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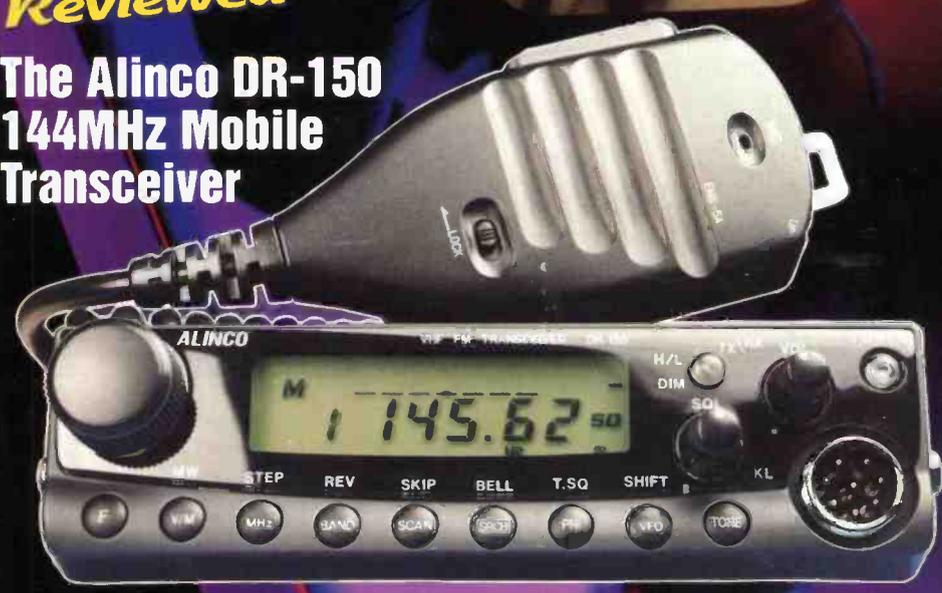
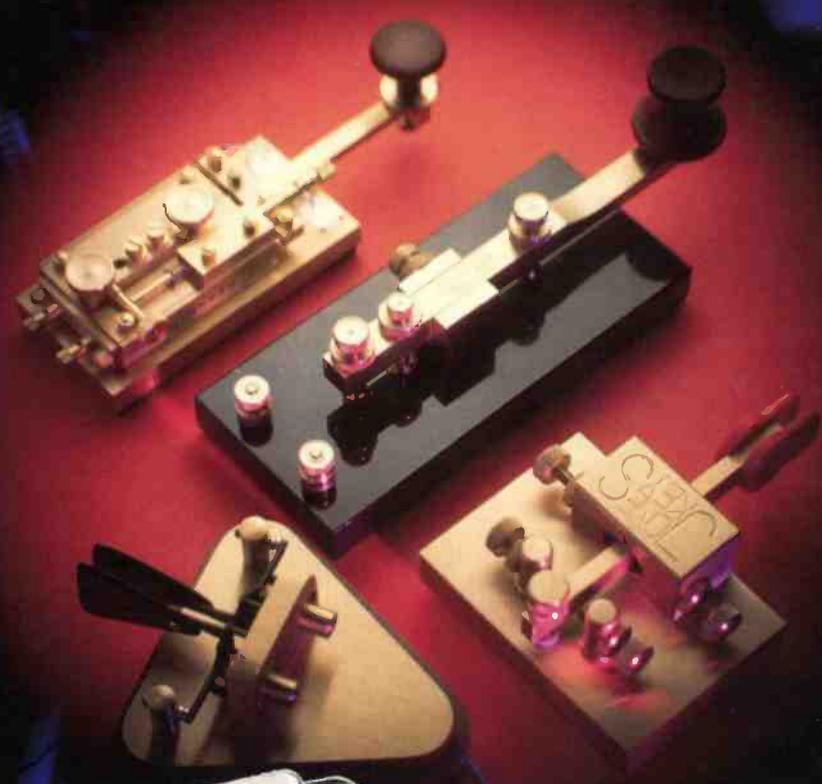
**Morse Choice
Computing The
Code**

plus

**Win Key Prizes In
Our Spot The
Difference
Competition!**

Reviewed

**The Alinco DR-150
144MHz Mobile
Transceiver**



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Dual Band HT

Dual Band Handheld FT-51R

Only one Dial/Volume knob required for easier use.

The First Dual Band HT with **WINDOWS!**

Three dual receive configurations VHF/VHF, UHF/UHF, or VHF/UHF with main band frequency on right or left side. Flexible programming allows transmit on main or sub band.

An 8 character alpha-numeric user help menu scrolls operation instructions in the bottom of the large, backlit display.

MH-29A2B LCD Display Mic with Remote Functions. (Optional)

The new FT-51R Dual Band HT is state-of-the-art, and easy to use!

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You'll like some of the other new, exclusive features, too. Like Spectrascope™. This unique feature displays real time, continuous scanning of activity on adjacent frequencies in VFO mode or 8 of your favourite

memories. A cloning feature duplicates favourite channels to another FT-51R.

A digital battery voltage display, five power output levels, the largest backlit dual band HT keypad made, Smart Mute™, two VFOs on both VHF and UHF as well as available 2 Watt and 5 Watt versions, round out the exciting FT-51R. Plus, the optional MH-29A2B Display Microphone allows you to control volume and also access Memory, VFO, Call Channel, Band Selection and scanning functions. All of this in world's smallest dual band HT radio!

See the FT-51R with "windows" at your Yaesu dealer today!

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"Scrolling instructions tell me what to do next!"

"I use the Spectrascope to find new contacts faster."

"Yaesu did it again!"



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2 1/4" W x 4 1/4" H x 1 1/8" D
(2 Watt version shown.)

Specifications

- Frequency Coverage
 - VHF RX: 110-180 MHz
 - TX: 144-146 MHz
 - UHF RX: 420-470 MHz
 - TX: 430-440 MHz
 - Spectrascope™ Display
 - Scrolling User Help Menu
 - Alpha-Numeric 8 Character Display
 - Up/Down Volume/Squelch Controls & Display
 - Selectable Sub-Band TX Mute
 - Automatic Tone Search (ATS)
 - Digital Battery Voltage Display
 - AM Aircraft Receive
 - Scanning Light System (SLS)
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 - Automatic Repeater Shift (ARS)
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 - 3 Selectable Scan Stop Modes with Scan Skip
 - User selectable lock function w/15 combinations
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 - TX/RX Battery Savers Built-in
 - Handy Cloning Feature
 - 5 Selectable Power Output Levels
 - Message system with CW ID
 - Selectable RX Smart Mute™
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 - DTMF Paging/Coded Squelch Built-in
- Accessories**
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Specifications subject to change without notice. Specifications guaranteed only within amateur bands.

Some accessories and/or options are standard in certain areas. Check with your local Yaesu dealer for specific details.

practical Wireless

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22 SPECIAL PRIZE COMPETITION

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COMING NEXT MONTH

Summer's coming and with that in mind *Practical Wireless* goes out and about with amateur radio. Plus we hope to review the Alinco DR-610E dual-band mobile transceiver.

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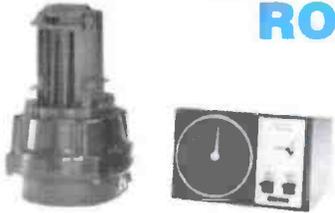
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COMET

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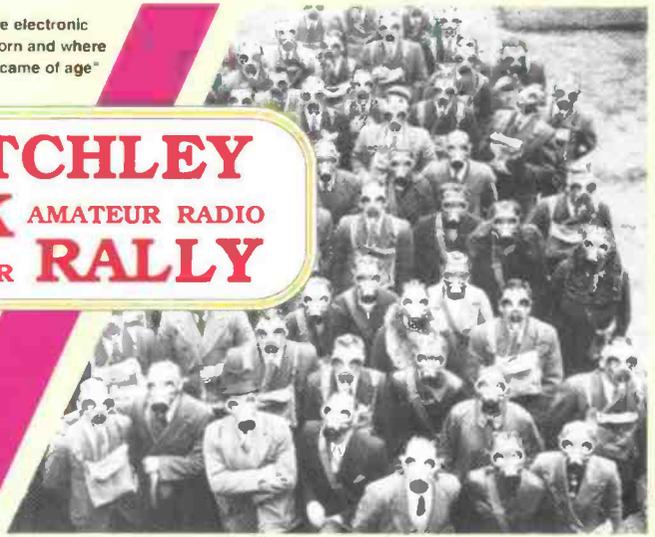
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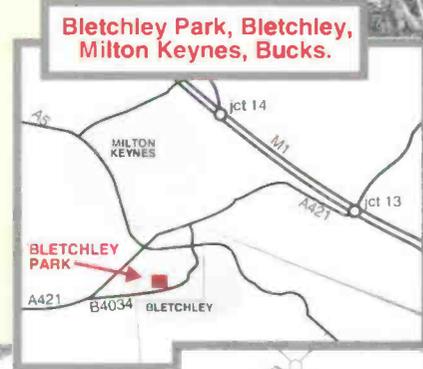


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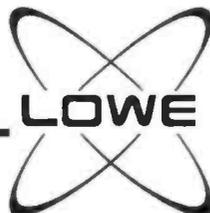
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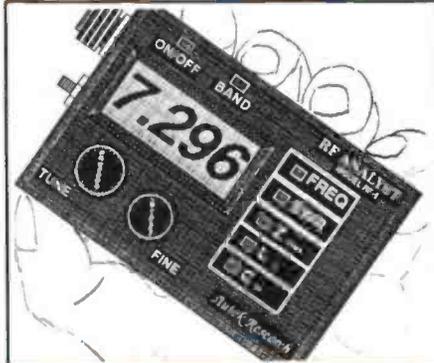
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EDITOR'S Keylines

And many others were saddened to hear the news that **Frank Hall GM8BZX** one of the United Kingdom's best 'ambassadors' for amateur radio had died suddenly on Saturday April 2. Frank's very sudden illness, followed very shortly by his untimely death, took place while he was visiting London for an RSGB Council meeting.

Frank Hall was one of those all too rare people who was able to share his love of the hobby at all levels, whether it be 'doing the rounds' and meeting people at the various large shows, or at official functions. He was always there, broad smile, firm handshake and with that delightful Scottish burr greeting you, accompanied by the ever present smile.

Although I had much to do with Frank during his time as the RSGB President in 1990, I was privileged to have known him for many years beforehand. I first met him when I was in broadcasting, and he a serving police officer in the Tayside region of Scotland.

Like many radio amateurs (including me!) Frank had an insatiable 'nosiness' for anything radio and when he saw an Independent Broadcasting Authority's RangeRover, festooned with TV antennas, he just had to investigate. Who should be in the vehicle?...none other than G3XFD and my good friend and colleague Eion Meldrum (my younger daughter's Godfather), and who later became GM6BKK!

From then on any time I was in that part of Scotland I always seemed to literally bump into Frank. And when he retired from Police duties and took up his special legal work, he never forgot the ITV man who he'd met in Dundee!

So, when Frank became President in 1990 he quickly sought me out. Not only was he out to renew 'old acquaintances'...he was also determined to get me to rejoin the RSGB (which I did).

In fact, the photograph of Frank and I, shown at the head of this page, was taken at the 1990 RSGB Show at the NEC in Birmingham. It's published by kind permission of *Radio Communications* magazine (With particular thanks to my friend and fellow Editor **Mike Dennison G3XDV**).

I felt pleased it was an old friend from my adopted country (I still 'feel' part of me belongs in the Highlands where the deer and GM3XFD used to roam!) who recruited me back into the National Society. But I'm sorry to say that the last time I saw Frank Hall for any length of time was at the 1995 RSGB Presidential Installation, in Bridgend South Wales, when **Clive Trotman GW4YKL** became President.

Unfortunately (and I've bitterly regretted this) I had to return home immediately after the ceremony because of a long standing appoint-



ment on the Sunday morning. If I had been able to stay on afterwards, I could have had much more time with Clive, Frank and our other friends.

However, although we've lost Frank Hall's commanding presence, wit and friendliness, we have not lost his memory. I'm sure that radio amateurs like Frank are 'the salt of the earth'. He proved his worth by being a marvellous ambassador both for our truly international hobby and his beautiful homeland of Scotland.

By electing people like Frank Hall, and now Clive Trotman and the others who preceded them, the RSGB are moving with the times. We've got 'Member's Presidents' now, and I'm proud to say they're my friends too.

So, let's remember Frank Hall GM8BZX in a positive way. Frank was an outgoing friendly person, always available on the telephone, forever making his way round the big shows (busily shaking hands on the way). We can do the same by being friendly and welcoming ourselves - to everyone. We too can be 'ambassadors' for amateur radio and follow in Frank Hall GM8BZX's footsteps. I shall be proud to do so.

Changes Ahead

There's some changes ahead for *PW* in the near future. This issue of the magazine sees the last regular 'HF Bands Report' column written by **Paul Essery GW3KFE**. Paul has written for our sister publication *Short Wave Magazine* and *PW* for nearly 30 years.

Now Paul is stepping down, and we wish him well in retirement. Well, he's almost retiring, because he still plans to write the occasional article for *PW*. He says he'll find time to squeeze something out of his word processor, despite his

heavy involvement in RSGB Council work, with all the travelling that involves from his home in mid-Wales and his work for the REMAP rehabilitation organisation. Good luck Paul, and thank you.

Our new column for DX enthusiasts is to be called 'HF - Far & Wide' and will be edited by **Leighton Smart GW0LBI**. Leighton is determined to provide an innovative column and wishes to involve anyone with an interest in h.f. operating, whether it be on c.w., s.s.b. using high or low power.

Incidentally, Leighton Smart's own speciality is QRP s.s.b. operations. Now that really is hard work! He's achieved remarkable results from his home tucked down in the bottom of a Welsh Valley, and together, we're out to prove that you can work the DX - Far & Wide - despite the fact you don't have a beam antenna or that you (like most of us) have a far from ideal QTH.

So, to help us help you, please support **Leighton Smart GW0LBI** in his new column. We need new reporters, and help from s.w.l.s to listen out for *PW* readers who want to know that they're getting out on the bands.

Have you got an unusual antenna which works well? Have you tried G3BDQ's 'Very Low Dipole' antenna ideas out? Or have you found that a cubical-quad antenna raises the DX for you? If so, let **Leighton Smart GW0LBI**, at **33 Nant Gwyn, Trelewis, Mid Glamorgan, South Wales CF46 6DB**, know and he'll pass it on for everyone's benefit in the column.

Readers based abroad who would like to contribute, can either speed their contributions to the new column by FAXing *PW* on +44 (0)1202-659950 or sending E-mail via our Internet address (on the contents page) and we'll gladly pass it on to Leighton on your behalf. It's your special column h.f. fans...so help us to help you! Finally, I apologise for missing out several vital words in my April 'Keylines' (centre column 5th paragraph down). By leaving out several words, I gave the impression that I believed our hobby was inhabited 'by funny old men' at the bottom of the garden. In fact of course (as I've frequently mentioned before) this is the impression of our hobby held by most of the media and which I strive to correct. Sorry for any offence caused, and I'm pleased to say that most readers realised it was a mistake or realised the real meaning. If I truly believed what I'd written...I could not do this job which I enjoy so much!

Rob Mannion G3XFD

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

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Interest in Wireless

Dear Sir

During the years following the Great War (the First World War), many young men took an interest in wireless, constructing crystal and then one and two valve sets on the kitchen table. They were called 'amateurs'. By the time they had built three sets to Scott-Taggart blueprints and read an article by F. J. Camm, they were no longer held to be 'amateurs', but experts!

On the other hand, the serious experimenter who sought to advance the science and art of communication, applied for a licence to transmit. Many who were granted licences, then and now, were professional radio engineers and officers in the Armed Forces. Nevertheless, the licence granted was called 'Amateur'.

I have long dealt that the private station should be licensed under the title Private Radio Experimenter, Licensed to Operate. If this title became abbreviated to Prelo, it would be more acceptable than the present 'Ham', which has unacceptable associations with 'ham' actors, which is an expression so beloved of journalists.

W. B. Brown G6QY
Hampshire

Magic Eye Tester

Dear Sir

Reference the 'magic eye' capacitor tester - 'Testing In The Wink of An Eye', *PW* Feb 1995. I made up the above unit, it was fun to build and fun to use. Everything from the junk box except the valve (£1.65!). An excellent article.

But, if you build the unit as suggested, using for R6 a 2MΩ potentiometer with double pole switch, the leak test doesn't work, as I found out. Eventually, I realised that this is because, in turning the potentiometer 'off', you discharge the condenser just before the switch operates: therefore no change to the leak.

The author's prototype was correct in using a separate switch, leaving the operating voltage as its correct level.

Incidentally, why are all the resistors specified as 1W when they only have to pass 1.8mA?

Can we have more articles like this (not without the challenge of a built-in problem!)?

R. G. A. Youard
London

Tex Swann G1TEX, our Technical Projects Sub-editor replies: All I can say about the combined switch problem is:- Mea Culpa, the sackcloth and ashes are on

★★★★ STAR LETTER ★★★★★

Callsign Prefixes

Dear Sir

With reference April issue *Practical Wireless*, - 'A Further Touch Of Class' - Callsign Prefixes.

Many thanks to Patrick Allely GW3KJW for his further article identifying the 'funny' callsigns one hears emanating from the UK nowadays. Another 'Ready Reference' item to stick on the shack wall next to Band Plans, etc!

The article points to the long overdue lack of distinctive prefix for Cornwall, which is the only one of the five Celtic Nations in the UK which have not been identified in this way.

I suggest that of the remaining unallocated letters, 'K' should be used, ie. in GK—, as the Cornish name for Cornwall is Kernow and this is shown on the road signs at the major points of entry to Cornwall.

Concurring with Patrick Allely's belief, I would offer that perhaps the genes of the committee, which designed the camel were carried forward to the 'nth' generations, surfacing in time to influence the design of the callsign system with the mystery of the club callsigns thrown in as a fillip to their new-found freedom!

However, and if enough pressure can be bought to obtain a unique prefix for Cornwall, the opportunity presents itself to have a reason for a Cornish club prefix from the letters available. The significance of 'A' as the first letter of the internationally accepted Roman alphabet could denote that the first DX 'QSO' originated from Poldu in Cornwall. The letter 'F' would also serve for 'First' or 'Founder', but only in certain languages?

I would have written to the Secretary of the Cornish Radio Club, referring to Patrick Allely's article, but I have been back through *Practical Wireless* for the past year for an address, only to find that they haven't been mentioned! You have provided details of the activities and office bearers of the Poldhu Amateur Radio Club. But as for all 'Club News'/'Spotlights' articles nowadays, only telephone numbers are given.

Please use this letter in any way you wish if you would like to support my suggestion but I would be grateful if you could pass a copy to the Cornish and/or Poldhu clubs as I feel that the matter should be more properly considered and dealt with officially by Cornish amateurs and their supporters.

Roy Beckerleg ZS1AEY (G3ZMP)
South Africa

Editor's comment: We'll pass on your letter to the Poldhu Club Roy. And as an honorary member of the Poldhu Club I'd be delighted to use a special prefix to represent the county of my forefathers. How about GSP3XFD (SP for Stannary Parliament?, or GT3 for 'Tin'? I proudly 'fly' the Cornish flag on my office door already!

order with the outfit- ters. Why we used 1W resistors when only a few milliamps flow is down to safety. It would be possible to have some 300V across C2 if the transformer has a high off load output voltage. If the voltage is high,

and R6 is at the top end - and with a short across SK1, a possible 3mA might flow through R3. Under these circumstances around 900mW is being dissipated in R3. A second but greater consideration is that 250-400mW

resistors are only specified up to a maximum of 250V potential difference. This specification is valid irrespective of how much, or how little, current flows through the resistor. In short, the answer is, for safety reasons only.

Not So Expensive

Dear Sir

In reply to Paul Knight, 'Receiving You', *PW* April 1995. That for £250 'you would buy the best of everything you need in CB', speaks volumes, whereas amateur radio need not be so expensive.

As a Class B licence holder, you could build or convert a number of v.h.f./u.h.f. transceivers plus antennas for that amount. With an A licence, one could build a very nice h.f. station and work the world!

Second-hand equipment is available at rallies or through small adverts, in *RadCom* and *PW*. It's a commonly held misconception that amateur radio is a cheque book or wealthy person's activity.

I have no operating experience on Citizens' Band, but do feel from my experience in amateur radio that the two services are very different, both fundamentally and in practice. I am sure that many a licensed amateur can be found using CB, and why

not. However, it's regrettable that Citizens' Band has no representative body - and no connection at all with amateur radio.

Just for the record, Paul is incorrect in stating that 'there are more CB licence holders than there are amateurs'. According to the latest statistics from the RA, the number of CB licensees has fallen from 53,926 in the period of March 1993 to March 1994 to 50,704. Amateur licences increased during the same period from 59,243 to 63,033 and this represents the largest single group of all UK licensed groups.

I am delighted to see that Paul is to study for his A licence and I wish him well. He will be warmly welcomed into the hobby in which all participants are well represented both nationally and world-wide.

**Michael G. Shread
GM6TAN
Council Member of RSGB
Aberdeenshire**

Student Income

Dear Sir

Thanks a lot for the sample copy of *PW* magazine you have sent to me. It's a pity that it is a bit expensive to me as a student to subscribe to it. It is more than my monthly income. I read *PW* reader's discussion about CB radio users and have decided to write some words.

Sometime ago, I, as usually, listened to amateur radio stations. But band conditions were bad and I could not find anything interesting and decided to get out of amateur frequencies and try to listen to something new - Radio Swaziland in this case.

But on this band I heard a speech, there were two people. This was a normal amateur contact, but in a.m. mode, not in s.s.b., and instead of callsigns, they used names.

Around I found many similar stations. They were all from former USSR - from Russia, Khazakstan, Middle

Asia, and spoke only Russian, and for the identification, used words like Secret, Wind, Dynamite, Signal, System, Mirage, Captain, etc.

Frequencies were 2.95-3.05 and 1.6-1.8MHz. Today I have a list of about 50 stations. The problem is, what makes them pirates, poverty, the c.w. test, or just people?

**Gintaras Banevicius
LYB-77
Lithuania**

Editor's reply: An interesting letter Gintaras. It seems as though illicit radio operators are to be found all over the world. Here in the UK there have been illegal operations in the region of 6MHz for many years, using ex-military equipment. Thank you for writing and I hope you enjoy our fascinating hobby to the full.

Data Cards & Wartime Memories

Dear Sir

Many thanks for the Data Card with the December issue.

Let me add that I am not a radio amateur, and can't understand half of the jargon I read (don't even know what 'Top Band' is, although I keep hearing it mentioned), but I have a general interest in radio, and have had since I was young (I'm 73 next April).

So, a copy of *PW* now and again is interesting to me. It was of course more understandable in past years as things were simpler.

At the start of the war, I was in the Territorial Army. I took a trade test and became an Electrician (Anti Aircraft), -this was before the Royal Electrical & Mechanical Engineers- (REME), and so anything to do with electronics was our job. I had to organise and install communications nets on AA sites in whatever area we were.

I did thousands, of miles netting them in, as operators were just the site guards. And if they couldn't hear HQ very well, then they twiddled... and next time a call went out, they didn't receive it! Dials were locked, but they undid them and when HQ said 'No reply from BR6' or whatever, I had to get out into the wilds and find the set off net.

