Reviewed This Month
The Kenpro KT-44 UHF Transceiver - A Handy Rig For Any Operator

Plus
Antenna Construction - A 50MHz Base Station Monopole
Build The PW Chatterbox 1.8MHz AM Receiver
Getting Started The Practical Way, Packet Panorama, Bargain Basement, Competition, CB High & Low And Lots More!
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**Acknowledgements:** Our thanks go to budding Novice Amateur David Owen, son of Mike GAYTA, for his help with this month's front cover.
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I’ve always enjoyed mobile operating. My first mobile receiving rig was a super-regenerative receiver working on 144 MHz or thereabouts. The little ‘swoosh-box’ worked well and was very sensitive. The receiver provided me with a great deal of pleasure, especially when I was able to park on relatively high ground.

Unfortunately, 25 years ago, 144 MHz was virtually dead during the day. The only activity was usually in the evenings and at weekends. However, during the evenings I soon learned to keep the receiver switched on, until I had driven up into the Hampshire downs. This was because re-radiation from the super-regenerative detector could be detected on any receiver tuned within 10 MHz. Policemen equipped with hand-held transceivers on foot patrol always seemed to know when I was coming around the corner, and it became rather embarrassing. I soon put an r.f. stage in to isolate the oscillator from the antenna! But those were the days when you could hear some excellent quality a.m. signals on the band, and my little 955 acom-valved receiver picked them up really well.

Top Band Mobile

By the time I was active on the bands, I’d graduated to Morris Minors. I fell in love with those amazing little machines and along with Chris G8DXF and Richard G8CEH (now sadly a silent key) we visited virtually every mobile rally in the country, enjoying many QSOs on 1.8 and 144 MHz.

Everyone had fun on 1.8MHz a.m. mobile during the ’60s. It was fascinating to walk around the grounds of the various rallies and meet other mobile enthusiasts, and look at the many varieties of gear. It was even more interesting to see some of the often (horrendously!) large home-brew 1.8MHz mobile antennas. I wonder how many of the huge systems we used to see, would survive one juggling act by nowadays?

Rallies then were much more of a meeting place than the scramble to get bargains that they’ve turned into now. Other things have changed too, but are they changing again?

High Frequency Mobile

I recently enjoyed a few hours at the Longleat rally in Wiltsire. Despite the very fickle weather, the car park filled rapidly and I noticed a strong contingent of 1.8MHz mobile antennas. Many of the antennas I saw were well made, home-brew jobs. Are we perhaps at the dawning of a new age of h.f. band mobile operation?

During my recent visit to the Dayton Hamvention, I saw a great deal of evidence indicating that h.f. mobile working is still very popular in America. Literally every band from 1.8 to 28 MHz was in use for mobile working. Speaking as a 7MHz mobile devotee, I was particularly pleased to see that the band is favoured by many operators in the USA.

So, why don’t we see more h.f. mobile work here in the UK? I must admit that I only saw one h.f. mobile rig in operation at the Friedrichshafen Hamfest last year, so it seems from my brief observation, that the same situation exists in mainland Europe.

No Antenna Problems

Nowadays there are very many h.f. mobile antennas available. Even the 1.8 MHz versions can be very small, and some can be smaller than 144 MHz antennas! I realise of course that there are many reasons why many amateurs don’t try working mobile on mobile bands. One reason is of course that h.f. rigs with s.s.b., usually come much larger than the freely available v.h.f. multi-mode transceivers. However, this argument is basically defeated by the many excellent UK-made and imported v.h.f. to h.f. transmitters.

I’m not going to waste valuable space discussing the possible reasons behind the decline of interest in working mobile on h.f. Instead, I want to tempt those of you who do operate mobile, to write in and tell us what you find so fascinating working at h.f.

Surely I can’t be alone in thinking that we are neglecting this aspect of the hobby. You don’t actually need to be an ‘on the move’ mobile to enjoy the fun. I found that operating my Yaesu FT-75 s.s.b. rig from my motor-caravan while parked overnight in remote spots in the Scottish Highlands, turned me into an instant celebrity!

I found over the years, that the simplest rigs could provide tremendous fun. Even a one-valved c.w. transmitter working from a rotary converter on 7 MHz, provided good results.

Simplest Rig

Here’s a challenge for you! Although I did it simply enough with valves over 20 years ago, perhaps you could do it in a simpler fashion using transistors.

My recipe for a (VERY) basic 1.8 MHz transmitter-receiver combination went like this: One home-brew base-loaded whip, resonated on 1.915 MHz. The receiver consisted of an early ‘PW’ designed, crystal-controlled transistorised 1.8 MHz to medium wave converter working into the car radio.

The two-valved crystal controlled transmitter sat in the boot, and was remotely-controlled by a typical G3XFD (cheap-skatr) method! Not wanting to have huge multi-way control cables snaking through my beloved Morris Minor, I managed to control the entire rig via the 2-cored screened microphone cable.

One Control

Closing the press-to-talk switch on the hand-held carbon microphone provided the polarising current for the mike, and operated the change-over relay at the same time. The antenna changed over to transmitter, and the valve power supply came into action. The transmitter antenna tuning was pre-set, and as I stayed on one of two crystal-controlled channels, there were no problems. After a few adjustments, I was on the air and the rig worked well during my time on the Isle of Wight.

The rig provided several years of inexpensive enjoyment. However, we soon had to modify the receiver converter. This was found to be necessary after Ivor Richardson G3XLP and I passed each other on the Newport to Freshwater road while in QSO, and my front-end transistor melted!

So, I’m going to offer you a challenge. How about coming up with ideas for simple h.f. band mobile rigs? George Dobbs has shown us the way with the ‘Chatterbox’. Can you come up with an idea for a similar rig to work mobile?

By the way, if by the remotest chance any of you are interested in my favourite 1.8 MHz a.m. mobile design (the basic TX was a PW design of course), drop me a line enclosing an s.a.e. I’d be fascinated to work anyone else using such simple ‘fun rigs’!

Cheerio for now, and try to enjoy what’s left of the summer.

73 DE Rob Mannion
G3XFD.
Dear Sir

Regarding the ‘Spot the Difference’ competition, I wondered if there was room for a little extra competition. Knowing the radio amateurs’ flair for understatement, etc., how about an amusing caption for the cartoons used in the ‘Spot the Difference’? Best or perhaps most apt/funnest could be awarded a small token, everyone likes competitions!

Geoff Bulleyment
Eastleigh
Hants

Editor’s comment: I think Geoff Bulleyment is a reader of Punch magazine as well as PW! For many years, Punch has reprinted some of its old cartoons, asking for new, apt, captions. They can be very funny. I look forward to seeing any ideas readers send in. We might even make it a regular feature, running at the same time as the ‘Spot the Difference’ competition.

Dear Sir

John Heys G3BDQ, writing in June’s ‘Receiving You’, cannot understand why PW carried the article ‘A Valved Transmitter For 3.5MHz’. I don’t agree with his opinion as I have built the ‘Three Valve Bloop’ in RMW.

The rig works well with 7W input. I am always happy to find projects like this in PW, now and then. My only problem is that I cannot find the word Bloop in my English dictionary! Johann Hans 0E7UT
Kufstein
Austria

Editor’s reply: Thank you for writing Olivier. We realise of course that PW has many readers over in Belgium, and we’re always pleased to hear from you. Fortunately, the Department of Trade & Industry’s Radiocommunications Agency in the UK has adopted a sensible attitude towards standards and specifications for amateur radio equipment. However, there is still a great deal of concern as to what’s going to happen in the future, with the EEC ‘Common Market’ regulations. If very high, rigidly enforced standards are ever applied, amateur radio construction and the PW approach to the hobby could suffer very badly.

Dear Sir

I wish to comment on John Heys G3BDQ’s letter, in the June issue. Firstly, I felt that the May article under debate was refreshingly different, and certainly most enjoyable. Contrary to G3BDQ’s comments, I think the author took pains to cover the safety aspects in quite reasonable detail.

My only minor criticism is that regenerative designs are not always an exact science. They often require a degree of ‘tailoring’ for best results, and further details in these areas would have helped. I use a variety of valved and solid state regenerative receivers on a regular basis and use them on a number of bands. They’ve provided many hours of pleasure, and their performance can be very effective with some operational care.

I found John Heys’s pre-1950 antique criteria amusing. This is because it can be said that any form of manually generated c.w. is similarly old-fashioned and inefficient compared to other forms of data communication. Are we to assume, therefore, that these pre-1950 methods are also redundant and not worthy of PW coverage?

Let’s have more valued projects in PW please! Finally, I’d like to mention that I work with the very latest technology. So, I’m not prejudiced, but I do have a love of the history of radio and the pleasure of using equipment based on ideas from the earlier years.

Terry Parker G4NXN
Nr. Sudbury
Derbyshire

Dear Sir

In the May PW, I found some very interesting letters from readers. You asked for reactions from younger readers, and here you have one! I am 18 years old and managed to get my first licence when I was 15. I’m very proud of this, because I had to learn all the technicalities by myself.

The average Belgian amateur is much older than I am. However, I’ve very pleased to say that in my area, I know of some youngsters who are very interested in amateur radio. So I keep on hoping to meet more amateurs of my age!

Young amateurs are often criticised because they don’t build equipment, but why should we if there are so many commercially-made transceivers available? Another important factor in Belgium, is that all our equipment must have legal standards.

The problem here is that these regulations have become very strict. This makes it impossible for a novice to build a transceiver that satisfies the PTT tests and requirements!

The licence is a good idea, and it’s certainly an alternative if we don’t want our hobby to die out. All you radio amateurs should spread the news about our exciting hobby to their friends.

To finish my letter, I have noticed in PW, that some amateurs regard handheld transceivers as ‘wallies’. But what’s the alternative for very young amateurs to start with? Should they work hard for a long time and save £1000 for an expensive rig, just to be respected by other operators?

Olivier Hoet ON4AGM, Roeselare, Belgium

Editor’s reply: The letter from John Heys provoked a big response, and I’m very grateful to those of you who took the trouble to write to PW. Most of the letters received so far reflect a keen interest in valve techniques. The next valued project in PW should appeal to many readers, especially as it uses a valve that has no direct semiconductor equivalent. It should prove useful to everyone. Watch this space!

Dear Sir

It was interesting to read the letters from Bob Hurst and John Heys in June’s PW. Having been interested in radio myself for the last 40 years, it seems to me to be a hobby with many aspects such as making, mending, modifying, etc. Providing they don’t break the law, I would also encourage others to do the same.

My own interest is collecting and renovating valved radio receivers. They take up a huge space, but I would not swap any for the modern ‘wonder boxes’.

I was disappointed however, in your answer to Bob Hurst, when you replied that you intend to “offer the occasional valve project” in future issues. I’d look forward to PW a lot more, if you included a valved equipment feature every month!

D. Andrew Tarrant
Devon

Editor’s reply: The letter from John Heys was original, and not duplicated to any other magazines. We reserve the right to edit or shorten any letter. Brief letters may be filed via our Prestel Mailbox number 02671191. The views expressed in letters are not necessarily those of Practical Wireless.

Send your letters to the Editorial Offices in Poole, the address is on our contents page. Write of the Star Letter each month will receive a voucher worth £10 to spend on items from our PCB or Book Services, or on PW back numbers, binders, reprints or computer program cassettes. And there’s a £10 voucher for every other letter published.

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Dear Sir

In reference to Bob Hurst's praise and John Heys's criticism of valved construction projects, I'm writing to support the relevant articles and Bob Hurst's views. I was 12 when I first became interested in radio. With the help of a retired postman, I was soon introduced to the art of radio construction. A teacher at my school, who was a radio amateur also encouraged me. Receivers made by the school radio club, out-performed the imported transistor radios of the day, although they weren't so portable.

I agree that extreme care must be taken, due to the lethal voltages present in a valved rig. Many newly-licensed amateurs, find that ignorance of valve technology is a disadvantage when buying on the second-hand market. There are many bargains to be had with valved transceivers.

If the solid state revolution had taken place five years later, I believe that we would still be using valves in many more applications, if valve technology had only been allowed to reach its zenith.

Colin Topping GM6HGW
St. Andrews, Fife

Dear Sir

As a faithful follower of PW since the early 30s, I was interested in the correspondence regarding valves in June's 'Receiving You'.

Despite the fact that letters in favour were two to one (that 15 year-old young man will go far!), I feel that John D. Heys comments really hit the spot! Like anyone of my generation, I'm keen on valves, but I feel your projects so far will have limited appeal.

I use a legally converted CB rig for 28MHz. This is not from choice, but simply because I'm on a pension and cannot (brief pause for sympathy) afford the high prices demanded by dealers. This limits me to around 10W output, and I'd like to see a simple, no frills, valved p.a. design dedicated to one band.

It doesn't have to be a sophisticated circuit, it could use an OKC6 or 6LF6 or even the 807! An amplifier like this would compare most favourably with a commercial product, with the added advantage of being virtually indestructible.

So come on PW, what about it? Let's see a nice simple circuit for a 100W 28MHz p.a. In view of my advancing years, I ask that you don't make it too far in the future, because I'd like to build it before departing to the great shack in the sky!

With very best wishes to PW and all who sail in her!

Trevor C. Harris GOOIB
Peacehaven
East Sussex

Editor's reply: Trevor has an interesting suggestion. If there's enough interest, we could come up with something fairly quickly. So, readers, it's up to you and your comments for a project like this would be welcomed (on postcards please) as soon as possible.

Dear Sir

Can I suggest that part of the Rev. George Dobbs G3RJV's series 'Getting Started the Practical Way' might include the use and manufacture of various pieces of test equipment, such as wavemeters? It could be very useful.

This subject came to my notice when my wife and her friend were taking their RAE in May. They said that this subject was not covered very well in the RAE syllabus.

R. G. Oldridge
Stourbridge, West Midlands

Editor's comment: Life is full of amazing coincidences Mr Oldridge, for George Dobbs has just sent in the next batch of projects for the series. Among them is a delightful little wavemeter, which will be featured soon. The series is proving very popular, and both George and the PW team are pleased to hear from readers with ideas.
Fifteen different ‘radio’ words have been hidden in the letter grid. They have been printed across (forwards or backwards), up and down or diagonally, but they are always in a straight line without odd letters in between. You can use the letters in the grid more than once for different words, and they’re not all used. Once you have found all fifteen words, mark them on the grid and send in your answers.

Send your entry to PW Publishing Ltd., July '91 Wordsearch Competition, Enefco House, The Quay, Poole, Dorset BH15 1PP. Closing Date last post received Friday 27 September 1991. The Editor’s decision on the winner is final, no correspondence will be entered into.

First prize is a year’s subscription to Practical Wireless, two runners-up receive six months subscriptions.
Silent Key Sale

A large collection of amateur radio equipment gathered over a period of 50 years, is to be sold at a Silent Key sale on Saturday 21 September

1991. The sale, which is being organised by radio amateurs on behalf of Mrs. E. Verriender, will start at 11am and take place under the garden of her home in Dorset.

Equipment to be sold ranges from vintage receivers and books, to modern transmitters, receivers, test gear, antennas, magazines and much radio "bric-a-brac". Full details of how to get to the sale, with short-form listings of equipment can be obtained by sending an A5 sized s.a.e. to: Box No. 24 PW publishing Ltd. Enfoco House The Quay Poole Dorset BH11 1PP

Extra Special Event Station

During the weekend of September 14 and 15th, the Solihull ARS will be operating a special event station with the callsign G82BRM (Birmingham Railway Museum). The event is the museum's "Friends of Thomas the Tank Engine Weekend".

This is no ordinary event station, as the radio station will be operating from the Royal Coach complete with the original table and furniture as used by royalty and Sir Winston Churchill during World War II. Sir Winston used the coach as a meeting and communication post in when Eisenhower the coach was built in the 1930s and is of great historical interest and value.

The radio station will be operating on 144, 7 or 3.5MHz, depending on band conditions. The RSGB's recruitment will be shown nearby.

Birmingham Railway Museum is located at Tyseley, approximately three miles south of Birmingham city on the A41 (near to Tyseley railway station) and will be open from 10am to 5pm Saturday and Sunday.

If more information is required, please contact Norman Parker G4VMP on 021-707 3376.

-- Newsdesk '91 --

RAE Courses

London: The City of Westminster College (formerly Paddington College), will be running an RAE evening course, commencing early September 1991 (for May 1992 exam). Both class A and class B licences will be catered for (i.e. a Morse course will run concurrently). Professional college lecturers will conduct the course. For enrolment details, etc., prospective candidates should contact: Ann James, The City of Westmi-

ter College, Science and Technology Department, 25 Paddington Green, London W2 IN. Tel: 071-723 8262.

Kent: Povest School, Povest Road, Dartford, Kent, are running an RAE course on Wednesday evenings, 7.30 to 9.30pm, starting in late September. Early enrolment is advised, to Bromley Adult Education Centre, Church Lane, Prince's Plain, Bromley BR2 BLD, tel: 01689 19184. The course leads to the May 1992 examination which will be held at the school. Course tutor is Alan Betts G01110 on (0689) 831123.

Kirkcaldy: The Glenrothes & District ARC are planning to run a course to prepare candidates for the radio amateurs examination to be held in late September, leading up to the City and Guilds examination in May 1992.

A second course in Morse code will be running during the same period on Tuesday evenings from 7 to 9pm. It provides training for beginners and those amateurs wishing to improve on the basic 12w.p.m. required for the RAE examination. Both of the above courses will begin at the start of the September term.

Wolverhampton: RAE classes will run on Mondays 7.15 to 9.15pm at Ounsdale High School, Ounsdale Road, Wombourne, Wolverhampton. First class on September 16. Enrol now. Details from Roger Price on 0952 265789 evenings or Mr McGill at Balwearie High School, Kirkcaldy (0952) 640335.

Doncaster: Doncaster College will again be running the City & Guilds course on the RAE from September. The course will be a one evening a week course, starting Thursday 19 September. The course will run until the May examination. His candidates sit their examination at the North West Kent College at Dartford.

Wilmorton, Derby DE28UG. Enrolment for this course will be in September. Staff tutor is Alan Betts G01110 on (0689) 831123.

Bromley: The Rugeley Adult Education Centre, Aelfgar Centre, Taylor's Lane, Rugeley will be running an RAE course on Thursday evenings, 7 to 9pm, starting in September. Course tutor is Brian Smith G3CCU. The course has been running successfully for a number of years and is aimed at beginners of all ages. Further details from the principal, Mr B. Golemboski on Rugeley 578738.

Kent: Len Buck GDGLD has been running very successful RAE courses since 1983, and this year's class will commence in the last week of September to run until the May examination. His candidates sit their examination at the North West Kent College at Dartford.

The course is held at his private address, and therefore the accommodation is relatively limited as it is only practical to teach about two people at one time. However, if there is a sufficient number of candidates, Mr Buck will be happy to run the course on two evenings of the week.

The cost of the 32-week session is £50.00, plus of course the examination fee which is payable to the College. People who are interested should contact Len on (0732) 324383.

Further details of enrolment dates, contact Ken Home GM3YBQ on Rugeley 578738.

