QRP DXpedition
A Mobile Peter Barville G5XJJ Visits Monaco

Features
The World Of QRP
The Challenge Of QRP

Build
The Tiny Tim 3.5MHz SSB Transceiver
The Queensbury 7MHz CW Transceiver
The Bourbon SMD Transmitter

Reviewed
The Jim MX-14S HF Hand-Held SSB Transceiver Tested By G4SVU

Plus
Bits & Bytes - Antenna Workshop - Valve & Vintage And Lots More!

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QRP - Communicating With Low Power
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Front cover acknowledgements. Our Thanks to Mike Richards G6WFC for the rugged background shot from Minorca. Thank you also to Brigitte Charles of the Monaco Tourist Office, No. 5-18 Chelsea Garden Market, Chelsea Harbour, London SW10 OXE, tel. 071-352 9962, for the inset photograph showing the famous Casino and Hotel in Monte Carlo.

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Lee Electronics

Practical Wireless, July 1993
If Kenwood’s TS-50S wasn’t the world’s smallest H.F. transceiver, it would still be a mighty impressive piece of equipment.

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After all, the Kenwood TS-50S may be the world’s smallest H.F. transceiver. But you don’t need the world’s biggest bank account to own one.
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Very Accurate & Reliable

Specifications:
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Connectors SO-239 RMS or PEP
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Free Credit!
On HF rigs

Now you can get our quality service whilst spreading your payments over a manageable period. And all at zero interest!

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All figures based on 12 monthly payments and subject to acceptance
The DJ-580SP handheld is the most advanced design ever offered to the radio amateur. Building on the winning formula of the DJ-560E, ALINCO have now reduced the size dramatically and introduced a combination of innovative features that will make your operating even more fun and certainly more versatile.

It goes without saying that ALINCO offer you all the standard features you expect from a hand-held including dual watch, dual controls, scanning, searching, priority, etc. Of course ALINCO’s standard of engineering and reliability is now becoming the envy of its competitors. (They’re also pretty envious of ALINCO’s prices!) Naturally you get a full 12 month warranty including parts and labour. It’s the extra features that really make this a winner.

For example you now have ALINCO’s patented circuit that retains full operation with dry cells even when battery voltage falls by 50%. Great for emergency applications. You get a programmable auto power off feature, battery saver, digital telephone dialler and three output power levels. And we’ve only just started! Key in a special code on the keypad and your rig will turn into a fully operational automatic crossband repeater. Key in another code and you will open up the receiver for a.m. airband reception and frequency segments up to 950MHz! You can even use the DTMF feature to send and receive two digit code messages.

To learn more about the transceiver that has already taken the Japanese and American markets by storm, phone or write for a full colour brochure.

Specification

| Tx   | 144-146MHz |
| Rx   | 430-440MHz  |
| AM   | 108-143MHz  |
| FM   | 130-174MHz  |
| FM   | 400-470MHz  |
| FM   | 810-950MHz  |
| Steps| 5, 10, 12.5, 20, 25kHz |
| Memories | 42 |
| Power Output | 2.5/1.0/0.3 Watts |
| Scan | 8 Modes |
| Tones | 1750Hz plus DTMF |
| Sensitivity | 12dB SINAD -15dBu |
| Size | 140x58x33mm |
| Weight | 410g |

Accessories Supplied
Ni-Cad pack, AC charger, belt clip, carry strap, dual band antenna and CT CSS unit.

WATERS & STANTON ELECTRONICS
22 Main Road, Hockley, Essex. Tel: (0702) 206835. Fax: (0702) 205843
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Retail Only: 12 North Street, HORNCHURCH, Essex. Tel: (04024) 44765
VISA & ACCESS MAIL ORDER: 24 Hour Answerphone. Open 6 days a week 9.00am - 5.30pm
Rail: Liverpool Street/Hockley or District Line/Hornchurch
Kenwood's new mobile HF rig has caused a real stir in the market place. At last, an HF rig that will fit under your car's dash and still leave room for a passenger! Let's face it, the so-called HF mobiles that have been available of late have hardly been portable, let alone mobile, but the new TS50S will set new standards in size and performance. You can really do that DXpedition now as you can take the rig and the auto ATU as hand-luggage!

Quite how Kenwood have squeezed so much into such a tiny package, I can only marvel at. They haven't, however, skimped on performance: All modes, gen. cov. RX, 0.25µV sensitivity on ssb, a dynamic range of 105dB and a full 100W output.

A LOWE ELECTRONICS EXCLUSIVE . . .
The KENWOOD TS450SDXTM
A DXER'S DREAM FOR THOSE ON A BUDGET!
Full details for personal callers at any of our branches

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G68 0HH
Tel: 0236 721004
Once again Kantronics assert themselves as leaders in the world of digital communications. The ever-popular KAM has been fully upgraded to meet the demands of the latest digital modes. The new KAM Plus will become the standard by which all the others are judged, and the new facilities now include:

- New User and Expert command sets
- On-line help messages for each command
- 128K RAM
- 1 Megabit EPROM
- Socketed lithium battery to back up RAM and on-board clock
- Expanded personal mailbox
- PACTOR now fitted as standard (V6.1)
- Enhanced CW operation – dot/dash weighting, Farnsworth spacing, tone transmission, and programmable CW filter bandwidth and centre frequency
- Programmable mark and space tones
- Extended RTTY and AMTOR character sets

The KAM Plus should be available about now, but you don’t need to throw away the old one! Simply buy the new KAM Expansion Board to upgrade to all the new features. Both still run with Hostmaster software, now available for the PC, C64 and the Macintosh.

The KPC3 continues to be the world’s most popular VHF TNC. Designed to be user friendly (even to new Packeteers!), this amazing TNC delivers high performance in a very small package. It's less than half the size of its nearest rival but manages to pack in many more features.

The KPC3 features an improved DualLevel™ command set that gives new users just 23 commands (all most people will ever need!) that get you up and running but with the full 130 plus commands available in Expert mode for those wishing to exploit the full potential of Packet.

The power consumption is so low it can be run from a PP3 battery, ideal for portable operation and Raynet use. Runs on 6–25V.

Additional features include Kantronics PBBS with reverse forwarding, message header editing, a mail waiting led, remote sysop access and Kantronics KA-Node. Kiss mode and Kantronics Hostmode are also included for TCP/IP compatibility and advanced operation. If that’s not enough, it also decodes WEEFAX with appropriate software.

Hostmaster software expandable RAM and Real Time Clock are a few of the options.

FULL Datasheets available on request

Some people still regard Packet as a difficult mode to operate (probably when they see their friends TNC manuals! Don’t worry, it’s a lot easier than you think! We’ll also help you out by providing an RS232 lead, a lead to your radio and some terminal and fax software to get you on the air with the minimum of fuss and delay. Ask for your FREE Packet Package when buying a TNC at any of our branches. Don’t forget our Branch Managers if you need help in setting up – many of them have been doing this for years and will happily help you out.

Specialist help available at our Maidstone, Cambridge, Cumbernauld and Matlock branches.
CALLING ALL RADIO AMATEURS AND SHORTWAVE LISTENERS!
ICOM (UK) PROUDLY PRESENT...

THE OFFICIAL OPENING OF OUR NEW LONDON HAMSTORE • SPECIAL BARGAINS INCLUDING: IC-737 • IC-W21ET • FRG100 • TS50 ETC • EQUIPMENT DEMOS • COFFEE • TEA • BUCKS-FIZZ • HAM SANDWICHES (SORRY) • CAKE • SPECIAL GUESTS • FREE RAFFLE • & LOTS MORE!

We would like to say thanks to all of you who have supported us over the last few months. If you haven’t visited the London Hamstore yet - why not? We have bargains on new, used and ex-demo equipment. We will gladly take your good, clean, working gear in part-exchange - call us now for the best prices around.

As well as ICOM, we also stock KENWOOD, YAESU and all leading brand names.

Do you know who the staff are at Hendon? Well there’s Paul G7MN1I who has had technical features published in many radio mags + Doug G0LUH/4S7DGG/4SOUK/8Q7AB, who would you prefer to deal with? salesman or...

Saturday July 24th.

We have receivers, transceivers and every conceivable gadget you could want. If it’s cash, credit or part-exchange - we do it. We are probably the world leaders in radio communications and have the best technical back-up and service facilities in the country. Call now for our daily-updated list of second-hand equipment.

How to get here...
Northern Line tube to Hendon Central or... simply park your car outside.

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Saturday July 24th.
As I write this month's 'Keylines' I'm looking back at the PW trip to the Dayton Hamvention. It was a memorable trip in many ways, particularly as I achieved two ambitions.

The first ambition was to visit the United States Airforce Museum, close to Dayton itself. It turned out to be a fascinating day's visit and it was free to enter the museum itself! Along with several friends on the trip, I bought a $4 ticket and 'travelled' in the 'IMAX' 3-D cinema, experiencing a flight in a balloon (nearly colliding with a church steeple) and looping the loop in barnstorming aircraft.

The sensation of flight and movement was such I had to hold on to my seat. It was a wonderful experience, with great company from my fellow PW travellers.

The second ambition was to have ridden on all of the Dayton trolleybus routes. I managed it, and I'm looking forward to riding on the newly-extended, pollution free system next year. I admire the Daytonians' determination to keep and extend the trolleybus network, especially when there's no real money-saving incentive (as there is in Europe) as petrol only costs around $1 a gallon!

On the first day of the Hamvention, I was out and about with my camera, and managed to interview a lot of people. I even managed to be photographed next to the Kenwood balloon.

In fact, if you think you can beat our caption - please send your entry in as soon as possible (by the end of July please). The PW team will pick the funniest, and I'll award a special Editor's prize for the winner. Let's face it, if you can't laugh at yourself sometimes, you must be a really sad person. So, get those postcards on the way!

While we were at Dayton, we met many old friends, and made many new ones. One old friend from previous years came and asked if PW was available on audio cassette in the USA for the blind. Although the service could be provided from the UK, via the excellent newspaper and magazine cassette systems, I'm appealing to our American readers for help. So, if you live in the USA, could you read PW onto cassette for a blind radio amateur?

If you can help, please write or FAX me the details, and I'll be in contact as soon as possible. I'm hoping that our friend (he's got a delightful Labrador guide dog), will be able to enjoy PW with your help very soon.

In the meantime, I'm looking forward to coming back to the USA again. Hopefully, I'll be 'deflated' somewhat before then!

Rob Mannion G3XFD

COMPETITION CORNER

First Prize
A year's subscription to Practical Wireless or a £20 book voucher.

Second Prize
Six month subscription or £10 book voucher

Name ...........................................................
Address .......................................................  
.............................................................

Send your entry (photocopies acceptable with corner coupon) to: Competition Corner, Spot The Difference Competition, July '93, PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Editor's decision on the winner is final and no correspondence will be entered into. Entries to reach us by Friday 23 July 1993.
Star Letter

Renewal Of A Friendship

Dear Sir
You may be interested to hear how the appearance of my article 'A Table Top Project Bench' in PW December 1992 has resulted in the renewal of a friendship from 27 years ago when I moved from the Cambridge area to the North East.

My friend John Cutler, ex G3KBC, now living in New Zealand, was looking through the particular copy of PW in a shop in Wellington when he came across my article. This resulted in an immediate letter to renew our acquaintance and now the possibility of a regular 'over the air' schedule. Incidentally, a copy of PW in Wellington is the equivalent of £3.50 so I must suggest he takes advantage of the 'Subscribers Club' method of payment!

Vic Flowers G8QM
Sunniside
Newcastle Upon Tyne

Editor’s comment: The team were pleased to hear that PW has helped renew an old friendship Vic. Did he send his copy of the magazine back for you to autograph your article?

No Code Licence

Dear Sir
Whilst listening to BBC Radio 4 (I think) recently while mobile in my car I was pleased to hear a program concerning the use of computers in the UK (I am presently attempting to unravel the mysteries of a secondhand Amstrad 1640 I purchased).

A point dealt with in great depth was 'Networking' whereby one person may contact another user anywhere in the world via computer to have a chat or leave a message, etc. Probably similar to our packet radio.

It occurred to me that in the near future, will prospective radio amateurs go to the bother of obtaining a Class B licence, a Class A licence and a lot of very expensive radio equipment in order to access the h.f. bands? Or will they instead use a computer and modem at less cost, and with no licence required, no studying and no licence restrictions in order to have their chat? Perhaps groups such as the RSGB and the DTT should bear this in mind while they are considering the possibility of a 'No Code' h.f. licence.

Victor Best
Portadown
N. Ireland

Cordless Telephones

Dear Sir
I share the concern about the cordless 'phones expressed in the May edition of 'Keylines'.
Can I draw your attention to the new EMC regulations, which are more relevant than obvious from first glances. It could help you (see 2).
1: The CE approved cordless 'phones should not become a major problem with out of band transmissions and breakthrough.
2: As for illegal units, under section 73 of SI no; 2372 1992 it is the DUTY of the weights and measures authorities to enforce the EMC regulations.

Under section 79 an officer can issue a suspension notice to a USER where there is a suspected breach of the regulations.
Under section 76, with the approval of a Magistrate, an officer can enter a private residence and seize apparatus.

This duty applies to and can be used in respect of both approved apparatus, and relevant apparatus which is not approved. You can take 'relevant' to mean all electrical and electronic apparatus.

These powers apply to any apparatus taken into service after 28th October 1992, and the powers of confiscation apply to any apparatus. There is no appeal for six months, and not many people keep dated receipts. If they have, and it's not CE approved well, the answer is the same.

The weights and measures authorities are the Trading Standards authorities. It would now appear that 'suspected' cordless phones fall into a similar category to illegal CB sets. The practical question is how to get the officials to act. Like the user asks “Why did you let them sell it to me?”.  

3: The RA has discretionary EMC power under the Secretary of State, and prefers to confine it's role to interference to wireless telegraphy under the Wireless Telegraphy Act, as you report.

However, things do change. The RA now says it will act on justified complaints of interference to ANY EMC schedule III listed apparatus, according to my latest enquiries about the effect of the EMC regulations, despite what the form says and what you have been told. I reproduce the list overleaf. It could inform the Trading Standards, for example, who have appropriate powers.

4: Radio amateur apparatus is not on the list.
When CE marked commercial radio amateur apparatus appears on the market, it would appear reasonable to campaign to have it added. There can be no justification for not giving an approved £1500 radio the same protection - under the EMC regulations - as a £20 toaster. Note I do not ask for greater protection for obvious reasons like the lower signal strengths and greater sensitivities. Also, one asks why should the RA adopt, in the cases of interference to approved (radio amateur) apparatus, the same levels of immunity as for say, a burglar alarm, when determining what constitutes undue and excessive interference, as specified in EN50082-1

It is obvious that the EMC regulations and the Wireless Telegraphy Act have different but relevant bearings on the matter.

In conclusion, there is hope. What is needed is some push and shove through reasoned publicity. Let's start with cordless phones and the Trading Standard offices, and a few solid reports of suspected breaches of the new EMC regulations.

Why not check it out?
Donald Elkington G6OPAN
Adel
Leeds

Editor's reply: Thank you Donald for an interesting letter. I’ll be contacting the local ‘Weights & Measures’ office to see what they say!
Phone Patching

Dear Sir

With reference to the letter from GM01JV in the May issue concerning the possibility of phone patch use. I am pleased to see that you feel that an approach should be made to the RA for comment and I for one would hope that this would be favourable.

I would however, object to it's use being restricted to members of certain amateur radio groups. I feel that this would only lead to a certain amount of dissension in our hobby.

There are a number of other reasons for phone patch use, other than connecting just service personnel with their families. There are quite a number of civilians abroad who have no access to a telephone. As I well know, having spent the better part of my working life in Africa where one can be 300 miles from a telephone as such and perhaps dependent on a h.f. radio link to the nearest main town or city. These links are never suitable for connecting into international circuits.

There have been a number of times in my hobby when handling life saving traffic, when I would have given a great deal of the use of a phone patch. The last time was on May 2 to May 6 last year when the NV Spirit on route from Angola to Guatemala was in the middle of the Atlantic when a number of crew were taken ill, together with the Captain's young daughter.

The s.s.b. Emergency System that operates daily on 14.323MHz (of which I have been a member these past 15 years) helped to maintain contact. This was done from the USA with help from South Africa and New Zealand and stations in Brazil. The main coordinator being Chuck PJ4CR, in the Dutch Antilles.

We stayed with this emergency from the May 2nd to the 8th May. Finally, the moment arrived (due to conditions) I was the only station in touch with the Spirit. This is when I would have given a lot for a phone patch, instead of which I had to relay to a Brazilian station who had to relay to an American station. Had I had the use of a phone patch the US Coastguard could have spoken direct to the Captain.

I have not done very much on my own since returning to this country. But I have a commendation or two for life-saving abroad with the rig, as does my good friend Roz Nelson ZS1JS in Cape Town. Between us I think we have about 10 lives in the book. We must have something going for us, other than TVI!

Ron Greenwood G4EEO

Thorney

Peterborough

Editor's comment: I have made enquiries, and apparently there's not much chance of amateur radio in Europe being allowed to phone patch. It appears that radio amateurs passing third-party traffic are seen as possible competition for the telephone industry. This is unfortunate, as we could assist in situations where official administrations can't, particularly in the sort of emergencies in the news at the moment.

Use It Or Lose It

Dear Sir

We have all heard of the phrase 'Use it or lose it' when it comes to protecting bands for amateur use. In an attempt to increase more activity locally, we at the Harwich Amateur Radio Interest Group have designed some ingenious ways of entertaining ourselves 'on air', during our regular Sunday evening net (5-18 14.450MHz).

At first we borrowed an idea of a 'trivia quiz' heard on GB3SA. This has proved good fun, but for more concentration and the possible chance of answering clues that other operators couldn't, we also run a crossword.

The crossword is produced in our quarterly newsletter CrossTalk. On the evening itself, one station gives out the clues asked for, a station fills in all the answers as they are correctly answered and scoring is simple, as one point is awarded for each letter in the answering word.

The crossword and the trivia quiz are good fun and provide a good deal of activity on the band, other than just the normal chat. I would be interested if other groups have any activities they use to brighten up their evenings.

We are putting together a game of Bingo. Easy you say? But we're using c.w. to call the numbers!

Colin Kendrick G0STW

Harwich

Essex

Editor's comment: Sounds as if you have a busy group up there Colin! Although I'm not quite so sure about the Bingo over the air, I think that provided that your communication is always addressed to a particular station, you will remain within the licence conditions when you're playing the other games. Any other initiatives out there readers?

Radio Hams In Newspapers

Dear Sir

I am not a radio amateur but I often notice articles about 'radio hams' in newspapers. The interesting point about all these stories is that none of the people mentioned are actually radio amateurs.

