indianapolis, IN 46244, USA** or by pointing your web browser at <http://pw2.netcom.com/~fnm>

Finally, in this line-up of clandestine stations is **Radio New Nigeria** which originates from a US-based pressure group on human rights. It has broadcasts in English and local languages on Saturday at 0100-0130 on 5.91MHz and 1500-1530 on 6.175MHz and on Sunday at 0600-0630 on 11.995MHz.

Meanwhile, we should not forget that the **Voice of Nigeria** is the state broadcaster and can be heard in English and other languages during the day. The current schedule for English - all beamed towards Africa - is believed to be: 0500-0700, 1000-1100, 1500-1700 and 1900-2100 all on 7.255 and 15.12MHz.

If democracy returns to Nigeria, listen out for a change in the tone of broadcasts from the Voice of Nigeria. I would like to hear from any reader who catches one or more of the stations which I've highlighted here, and if anyone comes across a station that I have not mentioned, let me know!

OTHER CUTS

Elsewhere in the world cuts are still the order of the day with a number of broadcasters. The **Canadian Broadcasting Corporation** (CBC) has announced that it will close its news bureau in Delhi and Moscow as part of cost-saving measures. Presumably CBC will rely on material filed by BBC correspondents with which it has an exchange agreement for news stories.

Further afield, **Radio New Zealand** is being targeted by the country's government and asked to find savings across the board. There is a serious threat to some output, which may be replaced by programmes sourced from outside New Zealand, including - potentially - some from a number of the world's major international broadcasters via **World Radio Network** in London. More news as I get it!

PROGRAMME INFORMATION

On now to some general frequency and programme information from around the world. **Radio Korea International** broadcasts in English not just from South Korea, but also via Skelton in



the UK and Sackville in Canada.

The Korean station has English at: 0200-0300 on 7.275, 11.725, 11.81 and 15.575; 0800-0900 on 9.57 and 13.67; 1030-1100 on 11.715; 1100-1200 on 7.275; 1200-1300 on 7.285; 1230-1300 on 6.055, 9.57, 9.64 and 13.67; 1600-1700 on 5.975, 9.515 and 9.87; 1900-2000 on 5.975 and 7.275; 2100-2130 on 3.97 and 6.48 and 2100-2200 on 15.575MHz.

Radio Netherlands' (RN) English-language service has some interesting programmes (as is always the case!) on the air during September. In the regular documentary slot-in broadcasts on Wednesday and Friday, depending on the particular transmission, you can hear *A Curse and a Blessing*, examining the water in Bangladesh. It's the stuff of life and death in the country and there's even a proverb which sums up the curious place water holds in the Bengali heart: "The river destroys this way and that way: it's the game the rivers play."

Bangladeshis have a true love-hate relationship with water, for they celebrate its beauty in song and poetry yet spend much of their time and money in attempts to control it. **Francis Rolt** explores the positive and negative sides of water as creator and destroyer.

Also during September there's a special feature on RN's English Language service about the touchy subject of *Ageing*. According to **Pete Myers** getting older is an unavoidable drag.

As Dutch society gets greyer, the middle-aged have become a political force in Holland. There are dozens of organisations helping people adjust to a new lifestyle and to play a useful role in society.

English from Hilversum can be heard in Europe each evening between 2030 and 2230UTC on 1512kHz medium wave (from the Belgian transmitter) with the documentary slot on Wednesday at around 2051 and on Friday at about 2151. There is also a day-time placing on short wave at 1030-1230UTC on 6.045 and 9.86MHz.

THAT JUST ABOUT WRAPS THINGS UP FOR THIS MONTH. WRITE TO ME, OR E-MAIL ME (ADDRESS AT THE HEAD OF THE COLUMN) IF YOU HAVE ANY NEWS FOR THE NEXT COLUMN. UNTIL THEN, GOOD LISTENING!

Peter

FREE ADVERTS

Now's your chance to send in a photograph of your equipment (a good idea if it's really unusual) to accompany your advert. Please note that all photos will only be published at our discretion and are non-returnable.

When sending in your advert, please write clearly in BLOCK CAPITALS up to a maximum of 30 words, plus state your contact details. Please use the order form provided.

Bargain Basement

Advertisements from traders or for equipment that is illegal to possess, use or which cannot be licensed in the UK, will not be accepted.

No responsibility will be taken for errors.

You should state clearly in your advert whether the equipment is professionally built, home-brewed or modified.

The Publishers of *Practical Wireless* also wish to point out that it is the responsibility of the buyer to ascertain the suitability of goods offered for purchase.

For Sale

1.5m prime focus dish with stand, aluminium, £180. Mr Mitchell, Yorkshire. Tel: (01377) 253999.

2 Pye Cambridge v.h.f. f.m. portable radiotelephones, 88-108MHz, type FM10P, bare sets with one battery holder only, no crystals or ancillaries but including Pye service manual, offers please. Noel on (01743) 356430.