London: The City of Westminster College (formerly Paddington College), are offering an evening class for the RAE. The course will be on a Wednesday evening 6 to 8pm. Anyone interested should contact Mike Parken G3GSD at the School of Electrical & Electronic Engineering. Tel: (0795) 302122 Ext. 297 or 282. There will also be a basic practical electronic course on a Wednesday evening 6 to 8pm, the tutor being Trevor Jones, who can be contacted on the same extension.

Birmingham: The Summer 1991 RAE course begins on June 6 at a cost of £80.00. The course fee includes tuition, books, folder, paper, calculator and refreshments at break time. The examination fee is extra. His candidates will sit their examination at the North West Kent College at Dartford.

The exams are run concurrently. Professional class tutors will conduct the course. For further details, etc., contact the course tutor, Rik Whittaker G4WAU, on 0823 283403 Ext 313 or Ext. 211.

Stockport: The RAE is available as a course of 25 Monday night sessions beginning up to the May 1992 exam, with the option of taking the exam in December 1991 for those needing to re-sit a component or for students with a good knowledge of electrical theory. The lessons run from 7 to 9pm. Students sit the exam within the centre.

A Morse course of 25 lessons for all levels of ability up to about 17w.p.m. Several tutors will be available to assist. The lessons will run on a Monday evening 6 to 8pm, starting Thursday 19 September. The course will run until the May examination. The course tutor, Rik Whittaker G4WAU, can be contacted on (0732) 823483.

Cardiff: The City & Guilds course of 25 lessons for all levels of ability up to about 17w.p.m. Several tutors will be available to assist. The lessons will run on a Wednesday evening 6 to 8pm, starting Thursday 19 September. The course will run until the May examination. The course tutor, Rik Whittaker G4WAU, can be contacted on (0732) 823483.

Derby: The City & Guilds course 756 (RAE) will run on Wednesdays, 6.30 to 9pm at the Darby Tertiary College, Wilmorton, London Road, Wilmorton, DerbY DE28UG. Enrolment for this course will be in September. Further information, contact 'Student Services' on (0332) 757170 or course tutor Frank Whitehead on (0332) 519555 Ext 226.

Derby: The City & Guilds Novice course 773 (NRAE) will run on Thursdays, 6.30 to 9pm at the Darby Tertiary College, Wilmorton, London Road, Wilmorton, DerbY DE28UG. Enrolment for this course will be in September. Further information, contact 'Student Services' on (0332) 519555 or course tutor Frank Whitehead on (0332) 519555 Ext. 226.

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Both of the above courses will begin at the end of September at Reddish Vale Evening Centre, Reddish Vale Road, Stockport, Cheshire SK5 7ND. Tel: 061-477 3544. Enrolment will take place on September 16th, 17th and 18th between 7 and 9pm. Further details can be obtained from Dave Wood (Course tutor) on 061-430 4246 most evenings.

Mersyside: The Wirral ARS at Avery Farm, Arrow Park Road, Birkenhead, Mersyside, are running an RAE course, commencing early September for the May 1992 examination. Norman G3CSG and Denis G00TD, are conducting the course. Prospective candidates should contact Norman Kendrick G3CSG at 77 Granby Way, Merton, Wirral L46 9BF. Tel: 051-671 6366 for full details.

Teaunton: Somerset College of Arts & Technology, Wellington Road, Teaunton, are offering the RAE Course for the May exam. It will be held on Tuesday evenings from 7 to 9pm and the tutor will be Peter Upton GTCVU. For enrolment details, please telephone (0233) 283403 Ext. 373 or Ext. 211.
Big Event

On August 31/September 1 - GB60NTS - will be on the air for the Third Annual 8 Nations National Trust Event (Diamond Jubilee Event). This is the big event for the National Trust For Scotland for 1991.

This event involves all call areas in the UK and Ireland and they are all operating from National Trust properties to combine with Scotland to celebrate 60 years of NTS.

Taking part in this event will be the following stations:
- GB2NTU, E77MP
- GB2NTW, GB2NTC
- GB2NTJ, GB2NTE
- GP3HFN, GT3FLH
- GH3DVC and GB60NTS.

A special certificate is available for overseas, contacting any of the above stations in three call areas. UK and Ireland, contacting any of the above stations in five call areas. Cost to UK and Ireland is £1 and overseas is 45. There is a special QSL card for every contact, with all QSLs via the bureau.

Log extracts only please, to: Robbie GM4UQQ Awards Manager PO Box 59 Hamilton Scotland ML3 6QB.

Northen Sound, Vision & Electric Show

Millions of people will be making their way to Blackpool this autumn for the illuminations. Not all will be travelling just to see the Lights. Thousands will be travelling to see a new public exhibition - The Northern Sound, Vision & Electric Show.

The exhibition will be staged at the Norbreck Castle Hotel, on Friday, Saturday and Sunday 13-15th September. The well-known seafront venue is easily found and has good car parking facilities.

The Northern Electric Show, will present to the public all that is best in the world on consumer electronics, computers, computer accessories, antennas, cables, hot plates, curling tongs, hi-fi to hot plates. If it's powered by electricity and consumer-orientated, it will be on show in Blackpool.

For more information on the show, contact: Nicola Woodcock Northern Sound Vision & Electric Show 335 Red Bank Show Bisham Blackpool FY2 0HJ. Tel: (0253) 52557.

Car Boot Rally

The Madley Satellite Earth Station Amateur Radio Group (G7BTI) are holding their annual car boot rally, within the grounds of the Communications Centre, on Sunday September 8. Madley Comms Centre is located 10km south-west of the City of Hereford. In addition to the amateur radio section there will be a segregated conventional car boot sale. The gates open at 8.30am and talk-in is available on S22. Further details can be obtained from our "Backscatter" columnist, David Butler G4ASR on (0873) 87679.

August Bank Holiday Sale

Garex Electronics have an August Bank Holiday Monday (26th) Sale - One day only from 10am to 4pm.

Regular lines: new & second-hand scanners, antennas, components, plus lots of lovely junk and surplus materials. All the clearance items offered at "must go" prices.

Garex are easy to find, with ample parking. South Brent is just off the main A38 between Exeter and Plymouth.

Garex Electronics Station Yard South Brent South Devon TQ10 9AL. Tel: (0364) 72770.

Northern Sound, Vision & Electric Show

South Dartmoor School ARC

As a direct result of the Novice amateur radio course, South Dartmoor School, Ballard Lane, Ashburton, Devon, has now formed a radio club.

It is called South Dartmoor School Amateur Radio Club, and it will be active after the school summer holidays.

The South Dartmoor School has nine students and one teacher taking the Novice amateur radio exam, with another five from Knowles Hill Comprehensive School at Newton Abbot in Devon.

The support from the parents, teachers and head teachers has been 100% and all their courses finished in time for the school summer holidays. This will give time for revision when they return after the holidays, ready for the September Novice amateur radio exam.

The School’s Headmaster, Ray Tarleton, is very keen on the project and is making a room available for a radio club in the school with funds for some equipment. To justify the room it will also have a weather satellite station, that it can be used by the geography and science departments in the school.

Local radio amateurs will also help, and it is proposed that they get a club callsign for the school. Hopefully this can all be carried out in the summer holidays, ready for when the autumn term starts in September.

The students will be the first in Devon to take the exam and hopefully will have their callsigns at the end of October.

Peter Thornhill G6ZKQ, Tutor, 21 Elmbank, Buckfastleigh, Devon TQ11 0DN.

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The exhibition will be held at the Tower Mint, London. A book has also been published on the subject.

Island Council have struck a commemorative coin in identifying Shetland radio amateurs, it is hoped that this will combine with National trust properties for the National Trust For Scotland event for the National Nations National Trust September 1.

GM4CA on (0595) 5411.

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USA Special Event Station

Amateur radio station WBIU will be operating a special event station from the USA Marconi site on October 5 and 6th. Starting at 1300UTC to celebrate the 90th anniversary of Marconi's Wireless station, South Wellfleet, Massachusetts, USA, (construction started in 1901).

Operating frequencies will be the general section (lower 25MHz) of 21, 14 and 7MHz and the Novice section of 28MHz (2.800MHz) and 3.5MHz (3.700MHz).

To receive a certificate, please send a QSL card, 9x10 envelope and IRCs to: Ray Wilson W8IUS 6 Sherman Place Norwalk CT 06851 USA.

Scottish Tourist Board RA Expedition Group

On August 17/18 GB6SM will be on the air for the Summerlee Museum in Coatbridge, Lanarkshire Steam Fair. It was 150 years ago when Summerlee Iron Works were at the Hub of the Industrial Revolution, when coal and iron brought prosperity to Scotland.

Fifty years ago, the works became derelict. Today, the site is the home of a major working Museum illustrating 200 years of Scottish Industry and people. The site won the Museum of the Year 1990 and there's a special QSL card for every contact.

John (Paddy) McGill GM3MTH
Tel: (0238) 404955.

Car Boot Sale

Milton Keynes & District ARS have an amateur radio car boot sale on Sunday 8 September at Cranfield Airfield, Beds (south side). It runs from 9.30 until 4pm. Hot & cold snacks and drinks, admission 50p. Talk-in S22. Advance bookings are £7 private (£3 on the day) and trade £12.50 (£5 on the day).

Enquiries to Ray G1LRU on (0908) 680798.

Newspaper Ad

Clubs News

Aylesbury Vale RS meet 1st & 3rd Wednesdays, 8pm at the old Village Hall, Hardwick, except during June, July and August when there is only one meeting on the 1st Wednesday of the month; September 4th is a talk by Bill GEWDF on 'Amateur Satellites, All I Know About Them!' Further details from the club on Geoff on (0286) 817406 or Martyn on (0694) 870842.

Bradford ARS meet 2nd and 4th Thursdays, 8pm at the Community Ex-Servicemen's Club, Shearborough Road, Bradford, West Yorkshire. August 22 is GB2G5MSM: a 50MHz special event station GB2DAT. Charles Bolf G5AXX on (0292) 459604.

Braintree & District ARS meet 1st & 3rd Mondays, 8pm at the Community Centre, Victoria Street, Braintree. August 14 is 'Weather Measurements' by Derek G5WMMA and September 2 is 'Packet Radio' by Ted G6FVP and Nick G6EZF. D. Andrews, 2 Arnhem Grove, Braintree, Essex CM7 SUU, Tel: (0763) 27431.

Epsom ARS meet at Licky End Social Club, Alcester Road, Burcot, Bromsgrove. August 13 is 'Ceramics' by Eric Danks G6BHZ and the 27th is a night on the air. Mr. R. Davis. G4ZMW, 2 Mason Close, Hanley, Stoke on Trent, Staffs. September 9 is an outdoor meeting with Cheese & Wine by Peter G0JEY. More details from Andy Bitters G8ICT at 8116 7004.

Dragon ARS meet 1st & 3rd Mondays, 7.30pm at the Four Crosses Hotel, Menai Bridge. August 17 is a special event, the 100th anniversary of No. 4 Flying Training School. The 19th is the club station HF Night, September 2 is a construction night and the 27th is another special event. Seven Nations National Trust event. More details from Tony G3NRF on GB2GOFG (0286) 870842.

Erfalch ARS meet in the Community Hall, St. Martin's Court, Kinston Crescent, Ashford, Middlesex, 7.30pm. August 12 is The Great Egg Race GB2ZDP and September 9 is 'Keys and Keyers' G6EZH. Further details from P. Townshend G6PMT on (0344) 834712.

Fareham & District ARS meet Wednesdays, 7.30pm in Portchester Community Centre, Westlands Grove, Portchester, Fareham, Hants. September 11 is a talk on 'Up Mountains' by Peter G0FHI. More details from Rod Smith G6ERS on (0293) 872491.

Fylde ARS meet 2nd & 4th Thursdays, 7.45pm at South Shore Lawn Tennis Club, Midland Road, Blackpool. August 22 is an informal meeting with programme review and September 12 is also an informal.

Eric Fielding G6HRF on (0253) 726685.

GHS Repeater Group meet at Chiltern Communications, Lincoln Road, Cresssex Industrial Estate, High Wycombe, Bucks, 8pm. Their next September.meeting is on September 26. Details from Francis Rose G2DERT on (0494) 814240.

Gloucester ARS meet at St. Johns Ambulance HQ, Heathwilde Road, Gloucester. 7.30pm. August 14 is Construction Group, the 21st is Morse Sending Practice and the 28th is Homebrew Clinic. More info from J. Berridge (0925) 35555 Ext. 2741.

Hamilton ARS meet in Room 45 of Northhillron Grammar School at 7.30pm. September 9 is Gossip by Nigel Roberts. GB4HNH. For more details on the contact Nigel Roberts GB4HNH on (0694) 776515.

Ipswich ARS have a new Secretary, Mrs. S. M. Edlen G8EYH, 12 Larchcroft Road, Ipswich IP1 6PD.

Kettering ARS meet Tuesdays, 7.30pm at the Electricity Sports, Social Club, Exekeld Street, Kettering. August 31/September 1 is an HF Field Day at Loddon. All enquiries to Len G7EHH on (0536) 516544.

Luton ARS meet on the 2nd and 4th Wednesdays, 7.30pm in the Dwell Hotel, Polworth Terrace, Edinburgh. September 11 is The President's Address. Further details from Mel Evans at 66 Southhouse Road, Edinburgh EH7 3EU or telephone 031-614 5403.

Maidhead & District ARS meet at The Red Cross Hall, The Crescent, Maidenhead, 7.30pm. August 20 is Quiz against Brassknell ARC (at home) and September 5 is Technical Questions & Details. Answers from Nigel G4FX in 'The Wireless World'.

Mansfield ARC meet at the Polish Catholic Club, off Windmill Lane, Woodhouse Road, Mansfield. On September 5 they have a talk on the 'Short Wave Broadcast Bands' by John G4YOY. Further information from Mary on 1062392598.

Mansfield ARC meets Wednesdays, 7.30pm at 'The Norfolk Dumpling', the Livestock Market, Hartford, Norwia. August 14 is a Real Radio evening, the 21st is a talk on 'Amateur Satellites, All I Know About Them!' For ALL by Arnold Tomalin G3TMY, the 31st is his SSB NBFN at East Tuddenham site, September 4th is Town & Country Show final briefing, the 11th is a special event station for Gulls for the Blind. For more details on Steve G3KUH, 4 Hilperton Road, Caversham, Reading RG4 7HR.

South Dorset RS meet 1st Tuesdays, 7.30pm in the Wessex Lounge of Wimborne Football Club. August 11 is Hamfest Rally, Wimborne and September 3 is an Activities evening. Geoff Gwilliam G4JD, 13 Overlands Road, Wyke Regis, Weymouth DT4 9HS. Tel: (0306) 781164.

South Nets ARS meet at Highbridge Community Centre, Farnborough Road, Clifton on Thames, Berkshire. August 8th, the 15th is Open day, the 16th is On Air Operating/If from leek, the 18th is a Foxhunt, the 23rd is talk-in on 2m/FM on Packet Radio by Edyd G8INN, the 29th is 'Keys and Keyers' G6EZH. Further details on Fairham (collegiate). For further details contact Trevor G4RRN on (0602) 672834.

Stevenson & District ARS meet in Ground Floor Lecture Room, 'D' Block, Ridgeway Training Enterprise, Ridgeway Park, 3.30pm. September 2 is their RA course enrolment evening, the 3rd is a talk on 'Mobile Operating' by Peter G6YCH and Gary G6ETA and the 10th is Practical Test Equipment. Details from Pete Daly G6GGE, 48 Lincoln Road, Stevenage, Herts SG1 4PF. Tel: (0438) 724901.

Stratford-upon-Avon & District RS meet 2nd and 4th Mondays, 7.30pm at Baptist Church, Payton Street, Stratford-upon-Avon, Warwickshire. September 9 is an evening with Cheese & Wine and September 6 is Construction (10 minute story by members). Further details from Alan Beswick G6GCB, 21 Bilton Road, Blackwell, Shipston-on-Stour, Warwickshire CV36 4EP. Tel: (0869) 828495.

Suffolk & Bury St. Edmunds RS meet 3rd Thursdays, 7.30pm at Downs Lawn Tennis Club, Holland Avenue, Cheam, Surrey with natter nights on Mondays, the 1st in Doors Bar, August 15 is a Barbecue, the 29th is a committee meeting at GB2GOZ and September 2 is a natter night. More from John Papi G3QJ, 53 Alexander Avenue, Sutton SM1 2PA.

Wimborne & District ARS meet 2nd and last Fridays in St Andrews Church Hall, Hermit Road, Wimborne, Weymouth SW19. August 30 is a general activity evening, Chris Frost G6KCB, 61 Salbourne Avenue, Tolworth, Surrey KT6 7NF. Tel: 081-292 6427.

Auction

The Tyne & Wear Repeater Group Auction is to be held on Sunday 3 November at Fenhouses Community Centre, Fenhouses, Nr Chester-le-Street, Co. Durham. Doors open at 11am for booking in goods. The Auction starts at 12.30pm. For further details, please contact Ian G4CO on 091-384 0827.
Tex Swann GITEX isn't one to turn down the chance of trying out a useful piece of equipment. He tried out the Kenpro KT-44, and was impressed with this budget-priced rig's excellent performance.

### Setting The Frequency

If you look at the photograph of the top panel, you'll see that the frequency is set for 433.350MHz, a local repeater channel. The MegaHertz decimal point is assumed to lie between the first two numbers. By adding 430 to these and you'll have set 433.350MHz on the rig. The final 0 or 5kHz is selected with the aid of a small slide switch, which is just visible below the Kenpro name.

In the UK we use a +1.6MHz repeater offset. Two of the three small slide switches, hidden on the back panel above the belt clip, may be used to select this requirement. The switch marked '+1.6' and '-1.6' is almost self-explanatory. In use, this switch selects a transmission frequency either 1.6MHz higher or 1.6MHz lower than the thumbwheel set frequency. You may regard the switch as a 'preset', and it may be left on '+1.6' for use within the UK.

When you're about to use a repeater, all you have to do is move the middle slider switch on the back panel, to the 'DUP' (Duplex) position. To use the normal, or simplex channels, slide this switch back...
over to the ‘SIMP’ setting. What could be simpler?

The final switch, in this cluster of three controls is the r.f. power output. The actual measured power out was as shown in the composite diagram in Fig. 1.

Using The Transceiver

Two of the transceivers had been supplied for evaluation and Rob Mannion G3XFD and I tried them out in the office, and during lunchtime walks in Poole High street. Rob also took his transceiver out on the Dorset hills, and thoroughly enjoyed himself as a pedestrian portable. Band conditions were so good he managed to work into Bedfordshire and East Anglia using just the ‘rubber duck’ antenna.

We found that the rigs were very sensitive, and they provided crisp and clear audio on transmit and receive. This is an area where some hand-helds can show their shortcomings.

The PW editorial office is one floor down from the technical sub-editor’s workshop (it’s known as the ‘Tardis’ because of the specially screened measurements cubicle) where much of our development work is done. Despite masses of r.f. noise from the various computers in our, and other nearby offices, the rigs coped very well indeed. Rob and I were able to chat away with no bother, over the short but very badly obstructed pathway.

Summary

To sum up, I think that the Kenpro KT-44 is a very nice and easy set to use, once the initial fumbling with the frequency selection switches had been overcome. It’s a simple, but comprehensive little transceiver with a more than adequate performance for portable use.