Sets were WT13 - I think - I've never been able to find any reference to them, but they were in a wooden cabinet, with a dry h.t. battery and a wet accumulator. The wavemeter was also a wooden box which plugged into the back of the set and which had a small bulb on it, which you tuned for maximum brightness. We used an H type antenna and the sets had a range of about 10 miles, but we did get freak performances, sometimes as far as 20 or so.

I also had to maintain the early radar, until REME was born, and took over from us. This was the latest form of location and after the various types through the years, it was absolutely wonderful to get onto an aircraft, spot-on first time.

Maintenance as far as we were concerned in those early days went something like 'Trace on scope inclined to left'. Remedy - change valves number 12 and 16. And so we didn't have to know too much as long as we could read!

How the stuff functioned under the weather conditions it operated, I'll never know. Opening up a 14 valve amplifier in a snow storm, with a ground sheet flapping around to try and keep it dry, and perhaps a soldering job to do, and the only fire to heat the iron on was in the cookhouse 200 yards away. Great fun! We kept it all going though, and seldom, if ever, had to resort to putting a site out of action for equipment failure.

Later, when I transferred to 6th Airborne Regiment, we had a small portable set, with controls one end, with miniature valves. Forgot the number, 38 was it? The dials knobs had slots in them with a screw through, which could be locked down to limit movement.

If you tuned the knob to its absolute extreme one way, you could pick up Forces Network (or whatever it was called when on the Continent) and this is where it was locked when things were quiet. I got off the subject didn't I? - the Data Cards!

The three cards I already had were from 1963, 1967 and 1980. Well, Ohms Law was always a useful one, and resistor calculations, etc. Now I have four!

I've had an airband set for a year or so, but my FRG7 I only got recently. It's my first excursion into short wave listening. However, my trouble is I write long letters - so I'll finish.

**Des Reed
North Yorkshire**

Editor's reply: A fascinating letter Des! I wonder if the v.h.f. transmitter receiver you mentioned was possibly the 17 Set? I was just too late to buy one on the surplus market (they were advertised in *Short Wave Magazine* in the early 1960s for around £10), but I understand that they weren't too good anyway! Des also mentioned in his letter he is having a few problems with his FRG7, so if there's anyone in North Yorkshire who could possibly help him, we would gladly pass on any letters.

Young Radio Amateur Of The Year 1995

The Radiocommunications Agency in conjunction with the Radio Society of Great Britain (RSGB) have recently announced the Young Amateur of the Year Award for 1995. The idea behind the award is to generate interest in amateur radio and to encourage people to become involved for themselves. The award is open to anyone under the age of 18 who has an interest in radio.

Entrants do not need to hold a licence but the following areas of activity will be taken into account when applications are assessed: d.i.y. radio construction, operation of radio, community service helping the community or assisting in emergency communications, encouraging others and school projects.

The prize for the most outstanding achievement between August 1 1994 and July 31 1995 will be awarded by the Radiocommunications Agency and presented at the RSGB's HF Convention on September 10 1995. The winner will receive a £300 cash prize and the runner-up a £50 cash prize. All entrants will receive a copy of the RSGB's amateur radio logbook. Both will also be invited to visit the Radiocommunication Agency's Monitoring Station at Baldock in Hertfordshire.

The award is open to anyone resident in the UK, Channel Islands or the Isle of Man who has not reached his or her 18th birthday by the closing date. Entrants can enter themselves or can be nominated by an adult sponsor and all applications should be received by July 31 1995.

Applications or nominations should be sent to **Young Amateur Of The Year Award, Radio Society of Great Britain, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE.**

Frank Hall GM8BZX Obituary

Former RSGB President Frank Hall GM8BZX died on Saturday April 2, in London, having been taken ill the previous day.

Frank had been a Regional Representative for some years, before being elected to RSGB Council as member for Zone G (Scotland) for the first time in 1982. He served continuously until 1991 having, unusually, been Executive Vice President no less than three times. He was the RSGB President in 1990 and was elected to Council once again as member for Zone G in 1994.

Frank was one of the earliest v.h.f. licensees and a long time keeper of the three GB3ANG beacons. He served in the Royal Air Force and then with Tayside Constabulary where he combined his interest in radio with his work and was a member of the International Police Association radio club.

Since his retirement from the Police, Frank had been in business as a Precognition Officer under the Scottish legal system. His knowledge and long experience made him one of the Elder Statesmen consulted by successive RSGB Presidents.

His death was sudden and untimely. He will be greatly missed both in amateur radio circles and by his family.

Paul Essery GW3KFE

NEWS '95



Radio Reunion

As many amateurs know the 1995 edition UK Call Book not only contains details of 60 000 licence holders but also boasts a new feature in the form of a surname and UK town index. When a member of the Grafton Radio Society, **George Morley G00XH** discovered the new feature he was keen to see if it could help him to look-up a long lost wartime 'secret radio' colleague whose callsign he couldn't recall.

It didn't take George long to find his friend's surname, 'Arnfield' together with the initial 'H' and G3 callsign. George then wrote a formal but friendly letter to H. Arnfield G3LX in the hope that it was his old friend.

Harry Arnfield G3LX, a member of the Radio Society of Great Britain for 60 years and now President of the Stockport Radio Society, in it's 75th year, was shocked and pleasantly surprised by the arrival of George's letter in January of this year. It had been 54 years since the two men, who had become friends during the Second World War when they were involved in the interception of and 'jamming' of the Knickebein Beam Guidance system, had last seen one another and they were anxious to meet up.

A reunion was organised with the help of **Laurie Newman G4DZO** Chairman of the Stockport Radio Society and was held at the London Amateur Radio & Computer Show (Picketts Lock) over the weekend of March 11 & 12th 1995. The news of Harry and George's reunion soon spread around the Picketts Lock venue and the pair were sought out, photographed and interviewed by many interested parties.

George's G0 callsign belies the fact that after many years working as a British Telecom transmissions engineer he only got back to being a radio amateur after he retired.

George and Harry's story is just one example of how long standing friendships can be forged and linked by amateur radio. It also shows what a wonderful friendly hobby radio can be.

(L-R) George G00XH and Harry G3LX happily reunited, tell their story to Rob Mannion G3XFD and Kathy Moore on the PW Stand at the London Amateur Radio & Computer Show.

School Special

David Haigh is a parent governor at the Mixenden Junior School, Halifax and together with the help of others he will be running a special event station from the school on May 19 using the callsign GX2UG. This event will be a school first as they have only recently got involved in radio. The school has already got several children who are keen to find out more about radio and it's hoped that GX2UG should help to strengthen this interest.

So, if you hear GX2UG on the air on May 19 why not have a QSO? In doing so you will be helping the future of amateur radio and will be helping to show the Mixenden Youngsters just what can be achieved with radio.

Send in your
news,
photographs and
product
information to
**Donna Vincent
G7TZB** at the
editorial offices
in Broadstone.

Cancelled Rally

The organisers of the North of Scotland Amateur Radio Convention (The Gordon Rally) have informed the 'Newsdesk' that this event, which was due to be held on Sunday June 18 1995, has had to be cancelled. Unfortunately, the response from traders was very poor owing to the fact that another radio rally had been scheduled over the weekend of June 17/18th.

More information regarding the cancelled North of Scotland Amateur Radio Convention can be obtained from **Michael Shread GM6TAN, 15 Hardie Court, Aberchirder, Huntly AB54 5TG.**

Open Day Number Five

For the fifth year in succession Waters & Stanton will be holding an Open Day at their Hockley premises on Sunday May 21 between 10am and 5pm.

On offer there will be a vast selection of special offers, end of lines, cancelled orders, second-hand and reconditioned items for sale and plenty of bargains to be found for the early visitor. As in previous years refreshments will be provided free of charge for visitors.

So, if you'd like the chance to snap-up a bargain and at the same time want to put faces to the names behind the Waters & Stanton set-up, make sure you are first in the queue at 22 Main Road, Hockley, Essex on May 21.

Prize Draw

The lucky winner of the £50 Prize Draw as featured in the Book Service pages of the April issue of *PW* was **Keith Blackwell of Norfolk**. Don't forget that the names of all customers who order books from this issue will be entered into the £50 Prize Draw for this month (see page 72 for more details).

Can You Help?

Ian Stewart from Orban, Argyll has recently acquired two **Pye Pocketfones, Cat. No. P5001** complete with chargers. However, both sets are tuned to receive and transmit on 86.3125MHz, which Ian believes is the frequency used by the National Mountain Rescue.

Ian would like to modify the Pocketfones to work on a frequency above or below that specified, he has noted that the sets have six channels but that they only appear to work on Ch1. Any advice on how to go about the modification would be appreciated.

Ian can be contacted using his E-mail address: **100416.1336@compuserve.com**

Taiwanese Visitor

The ADI Corporation of Taiwan have recently added the AT-400 430MHz hand-held transceiver to their small, but fastly growing range of amateur radio equipment. The manufacturers say that the AT-400 should make an ideal first radio for the Novice licensee.

To mark the AT-400's launch John Chang, Manager of the Sales Department for telecommunications equipment from the ADI Corporation visited Waters & Stanton Electronics who are one of the selected UK dealers for ADI equipment. At the moment, radio equipment represents only a small part of ADI's production (about 2%) as their main production is of monitor terminals for many of the world's computer manufacturers. However, the radio side of ADI's business is growing fast, with huge quantities going to China and increasing quantities coming to the West. With that in mind, it shouldn't be too long before we see more in the way of ADI equipment available in the UK.



John Chang from the ADI Corporation pictured holding the AT-400 on his recent visit to Waters & Stanton Electronics.

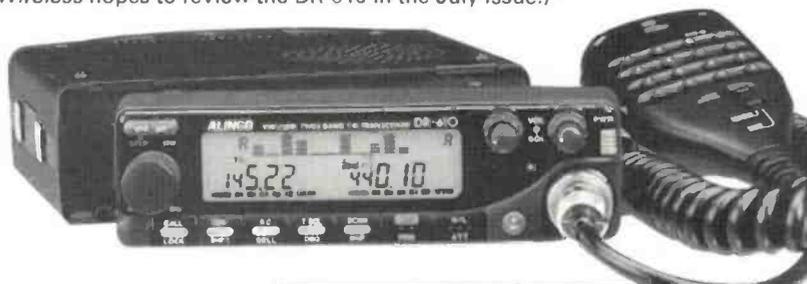
Alinco Does It Again

The Alinco Company, who have already been busy this year with the introduction of the DR-150E 144MHz mobile f.m. transceiver and the soon to be available DX-70 50MHz h.f. mobile transceiver, have launched yet another new mobile transceiver. This time it's in the shape of the DR-610E which is a dual-band f.m. mobile transceiver designed to replace the already popular DR-599E.

The DR-610E features a detachable front panel, 11-band channel scope monitoring facility, dual v.f.o., and also has the capabilities to monitor two frequencies on the same band. The frequency range of the DR-610E is 144 - 145.995MHz and 430 - 439.995MHz with extended receive coverage available.

There is also a CTCSS tone encode supplied as standard in addition to the conventional tone burst which can be controlled from the microphone. The recommended retail price for the DR-610E will be £659.

Further details from **Waters & Stanton Electronics, 22 Main Road, Hockley, Essex SS5 4QS. Tel: (01702) 206835** for more details. (*Practical Wireless* hopes to review the DR-610 in the July issue.)



AKD's Eye On The Future

The Hertfordshire based AKD company who manufacture a wide range of amateur radio equipment are already taking steps to comply with a new EMC directive which is due to come into force from January 1 1996. Although guidelines for the directive have not yet been finalised, it is thought that it will relate to EMC and its regard to radiated signals from the case of the transceiver and susceptibility with regard to unwanted signals getting into the transceiver.

The first step taken by AKD in working towards the new EMC directive was on show at the London Amateur Radio & Computer Show under the banner of an 'Eye For The Future'. The AKD team presented a re-designed version of their popular 144MHz rig. The re-design involved changing the existing layout and adding screening. They have tried to avoid making complex changes as it is well known that their designs are easy to repair and maintain, which is a reputation they wish to uphold.

Without knowing what the final EMC directive will be, AKD have said that there may of course be a need for further changes to their equipment. They wish to assure the amateur radio buying public that whatever the directives turn out to be, AKD will comply and that they will keep an 'Eye and an Ear of the Future'.

AKD can be contacted at Unit 5, Parsons Green Estate, Boulton Road, Stevenage, Herts SG1 4QG. Tel: (01438) 351710. FAX: (01438) 357591.



The AKD team busy in the workshop 'keeping an eye on the future' of EMC.

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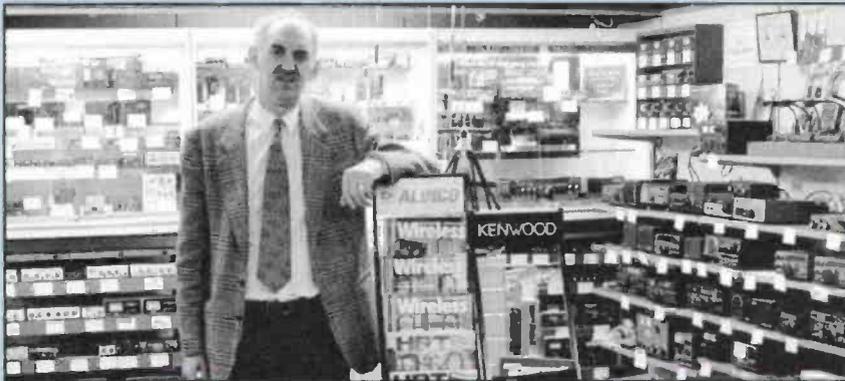


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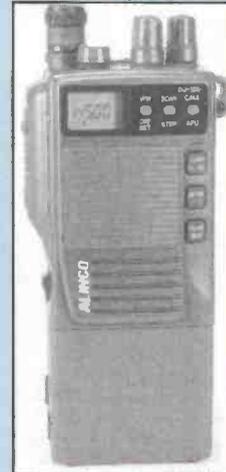
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This month Elaine Richards G4LFM has news on the search for the Young Amateur of the Year and weighs up the arguments for mobile and portable operation.

NOVICE Natter

For Radio Beginners of all Ages.

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



The British Airways Concorde supersonic jetliner

Postcard Collections

Do you have a picture of Concorde on your QSL card, or is there one in your collection. If so, Pete Cooper would really like to hear from you, he collects picture postcards of the Concorde Supersonic Airliner. If you can help, drop me a line and I'll pass on the information.

Special Event Lighthouses

I know many of you who are new to radio enjoy special event stations (in this case special event lighthouses) as they are a way of boosting the stations heard or worked in your log. Well, at the end of August over the weekend of the 26th and 27th there will be a really interesting special event weekend taking place. The 2nd Northern Lighthouse weekend looks like it could be a good one to listen for.

There will be 11 stations on the air, all operated from various lighthouses in Scotland. The stations to listen out for are:

GB2LS	Shetland Islands
GB2LO	Orkney Islands (HY22)
GB2LTH	Isle of Lewis (NB53)
GB2LCP	Channary Point (NH75)
GB2LBN	Barns Ness (NT77)
GB2LEN	Elie Ness (NT49)
GB2LA	Ardnamuchen (NU46)
GB2LDH	Dunnet Head (ND27)
GB2LT	Turnberry (NS10)
GB2LL	Lismore Island (NM84)
GB2LG	Mull of Galloway (NX13)

Don't forget, if you are trying for a Worked All Britain Award, check out the information in brackets, are there any there you are waiting for? For more information, contact **Mike GM4SUC** who is QTHR.

Bad Reception

Noel Amis has dropped me a line covering lots of points - many thanks. One of the things I found most interesting was his information as to how modern multi-storey offices are made.

After reading his description, you can see why it is so difficult to receive radio signals on your portable radio sat on your desk! To achieve high thermal resistance, external walls of multi-storey buildings use aluminium foil-backed wallboards fixed to the internal side. The light-weight metal stud partitions are also clad with these wallboards.

The metal studding is generally earthed too. When you add similar construction features for the suspended ceilings and the steel supporting frame, it's no wonder life is so difficult for the s.w.l.!

Seek You Again

I've received another FAX about the *Seek You* CD of amateur radio songs. Apparently, it's available in the UK from **Ham Band Music, Willow Bank, Riddlesdon, Nr Keighley, West Yorkshire. Tel: (01535) 691712.**

Beginner's Corner

The 10th Annual QRP Convention, organised by the Yeovil Amateur Radio Club, this year has a Novice and Beginner's Corner. They are aiming to have a display showing the different licences available and have examples of the practical elements of the Novice Licence. This is as well as all the usual talks, displays and trade stands.

Do you live locally to Yeovil and think you would like to know more about becoming a radio amateur? If so why not go along on May 21 to the Yeovil Amateur Radio Club and find out more?

Young Amateur Of The Year

Do you know someone who could be an entrant in the Young Amateur of the Year competition? As long as they are under 18, interested in radio and have shown outstanding achievement they could be nominated - they don't need to be licensed.

The areas of activity that the judges are especially looking for are: d.i.y. Radio Construction; Operation of Radio; Helping in the Community; Encouraging Others in Radio and School Projects. You have until July 31 to nominate someone.

All entrants will receive a free RSGB logbook, the runner-up gets £50 from the Radiocommunications Agency and the winner gets £300. Both the runner-up and winner get a trip around the Radiocommunications Agency's Radio Monitoring Station at Baldock.

By the way, if you think you qualify, don't wait for someone else to nominate you, do it yourself! This is quite within the rules.

Send you entries to:
Young Amateur of the Year Award, RSGB, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE. Tel: (01707) 659015.

Get Your Morse!

Robert W. Moore 2E0AHQ has written to say to other Novice Licence holders that it really is worth carrying on and getting your Morse. He's on the 28MHz band just using 3W and yet finds he can talk to all kinds of countries.

Robert sent in examples of his January and February log just to prove his point. **January** OM1GM (Czechoslovakia), DL5MCQ (Germany), SM0OWX (Sweden), HA8FM (Hungary), S51CL (?), SP9BBH (Poland) and OE3FR (Austria). **February** LU3HYS (Argentina), PY4HF (Brazil), CX2VG (Uruguay), PU5EEM (Brazil?), DL3XUN (Germany), 5R8ED (Madagascar) and EA8/PA3GIO/M (a Dutch operator out mobile in the Canary Islands!).

It's really amazing that so little power can achieve such great distance. Keep up the good work.

First Steps

Portable Or Mobile - Which Is Best ?

Lo's Martins CT1FNK has written with a host of 'First Steps' questions that I hope to work my way through in the next few issues.

The first of Lo's questions is portable versus mobile. What are the differences and what can you expect to achieve?

Well, to simplify things, let's talk about v.h.f./u.h.f. hand-helds and mobiles. A portable rig is just that, one that can be carried around with you. It will have its own power supply attached and is usually reasonably small - hence the common name 'a hand-held'. It has its own antenna, usually a 'rubber duck' or telescopic fitted directly to the rig.

A mobile rig doesn't have to be fitted into a car or other vehicle, but will need an external power supply. This is usually taken from the vehicle power supply or if you're using it at home from a power supply on the bench.

These mobile radios are usually bigger, about the size of a large hard-backed novel. Because it is much larger, you will find that mobile rigs are capable of delivering higher r.f. power to the antenna - this time the antenna is separate, on the roof of the vehicle, etc.

Again because it is physically bigger, there is usually a larger audio speaker built into the mobile radio and the audio power is also greater to combat the dreadful amount of noise that is associated with being in a car.

Before you decide which you want to buy, think very carefully about the kind of operation you want from your radio, especially if you can only afford to buy the one rig.

Adapted For Use

If you want to use a radio out portable most of the time, but need to take it on the odd journey, don't worry, your hand-held can be adapted for the car. You can get some very good headsets that place the microphone in front of your face and a speaker on your ear.

The push to talk (p.t.t.) switch can be clipped to your seat-belt or some other convenient place. You could also go to the effort of adding a power amplifier to boost the output power.

If you usually operate at home or in the car, then the mobile radio can be adapted again for this use. You can easily add an external speaker to make the audio that bit better and creating a stand to sit the rig on shouldn't be too much trouble.

A decent power supply is readily available from many sources or perhaps you fancy trying to build your own. *Practical Wireless* have published many designs over the years that you could use.

Surprised To Learn

Now then, what can you expect to achieve when working both mobile and portable. You may be surprised to learn that you can really achieve a lot with a portable rig.

The trick is to take advantage of the portability and operate from particularly good locations. Whilst most amateurs have to work on the spouse for months to get the go-ahead for a 10m mast in the garden, the portable operator can sit on top of a 300m hill for the price of a bus ride!

By choosing your location carefully you can work tremendous distances using very low powers. In fact you'd be amazed just how far you can get when conditions are right.

Portable operation is particularly popular in the summer months where hill-topping can be an extremely pleasant experience. It's interesting to note that you don't even have to climb a hill to achieve good results.

A few years ago I used to experiment with the enhanced propagation that occurs over sea paths. Next time you go the beach sneak your rig into the beach bag and try putting out a few CQ calls on the 144 or 432MHz bands. If conditions are right you'll find that you can easily work across the English Channel from the South coast or similar distances.

I will however, offer one tip when operating portable - don't try operating whilst you're walking. The combination of heavy breathing and wind noise makes the transmission very difficult to copy.

Mobile operation offers many of the same advantages as portable except you can't usually take the car on the beach! Operation from a car also means that you're not restricted to fine weather for your hill-top DXing.

You also have the advantage of a higher output power and generally more effective antenna than the portable operator. Although these points generally represent an advantage you need to be careful to control your output power when transmitting from good locations.

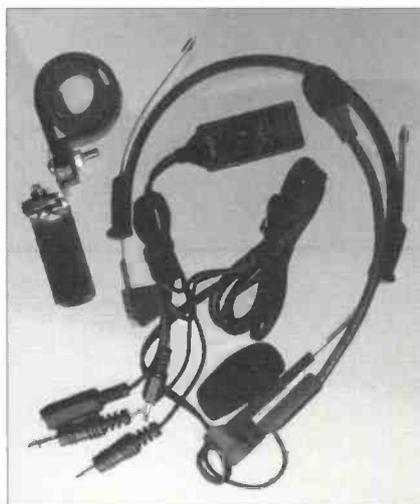
As soon as you've made contact turn the power down as much as possible to avoid causing unnecessary interference to others. This is particularly true when working through repeaters as you can easily end up unwittingly operating through more than one repeater. This is because repeater frequencies are shared around the country and abroad.

I hope this helps you to decide whether to operate portable or mobile, why not try both and weigh up the advantages for yourself?

Portable rigs have their own built-in power supply and an antenna.



Left: It's easy to adapt your hand-held for use in the car.



Right: There are some very good headset arrangements available for mobile operation.

Time and space have caught up with me again so cheerio for now. I look forward to receiving more of your letters in the coming month.

Elaine G4LFM

Royal Signals Radio

On July 22 the 21 Signal Regiment (Air Support) will be holding an Open Day, known as the Air Formation Signals Open Day, at the Colerne Airfield, Azinghur Barracks, Colerne, Nr. Chippenham, Wiltshire. In connection with the open day the **Royal Signals Amateur Radio Society** will be running a special event station using the callsign GB4AFS.