Newspaper reporters describe anyone who has enough money to buy an expensive toy such as a radio scanner as a 'Radio Ham'. I suggest that PW runs a regular column which reprints these stories. You could award a £5 voucher for each new example sent in by readers.

Robin Soar

Doncaster

Yorkshire

Editor's comment: Thank you for the newspaper cutting you sent in Robin. Although the 'tabloid press' (the worst offenders) have been told many times, I am afraid we are wasting our time. The argument I get from editorial staff is 'The public know what a radio 'ham' is, and it's a convenient term'. Unfortunately, they (the newspapers) obviously DON'T know what amateur radio is all about despite the intervention of journalists such as myself, the Radiocommunications Agency and the RSGB.

Dear Sir

Tuning below 7MHz at approximately 1630UTC, on Thursday 4th March, this year, listening for Sydney Volmet on 6.676MHz. I was astonished to tune into a positive British network using 6.675MHz. They were all talking to each other in very technical terms, with perhaps the exception of a very Irish lady who insisted that her dog should talk into her microphone, because "he liked doing it".

Transmitter locations, from what I could learn, ranged from the North of Scotland, Northern Ireland to the South of England, some indeed claiming to be mobile. Callsigns were mostly odd, MA3, MA4, EDH21, RT1, TS52 to name but a few.

Later, during the week, I found them again at approximately the same time of day. This time they were using 6.655, 6.873 and 6.678MHz.

Who are these people? There is no reference to these frequencies in the Radiocommunications Agency's publication 'How to become a Radio Amateur'.

Roy Nicholls G7NUW

Epsom, Surrey

Editor's comment: It sounds as if you've discovered a long established 'pirate' network Roy. Illegal activity on the frequencies mentioned, has been monitored for many years (although there are of course legitimate services in this part of the spectrum). In the past, much of the activity was centred on the use of military surplus equipment and it's unfortunate that they give the false impression they are 'radio amateurs'.
New Fluke Meters

Fluke have introduced three new digital multimeters called the series 10 to their range. The new meters are designed to support first level electronic and electrical troubleshooting, their compact shape and push button controls aid one handed operation. The meters offer a.c. and d.c. volts, ohms, diode test, continuity bleeper and 4 000 count digital display. There’s also auto ranging and ‘sleep’ mode to preserve battery life.

Model 10 is the cheapest of the range, Model 11 has a ‘VCheck’ facility to simplify the safe measurement of power sources, supplies and capacitance with auto or manual ranging from .001 to 999µF and to 9999µF. Model 12 combines the features of the other two plus min/max record with a relative time clock and continuity capture to collect intermittent opens and shorts as brief as 250µs.

All new range will run for 650 hours on alkaline batteries and 450 hours on carbon-zinc, and are guaranteed for three years.

For further details contact Alpha Electronics Plc., Units 5 & 6, Linstock Trading Estate, Wigan Road, Atherton, Greater Manchester M29 0QA, tel. (0942) 873558.

Special Event Station GBOAMY

The North Ferriby United Amateur Radio Society will be operating a special event station - callsign GBOAMY throughout the month of July. This event is to commemorate the 90th anniversary of Amy Johnson’s, the pioneer lady aviator, birth. She was the first lady to fly from England to Australia in a tiny Gypsy Moth. The special event station will be regularly operational on all bands and a special QSL card will be issued to confirm contacts and s.w.l reports.

Siskin Digital Radio Products

Siskin Electronics have produced a new catalogue covering their digital radio products.

The comprehensive catalogue gives details on their digital products, specifications and product ratings on the three major areas of, performance, quality of documentation and expandability.

There is also a useful reference guide together with a question and answer section on frequently-asked digital radio topics. To obtain your free copy of this catalogue contact Siskin Electronics, 2 South Street, Hythe, Southampton SO4 6EB, tel. (0703) 207155/207587 (quoting Digital Radio Products Catalogue No.8).

High Temperature PCB Switches

The Danish company MEC have announced the introduction of the new second generation UNIMEC 1500 switch series. Using Liquid Crystalline Polymer (LCP), UL94VO high performance plastics the lifetime of the switch has been increased from 1.5 million cycles to 10 million cycles for momentary switches and from 500 000 cycles to 5 million cycles for alternate action. The switches will operate in temperatures ranging from -40°C to +160°C with a protection rating of IP54, making them ideal for use in harsh environments where style and durability is required.

Each switch module is capable of performing any one of eight contact functions, depending on p.c.b. layout, at a rating of 250mA/120V.

For a free sample and more information contact British suppliers Quiller Switches Ltd., 2 Paisley Road, Bournemouth, Dorset BH6 5EU, tel. (0202) 417744 or FAX, (0202) 421255.

Enterprising Engineer’s Key To Success

Peter Jones is an enterprising engineer, and almost by accident he has found himself in the Morse key business. He’s the driving force behind Peter Jones Engineering in Smallfield, Surrey, not far from Gatwick airport. When he heard that an American distributor wanted 200 Morse keys, and that the manufacturer was not interested - Peter decided to design and manufacture an entirely new key in his own workshops.

As he’s an engineer and not a radio amateur, Peter took the advice of Phil Godbold G4UDU to find out what was required. The result was what has turned out to be a popular and solidly built paddle key that has proved to be a winner, especially in the USA.

Following the interest shown in the Jones’ key at the 1992 Dayton HamVention, Peter has produced yet another, but this time it’s a traditional ‘pump’ action. The latest key was launched in time for the 1993 HamVention, attracted a great deal of interest on the Palomar Engineering stand at the show.

The newly-introduced traditional key from Jones Engineering has a very heavy metal base, with an attractive finish. It’s likely to appeal to operators who prefer a traditional key that’s not likely to slip around the operating desk during QSOs. Further details on this and other products are available from Peter Jones Engineering, Chapel Road, Smallfield, Surrey RH6 9NR, tel: 034-284-3555.
In the first of three reports on the 1993 Dayton HamVention, Rob Mannion G3XFD explores the enormous open air ‘flea market’. It’s said to be the largest in the world.

The PW party flew to the USA via Cincinnati this year, and were then transported direct to our Hotel in Dayton by coach. In the three years PW has been running the trip, we’ve tried various routes, and travelling via the attractive city of Cincinnati certainly seems the most convenient.

The HamVention, held in the large Hara Arena sports complex on the outskirts of Dayton, officially opens on the Friday at mid-day. But, what is perhaps the most attractive part of the HamVention for the European visitor, the gigantic flea market, opens from around 6am.

As the weather is far more variable than in Britain in late April, I decided it was best to try and see as many of the 2000 plus flea market stalls as I could on the Friday morning. It was a wise decision because it was a delightfully sunny and clear day and as it turned out, the only dry day of the show.

Test Equipment And Vintage Radio

There seemed to be a tremendous variety of test equipment and vintage radios on offer this year. Each year seems to bring various items to the fore in the flea market. Several years ago it was Heathkit equipment, this year brought test equipment and vintage radios. It was truly an Aladdin’s cave.

Some sellers had small pitches, and one or two had three or four car parking spaces filled with equipment for sale. Two Danish PW readers on the trip had a field day and sent home a variety of modern radio laboratory instruments, which even after air freight and customs charges, were superb value. Sending them home wasn’t a problem either because Cincinnati based Delta Airlines had a ‘pack and despatch’ service on site throughout the three-day event.

Up And Coming

Several ‘up and coming’ American and Canadian amateur radio equipment manufacturers were showing their products in the flea market. Among their products were some interesting new antenna ideas. One, particularly fascinating stall had a selection of guided missiles (minus harmful fuel and warheads) for sale as the ultimate ‘conversation pieces’. The same stall had a radio-controlled artillery target aircraft for sale, an ideal toy for someone, except that its wings spanned nearly five metres.

Born Lucky

Some people are born lucky, and so it seemed to be for the one of the husband and wife teams on the PW trip. Arthur GONDI and Anne Izzard GONDJ, from Birmingham, won two major prizes in the huge HamVention draw.

The couple were pleased and surprised the first time. When the second win came up they were (to quote) “Gobsmacked”. And that about sums up the effect the Dayton HamVention flea market has on me. It’s got to be seen to be appreciated, and even then you won’t believe it!

This vintage Zenith radio was offered to G3XFD for $20, but he had to decline the offer because his suitcase was full.

The 1993 Dayton HamVention flea market had plenty in store for anyone needing test equipment. And to help, Delta Airlines had a (very busy) pack and dispatch facility on site throughout the three-day event.

Lucky couple Arthur GONDI and Anne Izzard GONDJ from Birmingham, won two prizes in the huge draw at the 1993 Dayton HamVention.
No. 2
Right up at No. 2 is the new TS-50S from Kenwood. A real MINI-MOBILE H.F. Transceiver, no bigger than a TR751E 2M Multi! 500kHz to 30MHz, 100w out, AT-50, auto ATU & Kenwood MA5 mobile antenna available as options.

DEPOSIT £199.95 & 12 payments of £66.66
With AT-50 Auto ATU, Deposit £295.00 & 12 payments of £83.75

No. 3
My favourite for months, the Yaesu FT-890. With or without Auto ATU, a real winner for BASE or MOBILE H.F. Did you know that it is now available with SPEECH ANNOUNCEMENT, as an option, for blind operators? Only from LYNCH!

Without Auto ATU, Deposit £375.00 & 12 payments of £85.00
With Auto ATU, Deposit £495.00 & 12 payments of £90.00

No. 4
Probably the best selling H.F. transceiver in the world, the T5850S from Kenwood. Certainly one of the most reliable. A true base station radio from a world beating company.

Without Auto ATU, Deposit £510.00 & 12 payments of £95.00
With Auto ATU, Deposit £540.00 & 12 payments of £105.00

No. 5
It's crept up in price, but it's now only the same cost as an old TS940S listed 4 years ago! The radio? Yaesu FT990. For Peter Hart to use words like "thoroughly recommended", I can't really comment anymore.

Without Int. PSU & CW filter, Deposit £595.00 & 12 payments of £129.50
With both options, Deposit £699.00 & 12 payments of £150.00

No. 6
At the budget end of the market, the Icom IC-728 offers excellent performance together with the quality feel from this famous manufacturer.

Deposit £195.00 & 12 payments of £66.66

No. 7
For those of you who want a good, no frills H.F. package but also want to dabble on 6 Metres, how about the Icom IC-729? Identical to the IC-728 at No. 6, but with 10 watts on 50MHz as well as a full 100 watts on H.F.

Deposit £275.00 & 12 payments of £85.00

No. 8
Performance and flexibility of the "big boys", the TS-690S from Kenwood is still up in the TOP TEN, and there's good reason. The price. Closely compare the spec of the '690 with other H.F. machines and the rig scores high up the ladder. Throw in a SIX METRE option giving a massive 50 watts output in addition to 100 on H.F., and you can see why this one is so popular.

Without Auto ATU, Deposit £480 & 12 payments of £85.00
With Auto ATU, Deposit £510 & 12 payments of £95.00

No. 9
Want the No. 8 slot, but without SIX Metres? You got it with the TS-450S. 100 watts, General Coverage, All Mode, Selectable filtering in both I.F., big radio features in a mid-sized package.

Without Auto ATU, Deposit £449.00 & 12 payments of £85.00
With Auto ATU, Deposit £480.00 & 12 payments of £85.00

No. 10
A joint entry at No. 10, The Flagships from YAESU & KENWOOD, the FT1000 & TS950SDX transceivers. Both have features for the really serious amongst our H.F. operators, including 150-200W output, Dual Receive, Built in Power supplies & Auto Tuners as standard, the list goes on forever. If your serious, ring me for a tailored quotation to suit your needs. If your not, ring someone else.

FT1000 & TS950SDX, deposits from as little as £700.00.
THE MARTIN LYNCH V.H.F. TOP TEN

It's got to be the LYNCH + muTek FT736RDX from Yaesu. The most flexible multiband 2/6/70/23 all mode transceiver available today. Complete FRONT END REPLACEMENT DESIGNED BY muTek, push this transceiver to the No. 1 slot. The performance is now exceptional - expect to see these being used in "VHF CONTESTS" around the world.

FT736RDX, with muTek, 2/70 operation, Deposit £495 & 12 payments of £125
FT736RDX/6 with 6m extra, Deposit £608 & 12 payments of £142.50
FT736RDX/23 with 23cm extra, Deposit £623.00 & 12 payments of £160.00
FT736RDX/6/23 with all bands fitted, 2/6/70 & 23cm, Deposit £742 & 12 payments of £175.00.

*muTek FRONT END BOARDS available as "after fit kits", £199.95, plus £59.00 fitting charge if required.

No. 2
Not a transceiver, but a WIDE BAND ALL MODE PORTABLE RECEIVER, the NEW MVT7100 from Yupiteru. As supplied by MARTIN LYNCH to the M.O.D. and countless other customers, this new model from Japan is truly amazing. 500kHz to 1650mHz. ALL MODE, in your hand? Are they serious? Yes, I'm handing them out like confetti, it's not a toy, it's the most incredible miniature receiver available.
Deposit £49.00 & 9 payments of £44.45

No. 3
First the FT727, then the FT470 and now the FT530, YAESU get better and better at Dual Band portable design. Complete with CTCSS fitted as standard, (NONE of the others have), extended RX, AM/NBFM selectable. Auto Repeater facility; it's been the choice for hundreds already.
Nicads & Charger Included.
Deposit £100.00 & 12 payments of £8.75

No. 4
Icom were the first company back in 1980 to bring you a fully synthesised solid state transceiver - their technology in digital design carries on - witness the NEW IC-221ET dual band Handie. Massive dual display, Extended RX, superb "feet" to the user.
Nicads & Charger Included.
Deposit £74.00 & 9 payments of £45.00

No. 5
Alinco have been knocking the "big three" for several years now and they continue to do so with the DJ-580. Ask around the Dual-Band Handies and the odds are they'll be using one. All the bells and whistles, well built and very reliable.
Nicads & Charger Included.
Deposit £53.00 & 12 payments of £3.00

No. 6
When Angus McKean, G3OSS said this is THE transceiver for Two metres all mode, he wasn't kidding. I've been selling them for years and there's still nothing to touch it. Full 25W out and don't forget the matching 70cm version, the TR551EI.
The TR751E 2M, Deposit £149.00 & 12 payments of £50.00
The TR851E 70cm, Deposit £199.00 & 12 payments of £50.00

No. 7
Kenwood's TH-78E marches into the TOP TEN because of its performance, excellent ergonomics, (if SONY ever designed a dual band Handie, this is what it would look like), beautiful build quality and endless user features. For people who like mind blowing "ADVANCED" facilities, wait no longer.
Deposit £49.00 & 12 payments of £35.00

No. 8
Want a simple to use, REMOTE HEAD DISPLAY High-Power Dual-Band Mobile, that doesn't blow your brains away whilst QUEUING ROUND THE HANGER LANE GYRATORY? (WHERE?) - Well get your cheque book out ladies & ladies, the TM-732E from KENWOOD is for you! Yes, it's got all the gizmos if you want them, but if you don't, then it's got to be the easiest mobile/base FM 2/70 transceiver available.
Deposit £69.00 & 12 payments of £50.00

No. 9
TH48E Transceive on 70cm, Deposit £39.00, £250 in 3 Months
TH28E Transceive on 2M, Deposit £39.00, £250 in 3 Months
No. 10
Still a firm favourite for people who want MULTIMODE PORTABILITY on 2 Metres, the FT290R mk1, still has the market to itself. The rest have given up! Available with a "clip on" 25W linear, the FT290R is the perfect all rounder for 2M operation, either portable, base or mobile.
Without matching linear,
Deposit £129 & 12 payments of £35.00
With Matching FL7205 Clip on Linear,
Deposit £159 & 12 payments of £45

...THE MARTIN LYNCH V.H.F. TOP TEN...
Dorset


Clwyd

Wrexham ARS. Maesgwyn Community Centre, Maesgwyn Road, Wrexham. June 15 - Field Evening. June 7 - Quiz. Ian Wright GW1MVL on (0978) 845858.

Derbyshire

Buxton Radio Amateurs. Lee Wood Hotel, Buxton. 8pm. May - SWL Class, 30th - Morse Tuition Evening. Derek Carson G4HHO on (0298) 255566.

Derby & Dars. Wednesdays, 7.30pm. 119 Green Lane, Derby. June 16 - Talk by Castie Electronics. Derek Carson G4HHO on (0298) 255566.

Devon


Exeter ARS. 2nd Mondays, 8pm. The Community Centre, St Davids Hills, Exeter. June 14 - Talk by Richard GD2YM.

Plymouth RC. Tuesdays, 6.30pm RAE class, 7.30pm Morse class, 8pm Club activities. (As from June for the summer, meetings will be fortnightly). The Basement, The Royal Fleet Club, Devonport. June 15 - Table Sale. G7NA, 50 Bellington Crescent, Plymouth, Devon PL7 3OP.


Dorset

Dorset Police ARS. The Dorset Police ARS will now be holding regular monthly meetings, at force HQ on the first Thursday of every month, at 7.30pm. Membership is open to Police Officers, serving and retired, Civilian employees, Special Constables and their immediate families. July 1 - Hampshire Police ARS visit Dorset Police ARS. Further info from PC 915 Richard Newton at Ferndown Police Station on (0202) 229351.

Down


Essex


Brantree & DARS. 1st & 3rd Mondays, 8pm. Community Centre, Victoria Street, Brantree. June 21 - Discussion on Future Venues for the Club. J. F. Burton G1WOO c/o G4JXG, 88 Coldnailhurst Avenue, Braintree, Essex CM7 5PY.


Greater London


Crystal Palace & DRC. 3rd Saturdays, 8pm. All Saints Parish Rooms, Beulah Hill, London SE18 (opposite junc. Grange Road). Wilf Taylor G3OSC on (081) 699 5732 or Bob Burns G3OU on (0737) 552170.

Edgware & DRS. Watling Community Centre, 145 Orange Hill Road, Burnt Oak, 8pm. June 10 - Experiences in Sri Lanka by Doug Goodison GOLUH, 24th - Morse Training Evening, July 8 - Antena Systems & Discussion by John Pleased G4YOS. Howard Drury G4HMD on (0222) 822776.

Greater Manchester

Tameside ARS. 2nd & 4th Tuesdays, 7.30pm. ATF Camp, Moorcroft Street, Droylsden, Tameside. A. N. Laughlan G1YCM, 8 Kempton Close, Droylsden, Tameside, Manchester M35 7LJ.

Hampshire


Farnborough & DR. 2nd & 4th Wednesdays, 8pm. Farnborough Community Centre, Meadon Avenue, Farnborough, Hants. I. F. Ireland G4BJO on (0252) 543036.