The local repeaters were more than happy with the transceiver’s signals. Reports received from other operators said that it provided good audio, with a very crisp and clear transmission. This is most likely to be due to the sensitive electret microphone insert, and partly due to good speech processing circuitry.

It’s not often we get two rigs of the same type to evaluate and I was able to check the specifications and to put both transceivers through their paces. I’m pleased to report that the final, composite results below reflect the quality of the product, as both rigs were within or better than the manufacturers specification.

PW

---

**Measured and tested specifications**

**General**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency range</td>
<td>430-439.995MHz in 5kHz steps</td>
</tr>
<tr>
<td>Type of modulation</td>
<td>Frequency Modulation (F3)</td>
</tr>
<tr>
<td>Antenna impedance</td>
<td>50Ω</td>
</tr>
<tr>
<td>Power requirements</td>
<td>5.5-12V d.c. (battery packs available with 8.4 or 10.8V)</td>
</tr>
<tr>
<td>Consumption (at 10.8V)</td>
<td>22mA (standby)</td>
</tr>
<tr>
<td></td>
<td>170mA (Max received audio)</td>
</tr>
<tr>
<td></td>
<td>700mA (High power transmission)</td>
</tr>
<tr>
<td></td>
<td>300mA (Low power transmission)</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-10° to +60°C</td>
</tr>
<tr>
<td>Dimension</td>
<td>65(w) x 40(d) x 180(h) mm (excluding antenna)</td>
</tr>
<tr>
<td>Weight</td>
<td>490g (approximately)</td>
</tr>
<tr>
<td></td>
<td>(includes 8.4V battery pack and antenna)</td>
</tr>
<tr>
<td>Frequency selection</td>
<td>Thumbwheel, 10kHz steps +5kHz switch</td>
</tr>
<tr>
<td></td>
<td>(three decade range, add 430 to read frequency '335' equates to 433.350MHz (RB14 channel))</td>
</tr>
</tbody>
</table>

**Receiver Section**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receiver type</td>
<td>Double Superhet</td>
</tr>
<tr>
<td>Intermediate frequencies</td>
<td>21.8MHz (1st I.F.)</td>
</tr>
<tr>
<td></td>
<td>456kHz (2nd I.F.)</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>better than 0.5μV (see Fig. 1)</td>
</tr>
<tr>
<td>Squelch setting</td>
<td>0.16-3.5μV (measured)</td>
</tr>
<tr>
<td>Selectivity</td>
<td>better than 60dBμV (see Fig. 1)</td>
</tr>
<tr>
<td>Bandwidth</td>
<td>±7.5kHz</td>
</tr>
<tr>
<td>Audio Power</td>
<td>Better than 400mW (10% distortion)</td>
</tr>
</tbody>
</table>

**Transmitter Section**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output power</td>
<td>1.5W (high 8.4V) 2.5W (10.8V) (see Fig. 1)</td>
</tr>
<tr>
<td></td>
<td>250mW (see Fig. 1)</td>
</tr>
<tr>
<td>Modulation</td>
<td>Reactance</td>
</tr>
<tr>
<td></td>
<td>±5kHz</td>
</tr>
<tr>
<td>Maximum deviation</td>
<td>±1.6MHz repeater shift (+1.6MHz in UK)</td>
</tr>
<tr>
<td>Spurious emissions</td>
<td>-60dBc or less</td>
</tr>
<tr>
<td>Microphone</td>
<td>Electret type</td>
</tr>
<tr>
<td>Repeater tone</td>
<td>Separate access tone switch on the front fascia.</td>
</tr>
</tbody>
</table>
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Errors And Updates

Wrong Toroidal Core.
The PW Chatterbox transmitter parts list, page 23 of the August 1991 issue of PW, has L5 described as being wound on a T50-12 toroid. This is incorrect. The inductor L5 should be wound on a T50-2 toroid. Our apologies to those who’ve the started to build the transmitter.

Before starting on the receiver side of the ‘Chatterbox’, we ought to take a final look at the transmitter itself. The Chatterbox transmitter is built separately, because many constructors will want to use it in conjunction with an existing receiver on 1.8MHz.

It’s been assumed that an existing antenna tuner and low-pass filter unit will be used with the transmitter. However, if you intend to use the complete transmitter and receiver combination as a ‘stand alone’ unit, it will be necessary to use a suitable low-pass filter to reduce potential harmonics.

A filter of this sort can be built into the transmitter, or it can be an outboard type used in conjunction with a small antenna tuner. What the individual constructor does of course, will depend on the size of casing and whether or not the project is built as separates or as one small unit.

With the change-over switching described in the previous article, the transmitter can be used with any 1.8MHz receiver. If you don’t have a suitable set, you can add a simple single board receiver of the sort described here. However, bear in mind that the receiver is not a DX model and it’s designed for using the Chatterbox combination in local a.m. nets.

The Receiver

The receiver section is based on the TDA1072A a.m. receiver i.e. This is an inexpensive chip which performs all the functions of an a.m. receiver between the antenna and the audio stages.

The TDA1072A’s sensitivity and signal handling capabilities are such that it’s suitable for this application. The i.c. also supports several features not used in this design.

Some of the features are made available on the p.c.b., should you wish to incorporate them in the receiver. For example, the chip provides an S-meter output, a muting facility and a buffered oscillator output for driving a frequency counter. The circuit is shown in Fig. 2.1, and it closely follows the manufacturer’s specification sheet.

The incoming signal is filtered with a high-pass filter, L6 (wound on a toroid) and associated capacitors, and a two stage band-pass filter, comprising of T2 and T3. The high-pass filter was included because the receiver operates close to the medium wave broadcasting band.

Winding the toroid for L6 is a simple job and it only requires a little concentration for a neat job. All you need to do is wind 24 turns of 0.4 or 0.5mm enamelled copper wire on a T37-2 core.

I have a local commercial broadcasting station at the top end of the medium waveband that can light bulbs in my location in Rochdale! The high-pass filter was included to kill the pop music breakthrough. The band-pass filter has manual tuning provided by a polyvaricon capacitor, C36, to peak the wanted band signals and reduce the out-of-band signals.

Receiver Tuning

The band is tuned using a variable capacitor, C39, in conjunction with T4. Although the TDA1072A was designed for varicap tuning, this arrangement allows for very stable tuning over the band.

The variable capacitor, C39, is a standard value, 75pF, (a 100pF may be used as an alternative) which more than covers the whole band. The tuning capacitor is mounted directly on the printed circuit board.

The ground connection on C39, is made through the mounting nut to the p.c.b. To avoid any problems with poor connections, I also added a wire between the tag to the moving vanes and the ground plane on the top of the printed circuit board.

Intermediate Frequency

The i.f. at 455kHz, is filtered by using a CFW455HT ceramic filter and an i.f. transformer, T5, placed between the mixer output, pin 1, and the i.f. amplifier, pins 3 and 4.

It’s possible to inject a b.f.o. signal at pin 4, to make the receiver available for c.w. and s.s.b. reception. Several radio amateurs have used this i.c. to make a c.w. and s.s.b. receiver. I tried injecting a 455kHz signal at pin 4, but found that it triggered the internal a.g.c. This reduced the overall gain of the receiver, to what I considered to be an unacceptable level.

Sprat Debate

There was a debate between DF2OF and G8SEQ, reported in the G-QRP Club journal Sprat (issue 57), on using a b.f.o. with the TDA1072 without a.g.c. problems. The technique is obviously open to experimentation!

One possible idea, would be a b.f.o. which only injects a signal when netting the transmitter to the receiver. This technique would make the netting process somewhat easier.

The circuitry around pins 5 to 8, clearly demonstrates that the TDA1072A requires considerable decoupling,
1.8MHz Receiver

around the audio stages. Don’t miss out these capacitors, as reducing the decoupling causes instability. To further help stability, the receiver is built on a double-sided p.c.b.

The audio amplifier is the popular LM386 i.c. in its high gain configuration. A muting switch can be applied to pin 2, but in this application the receiver is switched off during transmit cycles, so pin 2 is grounded. Switching off the receiver is quite acceptable in this particular application.

Building The Receiver

The receiver is built on a single p.c.b. which also holds the three controls, peak (C36), tune (C39) and audio volume (R29). The board is a double-sided p.c.b., the top of the board forming a ground plane. Wherever possible, the grounded connections and leads should also be connected to the top side of the board.

It can be helpful to build and test the audio stages first. This would start from the loudspeaker output as far as pin 6 on the TDA1072A. The capacitors C45 and 46 are tantalum bead types to fit in the small space available. When the audio stages are wired, the rest of the components may be added.

Setting Up

The method used to set up the receiver will depend upon the available test equipment. Although some test equipment is helpful, the receiver can be set-up by using signals on the band.

Even after a setting-up operation on the test-bench, I tend to make final adjustments using signals on the band. The first task is to get C39 to tune over 1.8 to 2MHz. It is, of course, tuning 455kHz lower than the range 1.8 to 2.0 MHz.

One suitable method is by using a frequency counter to take a signal from TP1. This is a simple technique, but some poorly buffered counters can change the frequency of the signal.

Another method is to listen for the signal on a receiver, set to receive c.w. or s.s.b. This is done by connecting a short wire antenna to the receiver, and then draping it close to C38. The adjustment is by means of the core in T4. You may find it necessary to increase the value of C38, by perhaps 56 or 68pF (the actual value depends on the individual coil) to achieve this easily.

Bandpass Adjustments

The adjustment of the band-pass filter is rather more exacting, and it’s done by adjustment of T3 and T4. The ideal method is to set the two cores to peak the band in conjunction with C36.

This may be done by injecting a low-level signal of the required frequency into the receiver input or using signals on the band. There are enough ‘jingle-jangles’ from navigational beacons on 1.8MHz to provide tuning signals. The signals to avoid are any popular songs creeping in from medium wave broadcasting stations!

Begin the process by setting C36 about midway, and finding or injecting a signal at around 1.9MHz. Next, T2/3 are adjusted to peak the required signal.

You should then set a signal at about 1.8MHz, rotate C36 to peak the signal, and then re-adjust T2/3. This operation should then be repeated at around 2MHz. It’s worth repeating the whole tuning up process at least twice, and then perhaps re-peaking on a favoured frequency on the band. To finish the job off, you should peak T5, the i.f. transformer, for maximum signal.

The receiver input is designed for 50Ω, and it should be used into a correctly matched 50Ω input from an antenna or tuning unit. An antenna tuning unit will also help to reduce adjacent channel broadcast signals.
Boxing The Chatterbox

The receiver unit can be mounted in a box the same size as the transmitter. The interconnecting leads that form part of the transmit to receive switching, are clearly shown in the photographs.

To provide a suitable receiver tuning rate, a slow-motion drive is required for C39. I used an in-line epicyclic drive. To enable the slow-motion drive to be used, the receiver p.c.b. is mounted behind the front panel, using stand-off pillars spaced to suit the drive.

Switching Modification

As the unit uses a.m., and frequency stability is less critical, several short-cuts may be taken in the transmit-receive switching arrangements. For example, the v.f.o. is switched off during the receive periods, as the ‘warm up’ drift is insignificant in terms of an a.m.
signal. For the same reasons, the receiver is completely switched off during transmit periods.

The circuit of the change-over arrangement was shown in Part 1 as Fig. 1.1. The switching circuitry now requires a small modification to incorporate the receiver half of the project.

The change-over action is centred around a 12V relay, RL1, operated by the p.t.t. switch on the microphone. This is a double-pole change-over relay which switches the antenna between the receiver and transmitter output.

An extra supply wire is added to the contacts on the switch. This supplies 12V to the transmitter and the v.f.o. The extra wire, from the normally closed contact, supplies the receiver with 12V which is disconnected when the p.t.t. is operated and the relay switches to transmit.

As the transmitter and receiver are separate units, the transmitter has to be 'netted' to the receiver frequency. This is done by switching on the v.f.o., and


I hope you build, and enjoy using this delightful little rig. There's quite a few of them about already. Perhaps your Chatterbox could be the next one on the air!

then tuning it to the desired frequency on the receiver. The 'Net' Switch, S2, connects a 12V supply directly to the v.f.o. when the unit's in the receive mode.

If the transmitter is to be used for c.w., a more sophisticated method of change-over will be required. In this case, the v.f.o. should be left to run all the time. Additionally, a method of off-setting its frequency is required during receive periods, to prevent it being picked up on the receiver.

Chattering In Morse

Although the Chatterbox was designed as an a.m. transmitter, it works very well on c.w. Colin Turner G3VTT, has built a prototype Chatterbox transmitter and uses it successfully on c.w. with the slight modifications shown in Fig. 2.5.

How Much?

£28 + p.c.b. + case

How Difficult?

Intermediate

<table>
<thead>
<tr>
<th>Shopping List</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Resistor</strong></td>
<td></td>
</tr>
<tr>
<td>Carbon Film 0.25W 5%</td>
<td>1 R33</td>
</tr>
<tr>
<td>10Ω</td>
<td>2 R24, 32</td>
</tr>
<tr>
<td>2Ω</td>
<td>2 R26, R26</td>
</tr>
<tr>
<td>2.2kΩ</td>
<td>1 R34</td>
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<tr>
<td>1kΩ</td>
<td>2 R28</td>
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<tr>
<td>12kΩ</td>
<td>1 R27</td>
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<tr>
<td>22kΩ</td>
<td>1 R31</td>
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<tr>
<td>47kΩ</td>
<td>1 R30</td>
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<tr>
<td><strong>Variable Rotary</strong></td>
<td>1 R29</td>
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<tr>
<td><strong>Capacitors</strong></td>
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<tr>
<td>Miniature Disc Ceramic</td>
<td>1 C33</td>
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<tr>
<td>3.3µF</td>
<td>1 C48</td>
</tr>
<tr>
<td>3.3pF</td>
<td>1 C47</td>
</tr>
<tr>
<td>0.12µF</td>
<td>1 C44</td>
</tr>
<tr>
<td>10µF</td>
<td>8 C37, 40, 42, 43, 49, 51, 54, 56</td>
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<tr>
<td><strong>Poly styrene</strong></td>
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<tr>
<td>50pF</td>
<td>2 C34, 35</td>
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<tr>
<td>100pF</td>
<td>2 C57, 58</td>
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<tr>
<td>100pF</td>
<td>2 C38</td>
</tr>
<tr>
<td>820pF</td>
<td>2 C29, 31</td>
</tr>
<tr>
<td>1000pF</td>
<td>2 C30, 32</td>
</tr>
</tbody>
</table>

| Miniature Radial Electrolytics 16Vw | 10µF 1 C60 |
| 47µF | 1 C41 |
| 100µF | 1 C52 |
| 220µF | 1 C53 |
| 470µF | 1 C56 |
| **Tantalum Bead 16Vw** | 2.2µF 1 C45 |
| 22µF | 1 C46 |
| **Variable** | |
| 75/100µF | 1 C39 Jackson C804 type either value |
| 266pF | 1 C36 (Polyvaricon, double variable capacitor) |

| **Inductors** | |
| T5 is Circit Stock code 35-11000 (455kHz i.f. transformer) | |
| **Semicon ductors** | |
| 7808 | 1 IC6 |
| LM386 | 1 IC5 |
| **Miscellaneous** | |
| A ceramic filter type CFW455HT, one T37-2 type toroid core (Circit), p.c.b. from PW services, slow-motion coupling, spacers, nuts, screws, etc. Miniature coaxial cable, interconnecting wire, a suitable 8-16Ω loudspeaker. A box to enclose the unit (I used a box from Minford engineering). |

<table>
<thead>
<tr>
<th><strong>Errors &amp; Updates</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Cost NiCad Tester, February 1991 Page 26</td>
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<td>This E&amp;U corrects a second mistake that crept into an earlier Errors &amp; Updates (PW March 1991). Refer to the diagram Fig. 3 on page 27 of the February '91 issue of PW. The battery under test is connected with its positive terminal to Pin A of the circuit, not pin G as stated in the previous E&amp;U. The negative of the battery under test goes to Pin 5. Further down in the same column beginning, &quot;Remove power and transfer the link from pin 5 of IC3 to pin 10&quot;, this should be to Pin 10 of IC2. This is the input to the counter which is 256Hz. There was also some confusion about which parts DJ Electronics were sourcing for the PW Robin. We asked them to supply the electronic parts only. See PW August '91 page 35, for more details. The p.c.b.s WR290 and WR291, are available from the PW PCB Service at £5.42 and £7.25 respectively. These prices include VAT and p&amp;p. Once again our apologies to all involved.</td>
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PW Robin Frequency Counter Part 2, August 1991 Page 35

Several readers have contacted us about the testing of the PW Robin, the description on page 35 is not very clear. In the paragraph beginning 'Testing Time' the links to IC3 pins 7 and 10, are made to the socket, as IC3 has not been fitted at this point. The temporary connections in (b) should be to IC3 pin 5, not IC2 pin 5. Further down in the same column beginning, "Remove power and transfer the link from pin 5 of IC3 to pin 10", this should have read "pin 10 of IC2". This is the input to the counter which is 256Hz. There was also some confusion about which parts DJ Electronics were sourcing for the PW Robin. We asked them to supply the electronic parts only. See PW August '91 page 35, for more details. The p.c.b.s WR290 and WR291, are available from the PW PCB Service at £5.42 and £7.25 respectively. These prices include VAT and p&p. Once again our apologies to all involved. |
'Quaynotes' comments on some of your critical letters this month, and asks for some help from you, to plan for the future of the CB page in PW.

O kay, so I boomed! I'm sorry that I got so carried away with my interest in SSTV that the rules were broken. I must say thanks to the various CBers who took the trouble to write in and warn me of the problem. One or two of you even took the trouble to explain what had happened after your own experiments with SSTV and packet radio.

Several readers who'd mistakenly tried SSTV and other data modes, reported that they were visited by the DTI's Radio Investigation Service. The RIS men put them 'on the right track' and left it at that. Fortunately, the same happened to me, and apart from some finger-wagging and an outsize Dunce's cap, here I am. The Editor's intervention and the statement produced on last month's page says it all. So, enough said.

Moans And Groans

While I'm on the whipping block, it's perhaps a good idea to look at some other criticisms that have come my way. I get a big postbag every month, and although the feedback is usually very favourable, one or two adverse, although constructive comments have arrived. It's not my job to ignore them - I'll try to do my job properly.

I must start the ball rolling by mentioning a letter from Mr. A. B. Stanley from Appleby in Cumbria, who says that he's disappointed in the CB enthusiasm reader PW. In his long letter, which contained much constructive criticism, Mr. Stanley suggests technical reviews of CB rigs, even or two adverse, and refers to other related items.

What do you think? Would you like to see some reviews on new gear? Drop me a line and let me know. I shall be replying in full to Mr. Stanley in a personal letter, but I do appreciate the time he's taken to write to me. I'm also hoping you'll write and let me know what you prefer to see, now that we've got our own little corner in PW.

Other letters have come, notably from M. A. ('Lofty') Phillips in Slough, who comments, amongst other things, that it must be difficult to produce a page covering 27 and 934MHz. In reply, I've got to say that I enjoy the feedback from you, but now that we're established, it's time to see where we're going!