The GB4AFS station will be operational on u.h.f. and

h.f., 3.740, 7.070 and 14.123, s.s.b. and hopefully c.w. 3.565, 7.027 and 14.065 subject to time and conditions. A special QSL card will be available for contacts made during the event and the route for QSLs will be via the RSGB, RSARS, RAFARS and the RNARS bureaus or direct with an s.s.a.e. Operators not requiring a QSL card should advise at the time of contact.

For more information please contact **Major Craig R. Treeby** on (01226) 743240 Ext. 5286 or **RSM Geoff Baldry** on Ext. 5256.



CLUB Spotlight

Send your information to the 'Club Spotlight' newshound Zoë Shortland at the PW Offices.

Club Reminders

The **Clifton Amateur Radio Society** meet at 8pm every Friday at the Kidbrooke Centre, 90 Mycenae Road, Blackheath, London SE3. New members and visitors are always welcome. For more information, you can contact **Kelth G4TJE** on 0181-859 7630.

Members of the **Crowborough and District Amateur Radio Society** meet at The Plough and Horses Public House, Crowborough. Meetings are held every fourth Thursday in the month at 20.00hrs. For more details about the Society you can contact **Pauline Moldon G7SPT** (Secretary) on (01892) 653782.

New Secretary for Appledore

The **Appledore & District Amateur Radio Club** have now elected a new Secretary. With immediate effect, all correspondence regarding the club should be addressed to: **Mr David K. Brierley G3YGJ**, 4 Waterloo Terrace, Bideford, Devon **EX39 3DJ** or you can telephone him on (01237) 476124.

Life President

The **Leicester Radio Society**, known to be in existence since at least 1913, honoured two of their older members at their recent Annual General Meeting. Firstly **Frank Elliott G4PDZ** of Glenfield was made honorary life president.

Frank has been a member of the Leicester Radio Society and the Radio Society of Great Britain for many years. He's well known as the organiser of the Leicester Amateur Radio and Electronics Exhibition, which has been held at the Granby Halls Leicester, for the past 24 years.

Secondly **Bob Peace G8SOZ** of Great Glen was made the club's honorary life vice-president. Bob has also been a member of the Leicester Radio Society and the Radio Society of Great Britain for many years. He's well known for his tutoring and coaching would-be radio amateurs through their courses, also enabling them to pass their Radio Amateurs Examination.



Frank Elliott G4PDZ
Honorary Life President
of the Leicester Radio
Society.

Ugly Expedition Group

The **Northern VHF Activity Group** are following up their successful VHF DXpedition to the Western Isles last year by going back to Scotland this year, on June 10 - 24th. The Group now have their own callsign, G7UEG (Ugly Expedition Group!).

The group callsign should make things much easier than last year when the operators were using their own callsigns, confusing people as there were as many as five operators on the air during the day!

The following is a list of dates, islands, locators and bands.

Date	Island	Locator
June 10-13	Isle of Islay	IO65
June 14	Isles of Colonsay & Oronsay	IO66
June 15-16	Isle of Jura	IO65
June 17-23	Isle of Mull	IO66
June 21	Isle of Iona	IO66

The club will be active on the following bands: 144.222, 50.122/222 and 432.222MHz

The Northern VHF Activity Group are hoping to have a special award, if enough people are interested, for working three or more islands, on any band or any mode, s.s.b., c.w. or f.m. For the cost of £3, a special QSL card will be available. Cheques for the card should be made payable to Peter Austin G7BXA who is QTHR. Any QSLs should be sent via G7DKX who is also QTHR.

The following operators will be active over the two weeks: **Pete G7BXA**, **Manny G7HSP**, **Derek G7DKX**, **George G1LMZ**, **Keith G4YQW** and **Don GONES**.

If anyone would like more details or would like to fix skeds, please call **Peter Austin G7BXA** on 0113-256 3462 after 2pm.

Attention All Club Secretaries

The *PW* Book Service Department has put together a special deal offering discounts on book orders received from radio clubs. If your club places an order for books from our comprehensive selection of titles that totals over £50 we will give you a **10% discount** and **free post and packing!**

To take advantage of this offer please use the order form towards the back of this issue, making sure that it is the club secretary who places the order and that the name of your club is stated.

So, don't delay take your copy of *PW* along to your next club meeting and get your members to start making a list of all those books they've been meaning to buy but never quite got round to.



Raspberry Blowing Radios

Gary Milton G0CUQ shares his story of the Ilford Group's attempt to get on the 70MHz band.

Here at the **Ilford Radio Club**, we're never afraid to tackle home construction. One of our favourite projects is getting old p.m.r. equipment onto the amateur bands.

One such project was the conversion of some elderly f.m. transceivers to the 70MHz (four metre) band. These allegedly 'mobile' valved radios had the dimensions, looks and charm of an empty five litre oil can. They were heavy, worn out, full of dangerous voltages and we didn't have a circuit diagram. The perfect club project!

My contribution to the project was an i.c. audio amplifier, which had a nasty habit of burbling away to itself every few minutes. Despite this, it was still fitted to the radio.

After several hours of unsuccessful 'tuning', the arrival of the club tea tray was announced. It arrived with the usual call of "Get that scrap off the table!"

The owner of the radio leapt to his feet in its defence. "This isn't scrap! This is real amateur radiol!" At this point, my little amplifier summoned up its watts, and delivered a long, and enormous 'burp'! We laughed so hard that we could barely speak for the rest of that evening!

Following the incident, our 70MHz project was abandoned. We never did make it on the band, but the radio went on to a new life, courtesy of the local scrap merchant!

If you have any amusing club stories that you'd like to share with other 'Club Spotlight' readers please send them to Zoë at the *PW* Offices.

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Cycle, Ride Or Walk

Last year **Harry Hogg G3NGX** operated GB5CR from Greyfriars Church in the centre of Reading in association with the Royal County of Berkshire Churches Trust. Harry operated using the cyclists check-in tent by the church gate as the radio station.

The local newspapers ran a picture of the event and a good number of visitors had an insight into amateur radio. Harry says he could have done with a 'Lieutenant' to keep an eye on the gang of youngsters who descended at one point, but he was helped out by a pensioner who spoke to them so effectively, that he must have been a Sergeant Major! Harry doesn't recollect the exact words that the pensioner used, but apparently the leaves started to fall off the trees by the church door!

This year, Harry is trying to get together a group of amateurs who would be interested to run a special event station from their local church. This would coincide with the annual Reading Church Cycle Ride, Cycle, Ride Or Walk (CROW) on Saturday September 9.

Many churches have high points suitable for suspending an antenna, so that at least one end can be quite high, giving a good signal on 7 and 3.5MHz. A 144MHz 1/4 wave and a hand-held transceiver are rather useful for opening the local repeater, should the visitors not be impressed with s.s.b. voices from far away.

Harry has already received good co-operation from the Berkshire Trust. The Trust felt that the publicity would be good for them, especially if some interesting contacts can be made between churches in different countries, or with mobiles on their bikes.

The organiser's purpose in CROW is to raise funds for the restoration of historic churches, often in beautiful places, but with small village congregations unable to raise sufficient money themselves for major structural repairs. Grants from the county trusts are a great encouragement to such churches to undertake work and fundraising of their own, to preserve their heritage for the benefit of us all.

Cyclists can obtain sponsorship from their friends, say, a fixed amount per church visited, then try to visit as many as possible during the day and earn a grand total. Usually the proceeds are collected at each church and split between a local project and the county trust for the benefit of other churches.

Some 23 countries are known to run the CROW event and hopefully these will continue to do so in 1995. So, all you amateurs out there who would like to have a go, cyclists, walkers, church members and others, why not contact **Harry Hogg G3NGX, QTHR** or by telephone him on **(01491) 872919** (answerphone on if out) for more information.

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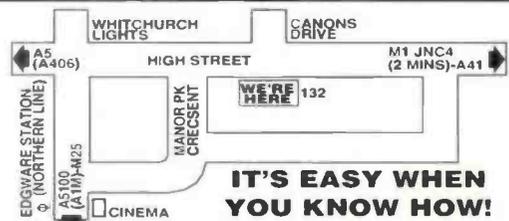
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Peter Jones, from his factory in Smallfield in Surrey (near Gatwick Airport) has been gradually establishing his name as a maker of Morse Keys which have proved to be particularly popular in the USA. Peter sold his first keys in late 1992, and they were of the twin paddle variety. The 'pump' version was released in mid 1994 and the single paddle version in the winter of the same year.

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A Nice Mobile!

The Alinco DR-150E 144MHz Mobile Transceiver

Kevin Nice G7TZC, Assistant Editor of Short Wave Magazine, goes mobile with a vengeance and gets to grips with the new Alinco DR-150E high power mobile transceiver.



There are some things you must never forget. Life has a way of levelling those of us who get smug, complacent or both!

My recent endeavours to install and set-up the DR-150 in my car, so I could put it through its paces and write this review, reminded me of smugness and complacency. And of course I'm referring to the old adage - 'read the manual'!

I was sure that having had my hands on many pieces of radio and computer equipment over the years, that the last thing I'd need was instructions. Up to a point I was right.

However, I realised my mistake when the rig was in the car and I was driving along listening for activity on the local repeater. I was just itching to have my first QSO with the shiny new box, it was then the fact I hadn't done my homework, by reading the manual, bit me fair and square in the rear.

Monitoring Activity

It all started when I had been monitoring some activity for a few moments and when the audio disappeared for several seconds, only to return again a brief while later. This whole process then repeated itself on a regular basis!

I realised that the audio effect must be intentional. So, having watched the display to discover whether or not the set was scanning various different frequencies, pressing every button in sight - in a logical sequence you understand - I gave up and read the manual!

Memory Channels

Whilst discussing the DR-150 and similar rigs with some fellow amateurs, several of

them were unimpressed with the trend to include lots of memory channels in transceivers. Everybody is entitled to their opinion, but I personally don't agree with that view.

In my opinion, having lots of memory is not just a status thing or an attempt to be flash, or for that matter a case of unnecessary features for features sake. Indeed not, what having lots of memory channels does, for the user of this kind of kit, is it enables you to produce a transceiver tailored to your own preferences.

In effect you get a configurable rig from your local friendly radio dealer. You then take it home and then set it up the way needed to enable you to use it in the way you want.

It's somewhat like having a tailored suit but running up the seams when you put it on! I really do prefer this approach.

I currently own two 144MHz transceivers. Both are second hand synthesised rigs but are inflexible due to their implementation in controlling the synthesiser.

Since both of my rigs are over ten years old it's not the fault of the manufacturers. It's simply the fact that memory was prohibitively expensive at the time of their manufacture.

Actually, when the f.m. only transceiver (a Trio TR2300), was built, Static Random Access Memory (SRAM) was an extremely rare commodity indeed.

Today however, with price performance levels being what they are, spurred on by the proliferation of computer based products, memory and microprocessors are very cheap. The effect is that almost every piece of electronic equipment shares this user configuration possibility - hurrah.

So much for what I think is good. But what's the DR-150 all about?

For Your Money

Well, for your money you get a 50W mobile transceiver which is very light at a mere 800g. And about half of the DR-150's very modest proportions is heatsink.

As you will see from the photograph in the heading picture, the front panel is very uncluttered. The area of this panel is about 50% of the size of the DIN specification in-car entertainment radio.

It's small by my reckoning! The size however, does not detract from the ease of use of the radio, well with one exception (more of that later).

The main Channel/Frequency selection, Power, Volume and Squelch controls are all easy and convenient to operate. And although some people may find the frequency control a bit on the light side, I did not.

The display is both large and clear to read, and is used to convey lots of information (detailed later). It's covered, along with most of the front panel, by a back printed acrylic moulding, hence it's very unlikely that the panel legends will wear off.

Well Put Together

Having taken the covers off to have a good look inside the DR-150 I conclude that this attractive little transceiver is very well put together indeed. It's based around a Toshiba integrated power module.

The main chassis is a high quality die-cast aluminium item. It is very well finished indeed. Judging by the finish there has been a significant investment on the tooling-up for this radio. Alinco are going to have to sell lots to make it pay.

The majority of the circuitry uses surface

mount technology hence the small size. The front panel appears to provide all the control and memory functions, with the main board providing the hardware for the radio functions.

Mobile Preparation

I had not operated mobile from my present vehicle. So, I needed to set about some pretty basic and obvious preparation to allow for a fair and objective appraisal of this tiny new Alinco rig.

There were several problems to tackle. Firstly, I didn't have an antenna but Bob G6DUN of Southern Shortwave and Scanning came to the rescue. Bob kindly lent me two whip antennas to attach to the gutter mount base which he also provided. The two whips were a $5\lambda/8$ base loaded and a $\lambda/2$ over $\lambda/2$ collinear.

The antennas, made by Sirio, were the HP2000 and HP2000C respectively. They both feature a tilt-over mechanism, absolutely essential with a colinear, being well over six foot in length. This gives a total height of about ten foot at normal ride setting on the suspension of my Citroën car.

I was very impressed by the quality of manufacture and performance of the antennas. The extra investment required for a colinear seems to be well worth it as there was significant (about 2 'S' points) improvement on reception of known signals - The local repeater - GB3SC. If you can cope with the altitude of the antenna tip!

As a matter of interest, using the DR-150 and the HP2000C on return from a recent trip to London I was able to initiate contact with the PW Technical Projects Sub-Editor 'Tex' Swann G1TEX in Poole from the M3 near Winchester.

The contact was via GB3SC at a distance of some 40 miles using the medium (25W) power setting. 'Tex' tells me that I had been successfully accessing the repeater for some time before we made steady contact. (Apparently for some 15 minutes or so, which equates to about an additional 20 miles.)

The problem though, as all seasoned mobile operators will know, is although you 'get-in', by the time you let go of the microphone you drop into a shadow and therefore don't always hear the repeater respond.

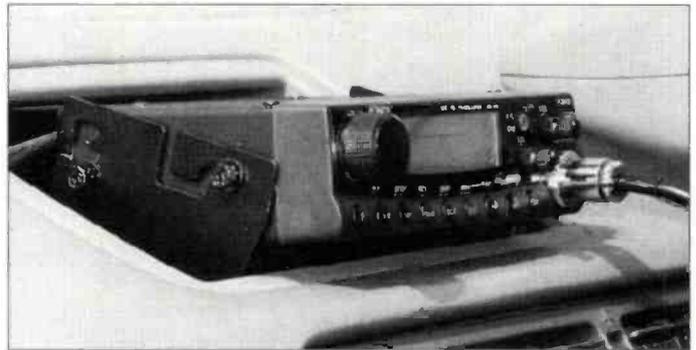
But I'm getting ahead of myself here. The next problem I had to solve was the lack of a power supply and I'm going to have to come clean on this one.

I cheated, and more to the point got away with it. I did it by using the cigarette lighter socket.

I know what you're going to say. And having installed many mobile radio sets in my time, I realised it's just not good enough - but I just wanted to get this radio going!

To satisfy all of you who are wagging your finger in disgust, you'll be pleased to know I routed some cable direct to the battery terminals later on. The only effect of this essential correction to my installation procedure was that it achieved a full 50W in the high power range rather than the lower

The DR-150 (snugly) mounted in G7TC's car.



power available because of the voltage drop via the 'cigarette lighter'.

Having obtained some volts and an antenna, what about actually fitting the unit? Fortunately, provided with the radio is a fairly standard 'U' shaped bracket and all the nuts, screws and washers needed (you even get a spanner). I guess it took me about 45 minutes to complete my temporary installation.

If I was going to do a more permanent fitting, then I suppose twice the time would be required. But this doesn't take into account antenna installation.

Ready To Go

With the installation done, I was ready to go and put this neat looking radio through its paces. Having now read and inwardly digested the contents of the manual, I was able to begin in earnest.

I was quietly confident that I would be able work the DR-150 and to select a frequency, power level, panel illumination setting, step size transmit offset to name but a few. So, after a brief period of frantic button pressing and knob turning, I had the beast well under control. This versatile transceiver was configured in the way I wanted.

The way I like to set things up is so that the display gives me both the channel number and the frequency. The way I normally achieve this on programmable rigs, is to assign the Simplex and Repeater channels to appropriate memory locations.

For example, I program S16 (145.400MHz) into memory location 16, S20 into location 20 and so on. It may be stating the obvious, but a little planned button pushing and it's all done for the life of the radio.

Since the DR-150 has 100 memories it should give the average operator more than enough capacity. There are exceptions however.

If you do a great deal of travelling and use repeaters with different access methods on a frequent basis you'll probably want to give each its own memory location. This saves setting up the radio manually each time - although, there's nothing to stop you working this way if you prefer.

Whilst on the subject of programming memories, for some reason the calling channel button has the wrong frequency assigned, 145MHz not 145.500MHz i.e. S20. Alinco please take note! On reflection though, my Kenwood 430MHz hand-held had the default value for the calling frequency wrong too.

Read The Manual

My advice is don't be smug, don't be clever - just read the manual. Alinco have made this both easy and worthwhile.

The style of the documentation is clear and concise. It really is a joy to read a manual which is structured in such a logical way.

The manual provided with the DR-150 did give me a scare though, as it was a provisional copy. The cover was printed in Japanese and I must admit I had visions of struggling with that one!

I noted one minor inconsistency between the manual and the rig. The button referred to as **Call** is labelled **Tone** on the rig, but it is a dual function so it's no real problem.

It didn't take me long to discover the cause of my periodic lack of audio on receive. It was caused by the **Search** facility taking a look at the adjacent channels for display on the channel scope. This is a facility that you really miss once you've used it. If you're not as enthusiastic about this feature as I am though, you can turn it off. I think this is advisable during a QSO, otherwise you miss chunks of the other station's over.

The **Search** button has a toggle action like the most of the other functions. So, you only need to press the button again to disable the facility.

The **Search** operates in the following manner: The receiver will, for a period (defineable by the user) switch frequency and 'listen' to three channels (or memory locations) above and below the one selected.

The signal strengths are then displayed on the histogram type display. This continues until the next sequence, or the centre frequency is changed.

The 'S' meter displays the strength of the central channel, i.e. the one you're operating on. However, there are some shortcomings with this type of operation.

For instance, the periodic drop of audio, and the fact that the signals strength shown by the histogram are not 'real time', indeed, only recent history (albeit less than a few seconds old.) The added functionality provided by this facility is terrific - I think it's the singular most important feature on the DR-150. It certainly helps when searching for activity on the band.

The historic nature of the display on the transceiver can be puzzling initially. Leading to phantom stations when you either tune up or down to an indicated strong signal to find on arriving at your target frequency, the station has stopped transmitting. As I mentioned earlier, this is a trade-off, and you soon get familiar

with using this useful feature.

I will not bore you with all the details of the many functions that this radio has to offer. After all, if you end up buying a DR-150, you'll get a manual and you can read it first hand.

Instead I'll summarise the features provided. And those I could test worked just fine, with good explanations in the documentation.

What Else?

So, what else can the DR-150 do? Briefly it provides the functions on offer by all of its genre.

The other functions include: dual v.f.o.s with separate definable steps; 100 memories programmable with offsets and squelch type; Beep tones for key depressions and band edges.

The microphone **Up** and **Down** buttons produce a low tone for down and a high tone for up - great as you don't need to look at the display. You just count the low or high beeps and you know where you are.

Power levels are three-fold 10, 25 and 50W, designated low, medium and high. I found that I ended up using the rig mainly on the medium setting as this seemed to give the optimum balance between transmit and receive performance.

There's also a scan capability which offers an alternative to the search function. It's useful for finding active channels quickly and with minimum operator intervention, essential while driving!

The squelch has four modes of operation. The 'normal' noise, a definable level 'S' meter, CTCSS and DTMF mode, are very versatile indeed. I'm still thinking of new ways to make use of these features. Since the rig has the option of split frequency working - perhaps a cross-band repeater? There are more, but it would be tedious to list them all.

Entire Band

The DR-150E, to give the transceiver its full product code for the European market, is programmed ex-factory, with a transmit and receive range that covers the entire UK 144MHz band. Additionally, receive only coverage is provided for 430MHz, just to make you wish you had a dual bander!

Now I've got around to installing a rig in the car it will have to stay, in one form or another. In fact, I actually wished that I lived further from work so that I had more of a chance to operate mobile!

I've also now operated both simplex and via a good few of the repeaters around the country, all the way from the South Coast area, around the M25 and up to the North Midlands areas. Mobile operation really is a pleasant addition to a tedious journey. I can thoroughly recommend it, you get to meet lots of nice people too, but then that's the beauty of this hobby.

The only way to operate mobile properly and safely though, is to get a hands-free microphone set-up. Using a fist microphone while driving, is at best inconvenient. At worst, well it doesn't bear thinking about.

I have invested in the 'hands-free' operations

Inside view of the DR-150.

area now. But unfortunately I didn't get a chance to try my boom microphone and headset with the DR-150 before it had to go back (shame). I would have liked to have kept this radio.

Two Grumbles

I have two grumbles. Firstly I think there just aren't enough channels displayed on the spectrum display at any one time.

Secondly, why on earth put the tone burst button on the front panel of a mobile rig? It's particularly difficult to find and press with the microphone in your hand whilst driving. I found it more convenient to 'whistle up' the repeater when on the move! **Jeff Stanton of Waters & Stanton replies: I understand and acknowledge Kevin's comment on the repeater tone burst button. However, with the introduction of the CTCSS facility with repeaters (even though it's only in the introductory stages, with the old tone burst system working in parallel with CTCSS) I don't think it's likely to be a problem. G6XYU.**

The microphone is the place to fit a tone burst, either with a switch, or as a sequence of presses of existing buttons, better still as a programmable function in a memory location. Then you could set-up repeaters in memory and only have to select the correct memory to have all necessary functions enabled. Then again, if you're using a hands-free system, you'll have more hand available to hit the button to open that repeater.

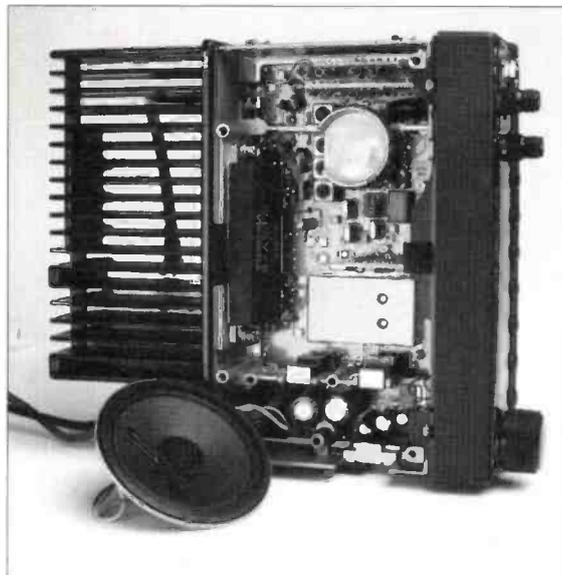
Lastly, although not really a grumble (although the speaker has to go somewhere) for my set-up the location in the top of the case is best. But if you wish to 'hang' the DR-150 under the dashboard, an external speaker might have to be a consideration.

Honest Opinions

To round off I've got to be honest in my opinions and say that I really like the DR-150. It has all you need for solid mobile working.