19-element Cushcraft boomer 2m (144MHz) never used, £100. 19-element Cue Dee 70cm (430MHz), £40. 4-element Cue Dee 2m, 325. 4CX250 valves and bases, £15. 400W 2m (144MHz) amp, hardware with 2 off 4CX250s, £50. Mike on (01304) 211609.

27MHz 27/81 Fidelity CB2000, f.m., £28. Maxcom 30E, £20. Midland mobile port-a-pak, model 77-805, £55, boxed and unused. Sony SW77, £230 and Radio Shack DX-394, £80, both boxed and unused. Bandit home-base antenna, with new TK brackets, 27-30MHz, £30. All offers considered. Ron on (01608) 659487.

40" pneumatic masts for sale, Clark Scam 12, one in immaculate condition, absolutely brand new not a recon, only used for 6 weeks in still weather, £200 no offers. The other is the older version with a minor seal leak, £80 o.n.o. Both 7'10" tall when collapsed with plenty of spares, seals, e.t.c. The military pay £2k for these. Maybe swap for an SGC remote a.t.u. Contact Jon MOBQQ (QTHR as M1CCK) Portland, Dorset. Tel: (01305) 823232, or E-mail: jon@zetnet.co.uk

70cm (430MHz) hand-held transceiver, Kenpro KT-44, boxed with original accessories plus extra dry cell pack, thumb wheel tuning, little used, £60 including postage. Brian GOMJI, Liverpool. Tel: 0151-228 3080, evenings.

A number of assorted magazines: 96 assorted *Practical Wireless* magazines from between the years 1948 and 1966, 38 assorted *Radio Constructor* magazines from between the years 1948 and 1966, and 82 assorted *Television Construction* magazines from between the years 1962 and 1974, offers welcome. Tel: Fareham (01329) 286826.

Alinco DR-590 twin band f.m. mobile, CTCSS, 12.5 band fitted, detachable front panel plus remote control cable mounting bracket and mic., boxed with manual, £250. Tom G60EI, Derby. Tel: (01332) 767960.

Alinco DR-M60TH, 6m (50MHz), 20W model, used twice, £150. Alinco DR-430, 70cm (430MHz), 35W model, two months old, £150. Both as new. RN electronics 4m (144/70MHz) transverter, as new, £95. Contact Alan GWIMCD in Cwmbran, Gwent on (01633) 870791 after 6pm or weekends.

Altron AQ6-20 Minibeam for sale, 3 element beam for 20, 15, & 6m, v.g.c. with rotator, can be seen working, £100 o.n.o. Contact Jon MOBQQ (QTHR as M1CCK) Portland, Dorset. Tel: (01305) 823232, or E-mail: jon@zetnet.co.uk

AOR 3000A, boxed, £475. Realistic 2042, boxed, £175. Datong FL3, £70. New Jupiteru 9000, bargain at £275. Sirio 827, buyer takes down, £45. Vic, Stoke-on-Trent. Tel: (0973) 538502.

AOR A8000 scanner, plus OPTO Scout plus leads, £350. The pair will split. Also AR1000, £40. RA17L, needs t.l.c., £50. MM 30W, 2m (144MHz) linear, £25. Sharp PC1000, mini PC, £60 (packet) Tel: (01509) 214336, or E-mail: beano@globalnet.co.uk

AR88LF communications receiver, 1943, good working order, buyer collects. Any reasonable offer accepted. Tel: South Wales (01633) 861771 after 6pm.

B40C, mint, and one for spares, plus Admiralty manual, £100. No. 52 Remote RX and p.s.u., and spare set valves (new), £75. Tel: 0181-384 9199, after 6pm please.

Communications receivers: Collins R390, £200. Marconi Apollo, £250. Marconi Atlanta, £100. Marconi Electra, £60. Marconi HR22 s.s.b., £60. Eddystone EC 880/2, £250. Eddystone EC 958/7, £250. Eddystone EA12, £125. Eddystone 680X, £125. Philips BX925, £100. Lots of other equipment, transmitters, components, e.t.c. Paul, Poole. Tel: (01202) 690019.

Complete set-up including Icom IC-736 transceiver, IC-2KL linear amplifier, IC-AT500 tuner, 255E 2m (144MHz) transceiver, Weston ulti mast, rotator, 12/17m beam. Plus lots more, will only sell complete. For details Tel: Warwick (01926) 400423

Complete station going QRT - Kenwood TR9130, Icom IC-40E, Yaesu FRG-7700, Baycom BP2, c.w., s/wave, aerials, books, accessories, all for £600 o.n.o. - or will split. Buyer collects. Tel: Barry (01797) 270651, after 6pm, or G1VZT @ GB7RMS.

Compressed air mast for 50kg

payload, 12ft closed, 72ft extended complete with fixing frame, control valves and compressor, little used and in excellent condition, can possibly deliver, £495 o.n.o. Tel: Bob on (01305) 832387, or 0374 424272 (mobile).