Southampton ARC. 1st Mondays. Millbrook Community School, Green Lane, Maybush, Southampton, also 3rd Mondays at the home of one of the club members. Malc Troy G1WIUL QTHR.


Hereford & Worcester

Bromsgrove ARS. 2nd & 4th Tuesdays, 8pm. Lickey End Social Club, Alcester Road, Burcot, Bromsgrove. June 22 - Night on the Air (r.f). Mr D. Edwards G4WR on (0527) 546705.

Vale of Evesham RAC. July 1 - Visit to Wyre Mill/Night on the Air from the Mill. Alasdair on (0386) 41508.

Woodpecker RC. Mondays, 8.30pm. Richmond Place Club, Edgar Street, Hereford. Bob G1HWP on (0432) 277591.

Hertfordshire


Hoddesdon RC. Alternate Thursdays, 8pm. Conservative Club, Yeo Road, Hoddesdon, Herts. June 10 - Social Night, 24th - Visit to Tolmers Campsite, July 8 - Social Evening. Roy G4JUNL on 081-804 5643.

Humberside

Goole R. & ES. Fridays, 7.30pm. West Park Pavilion, West Park, Goole, last
Practical Wireless, July 1993

**West Midlands**
Midland ARS. Unit 22, 60 Regent Place, off Caroline Street, Birmingham B1 3NJ. Wednesdays - RAe classes. Thursdays - natter nights, 2nd & 4th Mondays - PC Night. Last Fridays - Atari Night.
John Crane GGLAI on 021-628 7632 evenings.

**West Sussex**
Crawley ARS. Wednesdays, 8pm & Sundays 10.30am. Hut 18, Tiltyate Forest Recreational Centre, Tiltyate, Crawley, Sussex. June 23 - DXCC by G3LQP, P. Chayney G3PVK, 11 Southgate Drive, Southgate, Crawley, Sussex RH106EE.

**West Yorkshire**
Halifax & DARS. 1st & 3rd Tuesdays, 7.30pm. June 15 - Modifying PMR Equipment by Philip Morley G4FSQ. David Moss G0DLM on (0422) 262306.

**Wiltshire**
Devizes & DARC. Weekly, 8pm, Hare & Hounds Inn, Hare & Hounds Streete Devices. June 16 - Alternative Technology & Amateur Radio, July 3 - BBQ. Noel Woolrych G4JTX.

**Worcestershire**

**Donna says** “send in some funny club photos or anecdotes to liven up this page...really good ones will end up in print and make your club famous!”
SCANNING RECEIVERS

NEW - MVT-7100, Set to be the THF handheld of 1993. This radio must be heard to be believed. It provides effortless reception of SSB and CW signals using TRUE carrier injection with 50kHz resolution. It can even be used with accessories. £1499

YUPITERU MVT 7000 HANDHELD

* Receives 8 to 1300 MHz
* 1000 Memory channels
* AM/FM/NFM Modes
* Narrow filter for CW
* Large display with strength meter £399

HP2000 HANDHELD

Still our most popular handheld scanner.
* 50MHz-1300MHz
* 1000 Memory channels
* AM/FM/NFM Modes
* Large display £599

MS1000 Base/mobile

A mobile version of the HP2000 handheld but with added features.
* Tape recorder voice activated switching
* Audio squelch
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HT51500P - As above but with both DUNNY Dummy Load and peak or average power meter £169.00

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Review
The Jim MX-14S 14MHz Transceiver

The Jim MX-14S is a hand-held, low power s.s.b. and c.w. transceiver manufactured by Santec in Japan. Coverage of the MX-14S is two 50kHz sections of 14MHz with the frequency controlled by a variable crystal oscillator. The MX-14S can be powered from seven NiCad or six ordinary AA size batteries fitted internally, or from an external 9.5V d.c. supply. If NiCad batteries are fitted they can be charged in situ with 13.8V via the external power socket. As delivered the MX-14S is supplied with a d.c. lead, six dry cell batteries, and a dummy battery. There’s also a short carry strap, but it doesn’t come with an antenna.

Small Manual
The small operation manual consists of two double-sided sheets of printed A4, and it’s written in real English by the importers! It includes all the information necessary to use the MX-14S and wiring diagrams for the external attachments.

First impression of the MX-14S is that it’s solid and robust. The case is metal and in two parts, the rear section of which has to be removed to fit the batteries. All the major controls are on the top panel and clearly marked. The fitted Morse key is a small button next to the S/output meter. There are also sockets for an external speaker/microphone on the top panel. On the bottom panel are the connections for a key and the d.c. power lead, plus the mode switch and 10dB receiver attenuation switch.

On The Air
Having read the manual the time came to try the MX-14S on the air. Only one crystal is fitted as supplied, providing coverage from 14.20 to 14.25MHz, this doesn’t include the international QRP s.s.b. frequency of 14.285MHz.

I used a bench power supply and found the r.f. output into a dummy load to be a little over 2W on c.w. It was a little under 2W on s.s.b. when I whistled hard into the microphone.

Listening on the band revealed the receiver to be sensitive but prone to overloading by very strong signals. Switching in the 10dB attenuator was helpful under these circumstances.

Editorial note: Waters & Stanton, commenting on the review say the overloading occurs on a large antenna, because the receiver front end is optimised for the optional whip antenna. A simple five minute modification to the attenuator (increasing it to 20dB) removes the problem. Details on the modification, and other operating tips are available direct from W&S.

The tuning rate of the variable crystal oscillator is slow enough to allow signals to be easily resolved. On receive the audio output from the internal loudspeaker was clear and of more than adequate volume. The output reading on the meter is useful reassurance that r.f. is going out into the ether when nobody answers your QRP calls! Despite my pessimism, with the MX-14S connected to a trap dipole via an a.t.u., my first proper contact came within the hour with Alex UI23AZW in Moscow who gave me a 5 and 5 report.

I got a crystal to cover the QRP s.s.b. frequency and the total coverage available was 14.2 to 14.3MHz. In practice the coverage is slightly more as the variable crystal swings the crystals a few extra kHz beyond their quoted coverage.

There are a considerable number of optional accessories for the MX-14S. These include all the crystals required to cover the band from 14.00 to 14.35MHz, a carry case, and antenna. Also available is a c.w. semi-break-in and sidetone circuit, a 10W linear amplifier and a 12V to 9.5V d.c. to d.c. converter.

Although there’s no sidetone, keying is not completely blind as the ‘send’ i.e.d. lights when the key is depressed. If an external key is fitted it must be unplugged on receive.

I used the MX-14S over a bank holiday weekend, only s.s.b. was used. Contacts were made with several European countries. I received 59 reports from Juan EA6YX and Ati HA8RJ.

Summing Up
Summing up, however good the MX14S is (and it is good), the price has to be a significant consideration. At £289 at the time of writing for the basic rig, it seems to me to be a great deal of money. I think that there’s absolutely nothing wrong with this rig that a substantial price reduction won’t cure.

The MX-14S may be pocket size, but it is a real h.f. radio. Operating QRP is a challenge but contacts can be made, and you may be surprised how far a few Watts will go.

My thanks go to Waters & Stanton of 22 Main Road, Hockley, Essex SS5 4Q5, tel. (0702) 206835/204965, FAX (0702) 205843, for the loan of the review transceiver which is available from them at £289 inc. VAT with free delivery.
The 'Tiny Tim' is a 3.5MHz single sideband 'phone Transceiver In miniature (hence Tiny TIM!). My aim was to design a rig which is complete, simple yet effective, low cost, suitable for home construction and with an output of about 10 to 20W p.e.p.

The rig is a superhet using the filter method of s.s.b. reception/generation. In this way it avoids the main snag of extra QRM inherent in the simple direction conversion method which receives (and transmits) both sidebands.

The block diagram, Fig. 1, clearly shows how simple the transceiver is. You'll also see that the filter is used 'both' ways, another technique towards simplicity.

KEY TO SIMPLICITY

The key to the mechanical simplicity in the 'Tiny Tim' is the use of varactor diodes for tuning. The tuning range is 3.6 to 3.8MHz, and is provided by potentiometers.

Using potentiometers, allows the use of p.c.b. copper clad material for the front panel. This can then be soldered directly to the main board itself.

The transceiver provides audio output for a speaker or headphones. In use, it only requires an uncritical d.c. power supply in the range of 12 to 25V at 2A.

Operating on 12V d.c. the transceiver will provide 10 to 12W p.e.p. It's possible to run it with higher voltages, and up to about 35W p.e.p. output can be achieved. The transmitter output uses a robust f.e.t. with a high Q tuned matching circuit.

The design is suitable for most types of microphone. The transceiver also has built-in r.f. speech limiting or processing.

Setting up is relatively simple. A frequency meter is desirable, and you'll also need a 2A d.c. meter and an output power indicator.

Although primarily designed for s.s.b. 'phone operation, the transceiver can be used on c.w. If there's enough interest, this could be the basis of a future modification.

The complete transceiver only uses six i.c.s, seven transistors and a voltage regulator. My prototype measured 160 x 100 x 80mm.

The Tiny Tim is aimed at constructors with previous experience. I suggest you photocopy the circuit from the magazine page, and you can then cross off the parts as you fit them.

THE RECEIVER

I shall depart from the usual PW convention, by describing the receiver first. I'm doing it this way since the receiver can be built and used on its own, whereas the transmitter part of the project can't be used by itself.

The receiver, as can be seen in the circuit diagram, Fig. 2, is actually a simple superhet in which the incoming signals are converted to the intermediate frequency of 455KHz. They're then filtered, detected and the audio amplified for either the headphones or a loudspeaker.

The circuit appears more complicated than...
you might expect. This is because electronic switches are included in the signal path to reverse the flow during transmission (more on this later).

Because of the two-way flow, I call the rig a ‘bi-
directional’ superhet. If you only want to build the receiver, this circuit works on its own, provided you connect your antenna to the receiver antenna terminal.

INCOMING SIGNALS

Incoming signals are initially filtered in the double tuned r.f. filter T1 and C27 and L2/C29. These cover the 3.6 to 3.8MHz band without the need to retune.

Output from the second resonator is capacitively coupled to the NE612 first mixer i.c., IC1, at an impedance of 1.5kΩ. It's done through one section of the CD4066 quad electronic transmission gate, IC2.

An LM317 voltage regulator, IC5, is used to provide a very stable +8V supply for the varactor diode and other circuits that can’t withstand the intentionally wide range of main transceiver supply voltage (12 to 25V).

In this particular application the first mixer, IC1, is driven by an external v.f.o., Tr1, working in a Hartley configuration over the range of 4.055 to 4.255MHz.

Special ceramic capacitors with a negative temperature coefficient compensate for temperature changes in the coil leading to a stable v.f.o.

The tuning varactor diodes, D1a and D1b, are connected across part of the coil. And to avoid slow motion drives (with all their horrible mechanical complexity) the tuning voltage is obtained from two potentiometers R1 and R4.

The potentiometers provide coarse and fine tuning control, rather like some older rigs had band-set and bandspread controls. Without this arrangement it would not be a TIM! However, in practice it's very easy to use.

THE MIXER

The output of the mixer (again at 1.5kΩ) is fed back through another transmission gate to the i.f. filter. The filter FL1, has excellent performance for its price, and removes unwanted signals and the other unwanted sideband.

The filter output is applied (through another transmission gate in the second 4066, IC4) to the second NE612 mixer which acts as a product detector. This NE612, IC3, uses its own oscillator section which is stabilised by the ceramic resonator XL1, which is pulled down from its nominal frequency of 455 to 435.5kHz.

Each NE612 mixer has about 15dB of gain, so this compensates for the lack of an i.f. amplifier. Audio output from the product detector is applied direct to the a.f. gain control. This is set at a higher impedance than normal to improve receiver muting on transmit.

The audio amplifier, IC6, is a TDA2030H and provides all the audio gain and low impedance output necessary for driving a loudspeaker. It's a cheap and very flexible device which is used in op-amp fashion.

In this particular application the audio amplifier i.c. remains active on transmit, so that c.w. enthusiasts can feed in a side-tone signal at ST on the IC6 negative input, while remaining unaffected by the receiver audio gain setting.

That's enough on the theory of the Tiny Tim for now. Next time, I’ll describe the construction of the receiver and we'll proceed on to the p.c.b. aspect of the project.
### SHOPPING LIST (FOR THE RECEIVER)

#### Resistors
- **Carbon Film 0.4W 5%**
  - 1Ω 1 R19
  - 220Ω 2 R12, 20
  - 470Ω 3 R8, 11, 16
  - 1.2kΩ 2 R3, 14
  - 3.3kΩ 1 R6
  - 10kΩ 1 R18
  - 100kΩ 1 R7
  - 220kΩ 4 R5, 9, 10, 17
  - 1MΩ 1 R15
- **Miniature p.c.b. mounted preset**
  - 10kΩ 1 R2
- **Rotary ‘Normal’ size potentiometer**
  - 10kΩ 2 R1, R4 (Linear)
  - 470kΩ 1 R13 (Logarithmic)

#### Capacitors
- **Miniature Disc Ceramic**
  - 10pF C4, 6 (NPO type)
  - 18pF C28, 30
  - 47pF C15
  - 100pF 2 C5 (N150 types making C5, 200pF)
  - 220pF C24
  - 330pF C27, 29
  - 470pF C14, 16
  - 10nF C1, 3, 7, 8, 10, 12, 21, 31, 32
- **Miniature Polyester 5%**
  - 10nF C19, 20
  - 22nF C18
  - 100nF C9
  - 470nF C2, 13, 26

- **Miniature Electrolytic (16V working)**
  - 1μF C23
  - 100μF C11, 22 (C22 must be 35V if using a higher voltage p.s.u.)
  - 330μF C25

- **Rotary Trimmer Type**
  - 65pF C17

- **Inductors**
  - 5μH 3 L1, 2 and T1 (Toko KANK3337 type)

- **Semiconductors**
  - 1N4148 D2
  - 2N3819 Tr1
  - BB212 1 D1 (a and b)
  - CD4066 2 IC2, 4
  - LM317 1 IC5
  - NE612 2 IC1, 3
  - TDA2030H 1 IC6

#### Miscellaneous
- The filter FL1 is a CFJ455K5 type, and the resonator XL1 is a CSB455E, suitable connecting wire and cables, plus suitable plugs and sockets. Other constructional items will be needed to finish off the project.

An additional components list for the transmitter section of the transceiver, together with a combined miscellaneous list will appear in part two of the project.

### TINY TIM KIT

A complete kit including the p.c.b. and additional components for the Tiny Tim will be available from G3PCJ for £75 inc p&p. For further details contact Tim Walford G3PCJ, Upton Bridge Farm, Long Sutton, Langport, Somerset TA10 9NJ.

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**Tim Walford G3PCJ is a busy designer, and the 'Tiny Tim' prototype (Centre) is shown with his 'Yeovil' and other items at the 1993 Yeovil QRP Convention.**
My QRP DXpedition to Monaco

Peter Barville G3XJS had an idea “Why not nip along to Monaco and put 3A on the QRP map?”. However, at 5am when the alarm clock was ringing loudly in his ear, he thought the trip seemed less attractive. But, he went, and here’s what happened......

I was on holiday with my family in the south of France, just outside Frejus when the idea came. I would have an ideal opportunity to activate Monaco. It’s one of the few European countries from which (as far as I know) there had never been any h.f. QRP c.w. activity.

At first, it all looked too easy. Monaco was, after all, only about 100km from our holiday site. And I would have the h.f. mobile equipment with me.

It seemed sensible to make a few enquiries to minimise possible problems. So, I wrote to Claude (3A2LF) for any tips he might have. I also spoke to the operators of 3A/GOFUN/M who had been to Monaco twice previously.

I soon realized that there would be many problems, and that they could make my proposed operation impossible. This view was supported by John (3A2LU), to whom I was lucky enough to talk at length on 144MHz f.m. whilst he was visiting Britain.

Small Principality

Monaco is small (in English terms 8 square miles). It’s a densely populated Principality, with no spare space whatsoever. The Principality is dominated by high mountains to the north. These rise steeply from the shore line, enclosing the whole area.

No antennas may be put up at any location for portable operation. So, it’s not possible (or indeed legal) to operate a portable amateur radio station from Monaco.

The only way to activate 3A is to operate mobile (unless you use a local station’s site!). But there are some parking spaces beside the harbour, and from which mobile operation is permitted.

However, several million tourists visit the Principality each year, and parking spaces are very much in demand. As we would be going during August, parking couldn’t be guaranteed, unless we arrived at the crack of dawn!

Very Hot

Monaco is very crowded in August, and very hot indeed. So much so, many residents choose to spend August elsewhere. Both Claude and John would be away for that very reason.

Claude suggested I would be able to cool off in the harbour swimming pool. For this and security reasons, ideally I would need at least one other member of the family with me.

So, how could I ask the family to devote one day of our holiday to amateur radio, and get up very early? I was also hoping somebody might like to join me on the venture!

Floating The Idea

So, I began floating the idea of ‘a day trip to Monaco’. There was much discussion, particularly concerning the fact that it would involve getting up at 5am! And, to my surprise, agreement was reached that we would all go later that week.

I now had a few days to provide as much warning as I could for those operators I knew would be keen to work 3A 2-way QRP. Luckily, with some pre-arranged skeds, I was able to warn friends I was to be in Monaco on the following Friday.

I suggested the start time would be about 0500z (0700 local French time, 0600 in Britain) so we could park the car and make use of the coolest part of the day. The heat was likely to be a limiting factor to the amount of time I could operate.

Fortunately, the timing of my s.s.b. sked enabled Bren G4DYO to put some advance publicity in the DX Newsheet. The QRP gang also did their best to alert others. From now on it was down to me and the alarm clock!

Into Monaco

The route into Monaco from the coastal motorway takes you via a 1.5km tunnel through the mountains. Nothing can prepare you for the experience of emerging into the wonderful spectacle and atmosphere which is Monaco.

Perhaps the fact that we arrived before 7am, and that the town was still largely asleep, contributed to the magic. It was too early for tourists, but there were men with high pressure hoses washing down the roads and pavements. We were to learn how spotlessly clean Monaco is maintained, and I was soon to learn how powerful the hoses were!

We asked one of the men the way to the harbour, and although he gave us suitable directions, he was obviously somewhat bemused at being approached by tourists at that time of day!

Sure enough, we discovered the parking spaces next to the harbour I had been told

Parked alongside the harbour in Monaco. Peter Barville G3XJS, was grateful for the shade offered by the tree when he was operating as 3A/G3XJS/M from the Principality.
My QRP DXpedition to Monaco

During the G3XJS Monaco QRP DXpedition, the cramped operating conditions in the hot and humid car weren't helped by the inquisitive visitors and high pressure hosepipes!

about. But to my dismay, there was a very large building just across the road.