Finally, on the brickbat front, a letter arrived from Leon Greenfield who lives around the corner from the famous Chalkpits Industrial Museum at Amberley in West Sussex. Leon says that he'd like to see an article on the CB REACT service. He also points out that he's active on 27 and 934MHz, and considers that many amateurs would not be on the air now, if they hadn't had their first introduction through CB.

So, to sum up, I must thank all of you for writing. To be honest, even the most critical letters ended up with 'thanks for the column'. It's obvious from your letters and final comments that 'CB High & Low' is needed, but we've got to try and reflect the CB radio scene in an effective way. I'll do my best, but to achieve our aim you have to do your bit and let me know what YOU want. It may be that you might want to see a rig reviewed occasionally, an antenna project, and constructional ideas with 'High & Low' appearing in this form during alternate months.

In the meantime, I'm going to reply personally to as many of you as I can, and look forward to your ideas and suggestions arriving from the office.

Antenna Time

One of the problems associated with magazines, is the limited amount of space available each month. The editor has to juggle his time to see where we're going!

The newly introduced and popular 'Bargain Basement' has proved that I was far too late to buy either of the u.h.f. CB transceivers offered in PW recently.

Because of the interest shown in second-hand gear, and as I'm still looking for a rig myself, I was pleased to hear that Brian Hollins is offering a solution to the problem of finding 934MHz gear. Brian, based in Weybridge in Surrey, runs the '934MHz Exchange' where he offers a service of buying and selling u.h.f. CB gear.

I haven't met Brian myself, but the Editor Rob Mannion G3XFD, met Brian at the Longleat Mobile rally on June 30th. He had quite a chat with Brian and Frank Fuller, (Fig. 1 and 2) the Chairman of the 934MHz Club, about the 934MHz Club UK itself and the difficulties in buying second-hand equipment. Brian took the opportunity of telling the editor about his service, and the news was soon passed on to me.

It's a great pity that I work most weekends, as it means that I can't get along to rallies. For my sins, I'm on call-out duty to repair specialised communication equipment, but at least I can see our delightful countryside.

Still, at least I can pass on Brian Hollins address and 'phone number. I've no doubt that either Brian or Frank Fuller (as prominent members of the 934MHz Club) would do their best to help you find a rig. You can call or write to Brian at Beech Rise, Rodona Road, St. George's Hill, Weybridge, Surrey KT13 8NP. Tel. (0932) 852656.

That's the lot for this month, don't forget to write, brickbats and all!
Ray Fautley G3ASG continues with his look at algebra, dealing this month with the multiplication and division of terms.

Mathematics For The RAE  
Part 6

How, when the terms contain different symbols, do we multiply simple algebraic terms together? The answer is quite simple and logical. Multiply any COEFFICIENTS together and then write down the symbols in order. Examples are the best way to explain, so we will start with a simple one:

(i) Multiply together $2a$ and $4b$:

$$2a \times 4b = (2 \times 4) \times (a \times b) = 8ab$$

(ii) Multiply together $5b \times 6a^2 \times 2b^3$.

Multiply the coefficients together, then the 'b' terms and finally the 'a' term:

$$= (5 \times 6 \times 2) \times (b \times b^3) \times a^2$$
$$= (60) \times (b^{1+3}) \times a^2$$
$$= (60b^4) \times a^2$$
$$= 60a^2b^4$$

or as the terms are usually written in alphabetical order:

$$= 60a^2b^4$$

More Rules:

You may have noticed that the above terms were all positive (+). What happens if some or all of the terms are negative (-)? Don't worry, there's a series of rules which cover these cases.

(i) Multiplying a 'plus' quantity by a 'plus' quantity gives a 'plus' answer.

$$+ \times (+) = (+)$$

(ii) Multiplying a 'plus' quantity by a 'minus' quantity gives a 'minus' answer.

$$+ \times (-) = (-)$$
$$(-) \times (+) = (-)$$

(iii) Multiplying a 'minus' quantity by a 'minus' quantity gives a 'plus' answer.

In short:

$$(-) \times (-) = (+)$$

I'm afraid these rules will have to be committed to memory as they are very important. But there is a small memory jogger that can help. If the signs are the same, the answer is 'plus'. If they're different the answer is 'minus'. Not really as difficult as you may have thought, is it?

Now let's make the terms a little more complex. Don't shrink away it's not too difficult. Get all the terms having the same symbol together and add their indices. Then multiply ALL coefficients together.

Remember that $a \times b \times c = abc$

or when it has some terms more than once:

$$a \times a \times b = a^2b$$

Now add a few more terms:

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Here are a few more worked examples.

(i) Multiply $3a 	imes 6c 	imes 8b$.

\[
(3a) 	imes (6c) 	imes (8b) = (3 	imes 6 	imes 8) (a 	imes c 	imes b) = 144abc.
\]

(ii) Multiply $3x^3y^2 	imes 4y^4z 	imes 6a^5$.

\[
(3x^3y^2) 	imes (4y^4z) 	imes (6a^5) = (3 	imes 4 	imes 6) (x^3y^2y^4z) (a^5) = 72x^3y^6z.\]

Division of simple terms is not much different (if you remember the rules for indices).

\[
a^2 = a^{(2-1)} = a
\]

The coefficients are divided in the usual way. Sometimes you may need to 'break' the individual terms down to make simplifying easier.

\[
6a^3 = \frac{6}{2} a^3 = 3x(a^{(3-1)} = 3a^2
\]

Terms in Brackets

Now for some more difficult problems involving the use of brackets.

\[(a-b)(a+b)\] means \((a-b) \times (a+b)\).

To multiply the bracketed terms together needs a little care if the answer is to be correct. The rules (there are always rules!) to be followed are:

(i) Multiply the first part of the first term by the first part of the second term.

(ii) Multiply the first part of the first term by the second part of the second term.

(iii) Multiply the second part of the first term by the second part of the second term.

(iv) Add all four answers together.

As usual, an example is far easier to follow than the rules on their own!

Multiply \((a+b)\) by \((a+b)\):

From rule (i) \((+a) \times (+a) = +a^2\)

From rule (ii) \((+a) \times (+b) = +ab\)

From rule (iii) \((+b) \times (+b) = +b^2\)

Finaly from rule (v) we arrive at:

\[
a^2 + 2ab + b^2 = (a+b)^2.
\]

That was very dry and dusty with just letters wasn't it? So now to check if we've got it right, and to make

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it more interesting, let's assume that a = 6 and b = 7
(a + b) x (a - b) = (6 + 7) x (6 - 7) = (-1) x (6 - 7) = 13 x (-1) = (-13) = (13) = 169 = (answer i)
Now our answer was a^2 + 2ab + b^2
Putting a = 6 and b = 7
a^2 + 2ab + b^2 = 6^2 + 2(6)(7) + 7^2
= 36 + 84 + 49 = 169 = (answer ii)
Good! As (answer i) is the same as (answer ii) we were correct. Now just to check your answers, try other figures in place of a and b above.

Try another similar problem:
Multiply (a - b) by (a + b)
From rule (i) (+a) x (+a) = +a^2
From rule (ii) (+a) x (+b) = +ab
From rule (iii) (-b) x (+a) = -ab
From rule (iv) (-b) x (-b) = +b^2
Finally from rule (v) we get:

a^2 + ab - ab = -b^2

and as the addition of +ab to ab is 0 (or zero) we are left with:
a^2 - b^2

Once again, let's check the results with some simple numbers. Assume a = 9 and b = 5.
(a - b) x (a + b) = (9 - 5) x (9 + 5) = 4 x 14 = 56
Our answer was a^2 - b^2. Substituting the numbers:
a^2 = 9^2 = 81
b^2 = 5^2 = 25

44 + (43x 6) - (4 x 36) - y^3

Now the second worked-out algebra:

= 256 + (64 x 6) - (4 x 36) - 216
= 280

Let's check again. Substituting, say 4 for x and 6 for y, from the original we have:

(4 - 6^2) x (4 + 6) = (64 - 36) x 10
= 280

Well once again, it looks as if algebra does work! Now that you can set and check your own questions and answers, I'll leave you without homework this month. We'll start with transposition of formulae in the next part of this series.

Don't forget, keep practising!

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The strange looking liquid crystal display not only shows the frequency, mode and so on. It is also a panadaptor! Covers 50 to 904.995MHz with AM and FM (wide & narrow). It is powered by 13.8V dc and it measures just 180mm W x 180mm D x 75mm D. Come into the shop and see for yourself.

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NORMAN G4THJ
Ian Harley G6BJJ, former Group Controller of the West Devon Radio Amateurs’ Emergency Network, tells us the story behind their mobile control-centre, and how a ‘high profile’ approach is helping the group’s expanding emergency communications service.

The members of the West Devon RAYNET have found that having a ‘high profile’ is paying dividends. The latest addition to our growing fleet of vehicles is a Mark II Ford Transit ambulance, which formerly belonged to the Plymouth branch of the St. John’s Ambulance Brigade.

I had the job of Group Controller and I’d heard that the local St. John’s group were about to replace their old ambulance. We’ve got a strong and close relationship with our St. John’s branch, and we offered to buy the vehicle for conversion into a group control vehicle.

Empty Shell

When we eventually took delivery of the ambulance in December 1989, it was an empty shell with several major faults. It took some three months of hard work to make the vehicle roadworthy again.

Once we’d done this, Ken Parker, a friend of mine who’s the signals officer at the local Air Training Corps, helped me to convert the inside of the ambulance. It was quite a job, but the finished result was worth the effort!

The re-furnished control unit now seats six people. Four of the seats are around the main table and there are two others nearby. We also fitted several lockers, a sink and a cooker unit.

There’s also a white ‘blackboard’ inside the vehicle and we managed to find room for a colour TV receiver for those periods of ‘stand-by duty’ when things can be very quiet!

Much thought went into the radio equipment needed for our control unit. We eventually ended up with a telescopic mast and provision for 144 and 430MHz transceivers, plus communications equipment for St. John’s, British Red Cross Society and County Ambulance Service frequencies.

Overnight Exercises

Overnight exercises, or duties away from home, meant that we had to incorporate somewhere for the crews to sleep - in a limited space. Fortunately, we were able to arrange the four seats around the control desk to convert into a double bunk.

The ‘Battle Bus’, as it’s affectionately known

There are RAYNET groups all over the UK, why don’t you offer to help? This long established service not only provides an excellent communications ‘back up’, it also promotes Amateur Radio in a very positive way. Practical Wireless will support RAYNET in every possible way, why don’t you?
to the group, had its first outing during September 1990. The occasion was a two-day operation when the vehicle, based at Plymouth Hoe, became the base for RAYNET operations assisting with a 53km cycle ‘fun ride’ in aid of three local charities.

The control unit was soon in action again, on October 10, during the traditional Tavistock ‘Goose Fair’. On this occasion the ‘Battle Bus’ became the communications liaison point for the Tavistock Town Council, Devon & Cornwall Police, St. John’s Ambulance Brigade, Devon County Ambulance Service and several local bus services!

Quick Response

For the shorter exercises or mobile escort duties that our RAYNET group has been asked to do, we’ve found that the ‘quick response’ vehicle offers the best solution. The vehicle is manoeuvrable when escorting runners or cyclists and with their distinctive marking and flashing overhead beacons, provide useful front or rear ‘markers’ for road events.

Over The Top?

Some of you may think that this approach is ‘over the top’, but we are trying to provide as near a professional a service as possible, and it’s often said that ‘looks are everything’! If you look the part, not only do you feel the part, but others, (user services) respect you more for what you do and stand for.

To this end we have developed a group standard of dress to be adopted at ‘call-outs’, very much along the lines being discussed by other RAYNET groups. Our own ‘rig of the day’ consists of dark trousers, with either the group’s navy-blue sweat-shirt, a T-shirt, or woolen pullover with the yellow and black RAYNET logo on the front.

British Weather

The standard RAYNET ‘tabard’, or for the more usual type of British weather, reversible black and yellow fluorescent coat with reflective badges, has proved to be practical and hard wearing.

So, when you’ve just completed an overnight stint on RAYNET duty, in the cramped confines of the usual family car - just think what an old ambulance could do for your RAYNET team’s efficiency, health and moral!

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The PW-50V Vertical Antenna For 50MHz

The Department of Trade and Industry now permit the use of vertically polarised antennas on the 50MHz band for both main station, and mobile operation. This article (Part 1) provides construction details of a relatively simple design for main station use.

I'm also going to provide references for alternatives, and most importantly, explain how the performance of vertical antennas at these frequencies are affected by their physical height above the ground.

The quarter-wave vertical antenna with a ground-plane will be considered separately, for reasons that will become apparent.

Critical Height

The physical height of all 'vertical' antennas above ground becomes a critical factor, particularly in view of the various 'modes of propagation' that are possible. Some understanding of what follows is important, and incidentally, the same factors apply equally to vertical antennas for the 21, 24, 27(CB) and 28MHz bands.

With all vertical antennas, radiation in the horizontal plane is omni-directional. That means the radiation pattern is circular, regardless of the frequency of operation or height of the antenna above ground.

With multiple element antennas, e.g. Yagi type beams, a multiple element cubical quad, etc., radiation in the horizontal plane will be either bi-, uni- or multi-directional. This will depend on configuration, but is virtually unaffected by frequency of operation, or height above ground.

Vertical Plane

Vertical radiation occurs at angles considered vertical with respect to ground. The pattern of radiation depends very much on the height of the antenna above ground. This incidentally, applies to ALL types of antenna except the 'ground plane'.

Radiation patterns, even at these high frequencies are difficult, if not impossible to measure physically. However, computers can be used to illustrate on screen or by print-out, both vertical and horizontal radiation patterns for virtually any type of antenna. This can be at any frequency of operation and at any height above ground.

Vertical Half-wave

The computer produced vertical radiation patterns, shown in Fig. 1, apply to a vertical antenna above ground. The distances, to the centre of the antenna are, \( \lambda/2 \) and \( 3\lambda/4 \) at the frequency of operation.

These patterns are based on perfect ground conductivity. They are derived by multiplying one lobe, of what would be the 'free-space' pattern of the antenna, by the ground reflection factor that applies at each wave angle for the selected height. As the height above ground is increased, so the number of vertical lobes increases.

The variations in magnitude in vertical radiation for other types of 50MHz vertical antennas, at relatively low height with respect to ground, are much the same as those illustrated. In other words, the lobes increase...
Fig. 4: Photo of PW-50V mounted on a mast. Note: The sleeve joint, visible near the base of the radiating section, is not required and was only used for original development work.

in number as the height of the antenna above ground is increased.

Note: The patterns exist all around the antenna. You need height to obtain a 'free-space' symmetrical vertical radiation from a half-wave dipole operating at 50MHz. The antenna would have to be at least 5A above ground, which is a height of 30m!

Antenna Choice

One of the simplest antennas for any frequency is the Λ/4 ground plane. The antenna consists of a single vertical radiating element and a minimum of four horizontal radials, each at least a quarter-wave in length (Λ/4 at 50MHz is approximately 1.5m).

The magnitude of radiation from the antenna as a whole, is NOT equal to that of a Λ/2 dipole as many people think. The vertical radiation will have a lobe with an angle of about 30°, as shown in Fig. 2.

This angle is not a good proposition for short, ground path working. It should be more effective for Sporadic-E, intense E and even F region working, if the 'critical frequency' is high enough.

A more efficient single element vertical antenna is the Λ/2 antenna. This could be centre fed from a coaxial, or better still via a balanced line. However, close proximity of the cable to the antenna could distort the otherwise omni-directional radiation pattern, and make it difficult to obtain a low v.s.w.r.

A better, and much more convenient arrangement is an end-fed half-wave (monopole). It's this type of antenna for which constructional and performance details are described here.

If specific directivity gain is required, there are of course the active and parasitic arrays, such as the Yagi type beam antenna, the quad, and "end-fed" systems that can be operated vertically.

The Design

The theoretical circuit is illustrated in Fig. 3. The diagram also shows the voltage and current distribution on the half-wave radiating element.

The antenna is voltage-fed from the high impedance matching action of the tuned circuit. Note: The line marked 'Q' may be used to prevent r.f. currents flowing back down the feed cable, if this is less than 5m long. I'll explain the theory behind this technique later.

The radiating element is made from aluminium tubing 2.74m long, and 15-20mm in diameter. I recommend a wall thickness of 1 or 1.5mm, but it isn't critical.

The length is a little less than the electrical half-wavelength of 3m, owing to the inductance (L) at the base. The whole system is assembled on a flat mild steel or aluminium plate. It may be mast-mounted with 'U' clamps or through bolts, as in Fig. 4, which shows part of the radiating element.

The plastics box also shown in Fig. 4, houses the inductance and tuning capacitor and is mounted on one side of the plate. The solid insulating block that supports the radiating element is on the reverse side. Both items are secured to the plate with four through bolts.

Further Details

The inductance, the electrical connectors and the tuning capacitor (C) are assembled as shown in Fig. 5. The wire from the coaxial cable inner conductor, to the inductance may be a short length of insulated wire with a small 'crocodile' clip attached, so that the
correct tap to the coil can be found experimentally (more later).

The completed assembly is shown in Fig. 6. I recommend that you use only the specified wire gauge, number of turns, diameter and turns spacing for (L).

Next job in line is the antenna mounting block, Fig. 5, this must be a good quality insulator. The bolts that hold the radiating element to the block are countersunk, so as not come into contact with the mounting plate. They are secured to the block with nuts, as shown, before it is attached to the metal plate (C).

The housing box with its internal components and the antenna mounting block, is attached to the metal plate with four ‘through’ bolts marked (a). The insulated lead marked (X) from the top of the capacitor, is taken through a hole near the top of the box and also goes through the metal plate as in Fig. 7.

This lead is long enough to reach either of the antenna securing bolts, and is terminated with a large solder tag. Details of the assembly is shown in Fig. 5. Finally, the radiating element is attached to the three countersunk bolts that go through the holes in the insulating block in Fig. 5.

Antenna Adjustments

To start the adjustments, mount the whole antenna so that it is vertical, and with the base at least 1.25m above ground. It may be clamped to a temporary short mast, a pair of steps, or suspended from a rope between two points.

If possible, you should use the length of coaxial cable that will be used when the antenna is finally sited. This cable may be (M)UR43 or (M)UR67.

Should the cable length be 5m or less, then the line marked ‘Q’ will be required. This is indicated in Fig. 5, and is connected to the earthy part of the circuit, i.e. the screen braid. The line may be any thin insulated wire 1.5m long.

The line is taken through a hole at the bottom of the box with its full length taped, at intervals, along the outer cover of the coaxial cable. The ‘Q’ line will cancel any r.f. currents that may flow along the screen if the cable run is short. If the coaxial cable is longer than 5m, the ‘Q’ line won’t be necessary.

An s.w.r. meter may be used at the transceiver end of the coaxial line. First, clip the lead from the coaxial inner to the centre of the inductance and set the capacitor about half mesh. The lead to the radiating element is connected to one of the bolts, as in Fig. 5.

Tuning Up

Adjust tuning capacitor for the lowest s.w.r. at 51MHz. If you cannot achieve a 1:1 ratio, try another tapping point on the coil and adjust it again.