Cushcraft R7000 vertical, £235. Diamond V2000 2-70-6 (144, 430, 50MHz) vertical, unused, £70. FT-2901I mobile mount, £12. FT-707 m.mount, £12. Pole mount rotator cage, £25. FC-707 a.t.u., £90. FT-7 h.f. mobile, £185. PS31, £100. Tel: East Anglia (0468) 756762.

CX201 2-way coaxial switch, as new, £9. Magnetic balun for long wire antenna, as new, £15 (Waters & Stanton catalogue price £30). Please write to Dave, 5 Alton Close, Bushbury, Wolverhampton WV10 8ES.

Datong FL3 audio filter, £60. Kenwood LF30A low-pass filter, £20. Heath HW9 with matching a.t.u. and s.w.r. meter, all manuals, no mods, £275. Capco mag loop, £50 (AMA-3). Tel: (01452) 741036.

Decoder MCL1100 easy read with auto baud rate, auto align lock, normal and auto mode, auto speed, RTTY, c.w., NAVTEX, FEC, ARQ, SITOR, with Reuters 10in monitor, only £90, easy use. Tel: Frank (01295) 670108.

Drake R4245 professional h.f. receiver, absolute mint condition, £1000. Drake R8A receiver, mint condition, £650. Tel: (01772) 704009 after 6pm. Wanted - MFJ-1026 eliminator or ANCA. May exchange R4245 for mint condition NRD-235D.

Drake R8A receiver, £600. Vectronic VC300M a.t.u., new, £80. PR-150 pre-selector, £75. Yaesu FRG-9600 100kHz to 905MHz receiver, £100. All o.n.o. Colyn on (01624) 801592.

Eddystone 358X RX, only £85. WS19 with p.s.u., £180. BE-201 plus p.s.u., £80. Class D Mk1, £15. TCS a.t.u., £15. Pac-Bell pre-amp, model K, new valves, £12. PC desk top case, £10. Ben on (01562) 743253 or E-mail: 106312.1035@compuserve.com

Eddystone 770R receiver, good condition, £70 o.n.o. Also various coil packs for HRO receiver, offers please. Andy Chepstow on (01291) 627585 (daytime), and (01453) 546555 (evenings).

Eddystone 880, immaculate, £250. KW202/204 and a.t.u., £175. Codar CR70A, M11, £45. AR88, £25. Labgear L300, TX, £55. TUB5 TX tuning unit, mint, £28. Test set type 46, Ref 105/111, £20. Wavemeter, type W1191, Ref 10731, £20. Tel: Yorks.(01274) 824816,

Eddystone 1837/2, digital, five filters, v.g.c., £350. Lowe HF-150, like new, excellent receiver, £200. Trio 9R-59 valved radio, s.s.b., v.g.c., £70. Grundig Satellite 6000, s.s.b., £150. Satellite 5000, multi-bands, s.s.b., £150. Drake 8E, excellent, £600. FRG-7, like new, £130. Normende world radio, excellent, £115. Tel: London 0181-813 9193.

Eddystone EC958/5 (a.k.a. Marconi Nebula) 10kHz to 30MHz s.s.b. receiver, g.w.o., table cabinet, original manual, £175 o.n.o. Tel: Southampton (01703) 454586 evenings.

Eddystone radios, approx. 30 sets, prices from £20-£150. Contact Dave on (01582) 840988 after 3pm or leave message before.

Explorer h.f. amp, £725. Yaesu FT-736R 2-70 (144-430MHz) base, mint, £795. FT-726R 2-70-6 + Sat board, mint, £695. Standard C7800 70cm mobile, mint, £120. AOR 2002 scanner, 1300MHz, mint, £155. Transmatch a.t.u., £45. Tel: East Anglia (0468) 756762.

F&L Hamtower with head unit, three section, 30ft by 15in triangular stepped mast, part of uni-mast system, free standing, dismantled, good condition, £65, ready for collection, moving QTH, must sell. Call John on (01242) 524217.

Ferguson Stereogram, model 3367, a.m./f.m. with Garrard 6200C turntable, 1974, with operating instructions book, v.g.c., £100 o.n.o. Contact Mr Goodson, 27 Clearsprings, Lightwater, Surrey. Tel: (01276) 472995.

For sale - radio spares, transformers, condensers, plugs, resistors, books, valves, e.t.c. Tel: 0113-240 3496.

FREE, about 1.5Kg of 10Hz microwave bits and pieces, including CV 6108 Magnetron (good door-stop), quick before the skip gets the lot. Tel: Roy GW4KGD, QTHR (01758) 712108.

FRG-8800, comm receiver, a.m., i.s.b., u.s.b., c.w., f.m., with manual, v.g.c., £295, or swap for 2m (144MHz) multi-mode, same value. Tel: (01487) 823879.