Not only would the QRP r.f. have to contend with the mountain barrier, but also the large man-made barrier. And how much QRN would be generated from within the building?

Well, there was nothing for it but to screw on the 7MHz whip, set up the rig and try a call. A quick check of 7.030MHz to find a clear frequency, and then at 0507z, a brief "CQ QRP de 3A/G3XJS/M QRP".

First Contact

To my utter delight, Bob G4JFN QRP came straight back. We exchanged RST 549, for what may well have been the first two-way QRP QSO between the UK and Monaco.

Many other QRPers were waiting on frequency. I was delighted to have a steady supply of callers from all around Europe, there were so many I missed breakfast!

My family soon went off to explore a still delightfully peaceful Monaco. Meanwhile, I was discovering how difficult it can be working a c.w. mini pile-up while sitting in a cramped car.

There were other problems too. An American gentleman stuck his head through the open window to ask (in mid pile-up) what sort of radio I was using, and to say that I looked like a "mobile radio station"!

A lorry carefully but noisily manoeuvred in front of me to the edge of the harbour wall to pick up a waiting skip. The heat and humidity was far too great to close the car windows against the noise and diesel fumes it was creating.

However, I had to hurriedly close the windows when one of the high pressure hose operators appeared from nowhere to clean the road. The water may have been refreshing in smaller quantities, and lower velocity, but it did nothing for my operating technique at that instant!

The parking spaces quickly filled, leaving barely enough room between cars to open the doors. An Italian family parked next to me, spent a considerable amount of time standing by my open windows discussing, in a very loud and animated fashion, the contents of their picnic lunch.

Family Exploration

My family returned from their exploration, and we enjoyed our picnic lunch. But by then, I had completed many QRP QSOs on 7, 10 and 14MHz. I had already remained active for longer than anticipated, thanks largely to some shade offered by the small tree next to me.

My family were enjoying their visit immensely, and were keen to offer me the chance to have a look round. While my wife and daughter stayed with the car, my son took me on a guided tour of some of the wonderful sights they had discovered.

Before leaving Monaco, the others chose to cool off in the harbour swimming pool. By now, the heat was affecting the rig, and (strange as it may seem) I couldn't wind the power down to QRP levels, but had to use slightly higher power.

By then though, I think I had satisfied most of the stations looking for two-way QRP QSOs. I felt the trip had been more successful than I could have hoped for.

Voted The Best

What really pleased me, was that the Monaco trip was voted as the best day of the holiday by the whole family. It's a fabulous place to visit, and the local people are very welcoming.

My efforts in acquainting myself with local licensing conditions, and informing one or two of the locals, paid dividends. Without the help from Claude and John, my mini DXpedition would not have been successful, and my thanks go to them. For anybody contemplating a similar venture, the moral of this story is obvious.

The rig recovered once it was allowed to cool down. However, I suffered a little the following day due to dehydration. Perhaps the man with the hose was only trying to be helpful, and I should have made better use of the water coming my way!

PW

Practical Wireless, July 1993
The new TS-505 from Kenwood

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THE WORLD OF QRP

Leighton Smart GW0LBI is a keen QRP operator and regularly contributes to the PW ‘HF Bands’ column. Leighton’s advice compliments that of Frank G3YCC’s in ‘The Challenge Of QRP’, and he’s determined to try to encourage you to have a go too!

The casual listener to the amateur bands today will undoubtedly be enthralled when they hear Australia, North and South America, Japan and so on. But, most of these stations will be running powers of anything between 100 and 1500W. So, as far as the amateur operator or s.w.l. is concerned, it’s not really surprising that such stations can be heard thousands of miles from their source. It is however, more than just possible to work stations around the world using much lower power levels. Unfortunately, the vast majority of amateur stations use excessive power unnecessarily.

The high power leads to high levels of QRM on the bands. Because of this, there’s more difficulty in hearing or working that elusive DX. Many newly licensed amateurs seem to think that you need towers, beams and huge amounts of r.f. to work DX. But how wrong that assumption is!

Frank Lee G3YYC in his article shows has shown you the figures for power and the received S-reports. So, why not use the minimum power that’s needed to maintain reliable radio communication? That it seems, is the thousand dollar question. This leads us to the subject of QRP!

Official Limit

The ‘official’ international QRP limit has been set at 5W and less for c.w., and 10W for s.s.b. As Frank G3YCC says in ‘The Challenge Of QRP’ (and surprising as it may seem) it is possible to work great distances using powers within these limits. Long distances are not only possible, but they can also be done regularly. Contacts over thousands of miles are made every day by stealthy QRP operators, including me!

When operating on the lower h.f. bands, I usually run 10W p.e.p. on s.s.b. I find this quite adequate to work in and around the British Isles. So, to increase my output would serve no purpose, on c.w., I can use even lower power to maximum effect.

Among the stations worked from my station using QRP power levels are: W8ELL on 21MHz using 500mW and a dipole antenna, SH1HK on 18MHz (s.s.b.) using 5W and a dipole, and TA2AU/P on 28MHz (s.s.b.) with 1W. So why don’t YOU try turning down the power now and then?

There’s no need to try 5W straight away. Start with 30W or so, and gradually reduce the transmitter output until you reach the QRP level.

You never know, you may be pleasantly surprised at what you can achieve using just a handful of watts! And remember, whichever mode you use, it’s your operating skill and expertise that make you a good DXer, not your power output. Power is no substitute for skill.

Totally Bored

I became interested in low power after working 100 countries on high power, and then becoming totally bored with the ease of working DX in this manner. There seemed to be no challenge in working DX or new countries by using power levels of around 100W.

However, on 5W and less, the feeling of achievement is immense. It has to be experienced to be believed.

My intention in writing this article was to introduce PW readers to QRP operation through my experiences, and to encourage you to try QRP for yourselves. So give low power communication a try, remember that even Europe is DX if you are QRP. I think that you may be surprised by the potential of low power operating.

PW

Practical Wireless, July 1993
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  - 172B - 12m Boomer
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  - EXP14 - 30-15-10m Vertical

- THSJR - 20-15m 3el Beam
  - 1828 - 50-25-15m Vertical
  - 144VQ - 40-30m Vertical

- 88DX - 40-10m Vertical
  - D4DX - 5el 4el Beam

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- KT34A - 20-15-10m 6el Beam
  - KT34A - 20-15-10m 6el Beam
  - KT34A - 20-15-10m 6el Beam
  - KT34A - 20-15-10m 6el Beam

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  - 6M5 - 6el 1500m Beam
  - 2M165LX - 2m 16el Beam
  - 2M13LX - 2m 13el Beam
  - 2M22C - 2m 11XY Oscar
  - 2M14C - 2m 11XY Oscar
  - 432-30 - 70cm 3el Beam
  - 435-40X - 70cm 40el Beam
  - 435-38X - 70cm 38el Beam
  - 440-6 - 70cm 6el Beam
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  - B151G - 2m 2-15w
  - B1108G - 2m 10-80w
  - B1016G - 2m 10-80w
  - B2516G - 2m 10-80w
  - D2516G - 2m 25-150w
  - 2M5WL - 2m 150w
  - 2M165LX - 2m 16el Beam
  - 2M13LX - 2m 13el Beam
  - 2M22C - 2m 11XY Oscar
  - 2M14C - 2m 11XY Oscar
  - 432-30 - 70cm 3el Beam
  - 435-40X - 70cm 40el Beam
  - 435-38X - 70cm 38el Beam
  - 440-6 - 70cm 6el Beam
  - J4V - VHF/150MHz

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Practical Wireless, July 1993
"I have a four year old daughter and a demanding job so I like simple projects that I can get going easily". These remarks struck a chord with me as I sat in St Aidan's Church, at Rochdale, Lancashire during the October 1992 G-QRP Club's Mini Convention.

The Editor Rob Mannon G3XFD, was holding a PW feedback discussion. The remark about simple projects came from one of the eager participants.

I have three children, and my job as a Civil Engineer demands a lot of re-study. Brunel and Telford were lucky, as they didn't have to wrestle with the Unified European Code for reinforced concrete! So, I have had lots of therapeutic fun with the simple projects.

The 'Queensbury' 7MHz transceiver is a variable crystal oscillator rig. It takes some r.f. from the crystal oscillator of a simple transmitter, and mixes it with the signal to produce audio in the well tried direct conversion manner.

UNIVERSAL TRANSMITTER

The transmitter, Fig. 1, is our old friend the 'Universal QRP Transmitter' from Solid State Design for the Radio Amateur. It's similar to the PW 'Challenger' transmitter, with the added switching transistor.

An r.f. feed is taken from the emitter of Tr1, and is mixed in an SBL1 double balanced mixer to produce audio. The audio is amplified by Tr4 and IC1, with the output fed to the headphone jack socket. Sidelone is provided by IC2.

I constructed the prototype on plain perforated board. I prepared the board by drilling support holes in the four corners and bolting a solder tag to them. A 22s.w.g. tinned copper wire is then soldered around the perimeter to the tags and forms the earth busbar.

My method is to build a bit, and test it even with a simple project like this. I started with Tr1 up to T1, and checked for r.f. output with a diode probe and a meter. I didn't bother with the variable crystal oscillator capacitor C2 at this stage, adding it later.

Next, the transistor Tr3, and associated parts can be added and the output checked across a 50Ω dummy load. I managed 2W with a 12V supply, and 3W with a 13.8V supply. The switching transistor Tr2 can now be added and checked for 12V on its collector when the key lead is grounded.

The variable crystal oscillator capacitor can now be fitted. I got a 7kHz swing from 7.029 to 7.036MHz using the QRP calling frequency crystal of 7.030MHz.

The receiver can be built a bit at a time. Start with the audio i.c. by testing into some headphones. The usual test of a finger on the input should give a loud buzz in the 'phones. After adding the pre-amplifier transistor, Tr4, the buzz should be louder.

The mixer and input coil, T2, can now be added to complete the board. Adding the 12dB attenuator helped with noise and BC breakthrough.

The whole board can now be tested and hopefully all will be well. The changeover and switching wiring can now be added.
ON THE AIR

My first try on the air had me in QSO with a DL from near Düsseldorf, who gave the little rig a 579 report. I have also had some QRP-QRP QSOs with G-QRP members, and have been pleased with its performance.

I soon learned to tweak C14 for weaker signals. But the variable capacitor, C2, required a little care to know where the rig was transmitting in relation to receive frequency. The best way is to ask a friend to answer your CQ. Then you will know where to place the variable crystal oscillator (VXO) in relation to an incoming signal.

These simple VXO rigs usually shift a small amount between receive and transmit. On the prototype it was about 150Hz. Knowing this, by tuning the receiver on the high side of the received signal, with a very low c.w. note, I could be heard by the other station.

I hope you enjoy using the PW 'Queensbury' (named after the town near my home) as much as I did. Have fun - QRP (Queensbury) rules!

BUILDING THE QUEENSBURY TRANSCEIVER

Keen constructor Clive Hardy G4SLU built the PW prototype 'Queensbury' and tried out another construction method, using the Howes 'Speriboard' system.

The prototype 'Queensbury' transceiver was built on plain perfboard. But when I was asked to build one, 'Speriboard', a new p.c.b. type product from Howes Communications immediately came to mind.

Speriboard is a single-sided p.c.b. system etched with lands, and it's very useful for the prototype builder. A review of Speriboard by Tex Swann G1TEX, appears in the December 1992 issue of PW. The boards measure 160 x 100mm.

CONSTRUCTION TECHNIQUE

My construction technique follows the same philosophy as that of Steve Ortmayer G4RAW. Build a bit then try a bit!

Mail order produced those components I couldn't find in the junk box. The layout of the circuit on the Speriboard was arrived at by using that high level design technique - trial and error.

The two 8 pin i.c.s are fitted back-to-back on one of the two i.c. areas of the board. I used a single 16 pin dual-in-line socket, as using a socket makes changing an i.c. a lot easier if faults occur.

The 50pF air spaced capacitor used in the crystal oscillator can be an expensive item to buy new. So I tried a miniature a.m. tuner capacitor, which has a 59pF section and costs just over £1 from the Maplin Electronics catalogue.

The crystal I used, swung from 7.029 to 7.032MHz. Different crystals cut for the same frequency may well swing more.

Practical Wireless, July 1993

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Fig. 1: The circuit diagram for the 'Queensbury' 7MHz c.w. transceiver.

Next to be fitted was the p.a. and switching transistors. I didn't get nearly as much power out with the BD131 as Steve. So I exchanged it for a BFYS1 and got about 1W out.

Further down the junk box I found a 2SC495 transistor which produced 4W into a 50Ω dummy load at 13.8V, and so was left in place. A 2SC495 equivalent is the BD139. Both the BD139 and BD131 transistors are TO126 types.

It's likely that numerous transistors are suitable for use in the p.a. Any transistor which produces a 1W or more is fine. The switching transistor used is a BD140, an equivalent to the BD136.

THE RECEIVER

When building the receiver, the pin spacing of the SBL1 makes it difficult to solder it directly to the d.i.l. pads on the board. So, I made up a piggy-back board from a piece of scrap Veroboard and Veropins.

With an antenna connected and C2 adjusted, signals could be heard from all around Europe. My version suffered from a high pitched whistle from the loudspeaker. It was cured with the addition of a 0.1µF ceramic capacitor (shown as C25) across the audio output between and earth. The trimmer, C14, is adjusted for best results on receive before boxing up.

Fitting the board into the box was very simple using double-sided adhesive foam pads. Wiring up the various sockets was also straightforward. When the rig was fixed in the box and all the sockets fitted the output power went right down.

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Fig. 2: The transceiver sidetone circuit.
I found that a 100pF trimmer capacitor (shown as Cx) across C2, in Fig.3 allowed the circuit to be brought into resonance, and so restore sufficient drive to Tr3. A further 22pF capacitor may have to be added as the 100pF trimmer was initially fully meshed at resonance.

Don't ask me what caused the problem! And although it might not happen to you, it's worth noting that in the original ARRL circuit a variable capacitor is used.

The whole project only took a couple of evenings to construct. There was much soldering and de-soldering whilst component positioning were decided. However, the Speriboard's lands stayed firmly attached to the board, despite the abuse to which it was subjected.

ON THE AIR

I went on the air, and managed a quick local contact to check that the rig was performing correctly. Then I rushed it over to Rob Mannion G3XFD who was itching to have a play with it!

In one afternoon, with over 2W going into the antenna, G3XFD obtained a 589 from DJ2OD and QSOs into several other European countries. He also worked Gus G8PG, the well known QRP operator. Both Rob and I think Steve has designed a nice little rig, which works well and should give hours of fun.

The total cost for my version, buying everything new and via mail order, worked out at about £43 including post and packing. Careful selection of supplier, bargain hunting at rallies, and a good junk box will reduce costs significantly!

SHOPPING LIST

Resistors
Carbon Film 0.5W 5%
- 10Ω 1 R14
- 82Ω 3 R4, 7, 9
- 90Ω 1 R8 (2x 180Ω in parallel)
- 220Ω 1 R3
- 470Ω 2 R10a, 10b
- 1kΩ 1 R6
- 4.7kΩ 4 R2, 5, 12, 16
- 10kΩ 1 R1
- 1MΩ 1 R11

Miniature Rotary (Panel mount)
- 5kΩ 1 R15
- 10kΩ 1 R13
- 47kΩ 1 R17

Capacitors
Miniature Disc Ceramic 10%
- 220pF 1 C3
- 470pF 2 C8, 13
- 10nF 4 C1, 15, 16, 19
- 0.1µF 7 C7, 9, 11, 12, 23, 25, 26
- 0.22µF 2 C17, 18

Miniature Polyester 5%
- 82pF 1 C4
- 100pF 1 C6
- 180pF 1 C5

Miniature Electrolytic 16V working (axial)
- 10µF 2 C20, 24
- 47µF 1 C21
- 220µF 2 C10, 22

Miniature Film Rotary
- 36pF C14

Semiconductors
- BC108 1 Tr1
- BC109 1 Tr4
- BD131 1 Tr3
- BD136 1 Tr2
- LM386 1 IC1
- NE555 1 IC2
- SLB1 1 Mixer (or any other similar diode mixer)

Miscellaneous
Crystal 7.030MHz, and holder, knobs to suit the various controls, Speriboard SF04S, two I.e.d.s (colours to suit), interconnecting wire, a box for the project. Suitable socket for the various coaxial connection to suit (at this frequency and power, phono plugs/sockets are adequate).
Regular readers will probably now be familiar with the aim and general purpose of this short series of articles. They’re written to give radio amateurs the simple linguistic tools for a basic QSO in commonly-used world languages.

Many radio amateurs will have already come into contact with Spanish during their holidays. However, our aim is not to tell you how to order coffee on the Costa del Sol! We’re aiming to give you enough Spanish to catch the DX and enjoy a QSO with a the Spanish speaking operator.

Spanish is a very important world language. The language is of course spoken not only in Spain (EA) but has been taken from there into the New World. To help identify Spanish-speaking countries, we’ve prepared Table 1.

Many of the Spanish-speaking countries in the table, are ‘caches’ in terms of DX. But remember, that Spanish is not the official language of Brazil, whose language is Portuguese.

System Of Location

A look at the excellent RSGB Amateur Radio Operating Manual, will show that many countries have a system of location within their callsign. And in fact, mainland Spain itself is divided into nine areas, EA1-9.

Let’s look at EA9, as an example. This call area is Southern Spain. Generally, the lower the number the nearer the area is to us in Great Britain. The prefix EA1 is used in the North West and Basque area of Spain.

Contacts on 144MHz are possible from GW4JXN’s QTH in North Wales under lift conditions. Locations in North and Central Spain are usually worked on 144MHz. Southern Spain can be worked on 21 and 28MHz - depending on propagation conditions.

South American Systems

Most of the Southern and Central American countries have a basically similar system to that used in Spain, and have up to nine different call areas. Maps showing the different call areas can be found in the Amateur Radio Operating Manual. Most countries use numbers, although in Uruguay the first letter denotes the province.

Four of the countries - Guatemala, Honduras, Nicaragua and Venezuela permit third party traffic. But the licensed amateur in the UK is reminded that our licensing conditions permit only contact with other licensed operators, not third parties. Your contact in these countries would be committing no breach of his licence conditions. However, the UK based radio amateur speaking to third parties might bring themselves into conflict with the Radiocommunications Agency.

Table 1

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<thead>
<tr>
<th>Country</th>
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<td>Chile</td>
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A look at the excellent RSGB Amateur Radio Operating Manual, will show that many countries have a system of location within their callsign. And in fact, mainland Spain itself is divided into nine areas, EA1-9.