It may be necessary to try several combinations. When you have achieved this ratio, check the s.w.r. at 50 and 52MHz. The readings should not exceed 1.25:1. The prototype measurement results are shown in Fig. 8.

Next, you should solder the ‘tap’ lead on to the inductance, and then fit a lock cap on the tuning capacitor. If the specified (Maplin) plastics box is used, the lid is watertight when screwed on. Fill all the holes in the box with a sealant to prevent water getting in.

The vertical radiation pattern for an optimum height of 3.4m (4.5m) to the centre of the antenna. The diagram, Fig. 9, gives more details.

This antenna provides a strong very low angle lobe for maximum ground and tropospheric path distance, as well as F region propagation when the ‘critical frequency’ is very high. The stronger, but higher angle lobe may serve for fairly long distance propagation via sporadic-E and/or an intensely ionised E region.

Final Note: If the use of power higher than 10W is to be used, then the tuning capacitor must have wider spaced vanes. If this is the case, a slightly larger housing box may be necessary. A quarterwave stub match, with the stub horizontal could be used as an alternative.

Acknowledgement

I’m indebted to Waters & Stanton Electronics of Hockley, Essex for the loan of a Yaesu FT-69011 50MHz transceiver, along with a Yaesu FL6020 10W linear amplifier. All tests on the antenna prototype were carried out using the above equipment and a Bird ‘Thru-line’ power meter.
Next time I'll be looking at ideas for antennas to use on 50MHz mobile operation.

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October 25 & 26: The Leicester Amateur Radio Show will again be held at the Granby Halls, Leicester. Details from G6ZRM. Tel: (0803) 522216 or (0836) 577220.

October 6: The Blackwood Amateur Radio Club will hold their rally in the Community Centre, Great Lumley, nr. Chester-le-Street, Co. Durham. Doors open 11am. 10.30am for the disabled. Trade stands, along with a Bring & Buy, food and drink, etc. Talk-in will be available on S21 and the gates are open between 1000 and 1600. G40NF. Tel: (0603) 747702.

September 25: The Peterborough Amateur Radio Club, Market Street, Peterborough. Admission is £1, 10.30am for the disabled. Details from Mr T. Hall GI0OMSJ, 1 Hamitsonsbawn Road, Armagh City BT60 113L Tel: (0861) 523454.

August 11: The Warwickshire District ARS' annual rally will be held at the Warwickshire Science Centre, Wood End, Warwick. All the usual trade stands, plus other events. Details and trade enquiries from Tony Wills G4JFB, 12 The Mill, Stratford-upon-Avon. Admission is £1, OAPs 90p, children free. Over 60 trade stands in three large exhibition halls, bar and refreshments available, ample free parking, concessionary rates to visit museum. Frank Martin G4LUM. Tel: (051) 596117.

September 1: Telford amateur radio rally will be held at the Telford Exhibition Centre, Telford Centre, Telford, Shropshire. Doors open 11am (10.30 disabled). John Bamford GUGTN, 15 Beverley Avenue, Monkmoor, Wem, Shrewsbury SY4 2UZ.

August 25: Galashiels and District ARS will hold their annual rally at the Loch Ness Museum, Fort Augustus, Loch Ness, Inverness. The rally will include rafts, Bring & Buy stalls, hot and cold drinks, etc. Details from Godfrey Lencefield G30W0. 0THR. Tel: (0772) 53810.
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“O world invisible, we view thee”
Francis Thompson: The Kingdom of God.

Electricity is invisible. We can’t tell if a power cable is ‘live’ by simply looking at it. But if electrical energy is converted into some other form, we can see, and sometimes measure, the result.

If I connected a 12V bulb to a 6V supply, it would light up. If I then increased the supply to 9V, it would glow more brightly. Although this would provide an indication of the difference between the two voltages, it would be a crude way to measure voltage.

In electronics, there are instruments designed to show and measure electrical quantities. The most commonly used instruments are based upon the use of a meter. To start off this time, we’re going to look at workings and simple applications of the moving coil meter, which is a very popular instrument in amateur radio equipment.

Voltage And Current

What do we want to see, when we try to ‘look at’ electricity? Obviously, the basic things are how much we have and how much of it is flowing. These two basic units are voltage and current.

What are these units? To make life simpler at this stage, we are only going to consider direct current (d.c.) electrical flow. This is the term used when the electrical ‘flow’ is in only one direction through a conductor.

Many of you will already know that electricity involves the movement of electrons. But if you want to know more about electron theory, you’ll have to read a physics text book, and not this article!

It will do, for the time being, for us to know that current is the quantity of electricity passing through a given point. Its unit of measurement is the Ampere (A). In fact, one ampere is measured as 6,250,000,000,000,000,000 electrons passing a point in one second!

Large Unit

Although the ampere (A) is often used in domestic power applications, it’s a large unit for use in electronics. More frequently we use the milliampere (mA) which is a thousandth of an ampere and the microampere (µA) which is a millionth of an ampere.

It is usually said that voltage is a measurement of the electromotive force (e.m.f.) which is sometimes called the potential. This is a measurement of the ‘electrical pressure’ present in the circuit. It’s called the ‘potential’ because the electric charge present is capable of doing some work, but in fact, may be doing no work, a little work or a lot of work.

To put it simply, we might say that the voltage represents what the electricity present could do, and the current tells what it is doing. The amount of work the voltage does (hence the amount of current that flows) in a circuit depends upon the resistance present in the circuit. Perhaps you’ve noticed that we’ve come full circle back to Ohms Law once again!
instruments, the moving iron type is useful. Most of the indicating devices for fuel gauges and temperature displays on car dashboards are usually moving iron, although nowadays the l.c.d. and e.l.d. is beginning to become popular.

Physics Lessons

Perhaps you will remember from your school or college physics lessons, wrapping some wire around a compass and then passing a current through the wire. The current flow sets up a magnetic field in the wire and deflects the compass needle. That action is roughly how a moving iron meter works.

The moving coil meter actually works in the reverse way to the compass action. The magnet (a compass needle is a small magnet) is fixed, and it's the coil which is allowed to move. When the current passes through the coil, the magnetic field in the coil reacts to the magnet field in the fixed magnet and the coil deflects.

The illustration, Fig. 1, shows how this is done in the moving coil meter. A coil is held on a pivot in the centre of a fixed magnet. When a current passes through the coil, a magnetic field is set up in the coil. The interaction between the magnetic field in the coil and in the fixed magnet, causes the coil to rotate on its pivot. An indicating pointer (or needle) is attached to the coil which shows the amount of rotation (or deflection).

Right Hand Drive

Usually, the construction of the meter is arranged so that deflection of the coil (and the needle) is to the right. As the current passing through the coil increases, the needle moves more towards the right, indicating the increase in current flow.

The coil has a return spring so that when current no longer passes through the coil, the coil (and needle) returns to its original position. This is 'zero' on the meter, and it indicates when no current is passing through the instrument. Many moving coil meters can be accurately adjusted. It's usual to have a 'set zero adjustment' screw to move the needle at the bottom end of the scale, when no current is passing.

Moving Coil Meters

The diagram, Fig. 2, shows the electrical circuit diagram of a moving coil meter. It's represented by a circle with a pointer. This illustration also shows two other important factors about a moving coil meter which you shouldn't ignore!

You can see from Fig. 2, that the meter has fixed positive (+) and negative (-) terminals and therefore must be connected the right way round in a circuit. The direction the current flows controls the polarity of the magnetic field. Connect a moving coil meter the wrong way, and it will try to read backwards!

The diagram also shows the internal resistance of the meter. The coil itself has an electrical resistance. This factor, although small, is added to the total resistance of any circuit into which the meter is connected.

Sometimes the internal resistance is small enough to ignore. But we shall see later, that it becomes important when we wish to make accurate measurements with a moving coil meter. The internal resistance of a moving coil meter may appear in small print on the face of the meter, and it should certainly be mentioned in the maker's specification for the meter.

The main specification given for a moving coil meter is the full scale deflection (f.s.d.). This is a statement of the amount of current required to make the needle indicate to the highest mark on the scale. If a meter is marked as 'lmA f.s.d.', it requires 1mA to make the pointer deflect fully across the whole of the marked scale. Information about the f.s.d. of a meter is vital, because the user needs to know how much current the meter will indicate.

The Multimeter

Moving coil meters measure current, but they can be contrived to measure voltage and resistance. This is commonly seen in the analogue multimeter.

The multimeter is a meter equipped with several switched ranges marked in current, voltage and resistance. The maximum deflection permitted by each particular switch position, is clearly marked. The user can then immediately 'read' the values from a calibrated scale, which is directly below the 'needle' pointer.

A Meter Checker

Moving coil meters are expensive. It's not unknown for a constructor, wishing to add a meter to the front panel of a project, to find it could cost more than the rest of the project added together! Many constructors use surplus meters, bought cheaply at radio rallies or sales and modify them for their own particular use.

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things marked on their scales and what is worse, they may have no indication of the f.s.d. of the movement. One of my amateur radio friends has an excellent, and large meter indicating the output power of his transmitter which is marked in 'revolutions per minute'! It's usually a simple task to remark a meter scale, but for it to be useful, the f.s.d. must be known.

**Meter Tester**

The circuit in Fig. 3, shows a simple piece of test equipment which I've used for many years with unknown surplus meters. The gadget does two very useful jobs. It checks that the meter movement is good, and also gives an indication of the f.s.d. of the meter. Sometimes surplus meters can be defective, the commonest fault being sticky movements, and this little tester will show up such a defect. It's a simple project, and only requires a battery with two fixed resistors arranged to pass two set currents through the meter being tested. Usually, surplus meters have a f.s.d. of no less than 50µA, and more often the maximum will be in the region of 100µA, 200µA or even as high as 1mA. The meter checker project will show the f.s.d. value accurately enough to be useful.

**Internal Resistance**

The simple meter tester ignores the internal resistance of the movement, but still provides reasonably accurate results. If a meter is connected (the right way round) between the negative lead (-ve) and the 1mA lead, the 1.5V battery and the 1.5kΩ resistor will cause about 1mA to flow through the meter. You can work it out using Ohm's Law, remembering that 1mA is one thousandth of an ampere. A meter connected between the negative lead and the 50µA lead, will cause (approximately) 50µA to flow. This is less accurate (try it with Ohm's Law) but I have used the preferred values of resistor.

**Building the Project**

This month's little project is very simple to build. It only needs three parts, three wires and a container. For the wires, I used small clip leads which come complete with crocodile clips. Power is supplied by the HP7 battery and the two resistors just fit inside a plastics 35mm film canister. Some reliable way must be found to identify the three leads. You could do this by having colour coded wires, or marking them at the point where they leave the canister. The wires are soldered directly onto the battery. The most difficult connection, will be the negative lead which is soldered to the zinc casing of the cell. To make the connection, scrape the end of the case with a knife edge until it shines (or use a small file) and then tin a small portion of it with solder, before adding the lead.

**Do not use a NiCad rechargeable battery** for this tester. It is unsafe to solder leads directly to NiCad cells (they also provide less than 1.5V).

**Using the Tester**

Using the tester is as simple as the circuit. The negative lead of the tester is connected to the negative (+)-terminal of the unknown meter. Then the 50µA lead is connected. You should always connect the 50µA lead first to the positive (+) terminal. This will show how far 50µA moves the needle. If the indication is low, try the 1mA lead. Then by observing whether there's either full scale deflection, or part deflection, a useful approximation of the meter's f.s.d. can be found. That's the lot for this month, I hope you're finding the series useful. Don't forget to write and let me know if you've got any problems or suggestions to make.

**Shopping List:**

- HP7 battery
- R1 1.5kΩ
- R2 27kΩ
- 2 clip leads and a 35mm plastics film canister.

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EXCHANGE: Tornado 1000 28MHz linear 5 x EL519 valves, variable power out, g.w.o., for 934MHz delta one or PRO-2004 or w.h.y. Ian G7XKI Tel: (0692) 580201 day-time or (0692) 581663 evenings.

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Taking Another Look At Fuses

Although it's annoying when a fuse blows, the device is only doing its job. Ken Green GINAK thinks we take fuses for granted, and that it's about time we had another look, to see what they can and cannot do.

Fuses are certainly the best known and the simplest defensive tools in the engineering armoury. They're accepted generally as being extremely unreliable, but few either know why or look into the reasons.

It's best to tread warily when things seem simple. This rule certainly applies to fuses. Designed as the 'weak link in the chain', they're used to break an electrical circuit when the current increase to a certain value.

Fuses provide a visual check when you're seeking a break in a circuit. Their failure to work effectively, has more to do with what happens after a fuse has ruptured, than with the fusing process itself.

Voltage Limitations

As I've already said, fuses are used to protect circuits from the heating effect of excessive currents. As such, they are connected in series with the circuit they protect. So why does voltage enter the argument?

The answer is that a fuse is simply a form of thermal switch. When the switch opens, (when the fuse 'blows') the e.m.f. of the source appears across its terminals. It then becomes very important whether that e.m.f. is 5, 50 or 5000 volts.

A fuse must have a small thermal capacity so it heats rapidly, and ruptures before damage is caused. In other words, a fuse needs to be made from a fine gauge wire. However, fine wires tend to have high resistance, which causes a voltage drop. This generates heat and encourages the fuse to blow!

The real difficulty is because the fuse wire has to melt. As the wire vaporises it can generate an ionised and conducting media. This can keep the current flowing by means of an arc. When the arc is quenched, the vapour cools, depositing copper over the surrounding area and can re-establish a conducting pathway.

A fuse in a 5V circuit is not very likely to sustain an arc. However, the same fuse employed in a high-voltage circuit is far more likely to form an arc.

Another important factor, is whether the circuit involved is resistive or reactive. An inductive circuit, even at 5V, can generate enough voltage to set up an arc. On the other hand, a capacitive circuit can supply a very large current for a short time, helping an arc to become established.

Choosing A Fuse

It is important to understand the markings on a fuse. When you replace a fuse, you must use an exact equivalent or substitute.

Speed of operation is an important factor. Digital circuits, for example, are extremely intolerant of overloads and any protective fuse must rupture very quickly to be effective.

In some circuits there's a need for a fuse to 'wait and see'. Before it interrupts a circuit, the fuse has to 'decide' whether there's a fault condition or an acceptable transient.

A typical example, is the in-rush of current occurring when equipment is switched on. This happens because large value reservoir capacitors are virtual short circuits until they're charged up.

In-rush current is a reality, and was a menace before modern fuses became available. I can remember throwing the main switch in a television studio, only to be greeted by a heavy 'crump'. I then had to replace 15 sets of mains fuses!

In-rush current probably accounts for many of the so called 'tired fuse failures'. Nowadays, equipment likely to suffer this problem, is fitted with time delay or anti-surge fuses.

Making And Testing

Fuses are made and tested under standards laid down by the Underwriters Laboratories Inc. (UL) in the USA, the Canadian Standards Association (CSA) and the International Electromechanical Commission (IEC) in Europe and Asia (there are others). All fuses are batch tested and must be marked as follows:

**Super Quick Acting (FF)**

These are specified for protecting semiconductors and other equipment where the 'quick-acting' F-fuses are too slow.

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quench arcs. In American terminology this type is known as a 'Normal Blo' fuse.

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**Time-lag (T)**

These are intended for use in circuits subject to high in-rush currents. They’re called anti-surge or delay fuses, and in American terminology, as ‘Slo-Blo’ fuses. They have a built-in thermal delay.

**Super Time-lag (TT)**

These are similar to the T-fuses, but provide an even greater time delay before rupturing.

**Fuse Ratings**

The current-value marked on a fuse is the maximum current loading. The exact meaning of this, depends somewhat on the standards to which the fuse was tested. Fuses tested to IEC standards, should be selected so that the normal current equals the fuse-rating. Fuses tested to UL standards should be rated at 25% more than the normal circuit current.

**Voltage Rating**

The rated voltage marked on a fuse, refers to the maximum it can safely clear a short-circuit. A fuse can be used at any voltage not exceeding its rated voltage.

**Breaking Capacity**

The breaking capacity is also known as the short-circuit or interrupting rating. The term refers to the maximum short-circuit current the fuse can safely interrupt, without risk of explosion.

**Derating Fuses**

Fuses are thermal devices, but few technicians realise that fuse performance is affected by the temperature of their surroundings. It’s often forgotten that fuses are usually close to heat generating components and their surrounding temperature is likely to exceed the ambient levels.

The temperature assumed by any body stabilises when the heat which it generates is exactly balanced by the heat which it loses. The higher its surrounding temperature becomes, the higher that stabilised temperature becomes.

A fuse which is running hotter than the test-value, must rupture more readily. That’s why in determining the rating of a fuse, its operating temperature must be taken into account.

A fuse also runs hotter when the normal operating current approaches the rated-current of the fuse. This perhaps might explain why rogue fuses persistently fail for no apparent reason!

**Current Carrying Ability**

Fuses are tested for their current carrying ability at a temperature between 20°C and 25°C. However, a fuse rated at say 1.6A, would have to be replaced by a 2A fuse if it is to perform at 70°C.

Some fuses are manufactured with wire connections. In general it’s best to crimp and clamp the connections into place. If you solder the connections, it’s most important to use a heat-sink. The application of heat to any fuse, is likely to re-flow the internal solder and so change the characteristics of the fuse.

---

**What A Good Idea**

Like most amateurs I use the best quality coaxial cable, usually low loss type, for all cable runs. Imagine my feelings after paying quite a large sum for this cable, to find that within a few months the v.s.w.r. has risen once more to an almost unacceptable value.

After several occurrences, of this nuisance, I decided to investigate. I discovered that the major problem is actually the contact resistance of the outer braid to the body of the coaxial plug. I have tried many ways to maintain contact, and met with apparent success. But when one plug fails, the whole cable run becomes suspect.

Then I had a brain-wave. Solder, had to be the answer! Refer to the drawing of Fig. 1, here the operation is shown in sequence. Starting at the top of the series, by drilling two 6mm holes in the shank of the PL259 plug. Trim the outer covering back about 40mm from the end of the cable. Fold the braid back upon itself as shown. Cut the inner insulator back, about 12mm, to clear the centre conductor. Screw the coaxial cable into the PL259 as far as and as tight as possible.

Using a large HOT soldering iron, solder the braid to the body of the PL259 plug, filling the hole completely with solder. File the excess solder away to leave a neat joint. Finish off the job by soldering the inner conductor into the plug tip. After screwing the shroud back into place the plug is ready for use.

In almost two years of use, I haven’t had another case of poor contact to the plug body. You did put the shroud the right way round on the cable first, didn’t you?

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Tel: 0532 744822

DATONG ELECTRONICS LIMITED
This time Roger Cooke G3LDI looks at the problems of catching up with the news, packet guidelines, and suggests some good reading.

Catching up with news and bits and pieces is not always easy. Especially when it has to be planned some months ahead. Some of the news, when seen in print, seems to be out-dated, much like delayed bulletins!