FT-101B with c.w. filter, £130. FT-23R, speaker/mic, mobile mount, NiCads, charger, drycell case, £110. Datong Morse tutor, £25. v.h.f./u.h.f. s.w.r./p.w.r. meter, £15. Faulty MM14430, 1-3V in 30Wout amp, £15. All o.n.o. plus P+P. Tel: Steve on 0171-635 8386 evenings, or E-mail: s.bunting@ums.ac.uk

FT-767GX MkII, complete 6/2/70 (50/144/430MHz) modules, from a non-smoker, copy workshop manual, boxed, £775 o.n.o. Tel: Jim GOMSL on (01458) 834917.

FT-980, £500 o.n.o., FT-230R, £180 o.n.o., FT-208, £95 o.n.o., VC-300DLP, £110 o.n.o., MFJ-LPF, £15 o.n.o., USA & International Callbook CD-ROM, £30, all boxed, manuals, e.t.c. plus P+P. Also Eddystone 770R11 RX - offers - buyer collects. Contact Steve GOMHN on (01482) 795646 (Hull) QTHR.

FT-990 a.c., all filters, excellent condition, £1000. Also FT-480R multi-mode, £200. Going QRT. Tel: (01902) 497408.

Give the old stagers a surprise with your perfect Morse, buy my new, boxed, unused, keyboard, complete, £99 o.n.o. Tel: Medway (01634) 379140.

Goldstar OS9020A, 20MHz, two channel, Maplin's catalogue never used, boxed, new, operating and repair manuals, full accessories, £349 o.n.o. Tel: Medway (01634) 379140.

Good home wanted for Marconi, h.f./d.f. tuner amplifier, B21B in v.g.c. and working order. Swap for good RA17L/RA117E or sell for £125. Neil G8L1U on Uxbridge (01895) 230006.

Gould oscilloscope, OS4200, dual-trace, 10-bit digital storage, with analogue/digital option 4202, sample rate 800kHz, £60. Tel: Hitchin (01462) 459713

Ham Major 588 10m multi-mode 28, 29.700 with approved RA documents, excellent condition with box, bracket, g.w.o., £60 no offers. Christopher Brown G0UNJ, 5 Dunsley Ave, New Moston, Manchester. Or Tel: (01616) 810529.

Hand-held Dataman S4, c.w. mains charger and manual, s.w. and MCS51 ROM, as new, £175 o.n.o. Tel: Mike, Somerset (01749) 670016.

Helix, a 45ft length of Andrew EW-77 Helix elliptical wave guide, A10Vin very good condition. Sale or exchange for ham gear, e.t.c. Tel: Peter on (01771) 623654.

Hewlett Packard Spectrum Analyser 8551B (heavy) with 851B display, 10MHz-10GHz, working, including full maintenance, handbook, can demonstrate, £300. Tel: G8BIH, Gloucester (01452) 830018 (anytime).

IC-551, 10W, multi-mode, 6m (50MHz), with mic and handbook. TS-430S, 100W, h.f., g.c., RX, both v.g.c., TS-430S, £450 o.v.n.o. IC-551, £325 o.n.o., collect or pay carriage. Tel: Ken G3KIP QTHR in Tunbridge Wells on (01892) 547643.

IC-706 MkII, d.s.p., complete with AT-180 (h.f. + 6 a.t.u.), FL-223 (s.s.b. narrow filter), MB-63 (front mount plate), MB-62 (mounting bracket), OPC-581 (separation cable), SP-7 (base speaker), SM-8 (base mic.), OPC-589 (mic. adapter cable), Manson EP-925 (25A p.s.u.), Daiwa CN-101 (h.f. +6+2 s.w.r.), Daiwa CN-103 (2+70 s.w.r.), all in mint condition with original packaging, £1250. Garry on (01325) 255067 after 6pm.

IC-706, MuTek front-end professionally fitted, HM103 mike, OPC639 mains, r.f. filter, FL223, narrow s.p.c./1.9MHz, filter fitted, modular to 8-pin adapter lead, in v.g.c., £650 o.v.n.o. Free delivery, also complete station for sale. Paul GW6VZW, Cwmbran. Tel: (01633) 860921.

Icom 701, six band h.f. with p.s.u., excellent, £250. IC-32E 2m/70cm (144/430MHz), handy, £150. Tel: Kent (01303) 813213. (Ashford, Kent).

Icom 706HDS, new, £869. MB63, MB65, OPC589, OPC599, OPC581 free! Yaesu VXIR, new, £209. FT-51, MH29, FB14, CSC37, CSC66, EDC12, £350. Kenwood TS690's v.g.c., £799. Sony ICSF7 7600, new, £109. Bob on (01245) 495230.

Icom 736, fitted 9MHz-455kHz, filters for c.w., plus high stability Xtal. SM20 mike, SP21 extension speaker, manual, boxed, mint, buyer inspect and collect or carriage extra, £875 o.n.o. Contact Mike GOOGE in Glos. on (01452) 539106.

Icom 737, TX/RX with d.c. power supply, matching speaker, hand-mic, s.w.r. power meter if required, with manual and circuit diagram, original packing, £850. Tel: (01206) 395968, any time.