Let’s look at EA9, as an example. This call area is Southern Spain. Generally, the lower the number the nearer the area is to us in Great Britain. The prefix EA1 is used in the North West and Basque area of Spain.

Contacts on 144MHz are possible from GW4JXN’s QTH in North Wales under lift conditions. Locations in North and Central Spain are usually worked on 144MHz. Southern Spain can be worked on 21 and 28MHz - depending on propagation conditions.

South American Systems

Most of the Southern and Central American countries have a basically similar system to that used in Spain, and have up to nine different call areas. Maps showing the different call areas can be found in the Amateur Radio Operating Manual. Most countries use numbers, although in Uruguay the first letter denotes the province.

Four of the countries - Guatemala, Honduras, Nicaragua and Venezuela permit third party traffic. But the licensed amateur in the UK is reminded that our licensing conditions permit only contact with other licensed operators, not third parties. Your contact in these countries would be committing no breach of his licence conditions. However, the UK based radio amateur speaking to third parties might bring themselves into conflict with the Radiocommunications Agency.

Table 1

<table>
<thead>
<tr>
<th>Country</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chile</td>
<td>CH</td>
</tr>
<tr>
<td>Cuba</td>
<td>CU</td>
</tr>
<tr>
<td>Bolivia</td>
<td>BV</td>
</tr>
<tr>
<td>Uruguay</td>
<td>UR</td>
</tr>
<tr>
<td>Ecuador</td>
<td>EC</td>
</tr>
<tr>
<td>Dominican Republic</td>
<td>DR</td>
</tr>
<tr>
<td>Colombia</td>
<td>CO</td>
</tr>
<tr>
<td>Panama</td>
<td>PA</td>
</tr>
<tr>
<td>Peru</td>
<td>PE</td>
</tr>
<tr>
<td>Brazil</td>
<td>BR</td>
</tr>
<tr>
<td>Argentina</td>
<td>AR</td>
</tr>
<tr>
<td>Paraguay</td>
<td>PG</td>
</tr>
<tr>
<td>Mexico</td>
<td>MX</td>
</tr>
<tr>
<td>Nicaragua</td>
<td>NI</td>
</tr>
<tr>
<td>El Salvador</td>
<td>ES</td>
</tr>
<tr>
<td>Venezuela</td>
<td>VE</td>
</tr>
</tbody>
</table>

South And Central America

When working into South and Central America, a knowledge of Spanish can lead to some good DX. Although you might find you have to fight off stiff American competition for contacts!

Finally, don’t forget that the Spanish of America differs from that of mainland Spain. The difference is similar to the way American English differs from British English.

With Spanish from South America, there are also differences in pronunciation. For example, the Castillian (L) becomes almost an English ‘y’. And in the countries around the River Plate and part of Southern Spain, it becomes the ‘s’ as in the English word ‘invasion’.

Accurate Castillian

Although we have used the word Spanish until now loosely, it would be more accurate to use the word Castillian instead. Castillian is the approved Spanish used for speaking to foreigners, and it’s the standard Spanish forming the basis of the written language.

As in Britain, the geographical areas of Spain differ in dialects in their pronunciation. The letter ‘c’ before ‘e’ and ‘i’ is pronounced as ‘th’ in thank in Castillian but as s in other dialects.

Spanish is more like French and Latin than German. This means that many of the technical words look very similar to English technical words, and are easy for us to remember - and to try out! Also, there’s a great resemblance between the pronunciation of Spanish and the written form.

Notebook Prompter

It’s a good idea to start with your own notebook prompter. This can even be a prepared sheet with a very basic QSO, including a signal report, name, QTH and weather conditions.

Even five short phrases can be sufficient to help the Spanish-speaker in the QSO. If the QRM is bad, then you can try the bi-lingual speaking method suggested in the previous articles. This is the method where you speak Spanish, which is easier for your contact, and he uses English which is easier for you.

Pronunciation Of Spanish

Pronunciation of Spanish is fairly straightforward. The five vowels - a e i o u (w) - are sharp vowels with no tendency to being drawled as in English.

The diphthongs are pronounced like two vowels together. Spanish consonants that need attention are r which is rolled, ‘ch’ which is pronounced as ‘th’ in church, ‘ll’ as ‘li’, ‘yi’ or ‘y‘ according to dialect, ‘c & e’ as ‘th’ or ‘s’ according to dialect.

There’s also ‘b’ and ‘v’ which are pronounced with the lips touching, ‘g & e’ together with ‘g & i’ which are pronounced as ‘ch’ in the Scots ‘loch’ and ‘j’ as ‘ch’. As noted in the previous articles, individuals speaking Spanish will differ as to the number of anglicisms which they will readily use or accept in their language. They will also vary in their use of amateur radio terms and Q codes.

Enjoy speaking your basic Spanish. Good luck and good DX!
### Basic QSOs In Spanish - Part 1

#### English

CQ CQ general call. This is (own callsign) calling on 10, 15, 20 metres and standing by.

#### Spanish

CQ CQ Llamada general. Aquí (own callsign) que llama en 10, 15, 20 metros y queda atento.

#### Pronunciation

Saycō saycō liamadha cheneral. Akee (own callsign) kay llama en dee-ehz, keensay, vehindhē metos ee kwaydha atento.

#### Making a Call

<table>
<thead>
<tr>
<th>English</th>
<th>Spanish</th>
<th>Pronunciation</th>
</tr>
</thead>
<tbody>
<tr>
<td>I think this is the first time we have worked each other. I think we have worked before. The name is ... I'll spell it for you phoentically. I repeat.</td>
<td>Creo que es el primer contacto que tenemos. Creo que hemos tenido contacto anteriormente. El nombre del operador es ... Se lo voy a codificar. Se lo repito.</td>
<td>Crayo kay es el primer contacto kay tenaymos. Crayo kay haymos tenidho contacto anteriormente. El nombray del operadhor es ... Say lo voy a kodifikar. Say lo raypîeto.</td>
</tr>
<tr>
<td>The location is ... I'll spell it for you, in the county/state of ... in North/South/West/East England/Wales/Scotland/Ireland/Canada/USA etc.</td>
<td>Mi ubicación es ... se lo codifico, en el Condado del/Estado de ... en el Norte/Sur/Deste/Este de Inglaterra/Pais de Gales/Escocia/Irlanda/Cananda/USA etc.</td>
<td>Mee oobescathion es say lo kodiefiko, en el Kontadho day/down/eadho day ... en el Nortay/Sooe/Deste/Este day Inglatayrra/Pays day Gales/Escothia/Irlanda/Cananda/GOES AAh etc.</td>
</tr>
<tr>
<td>The location is in the centre of ... on the island of ... In the small/big town/city of ... In the seaside town of ... About ... kilometres from ... The longitude and the latitude is ... degrees - minutes North/South, degrees - minutes East/West. The QTH locator is ...</td>
<td>Mi ubicación es en el centro de ... de la isla de ... En la pequeña/grande ciudad/Capital de ... En la ciudad/Costera de ... Cerca de ... kilómetros de ... La longitud y la latitud es ... grados - minutos Norte/Sur, grados - minutos Este/Deste. Mi localizador QTH es ...</td>
<td>Mee oobiscathion es en el thentro do ... de la Isla day ... En la pekwaynay/granday kweevedthaad/Capital day ... En la kweevedthad costayra day ... Therca day ... kilometros day ... La longitud ee la la latitudh es ... gradhos - minwtos Norte/Swir, gradhos - minwtos Estay/Desstay. Mi lokalithadhor CuuTay He es ...</td>
</tr>
</tbody>
</table>

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**Practical Wireless, July 1993**
Signal Report

You are five and nine in ...
Your signal is variable, very weak, weak, strong, very strong, excellent.
There is no interference. There is a lot of local interference.
Your signals are fading.
Your modulation is good/bad.
I can understand you very easily.
I can understand you only with great difficulty.

Soo senial thinko nway vay en ...
Soo senial es variablay, mooee flocha, flocha, foosertay, indicativo day liamahda.
No tee-enay interferenthia. Hay moochta interferenthia lokal.
Soos seniales se pee-erden.
Soos modoolathion es boona/mala.
Pooyado comprenderlary fathilmente.
Solo pooyado entenderlay con gran difikwitadh.

Asking for Information and Commands

Please state your name/location/callsign.
What is your country?
Please spell your name/location/callsign phonetically.
Please can you give me a report?
Please repeat.
Please speak more slowly.
Do you have a lot of interference?
Are my signals fading?
Have we worked each other before - on this band/on another band.
I'm sorry I do not understand you.
I do not understand/speak Spanish very well.
Please stand by.
Please go again.
Do you copy?
How do you copy?
Is this frequency free/occupied?
This frequency is in use old man, I'm sorry.
I have a sked.
Can we change frequency? How about 10kHz up/down, if the frequency is free.
How about S19?
Can we go simplex?
I shall see you on the ... repeater.
Shall we try sideband?
How about Morse?
I'll give a report on the next over.

Por favor digame su nombre/su ubicacion/su indicativo de llamada.
¿Cual es su pais?
Por favor codifique su nombre/ubicacion/indicativo de llamada.
Por favor digame mis señales
Por favor repita.
Por favor hable mas despacio.
¿Tiene mucha interferencia?
¿Se pierden mis señales?
Hemos hecho contacto anteriormente - en esta banda/u otras bandas.
Lo siento, no le compiendo.
No comprendo/hablo Espanol muy bien.
Por favor esté atento.
Por favor adelante de nuevo.
¿Me copia?
¿Como me copia?
¿Esta la frecuencia libre/ocupada?
Esta frecuencia está ocupada, lo siento.
Tengo cita.
¿Podemos cambiar de frecuencia? ¿Que le parece 10kHz arriba/abajo, si está libre?
¿Que le parece S19
¿Podemos hacerlo en simplex?
¿Le veré en el ... repetidor.
¿Probamos en banda lateral?
¿Que le parece en Morse?
Le dare su reportaje al proximo cambio.

Por favor deegame soo nombre/soo oobikathion/soo indicativo day liamahda.
Kwal es soo pies?
Por favor kodeehekway soo nombre/ovikathion/indicativo day liamahda.
Por favor deegame mes seniales
Por favor raypeats.
Por favor ablavy mas despatih.
Teanay mooshta interferenthia?
Say piayrden mis seniales?
Aymos etsho contacto anteriormente - en esta banda/oostras bandas.
Lo siento no lay compendo.
No comprendo/ablo espaniol moosee be-en.
Por favor este atento.
Por favor adaylantay day nwayvo.
Me copia?
Como me copia?
Esta la frekwenthia libre/okwpahdo?
Esta frekwenthia esta okopahdo, lo see-ent.
Tengo theeta.
Pohdaymos cambiay day frekwenthia? Kay lay paraythe dee eeth kiloherts arreeva/abacho, see esta leebro?
Kay lay parenathay S dee eethi noogheve?
Pohdemos atherlo en simplex?
Lay veray en el ... raypetidhor.
Probamos en banda lateral?
Kay lay paraythe en Morse?
Lay daray soo reportache al proximo cambio.

Basic QSOs In Spanish - Part 2 to follow
Frank Lee G3YCC thinks that one of the saddest advertisements to be seen, is one saying all the station equipment is for sale as the licensee is going QRT. Frank believes this could be because they’ve missed the challenge and pleasure of QRP operating.

There are often good reasons when it may be necessary for someone to go QRT. They may be going abroad or perhaps getting married for example!

However, it’s often a case that the initial interest in amateur radio has gone. Or they may say “I haven’t been on the bands much recently. I don’t seem to have the time nowadays for radio”.

Unfortunately, what they really mean to say is that they just don’t feel the inspiration to go on the air, communicate, experiment or do practical work connected with the hobby. They have nothing to inspire them.

Much effort will have been involved in obtaining the licence, passing the c.w. test, setting up the station, installing antennas and masts, etc., often at considerable expense. By then the magic, the challenge of amateur radio has probably waned. This is a great pity.

BUY EVERYTHING

Nowadays, you can go out and buy everything you need to set up an amateur station. Equipment, antennas, keyers, etc., with the only limitation being your credit limit.

Perhaps if we had to work at acquiring all we need, our attitudes would be different. That’s why I believe in retaining the Morse test. It's a hurdle only hard work will surmount. If a thing is worth having, it's worth working for.

Obviously for some, to go out and buy the necessary equipment is the only way. There’s nothing wrong in this, providing they really use it to the full.

Try adding up the cost of all your gear and dividing it by the number of QSOs in a year. Is the price per contact high?

Then again, one hears the more heartening news that ‘old Fred has got back on the air after so many years being QRT’. More news comes that he’s taken up with RTTY, or packet, satellites, home brewing and so on.

The magic, the challenge has come back.

What I am saying, is that for myself and many others, the challenge that keep us going, is the fascination of operating at low power levels, or QRP. This fact is self evident, in the growth of the G-QRP Club.

THE G-QRP CLUB

Started by the Rev. George Dobbs G3RJV, Fig.1, (well known to PW readers as a regular contributor) over ten years ago, the G-QRP Club membership has risen to over 6000. Membership is still rising.

No-one, especially George, expected the interest to be so profound and popular! Apart from the G-QRP Club, which has members from all over the world, there are several other clubs and societies interested in low power operating.

There are QRP clubs in the USA, Russia, Australia and Eastern Europe, etc. So, just what is QRP?

The term QRP represents the use of low power operating, and is defined usually in terms of output power. The internationally agreed limits are 5W c.w. or 10W p.e.p.

However, there are those who would consider these limits as high power as they use milli or even microwatts! This very low power is sometimes referred to as QRPp. It’s really surprising what can be achieved with these levels of r.f., but more of this later.

You may ask what can be worked with QRP? My reply to this question would be simple. You can work almost anything with QRP you can
For products you can rely upon to give amazing results

For information on Active Antennas, RF Amplifiers, Converters, Audio Filters, the Morse Tutor and Speech Processors send or telephone for a free catalogue and selective data sheets as required.

All our products are designed and made in Britain. Orders can be despatched within 48 hours subject to availability.

--- VISA AND ACCESS WELCOME ---

--- Practical Wireless, July 1993 ---
Fig. 1: The G-QRP Club founder, Rev. George Dobbs G3RJV, presenting a QRP award to Randy AA2U at the Dayton Hamvention in 1991. Courtesy of G. Dobbs G3RJV.

Fig. 2: Chris Page G4BUE, is a keen QRP operator who has achieved tremendous results with ultra low power. Courtesy of G. Dobbs G3RJV.

with QRO (high power). Tremendous distances can be crossed with a few Watts, and there are awards to be won for those 'thousands of miles per Watt'.

Obviously, there are times when QRP will fail. For example, it can fail when band conditions are difficult or QRM levels are particularly high.

You have to be prepared to work that bit harder. You must be patient, and most importantly be absolutely sure that the gear is working to the maximum efficiency.

An efficient antenna system must be used. Only minimum losses can be tolerated by the QRPer. Of course, this applies to all amateurs!

Many of us would benefit a lot by attending to the most important part of the station, i.e. the bit outside. You can avoid pumping more and more r.f. into an inefficient antenna system, and the received signal will also benefit from antenna system improvements.

And, there's nothing incompatible with a QRPer operating into a multi-element antenna array. After all, they're only trying to get their precious flea power r.f. to go where it's intended.

THE TECHNIQUE

The other important point when using QRP is technique. I have often worked DX stations by putting the call sign in just once, when the wolf-pack dies down.

Adding the suffix QRP to the callsign can attract attention. But, please note that signing G3YCC/QRP is not permitted, but G3YCC (space) QRP is permissible. I remember a Korean station hearing my call with the QRP suffix added. I was among many other stations calling but he asked the rest of the world to stand by while we had a QSO, because he was interested in QRP. And this was in the middle of a contest!

Let's take a look at power and the effect of reducing it, with respect to received reports and illustrate what can be expected:

<table>
<thead>
<tr>
<th>Power (Watts)</th>
<th>Report (RST)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100W</td>
<td>S9</td>
</tr>
<tr>
<td>25W</td>
<td>S8</td>
</tr>
<tr>
<td>6W</td>
<td>S7</td>
</tr>
<tr>
<td>1.5W</td>
<td>S6</td>
</tr>
</tbody>
</table>

These figures bear out what was learned for the RAE. Namely, that for an increase of one S-point, we have to increase power by a factor of four. The reverse is of course, also true.

Many amateurs have achieved remarkable results with even less power than 2 or 3W. Even with microwatts, it's possible to work thousands of miles.

I haven't gone down to really low power levels myself. It isn't always easy to measure such levels or even to reduce the transmitter low enough. But I have 'crossed the pond' a few times using an input power of 100mW and approximately 40mW out. This works out at over 90 000 miles per Watt.

One keen 'milliwatter', Chris Page G4BUE, Fig.2, has had tremendous results with ultra-low power, worldwide. And DXCC has been achieved by many QRPers. For example, there's George GM30XX, who has worked over 100 countries with 1W using simple wire antennas and Randy AA2U who has worked well over 200 countries with low power.

AWARDS FOR ACHIEVEMENT

There are several awards for QRP achievements, especially organised by the G-QRP Club. The DXCC is one, as is the Worked All Continents award.

My own score stands at 120 countries worked. Once you start keeping a record of countries worked, you will find it of great interest and stimulation.

It's worthwhile noting the QRP calling frequencies. On c.w. these are 3.560, 7.030, 14.060, 21.060 and 28.060MHz. They are the most likely spots for you to hear QRP stations calling.
Although c.w. is the preferred mode for QRP, don't exclude the use of s.s.b. The 28MHz band is excellent when it's open and you can work great distances on lower power. Recently, I've contacted two V/Ks and A92 in Bahrain using my TS-130V barefoot at 10W p.e.p. into my doublet antenna, which is used on all bands.

The 7MHz band is probably the most fruitful for inter-G QRP working, especially at the weekend. The QRP contests organised by the RSGB, G-QRP Club, etc., are a good chance to QSO other low power stations, even where the contests do not particularly suit you. Reports from s.w.l.s are of particular value to the QRPPer, so there's plenty to interest listeners.

**POWER DOWN**

For a start on QRP, there's nothing wrong with just turning the power down on your QRO transceiver. This of course helps reduce the possibility of TVI and BCI. But in due course the appeal of home brewing may tempt you into making a dedicated QRP transceiver or transceiver.

There are many firms now advertising suitable kits, and constructional articles often appear in *Practical Wireless* and other magazines. Jandek, Howes, Malsor, Kanga and Lake Electronics are examples of firms specialising in QRP kits to suit all pockets.

Of course Sprat, the magazine of the G-QRP Club is full of such information. Anyone interested in building a simple rig should have no trouble finding all the information needed. Home building a simple rig is one of the aspects that endears QRP to many amateurs.