Certainly there are lots of 'bells and whistles' on the transceiver that your average, diehard 'Luddite' (like G3XFD!) will positively hate. But, if like me, you want to use a piece of equipment to the full, then the DR-150 is a good piece of kit to use.

The transceiver's compact size allows easy fitting to the vehicle. This fact, which when all



Manufacturer's Specifications

Frequency Range	
Transmitter	144-145.995MHz
Receiver	144-145.995MHz 430-439.995MHz
Modulation:	F2, F3
Antenna Impedance:	50Ω
Stability:	±10 p.p.m.
Receiver type:	Double conversion superhet
Intermediate frequencies:	45.1MHz and 455kHz
Sensitivity: (12dB SINAD)	144-145.995MHz > -16dBu 430-439.995MHz > -10dBu
Selectivity:	-6dB@12kHz -60dB@28kHz
Squelch sensitivity:	> -20dBu
Audio output:	1.5W
Speaker impedance:	8Ω
Transmitter	
Power output:	High 50W
Medium 25W	Low 10W
Modulation type:	Reactance modulation
Spurious emission:	< -60dB
Maximum deviation:	±5kHz
Distortion:	>3%@60% modulation
Microphone impedance:	2.2kΩ
Supply voltage:	13.8V d.c.
Current consumption:	10A Transmit (50W) 600mA Receive
Operating temperature:	-10° to +60°C
Dimensions:	140 x 40 x 129mm
Weight:	800g (Transceiver only)

is said and done isn't often so easy in these days of smooth, surrounding dashboards on the latest showroom offerings.

I suppose I'm quite lucky, since my not too youthful estate car (a Citroën BX) has a purpose-built shelf on which the tiny Alinco DR-150 could nestle in comfort. The photo shows just how well.

My thanks go to Jeff Stanton at Waters & Stanton, Spa House, 22 The Main Road, Hockley, Essex SS5 4QS. Tel: (01702) 206835, FAX: (01702) 204965. for the loan of the review model which costs £349.

PW

MORSE CHOICE

Keen c.w. operator John Goodall GOSKR takes a look at what's available to help you work in 'Morse Mode'.

Looking back in time, I'm wondering if it would have ever been envisaged by a certain painter that a brain-child of his, would still be in use 150 years later? The painter I refer to is of course Samuel F. B. Morse.

The Morse system brought the ability to send and receive signals by opening and closing an electrical circuit. Samuel thought of his brain-child while a passenger on a Packet Ship *Sully*, during the year 1832.

Much water has flowed under the bridge since that journey. But basically the Morse code is now almost as it was then. Although however, the technology of sending and receiving has become more refined.

So, I invite you to join me as I browse through a variety of up-to-date equipment. I'm looking at equipment used today for the sending, and in some cases, the learning of the code devised by, and named after Samuel F. B. Morse.

The Hardware

Like myself I feel sure you must have at times, been quite overwhelmed by the vast array of Morse equipment and related hardware. Not



A selection of MFJ keyers together with the dedicated c.w. keyboard and the chrome iambic MFJ-564 key.

only keys, but tutors, electronic keys, memory keys and much more!

Manufactured Morse keys vary from the very cheap, to the very expensive. Keys come in various guises: including straight, single arm paddle, double arm paddle and 'Bug' and others!

Looking at straight keys, **Hi-Mound** is a name that has been around for many years. So it's a good place to start.

The **HK-705** straight key, is a beginner's key, having an operating arm 100mm in length, with a rather flat button knob. The arm has nylon bushes at its pivot point. It has two adjustment points: contact gap and arm tension.

The contacts are of hardened steel. The 115 x 60mm base is very lightweight, but has mounting holes to allow it to be secured to the bench. Wiring is simple to the two screw post to the rear of the base. The **HK-705** was smooth and very positive to operate and well made, at an affordable price of £29.95.

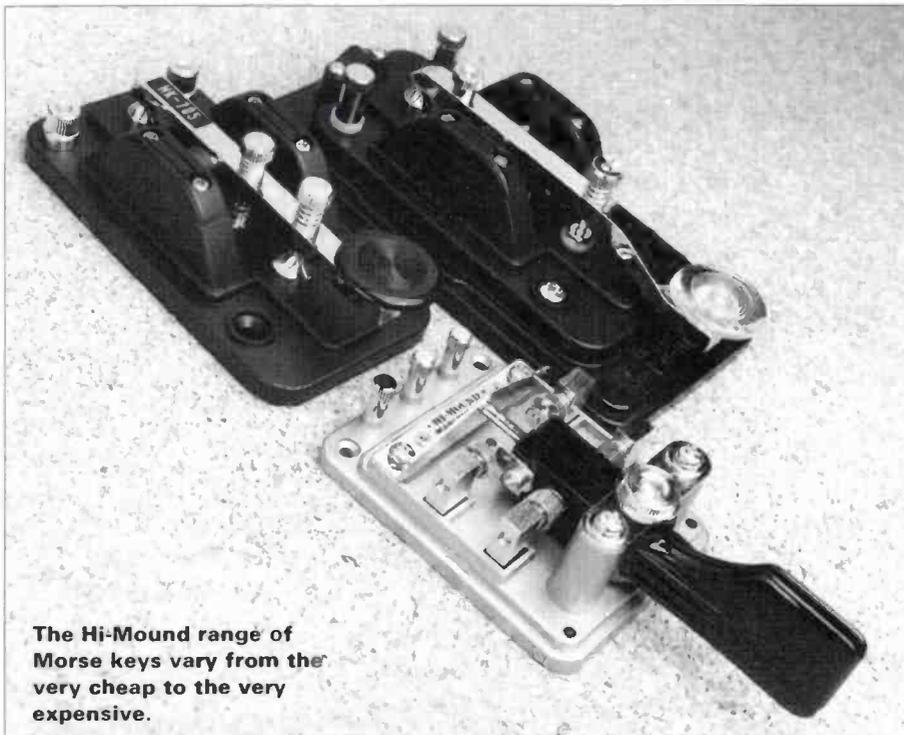
The **Hi-Mound HK-708** is their most popular and standard key at £41.95. The main arm is 120mm in length, also having Nylon pivot bushes and is cranked downwards towards the front to compensate for the added sub-base. This measures 150 x 75mm and is fixed securely to the base via the two mounting holes as in the **HK-705**. It has a cable clamp to the rear and an integral steel weight. The key operated very smoothly, and with precious metal contacts gave faultless operation.

The Double arm paddle from **Hi-Mound**, the **MK-704**, costs £37.95. The paddle arms of this key being mounted very close together, provided an extremely comfortable operating position. Precious metal contacts are used throughout and connections are via three screw terminals. The very lightweight base, measuring 83 x 65mm, has four bench mounting holes.

The blades on the paddle arms of the **MK-704** are well shaped and comfortable to use. The key proved to be an aid to tireless and positive operating. Dust covers for most of the comprehensive range of **Hi-Mound** keys are available from the suppliers, **Waters & Stanton Electronics**.

Also from **Waters and Stanton**, I tested a c.w. oscillator, the **COK-2** also from **Hi-Mound**. It's a self contained side tone unit, suitable for any straight key.

The **COK-2** is battery operated from an internal 9V PP3 and has external volume and internal tone controls. On the front face of the



The Hi-Mound range of Morse keys vary from the very cheap to the very expensive.

Continued on page 29

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Mike Devereux G3SED



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Continued from page 27

100 x 60 x 35mm plastics case, they've clearly printed the Morse code alphabet and numerals. The oscillator is based on the versatile 555 i.c. and is priced at £19.95.

The MFJ-557 is a budget priced Morse Key and Oscillator with the student in mind, priced at £31.95. It measures 220 x 60mm wide, with a front mounted straight Morse key, and to the rear an enclosure holding a 555 i.c. oscillator, battery and speaker. It has two external controls, volume and tone. It can be connected to any external 9V d.c. supply. Two accessory sockets, a 2.5mm phone jack for d.c. supply, and a 3.5mm jack for earpiece are provided. It's ideal for training but I felt that the arm of the key could be made from stronger material. It had the tendency to bend!

The MFJ-411 is a pocket Morse Tutor. It's a microprocessor controlled tutor with a variety of options for learning the Morse code, priced at £89.95. The unit is sturdy and designed for frequent use, and powered from an internal 9V PP3 battery. When switched on the MFJ-411 is preset at 13w.p.m., but can be varied between 5 and 60w.p.m. It has beginner and advanced levels, can send letters, numbers, words and QSOs. It's a very useful piece of equipment.

The MFJ range of keyers is quite comprehensive. And the MFJ-401C is a newcomer to the stable. Like other MFJ keyers and equipment, it can be operated either from an internal 9V PP3 battery, or from any 13.8V d.c. supply. The unit can be operated in fully automatic or semi automatic mode. Fully automatic being used for operation by three wire keys or paddles, and semi-automatic when used by 'Bug' and straight keys. The tone, speed and volume of the output is fully variable.

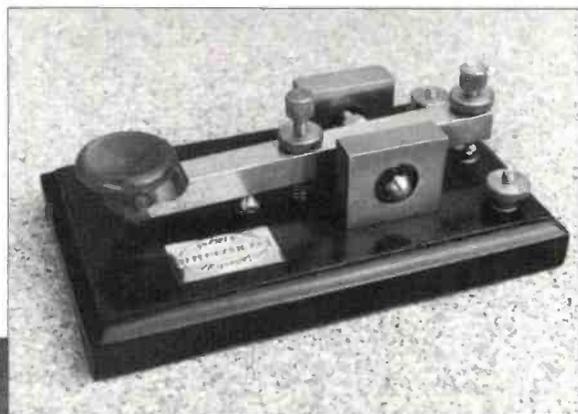
The unit can key either grid block negative transmitters or solid state positive transmitters. It measures 95 x 95 x 50mm, and is made from rolled aluminium having a rippled black finish. The speed and volume rotary controls, and push on/push off switches for semi/auto and On/Off are front panel mounted. The rear panel houses a 2.1mm d.c. power socket, two chassis sockets for output, and standard 6.5mm stereo jack for key input.

The MFJ-407C is an electronic deluxe keyer, measuring 180 x 150 x 60mm high. It can be powered by an internal 9V PP3 battery or external d.c. supply. It will also key valved and solid state equipment.

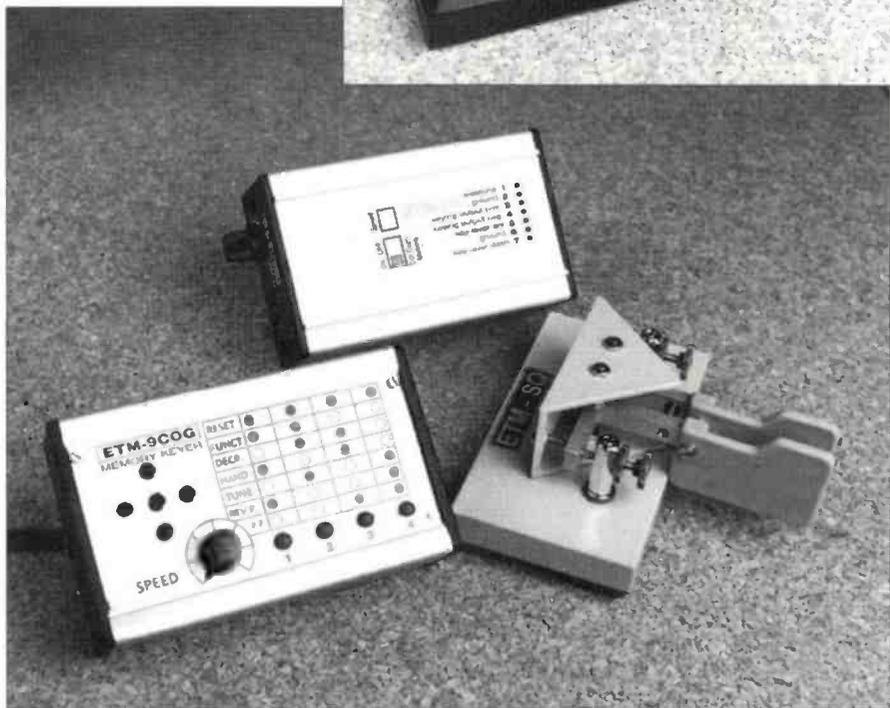
The front panel carries the rotary controls for speed, weight, tone and volume. Push on/push off switches for semi/auto keying, tune and power. By altering an internal jumper the keyer can be toggled between iambic A and iambic B modes. The rear panel has the 2.1mm d.c. power socket, two phono chassis for keying output and two 3.5mm stereo jack sockets for key input and sidetone output.

For the more discerning amateur operator, the MFJ-492 Menu driven Memory Keyer at £119.95 is a must. It has four, 192 character memories to store your own Morse messages in, plus other facilities. The Menus available are much larger than those portrayed on the front

The all-brass GMV straight key from the Watson stable.



The Samson range of keys and keyers have been manufactured in Germany since 1966.



panel of the MFJ-492. A row of six push-to-make buttons, two rotary controls and one push on/push off switch are front panel mounted.

After entering the 'Paddle Command Mode' certain parameters can be varied with direct input from the key or paddles. Weight, side tone frequency, semi/auto, iambic A/B, sidetone On/Off, output On/Off and many more modes can be varied either from the front panel buttons or the key.

One very useful facility of the MFJ-492 keyer is the output On/Off facility. This allows you to isolate the keyer from the transceiver for adjustments, self training or just demonstration of the keyer. It measures 165 x 150 x 60mm high.

Another item, the MFJ-451 is a dedicated c.w. keyboard and keyer. They're aimed at those who can type and are not too hot on the key, or for the serious contestator or for just plain fun. The MFJ-451 consists of a full size QWERTY computer keyboard, electronic keyer and mains power supply, all for a mere £109.95.

The MFJ-451 unit sends Morse directly from the keyboard or from paddles if connected, to the transceiver. Type away to your heart's content, and don't worry if you're faster than the keyer as it has a buffer of 200 characters, and can send at up to 100w.p.m.!

The MFJ-564 is an iambic paddle key. It has a heavy chromed base of 100 x 95 x 15mm

thick brass. Double paddles are located to the front of the base, with the return spring being held towards the rear of the base around a heavily chromed pillar.

Contact point gap and paddle tension on the MFJ-564 are adjustable, the contact points being of precious metal. The blades of the twin paddles are of 2.5mm thick coloured Perspex. The whole unit operates smoothly and costs £59.95.

Moving on to another manufacturer, there's the Bencher BY-2. It has a heavy steel chromed base and paddle blades of 3mm thick clear Perspex. Adjustments are carried out with an Allen Key provided and wiring accomplished via three solder lugs under the base plate. Contacts are of precious metal and it has an exceptionally smooth operation. Priced at £99.95 the key is also available in black finish at £89.95.

Brass Key

Next on the bench was an all brass construction straight key, from a new stable by the name of Watson. It's traditional in style and having two adjustments for gap and tension, having a wooden base measuring 140 x 80mm.

The brass arm is of 10 x 10mm and is 115mm in length with a wooden operating

knob. The arm pivots are of ball race bearing, and although due to its light weight I had to hold the base, it worked and performed very well (I didn't want to drill holes in the base to secure it to the bench). This key was the **GMV**, and at £44.95, I feel that mounted on a heavier base it would be an excellent key.

The **GMV** Key, **Bencher** Key, **Hi-Mound** items and all the **MFJ** Equipment are available from **Waters and Stanton Electronics**.

Vibroplex Original

A name that has been synonymous with Morse since 1890 is that of **Vibroplex**, the 'original' semi-automatic key. The Vibroplex 'Bug' Original, was invented in 1890 by a **Horace Martin**.

The famous 'bug' motif and its design, method of making and the 'Original' itself have changed little since those early days.

I have now had the pleasure of trying an 'Original', and I thoroughly enjoyed the experience. It's heavy and weighs in at 1.8kg (that's the equivalent of two bags of sugar!).

The 'Original' has no less than six points of adjustment, and its base is 165 x 90mm. You don't need a university degree to set up the 'Original', my wife managed the task during the adverts in **Coronation Street!**

Operating the 'Original'...now that's another matter! However, after a couple of hours of trial and error I was soon enjoying the feel of the 'Bug'.

The review model was the '**Original**' **Deluxe** at £145, made in heavily chromed base and upper parts. The top of the range is similar, but has a gold plated brass plate, priced at £225. The '**Original**' **Standard** has a grey textured finish base with heavily chromed upper parts and costs £125.

From the same manufacturer is the **Vibrokeyer** at £136.00, similar in action to the Original 'Bug'. But it has three heavy chrome terminals, allowing the same operating skills as with the 'Original' but with an electronic keyer.

The **Vibrokeyer** base is smaller than the Original, at 115 x 90mm. The review model was the heavy chrome **Deluxe** version. A grey textured finish base **Standard** is the only other model at £109.00.

For the amateur who prefers the twin paddle key, **Vibroplex** offer two models, the iambic and the **Brass Racer**. The iambic has a heavy base

plate of 115 x 90mm. The model I reviewed was the iambic **Standard**. It's finished in a grey textured base but with upper heavy chrome parts similar in appearance to the 'Original'.

As with other models, the movements of the keys are made super smooth with jewelled movements. The iambic is available in **Presentation**, heavy chrome with gold plated brass plate, and **Deluxe** (all heavily chromed). The iambic **Presentation** at £185, **Deluxe** £135 and **Standard** at £115.

The **Racer** employs a unique spring free return method using magnetism. I found it performed exceptionally well, as smooth as, if not smoother than models using springs.

The **Brass Racer** is available with or without an inbuilt keyer (based on the **Curtis 8044** i.c.). It's a very ingenious idea but a very functional one. With the keyer the **Brass Racer** is £164, and without £82.00. They're supplied by **Eastern Communications**.

Samson Keys

Another stable whose name has been associated with Morse for many years is the **Samson** company from Germany. Producing high quality keyers and keys, **Herr Samson** made his first electronic keyer in 1966.

I tried the **Samson ETM-1C**, a basic iambic keyer with dot-dash memory housed in a die-cast aluminium box measuring 107 x 65 x 35mm. It's powered by any external 6V d.c. supply and is a hard wired unit and can key either grid block negative or solid state negative keying.

The **ETM-1C** also has an inbuilt side tone keyer that can power headphones or an external amplifier. Power consumption of the CMOS controlled unit is negligible there's no on/off switch. The only external adjustment is the rotary speed control, ranging from eight to some 50w.p.m. The unit performed very well with the sidetone at an acceptable level and costs £45.00.

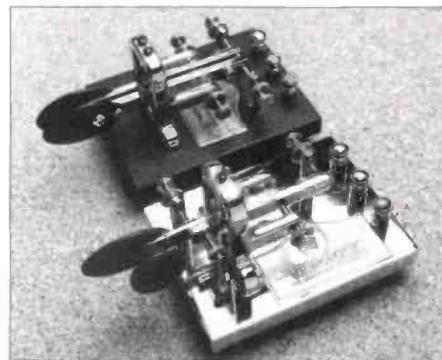
Next came the **ETM-9C** iambic memory keyer. This model is a state of the art CMOS keyer having its own set of integral paddles and is powered by three AA size cells. The keyer, measuring 160 x 113 x 46mm high, houses the CMOS keyer, batteries and speaker. It has a single rotary speed control on the front panel.

On the upper panel, there's a printed graph. It clearly shows which one or more of the four switches performs a particular task. The on/off switch is also on the top front edge of the unit.

Commands to the CMOS keyer are performed via one or more of the four control buttons. Sub menus, other than those on the graph, are accessed by direct control from the paddles.

Combinations of letters or letters and numbers are sent from the paddles to the keyer to perform

John Goodall G0SKR found the G4ZPY 3-in-1 'Baby' to be a well engineered piece of equipment.



The **Vibrokeyer deluxe** and **iambic standard keys** are available from **Eastern Communications**.

functions within these sub - menus'. The **ETM-9C** comes with a comprehensive manual containing a tutorial and is quite simple to operate.

The **Samson ETM-9COG** was the next unit I tried and this was truly a versatile little keyer (it really is small, measuring 107 x 65 x 35mm). But don't let the size give the wrong impression...it's as powerful as its big brother the **ETM-9C**.

The unit is powered by three AA 1.5V batteries. However, despite its size the speaker gives excellent quality to the sidetone. Having the message memory greater than many units twice the size, the **ETM-9COG** is a must at a modest £108.

Next in the **Samson** range, there's the **ETM-SQ** **Twin Paddle Key**. The base of this key is of 12mm thick heavy metal finished in flake grey, and only measures 112 x 60mm.

The **ETM-SQ** unit, also hard wired, is I feel a real bargain. Contact points are of precious metal and adjustments can be made for tension and contact gap. It's available for £45.

All the review **Samson** products are available from the sole UK Agent, **Frank Watts G5BM**.

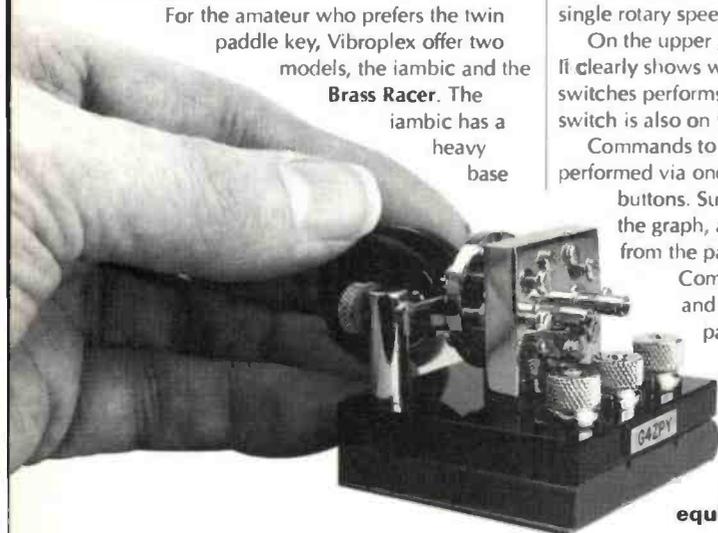
The G4ZPY Range

The range of **G4ZPY Paddle Keys** International includes a large and comprehensive array of keys, paddles and keyers. There are so many, there's not enough space for a detailed run down on all the models here.

However, an s.a.e. (A4 size), or two IRCs or 2 \$US Dollars to **Gordon Crowhurst G4ZPY**, will bring further details. The full address will be found at the end of the article.

I couldn't resist trying **G4ZPY's 3-in-1 miniature twin paddle key**. On a magnetic base measuring only 44 x 44mm and weighing in at only 150gm, the key is indeed small. But don't underestimate its quality or workability. It's fully adjustable for tension and contact gap and has precious metal contact points. There are three screw down wiring terminals to the rear of the base, are easily wired.

For QRP or mobile use the twin paddle can even be fixed to one of the miniature keyers provided by **G4ZPY**. The key is supplied complete with tape and Velcro fastenings to allow the key to be fixed around the leg. I



found it a very smooth and well engineered piece of equipment, and a credit to G4ZPY. It costs £75 in polished brass, or £62 in kit form.

Key Special

Although I've already discussed Hi-Mound keys, I feel the **Hi Mound HK-804 Deluxe** should have a special mention. It's made out of solid brass, weighing in at 1.2kg.