Icom IC-720A h.f. trans., 100W, IC-P515 power supply, IC-SP3 speaker, boxes, manuals, £600. Trio AT230 antenna tuner, £230, excellent condition. John GOFIK, Potters Bar. Tel: (01707) 872772 after 6pm.

Icom IC-781, top of the range, 150W all-mode h.f. transceiver, built-in power supply and a.t.u., CRT with real time bandscope, very good condition, £1850. GONBB, Whitstable. Tel: (01227) 266460.

Icom IC-821H v.h.f./u.h.f. multi-mode base transceiver, manual, boxed, £900 o.n.o. Cushcraft 13B2 13-element 2m (144MHz) Yagi, boxed, manual, £70. Tonna 70cm (430MHz) 19-element cross Yagi satellite antenna, unused, boxed, with manual, £35. Steve, Woodbridge. Tel: (01986) 798524 anytime.

Icom R-7000 scanner, £500. Icom R-71 receiver, £500. Icom R-70 receiver, £300. Yaesu FRG-100 receiver, £300. All complete with manuals and boxed, seen very little use and in mint condition. Tel: Wirral area on 0151-625 5501.

Icom R70, £300. Icom R71E, £500. Icom R7000, Yaesu FRG-100, ERA Microreader MkII, £70. Synoptic decoder, £60. All in excellent condition with manuals and boxed. Tel: 0151-625 5501.

Icom-737, v.g.c., boxed auto a.t.u. fist mic (user is non-smoker), £600. Contact GOMKA at 17 Trevor road, Swinton, Manchester M27 0YH, no 'phone.

Jones paddle key, brass, solid red base, £45. Bencher key chrome, £45. Katsumi bug key, auto/semi, £20. Vibroplex keying lever, £65. DX driver, £5. Trio TS-5208, new, PH drive, £185. Tel: (01494) 530018.

JRC NR0-525, high frequency general coverage receiver, includes phase locked system and four narrow band filters. Also magnetic balun, insulators and long wire antenna, detailed manuals, buyer collects, condition - as new, £800 complete. Tel: Canterbury (01227) 765831.

JRC NR0535 with bandwidth control and ECSS, excellent condition, £850. Rascal RA117, h.f. RX, v.g.c. with handbook, £150 o.n.o. Wanted, AR88 S-meter and plastic AR88 logo to right of vernier. Tel: (01245) 381961. **Keithley digital multi-meters (2)**, model 177 micro volt with IEEE, £25. Model 176A TRMS, £20. Tel: (01462) 459713 (Hitchin).

Kenwood 850SAT with record unit and filters, excellent condition, £920. Tel: (01704) 506008.

Kenwood R-5000, v.h.f., all extra

filters, late model, absolute mint condition, £675. Consider exchange for g.c. transceiver, must have RS232, cash adjustment if necessary, Realistic Pro 26 1.3GHz, hand-held, new, £160. Tel: (01903) 859712.

Kenwood R-820 receiver, very classic, mint condition, £350. Drake 8E receiver, excellent performance, £550. FRG-9600, v.h.f., u.h.f. and h.f., board fitted, works excellently, £250. FRG-7, like new, £130. Nordmende world-band portable radio, £120. Grundig Satellite 3000 digital, like new, show condition, £250. Tel: Middlesex 0181-813 9193.

Kenwood R2000 communications receiver, all-mode, plus two clocks, memories, VC10 v.h.f. converter fitted, like new, boxed purchased Love of Matlock, excellent, only £290. Frank, on (01295) 670108.

Kenwood R2000 with VC10, v.h.f. converter fitted, clean, boxed, little used, £290. MCL1100 decoder with Reuters, 10in monitor decodes RTTY, c.w., ARQ, NAVTEX, FEC, SITOR, auto baud, auto speed, £90. Frank on (01295) 670108.

Kenwood R5000, fully loaded, late model, mint, £675 or exchange quality transceiver. Hand-held scanner PRO-26, 1.3GHz, mint, £160. Tel: Sussex area (01903) 859712 anytime.

Kenwood TM-241E, 2m (144MHz), mobile, 50W transceiver, mint condition. Steve, North Wales (01678) 521280, daytime.

Kenwood TM-733E dual-band, 2m/70cm (144/430MHz), 50W output, data port, mobile bracket, manual, as new, boxed, bargain at £250. Tel: Harold GOEZN, QTHR, on (01773) 781290.

Kenwood TR-751E multi-mode, 25W on 2m (144MHz), £300. SOTA 100W linear, £100. Eagle 9-element Yagi for 2m (144MHz), £35, or the lot, £400. Buyer collects on all items, cash preferred. G4IUT on (01952) 550235.

Kenwood TS-450S, mint condition, limited use, boxed with manuals, £650, carriage extra. Tel: (01594) 833234.

Kenwood TS-570D, 10 months old, in mint condition, boxed, manuals, d.s.p., full coverage, a superb chance to own a modern set at a reasonable price, genuine sale, £885. Tel: (01283) 702212.