**COMMERCIAL RIGS**

There are also commercial low power rigs obtainable. For example there are the TS-120V, TS-130V, FT-77S, Ten Tec Argonaut 515 sets. And Heathkit products such as the HW8 and HW9, are still available on the second hand market, and well tried and tested transceivers.

In conclusion, I would recommend QRP to all who fancy meeting a new challenge. Perhaps your local club could organise a competition for members to encourage QRP activity. One idea could be to see how many countries can be worked in say one month.

*But please remember - QRP is addictive!* PW

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**Radio Diary**

*Practical Wireless & Short Wave Magazine in attendance.*

**June 12:** The Sussex Amateur Radio & Computer Fair will be held at the Haymill Youth & Community Centre, Burnham Lane, Slough (near, Brumwell Railway Station). Doors open 10.30am, admission is £1.50. Car boot sale is £2 per pitch on the day. Free parking on site & talk-in on S22. Nailing G0VIN (0283) 755652.

**August 8:** Derby Mobile Rally will take place at the Littleover Community School, Pastures Hill, Littleover, Derby. Usual attractions, including the famous monster junk sale. It is hoped to provide improved facilities for disabled visitors in 1993. Martin Stardow G3S2Z (0332) 555675.

**August 8:** Flight Refuelling ARS Hamfest will take place at the Flight Refuelling Sports Ground, Manor, Wimborne, Dorset. Doors open 10am to 5pm. Usual mix of traders, Boat & Buy, craft exhibitors, Car Boot Sale & field events. Overnight camping facilities available for Saturday night. Talk-in on S22. Richard Hogan G4/CQ (0226) 691921.

**August 29:** Castle Hill Computer, Electronics & Radio Rally will be held at Castle Hill Exhibition Centre, Stalybridge, Cheshire. Doors open at 11am to 4pm (10.30 for disabled visitors). Over 200 stalls, Boat & Buy, refreshments available. Talk-in on S22. Enquiries to 061-681 0569.

**August 30:** Coleraine & District ARG Radio Rally & Bring & Buy will be held in The Golf Links Hotel, Portrush. From 12 noon to 5.30pm.00 stalls, Boat & Buy, refreshments available. Talk-in on S22. Enquiries to 008 869 01969.

**August 28:** Colourama & District ARG Radio Rally & Bring & Buy will be held in The Golf Links Hotel, Portrush. From 12 noon to 5.30pm.00 stalls, Boat & Buy, refreshments available. Talk-in on S22. Enquiries to 008 869 01969.

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**QRP SPECIAL**

**SPECIALIST QRP KIT SUPPLIERS**

<table>
<thead>
<tr>
<th>Kanga Products</th>
<th>Lake Electronics</th>
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</thead>
<tbody>
<tr>
<td>Seaview House</td>
<td>Communications</td>
</tr>
<tr>
<td>Crete East</td>
<td>Signals 7</td>
</tr>
<tr>
<td>Folkestone</td>
<td>NN11 6PT</td>
</tr>
<tr>
<td>Tel: (0303) 891106</td>
<td>Northall</td>
</tr>
<tr>
<td></td>
<td>Tel: (0602) 382509</td>
</tr>
</tbody>
</table>

**July 4:** Newport Amateur Radio Society will be holding their Junk & Boot Sale at Bryngales CEC, Bryngales Road, Newport, Gwent NP1 5SU. Doors open at 10.30am to 1pm (10am for disabled visitors). Admission £1, QTHR or via Packet at G0JXM #1 @ G8SJ @ Brussels.

**July 4:** The 10th McMichael Rally & Car Boot Sale will be held at the Haymill Youth & Community Centre, Burnham Lane, Slough (near, Brumwell Railway Station). Doors open 10.30am, admission is £1.50. Car boot sale is £2 per pitch on the day. Free parking on site & talk-in on S22. Nailing G0VIN (0283) 755652.

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The Bourbon transmitter uses surface mount technology to pack a lot into a small space.

**THE BOURBON QRP 3.5MHz TRANSMITTER**

**PART 1**

Bill Mooney G3VZU describes his neat little design for a 3.5MHz c.w. or double sideband suppressed carrier transmitter, which uses surface mount techniques and components.

The oscillator is fed to the internal buffer amplifier accessible via pin 6, leaving pin 7 unconnected. The stability of the oscillator to 'pulling' is excellent.

A minimum r.f. voltage of 0.5V peak to peak is required at pin 6. The circuit shown achieves a comfortable 1V peak to peak.

You'll now have audio and carrier, and can pick off d.s.b. at pin 4 or 5. However, c.w. is also required.

A signal at pin 1 or 2 of the NE602 will produce sum and difference frequencies at pin 4 or 5. To get c.w. out, you have to apply a signal to pin 2 which will mix with the local oscillator. This signal needs to have amplitude of about 0.5V and zero frequency, in other words - a d.c. bias.

The zero frequency signal is derived from R11 and is switched in or out using Tr2. This transistor is normally switched off, and the collector appears open circuit.

If the cold end of R12 is connected to a positive stabilised supply (Vs) Tr2 is switched on. The c.w. mode is thus selected by transferring the slider voltage on R11 to pin 2, with minimal loss.

The result is a carrier of the same frequency as the v.f.o. appearing in pin 4 and 5. The amplitude of this signal is proportional to the d.c. bias from R11 within certain limits.

**MIXER PRODUCT**

The required mixer product is selected by the parallel tuned circuit around L2. It's applied directly to the gate of the output transistor Tr5.

The transistor, Tr5 is an enhancement type power m.o.s.f.e.t. (v.f.e.t.) device in a SOT89 s.m.d. package. It operates in class AB in the Bourbon, allowing us to switch the output off by removing the bias.

The turn-on bias for Tr5 is derived from R16. It's usually about 2.6V d.c., depending on the required drain bias current selected.

The transistor Tr3, is normally held in the switched on state by R14, and the gate is clamped to 0V in the key-up position. With the key down, the base of Tr3 is grounded turning the transistor off and removing the clamp from the gate.

Of course, the key-down condition should be arranged for the d.s.b. mode. The c.w. keying
characteristics are determined by the components around Tr3.

The output circuitry of Tr5 consists of a low Q parallel tuned circuit made up of L3, C25 and the stray capacity of the heatsink. The heavy damping of the 50Ω load reduces the Q to about 20, and the whole band is covered without the need to tune.

The output stage should always be connected to a lowish 50 or 100Ω non reactive load, or narrowing of the bandwidth will result. More importantly, there's no neutralisation and under certain circumstances some instability may result.

The d.c. supply for the output stage is taken direct from the unstabilised supply. This can vary widely (5.5V to 15V) because all bias and low level stages are supplied from the 5V regulator.

The i.c., IC2, provides a steady voltage of about 5V, removing the need for large decoupling capacitors. The capacitors on the input and output of the LM2931 are essential to keep the regulator itself stable.

Next time, I'll be describing the construction and setting up stages of construction of the Bourbon along with the p.c.b. and associated overlay.

HOW DIFFICULT?  Intermediate (but good eyesight is needed)
HOW MUCH?  £40 (approximately including p.c.b.)

SHOPPING LIST

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Surface mount 1206 type
1kΩ  3  R5, 6, 15
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10kΩ  2  R1, 12
22kΩ  1  R14
100kΩ  4  R2, 7, 8, 13
Surface mount trimmer
1kΩ 1  R4
5kΩ  1  R11
10kΩ  1  R16
Variable “Standard” size
1kΩ  1  R10
100kΩ  1  R9

Inductors
Toko SCD SMD variable type
22µH  2  L1, 2
Chip inductor
2.2µH  1  L3

Capacitors
Type 1206, COG Dielectric chip capacitor
68pF  3  C8, 18, 19
82pF  1  C13
100pF  2  C12, 22
150pF  2  C10, 11
560pF  1  C25
Type 1206, COG Dielectric chip capacitor
100nF  13  C2, 3, 4, 5, 6, 7, 9, 14, 16, 17, 21, 23, 24
470nF  2  C26, 27
Tantalum surface mount 16V working
33µF  1  C1, 15
Trimmer surface mount T704 type
6.5-30pF  2  C20, 28

Semiconductors
1N4148  1  D2 (Optional )
BB804  1  D1 (dual SOT23 package)
BCW72  1  Tr1, 2, 3 (SOT23 package)
B5R58T  1  Tr4 (SOT23 package)
B7T80  1  Tr5 (SOT23 package)
LM2291  1  IC2 (SO8 Package)
NE602  1  IC1 (SO8 Package)

MISCELLANEOUS
A small die-cast box or other enclosure, two s.p.s.t. switches (for mode change and on/off), one d.p.c.o. switch for the TX/RX changeover. A variety of small coaxial sockets, and thin coaxial cable, some interconnecting wire, and knobs to suit the tuning controls.

Circuit diagram of the 3.5MHz d.s.b. and c.w. transmitter.
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<table>
<thead>
<tr>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>SX400</td>
<td>350.00</td>
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<tr>
<td>PR080 SONY</td>
<td>200.00</td>
</tr>
<tr>
<td>SX200 JIL SCANNER</td>
<td>175.00</td>
</tr>
<tr>
<td>UBC175 RF SCA</td>
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<td>ICM 706 PRO</td>
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</table>

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Construction

In the second and final part of his article, Dr. Jim Lycett G0MSZ shows you how to start work on the pivot block for a high quality home brew Morse key.

Hopefully, you've accepted the G0MSZ home-brew key challenge. Take my word for it, you'll find the effort is very worthwhile. So, let's get on with the next stage - making the pivot block.

The pivot block, Fig. 4, can be made from 25mm square section or 'U' channel brass bar and of a length to suit the type of bearing selected. Cut a slot \( \frac{3}{16} \) in wide centrally by \( \frac{1}{4} \) in deep in the square section block to accommodate the \( \frac{1}{2} \) in square section arm.

The slot should be cut parallel and square to the faces of the cube. Decide now on the type of bearing you prefer and cut the section to size (1in long for ball races \( \frac{1}{2} \) in long for taper and parallel pins).

A sealed ball race will provide an excellent bearing. However, some of the fine early examples of hand keys used taper pins. The taper pin enables speedy strip down and permits adjustment for wear. When fitting a taper pin you'll need to obtain the appropriate taper reamer, ensuring the taper on the reamer is the same as that on the pin, and that your minimum starting diameter is correct.

Standard taper pins are available such as \( \frac{1}{16} \) in diameter with a standard taper of \( \frac{1}{64} \) in 12in, etc. Both the arm and block should be reameded together with shimming washers to provide the desired gap.

The taper pin is locked into the arm, and the bearing surface is in the pivot block. The parallel pin on the other hand has no adjustment for wear, and care is needed in fitting this type of pin.

Self-lubricating bushes can be inserted into the block, providing bearing surfaces. The bushes can be replaced as they wear. A good bearing is essential for any serious key working.

In the key down position the arm can be considered to pivot about the front contact. The bearing holes should be bored or at least bench drilled.

The bearing holes are the most important holes in the key. Extra care should be taken both in marking out and drilling. Sealed ball races must be held in place, unless you have been able to bore precision holes. I prefer to cut a slot in the block as shown in Fig. 4, and nip the bearing with a small screw.

Spring Adjustment

Although many methods have been used for spring adjustment, I've chosen to present three. The simplest consists of a tension spring positioned between the pivot and the back contact, the adjuster being a piece of studding and a knurled nut as shown in Fig. 5.

The stud passes through a clearance hole in the arm. The spring is looped through a hole in the stud and is retained at the bottom by a pin.

The second simple method, uses a compression spring positioned between the front contact and pivot. Here, the arm is threaded for the adjusting screw, and the underside is counter bored to take the spring and compression washer, Fig. 6.

Method three, shown in Fig. 7, consists of a tension spring, tensioning pin, and adjusting screw with a specially shaped head. The shaped head engages a groove cut in the...
tensioning pin, so that as the screw is rotated the pin is drawn through a clearance hole in the bar, tensioning the spring.

The adjusting screws in general are turned from brass bar. However, in my key the tensioning pin and screws are made of steel, gun 'blued' and oiled.

**Electrical Contacts**

Electrical contacts may be obtained from the suppliers listed, these are usually very cheap. I recommend silver contacts, of between between 3/4 to 1/4 in diameter. These will be more than adequate for keying even the most demanding amateur valve transmitters.

Contacts are fitted into the ends of the adjusting screws and into the fixed contact bases. The back contact and its adjusting screw can be identical to the front contact.

Adjusting screw threads around 1/4 in diameter with a fine pitch 40 t.p.i. (turns per inch) will ensure precision adjustment. However, 2BA or metric equivalent is just acceptable. Locking nuts are absolutely essential on all adjusting screws.

The fixed contacts on the base consist of a contact holder, made from a OBA or similar brass machine screw and a contact. The contact is mechanically fitted into the head of the screw, Fig. 8, shows typical contact and adjuster arrangements.

**Solid Base**

A solid base such as marble makes the key easier to use. I can vouch for this, having tried materials including wood, chipboard, steel, and brass.

It may simply be the psychological effect of having a good looking base. But one thing is certainly clear, a solid marble base to my mind feels better than wood.

However, rather than restrict constructors, I list other practical alternatives. Solid (dense) hardwood, marble, granite, ebonite, etc., are suitable for making bases.

Marble can be easily obtained (look under 'Monumental Masons' in the 'Yellow Pages') and makes an impressive base. It's fairly easy to work, but remember that it's a natural material and can split, chip or crack.

Conventional metal cutting tools can be used to cut and drill marble. A beautiful finish can then be obtained on raw edges by filing and sanding with various grades of 'wet and dry' paper.

It's best to make an accurate drilling template before drilling the holes in the base. The template should at least ensure that the key will fit.

Wood on the other hand, will need some additional weight 'setting in' on the underside. One method involves casting lead into the shape required, attaching it to the base underside. A minimum base size of 9 x 3 x 1/4 in for a key arm of 8in is recommended.

**Choosing Terminals**

When choosing terminals, I prefer brass terminal posts. Not only do they give a good robust connection, they also enable the key to be stored or displayed neatly.

Various sizes of terminals are available. A practical size for the key design I've provided is 2BA. The fitting of 4BA terminals (or the metric equivalent) look small, whilst 0BA give that definite chunky appearance.

An ideal position for the terminals is at the back edge of the key base, centrally positioned, Fig. 9. It's best to include a copper braid connection from the arm to the pivot block, providing a good electrical contact (avoiding relying on the bearing only).

**Summing Up**

In summing up, I've aimed at presenting a basic design which may be individually tailored for your use. The performance of the key will not be significantly affected when the alternative methods described are incorporated.

No doubt, you'll spend much time finishing off, burnishing the brass parts, sanding the marble edges or French polishing the wooden base. There seems little point in making a key without putting the finishing touches to it! A useful criterion to apply is 'will it be acceptable in my living room'. Like the Fabergé Egg, the key has been designed to give pleasure both to the user and the observer.

Finally, I strongly recommend you not to compromise on the arm and bearing block assembly. Don't forget, that a thing of beauty is a joy forever.

---

**Material Suppliers**

Unfortunately, K.R. Whiston of New Mills, Stockport in Cheshire, Jim Lycett's main source of supply for brass, bearing and contacts, etc., have ceased trading. Other suppliers may be able to help and Homie Dodsworth Ltd., of 59 to 69 Heaton Park Road, Newcastle-upon-Tyne, tel: 091-265-9077 are willing to supply small quantities of brass. Jim Lycett also discovered that AALCO, with stores around the UK (look in the 'Yellow Pages' directory) can order material. Finally, Peter Jones Engineering, Chapel Road, Smallfield, Surrey RH6 9NR, tel: 034-284-3555, may be able to assist with material and specialised machining.

---

**Fig. 7:** The final method of tension adjustment described by GOMSZ, uses a tension spring, tensioning pin and an adjusting screw with a specially shaped head (see text).

**Fig. 8:** A typical contact and adjuster arrangement (front and rear contacts), with lock nuts.

**Fig. 9:** An ideal position for the terminals is at the back edge of the key base, centrally positioned.
Peter Dodd G3LDO, looks at the importance of squeezing that little bit of extra efficiency from an antenna system for QRP. Peter also describes ways of improving the effectiveness of simple antennas.

When using low powers, every small increase in antenna efficiency is extremely useful. I've used one of the computer programs described in the May issue of PW, to explore the characteristics of some simple antennas at different heights above real earth.

I'll try and show how important positioning a simple antenna is, for it to become effective for any operation. The efficiency of these antennas is quite high. Most of the r.f. power fed to them is radiated as electromagnetic energy. I will not be considering antenna efficiency - only effectiveness.

**Antenna Required**

Professionals engaged in communications use a chart to determine the type of antenna required for point-to-point h.f. communications. The antenna, with a suitable 'angle of radiation', is selected from charts and tables.

Amateurs usually want to achieve the greatest distance possible. We require the lowest angle of radiation available, which produces the longest hops possible.

**Standard Antenna**

For the figures of the antenna being modelled, to have any meaning, they must be compared with those of some standard antenna. When mathematically modelling an antenna, it's convenient to use a theoretical antenna called an isotropic source.

An isotropic antenna is one which radiates equally in all directions. Its 3-D polar diagram is a perfect sphere.

Because the isotropic antenna is theoretical, we precisely define its field strength under theoretical conditions, making the it constant for all considerations. Any antenna compared with an isotropic antenna should have its gain labelled 'dBi'.

The radiation field strength pattern of any antenna is three dimensional. The computer model displays a horizontal or vertical section through this radiation field. I'm only using the vertical, or elevation, pattern because this clearly illustrates the angle of radiation of the antenna.

In later articles I'll use the isotropic reference for computer models. When I make antenna measurements using a computer I'll use a real reference antenna, under very controlled conditions.

**Simple Antennas**

First of all let's look at the simple dipole for 14MHz. One end of the antenna is fixed to the eaves of the house and the other to a post, to give a height of, say five metres.

Is a 14MHz dipole, 5m high (λ/4) a good antenna for DX?

The three dimensional polar diagram (in vertical cross section) of this antenna. Fig. 1, plot 1, is door knob shaped (at 5m high).

The maximum gain (0dB line) is 5.6dBi greater than our isotropic reference. However, most of the transmitted energy is radiated vertically.

When used for receiving, the antenna picks up more high angle signals. This antenna is fine for short range QSOs to Europe but what about the DX?

The DX signals that are propagated around 5-15° above the horizon are 8-10dBs down on the maximum. They're difficult to work in the short skip QRM from Europe.

By raising the height of our dipole, one end on top of the chimney and the other end with a suitable mast, the dipole height can now be doubled to 10m. What do we now find?