The HK-804 is a very low profile key having a base measuring 120 x 60mm. The 8 x 6mm solid brass arm is 170mm in length, and has a movable knob for personal operating comfort.

The key's operating arm is sprung with a unique fine double bow 'U' shaped springs, one on either side. It also has top mounted precious metal contacts. Also on the topside of the key is a novel spring loaded earth tuning switch.

To the rear of the key housing are two screw terminals for attaching the supplied transceiver cable. The HK-804 is available from **South Midlands Communications** and costs £82.50.

Relative Newcomers

I've also tested two items from two relative newcomers. The first, **Peter Jones Engineering**, started producing Morse keys around 1992, and secondly, **Stillwell Engineering** who have only been producing keys for some 12 months.

The Jones Key sent for review was a single arm iambic model. It was extremely heavy and robust, weighing in at 1.5kg. After setting it up correctly and using it my comments are: it's terrific! Operation is super smooth, having spring and magnetic return and damping. It's a real joy to use and I think we'll hear a lot more of Peter Jones Keys in the future.

Secondly, I've discovered 'Cottage industry' at its best from a company where engineering came first and amateur radio came last. This is because I think Derek Stillwell Engineering are producing what I can best describe as truly a 'Rolls Royce' amongst keys.

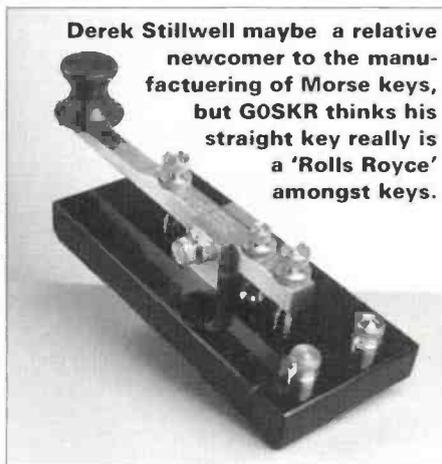
Derek Stillwell sent me an absolute masterpiece of engineering. It's a straight key, finished with such precision as can only be found in a Swiss watch or clock movement. It has a wooden knob turned to a comfortable and smooth finish. It's mounted on a solid marble base measuring 178 x 76 x 19mm, weighing just under 1.2kg. The arm is 12.5mm square and 178mm in length. Adjustments can be made to the arm pivot bearings, contact gap, arm balance and arm tension. The price of the Stillwell masterpiece is £75 with an extra £4.50 for personal callsign engraving.

It has been many years, since my very early days in engineering that I have come across an item so meticulously manufactured. Well done Stillwell Engineering!

Datong Morse Tutor

I couldn't leave the subject of Morse without mentioning an item of equipment that has been around for many years. This is the

Derek Stillwell maybe a relative newcomer to the manufacturing of Morse keys, but GOSKR thinks his straight key really is a 'Rolls Royce' amongst keys.



Datong D70 Morse Tutor, an item that I'm sure has successfully helped many radio amateurs to progress to the A Licence, myself included.

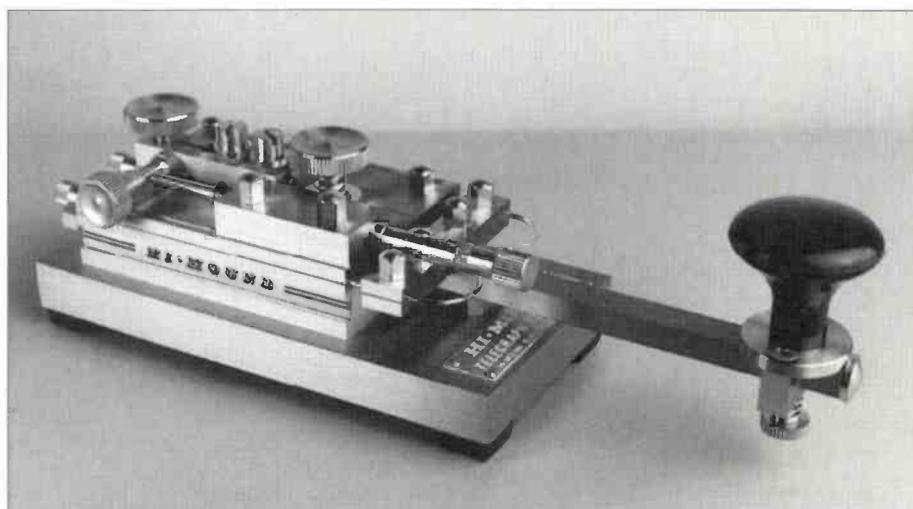
The D70 is a self contained Morse Tutor having rotary controlled adjustments for speed, volume and character delay facility. And personally, I think the character delay is one of its most useful assets.

A character speed of (let's say) 10w.p.m. can be set, and the spacing between characters enlarged up to some three seconds. As proficiency improves the delay, spacing can be shortened until it's at the correct three dot period between letters. A straight key can also be plugged into the rear to use the D70 as an oscillator.

Having an experienced operator to take down the correct letters is always helpful, although a tape recorder can be used. Otherwise difficulty is found with not knowing what Morse character has been sent.

The D70 is purely a random Morse letter group or number group generator. Being battery operated it's transportable, and is supplied with an earpiece for personal listening. At around £70 it's a useful item for those progressing to the A Licence. The D70 is obtainable from **Datong Electronics Ltd.**

And finally I would at this point like to express my gratitude to all suppliers for the equipment reviewed. Thanks to one and all, and to you I wish good keying and a clear frequency!



Contact address:

Datong Electronics Ltd., Clayton Wood Close, West Park, Leeds LS16 6QE Tel: (0113) 2744822, for the D70.

Derek Stillwell Engineering, 27 Lesley Owen Way, Shrewsbury, Shropshire SY1 4RP Tel: (01743) 354119, for traditional straight keys.

Eastern Communications, Cavendish House, Happisburgh, Norfolk NR12 0RV Tel: (01692) 650077, for all Vibroplex Models.

Frank Watts G5BM, Woodfield View, Birches Lane, Newent, Gloucestershire GL18 1DN Tel: (01531) 820960, for all Samson products.

G4ZPY Paddle Keys International, 41 Mill Dam Lane, Burscough, Ormskirk, Lancashire L40 7TG Tel: (01704) 894299, for the G4ZPY 3-in-1, 'Baby' and other models.

Peter Jones Engineering, Chapel Road, Smallfield, Surrey RH6 9NR Tel: (01342) 843555, for the single paddle Jones Key and their other models.

South Midlands Communications, School Close, Chandlers Ford Industrial Estate, Eastleigh, Southampton, Hampshire SO5 3BY Tel: (01703) 25511, for the Hi-Mound HK-804.

Waters & Stanton Electronics, 22 Main Road, Hockley, Essex SS5 4QS Tel: (01702) 206835, for MFJ, Hi-Mound, Bencher and Watson Models.

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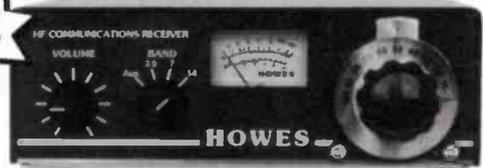
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73 from Dave G4KQH, Technical Manager.

THE KEY PROJECT

Ben Nock G4BXD describes the 'key project' in this year's 'Morse Special'. Ben's article describes a simple and effective electronic keyer, which uses standard i.c.s and Veroboard construction techniques to produce a very reasonably priced, easy-to-build instrument.



The brief I received for this assignment was to produce an electronic keyer that could be built from standard integrated circuits. At the same time it should only cost a reasonable amount to build.

Looking around the stalls at rallies, the lowest prices for ready-made keyers seemed to range around £50 or so for the keyer. With the paddles themselves costing around the same amount.

The resultant design I eventually decided on employs only four integrated circuits. There's only a few other components needed, and a small amount of hardware to produce the simple low-cost paddle.

I've ensured that the keyer's dot/dash ratio is correct, i.e. 1:3, and that it has an iambic 'feel'. (By this I mean that each dot or dash is completed even if the paddle is released during the side tone note).

The Circuit

The complete circuit of the keyer is shown in Fig. 1. But before 'getting down to it' let's examine each stage in turn and consider how it works and the use we're putting it to.

The basis for all keyers must be some form

of oscillator. The oscillator is either keyed or it's free running, with its output being subsequently keyed.

When I started work on the project I made some initial tests using a basic c.m.o.s. astable multivibrator. This employed 4069 inverters, or 4001 NOR gates wired as inverters, see Fig. 2.

The 4069/4001s worked as oscillators. But as my original thought was to use the output of the oscillator as the dot feed, then some attention would have needed to the mark-space ratio to ensure correct timing of the subsequent dash period.

The mark-space ration can in fact be altered or trimmed to suit by the use of steering diodes, as in Fig. 2. But as I was not happy with the arrangement, I decided to alter the oscillator.

The next obvious choice was the 555 i.c. This is ideally suited as a square wave oscillator, and it too can have its mark-space ratio adjusted by using diodes, as in Fig. 3.

Gated Oscillators

Both the c.m.o.s. logic chips and the 555 can act as gated oscillators. In other words the output only occurs when a gating or enabling

voltage is fed to it.

However, there's a problem in using the 555 i.c. as a gated oscillator. This is because when the chip is initially gated, the first cycle is longer than subsequent cycles which adhere to the resistance/capacity time constant being used.

The 555 would obviously be of no use as the dot generator, so I decided to leave it running all the time. And as the oscillator was now going to be on constantly and its output used to generate the dots and dashes via other i.c.s, the mark-space ratio components were no longer needed.

In the end, I decided to use the running oscillator to generate the dots and dashes, with the length of the dash being three times the length of the dot. Also, the dot or dash had to complete its cycle even if the key or paddle was released during the event.

So, some form of latching circuit was

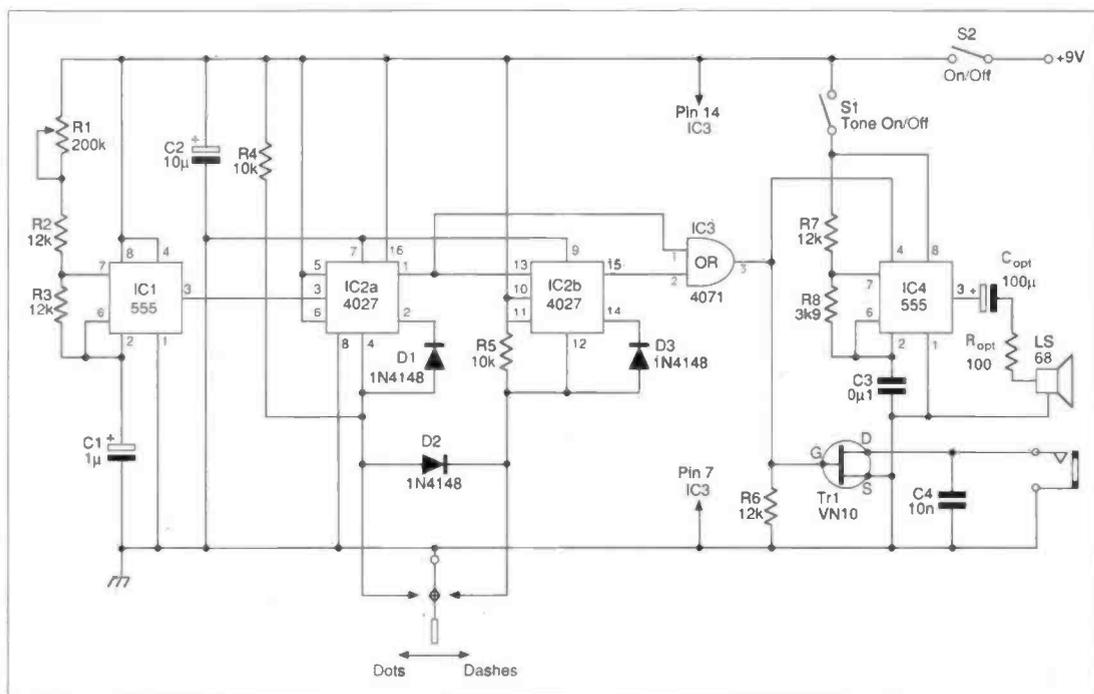


Fig. 1: Circuit of the Key Project. Note that on the Veroboard layout that there is an (optional) capacitor, C, in series with the loudspeaker. (See G4SLU's comment panel for details).

obviously needed and to this end I used a JK flip-flop in the form of a c.m.o.s. 4027 i.c.

The only really special part of the circuit is that the complimented output of the JK, the NOT-Q (the inverse of Q), is used to hold the flip-flop on whilst the cycle completes. After this time it's released and allowed to start the next cycle. (The NOT-Q signal is routed to the reset pin of the JK through a diode).

The first JK produces the dots, the second produces a dash twice as long as the dot. The OR gate combines a dash and a further dot to give a total dash length of three times the dot length.

Monitoring Oscillator

The output of the OR gate feeds both a monitoring oscillator, a gated 555 oscillator running at about 800Hz, and the solid state keying relay used for activating the transmitter. The monitor circuit will be useful if your rig has no sidetone for c.w. working.

A switch could be included to switch the monitor either on or off as required. This would make the keyer available for practice sessions as well as for use on the air. I found I had to include a resistor in series with the 68Ω loudspeaker (between 68Ω to 1kΩ depending on the speaker, as the sidetone was quite loud). *(Editorial note: See Clive Hardy G4SLU's comments panel regarding the audio side of this project).*

While on the subject of controls, the potentiometer controlling the speed could be ganged with the on/off switch for the entire unit. In fact, this was the method used in my prototype.

The solid state relay is in fact a power m.o.s.f.e.t., a VN10KM, which is capable of sinking 500mA at 60V. The VN10KM should suffice for most rigs.

The prototype worked well on my TS-430S. There are no problems and the device works fine, but when I tried it on my AT-5, an old valved transmitter, it would not fully shut off the transmitter on 'key up'.

I then tried an RFP2N15L, a logic level m.o.s.f.e.t. This directly replaced the VN10KM and proved to be quite satisfactory in keying the valved rig.

Should you wish to use a relay, thus having the keying circuit completely separate from the keyer, Fig. 7 shows the typical circuit.

The relay contacts should be capable of switching the keyed stage, but most relays are rated at 3A or more, so they should suffice. But remember...the relay has to be fast acting enough to handle the fastest keying speed you're likely to use.

A small, 12V, single pole normally open (s.p.n.o.) relay should do. The current consumption at 9V is 10-12mA whilst in the idle state, and a maximum of 30mA with the monitor switched on, or 14mA without the monitor during keying.

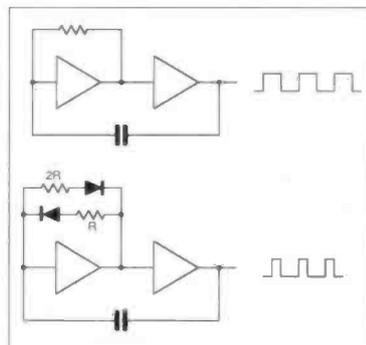


Fig. 2: Employing 4069 inverters or 4001 NOR gates wired as inverters (see text).

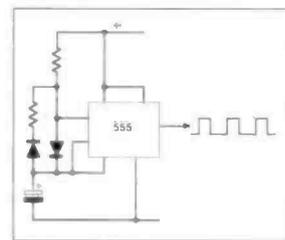


Fig. 3: Using the 555 i.c. as a square wave oscillator (see text).

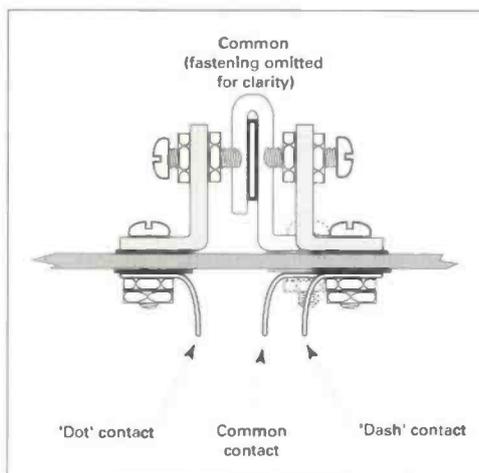
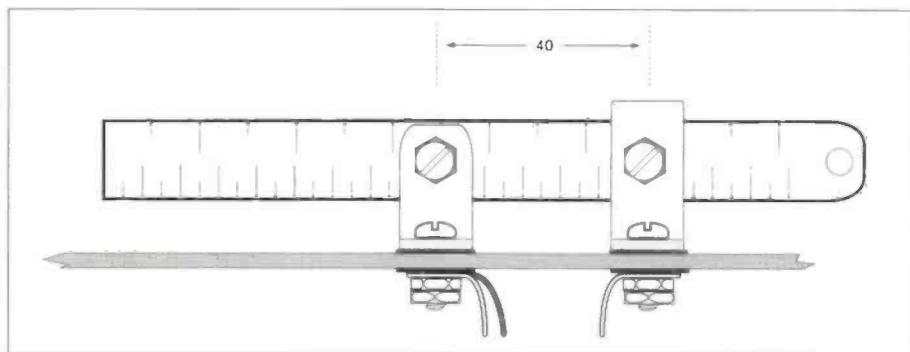
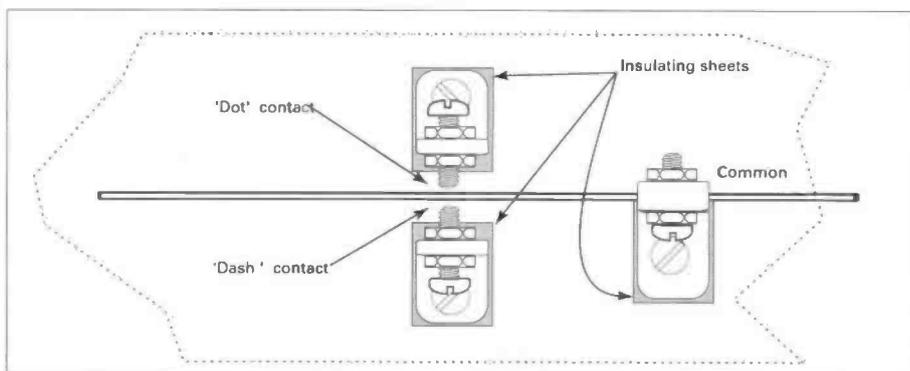
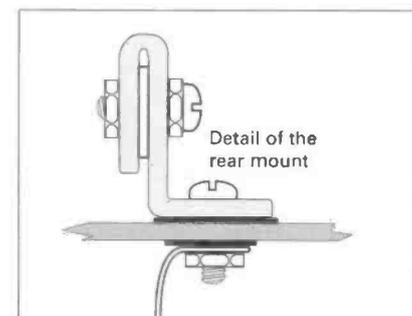


Fig. 4: (Above, Left, Below, Far Bottom) Contact arrangements for the keyer project using G4BXD's 'budget' paddle (see text).



The Paddle

There are two possibilities regarding the paddle arrangement. You can use either a single, left/right paddle or a twin, 'squeeze', type.

There are also two methods of mounting the paddle. You can mount it either on a separate base (wood for example), or on the lid of the box housing the keyer circuit, as I've done with the 'budget special' paddle

shown on my prototype.

If you decide to mount the paddle separately, then a 3.5mm stereo jack socket can be used. This can be mounted on the rear of the oscillator and used to connect the dot/dash contacts and ground.

The diagram in Fig. 4, shows the 'budget special' single paddle construction. The main item needed is a 6in stainless steel rule, available at most hardware shops. Mine cost me 89 pence!

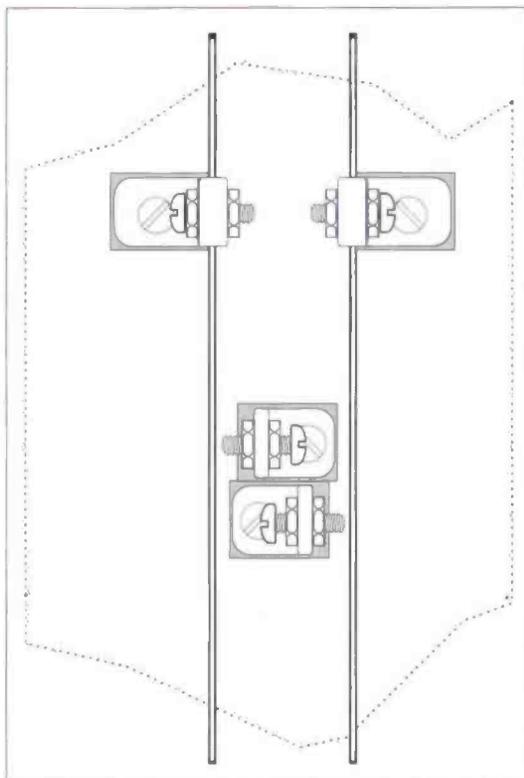


Fig. 5: (Left and Right) Double paddle arrangement (see text)

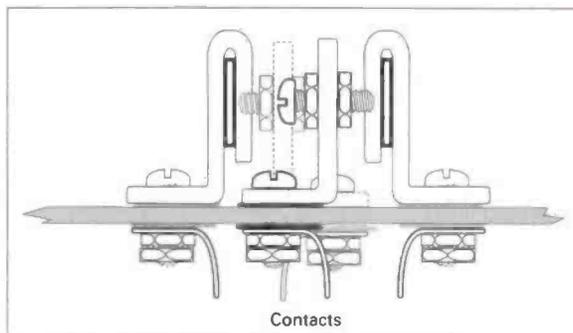


Fig. 6a: (Right) Waveform on oscilloscope screen showing 'ringing' on wave edges (see text).

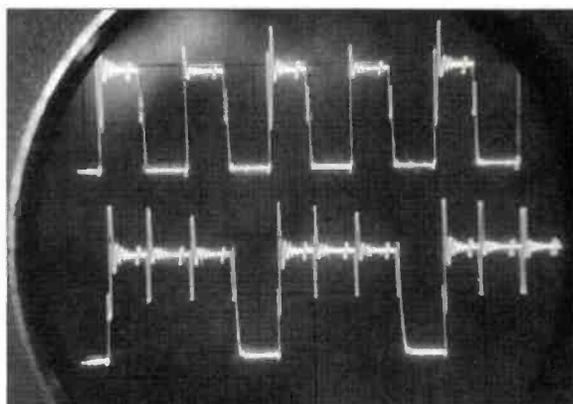


Fig. 6b: (Below Right) The ringing problem cured by fitting a capacitor close to the 555 'dot' i.c. (see text).

If the paddle is mounted on the lid of the keyer box, assuming you have used a standard aluminium box, then the two 'L' shaped parts will need insulating from the lid. Mica washers, or a small piece of rubber, etc., and grommets used to mount power transistors and the like can be used.

Make sure that the underside of the 'L' bracket is smooth and flat. This will stop any sharp edges cutting through the insulation.

In the single bladed paddle version, two 'L' shaped brackets are required and one fixing bracket also. In the squeeze paddle version, the two 'L' brackets are still required, but now you'll need two fixing brackets, one for each blade.

The diagram, Fig. 5, shows the basic squeeze paddle arrangement. Here the 'L' and fixing brackets are either screwed to the wooden base (if used) or bolted to the box lid. The cable between keyer and paddle can be secured with the aid of solder tags.