Kenwood TS-680S, with manual, a.t.u. type AT230, speaker type SP230, global frequency counter MM550, with manual, Microwave advanced Morse trainer MMS2, Lustraphone headphones with mic, model VC52. Douglas G3KPD, Ryde, IOW. Tel: (01983) 567665.

Kenwood TS-870SAT, good condition, £1150. Ernie G30HT. Tel: (01964) 630252.

KW2000B with handbook, RX is deaf, transmitted signal has 100Hz ripple, make good restoration project, offers around £150. Buyer inspects and collects. G3XAP, evenings on (01449) 723122.

Linear amp, 2m (144MHz), 800W, plus built and tested, p.s.u. needs work. Tel: Martyn on (01422) 251520.

Low-band, v.h.f., TX/RX, 20W, Pye Pegasus and accessories, also 5 Sorno CQP833 and accessories, £150. Tel: Paul, Leeds (01977) 684139, after 6pm.

Low 225, a.m., i.m. synchro, keypad, whip, amplifier, £225. AOR 3000A,

mint, £500. Yupiteru 9000, as new, boxed with case, £275. Realistic 2042, fitted with voice operated record for cassette, boxed, £200. Vic, Stoke-on-Trent. Tel: (0973) 538502.

Low 225, excellent condition with manuals, no p.s.u., £250. Buyer collects. Tel: (01332) 758636, after 6pm.

Low 225, g.d.o., FX-1, ok, no box, £35. Capco, v.h.f., a.t.u., SPC100, £40. SST ultra tuner, 0/30MHz, 3 op's, bridge 100W 9" by 5 1/2m, £50. Not boxed, all s/k sale plus postage or collect. Contact GW4XKE QTHR on (01222) 512959.

Metrix AX series, dual bench, p.s.u., digital meters, 0-30V, 0-2.5m, £100 o.n.o. Tel: Mike, Somerset (01749) 670016.

MFJ QRP mono band, 20m (14MHz) transceiver, good condition, plus MFJ-971 a.t.u., £280 for both. Tel: Matthew on 0121-786 2671 or write to G4PQK, 375 Station Road, Stechford B33 8PL.

MFJ-247 antenna analyser, £95. MFJ-207 antenna analyser, £50. SEM QRM eliminator, £45. 706 c.w. filter, £35. 1012D filter, £25. Discone can TX, 6, 2, 70, 23 150, 144, 430, 1296MHz) unused, £30. VHF/30 amplifier, £40. UHF/20 amplifier, £40. Tel: East Anglia (0468) 756762.

MMT-432/144 all-mode transverter, Novice output power, £70. Lowe HF-225 receiver, excellent condition, £240. Yaesu FRG-9600 v.h.f./u.h.f. all-mode scanning style receiver with built-in h.f. converter, £265. Collect or P+P extra, messages with luck via pensioner's ansaphone on 0161-477 5303. I'll phone back, evenings only!

Optoelectronics Scout pocket-size, frequency finder, boxed with manual, includes charger and aerial, v.g.c., £265 o.n.o. Tel: Romford (01708) 721558.

PA valves, new, for sale, GEC 6146B, £24 pair. Sylvania 6JE6C/6LQ6, £25 pair. Valve list s.a.e. P+P, £2. Tel: (01241) 828559, GMSOSH, QTHR.

Packrat PK232 MBX, Packet TNC all mode Packet, RTTY, c.w., etc. as new, £150. Tel: (01294) 607232.

PRO 2039, wide band, base scanner, 68-960MHz, with gaps, as new, boxed, £80. AOR 1500EX, hand scanner, 500kHz, 1300MHz, all accessories, as new, boxed, £120. Both items post paid. John G3OAZ. Tel: Basingstoke (01256) 465126.

Rascal RA-17L receiver, v.g.c., £395, or part exchange for faulty one. Also, two other Rascals for spares only. 50MHz T-beam, modern scope, £280. Please ring (01872) 862291.

Rascal RA1784 MA1072, £450. Eddystone 1650, £525. h.f. Rascal RA1771, £325. Rascal Kaynard h.f. TX/RX, £150. HR0500, £130. 2m PA, £25. Collins 6185, £50. 618T, £60. Marconi PA h.f., £40. Telford (01952) 419666.

Rascal RA17L receiver, desk top, case with manual, v.g.c., Navy colours, £125. Brian G4UJL, 8.30am to 5.30pm on (01249) 444270 or after six on (01249) 817757 (QTHR).

Realistic DX200 g.c., s.s.b. rec. band, set/spread dial, v.g.c., boxed with instruction book, £50 o.n.o. Tel: Ray, Glasgow on 0141-569 2155.

Realistic DX302 short wave comms RX, digital read-out and pre-selector, mains power and battery, £100. Weircliffe bulk tape eraser, heavy to lift, new £1500, want £150. G3WDK, QTHR. Tel: (01647) 281631.

Realistic short wave radio recorder, DX392, £100 o.n.o., boxed, or will exchange for any Eddystone models, 730 888A or 940, must be in good condition. Contact E. Foster at 72 Vimy Road, Billesley, Birmingham B13.