However, I've got to start with apologies to Simon GM4LPM who, some months ago, sent me some news for inclusion in the column. I hope that most of it is still current. Simon is sysop at GB7HFF in Glasgow, and is hoping to run an AMTOR h.f. port on a number of frequencies in the 7, 10, 14, 21 and 28MHz bands. It is also hoped to link up with GB7PX and GBTSCA to provide a "wormhole" from North to South. This pathway has always been somewhat of a problem. The Satgen bulletins from John GM4HIH, rarely make it to Norfolk, much to the consternation of Pat G3IOR, several of the local users and myself.

However, by using the Aplink software developed by Peter G3PLX, Simon hopes to close a few gaps. Knowing the lengthy business of licensing, he may or may not be active yet, but I wish him luck with the project.

Peter has also joined the Data Communications Committee (DCC), with specific responsibility for h.f. planning. I'm corresponding with him regarding h.f. bandplans, so hopefully something will be sorted out at the next IARU meeting, preferably internationally, not just in our own back-yard. If you have any views on this in relation to AMTOR/Packet, drop Peter a line.

One of the problems associated with the h.f. side of packet operations, is knowing just how many BBS stations to licence for any one country. As an example, a letter just received from Dave G3VOM, says he's having quite a difficult time justifying the need for another h.f. BBS besides the ones already licensed in the UK. This could of course, lead to a lot of congestion if we all operated in the similar vein.

I was told that there are several jobs to be done on h.f., not all of which can be undertaken by just one or two lone BBSs. Dave mentions that much of the private mail from his area, destined for abroad, does not reach my h.f. port. This would seem to be quite an indictment on the UK packet network. This only serves to support my theory regarding the North/South divide as mentioned above!

Packet Guidelines

The DCC, in agreement with the RA, has just issued the latest packet guidelines for both users and BBS sysops. There is a responsibility placed on both parties as to the content of messages, private as well as bulletins. This should help to both guide/dissuade the user from sending questionable packet messages. It will also support the sysop in his unenviable editorship.

The guidelines, recently propagated on the network by Ian GM4AUP, are reproduced below for those that have not seen them. It may be useful to duplicate them and keep them for reference.

Finally, I have had quite a mailbag over my article in the July '91 issue of PW, both in support and some against some of my suggestions. If you would like to add to the arguments, please let me have your views and I will present them in a subsequent article.

Guidelines For Sysops

1. In addition to these guidelines please read carefully, and complied with, the 'Guidelines for the use of the Packet Radio Network' (Guidelines).

2. Always ensure that the TNC parameters are adjusted correctly and suit the conditions on your Local Area Network (LAN). Especially PACLEN, MAXFRAME and CSMA parameters.

3. Ensure that you have a second sysop (who must be a licenced amateur, or more than one) who is familiar with the mailbox so that the service can be continued whilst you are away on holiday, etc. The second sysop need not have regular access to the equipment, but must know how to close down your station in an emergency. He, or she, should be able to do basic remote housekeeping on the mailbox on a daily basis. You should also ensure that the RSGB Mailbox Co-ordinator knows who your additional sysop is in the case of an emergency.

4. Review all messages at least once per day, to ensure that nothing contravenes the conditions of your licence. If in doubt about a message consult the Guidelines and act appropriately. Sysops are advised to err on the side of caution: it is your licence which could be at risk.

During the daily review, check why any messages have remained unforwarded, and look for any duplicate messages.

5. Ensure that the mailbox will auto-start after any power failure.

6. Where possible, limit the downloading of large files to off-peak times, or less congested frequencies. You should advise your users accordingly.

7. IRAU for Region 1 have advised that there should be no formal network links on the 144MHz band. You are strongly recommended to link on other bands covered by your Notice Of Variation.

8. Forwarding should only take place on fast efficient routes, preferably on a dedicated forwarding frequency. If it is essential to use the 144MHz band, or frequencies which are shared with users, then forwarding should only take place during the less busy, off-peak periods in your area.

9. Do not forward to unlicensed mailboxes, or use unlicensed stations for forwarding. It is however, permissible to forward personal mail automatically to the licensed amateur who is the intended recipient of that mail.

10. If you have any problems, ask the DCC mailbox co-ordinator to help. He will probably have encountered your problem before, or will be able to put you in touch with someone who has.

11. Remember that at all times, you are providing a service which should be as reliable and efficient as possible for your users, whilst at the same time causing minimum channel congestion for other packet radio stations.

12. The RA have advised that using the band 1298-1300MHz for mailbox linking, is likely to be subject to occasional severe interference from the primary band-users. Different parts of the country will experience problems on different frequencies and time of day. The radio frequency environment is also likely to be less hostile outside normal working hours.

13. For those providing an end user service, it is permissible to restrict the message categories available to the users, provided this is pre-advertised and even-handed. ALL trunk traffic must be carried until forwarded unless it contravenes the Guidelines.

14. If a user persists in sending messages that contravene the Guidelines after having been warned, he may be excluded. Users should not be excluded for any other reason.

Users Guide

Section A

1. All messages should reflect the purposes of the amateur licence, in particular 'Self-training in the use of communications by wireless telegraphy'.

2. Any messages which clearly infringe licence conditions could result in prosecution, revocation of, or variation of a licence. The Secretary of State has the power to vary or revoke licences if an amateur's actions call into question whether he is a fit and proper person to hold an amateur licence. An example of this could be unreasonable behaviour, such as, using the packet network to carry on a dispute or to deliberately antagonise other amateurs.

3. The RA has advised that the Amateur Radio Licence prohibits any form of advertising, whether money is involved or not.

4. Messages broadcast to 'ALL' are considered acceptable but, should only be used when of real value in order to avoid overloading the network.

5. Do not send anything which could be interpreted as being for the purpose of business or propaganda. This includes messages for, or on behalf of, any social, political, religious or commercial
organisation. However, our licence specifically allows news of activities of nonprofit making organisations formed for the furtherance of amateur radio.

Section B
1. Do not send any message which is libellous, defamatory, racist or abusive.

2. Do not infringe any copyright or contravene the Data Protection Act.

3. Do not publish any information which infringes personal or corporate privacy, e.g. ex-directory telephone numbers or addresses withheld from the call book.

Section C
1. Any cases of abuse noted should be referred, in the first instance, to AROS. This is coordinated by Geoff Griffiths G3STG, who will take the appropriate action.

2. It is worth noting that any transmissions which are considered grossly offensive, indecent, obscene or menacing, should be dealt with by the police. This action, initially, should be coordinated by AROS.

3. Mailbox sysops have been reminded by the RA, that they have an obligation to review messages daily. They (sysops) should not hesitate to delete those they feel are unacceptable. It is worth remembering that their licence is also at risk as well as your own.

Section D
1. Do not send ‘Open Letters’ to individuals.

2. Do not write in the heat of the moment. Prepare your bulletin first, then re-read it. You may feel differently after a few minutes.

3. Obey the golden rule - if you wouldn’t broadcast it in speech, don’t send it in packet.

Reading Material

I am often asked what books I’d recommend regarding information on packet radio for the beginner. Well, recently a copy of just such a book has been sent to me for comments. It is written by Mike Mansfield G6AWD and is called - Practical Guide to Packet Operation in the UK, available from the PW Book Service priced £6.95 plus P&P.

The book, spiral bound like many TNC manuals, runs to some 90 pages. It’s ideal for somebody with little knowledge of packet, who wishes to obtain the basic principles. The introduction is followed by a step-by-step course through to the actual operation of a packet station on v.h.f. In-depth technical aspects are avoided, so as not to confuse the reader. The ‘ins and outs’ of a TNC need not be a major topic. These days many of us can purchase a ready-made unit.

However, understanding the parameters is important, and Mike covers the parameters of a typical TNC and explains its use.

Parameters Explained

Explaining packet parameters takes some 17 pages, and covers the full command set, the PMS (personal messaging system) plus the error messages. Instructions on using a BBS are followed by similar instruction on using nodes, PMS, digipeaters, net-nodes and KA-nodes. Also included in its own section, is how to use the DX Cluster. This is the latest innovation from Pavilion Software in the USA.

Following on from this information, are four separate helpfiles for four different BBS systems GHNA, WORLI, A4RE and G4AWD. I must admit I hadn’t heard of the last two! The other popular ones, MSYS, P6FBB and S1IAZ are not covered, or even mentioned. Lists of v.h.f. BBSs and h.f. BBSs complete the book. When all is considered, it is a very worthwhile book for the beginner, and it will answer a lot of the questions that some operators seem afraid to ask.

Only Criticism

If I were to criticise the book, I would say that not enough space was devoted to the actual interconnections required for setting up a station. Only one page is devoted to this topic. I feel the beginner needs more diagrams, more specific help, especially with the RS232 connections. There also ought to have been more emphasis on the importance of the audio levels.

If I were to be hyper-hyper critical, GB7LDI was left out of the World-wide BBS list! In fact there were only two from the UK, mentioned, GB7JBN and GB7TED, both in Northern Ireland. Ah well, can’t win ‘em all I guess!

Hungarian Activity

I have a file, received from HASDN showing the amount of activity now taking place in Hungary. Actually the file is a few months old, so it may be more widespread. This information may still be useful to some of you. If you’d like the information, send a large s.a.e. to the editorial offices, marked ‘Hungarian Packet Lists’.

That’s it for this month, please send any information, hints etc., to G3LDI QTHR, GB7LDI. The time of response may drag out a little however, as I am off to the USA for a holiday. I intend capturing some of their packet scene on film!

73 and happy packeting de Roger G3LDI.
Reflections

Light

It is generally accepted that electrons, light and radio waves all travel at the same speed, 300 000km per second, and because they can each be reflected from its intended path, they become, individually and collectively, a subject for discussion in this column. After all, closely allied to our prime subject radio, is computing, which sends electrons darting in a multitude of directions at the same time and photography, which basically works on reflected light. Many of our present-day readers have a camera or computer, or both, either entirely dedicated to their radio activities or for a completely separate domestic or scientific interest. Whichever, there is space in 'Reflections' to cater for you.

Active People

On June 9th, I had the pleasure of meeting two of our readers Hugh Griffiths and Pete Dickerson (Malvern) who appear, complete with cameras, on the left and right respectively of Fig. 1. In addition to their general interests in broadcast band listening and photography, they are both narrow guage railway and model engineering enthusiasts. Pete uses RA17 and NRD515 receivers fed by a long wire antenna and an ERA Morse reader to decipher the c.w. signals. Hugh has a Sony ICF7600D for general listening and a vintage collection of Hammarlund (600), Marconi (T1154/R1155), National (HRO) and RCA (AR88) communications equipment. Hugh and Pete are near neighbours and, without their radio, they have plenty in common what with Hugh’s model railway and Pete’s Atari and Einstein computers and collection of scientific and technical books.

Watching The BBC

On the subject of cameras and broadcasting, Joan and I spent a pleasant afternoon on the 27th at nearby Parham House recording, on film, for archives and posterity, the live production of the BBC Radio 2 programme, A House In A Garden. That title aptly describes Parham, an Elizabethan House set in a most beautiful garden near the village of Storrington. Throughout the two hour programme, co-presenters, Gloria Hunniford and Alan Titchmarsh were each accompanied on their ‘walk-about interviews’ by an engineer with a v.h.f. back-pack transmitter, a pair of microphones and a talk-back set. The signals from these portable stations were sent to a BBC control vehicle elsewhere in the grounds, and then on to London via a microwave link. I had an enjoyable chat to the BBC’s engineering team, Fig. 2, under the charge of Doug Taylorson G3PPC, (left Fig. 2). At the end of the day Richard Earle, (centre Fig. 2), showed me the pack sets and the ‘base’ antennas. Richard is holding the set carried by the engineer, (from Fig. 2), who operated for Gloria Hunniford, Fig. 3, mainly inside the house during the programme. The sound engineer (right Fig. 2) who worked in the garden with Alan Titchmarsh, Fig. 4, is still wearing his full gear.

The ‘Instantaneous’ Circle

At one time the broadcast from Parham could be heard on a Roberts portable, only a few metres away from one of the many interview points where I was working. My thoughts temporarily turned away from the photography in hand and toward the theme of this month’s column. The Roberts was tuned to BBC Radio 2 on the domestic v.h.f. band, and receiving the programme from one of the local Band II transmitters in the normal way. Now readers, let’s marvel at this for a moment because it took less time than that for the following multitude of processes to occur. First, Gloria Hunniford’s voice was changed from audio frequency (kHz) at the microphone to tiny electrical impulses which, when amplified, modulated the engineer’s v.h.f. (MHz) back-pack transmitter. On arrival at the control vehicle, this v.h.f. signal was then converted to s.h.f (GHz) to be carried via a microwave relay link on the South-Downs, to London. In London, the signal was processed again and then sent, for final transmission, to the BBC’s network of Band II transmitters around the UK. The signal arriving at the Roberts, around 89MHz, was immediately changed inside the set from the incoming radio frequency back to audio frequency, so that Gloria’s words were clearly understood by her listeners through the loud speaker. For the benefit of the camera buffs among you, Joan used a Canon EOS 1000 with a 80 to 200mm zoom lens for Alan Titchmarsh in the garden, and I used a Minolta 5000i with a 70 to 210mm zoom lens inside the house with Gloria Hunniford’s team. Both cameras are computer controlled with auto-focus lenses.

Observations

The earth’s natural light is a product of our nearest star, the sun, which like most other stars in the known universe is a complex nuclear furnace. Periodically, explosions on the sun eject vast streams of particles into interplanetary space which create a great deal of scientific interest if they collide with the earth’s atmosphere. Solar observers have some prior warning of these events because dark patches, known as sunspots, appear on the sun’s apparent yellow disc (photosphere) and are a source of much abnormal activity. Sunspots vary in size and are often appear in groups and among the largest observed for some time can be seen in Fig. 5, which was observed and drawn by Patrick Moore at his observatory in Sussex, around 0700, on June 10. Although Fig. 4 shows this group’s central meridian passage, Patrick first saw

Fig. 1: Hugh Griffiths and Pete Dickerson (Malvern).

Fig. 2: Ron Ham (4th from left) with BBC engineers at Parham House.
it appear around the eastern-solar limb on the 3rd and progress with the sun’s rotation until the 13th. In Plymouth, Ern Warwick heard solar noise on the 28MHz band at 1230, 1545 and 1820 on June 10 and at 0850 and 1345 on the 11th. “A very patchy period with a lot of disturbance from the sun,” was the way Fred Pallant (Storrington) described the 28MHz band conditions to me on the 28th.

Solar Analogy

This group of sunspots like any other, can be compared with a large gun on a slowly revolving turret firing off random ‘rounds’ of nuclear waste, with the ‘shot’ taking between 20 and 40 hours to reach its target. At the point of ‘fire’ there is a flash of light and an emission of radio waves. Both of which can be seen and heard respectively from the earth, 8.3 minutes after the ‘round’ was fired. Sometimes giant groups like this, have a long life and reappear on the eastern-limb approximately 14 days after leaving the western limb.

Associated Disturbances

Richard Noble (Abergavenny) has designed and built a magnetometer with its sensor mounted in the attic. His recording chart, Fig. 6, for the period June 12 to 14, shows that a large magnetic disturbance took place from approximately 2000 on the 12th to 2100 on the 13th. The instrument’s sensor coils for north-south and east-west are represented by the horizontal component and azimuth respectively. Fred Pallant heard a “pronounced” auroral ‘rasp’ on the signal from the Rutherford Appleton Laboratory beacon (GB3RAL-28.215MHz) at 1700 on the 12th, strong at 1834 and weak at 1850 on the 13th. Prior to this Ern Warwick heard DK0WCY give a strong auroral warning at 1637 on the 12th, strong at 1834 and weak at 1850 on the 13th. For

Astronomy

W. K. Willan G7IKM (Netherton) tells me that a number of his amateur radio friends in Yugoslavia “are very active in the world of astronomy” and that statistics of one of their star discoveries is currently at Jodrell Bank for examination. WK feels sure that “any person wishing to exchange information would be welcome in Ljubljana” and gives the address of Primoz Kolman YU3JI, Velebtiska - 11, 61000, Ljubljana, Slovena, Yugoslavia, to contact.

Earth Field Magnetometer Readings

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Sporadic-E

Although unlikely to have been caused by the prevailing solar activity, television pictures in Band I (48-68MHz) from Spain and Italy were received, during periods of Sporadic-E, by Bob Brooks (Great Sutton) on June 11, 13 and Italy and the USSR on the 15th. Around 2200 on the 23rd Bob received strong pictures from three Norwegian regional stations, while a similar event was in progress. I received pictures from Spain at 1915 on the 15th, Norway and the USSR several times during the day on the 16th and from Sweden and the USSR at 0845 on the 20th. Also on the 16th, strong signals from a variety of eastern European f.m. broadcast stations were frequently heard in parts of the UK between 66 and 73MHz.

Computing

You may have already seen the TEQNICHE PCW 102, industry standard keyboard for the Amstrad 8256/8512 and 9512 computers being advertised. This new style board, with a recommended retail price of £90.85, but offered by dealers around the £75 mark, has 102 keys and is a direct, plug-in, replacement for the existing 85 key unit supplied with the 8000 machines. I have made the change readers, and found it a joy to use.

Reflections
Satellites And SIDs

A very powerful series of solar flares were produced in June when a huge sunspot could be seen passing the equator of the sun. Turning my satellite antenna to the sun produced strong noise on 145MHz. Energetic protons of greater than 100 MeV were observed shortly after the peak X-ray flux, which gave over 1.8 Joules per square. Whilst the h.f. bands were wiped out by Dellinger fades and absorption, spectacular auroral conditions extending down to Spain and Italy, resulted in some good 144MHz DX.

John Brangan GM4HJJ writes "The sun has been more active in the past 40 years than it appears to have been in the previous 4000, and the last two sunspot Maxima have been exceptional. Indeed the present 1989/90 peak which has been extraordinarily rich in Solar Flares and Aurora".

Flares and the following geomagnetic storms are not good news for satellites. Another problem is the increase in radiation received by the occupants of manned space stations. Memory erasure of computer control is a threat. The magnetic orientation sensitivity of the spacecraft is also likely, and a lowering of orbit due to the atmospheric expansion resulting in more drag. The magnetic orientation sensitivity and steering of satellites is also upset, causing more problems.

On the plus side, some fascinating propagational abnormalities have resulted. At sub-horizon, RS-10's Mode A beacon on 29.357MHz has been coming in loud and clear even with the spacecraft at an elevation of -35°. This effect occurs most often when Mode A downlink signals are lined up with the receiving ground station through the earth's geomagnetic field, which runs between the poles of the earth. High ionosphere ionisation can also produce ionopsheric reception of Mode A downlink signals when the transmitting spacecraft is on the opposite side of the earth to the receiving station. This was first observed in October 1957 from the 20MHz signals from Sputnik 1, and again later with 29.5MHz signals from OSCARs 5 and 6.

Angus GM4JY2, reported a Dellinger fade-out (sudden ionospheric disturbance, or s.i.d. for short) which wrecked his reception of the 137MHz NOAA-12 weather satellite. An important point was that when NOAA-10 passed on the same track 20 minutes earlier, before the s.i.d. started, it was a perfect signal.