As a form of damping, or weighting, a small section of rubber can be cut and used between the squeeze paddles. It can be moved in or out to alter the resistance. If two

slots are cut in the rubber, it can then be simply slid over the top of the two paddles and moved easily for adjustment.

Two Contacts

For the two contacts used in conjunction with the steel rule, I used small self-tapping screws. Alternatively, they can be made from bolts with nuts both sides on the bracket, which can be screwed in or out to adjust the amount of movement needed on the paddle to close the contact, as in Figs. 4 and 5.

If bolts are used it might be worthwhile filing a point on the ends. This will make a sharper contact point for the steel rule.

Additionally, the length of rule between the fixing bracket and the operator can be adjusted to vary the stiffness of the rule and thus adjust tension or weighting. Two rules could be used together to give a stiffer response, bolted together at the rear mounting

and perhaps glued together at the user end.

There is of course, no reason why a commercial paddle could not be used if already possessed. A small stereo jack socket on the rear of the oscillator box could carry the two paddle contacts, along with the common ground connection.

The prototype was constructed on Veroboard. I used small p.c.b. pins pushed through the matrix holes and soldered to make the off-board connections.

When I looked at the output waveform of the dots and dashes on an oscilloscope, I noticed a 'ring' on the wave edges, see Fig. 6a. Fitting a capacitor close to the 555 'dot' chip cured this as shown in Fig. 6b. Both scanned images of the photographs are taken directly off the 'scope tube.

On The Air

I've been used to the 'up and down' key for the past 25 years of operating on the air. Because of this, the side-to-side action of the keyer was very hard to get used to!

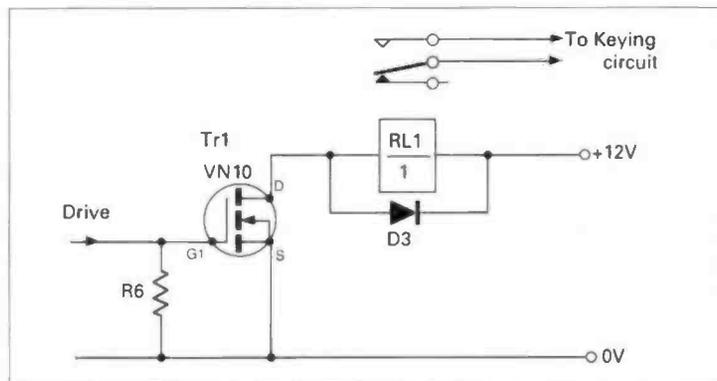


Fig. 7: Alternative relay circuit for keying purposes (see text).

Continued on page 37

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Continued from page 37

After a while practising dry, an 'on air' contact was tried. This, although the occasional mistake of left from right meant an 'N' went out in place of an 'A' or a 'B' ended up with four dots, went quite well! In fact, I would imagine that if I practice a bit more, I could get to like the new method of sending c.w. quite easily.

The addition of an l.e.d. on the keyer might mean you would not forget to turn off the unit after use. But the current drawn is so small that the PP3 battery should last for quite a while.

Pricing The Project

Pricing all the components for the project from the Maplin stock, I found that the total price of the unit comes to around £25. This depends upon the style of box chosen, any frills like l.e.d.s, etc., and even down to the type of knob selected.

Obtaining some of the items from a rally should greatly reduce the cost. For example, the box I used for the prototype was bought at a rally for 50 pence, compared to £6 odd from a shop!

I hope you have fun building the 'Key Project'. And of course I'll look forward to working you all in the near future on the key!

PW

Shopping List

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Carbon Film 0.25W 10%

3.9kΩ	1	R8
10KΩ	2	R4, 5
12kΩ	4	R2, 3, 6, 7
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Capacitors

Miniature ceramic

10nF	1	C4
100nF	1	C3

Miniature Electrolytic 16V working

1μ F	1	C1
10μ F	1	C2
100μF	1	C (optional, see G4SLU's panel)

Semiconductors

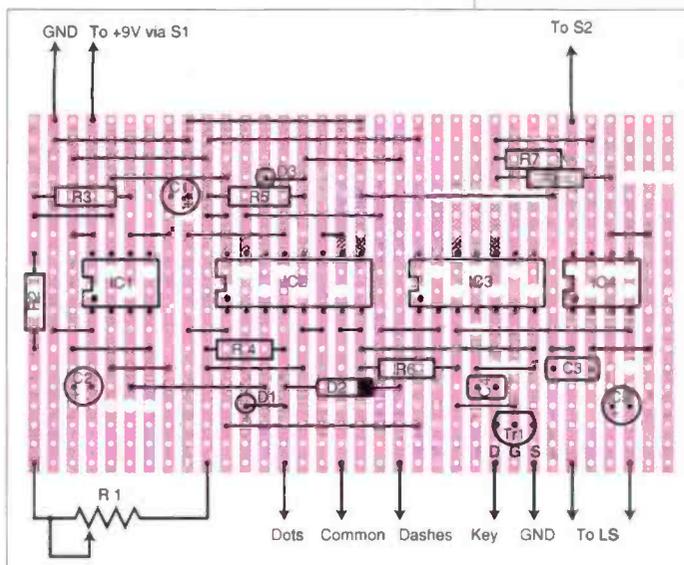
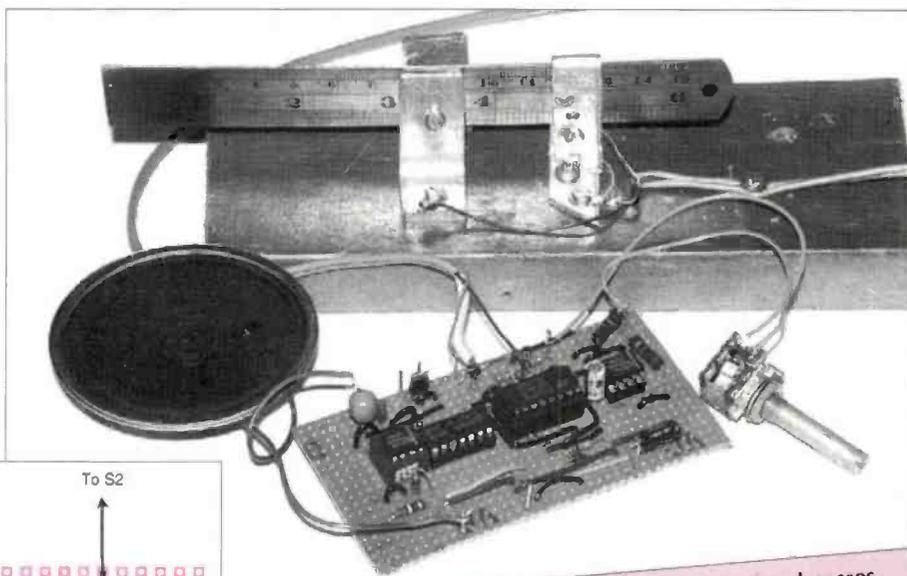
1N4148	3	D1, 2, 3
555	2	IC1, 4
4027	1	IC2
4071	1	IC3
VN10	1	Tr1

Miscellaneous

One 6in (150mm) steel ruler, small sections of aluminium sheet, and insulators, a die-cast metal box to mount the 'paddle' on, a piece of Veroboard, nuts bolts and spacers to suit, interconnecting wire, a small loudspeaker, a single pole switch, a suitable knob for the rotary control R1 and a suitable socket to connect the control cable to the transceiver.

Fig. 8: Clive G4SLU built his prototype using this layout on Veroboard strips.

Fig. 9: Ben Nock G4BXD's key in the prototype stage



Clive Hardy G4SLU built and tested the project and passes on some practical advice: Whilst Veroboard has critics when used for r.f. working, for circuits like this keyer project, it's very practical. For the speaker I used a 32Ω with the optional capacitor (in my case it was a 47μF) but it's worth experimenting for best results with the speaker you choose. I have only built the board as I'm sure other builders will have their own ideas for boxes. Single strand stripped telephone wire is ideal for wiring-up. The components are all very inexpensive. It cost me less than £5 for the parts from my local supplier. With a VN10KM the keyer switched my TS-120V without any problems. After a little practice I even managed to send some passable c.w. using Ben's single 6in ruler paddle!

MEET THE 1995 L

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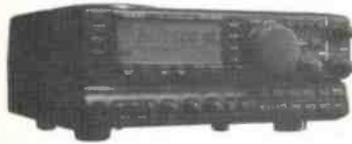
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Left to right:
Chris G1FMH, Graeme G4XOF, Steve, Martin Lynch, Chris G8VDQ, Jenny Lynch, Richard, Brian G3THQ, Graham, plus too late for the photo & not shown - Steve G6URJ.



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MANNION'S MORSE METHOD

As this is our annual 'Morse Special', Rob Mannion G3XFD takes the opportunity to pass on a bit of the history behind learning the code. Rob also describes his own 'method' which he's successfully used to help others to get the coveted Morse test pass slip.

Although my friends and I jokingly call the system I use to teach the code as 'Mannion's Morse Method' I can't really claim it as mine! However, the innovation I've adopted has helped many radio amateurs (convinced they could never learn Morse) to pass the test.

More than half the battle is **wanting** to learn Morse. If you're only learning it under duress, you won't make it easy for yourself!

In fact, I recently demonstrated the technique I've used so successfully, in front of a group of radio amateurs. Those who were keen to have a go and learn were quite impressed. However, one chap who has held a B licence for many years was quite unimpressed, and didn't really want to learn Morse. So, obviously the technique would not help him because it needs team work. From you and the method!

So, half the battle to learn is your attitude. If you don't want to learn...it's best not to bother, after all, the vast majority of people in the world live quite happily without knowing any Morse code!

But before I describe 'my method' let's have a look back at the 'blood, sweat and tears' involved in learning Morse in the past. If you think it's difficult now, you should have seen Yeoman Hoffmeyer's heavy ebony ruler in action at the Royal Navy training school when I was a student! I was over six foot six inches then but he always seemed at least 10 feet tall!

Learning Morse

Looking back over the time the code has been in use, I discovered that there have been many different systems to help in learning to read Morse. Although it's rather unclear from my research, it appears that once early students had learned the alphabet, they usually worked in translating inked paper Morse patterns.

The old paper tape system using an inker produced a wavy line representing 'dits' and 'dahs'. And, having seen Morse inker tapes...I don't think it was easy reading!

Most of us have seen American 'cowboy' films, complete with a telegraphist (usually just before he invariably got an arrow in the back or



the wires were cut!) listening to the 'click clack' of a Morse sounder. However, if you ever meet someone who can read Morse from a sounder - pat them on the back because it's quite an achievement!

The technique used in reading from a Morse sounder was to listen for the intervals **between** the clicks! My late grandfather (2FD before the Second World War) was able to do this and in fact his Signals Regiment used the system on the North West Frontier of India in the early 1930s.

On my visits to the fascinating Royal Signals Museum at Blandford Camp near Blandford, here in Dorset, I discovered that teaching any system of reading Morse (whether or not it was by sound or light) was a laborious process. Trainee signallers had to listen to a raspy buzzer as the instructor ploughed his way through groups of letters.

In fact, the same 'grouping' method for learning Morse code was used in the Sea Cadets and the Royal Navy in the late 1950s. Once we had mastered the alphabet in groups (sent in raspy, but impeccable 'buzzer' Morse by Chief Yeoman Hoffmeyer) he sent us to listen to the output of an automatic sender unit.

The automatic Morse unit (a Muirhead unit I think) used a paper tape with holes perforated through it. Feeler contacts met through the holes in the paper and transmitted either 'dits' or 'dahs'. Only when we were proficient at reading the Morse were we allowed to send, but before that came 'typing by music' method of learning touch typing!

Once we had learned to touch type (with the keyboard covered by board so we couldn't see our fingers - or even where they were!) we had to transcribe Morse signals heard in our headphones, straight into five letter groups on the typewriter.

It was hard work learning the Morse and we slogged at it for hours. However, one kindly grizzled old Chief Petty Officer helped us by

saying the letter as he sent the Morse symbols on the buzzer. That was a great help and it now forms part of my teaching system over 35 years later.

Marvellous Brains

Our marvellous brains can cope with an amazing variety of information. Once those chemical links have been made at each synapse (millions of them) they're usually 'locked' in. That's why I was able to read Morse by Aldis lamp (albeit it slowly), with no training whatsoever after I had learned to read it by listening.

Why could I read the Aldis lamp with no training? Personally I think it's because the brain only recognises the rhythm and particular groups of sounds (or the stimulations it receives via the optic nerves from the eyes).

In fact, my personal theory is backed up by the various systems which used 'rhythm' systems to help students. I'm probably not alone in remembering the G3HSC 'Rhythm Method' of teaching Morse. It was very successfully used by many radio amateurs.

Do you remember the G3HSC 'long playing' records? Like other methods using rhythm to teach you, they had to be used regularly for best results. And in fact (Linguaphone produced a series of 78r.p.m. Morse records) like modern language tapes and other recordings regular 'top ups' help.

The 'top ups' are provided when you either listen to your practice tapes, or get on the air and listen (no better substitute as it's 'real' Morse and not machine generated!). In fact, I practice what I preach because I'll often listen to Morse QSOs with no intention of joining in, just to keep in practice.

I also do the same with my language tapes. Although I don't get the opportunity to speak

the foreign languages I know, that often, I refresh my memory by listening to the tapes as I work in the office. Yes, it is a form of 'brain washing' but it's an almost unconscious form of learning...and very beneficial.

I find that I'm more relaxed when G3XFD is in 'listening mode'. There's no pressure to copy every last word, but because I am relaxed, I copy everything anyway.

So, my advice is: don't rely on 'machine Morse' all the time, listen to Morse 'as she's spoken' on the bands. It will be less of a shock for you when you do operate on c.w.!

Mechanical Morse

Interestingly, although I've seen many mechanical Morse sending methods (for actual transmitting and receive training purposes), I have never seen any mechanical aid to help or train a student in transmitting.

It seems that when it comes to learning to send Morse, the student is alone. They have to rely on the in-built rhythm gained by the receiving practice, to work in a reciprocal fashion. Perhaps that's why it was a court martial offence (in the eyes of Chief Yeoman Hoffmeyer anyway) for Royal Navy trainees to send Morse before we met his exacting receiving standards!

On my travels with the PW annual trip to the Dayton HamVention in recent years I've noticed some really interesting mechanical Morse transmitting/receive training systems for sale in the giant 'flea market'. Unfortunately for me, they've either been rather expensive or too heavy for my pocket in other ways!

Last year I found a complete 'Candler' Morse Training system for sale. It was beautifully made, and appeared to have been built during the Second World War.

The paper tapes and clockwork workings of the Candler system used to run the tape through the mechanical switching system was in perfect working order. And, apart from the battery to run the buzzer, it was self sufficient - provided the operator could wind it up!

I was astounded at the price that the Candler System fetches in flea markets. The model I found in Dayton went for the equivalent of £300 (The original adverts in pre-war magazines suggest they originally cost around £25 to £35 then - not cheap when you compare it against the wages then paid).

Another system for mechanical Morse I've seen, uses an ingenious series of rotating discs. Again they are clockwork, but instead of paper tape, with perforations to allow contacts (normally insulated from each other by the paper tape) the actual disc carries the Morse letter symbol.

I think the system I've seen is actually German in origin (I first saw them in Friedrichshafen at the Hamvention). They're beautifully made and come complete with a series of discs which slide onto a splined shaft.

As the shaft rotates raised notches on the rotating disc close contacts, operating a high pitched buzzer. Obviously, the faster the drum rotates, the faster the Morse is sent.

However, the really clever part of the

rotating disc system is the innovative way in which series of letters and words can be sent. This is done by incorporating a lead screw (similar to those used on the old fashioned mechanically scanning FAX machines and lathes).

The lead screw with the carriage mounted switched on it, traverses the series of discs, sending whatever symbols are mounted on the edge of the disc. The really clever part is that at almost 355° or so, is that a small offset ramp enables the switch carriage (which is of course moving slowly down the length of the series of discs) to smoothly change over to the new disc!

There's no doubt in my mind that readers will be able to tell me what the system I've described is, and who made it. It was internationally available because I have seen discs with the raised symbols for CQ, and ship's call signs mounted on them.

Finally on matters mechanical, there's nothing to beat simplicity. And what must be the simplest high speed Morse system I've seen is on show at the Royal Signals Museum in Blandford. In fact, nowadays c.w. operators often take 'a bit of stick' for being old fashioned...but this idea uses a stick to send a burst of high speed Morse.

In essence, all the 'Morse Stick' is, is a series of conducting brass collars or rings, interspersed with insulating collars (Ebonite I think). The stick was in fact a 'wiper switch', and once the letters had been set up using the insulating spacers and conducting collars, all they had to do was quickly slide the 'wiper' contact down the stick.

But, did they have to slide the 'wiper' down at a predetermined speed? Or did the receiving end just run a wire recorder, replaying at a speed which could be read? I've no doubt someone will enlighten me!

Morse Tutor

Fortunately, in the 1990s we don't have to rely on mechanical methods (even though they are fascinating) I just use a combination of myself and a Datong Morse Tutor. It's simple really, but the secret - if there is one - lies in the Morse Tutor itself.

All I do, and the method is ideal for club use, is to set the Morse Tutor to send at approximately eight words per minute (w.p.m.).

However, whereas it's difficult for a human operator to send single letters at a calibrated speed with wide spacing, the Datong Morse Tutor can do it easily.

So, all I do is set the interval between Morse letters at three seconds (the maximum delay on the Datong Morse Tutor) and start if off. If I'm teaching a class, I will have written the alphabet down for them on a board. If teaching someone individually I'll point out the letters on a sheet of paper.

There's no need for students to learn the Morse alphabet beforehand. In fact, it's better for someone to hear and recognise what each group of characters are. This is because as each Morse character is sent, the three second delay allows me to point out which letter has been sent.

Within an hour the majority of people (of all ages, from nine year olds to people in their late 70s and even older) can read the Morse. Very soon they start writing down the letters before I speak them.

As they progress, I reduce the delay on the Morse Tutor. The next stage involves decreasing the delay and gradually increasing the speed.

Suitable For Everyone

I think the method I use is suitable for everyone. I have even used it to teach Morse to someone who suffered from dyslexia. He was much better off because he only had to hear it, be told what the Morse characters were by me, before automatically (and unconsciously) memorising what he'd heard.

So, if I can get a group of 12 year old School Cadet Force youngsters reading Morse at 12w.p.m. in one evening session (albeit with the three second delay in use)...surely it could help you?

And even though you could get a computer program written to provide the same system I've described, why bother? For the cost of a Datong Morse Tutor, a club could help many more of its members to learn Morse with minimum stress and the only other extra you need is someone who can read Morse.

Even if the experienced Morse trainer can't spare the time for regular teaching sessions - what's to stop them from preparing a tape? You never know, they might even end up enjoying the mode as much as I do!

PW



Rob Mannion G3XFD uses the well known Datong Morse Tutor to help teach beginners. Rob uses the 'delay' facility to advantage (see text).

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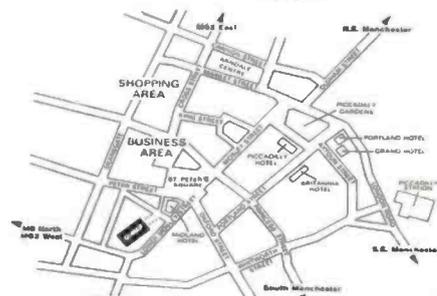
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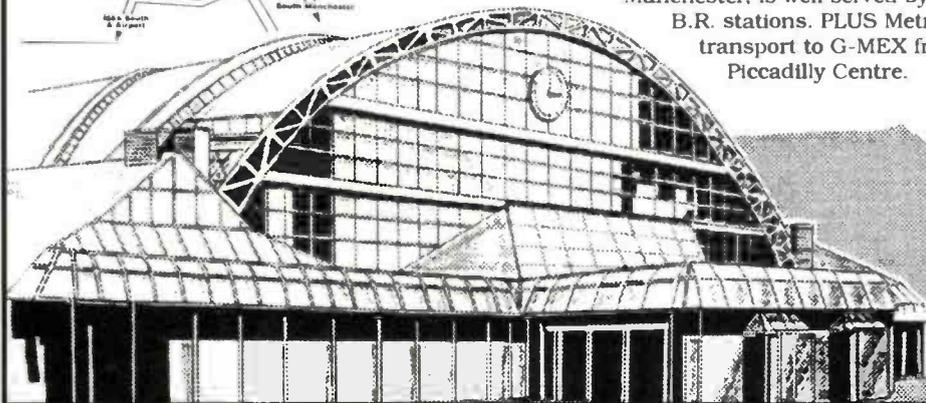
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AM I SENDING FAST ENOUGH FOR YOU?

In another of his light hearted looks at amateur radio, John Worthington GW3COI talks about bad operating habits with Morse keys and modest power.

Not so long ago I was working on 3.5MHz and heard a chap (who I will call Bill as I can't afford legal fees!) calling CQ and when he sent "K pse" I went back to him briefly. As I listened I heard a slow and hesitant station also calling Bill. (This chap I will call Syd for the sake of the story).

Bill came back to us both and gave us a report each and then passed it over to Syd. Syd came on after a long pause and shakily said he would drop out as he couldn't copy me.

Bill swiftly came back to him and told him not to go as he would never learn to work three way contacts without practice. Without handing it back to Syd, Bill told me to go ahead.

Touched My Key

So far, I hadn't touched my key except to answer Bill's CQ. Bill's sending style was what was known in the RAF as 'Baghdad' i.e. with exaggerated dashes and unevenly spaced dots and I therefore sensed that Syd, who was obviously a tyro from his slow responses and sending, was probably not reading much of Bill's work at all.

So, slowing my el-bug Morse key right down to about 9w.p.m., I gave both Bill and Syd their reports, my QTH and name and

turned it over to Syd. Syd came back and thanked me effusively for slowing down, going on to answer my query "Am I sending fast enough for you?" with a happy "Yes, but I am only getting a bit of Bill's overs".

Stung by the comment, Bill came back with more of his Baghdad style Morse. He says retorting that he was only sending at the same speed as Syd on the assumption that the skilled c.w. operator should always match his opposite numbers first.

Plainly he was miffed. And pleading lateness for a sked, he signed off as rapidly as his hand key would let him.

Continued With Syd

I continued the QSO with Syd who confided that he had read almost nothing of Bill and that he was still grateful for my snail-like sending. I signed with him in due course.

As I leaned back in my operating armchair, I was once again struck with the notion that many of our so called skilled 'Old Timers' are not as good as they think they are. Time and again, I have worked some of them who are obviously incensed by the criticism of what they perceive as 'young upstarts' but here was a case in point.

The 'Old Timer' just had not realised that



... SNAIL-LIKE SENDING ...

most beginners can send much quicker than they receive. This fact can be confirmed as soon as they come back to your first over and say "pse repeat so and so". In this instance, Bill had just not realised that his 'matching' of his speed to Syd was presenting Syd with unreadable copy.

Baghdad Morse

In addition, Bill's 'Baghdad' Morse presented its own problems. As it is a style which is seldom heard these days and one which takes a lot of getting used to even if you can copy at say 25w.p.m. properly spaced Morse (I should imagine that so far, a computer programme to read 'Baghdad' is still far in the future!)