Redifon R55 1940s marine RX, 350kHz to 8MHz + p.s.u., £60. Codar AT5 transmitter, 160 & 80m (1.8 & 3.5MHz), £40. Rascal RA17L receiver, 500kHz to 30MHz, superb, absolute bargain, £115 (2 available). Very scarce, collectors' grade. Hallicrafters S.36 wartime u.h.f. communications receiver, mint, £195. Tel: (01482) 887938.

Roberts 861 short wave radio, in mint condition, boxed, e.t.c., still in guarantee, bargain at £115. Bev GW00SQ, Pontypool. Tel: (01495) 757221.

Royal Navy B40 receiver, complete with s.s.b. converter, g.w.o. Also German tank radio, v.h.f. Empfänger, type E, No. 1094, working order, both very heavy, to collect, £120 both. Tel: (01203) 449637.

Scanner antennas, wide band, log periodical, 100-1300MHz, £75 o.n.o. Butternut 30-512MHz, £50 o.n.o. Maplin rotator, £30 o.n.o. All unused. Two 20ft aluminium poles, £15 each. Tel: Brian, Abingdon (01235) 525295.

Several s/h Quad valved tuners for sale, also various teletypes, all believed working, but are sold as seen. Stan Green, W. Midlands. Tel: 0121-422 3654.

Sony ICF-SW55 receiver, 150MHz, a.m., u.s.b., l.s.b., very small, v.g.c., all documentation, £195. Lucien on 0181-537 1651 and leave message or E-mail: sparx@orangenet.co.uk

SX200, 1.8MHz, 200MHz, s.w.r. power meter, mint, £40. NFJ 6m (50MHz) antenna tuner, 50MHz, 60MHz, new, £45. Wanted PR-150 pre-selector. FRG-8800 v.h.f. converter, FL3 Datong filter. Vince on (01487) 823879.

Tektronix 7403N 50MHz oscilloscope with 7A18 dual-trace amplifier and 7B50 timebase, 9.76 by 12.2cm display, g.w.o., original manuals, also full set of spares, including spare tube, £250 o.n.o. Tel: Southampton (01703) 454586 evenings.

Ten-Tec Delta 2, full featured h.f. transceiver, £450. Diawa 30A P.U., £75. JPS NIR 10 d.s.p. filter, £140. Millen (USA) g.d.o., 1.7-300MHz, £40. Datong FL3 a.f. filter, £75. Palomar a.t.u., mint condition with manuals, £485. Tel: Wirral 0151-645 2385.

Timewave DSP5992X, mint, £340, with full manual, £175. Tel: London 0181-931 5495.

Trio 9R59D, tidy and serviced, bargain, £60. w.h.y. AOR 3000A, mint, £450. Yupiteru 9000 + case, boxed, £225. PRO 2042 with VOX record, £175. 80m heavy duty coaxial, £20. Image 350BT, £200. Vic, Stoke-on-Trent. Tel: (0973) 538502.

Trio 9500, 70cm (430MHz), s.w.r. mode, £250 o.n.o. MFJ-924 s.w.r. meter, £60. Eddystone bug key, offers. Tel: Mike on (01792) 416768.

TS-530S h.f. transceiver, immaculate condition, s.s.b. and c.w. narrow filters fitted, £325. MC50 desk mic, £35. Brand new spare set of valves, driver and 2 x p.a.s, £50. AT230 matching a.t.u., one owner from new. Best offer over £500 secures the lot. Buyer collects on all items, cash preferred. G4IUT on (01952) 550235.

TS-850 SAT, £850. Mobile mount for Yaesu FT-77, £20. Remote mount for

Yaesu FT-4700, £25. Yupiteru MVT-7000 with NiCads and charger, £140. Kenwood TS-790E, £1000. 2+813 valves, £35 pair. Tony G0CZV, South Cave, East Yorks. Tel: (01430) 422657.

Two 1155 receivers, one working, one with no p.p. also short wave Eagle RX-60N, g.w.o., military RX107, g.w.o., buyer collect, £125 the lot. Tel: (01203) 440634.

VGA monitors for PCs, screen size 640/480, with 256 colours, already tested, £40 each, six to sell. Contact Mr Lewis at 115 Toderdoney road, Dervick, Ballymoney, Co-Antrim, N. Ireland BT5 8SS. Tel: (01265) 742167 or E-mail: mi3pe@compuserver.com

Viceroy MkIII power pack (offers?). Unused valves, boxed, no silly prices, all at £1 or less. Two Radford transformers, one 6.3, 6.3V 250-250, one 6.3V 250-250 plus 5V. G3HWD, 1 Alan Road, Padstow, Cornwall PL28 8DS, Tel: (01841) 532723.

Vintage EKO car radio, model CR32 1946 (yes, forty-six!), with hand-book, offers. Also, mic. from WWII transceiver, 19Set (I think). Tel: Dave on 0141-632 5408.