John explains, "We do not have to look far for a reason. Massive solar flares produce radiation which penetrates deep into the earth's ionosphere down to the E and D-layers, ionising these so much that they absorb all terrestrial h.f. signals for the duration of the event. What is never mentioned however is, "What happens to the F-layer during these events?" Previously no one has cared, but now that we have satellites trying to put their signals down to us through the F-layer, this point becomes important. Clearly the F-layer must be very heavily ionised, producing a maximum usable frequency (m.u.f.) of a very high level, which of course we cannot (or have never tried to) use for terrestrial purposes. The result I've found is that this extraordinary ionisation of the F, lower D and E-layers, produces a savage deterioration of the downlink of the 137MHz NOAA weather satellites, a marked increase in Faraday rotation and multi-path fading and scintillation".

John GM4HJJ recommends an interesting experiment, and says "I ap-preciate that we cannot predict Solar Flares (as yet), so we cannot predict the s.i.d.s which follow 9 minutes later, but anyone lucky enough to catch a s.i.d. h.f. fade-out would be well advised to try to copy v.h.f., u.h.f. and microwave satellites through it. Even the microwave geostationary TV band might show some effects!"

Readers might wish to read page 156 in the new RSGB Space Radio Handbook, where Experiment 8.4.01 could be a good line to follow at any frequency from v.h.f. to microwave.

The 'JUNO' Schools Experiment

Despite the anticipated problems that always arise from high popularity operations, the JUNO mission involving Helen Sharman GB1MIR, using amateur radio to talk to UK Schools stations during her stay on the Soviet MIR Space Station, was a great success. The idea came from the many educational missions of Musa Manarov U2MIR, (UV3AM) who has been using the MIR amateur radio station on S22 (145.550MHz) to talk with fellow amateurs and schools around the USSR. The SHUTTLE mission of Ron Parise WA4ISR, did the same with the schools and colleges in the USA.

The S22 channel has long been the established frequency for simplex f.m. QSOs between both American and Russian spacecraft and earth bound amateurs. Because this frequency is available to all amateurs, U2MIR, UW3AX, G3OR and head JUNO co-ordinator G3XWH, decided that 145.550MHz should be maintained for the MIR downlink. The offset split frequencies operation employed by the JUNO school stations was used to minimise QRM to enable the successful educational contacts.

Following Richard G3XWH's trip to Moscow, to discuss the details of the times and frequencies of operations with Helen GB1MIR, Tim GB2MIR and Boris UW3AX, the recommended frequencies were tested. Contacts between U2MIR and G3OR were made at times of peak European simplex usage on the previous Sunday evening. Although at MIR operational height, all the f.m. channels were in multiple use throughout the UK, it was believed that in the event of western Europe, those finally selected were found to be marginally superior.

The frequencies were further confirmed by an initial check QSO between GB1MIR and G3OR at 1630UTC on Tuesday June 21, the first operational pass of MIR over the UK. Helen then went on to try to work the set schedules with the nine JUNO stations over the next three days of the mission. I'm pleased to report that six of the nine JUNO stations successfully contacted Helen. The successful six were: GBOJUNO at Harrogate Ladies College, GB2JUNO at Alford Academy, GB3JUNO at Norwich's Hewett School, GB4JUNO at Canterbury High School, GB7JUNO at Guildford's Royal Grammar School, GB8JUNO at Ipswich, GB1JUNO at Bigywn Primary School, GBOJUNO at Belfast Royal Academy and GB6JUNO at Loughborough School. The established contacts if QRM and on board operational problems had not intervened, causing the loss of six of the earlier planned schedules.

Three of the GBOJUNO YL team are shown in QSO with GB1MIR in Fig. 1, which was snapped by Richard G3XWH. The team are all very enthusiastic, having taken their RAEs in May. The Hewett School in Norwich GB3JUNO team are shown in Fig. 2. They are, standing from left to right: David Albury, Adrian Hendrick, David Atkinson and Charlie Gregory. Those shown sitting are Sarah Fuller and Suzie Payne, Jonathan Rowles and Alan Wright G0KRU, their science teacher.

The Saturday in the museum was open day for all amateurs, and despite what must have been the UK's biggest ever 145MHz f.m. pile-up, Helen's amazingly managed mixed simplex and duplex QSOs with five stations. She picked out from the massive...
number of callers GW4VEQ, G4SMC, G4PIQ, G3MRU and G3STU. Audio recording tapes from dispersed sources such as G1YL in Devon, G3JOR in Norfolk and others all helped resolve Helen’s signal from the many stations simultaneously calling her. Sadly on-board MIR, shown in Fig. 3, experiments and preparation for return prevented her from operating on all the in-range passes or contacting amateurs in other parts of the world.

Tony Jones GW4VEQ of Angelsey got the Saturday calculated pass times from GB3JUN at Belfast Royal Academy, and confirmed tracking precision by monitoring the 143.625MHz MIR communications link. Using his pair of 8-element horizontal quad antennas, Tony began calling as Helen came over the Atlantic toward the UK, to hear her reply with “Hi - nice to hear you! How are things down in Wales today?”

John Tucker G3STU of Falmouth, Cornwall, writes how much he enjoyed his three minute QSO. He was running 100W to an 8-element crossed Yagi under directional control from his home made az-el interface from his BBC computer.

Helen, advised by Musa, had the good sense not to try to exchange numbers with as many operators as possible. Instead she seized upon any call she heard and the fascination of the interesting work, findings and experiences she had encountered. This provided great enjoyment to everyone who was listening.

The amateur activity side of JUNO was not without its critics. Whilst over 90% of amateurs expressed their delight and thanks, there were some complaints. In the main these balanced out. Those who were critical of insufficient distribution of the pass times and frequencies, were equalled by those who said that publishing the information we had encouraged the QRM problems.

Of some concern, was the bad publicity resulting to the amateur radio movement by the media quoting the disappointed student at Aldford Academy who complained of the interference “by other radio amateurs”. The comments were partially correct. It did not take long for some of those with scanners to locate the uplinks and overcall, or to intervene on the U2MIR frequency. The result was that some of the carefully pre-arranged schedules could not be completed in the all too short five minute allocated slots.

I’m pleased to say that JUNO was an outstanding success, mainly thanks to the vast majority of amateurs who listened, but did not intervene during the set schedule periods. Other amateurs provided passes with pre-determined Doppler corrections, while amateurs in both the UK and the USSR tutored our first cosmonaut, enabling her to get an amateur radio licence, which was arranged by the RSGB and the RSAB with such short notice. In the end, including AMSAT, the RSGB, the RSF and all involved in the mission, have stated that they are very happy with the organisation and the outcome. It would have proved impossible without full and mutual cooperation between all concerned.

Cards for QSLs will be arranged when Helen returns. This will be possible through the use of OSCAR-10 to the MI3R co-ordinator and QSL Manager. Special commemorative certificates may also be available. Don’t forget U5MIR will continue to be on 522 from the space station on both voice f.m. and packet for the next five months, after which further amateur crews should follow.

**OSCAR-10 Returns**

Peter Guezlow DB2OS reports that OSCAR-10, which celebrated its 8th birthday on 6 June 1991, has returned in good transponding condition, and is providing excellent Mode B operation. Signals are reported to be very good during parts of the orbit, despite the apogee limitations imposed by the monopole antenna system.

**OSCAR-13 Schedule**

James Miller, one of the dedicated OSCAR-13 command team, which consists of G3RUH, VK5ALR and DB2OS, explains the coming modes of the A-O-13 satellite from now until the end of the current year.

From August 12 until 18 September 1991, a temporary re-orientation to ALON/ALAT 180/20 will result in the satellite’s solar eclipse occurring between Mean Anomaly 246 and 256. During eclipses the satellite loses its celestial marker (the sun) from its special sensor. In addition, when BLON reaches 203 degrees, when the sun angle will be less than 8 degrees, the separate earth sensor will trigger on the sun, which is likely to cause the temporary loss of the attitude determination capability. Thus the last leg of the attitude change will be performed on “open loop”, aided by a new magnetorquing simulator to help predict how the spacecraft will react during the magnetorquing sessions.

**OSCAR-21/RS-14**

AMSAT-U-Orbita, whilst trying to remedy a self-oscillation on the TR-2 transponder, temporarily took the RM-1 TR-1 and RUDAK transponder off the air. The No.2 RM-1 transponder has been activated, with its 30 channels of digital information at 1100bps. Its 2W beacon is on 145.800MHz, its 0.4W digital telemetry on 145.838MHz, and its 0.2W c.w. beacon at 145.948MHz. The transponder uplink runs from 435.123 to 435.043MHz, and the downlink from 145.866 to 145.946MHz.

The receiver is very sensitive, and the 10W inverting downlink transmitter very strong indeed, with even 1W problem signals being transponded fully readable. Bob McGwier N4HY, reports first working the second transponder on May 21. Other than a little breakthrough of digital mode into the analogue passband reported by Dave Rowan G4CUO, all seems to be functioning very well indeed.

John Branean GM41HJ has worked out that US States Maine, Vermont, New York, New Jersey, Maryland, Delaware, Virginia, North and South Carolina, Georgia and Florida are within general range of the UK, with the more westerly states out to the Dakotas, Minnesota, Iowa, Illinois, Kentucky and Tennessee at extreme edge of the footprint. The capture range extends beyond Hudson’s Bay to the Soviet Arctic, to East and West Africa and the Persian Gulf. A-O-21 has 10 or 11 orbits in UK range daily, each some 109 minutes apart and occupying an orbit window about 18 hours wide. Because of perturbation of the RAAN the window drifts about 7.3 minutes earlier each day.

An eight hour sequencing schedule of planned operation which alternates the modes between transponders 1 and 2, with the -12dB attenuators alternating with the linear passband control going in and out has been sent by Leo Labutin UA3CR. The switching is currently changing at 0000, 0800 and 1600 m.s.k., but is likely to change as progress is made with the command system. Leo points out that when the timer is on, the 145MHz downlink will be off for ten seconds every ten minutes.

I now go off too, satellite fans! Next month we shall try to catch up with FO-20 and the rest of the news!
Amateur Radio for Beginners
by Victor Brand, G3JNB
At last, a simple introduction to the hobby, written specifically for the absolute beginner of any age. This copiously illustrated book shows how to tune into the fascinating world of short-wave radio, how to make a crystal set, and just how to go about becoming a radio amateur.
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A FULL RANGE OF RECEIVERS FOR AIR-BAND - MARINE - SHORT WAVE - AVAILABLE
The worst month ever since I started was that the rotator had stripped its half-way there. I asked for a brief visit to my land. When I was completing my last chore, I went off on What a month this has been! After Practical Wireless, September 1991, who did they have a 050 with, but Eric has been accepted, effective 15 also V29A, died suddenly on June 11. There are Novice licensees from Sri Lanka. If you come across a 4S6, these are Noble licensees from Sri Lanka. I’ve already said my piece and whenever the bands are open, Ron puts a strong signal into the UK. On the evening Douglas visited him, Ron switched on the rig on 21MHz, and who did they have a G50 with, but Eric G31MX, a fellow islander living at Cowes, and also just retired!

**Back-Scatter**

**HF Bands**

Reports to Paul Essery GW3KFE

287 Heol-y-Coleg, Vaynor, Newtown, Powys SY16 1RA


to On PT0/PJ7 (Kortrijk) now, who sticks 100% to his key, and managed VP2MDH, 4J1FS, UA9CR and UL68G.

Angie G0HGA (Stevenage) now has a 22m wire for this band, but so far there have been minor problems which he's kept at c.w. The antenna, it wouldn't have made a fat difference, as I've got the antenna, it wouldn't have made a fat difference, as I've got the

Top Band

The 18MHz band has been very noisy whenever I’ve listened. Ted G2HKU (Minster, Sheppey) says his s.s.b. worked VP2MDH has been a terrible struggle, while c.w. was the mode for LY1BY.

One of our s.w.l. D. Sheppard (Earl Shilton) mentions hearing LL1BYT, RB3MM, UB5EKI and RB5VQ.

**Oddsments**

The news is that 52075W2 is said to be in Bangladesh for four years, but because of the brokeners and tailenders, he'll not have to walk-up to answer QG calls. If you do hook him, card FA5VJR.

If you come across a 4S6, these are Noble licensees from Sri Lanka. I’ve already said my piece and whenever the bands are open, Ron puts a strong signal into the UK. On the evening Douglas visited him, Ron switched on the rig on 21MHz, and who did they have a G50 with, but Eric G31MX, a fellow islander living at Cowes, and also just retired!

The Bands

I've already said my piece regarding band conditions, so let's go straight to 3.5MHz, home of the QR 0 operators. First G04LW (e-mail 2W output from a Lake DTR3, and whenever the bands are open, Ron puts a strong signal into the UK. On the evening Douglas visited him, Ron switched on the rig on 21MHz, and who did they have a G50 with, but Eric G31MX, a fellow islander living at Cowes, and also just retired!

![Fig. 1: Ron ZL2APW (left) with Douglas G3KPO.](Photo by G3KPO.)
Listen to AOR

In the last decade AOR has gained a reputation for unique high performance wide band radio receivers world-wide. With the arrival of its new subsidiary AOR (UK) Ltd, UK customers may enjoy a much closer link with the factory.

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AR3000 The AR3000 now extends your listening horizons further than anyone believed was possible. Covering the entire frequency spectrum from 100 kHz to 2036 MHz without any gaps in the range, the AR3000 brings the general coverage receiver to a new level of performance and versatility. Not only will the AR3000 cover this extremely wide range, it will allow listening on any mode: USB, LSB, CW, AM. FM (narrow) FM (wide). Tuning rates are selectable from an ultra-fine 50kHz step for SSB and CW, right up to 1000 kHz steps for the TV bands and Band-2. A slight pull on the spring-loaded rotary tuning control will increase the tuning speed by a factor of ten for really fast tuning. 400 memory channels are provided arranged in 4 banks x 100 channels. Each memory channel will retain mode, frequency and RF attenuator setting. 15 band pass filters are used before the GaAsFet RF amplifier, this ensures high sensitivity throughout the entire range with optimum dynamic range and freedom from intermodulation effects. An Rs232 port is provided to enable remote operation by plugging directly into most personal computers. The AR3000 is supplied with a telescopic whip aerial, 13.6V DC lead, AC power supply and operating manual.

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73 from Dave G4KOH, Technical Manager

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EAOE
Solar Data for May-June 1991

Details of solar activity were omitted from last month's column because of the need to give you immediate details of the major auroral openings during the early part of June.

The period from May 3-12 saw the more active side of the sun coming into view with solar flux levels rising every day. Between May 13-19 the more active side of the sun was looking our way, with solar flux levels rising every day. Minimum operating time on a particular band is 15 minutes. Exchange QST plus serial number from 001. Score one point for each QSO and one point for each QTC. Multiplier for non-EU stations is the ARRL DXCC list of non-EU stations. For the non-EU types the multiplier is the EU countries as defined in the WAC country list. Bonus multiplier is found by multiplying your 3.5MHz multiplier by four, on 7MHz by three, and on 14/21/28 MHz by two. QTC traffic points are achieved by non-EU stations reporting a completed QSO from earlier in the contest back to a European station; such QTC to contain time, call and QSO number of the station being reported. Maximum 10 QTC lists to be reported. If more than 1000 QTC stations are reported back. Score is one point per QSO, plus one point per QTC, times the total multiplier from all bands. There is a club section, w.w. section and the usual single-single, single-multiband, and multi-multi sections too. Mailing deadlines September 15 and October 15, addressed to WAEDC Contest Committee, PO Box 1328, D-8950 Kaufberen, Federal Republic of Germany.

The same weekend as the EDXC Contest sees also the All Asian SSB Contest, with rules the same as the c.w. even back in June. Logs to arrive at JARL, PO Box 377, Tokyo Central, Japan by October 15.

VHF Up

Reports to
David Butler G4ASR
Yew Tree Cottage
Lower Maescoed, Herefordshire HR2 0HP

Fig. 1: How the longer distance QSOs from June 5 look on the map.

Back-Scatter

VHF Up

Reports to
David Butler G4ASR
Yew Tree Cottage
Lower Maescoed, Herefordshire HR2 0HP


At OH2AP/OJO, ZS10JUN, 4U1ITU and FY5KE, the usual single-one was heard to say "Oh no! Not another aurora!" Most of you operators who were heard to say "Oh yes! Aurora!" for many v.h.f. operators, the period from June 4-14 won't be forgotten very quickly. I've lost count of all the operators who were heard to say "Oh no! Not another aurora!" Most of you probably got away with it, although I had to do the washing up for a week afterwards! I gave details of the June 5 opening in last month's column, but as a reminder, the day started off with an opening to GM, LA and SM between 0630-0730UTC, followed by a widespread opening between 1330-2100UTC, in which virtually every country in Europe could be worked from the UK. The opening spread down to northern Spain, across to Italy, over to Yugoslavia and Romania, up through the nearer Russian republics to Finland, Sweden and Norway. The illustration, Fig. 1, shows some of the longer distance contacts made during this opening.

John Lemay G4ZTR (J9001) sent in a report, as he wanted to let readers know what can be worked with a modest system, rather than that of the mega-stations. Running 30W into an 11-element Yagi on June 5, he worked a total of 24 stations including HA4XT (JN86), G4FZ (JN89), and OH2AP/OJO (JN95) for 9 and 3VQ (JN95), KO1V (JN95), and YU2VR (JN95).

Ralph Sachs G2GZS (J001) first.
heard the event on June 5 whilst listening to the 28MHz band. Signals had a distinctive auroral 'rasp' so he immediately moved up to the 144MHz band and worked a number of stations including G6EAM (JN85) for a new square, DB6KJ (J030), DF5DP (J031), GI4GVS (J074) and PA3EKS (J032).

Tom Cocking EM4DO and Charlie Coughlan E15FK both report contacting EA1NV (JN73), Charlie worked him at 1800UTC on June 5 and Tom found him at 1755UTC on June 10.

Auroras continued daily, being heard in central England through to June 14, with smaller events occurring on June 17 and 23. I've received a tremendous response from readers regarding these events but unfortunately I cannot report on everything sent in to me. If it's any consolation, I do try to tabulate all the results in the RSGB 'Six Metre and Up DXer' and every relevant letter is passed to the Propagation Studies Committee for evaluation.

Mervyn Rodgers GM6GDL (J096), working EI3I (J092) on June 5, reported auroras from June 10 and 16, with auroras also reported by French stations.

At my 0TH, the event on June 10 was quite good, allowing me to work 16 countries, between 1350-1840UTC. The best c.w. contacts included H9CEN (JN68), RH6BZ (JN70), DE4PJB (JN68), DE3XHP (JN76), SP2DFW (J093), SP5DCS (J091) and SM1AIH (J097). I found the aurora on June 10, from 1700-1830UTC, to be quite interesting, as all my DX contacts were made in an eight minute period between 1753-1801UTC. During this time I worked SM7CJJ (J065), SP2DFW (J093), H60DG (K079) and OK1SC (J070). Did anyone else work anything unusual at these times?

Meteor Scatter

Although the Perseids shower occurs between July 20 to August 23, most operators are particularly active during the period August 8-13. The theoretical peak this year will be on August 11th.

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<th>Annual c.w. ladder</th>
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Number of different stations worked since 1 January 1991

Annual v.h.f./u.h.f. table

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Monthly Counties

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Fig. 2: The OZ7UHF e.m.e. dish.