Incidentally, I have often heard the remark "Oh yes, I have always been better able to send quicker than I receive". And usually, this is the case because after all, your brain has foreknowledge of what it has to translate when you are sending! **PW**



OTHER CASES FOR MORSE

Can having a cold be an advantage when going on the air using Morse? John Worthington GW3COI seems to think so..!

in the pink of condition. (I put this bit in because I have never been much good on straight keys and I abandoned them when beer was 10 pence a pint!). You're not reading the words of a callow youth here you know!

Privacy Mode

The next big advantage is the privacy of the Morse mode. I know a lot of fellows don't give a damn what they say about their fellow amateurs, but when I'm dishing the dirt out, I like to do it discreetly.

I can tell you that if you spill any secrets on c.w., you are quite safe, as the only possible chance it will be read by any unauthorised person is very, very remote. (Mind you, and this is yet another advantage of the mode, a few minutes spent reading someone's QSO can often raise a welcome smile to your lips as they speak frankly to each other).

The next major quality is the ability to have as many QSOs as you like. This can be at any

time of the day or night and still not make a sound to disturb even someone who is almost intimately close to you, physically I mean.

Of course, operating and not disturbing your partner involves wearing 'cans' and again using an el-bug. (The old straight key is getting a hammering today!). Well, let's face it, you can hear the mechanical clunks from a straight key from great distances.

Intellectual Angle

Then there is the intellectual angle which you hardly hear a word about. On c.w., you are using a considerable part of your brain in thinking about what to say, then translating this into another language.

If you are working someone, say in French, then that adds yet another dimension - you might say, 'well, that is why I prefer 'phone, because I don't have to think'. But on the other hand, if you like to reflect after a QSO that something has actually been accomplished... Perhaps you should look at the other reasons for Morse! **PW**

The advantages of Morse have been fairly well advertised, but it has other attractions which are hardly ever mentioned. I think one of the best is being able to go on the air when you are suffering the symptoms of a cold, sort throat, loss of voice and all those horrible upper respiratory afflictions that even the Queen gets!

To operate properly from bed involves using, if possible, an el-bug so that you can lie back and manipulate the key at any old angle that suits you. You can operate it on your lap, stomach, chest or wherever.

It is important that you do not have to sit on a straightbacked chair in order to use a straight key, as this can be exhausting, even when one is

COMPUTING THE CODE

Our Technical Projects sub-editor Tex Swann G1TEX combines business with pleasure and looks at computer Morse trainer programs for the IBM PC (or clone) and the Apple Macintosh.

As many of you will gather from my callsign I don't speak Morse. Or at least I don't speak Morse well enough to pass even the Novice Morse Test.

It isn't that I don't try, (the Editor says I'm very trying at times). It's just that I don't get the concentrated period of practice to get the code through the cranium and to stick.

The Editor, Rob Mannion G3XFD, said I could combine my fondness for computing* and amateur radio. He suggested that I find Morse code tutors and trainers that will run on one, or more, of my computers and write this feature article to help other 'code illiterates'!

**Editorial note: We published an article 'Keyed In Morse' by G1TEX in the March 1990 issue of the magazine. Details on the reprints available are provided at the end of this article.*

I run both an IBM PC Clone and an Apple Macintosh system. So, in hunting out the elusive ultimate Morse tutor (with my inability it will have to be the ultimate), I set about trying to find a code tutor for my IBM PC clone.

First Stop

My first stop is **Public Domain & Shareware Limited (PDSL)** who support many machines. Rod Smith of PDSL suggested I try 'CWTUTOR', although I noted that there were other Morse code programs in the PDSL catalogue.

The CWTUTOR program, see screen grab in Fig. 1, I found to be very easy to use. However, as it uses the PC's internal speaker, the sound quality isn't great, just adequate.

But lack of visual confirmation of the character sent made it difficult to check that my guess was correct. This program is more use to bring you up to speed, rather than to begin the initial training.

Another program I discovered in the PDSL library was one called SUPERMORSE and I found this program easier to use. Given time, I

think that this program would suit my needs.

The SUPERMORSE program, see screen grab in Fig. 2, supports all levels of knowledge. It can take you from the very simplest of beginnings to a full American style Morse Test. I was unable to see how it dealt with a sound card in the time available, but it will run as a DOS task within Windows.

Programs For Apple

I then turned to getting programs for the Apple Macintosh. This turned out to be more difficult, as the Apple 'Mac' is only recently finding its way onto the home computing scene, at least in the United Kingdom.

No doubt by 'surfing' the Internet I will eventually find a small bywater that is absolutely full of superb amateur radio programs (but as yet I've not managed to find it). However, I then had a stroke of luck from an unusual source.

Hidden in the depths of CDROMs that are free with the computer magazines, I found three different Morse code tutors. They are, in reverse order of course, 'MorseCode', 'MORSE CODE TUTOR' and 'The Morse Trainer' and finally the one I think is perfect for me, MorseMaster, see screen grab in Fig. 3.

All the programs (with the exception of 'MorseMaster') are somewhat Spartan in presentation. However, 'MorseCode' does have what seems to be the source code, written in the C programming language, provided with the package.

The program I found best out of the collection, as already briefly mentioned, was called 'MorseMaster'. It's a shareware program that has a wide range of levels.

The 'MorseMaster' program has a fairly musical tone on all types of Apple Macintosh models. And (perhaps most importantly) the character is printed out on screen just after it is sounded out in Morse.

The layout of 'MorseMaster' is not overly flashy, but it has the ability to make Morse sound clean and nice. I have found that clarity and purity of sound makes for easier listening for longer periods.

Both the tone and speed, as well as the audio level may be adjusted on 'MorseMaster'. They can be set to personal preference, with 'slider' controls.

In use, as in Fig. 3, the 'MorseMaster' program is simplicity itself. Although sadly, it would not run in the background while I was working on other things.

If you would like copies of the three programs for the Apple Macintosh you will need an Apple Macintosh formatted disk with at least

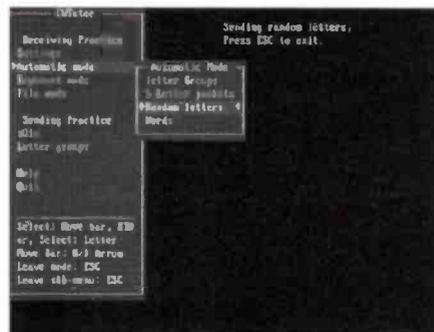


Fig. 1: A screen grab from CWTUTOR.



Fig. 2: Screen grab from SUPERMORSE.

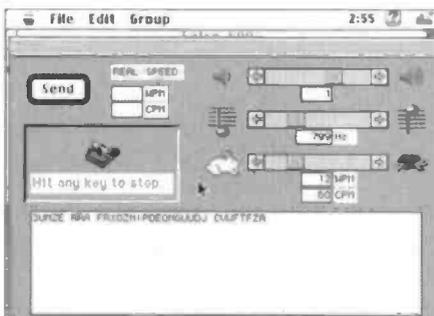


Fig. 3: Screen grab from 'MorseMaster' on the Apple Macintosh.

400kb of free space.

Send the Macintosh formatted disk, marked 'Mac-Morse Programs', to the PW Editorial Office address in Broadstone. Please send four first class stamps and a self addressed label with your disk, which you should preferably send in a padded envelope.

Software

The Software for the IBM PC Clone is available from PDSL at: **Winscombe House, Beacon Road, Crowborough, Sussex TN6 1UL. Tel: (01892) 663298. FAX: (01892) 667473**, or any other good shareware library.

* Photocopies of the PW Morse programs written in the BASIC programming language, which will work on most machines **except** the BBC computer (from the article 'Keyed-in Morse' written by Tex Swann G1TEX in March 1990) are available from: the **Post Sales Dept, PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: (01202) 659930, FAX: (01202) 659950 for £2 inc. P&P.**

PW

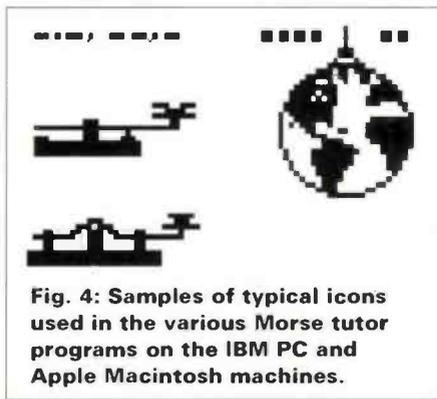


Fig. 4: Samples of typical icons used in the various Morse tutor programs on the IBM PC and Apple Macintosh machines.

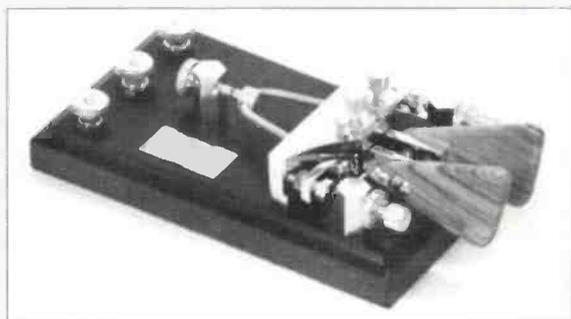
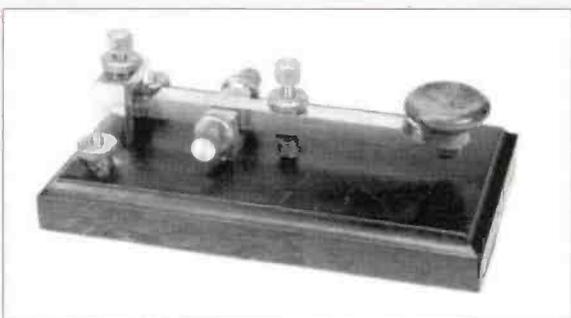
SOME 'MORSE' NEWS FOR YOU!

Rob Mannion G3XFD takes the opportunity to pass on some 'extra' news for you as we've let him loose on his 'key' interest...but only for our annual Morse Special issue!

Waters & Stanton - Plus Watson

The well known Essex based Waters & Stanton Electronics company have recently introduced a new name into the United Kingdom - in the shape of the Watson range of hand-made Morse Keys.

The Watson range of Morse keys are made from solid wood and brass and Waters & Stanton inform me that they are finely crafted and carefully balanced. So, if you're looking for a new Morse key, look out for the Watson range on the W&S stand at the various rallies and shows, or contact them for further details at: **22 Main Road, Hockley, Essex RM11 1QX. Tel: (01702) 206835, FAX: (01702) 205843.**



Key Note From IMPS

The *Key Note* newsletter from the International Morse Preservation Society (IMPS) makes interesting reading and is full of anecdotes, helpful information and news. If you're interested in Morse and preserving the mode, the society would welcome you as a member. **George Longden G3ZQS** is the Hon. Secretary, and he's very keen to encourage everyone interested in the Morse mode to join up and enjoy membership of the IMPS.

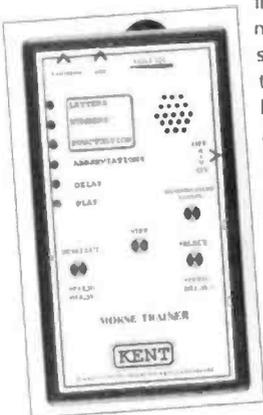
However, although **George G3ZQS** is very keen to recruit Morse enthusiasts to the IMPS, he's adamant that the various groups and individuals retain their own autonomous identity. In other words, **George** wants IMPS to become an 'Umbrella' organisation where everyone with similar interests can gather, without compromising their own group. Seems a good idea to me, and I for one will enjoy reading *Key Note* on a regular basis in future, I was especially encouraged when I telephoned **George** for the latest details...as I interrupted a QSO in Morse (of course!). For further details on the IMPS and membership contact **George Longden G0ZQS** at **119 Cemetery Road, Darwen, Lancashire BB3 2LZ. Tel: (01254) 703948.**

Trainer From Kent

Lancashire-based **Bob Kent** is justly famous for his beautifully made Morse keys. I use a Kent key and find it's just right for my c.w. work. However, what's not generally known is that **R. A. Kent (Engineers)** also produce an interesting Morse Trainer.

The Morse Trainer provides random groups of letters, numbers and punctuation and can provide speed varying from five to 40 words per minute. The delay between characters can be set from zero to four seconds.

Unusually, the tutor will allow you to select five character groups or the more authentic random one to eight character groups. Powered by four 1.5V AA cells, the unit is portable (measuring only 145 x 80 x 34mm), has a built-in speaker, i.e.d. menu and built-in side tone for transmitting practice. Further details on the Morse Trainer (available for £49.99 including VAT) from: **R. A. Kent (Engineers) at 243 Carr Lane, Tarleton, Preston, Lancashire PR4 6YB. Tel: (01772) 814998.**



Adur Key Imports

Adur Communications, based in West Sussex have entered the great 'Morse Race' by importing a pair of interesting keyer paddles from the USA. Manufactured by WBL from Indianapolis, Indiana, they feature what's claimed to be a completely new outlook for keys compared to traditional designs.

Both the new Adur Communications imports feature heavyweight bases, and the manufacturers say that they're easy to 'user customise' for paddle height and spacing. And although the price of the new paddles has yet to be announced, it's expected to be approximately £100 for the single paddle version and £120 for the dual paddle model.

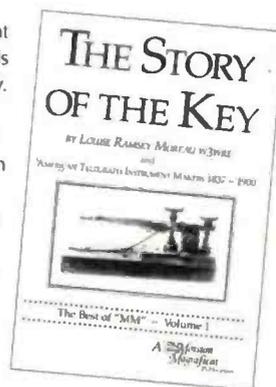
The company also have another product - specifically aimed at anyone trying to improve their Morse reading abilities - in the form of a 'shirt pocket' tutor. It's supplied with an earpiece and will provide randomly generated letters and numbers or a combination of both. It's also programmable for speed and is available for £29.95.

The 'Deluxe' version of the tutor has the same specifications as the basic model, but also has the ability to send random simulated QSOs and a repeat facility and costs £45. For further information on the products contact **Adur Communications at 13 Dawn Crescent, Upper Beeding, Steyning, West Sussex BN44 3WH. Tel: (01903) 879526, FAX: (01903) 879527.**

The Story Of The Key

Anyone interested in the history of Morse and the history of telegraphy can't fail to be fascinated by a new booklet published by *Morsum Magnificat* magazine. This subscription only magazine, edited by **Geoff Arnold G3GSR** is the established publication for all Morse enthusiasts and **Geoff** has decided to reprint popular articles from *MM* in the form of booklets.

So, the first of *The Best Of MM - Volume 1* carries *The Story Of The Key* by the late **Louise Ramsey Moreau W3WRE**, and *American Telegraph Instrument Makers 1837 - 1900*, providing what in effect is a detailed look back at the history of the technology, equipment and operating methods involved in telegraphy. It's fascinating and highly recommended. Further information on *Morsum Magnificat* and subscription rates are available from **Geoff Arnold G3GSR** at **9 Wetherby Close, Broadstone, Dorset BH18 8JB. Tel/FAX: (01202) 658474.**



*PRACTICAL WIRELESS & SHORT WAVE MAGAZINE IN ATTENDANCE

May 14: The Dunstable Downs Radio Club are holding their 12th Annual National Amateur Radio Car Boot Sale at Stockwood Country Park, Luton, Nr. Jn. 10 M1. Doors open 10am until 5pm. Talk-in on 144MHz. Attractions include open day, environmental exhibits, side stalls, and free entry to the Mossman Collection of horse-drawn vehicles, craft museum, train and carriage rides, plus much, much more. **Ken Brewer** on (01582) 451057.

May 14: The Drayton Manor Radio and Computer Rally is to be held at Drayton Manor Park Zoo, Puzbly, Tamworth, Staffs on the A4091. The main traders will be in four marquees. There will be an outside flea market, large Bring & Buy stall, local clubs and special interest stands. Doors open at 10.30am. Make it a day out for all the family. **Norman G8BHE** 0121-422 9787 or **Peter G6DRN** 0121-443 1189 evenings please.

May 20: The Ipswich Computer Show is being held at Willis Corroon Sports & Social Club, The Street, Rushmere St Andrew, Ipswich. Entry fee for adults is £1.50 on the day. Children under 14, OAPs, UB40 and wheelchair users only 50p. Doors open 10am to 4pm. Free parking. **Sharward Promotions** on (01473) 272002 or FAX: (01473) 272008.

May 21: The 11th Yeovil QRP & Construction Convention is being held at the Preston School/Centre, Monks Dale, Yeovil, Somerset. Doors open at 9am. Admission is £1.75. There is a free car park and refreshments all day. The convention will be preceded by a Morse Fun-run on each evening from Tuesday 9 to Friday 12 May. Further details can be obtained from **G3CQR, QTHR.** (01935) 813054.

RADIO Diary

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

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

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

May 28: The 19th Annual East Suffolk Wireless Revival will be held at The Maidenhall Sports Centre, Stoke Park High School, Ipswich, Suffolk. Doors open at 10am to 4pm. There will be a Bring & Buy, car boot sale, vintage radio display, Novice stall, rig clinic, antenna test, RAIBC, BYLARA and RAYNET stands plus lots more. Talk-in on S22 GB4SWR. Admission is £1.50 which includes car parking. Further details from **Bob Baal G7HZV** on (01394) 271257.

***May 28:** The Great Northern Rally, G-MEX, City Centre, Manchester. All the usual attractions, admission is £1.50. Doors open at 10.30am and close at 5pm. 0161-748 9804. *Yes! This is the correct date! This year, the rally has moved from its usual February slot.*

May 28: The Maidstone YMCA Radio Rally. Route - M2 junc. 3 or M20 juncs. 4, 5, 6 or 7 then A229 to Loose

Village, two miles south of Maidstone. QSX GX8TRF (S22) and GX3YSC (10FM and SU22). Exhibition h.f. station GX3TRY. Doors open at 10.30am (free 10am admission for severely disabled). Entry fee £1.50 per adult. All day videos, free sweets and sickly drinks for juniors. Snack bar also available. Do your own Bring & Buy, outdoor tables for hire. (01622) 743317.

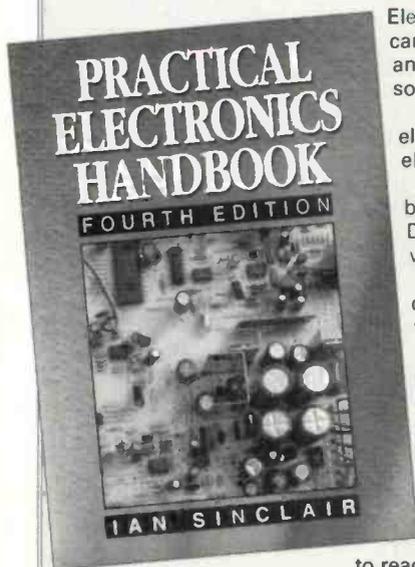
June 11: The annual Royal Navy Amateur Radio Society Rally will take place between 10am and 5pm on the Sports Field, HMS Collingwood, Fareham, Hants. **Clive G3YTQ** on (01329) 234143.

June 17/18: The Bletchley Park Amateur Radio & Computer Rally is being held at Bletchley Park, Bletchley, Milton Keynes, Bucks. Doors open at 10am to 5pm, both days. This is a new rally in the grounds of the former Second World War top-secret code-breaking, cipher and intelligence centre. There will be special interest groups, Morse tests, numerous interesting displays, talk-in and a Bring & Buy. One price admission to rally and museum. For further details you can ring (01923) 893929.

***June 23-25:** Ham Radio '95 Friedrichshafen, Germany. The largest amateur radio show in Europe, and well worth a visit. The Flea Market alone is worth the journey and Friedrichshafen, situated on the Bodensee - Lake Constance to the English - and within easy reach of Austria and Switzerland, is a fantastic area for a holiday.

***June 25:** The 38th Longleat Amateur Radio Rally. Trade stands, club stands, free parking, catering and bar on site. Large Bring & Buy. £2.50 entrance fee for adults, £2 for OAPs and 50p for children. Further details from **Gordon Lindsay G0KGL** on 0117-940 2950.

BOOK REVIEW OFFER



Electronics like any hobby is one in which you cannot have too much information. Techniques and components used within the hobby change so rapidly that at times it's difficult to keep abreast with the changes.

So, it is pleasant to find a book that covers both the basics and the more up-to-date aspects of electronics. In this 438 page book the index alone covers almost 20 pages. And the subjects cover electronic principles such as mathematical conventions, electronic calculations and components.

There follows eight further chapters of Active discrete components, electronic circuit building blocks, linear i.c.s, transducers, digital i.c.s, microprocessors (separately), the transfer of digital data, D-A and A-D conversion. The final two chapters cover the use of computers in electronics and hardware components with practical work.

In the chapter 'Computer Assistance In Electronics' a more detailed look is taken at how the computer can be used to show how a circuit behaves under dynamic conditions. This section centres around a shareware program called 'Aciran'.

The Aciran shareware program allows you to 'build' and 'test' circuits mathematically within the computer. Using this method many variations can be tried without the need to buy components. You can make many versions of a project before you decide which is the best version to build for real.

Once you have decided on the circuit and you go on to make up a p.c.b. the author Ian Sinclair describes a number of schematic and p.c.b. layout programs. He describes both the shareware 'PC Trace' (from PDSL) and the commercial 'Easy-PC' (from Number One Systems Ltd.) and shows how they can be used to make a printed circuit board.

The book is liberally illustrated throughout with many drawings and diagrams making it easy to read and understand, and a very useful reference book. It gets a 'highly recommended' from me.

G1TEX

439 pages The **PRACTICAL ELECTRONICS HANDBOOK** is available from the PW Book Service for the special offer price of **£11.95 plus £1 P&P (UK) or £1.75 P&P (overseas) instead of the normal price of £12.99 plus P&P.**

To take advantage of this offer please use the order form on page 68 of this issue or telephone Ann or Michael in our Post Sales Department on (01202) 659930 to place your order.

The CW Centre!©

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Single Lever Paddle	£86.82	£83.61
Twin Lever Paddle	£77.19	£85.22

R A Kent (Engineers)

Pump Key	£39.50
Single Paddle	£44.50
Twin Paddle	£51.50
Practice Oscillator	£17.50
Morse Tutor	£57.00

NB Jones and Kent key prices are for kits for home assembly.