The overall gain has increased by about 1dB. However, low angle radiation gain is quite substantial.

In Fig. 1, plot 2, you can see that the low angle gain, 10 to 15°, has increased by about 6dB. This means that the DX signal will have increased by 6dB.

Furthermore, the reduction in high angle radiation is around 10dB. More importantly, this means that short skip QRM will be reduced by around 10dB. Working DX is about 16dB easier.

Additionally, the increased height reduces electrical QRM on receive. It also reduces the possibility of BCI and TVI on transmit. Having looked at a horizontal antenna, are there other simple antennas that perform well at lower heights?

**Vertical Antennas**

It's generally supposed that vertical antennas provide the best low angle of radiation. How true this is?

An elevation polar diagram of a vertical antenna is shown in Fig. 2 (plot 1). This is the classic diagram of the vertical antenna. Sure enough, it has a very low angle of radiation with over 5dB gain over the isotropic reference.
However, this model assumes that the ground for some considerable distance around the antenna is a perfect conductor.

Very few locations have earth characteristics that are anywhere near perfect. When the antenna is over an average earth, as in Fig. 2, plot 2 shows that the picture is very different. The gain decreases by about 6dB at our 15° degree angle of radiation.

**The Ground**

The ground's contribution to the gain of an antenna is determined by its dielectric constant and resistance. The higher the dielectric constant and the lower the resistance, the greater will be the effect of ground to the antenna performance, see Table 1.

All the models, with the exception of Fig. 2, plot 1, were computer modelled over average ground. The subject of ground effects on antennas is quite involved, and I hope to make it the subject of an article at a later date.

**All Directions**

The horizontal pattern of a vertical antenna is a circle, indicating that the antenna radiates equally (and some cynics say weakly) in all directions. This is assuming there are no obstructions to distort the pattern. The vertically polarised radiation is particularly susceptible to distortion from nearby house wiring.

Furthermore, radiation from house wiring appears to have a high vertical polarization component making a vertical antenna susceptible to electrical noise.

The performance of the vertical antenna is affected considerably by its environment. This dependence on ground quality and environment probably causes the disagreements, regarding the performance of vertical antennas, that exists among radio amateurs.

The horizontal pattern of a dipole is a figure-eight with some gain, compared with an isotropic source. The diagram, Fig. 3 (plot 1) (/4 wave vertical antenna) is shown compared with plot 2, a 10 metre high 14MHz dipole.

The dipole has a clear lead in the low angle of radiation. Although it must be said that it was plotted against the dipole's plane of greatest gain.

Up until now I have only looked at antennas at 14MHz. An antenna 10 metres high on 7MHz would only be about quarter of a wavelength high. Will a vertical antenna outperform it?

The vertical and the quarter wave high dipole are compared in Fig. 4, with the vertical antenna is shown in plot 1 and the dipole in plot 2.

The computer model shows that the gain of the vertical is slightly greater at lower angles of radiation, and the attenuation of the higher levels of radiation is fairly good. However, there's a tendency for this modelling program to give inflated gain figures of horizontal antennas close to the ground. So the relative performance of the vertical may be better than indicated.

**Summing up**

In summing up, on 14MHz and above, the horizontal antenna at more than X/2 above ground, appears to be an effective antenna for working DX. Increasing the height will increase the gain, and additional gain may be achieved by making the antenna longer than half a wavelength.

A multiband antenna, centre fed with open wire feeder, is an effective DX antenna provided it can be erected more than 13 metres high. However, if you want to work 3.5 or 7MHz DX in the approaching low sunspot years, a vertical may be the answer!

I've not discussed or considered beam antennas. A beam increases the gain in one, or more, desired directions and reduces the signal from undesired directions. I'll describe simple beams, capable of giving useful gain, in later 'Antenna Workshops'. Cheerio for now.

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**Table 1:**

<table>
<thead>
<tr>
<th>Surface Type</th>
<th>Diel. Const.</th>
<th>Resistance (Ohms/Metre)</th>
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</thead>
<tbody>
<tr>
<td>Salt water</td>
<td>81</td>
<td>0.0002 (Excellent)</td>
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<tr>
<td>Pastoral, low hills, rich soil</td>
<td>20</td>
<td>0.03 (Very Good)</td>
</tr>
<tr>
<td>Pastoral, medium hills, clay soil</td>
<td>13</td>
<td>0.2 (Average)</td>
</tr>
<tr>
<td>Cities, industrial areas</td>
<td>5</td>
<td>1.0 (Very Poor)</td>
</tr>
</tbody>
</table>

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**Fig. 3:** A comparison of the polar radiation patterns of a horizontal dipole (X/2 above ground) and a vertical antenna.

**Fig. 4:** A comparison of the polar radiation patterns of a horizontal dipole (X/4 above ground) and a vertical antenna.
It’s time again for Ron Ham to open the PW vintage wireless shop, and this month he starts with a letter mentioning a very famous name in the history of radio design.

Let’s open up the ‘shop’ this time with a letter from Eric Rowe (Wirral, Merseyside). He writes: “My brother and I have been interested for a number of years in the sets designed by John Scott-Taggart.

Eric lists models as the ST 200, 300, 400 and 500. There’s another, the 900, which, as yet they have not found.


A Scott-Taggart 300, including the cabinets for the set and loudspeaker have been reconstructed by John Tye (Dereham, Norfolk). Rather than squeeze it up, I hope to feature the photograph John sent, very soon.

George Shankie (Hawick, Scotland) has written to tell me about the American station heard on his one valve (O-V-O) receiver made by HAC (“Hear All Continents”). He followed this with an O-V-I and a I-V-I (Aberystwyth, Wales) has also asked if I have any information about the sets used in clandestine operations by allied agents during the Second World War.

Actually, there were a variety of sets for special operations like the ‘A’ and ‘B’ series. I suggest you try your library, or book shop, for a copy of Secret Warfare by Pierre Lorain, from Orbis publishing. (ISBN 0-85613-586-0). The book has a green cover with a ‘Boyes Rifle’ on the front and covers much of the equipment used by the resistance movements. Another among the many books dedicated to clandestine operations is The Secret War Of Charles Fraser-Smith (ISBN 0-7181-2035-3).

**Clandestine Operations**

Both Leslie and Richard Williams (Deddington, Oxfordshire) asked if I had any information about the sets used in clandestine operations by allied agents during the Second World War.

Actually, there were a variety of sets for special operations like the ‘A’ and ‘B’ series. I suggest you try your library, or book shop, for a copy of Secret Warfare by Pierre Lorain, from Orbis publishing. (ISBN 0-85613-586-0). The book has a green cover with a ‘Boyes Rifle’ on the front and covers much of the equipment used by the resistance movements. Another among the many books dedicated to clandestine operations is The Secret War Of Charles Fraser-Smith (ISBN 0-7181-2035-3).

**Knickebein Beams**

Leslie also asked about Knickebein, a system of navigation beams used by the Luftwaffe to guide their bombers. I can’t remember the title but I feel sure a BBC producer, Brian Johnston, researched and produced an interesting book about Knickebein (Battle of the Beams?). There are also books such as Most Secret War, by Professor R.V. Jones, ISBN 0-241-89746-7. (Highly recommended: Editor) and War Planes Of The Third Reich by Graham Green.

Don’t forget readers that in addition to your public library, establishments like The Royal Signals Museum at Blandford in Dorset (they’ve got a comprehensive collection of ‘spy’ sets), The Royal Air Force museum at Hendon and The Imperial War Museum in London are good sources for research material.

**Air Ministry Manual**

My thanks go to Mike Turnbull (Whitley Bay) for sending me an original Air Ministry manual for the v.h.f. communications receiver R.1132A, Fig. 2. I’ll pass this document on to the wireless library at the Amberley museum in the course Mike.

Firstly, although this manual was published in June 1945, the valves were listed under their service numbers and not the CV equivalent. During the Second World War tunable v.h.f. receivers were rare. Hallicrafters made the S-27 and S-36 for air to ‘carrier’ communications for the United States Navy and the R.1132 was built, in the UK, for the RAF’s air to ground communications.

The R.1132A measures 748 x 413 x 413mm and, complete with two chrome handles, was designed for standard rack mounting. This straightforward superhet receiver has two VR65 (r.f. amplifier and frequency-changer respectively) and a VR66 (local oscillator) in the front end. A VS70 neon stabiliser is used to supply the local oscillator. The intermediate frequency, around 12MHz, is amplified by three VR53s followed by a VR54 double-diode for signal and a.g.c. rectification.

The 1132’s main chassis is rugged to say the least, and well laid out. The three-valve front end has its own screened compartment with an Eddystone coupler to connect the tuning capacitor shaft to...
the dial mechanism spindle. The t.r.f. unit, using another VR53, is also self-contained in a screened box.

The audio signal from the VR54 is fed to an octode valve VR57 (CV1057) Mullard EK32. It's then fed to a triode VR67 (CV1067) Osram L63 or American 6J5G. The triode feeds a 600Ω output transformer.

While we're on the subject of v.h.f., take another look at the WS-19 in Fig.1. You'll see a thumbwheel dial to the lower left of the meter movement and immediately below that, a Pye coaxial socket. The former is scribed 'Tuning B' and the latter 'Aerial B'.

Whereas the two main dials on the right of the meter are for tuning the 2.8MHz transmitter and receiver, the 'B' set is a v.h.f. transceiver, using a CV6 (DET20) valve, working on 235MHz. This was designed for short range communications between tanks in action with minimal risk of their conversations being overheard.

**Pilot Receivers**

Although the manufacturer Pilot made a wide variety of radio and television broadcast receivers most people's minds go back to the popular 'Little' and 'Major' Maestro series of sets.

The 'Little Maestros' were frequently seen on a kitchen shelf or on the bedside table while the 'Major' was the family set in the living room. Pilot used both Bakelite and wooden cabinets and utilised most of the popular ranges of valves.

'Valve & Vintage' reminded Mr H. Hughes that he had a Pilot 'Major Maestro' stored in his loft. He purchased this Five valued superhet in 1949 when he moved to a house with a mains supply.

The 'Major Maestro' long-medium and short wave receiver has a Bakelite cabinet and a typical valve layout of the period. It had a 6K8G (frequency changer), 6K7G (i.f. amplifier), 6J7G (double-diode triode), 6V6G (output) and a 6X5GT (rectifier). These particular valves were the 'work-horses' of radio for many years and proved themselves very reliable.

**Octal Valves**

Incidentally, the difference in the international octal range of valves is denoted by the letters 'G' and 'GT'. The letters refers to the physical shape and size of the glass (Glass or Glass Tube).

Whereas the two main dials on the right of the meter are for tuning the 2.8MHz transmitter and receiver, the 'B' set is a v.h.f. transceiver, using a CV6 (DET20) valve, working on 235MHz. This was designed for short range communications between tanks in action with minimal risk of their conversations being overheard.

**Figure 3: Ron Weller working on a receiver in the Chalk Pits Museum.**

Pilot's later models, released in the early 1950s, used local based valves and a typical superhet comprised a 7B7 (frequency changer), 7B7 (i.f. amplifier), 7C6 (double diode triode), 7C5 (output valve) and 7Y4 rectifier.

**Dried Out**

My mention of the Bush DAC90 recently, reminded B.M. Hugh (Poynton, Cheshire) of the old adage that if a set was unused for any length of time the electrolytic smoothing capacitors 'dried out' and became faulty. Like many of us, B.M. often ran a 100W lamp in remembered 'wet' electrolytics? I most certainly do, they went on for years. He added, 'I have seen one of these imbedded in a workshop ceiling 6ft above the chassis!'

**Amberley Museum**

On a recent visit to the Amberley museum, I saw an old friend, Ron Weller (Worthing), Fig. 3. Ron was replacing an output transformer in an immediate post-war Philips receiver. Although Philips sets have a very high standard of reliability, some of the early valve models were not the easiest to handle when they required service.

Ron, a radio engineer for over 45 years, has carefully removed the chassis and loudspeaker from the cabinet and replaced the knobs on the spindles. This is a protection against losing the knob retaining grub-screws, and gives something to grip when checking the movement of the controls.

Care must be taken not to disturb the dial drive assembly. This is important on receivers with 'Bowden' type linkages, when removing the chassis for service.

**Hallicrafters Skyrider**

Brook Verrall (London) is renovating a 'burnt out' Hallicrafters Skyrider SX28. He's already replaced the mains transformer.

Before you spend much more time on the SX28 Brook, have a close study of all the wave-change switch contacts. I say this because the last one of those I serviced, I couldn't complete the repair. After tracing the fault to the coil switching, I found a couple of segments on one of the inner contact wipers had broken away.

Unfortunately we've run out of space, and it's time to close the 'Valve & Vintage' shop. But you can be sure I'll be open again next month. Cheerio for now and keep writing to me at 'Faraday', Greyfriars, Storrington, West Sussex RH20 2HE.
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Welcome to the July edition of 'Bits & Bytes'. You've certainly kept me busy with requests for the packet program I mentioned in the May PW. I had no idea that so many of you were using Amstrad PCW computers!

Many thanks go to our anonymous benefactor John for offering, and providing the program in the first place. I'm also grateful to Ian G7HXY for helping out with the copying of the 3in disks.

**Best Computer**

I've had a lot of letters and phone calls asking me "what's the best computer for the shack?". This is a bit like the famous question "how long is a piece of string?". Fortunately, with computers there's a simple answer. It's an IBM or compatible. However, if you already own a computer (regardless of make or model) you want to use it for general tasks, a lot of these programs are popular machines. And, as a rule of thumb, most are suitably adapted for any and all of those jobs.

Then your existing machine makes the PC the ideal choice.

**IBM Or Compatible**

Just mentioning the 'IBM or Compatible' (typically called an IBM PC), frightens a lot of people. The main reason for this is the supposed cost. However, if you go into or (0256) 810550 (between 10am & 7pm). The TR stands for Tim Rustige. Tim specialises in 'second user' computers and peripherals at very low prices. Here's an example of what TR can supply: an IBM XT with 640K RAM, one 5.25in 360k floppy drive, 10Mb hard disk, keyboard and green screen monitor, for just £115.

Or how about a '286 machine? These are available with a high density floppy drive, but no hard disk, for just £130, plus about £100 if you want to add a 40Mb hard disk. Tim informs me that, although his stock is constantly changing, this is an example of goods that are "constantly" available.

If you can't afford to build your own computer from a kit or individual components at the moment, (see the Computing In Radio supplement inside the May PW), then this could be an ideal starting point.

Unlike any other make of computer, the 80386 system (or the more popular 486) can often be suitably changed to run on the 'not so popular' computers. However, your needs may be much more complex and varied than this. For example, you may wish to run a packet BBS, or a multi-satellite tracking station that controls your antennas as well as your receiving/transmitting equipment. A lot of computers will meet your needs. But the flexibility and expandability of the PCs, as well as the availability of software, makes the PC the ideal choice.

Peter Hunter G0GSZ has been surprised to find out how many 'Bits & Bytes' readers use the Amstrad PCW computer. He's also planning a new 'Program Listings Database' for all computers.

**Popular Demand**

Because of popular demand, I've decided to set up a 'Program Listings Database'. Let me know if you have any programs (for amateur radio) that you've written yourself, or have any that are in the Public Domain.

Either send me information about what you have, or the program listing (code) as a 'readable' printout. I'll pass this information, or a copy, onto anyone requesting it (i.e. with request please!).

The new facility is for ANY computer, in ANY (computer) language. I'll print a list of what's available, from time to time, in 'Bits & Bytes'.

Don't forget I enjoy your letters, phone calls, and packet messages, so please keep them coming. So, until next month, 73 DE Peter G0GSZ.
Paul Essery GW3KFE says conditions have been very up-and-down in recent weeks. Apparently there is some restructing going on in the sun, but he says no doubt we shall survive!

If you have an interesting QSL card or report, make sure you send it to Paul at 287 Heol-y-Coeg, Vaynor, Newtown, Powys, Wales SY16 1RA.

Spain/E2/JG6 Gordon Robertson in Saltash (Cornwall) mentioned this one, heard between the hours studying for the RAEC - Good Luck!

Another bearing of SORASD was by Tim Allison, also in Saltash, with his HF225. Tim listens to the Desert Storm Net on 14.280MHz, now at 1700Z on Tuesday and Saturday.

An Eddyson 807A is the tool used by John Collins in Birmingham. John is mainly a night-owl, listening from around 2300 onwards.

Our next two listeners have to be lumped together: Andy Wright is in Sawley, and has an R2000, a.t.u., 25 metres of wire, and a BP34 audio filter as back-up.

Gerald Bramwell in Swinton (Greater Manchester) is a dedicated s.w.l. and says he has no intention of taking a licence - but he certainly catches most of what's about, on sideband, t.m., RTTY, and c.w.

Finally, there's Viv Franklin, in Swindon. Viv has occupied time since being made redundant rebuilding the shack in a box room. This is now done, and all the continents are noted in the log with 3XOHU possible the pick of the crop. I hope Viv is 'fixed up' as soon as possible. That's all for now, usual mid-month deadline, and address as in the picture caption above. 'Bye now!
This month in his monthly look into the world of amateur radio in orbit, Pat Gowen G3IOR provides the latest MIR news and information on both current and coming amateur satellites.

The Current MIR crew, Flight Commander Gennady Manakov USMIR and Flight Engineer Alexei Polischuk R2MIR are active on 145.55MHz f.m. voice, and on packet as mailbox R2MIR-1. The 'digital memory microphone' built for them by DL2MDE has been in use. It's been putting out a greetings message recorded by Alex R2MIR every three minutes. Although ESA now have control of MIR, the future plan is still for Vassily Zibliev R3MIR and Alexander Serebrov R4MIR to man the space station from 1st July to 24th November. For the first three weeks of this mission they will play host to visitor Jean-Pierre Haignere who will be using his French callsign.

The MIR crews will continue to use the on-board gear, including the Yeasu FT-250R 144MHz f.m. 25W and the Icom IC228A/H 5/25W transceivers. These work into the external hull-mounted ground plane antenna. The crews will also have a TNC-PacComm HAND/PACKET packet controller (pictured in 'Packet Panorama') with an PC/AT Laptop. Also on board, there's the Austrian AREMIR system, a OJ-120 ALINCO transceiver, and a TNC-2 plus packet controller.

More New Satellites

The AMSAT Argentina organisation are adding to their already operational LUSAT-1 with a new satellite AMSAT-LU-2. The new satellite, which should be launched by the end of this year, will include a programmable digitalker. This facility will provide up to two minutes of digital voice recording time. The AMSAT-LU-2 will also carry an f.m. transponder repeater that will operate on Mode 'B', up-link in the 435MHz spaceband, downlinking in the 145MHz spaceband. The satellite's beacon will downlink telemetry in standard 1200bps AX.25 packet format. The digitalker will also be very similar to AMSAT Brazil's 'Dove' OSCAR-17 and the Russo-German RS-14/OSCAR-21. The plan is to attach LU-2 to a Russian satellite primary mission.