**Monday 12th,** and no doubt many operators will be taking a days holiday or alternatively, may be struck down by that rare 24 hour disease called Perseiditus! If my boss reads this, I'll have to take it as annual leave! The Perseids shower is circumplanetary, which means that it does not set and is therefore usable, in particular directions, throughout the 24 hours. Between 1000 and 1400UTC, beam north-east or north-west, 1400 to 2000UTC beam east or west, 2200 to 0200UTC beam south-east or north-west. There is no well defined peak for the north-south path, it generally being good at all times except between 0500-0900UTC and 1700-2100UTC.

**Moonbounce**

The Copenhagen Engineering College e.m.e. station, OZ7UHF, uses an unusual method of antenna rotation. The 7.5M dish, shown in Fig. 2, is hydraulically powered, enabling it to be moved very quickly in both azimuth and elevation. The dish is used mainly on 430MHz, but it still exhibits a good performance up to 35MHz. Last year, this year it will be extended to 9.5m diameter, and a finer mesh will be placed in the centre section to enable it to work on the 10GHz band. The picture, Fig. 3 shows Peter Hall SM0FSK, the Swedish v.h.f. manager (left) and an OZ club member outside the e.m.e. shack.

**The 50MHz Band**

On June 14, Yugoslavia became yet another European DXCC country to be allowed 50MHz operating privileges. Class A amateurs, the highest class, can operate between 50.0-51.0MHz, on a secondary basis, provided no interference is caused to any other services within the band. Operators are permitted to use A1A, J2E, F1B and F2B with powers up to 10dBW in urban locations and 20dBW outside of these locations. Stations heard during June included Y72AD, YU2SB, YU2Z, YU0D, YU0E, YU0F, YU1SGO, YU1DV, YU1UF and YU1ZM, the SJR v.h.f. manager.

During June, it was also learnt that some 50MHz permits have been granted to Romanian amateurs. For the past year, Y091S has been the only operator with a permit, but now he is joined by Y07YS, Y07VY and Y06HP.

Band conditions were very lively during June, allowing up to four contacts to be worked from the UK. Sporadic-E was quite prevalent during the month, apart from the period between June 4-14 when aurora was the predominant propagation mode. Many operators made their first DX contacts via Sp-E and I recorded over 30 European countries that were available via this mode. If you listened very carefully between the S-9+ local European stations you could have found some choice DX stations. A number of stations worked into Asia, contacting 4X11F (KM72) on June 1 and 2, ZC4MK and ZL1CH on June 4 and 5. Other contacts included YU3AP (1082), YU3AV (1083), YU3B, YU3DA, YU3E and YU3F, the SJE v.h.f. manager.

**The 70MHz Band**

The appearance of ZBOW on a number of occasions, and the string of DXCC counties that it served, provides the potential for much activity in this much under used band.

Paul Newcombe ZB6BW (KM76) has kindly forwarded copies of his 70MHz logs, giving details of recent UK contacts, made via Sp-E.

His first contact of the season was with G3UXV (J062) on June 2 at 1224UTC. This opening continued until 1540UTC, enabling 72 G2DS to be made on s.s.b. and f.m. Some of the notable contacts included G3AEB (J063), G3JPTZ, G3JLP and G3MTAL (J066) for the best DX at 2208km. Mention must also be made of Steve Carey GM4JW (J091) who made his first s.s.b. G3D over on 70MHz, with ZB6W, at 1340UTC. I hope Steve doesn't think this happens all the time! Mark Dickinson G6GTX also gets a mention, as he made the most of the opening by working Gibraltar from three different locations. Apparently G6GTX is trying to obtain the RSGB Four Metre and Down Award whilst at home, mobile and portable! Paul ZB6W is also trying to gain this award and contacts made during this opening provided G4WDX with contacts in 9 countries. The next opening to the UK occurred on June 15, between 1807-1935UTC, with 37 contacts going down in the log. One of the G2DS was with G4WDXM, who needed ZB from his home location.

Turning the car around, he managed to get within 1km of his QTH, but the band conditions changed and ZB6W disappeared into the noise. There was a happy ending to this story, as G4WDX

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was the first station to respond to CQ calls from ZB0W, during another opening on June 18. This event, between 1648-1930UTC, produced 30 G30s, the best DX being with GB7PAI (1096). The band was also open the next day, June 19, from 1700-1900UTC, but unusually, although the GB3ANG and GO5BSB beacons were both copied at good strength, up to 568, no contacts were made. A similar opening was observed on June 21, between 1551-1920UTC, with only the GB3CTC and GO5BSB beacons heard on 50MHz. By the time that ZB0W also makes. Paul was getting severe QRM from this network and wonders if anyone knows what allocations other countries have on the 50 MHz band. At 2200UTC the last contact had gone down in the log, ZB0W had worked five counties and 45 counties. He is hoping that by the time he leaves Gibraltar in August, he will have worked the EP, up to 568, no contacts were made. A problem only that he still requires ZB on 70 MHz.

Gordon Smith GW6TE0 (1071) reports that he was listening to the 144MHz band on June 16 via Sp-E but missed most of the auroras because of work commitments. However, he did manage to catch the event on June 10, working G1JHZ (1082). He used a modified Pye Westminster running 28W of f.m. on 70.250MHz and 70.450MHz. He mentions that he was getting bursts of French beacons and a German beacon from GP62 between September 17-26. He noted that he was getting bursts of GB7PAI, GB3CTC and GB3REB beacons being heard. The remaining opening on June 18. This event, beginning with Gibraltar. Steve uses a modified commercial grade antenna system. The RA equipment consists of a high power transmitter and a commercial grade antenna system. The RA will consist of a 6-element Yagi, on a beam heading towards the receiving stations direction. The GB3LER beacon has been added to allow the 144MHz beacon to use two 3X150 amplifier, 15-element Cue-Dee Yagis, will provide an interesting comparison to the results obtained from GB7PAI, and a group of four 16-element Yagis. GOISW will be on holiday in the Paphos area of Cyprus and is hopeful that he can obtain permission to operate on the 50 MHz band. He will be using an Icom IC505 and Yaesu FT767, feeding a variety of antennas. If Philip does get a permit, it is unlikely that anyone will hear him in the UK, as August is not normally one of those months that you can expect to work into Cyprus via multi-hop sporadic-E.

**Back Scatter**

Conditions during May and June were quite interesting with a variety of propagation modes, such as aura, ionoscat, meteor scatter and tropo, which had the main operators working the DX.

But where was the Sp-E? It was most probable that the upsurge in geomagnetic activity, although producing exciting auroras, was the mechanism that disrupted the required E-layer ionisation.

Having said that, it should be noted that stations in Holland and Germany did enjoy a few openings. On June 15 at 1930UTC, PE1NMP (J032) worked EASG5T (IM98) and in the same opening DL1GNM (JN36) heard CI2TUW A few minutes later, between 1547-1640UTC, DB4AVD (JL98) heard EA1E1F, EA4CTP and EB4DNA. There was a good Russian opening on June 18 which enabled many operators to work via Sp-E but missed most of the auroral event on June 18. This event, beginning with Gibraltar. Steve uses a modified commercial grade antenna system. The RA equipment consists of a high power transmitter and a commercial grade antenna system. The RA will consist of a 6-element Yagi, on a beam heading towards the receiving stations direction.

**Bacon And Repeaters**

The GB3LER beacon on 144.965MHz presently uses a 10W transmitter into a 5-element yagi, on a beam heading towards the receiving stations direction. This beacon was originally intended to indicate the presence of auroral type propagation, however its location too far north for many auroral events. Recently, forms of Sp-E and auroral scatter propagation associated with auroras have started to be used by radio amateurs. The GB3LER site, on the Shetland islands, is an ideal location for research into both these propagation modes but requires a high power transmitter and a commercial grade antenna system. The RA have recently approved an application to operate the 144MHz beacon on 144.025MHz (6-element yagi), beaming at 45 and 135°, each fed with 100W. In addition, permission has also been granted to add two more beacons at GB7PAI, one on 50.064MHz and the other on 432.965MHz. The 50MHz beacon, which will run 20W into each of two 3-element yagis, will provide an interesting comparison to the results obtained from the 144MHz beacon. The 430MHz beacon will run 20W into a 12-element yagi and will provide information on tropospheric propagation and may also show interesting effects during intense auroral events. Beacons such as these are only co-ordinated by the RSGB. They are NOT centrally funded and are usually set up and run on an entirely voluntary basis. Unfortunately, projects like these cannot rely on a organisation with local members, such as a repeater group, for funds. Andy Steven GM4IPK has procured all of the equipment for the beacon. Although some of it has been provided free of charge, a large proportion has had to be paid for at cost. Andy is quite disheartened by the response from local radio amateurs to help with the funding but is determined that the beacon project will succeed. If you wish to contribute towards the GB3LER fund, you can contact Andy at 27 Daisett Wynd, Dumfriesness, Shetland ZE23UJ or telephone him on (0950) 63012.

**Plan to operate via all propagation modes, including e.m.e. as appropriate, on 50.125MHz, 144.025MHz, 144.215MHz, 432.028MHz and 432.215MHz. The equipment for 50MHz will run 20W into a 4-element Yagi. On 144MHz, they will use a 3CDX300 p.a. and a group of four 16-element Yagis. On 430MHz, a similar set-up consisting of a 3CDX300 p.a. into an array of four 21-element Yagis will be used.**

Between August 10-25, Clive O'Hennessy GW4VXJ will be active on 144MHz and using (IT8) using the call sign GB2XS.

During August, Philip Lancaster G05ISW will be on holiday in the Paphos area of Cyprus and is hopeful that he can obtain permission to operate on the 50 MHz band. He will be using an Icom IC505 and Yaesu FT767, feeding a variety of antennas. If Philip does get a permit, it is unlikely that anyone will hear him in the UK, as August is not normally one of those months that you can expect to work into Cyprus via multi-hop sporadic-E.

**QOR Contest**

The Swedish Six Metre Group are holding a meteor scatter contest on August 8-12 between 2200-0400UTC. Only m.s. contacts over distances greater than 500km will count and all G3Os must be made within the band 50.150-50.300MHz. As a result, these band limits do not include the recognised IARU s.s.b. meteor scatter calling frequency on 50.350MHz. Further details of this contest were given in last month's column.

The RSGB 430MHz fixed station contest will be held on August 25 between 1600-2000UTC. It has sections for both single and multi-operators. The RSGB 430MHz fixed station contest will be held on August 25 between 1600-2000UTC. It has sections for both single and multi-operators. The RSGB 430MHz fixed station contest will be held on August 25 between 1600-2000UTC. It has sections for both single and multi-operators. The RSGB 430MHz fixed station contest will be held on August 25 between 1600-2000UTC. It has sections for both single and multi-operators. The RSGB 430MHz fixed station contest will be held on August 25 between 1600-2000UTC. It has sections for both single and multi-operators.
September 10 and Microwaves on August 20. All sections run between 1700-2100 UTC. You can obtain a full set of rules by sending me a stamped addressed envelope.

Deadlines
Please send your letters to reach me by the end of the month. I always write up the column in the first few days of the following month. Don’t forget that I can also receive messages via packet radio at my mailbox GBTICM.

Photographs of your shack, antennas or any v.h.f. activity are especially welcome. Other pictorial items such as QSL cards, awards, certificates etc are also required. These can all be returned if necessary.

144MHz QRB Table

<table>
<thead>
<tr>
<th>Top distances (kms)</th>
<th>Tropo</th>
<th>Aurora</th>
<th>Sp-E</th>
<th>Meteor</th>
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<tbody>
<tr>
<td>GM4YKI</td>
<td>2560</td>
<td>3020</td>
<td>3080</td>
<td>2107</td>
</tr>
</tbody>
</table>

Fig. 2: The OZ7UHF club shack.

Back-Scatter

Israel Radio has won a temporary reprieve from major reductions in its operation. The station was due to have its output curbed by well over half on July 1, but the authorities decided to postpone a decision on Israel’s external service for two months, whilst an investigation into its role and reach is carried out. There were sighs of relief all around the station from staff who feared for their jobs.

Radio Sofia in Bulgaria has introduced a new schedule which reduces its output by around 50 hours, and English is one of the languages with less hours. Details of the new schedule are in the Europe news section.

Meanwhile, Radio Exterior de España launched a 24-hour-a-day Spanish language World Service on July 1. This new service is carried not only on short wave but also on satellite for listeners in Latin America.

Radio France International plans to start using spare capacity on Hungarian short wave transmitters, to improve reception for listeners in Africa. This has been possible as a result of Radio Budapest’s cuts at the end of June. The agreement was due to be concluded with the Hungarian authorities in early July.

A report on Radio Japan’s DX Corner programme suggests that the short wave service of Radio Kuwait will be back on the air within the next eight months, with full operation two years later. There are no specific details on whether the English service will come back on the air when short wave broadcasts first resume.

Italian Radio, RAI, seems to be in rather a poor state of health at present. A report in the station’s magazine says that RAI’s external service cannot be heard at all well in many parts of the world and that a plan to re-equip the short wave transmitting station at Prato Smeraldo, where much of the equipment is now obsolete, was suspended because of lack of funds. The new head of the overseas service plans a reorganisation, which will result in the rationalisation of the 26 languages which RAI transmits now, together with the formulation of a new strategy. This will concentrate on new geographic areas of political and commercial interest such as China and Japan.

If you are in the market for a new short wave receiver, don’t rush out to your favourite dealer just yet! There is news from Sony that the replacement for the ICF-2001D is on route. Known as the ICF-SW 77, the new receiver will offer all the same facilities as the 2001D together with a whole lot of new ones. These include the ability to tap in a station name and page through all the frequencies for that broadcaster (many of which will have been pre-programmed in the factory), saving the need to memorise either of the frequencies or carry a copy of P W Round. There are 160 different memory channels and it is possible to overwrite any of them, which have been pre-programmed. Stereo sound is available through headphones for f.m. broadcasts. Switchable u.s.b./l.s.b. is provided and the synchronous detection remains in the set. I’m told that the new SW 77 will be on sale in the UK during September, with a smaller version, the SW 55 with many of the same facilities, available in the late autumn.

Panasonic also has a new receiver, to be launched at around the same time as Sony’s. The RF-B45 replaces the earlier RF-B40 and includes s.s.b. The design of the whole set is more attractive with a convex keypad area.

More comprehensive details of both the Sony and Panasonic will appear in the coming months in Short Wave Magazine.

Europe
All times GMT (=UTC)

Radio Sofia’s current European schedule:

- 0300-0315 on 17.825, 15.16 and 11.72MHz
- 0730-0930 on 17.825, 17.78, 15.33, 11.765, 11.72 and 11.66MHz
- 0745-0820 on 17.825, 11.765MHz
- 2145-2400 on 17.825, 15.37, 15.33, 15.11, 11.71 and 11.66MHz

Roy Merrall reports that the 1700 broadcast offers reasonable reception on 11.66 only, although 11.72 improves after 1720.

Iceland now transmits news in English, heard only Monday to Friday at 0730 for fifteen minutes. The frequencies are 9.265, 6.10 and 3.295MHz.

Examples of wildlife from Radio Australia.
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From the Soviet Union comes news of a new station operating in Vilnius, Lithuania. Radio Centras is a commercial station which can be heard each Saturday on short wave on 13.715 MHz at 0600-0700. Broadcasts are in English and Esperanto and reports can be addressed to Box 1792, Vilnius, Lithuania. Enclose two international reply coupons when writing.

Radio Vilnius with English at 2300 on 11.79 offers clear reception at present.

Roy Merrall says that Radio Kiev is regularly heard in English at 2100 on 9.865 for an hour, in parallel with cluttered 9.865MHz. The station can also be heard in Ukrainian at 1900 on 5.60, following on from a German transmission of Radio Minsk which starts at 1800.

Another new commercial station that can be heard on short wave from the Soviet Union, is Radio Vedo from Volgograd. It is heard in Russian at 1600 on 13.72MHz.

Radio Yugoslavia is probably a station worth keeping an eye on as the station is marred by a jammer.

From Equatorial Guinea comes Africa 2000, in Spanish, on 9.075MHz fading in around 2000 closing at 2130. This station is funded by the Spanish Ministry of Co-operation to promote Spanish culture in Central Africa.

Roy Merrall notes Iraq on 15.605 and 17.95, weakly received from around 1300 until after 2315. The 15.605 channel is marred by a jammer.

The Maltese station, Voice of the Maltese, is heard clearly in English at 0600 until 0700 usually with only light QSB. One of the more interesting programmes has been a series dealing with the history of Malta. The transmitter used is at the DW relay station on the island.

Radio Mogadishu is back on the air on short wave after an absence of almost a year, and was noted on 7.198MHz during the evening.

Roy Merrall says that he regularly hears Voice of Nigeria on 7.255 from around 1800 until 2100 or later. Initially in French, English from 1900-2030 and later a return to French. The channel is partly blocked for considerable periods by Deutsche Welle, with BBC English at 2030.

Radio Afghanistan has English via and Radio Kiev with all three in English Mondays to Fridays only: 1100-1200, Wednesday -Saturday on 15.33 and 15.425MHz.

Radio Bangladesh is on the air with just one channel at present, although two are still announced. Try for English at 1230 on 15.20. A further English broadcast is scheduled 1815-1800 with frequencies of 12.03 and 15.255MHz.

Radio Japan is heard with English at 1700 on 15.345 via Sri Lanka with variable signals up to SIO 333. At 1900 it is scheduled via Gabon on 7.14 and on 11.865, 11.85 and 8.94MHz. A further relay via Gabon is noted, with far better reception, at 2300 on 11.735MHz.

Radio New Zealand International on 13.785 has been very variable at 1800, ranging from inaudible to good until fading takes over at 1940. Sometimes it appears only briefly past 1900.

Radio Pakistan’s World Service in English signs on at 1700 with an initial announcement in Urdu on 11.57MHz. The broadcast, which starts with a very doleful tune, lasts one hour.

SLBC Sri Lanka can be heard in Hindi and other local languages on 11.85 from around 1515, although RDP tends to block the channel. It has offered reasonably clear reception between 1645 with the close at 1733.

The All-Asia Service in English has been noted on 6.72 after 1700 until close at 1730.

Radio Alma Ata initially noted on 5.96MHz at 2130 under Radio Yugoslav via and Radio Kiev with all three in English! The station is also on 17.73, 9.505, 5.97, 5.56 and 5.035MHz. Reception is difficult and variable, with 5.035 and 5.97 providing best reception. The announcement, noted by Roy Merrall, is “The International Radio Service of Kazakhstan, Soviet Union” and “External Short Wave Service of Radio Alma Ata”. The announcement goes on to list wavelengths of 59.58, 48.3, 41.49 and 333.3 metres. The station invites listeners’ comments and reports to: Radio Alma Ata, 175 Mira Street, Alma Ata, Kazakhstan 480013, USSR.

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Radio Havan Cuba has English at 2200 for an hour on 11.705 but suffers co-channel QRM from Sweden in Spanish and French throughout.

Radio Rumbos, Venezuela, has appeared very strongly on 8.66MHz after 2145 when the Radio Nacional de Amazonas on 11.78 becomes very prominent after 2230 on some days.

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