Yaesu FC-757AT auto a.t.u., £150. RA17L, £100. Scanner PRO-2035, £175. Yaesu FR-FL 400 h.f. separates, £150. All g.w.o., manuals with all except RACAL. Tel: Rod G3ZEH, Lowestoft (01502) 560869.

Yaesu FRG-100 h.f. receiver, 130k-300MHz, u.s.b./l.s.b. a.m./c.w. scan and memory, mint condition, must sell as newly licensed and need to buy transceiver, hence £295. Tel: Southampton (01703) 491229.

Yaesu FRG-7, v.g.c., seen working, £160. Cable wall bracket, e.t.c., £40, buyer collects. Tel: Somerset (01278) 789361.

Yaesu FT-101Z h.f. transceiver, nine bands, s.s.b., f.m., c.w., cooling fan fitted, comes with YD148 base station microphone, Welz AC-38M a.t.u. and manual, immaculate condition, boxed, £270 Tel: Wisbech (01945) 589707.

Yaesu FT-101Z in excellent condition, WARC bands, no mods, original packing and manual plus mic., used only on receive at this station, £250. Brian G4UJL, 8.30am to 5.30pm on (01249) 444270 or after six on (01249) 817757 (QTHR).

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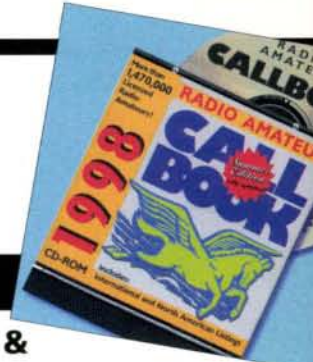
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Index to Advertisers

Aerial Techniques.....	79	Howes CM	16, 47	QSL Communications.....	6/7
BARTG Rally	79	Icom UK	IBC	Radioworld	32/33
Castle Electronics.....	66	Interproducts	59	RAS Notts	79
Centre Electronics.....	79	J Birkett	79	RSGB	33
Chelcom Aerials.....	22	Langrex Supplies.....	66	Short Wave Magazine	83
Chelmer Valve Co	16	LAR Communications Centre.....	79	South Bristol AR Rally	59
Chevet Supplies.....	58	Leicester Show	59	SRP Trading	31
Datong Electronics	58	Martin Lynch & Son	4/5	Sunrise Electronics.....	8
Electromail	19	Monitoring Times	19	Syon Trading.....	16, 22
Electrovalue.....	16	Moonraker	31	Tennamast	22
Essex Amateur Radio Services	59	Multicomm 2000	36/37, 60/61	Waters & Stanton.....	IFC/1, 2
Essex Shortwave Services	66	No Nuts	16	Yaesu	OBC
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- Emission modes: LSB, USB, CW, AM, FM, PACKET(9600/1200bps: External input.)
- Freq. Steps(Min): 0.1Hz for SSB and CW 10Hz for AM and FM
- Modulation Types:
 - SSB: J3E Balanced, filtered carrier
 - AM: A3E Low-level (early stage)
 - FM: F3E Variable reactance
 - FSK: J1D, J2D, F2D Audio frequency shift keying (external input), F1D Frequency shift keying (V/UHF: external input)
- Options:
 - FC-20 Automatic Antenna Tuning Unit (External)
 - FVS-1A Voice Synthesiser
 - ATAS-100 Active Tuning Antenna System

4 into 1 does go!

Technology moves inexorably onward, evolving, adapting, forever changing. At the same time, today's Radio Amateur puts even more demands upon designers to build quality, sophisticated, but easy to use stations for Voice, Packet, Satellite, CW, VHF, UHF, HF, just to mention a few. Yaesu's designers took on that challenge, and following in the footsteps of the revolutionary FT1000, FT1000MP and FT920 are now proud to offer today's Radio Amateur the station in a box - the all new FT-847!

The Yaesu FT-847 Ultra-Compact Satellite and All Mode Transceiver has jumped the technology with a transceiver ready for the new millennium. With it's high-tech design

and revolutionary features, the FT-847 is truly the one radio that can do it all! Massive band-width coverage from a single unit, the FT-847 has many features to keep it at the top of the evolutionary pile. These include crystal clear 100 watts on HF and 50MHz, a massive 50 watts on 2 meters and 70cms, Yaesu's effective DSP for bandpass, noise reduction and notch filter, and direct input of frequency on the supplied keypad. Silky smooth tuning with 0.1MHz tuning steps, Cross band and full duplex, CTCSS and DCS encode and decode built in. And for Satellite reception, normal and reverse tracking. A matching ATU (Automatic Antenna Tuning Unit) is also available as an option.

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...choice of the World's top DX'ers



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Specifications subject to change without notice. Specifications guaranteed only within amateur bands. Some accessories and/or options are standard in certain areas. Check with your local Yaesu dealer for specific details.

FT-920

The highest performing HF/6 meter rig in its price class with Yaesu's renowned Omni-Glow™ display



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