Further details and frequencies will be published in 'Satellite Scene' as they are made available. But in the meanwhile any comments, suggestions, requests or proposals are welcomed by AMSAT Argentina. Packet mail sent to LZ6AA.CAST.ARG.SOAM will find them, or you can send it to LZ6AA, P@CAS@R or via UO-22.

Navy Satellite

The United States Naval Postgraduate School (NPS) in Monterey California, is developing PANSAT. The acronym stands for 'Petite Amateur Navy Satellite'. In effect PANSAT takes the form of yet another store-and-forward packet radio satellite, but this time with a difference. The difference is that the signals used to access the satellite will employ direct sequence modulation Spread Spectrum techniques.

The proposed PANSAT will be a 150lb weight, 19in diameter spacecraft, as seen in the mock-up in Fig. 1. It will run AX.25 1200bps with full duplex facilities on 435.250MHz with 1MHz bandwidth. In addition to evaluating the performance of spread spectrum within the amateur radio community, PANSAT will investigate low jamming and low intercept possibilities while providing low cost over-the-horizon message exchange and orbital mailbox facilities.

Transmitter Output

The PANSAT transmitter's output is planned to be some 5W (1dBW) to a 0dB gain tangential turnstile antenna. Intending users should require no more than 1W (0dBW) to a simple quarter-wave ground plane (2.15dBi). Or for even better results, a simple turnstile antenna should work well. Because spread spectrum techniques are relatively unknown in amateur radio, NPS intend to make details available.

There's also a kit for a simple low cost modem and r.f. package under development.

Editorial reminder: See 'Spreading The Spectrum - Amateur Communications Of The Future?', by Phil Cadman G4JCP published in the April issue of PW.

Intermittent And Postponed Satellites

Leo Labutin UA3CR, reports that RS-15, the new amateur satellite expected to be in its 2300km altitude 67° inclination orbit by now, may now have its launch postponed to the end of this year. Well, as the old adage says, 'All good things are worth waiting for!'

The second Japanese 'FUJI' satellite, better known as OSCAR-20, has been intermittent in operation in both of its modes for many months. Now, with the eclipse period diminishing more transponder activity is possible. In June FO-20 will be in full sunlight. The JARL FUJI Command station, pictured in Fig. 2, has every hope that the battery condition will then permit the simultaneous operation of both the 'JD' digital and 'JA' analogue transponders. That's the lot for this look at amateur radio in orbit, see you next time.
This month David Butler G4ASR has news of recent openings via tropo, aurora and Sp-E on the v.h.f. bands. There’s also details about Sp-E propagation and how you can use it to make long distance contacts on the 144MHz band. If you’re a 50MHz operator you can read about the many Russian expeditions taking place this summer.

Auroral Openings

I’ve had reports of a number of auroral openings during April. At my QTH I noted events on April 4, 5, 6, 8, 9, 13 and 21. The event on April 4 without doubt being the best of the period. Reports indicate that the event started around 1800UTC. It continued for some four hours before fading out at 2000UTC. A second phase commenced at 2200UTC.

Sporadic-E

During the summer months, especially between May to August, the E layer of the ionosphere becomes charged up. Patches or ‘clouds’ of ionised metals sporadically form (hence the name Sporadic-E) creating a reflecting ‘mirror’ at a height of approximately 110km. Signals, sometimes as high in frequency as 220MHz, can be reflected off these clouds to create spectacular openings on the v.h.f. bands. When Sp-E appears on the 50MHz band, it’s normal to find one-hop contacts on an almost daily basis from stations up to 2000km away. The number of openings on the 144MHz band will be much less, but the skip distance will be generally the same.

On the 144MHz band most openings (not counting all) will be to the south-east of the UK. So keep a look out for stations around Europe. Conditions on the 144MHz band during the 1992 Sp-E season were not very good. Despite this, there were many auroras to compensate.

Looking back in the log I noted only six openings at my QTH. Contacts were made with stations in other countries. These included 60 x YU, 17 x 1, 12 x OE, 5 x DL, 4 x SP, 2 x HG, LZ, SV and YO.

On the following day many contacts were made into Russia with RA3LW and UC2CBZ. Note the predominance of stations to the south-east of the UK. On 50MHz band you’ll hear signals from all over Europe, sometimes all at the same time.

If you’re really clued up, you’ll be looking for the real DX from other continents such as Africa, Asia, South America and North America. Looking at the log book I noted many Sp-E openings during June and July with stations around Europe.

Contacts were also made with stations in other continents. These included CN, E99, OD, TE, VE, W, ZC4, 4X4, SB4 and 9K2. So, don’t forget to look out for mixed-mode propagation such as Sp-E extending into the trans-equatorial (t.e.p.) path. Typically, contacts can be expected with stations in Southern Africa and South America.

OK, so now you know what to expect. But when will it happen and what preparations should you make?

Although I’ll concentrate on the 144MHz band, it’s worthwhile remembering that openings on the 50MHz band are exactly the same. However, they occur about 20 times more frequently and are of longer duration. The general exception to the mixed-mode propagation path where openings can be quite short maybe 10 minutes or so.

As I’ve already mentioned, most openings will occur during the summer months of June and July. Statistically the best times to listen on the band will be between 1100-1300UTC and 1700-2000UTC.

Seconds To Hours

Openings can last literally from tens of seconds (most likely meteor enhanced though) through to a few
Normally the opening will be 10-20 minutes in duration, giving you sufficient time to point the antennas in the right direction.

I’ve briefly mentioned already that most of the openings will be to the south-east of the UK. So, if you park your beam on a great-circle heading of 140°, you won’t be too far out.

However, always be aware that openings can be in totally different directions. The easiest way to sense this and to monitor the rise in maximum usable frequency (m.u.f.) is to listen on the lower frequency bands.

Now move up to the 50MHz band and note all the stations and bearings you can hear. This will give you a good idea of the direction (or directions) the propagation path lies.

As the m.u.f. rises towards the 144MHz band, the skip distance on the lower frequencies decreases. So, for example, if you initially hear 50MHz stations in OK, then DL and then PA you know that the m.u.f. is on the way up and it’s time to listen on the 144MHz band.

Some people also like to monitor Band II f.m. frequencies and beacons on the 144MHz band.

Personally, I think this is a waste of time and you won’t go far wrong by monitoring the calling frequency on 144.300MHz. Apart from directly monitoring the band, you may also find it useful to keep a note of the sun’s geomagnetic activity. And keep an eye on the weather maps too.

Some ‘experts’ claim that a K index of 2 or less is required for the formation of Sp-E. Jet streams, upper ridge patterns and thunderstorms are weather features which, although at a much lower height (10km) than Sp-E (110km), have also been suspected as being a trigger for this mode of propagation.

A Few Surprises

Normally most contacts will be made on s.s.b. But don’t discount using f.m., as this mode can provide a few surprises in the right conditions.

Not many operators use c.w. during these types of openings. Despite this, it’s useful when working stations who can’t speak English!

The important thing to remember though, is that the distant station must understand what you’re saying. You must be clear and concise and know what you want to say. Don’t use ‘fancy’ phonetics.

Some operators like to tune around the band and then call any DX station they hear. Personally, I prefer to call CQ and see what comes back.

Even if you run low power I believe the latter method will give you more contacts. Try it and see!

The 50MHz Band

Now it’s time to look at 50MHz in detail. But, apart from the auroras that I’ve already mentioned, very little in the way of DX was reported on this band during April.

One solitary Sp-E opening between 1430UTC and 1500UTC was all that appears to have occurred.

Terry Chaplin G1UGH (J002) reported making five s.s.b. contacts with stations in Malta, a similar number in Italy and S59AM in Slovenia.

Dave Storr G6GXP (IG93) worked a handful of Italian stations and was also fortunate to find SV10E.

Many other operators also reported working 9A2MP in Croatia.

Another contact was with an American station was barely detectable at 10W, nearly 15dB down on the 300W levels. He would transmit at power levels of 300W, 100W, 50W, 25W and 10W.

During the tests, at the QTH of G3WGD/G4KGC signals could be copied down to the 25W level. The American station was barely detectable at 10W, nearly 15dB down on the 300W level. This means that it should be possible to copy W7CJQ on a 1.2m dish antenna.

Well, that’s the lot for this month. Don’t forget that photographs of your shack, antennas or any V.F.I. activity are especially welcome. Other pictorial items such as QSL cards, awards, certificates etc. are also required. They will all be returned to you.

Please send your news to me at: ‘Few Tree Cottage’, Lower Moorwood, Herefordshire, HR2 0HR or via packet radio G7FAD (the new BBS at Madley Satellite Earth Station) or via the DX Cluster system.

END
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Two very good, tutorial style books about packet have been published recently. The first of these books is *NOSINTRO TCP/IP Over Packet Radio, An introduction to the KARI Network Operating System* by Ian Wade, G3NRW.

To the average packet user, TCP/IP has always been shrouded in mystique. Admittedly, it's a professional networking tool, and most amateurs have been discouraged from trying it due to the lack of instructional information.

Look no further than this hands-on operational book. For the beginner, Ian describes all terms and operation. There’s not one page of solid text in the book, as these can be quite discouraging to the newcomer!

Two chapters deal with the principles of NOS, including TNC parameters, clients and servers. Then there's a full hardware checkout of your own system. The third chapter, is installation of the software and then learning before going on-air.

**Jargon Explained**

Jargon, such as FTP and POP, PING and HOP, are all explained in full. Once you're familiar with the system, Ian describes how to set up your own files and put the system on the air.

The book has 40 pages of appendices, containing valuable reference material. Ian's advice is to speed-read first, then take a more leisurely read, possibly making notes along the way.

The software is available from Ian. But PLEASE include a formatted 3.5 inch HD disk with return mailer plus return postage. This book providing information about a growing networking protocol, is available from the PW Book Service, at £11.50 plus £1 p+p UK (£1.75 p+p overseas).

The second book is *Basic Packet Radio* by Joe Kasser G3ZCZ/W3 (Joe is shown in Fig. 1). Printed and published in the USA, the book is now available from the PW Book Service, at £19.95 plus £1 p+p UK (£1.75 p+p overseas).

The book is practical and leans heavily toward Lan-Link written, of course, by Joe. There are some 150 pages devoted to the set-up and operation of Lan-Link.

The first few chapters describe how to get started, and to get the best from a BBS, and international mail. However, I feel that the F&PBB server could have been given more space. This software is rapidly gaining in popularity and the servers are not used to their fullest extent.

Joe discusses DX-Clusters, some of the more commonly used servers, such as REQDIR and REDFIL. There is an area devoted to Emel, a Smart-server supplied with Lan-Link. This is an interactive program, in which responses from the program allow the user to obtain information almost as if talking to the sysop.

Both books are a very valuable addition to anyone's book shelf and I am very pleased to add them to mine.

**Kent Packet Group**

The Kent and Essex Packet group (KEPAC) is the latest to be featured here. And it's thanks to Stan G4GKU @ GB7ICE for the information.

The initial aim of the group is to set up four nodes, at present two are in service. The node alias's represent KEPAC, N, S, E, or W.

The first node to go into service, was KEPS22 located near Wrotham in Kent. KEPE22 is located at Minster, on the Isle of Sheppey. Node KEPW22 is planned and awaiting equipment, and will be located in South Essex, some 100m above sea level.

The other node, KEPS22, will be at Barnehurst, about 8km west of the south end of the Dartford tunnel.

The group is young, with the usual problem of funds. But there's no lack of enthusiasm, judging by the progress so far!

When the group has been formally adopted, the members will be consulted for requirements, in order to plan for the future. For the moment however, the efforts are being concentrated into supplying user links, as distinct from BBS mail forwarding routes.

The group is currently run by a 'caretaker committee'. This consists of Jim G6FCL, and the secretary is Kurt G7NCV.

**Unusual System**

I've also had news of an unusual system that relies upon the 'Bratrush Six' transceiver. These transceivers run just 0.5W a.m. on the 50MHz band, and employ a super-regenerative receiver.

The transceiver service area is only 3 or 4km at most. So nodes, located on 70MHz a.m. are provided to interlink the clusters, with gateways out to the normal network frequencies. Completing the LAN are three private BBSs, all running FBB5.14d software, and handling only mail to/from the sysop.

Well, that's it for another month. Keep the news coming, it really is appreciated. Contact G3LDI @ GB7LDI - QTHR - or (0568) 70278.

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When you buy a HOWES kit, you know that you are dealing with well designed equipment that has full technical support, and a wide range of matching accessory kits to enable you to build up your station in easy stages!
Peter Shore reports on the month’s broadcasting on the short wave bands.

What benefits accrue to countries which spend the equivalent of millions of pounds on a broadcasting service which goes overseas? Is it a question taxing several governments at the moment, notably those in Stockholm and London.

Radio Sweden faces a cut of up to one third of its operating budget of around £170 million. If severely curtail its output, including the ending of some of its language services such as French and Spanish. The station’s English service has a weekly Mediascan following, particularly to its overseas service, and can it influence what is happening in London.

Foreign Office, is around £170 million. If severely curtail its output, including the ending of some of its language services such as French and Spanish. The station’s English service has a weekly Mediascan following, particularly to its overseas service, and can it influence what is happening in London.

Member of Parliament, stated that the World Service’s annual budget. Members of Parliament are protesting against the proposals and an unprecedented number - more than 260 - signed an Early Day Motion at the end of April. This action gained quite significant coverage in the British press, including some very supportive leaders.

As a result of one leader in the London Evening Standard, a Foreign Office Minister was moved to respond. The Minister stated that the World Service’s budget has increased significantly in the past few years and that efficiency has improved so much that cuts of the order suggested would not make a great impact. Time will tell whether this is the case!

Radio Vännin in Lithuania continues to have problems affording Russian transmitter hire as the price keeps going up! The station has now cut back considerably and mostly uses its own low-powered short wave transmitter which radiates just 50kW.

The current schedule of Radio Vännin is: 1900-1930 in English on 9.71; 2100-2130 in Lithuanian on 9.71; 2130-2200 in English, also on 9.71; 2300-2330 in English, Monday to Friday only, on 11.75 MHz and 2330-0000 on Saturday and Sunday in Lithuanian on 11.75 MHz. But it is not all doom and gloom this month, for there’s news of a new English language service from the Overseas service of Tajik Radio in the former Soviet Republic of Tajikistan. Radio Tajikistan already operated an overseas service in the Dari and Persian languages, and added English at the beginning of May.

The station announced that English would be heard at 2145 local time (1745 GMT), presumably on the existing external service frequency of 4.825 and 7.245 MHz. If you hear this station, please drop a line to me at the PW Editorial Offices.

Radio Australia

Radio Australia’s summer schedule has suggestions for listeners in Europe including 0730-0900 GMT on 21.595 MHz; 0900-1300 on 21.725; 0730-0830 on 13.75; 1430-1900 on 8.56 and 13.755; 1800-2300 on 5.88 and 7.26 MHz.

Correspondent Laurence Mason in Hassocks, West Sussex reports good reception on the 13MHz frequency during the afternoon throughout the winter months whereas this will continue during summer in the northern hemisphere.

Radio New Zealand has introduced a new frequency for the Pacific, using its new antenna array which can work on frequencies as low as 6MHz. The station now uses 6.035MHz between 1950 and 2130 GMT.

Bulgaria may soon be using two new frequencies following tests in April. Keep an ear on 15.675 and 15.72MHz during the European daytime for a signal from one of the 50kW transmitters the station owns.

Radio Korea is now being heard more clearly in Europe as a result of the introduction of relays from the BBC’s Skelton transmitting station near Penrith in Cumbria. The programmes are fed from Seoul by satellite and then relayed on 6.035MHz between 2330 and 2230 GMT, with English heard daily by satellite, followed by French and then German.

England to Europe from Korea is also heard at 0800 on 7.55 and 13.67MHz, direct from Asia. Radio Korea is also relayed by Radio Canada to North America from the Sackville transmitting station.

Changed Frequency

The World Service of the Christian Science Monitor changed some frequencies at the beginning of May. European transmissions are now heard at 0600-0800 on 9.87 and 9.84MHz; 0800-1000 on 11.705, 1400-1600 on 15.685, 1800-2000 on 17.51 and 15.685, 2000-2200 on 15.685 and 17.51 and 2200-0000 on 15.685MHz.

Radio Portugal, report that they have changed frequencies. The new frequencies are: Europe 9.87MHz at 1800UTC, Middle East 21.515MHz at 1430UTC, and Africa 17.900MHz at 1000UTC. Services to the Americas are as previously announced.

A while ago I mentioned that basic equipment could often work very well for international reception, a view heartily endorsed by Laurence Mason. Laurence wrote to say that he has listened on less expensive domestic equipment for the last 40 years.

Laurence spent 20 years repairing the Soviet-made Astrad and Vega radios as a profitable hobby. He still has quite a collection of old sets and unused spare parts, together with circuit diagrams and p.c.b. plans. Laurence says that anyone seriously interested in these sets would be welcome to anything he has, as he is no longer able to undertake repair work. If you are interested, contact Laurence on (0273) 844414.
The PW Shopping Arcade

Welcome to the Practical Wireless 'Arcade'. In this section of the magazine, you'll be able to find all those important services 'under one roof' - just like the shopping arcades you see in the High Street.

Let your eyes 'stroll through' the Arcade every month and you'll find all departments open for business including: The Book Service, PCB Service, Binders and details of other PW Services. Make a regular habit of 'visiting' the Arcade, because in future, you'll have the chance of seeing special book offers and other bargains. And don't forget, this Arcade is open wherever you're reading PW!

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5. Only one problem per letter please.

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We have talked to Badger Boards about the club and group discount on orders, and they are happy to continue this service. Club secretaries and group leaders should contact Badger Boards direct for the new discount rates.

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We've got a QRP theme to *PW* this month, and it seemed natural to select a good book to encourage more readers to try low power operating. So, what better book could there be to recommend than *W1FB's QRP Notebook*? With that in mind, I asked Kathy Moore from our Book Service, to see if she could come up with a special deal - and she has!

Doug DeMaw W1FB's book (Second edition) is excellent value for money. It has all new projects and has chapters including: Introduction to QRP, Construction methods, Receivers, Transmitters and techniques, accessories, and technical 'bits and pieces'.

Doug W1FB has provided the reader with many incentives, and a p.c.b. layouts are included so you can make your own boards. Personally, this notebook is a firm favourite of mine.

Rob Mannion G3XFD.

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