Bencher Paddles

BY1 (black)	£89.95
BY2 (chrome)	£99.95

Oak Hills Curtis Keyer (kit) £33.95

C M Howes ST2 Morse

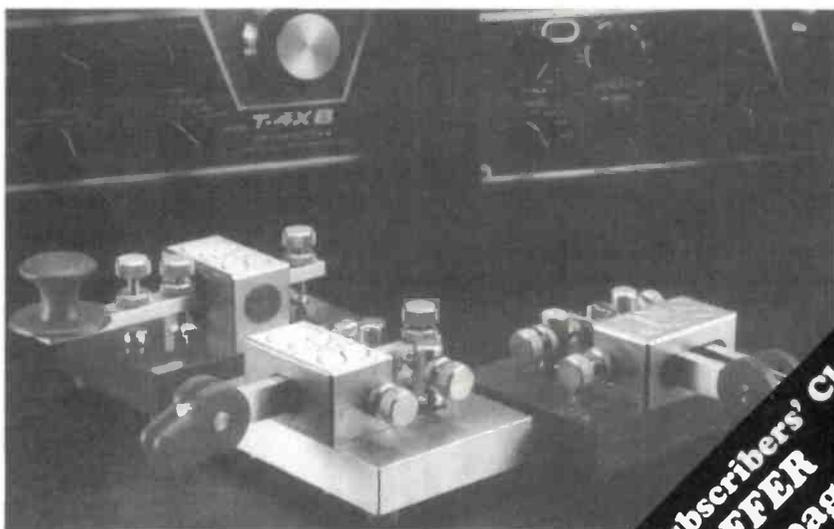
Oscillator Kit	£9.800
HA12R Hardware pack	£10.10

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JONES KEYS



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See page
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The 13th Annual Practical Wireless 144MHz QRP

Neill Taylor G4HLX reminds everyone that it's nearly time for our popular 144MHz QRP Contest. He invites you dust off that rig, find a good site, prepare the picnic, pack the antennas and join in the fun!

Mid-June brings long days, the start of Summer and warm weather (hopefully). And above all, it brings a day of low power v.h.f. activity - the *Practical Wireless* 144MHz QRP Contest.

The *PW* 144MHz event is **more** than just a contest. It's a day when anyone with even a simple 144MHz station can enjoy making contacts over distances that normally seem difficult. This is because a lot of QRP stations will be taking to the hills to operate from good locations around Britain.

All You Need

All you need to take part in the *PW* 144MHz Contest is a 3W transceiver (preferably s.s.b., which is where most of the activity is), so why not dust off that portable antenna and set-up station on your nearest high spot?

You might like to get together with friends to make a group, or if you prefer, operate from home as a fixed station. Those who have entered this contest before will need no encouragement - they know how much fun is to be had!

But newcomers are always welcomed. Most find that the *PW* day is an ideal introduction to the world of v.h.f. contesting.

After the contest, it is a simple matter to copy out your log and work out your score. There are no distances to work out or complicated computer software needed.

Next, pop it in the post and see your callsign in the results list when published in *PW* later in the year. And who knows, if you do well enough you may receive one of the many certificates that we issue, including one to the leading station in each locator square.

Great Rewards

For those who do really well, there are indeed great rewards. The winners will receive the coveted *Practical Wireless* Contest Winners Cup, as well as the special prize in the form of a Kenwood TH-22E hand-held transceiver with the optional keypad. This prize, kindly donated by **Trio-Kenwood UK Ltd.**, is worth £250.

The second prizewinners will receive a special prize, in the form of an **aluminium framed Solar Panel measuring 18 x 12in**, kindly donated by **Bob Keyes of Key Solar Products**.

The Tennamast Trophy, Kindly donated by **Norrie Brown of Tennamast**, will be presented to the leading Scottish Station.

But for most, the real reward is in the fun on the day and the long-distance contacts that they make; newcomers are consistently amazed by what their 3W can achieve.

Please read the rules carefully. There are a few minor changes this year. And before sending in your entry, please do make sure that you have provided all the information asked for, to make my job of adjudication a little easier!

I hope everyone enjoys the contest, and let's keep our fingers crossed for some really good v.h.f. propagation on the day. Good luck to you all.

Neill Taylor G4HLX

1. General:

The contest is open to all licensed radio amateurs, fixed stations or portable, using s.s.b., c.w. or f.m. in the 144MHz band. Entries may be from individuals or from groups, clubs, etc. The duration will be from 0900 to 1700UTC on Sunday June 18 1995.

All stations must operate within the terms of the licence. Entrants must observe the band plan and must keep clear of normal calling frequencies (144.300 and 145.500MHz) even for CQ calls.

Avoid frequencies used by GB2RS during the morning (144.250 and 145.525MHz) and any other frequency that is obviously in use for non-contest purposes.

Contest stations must allow other users of the band to carry out their activities without hindrance.

The station must use the same callsign throughout the contest and may not change its location. Special event callsigns may not be used.

2. Contacts:

Contacts will consist of the exchange of the following minimum information: (i) Callsigns of both stations (ii) Signal report, standard RS(T) system (iii) Serial number: a 3-digit number incremented by one for each contact, starting at 001 for the first (iv) Locator (i.e. full 6-character IARU Universal Locator for the location of the station).

Information must be sent to, and received from, each station individually, and contact may not be established with more than one station at a time. Simultaneous operation on more than one frequency is not permitted.

If a non-competing station is worked and is unable to send their full universal locator, the old-style QTH locator (QRA) or his location may be logged instead. However, for a square to count as a multiplier (see **Rule 4**), either a full 6-character IARU universal locator, or full 5-character European QTH locator must have been received in at least one contact with a station in the square.

Contacts via repeaters or satellites are not permitted.

3. Power:

The output power of the transmitter final stage shall not exceed 3W p.e.p.

If the equipment in use is usually capable of a higher power, the power shall be reduced and measured by satisfactory means. The simplest way is often to apply a (variable) negative voltage to the transmitter a.l.c. line, reached via the accessory socket.

The output power can be accurately measured using the simple circuit in **Fig. 1**. Connect this to the 50Ω output of the

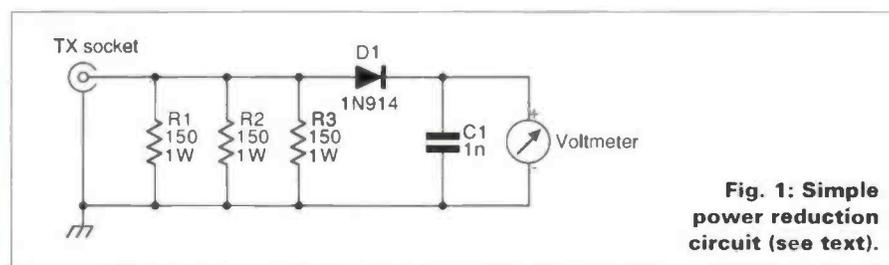


Fig. 1: Simple power reduction circuit (see text).

RP Contest

0900-1700UTC, Sunday June 18 1995

Practical Wireless 144MHz QRP Contest Rules 1995

transmitter and adjust the power so that the voltmeter does not exceed 16.7V on a good whistle into the microphone.

4. Scoring:

Each contact will score one point. The total number of points gained in the eight hour period will then be multiplied by the number of different locator squares in which contacts were made (a 'square' here is the area defined by the first four characters of a universal locator).

Example: 52 stations worked in IO81, IO90, IO91, IO92 and JO01 squares; final score = $5 \times 52 = 260$.

Only one contact with a given station will count as a scoring contact, even if it has changed its location, e.g. gone /M or /P. If a duplicate contact is inadvertently made, it must still be recorded in the log, and clearly marked as a duplicate.

5. Log:

The log submitted as an entry must be clearly written on one side only of A4 sized (210 x 297mm) paper (the normal way up, not sideways), ruled into columns showing: (i) Time GMT (ii) Callsign of station worked (iii) Report and serial number sent (iv) Report and serial number received (v) Locator received (or location).

Underline or highlight the first contact in each of the locator squares worked. At the top of each sheet, write: (a) Callsign of your station (b) Your locator as sent (c) Sheet number and total number of sheets (e.g. "sheet No. 3 of 5"). The sample shown in Fig. 2, illustrates how each sheet should be headed.

6. Entries:

Accompanying each entry must be a separate sheet of A4 sized paper bearing the following information: (a) Name of entrant (or of club,

etc. in a group entry) as it is to appear in the results table (b) Callsign used during contest - including any suffix (c) Name and address for correspondence (d) Details of location of station during contest; for portable stations, a national grid reference is preferred (e) Locator as sent (f) Whether the station is single- or multi-operator (a single-operator is an individual who received no assistance from any person in operating the station, which is either his/her permanent home station or a portable station established solely by him/her); if it is a multi-operator station, include a list of operators' names and callsigns (g) Total number of contacts and locator squares worked (h) list of the locator squares worked (i) A full description of the equipment used including transmitter p.e.p. output power (j) If the transmitting equipment is capable of more than 3W p.e.p. output, a description of the methods used (i) To reduce and (ii) to measure the output power (k) The antenna used and approximate station height a.s.l.

Failure to supply the previous information may lead to loss of points or disqualification. The following declaration must then be written and signed by the entrant (by one responsible person in the case of a group entry): "I confirm that the station was operated within the rules and spirit of the event, and that the above information is correct".

The declaration concludes the entry, which should be sent, with the log sheets, to: Practical Wireless Contest, c/o Dr. Neill P. Taylor G4HLX, 46 Hunters Field, Stanford in the Vale, Faringdon, Oxfordshire SN7 8LX. A large s.a.e. should be enclosed if a full set of contest results is required.

Entries must be postmarked no later than July 3 1995. Late entries will incur a heavy points penalty.

Comments Welcomed

Any other general comments about the station, the contest and conditions during it are welcomed. But they should be written on a separate sheet of paper.

Photographs of the station are also invited (but please note that these cannot be returned); if these are not available by the time the entry is submitted they may be forwarded later, to arrive by July 31 1995.

7. Miscellaneous: When operating portable, obtain permission from the owner of the land before using a site. Always leave the site clean and tidy, removing all litter. **Observe the Country Code.**

Take reasonable precautions to avoid choosing a site which another group is also planning to use. It is wise to have an alternative site available in case this problem does arise.

Make sure your transmitter is properly adjusted and is not radiating a broad or poor-quality signal, e.g. by over-driving or excessive speech compression. On the other hand, be aware that your receiver may experience problems due to the numerous very strong signals it will have to handle, and that this may lead you to believe that another station is radiating a poor signal. Before reaching this conclusion, try heavy attenuation at the receiver input. The use of a high-gain r.f. pre-amplifier is likely to worsen strong-signal problems, so if you do use one, it is best to be able to switch it off when necessary.

8. Adjudication: Points will be deducted for errors in the information sent or received as shown by the logs. Unmarked duplicate contacts will carry a heavy points penalty. Failure to supply the complete information required by rule 6 may also lead to deduction of points.

A breach of the rules may lead to disqualification. In the case of any dispute, the decision of the adjudicators will be final. **PW**

Fig. 2: Sample log sheet for PW 144MHz QRP Contest (see text).

Practical Wireless 144MHz QRP Contest 1995				
Date	Callsign	Locator		Sheet No Of
Time UTC	Callsign	Report & Serial No		Locator
		Sent	Received	

A Four & Six Filter

Ken Ginn G8NDL describes a simple and effective low pass filter for 50 and 70MHz operations.

The low pass filter I'm going to describe has proved its worth in use with a packet node. It is designed for use where there are three co-sited transceivers running on 70, 144 and 430MHz whose antennas share a common mast.

Running a number of transceivers in close proximity can often bring difficulties. They can show up when receiver blocking occurs when a transmitter fires up.

Unfortunately, a high level of r.f. from the 144MHz transmitter will find its way into the front-end of the 70MHz receiver and will cause blocking to some degree. So, to try to reduce this effect a low pass filter (l.p.f.) was designed to integrate into the system.

The l.p.f. unit will, as a bonus, also further reduce any second and third harmonic products present in the output of the 50 or 70MHz transmitter.

Filter Design

The filter design is a scaled up version, originally designed to work on 40MHz as a low pass filter, and was used to clean the output of an r.f. signal generator below 40MHz for testing receivers for spurious response.

The scaled up prototype filter is shown in Fig. 1. It was designed primarily to be put in line with the antenna feeder to attenuate the received signals of adjacent transmitters.

The adjacent transmitters could be operating on and above that of the 144MHz amateur band. They could be causing problems by virtue of their relative proximity and high powers used. The problems I'm referring to are my own 144 and 430MHz packet stations and a local commercial 'paging' transmitter.

Close Proximity

My 70MHz antenna is mounted in close proximity to my 144MHz antenna of my packet station (running 24 hours a day). So I considered it wise to isolate the receiver front-end from these and any high power erroneous signals

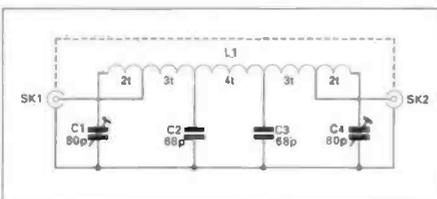
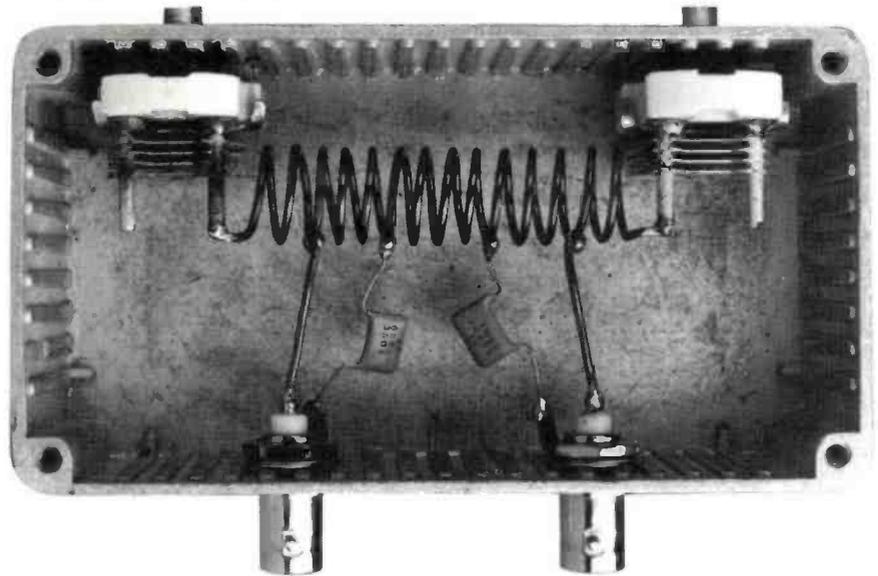


Fig. 1: Circuit of filter.

Fig. 2: Overall layout of filter design.



which could cause blocking of the receiver.

The prototype design, as I've mentioned before, is a scaled up design used successfully to carry out tests on radio equipment. Components used have been adjusted accordingly to cover the frequency band required - with either a 50 or 70MHz transceiver.

The trimmer, C1 and C4, shown mounted in Fig. 2, were recovered from an old high band Pye Westminster power amplifier (p.a.) which was headed for the scrap heap. These are actually air spaced trimmers from the p.a., which I measured on a capacity bridge, and found to be 80pF when fully meshed.

You can try looking for an alternative trimmer. It should preferably be an air spaced type, if it is to be used in the feeder of a transmitter. The Jackson C804 series would be ideal, which can be accommodated in the same size die-cast box as the prototype, but with a little modification to accommodate the larger size trimmer.

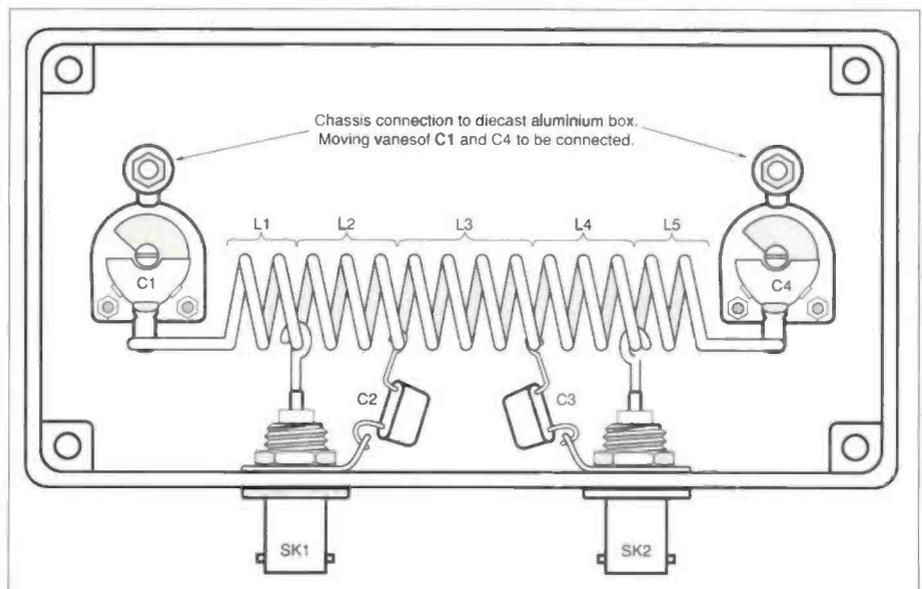
The Construction

Let's now look at the construction of the filter. The drilling dimensions are shown in Fig. 3, this is done before final assembly of the prime components within the die-cast box.

I haven't provided complete drilling details in this article. This is because there could be some mounting differences due to the trimmer capacitors eventually used by individual constructors.

The mounting of the trimmer capacitors, C1 and C4 in the prototype are shown in Fig. 5. The moving vanes of the trimmers are connected to the chassis of the die-cast box with solder tags.

The body of the trimmer is mounted clear of the bottom of the box with a 10mm M3 spacer. Each trimmer is secured with two M3 nylon nuts as shown. This should provide adequate insulation if the filter is used with a high power transmitter where high voltages would be present on the fixed vanes of C1 and C4.



The Coil

The coil is wound with 14s.w.g. tinned copper wire having a total of 12 turns. It should have an internal diameter of 12mm and each turn spaced 3mm apart, as in Fig. 4.

The two silvered mica capacitors (C1 and C4) and taps are soldered to the coil as shown. After coil construction is complete, all wire lengths are cut as short as possible when the coil is installed prior to final assembly.

The two silvered mica capacitors which have one free wire each will have this free end terminated to a BNC solder tag. This is the earth connection.

Setting Trimmers

The initial settings of the trimmers are: C1 20% meshed and C4 10% meshed. At these settings the filter should give a reasonable match on both ports with a loss of less than 0.2dB.

The filter can be set up in one of two ways: maximum rejection of harmonics, or minimum loss through the filter. Either way similar results will be obtained, the loss will be certainly less than 0.5dB.

When tuned correctly the filter should show some 55dB rejection at the second harmonic. There should be 65dB rejection at the third harmonic on the 70MHz design.

The attenuation should be 0.2dB throughout the passband, with the -3dB points at 98MHz for the 70MHz version and 78MHz for the 50MHz version, see Fig. 6.

The v.s.w.r. at both ports should be less than 1.4:1 at frequencies below the relevant filter frequency when tuned correctly, see Fig. 7.

I hope you find the filter design to be helpful. I have! PW

Shopping List

Capacitors

Silvered mica

68pF 2 C2, 3

Air spaced trimmer

80pF 2 C1, 4 (See text)

Miscellaneous

Copper wire (tinned 14s.w.g.), BNC socket (or other type), 10mm spacers (four off), Nylon nuts M3 (four off), solder tags, screws, nuts, 20s.w.g. tinned copper wire and a die-cast box 114 x 55 x 63 mm.

Clive Hardy G4SLU built and tested G8NDL's filter and has the following comments: My only variation from original design was to use Jackson pre-set capacitors instead of the Pye Westminster types which are a touch rare. The Jackson capacitors are very readily available. Every rally has lots for sale at very low prices. If you can't wait for the next rally, the capacitors can be obtained from John Birkett in Lincoln (he regularly advertises in PW). Using a recently completed PW Marlet transceiver and a dummy load, I tuned the filter for minimum v.s.w.r. at the top end of the 70MHz band. Adjustment was simple, with the resultant v.s.w.r. being pretty close to unity. The attenuation of frequencies above 70MHz is shown in the Fig. 6. G4SLU

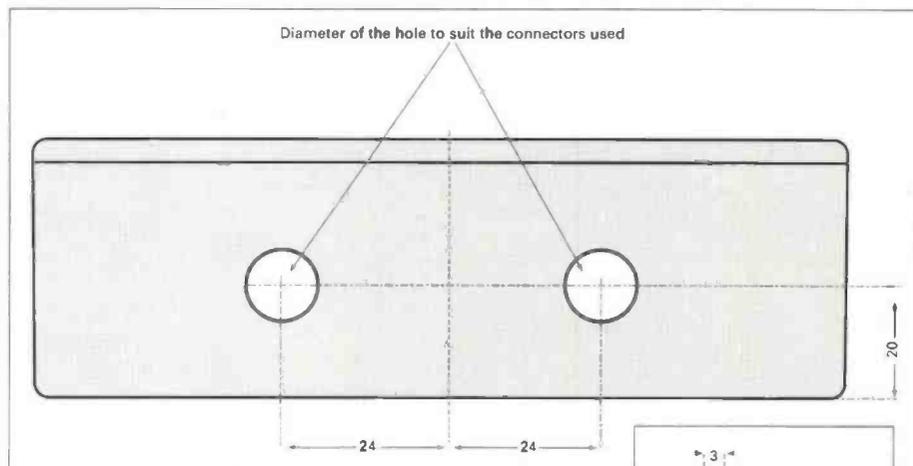


Fig. 3: (Above) Drilling details.

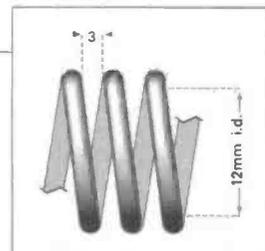


Fig. 5: (Below) Capacitor mounting details.

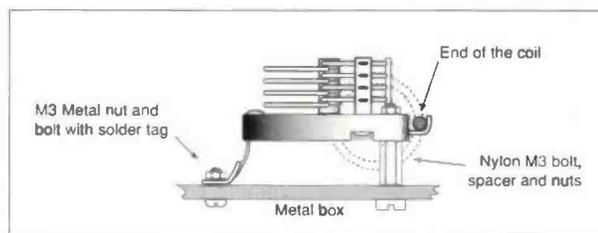


Fig. 6: Theoretical rejection available from the filter (actual results were at least as good, with no noticeable dip).

Fig. 4: (Above) Coil details (see text).

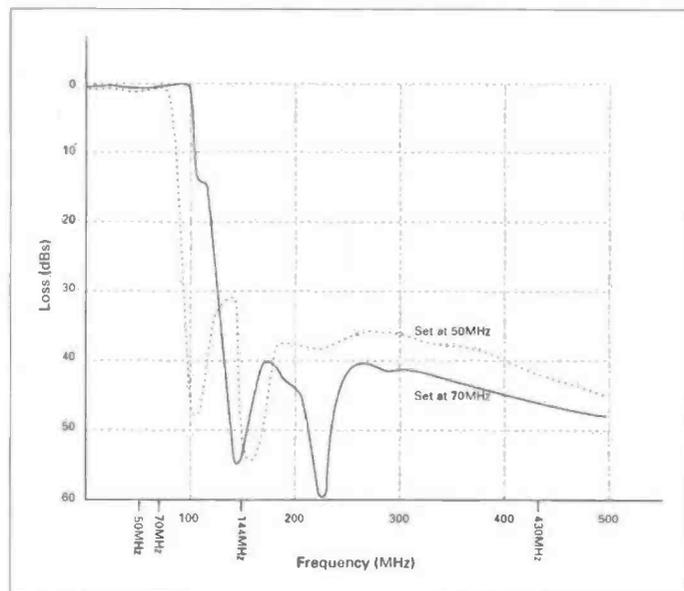
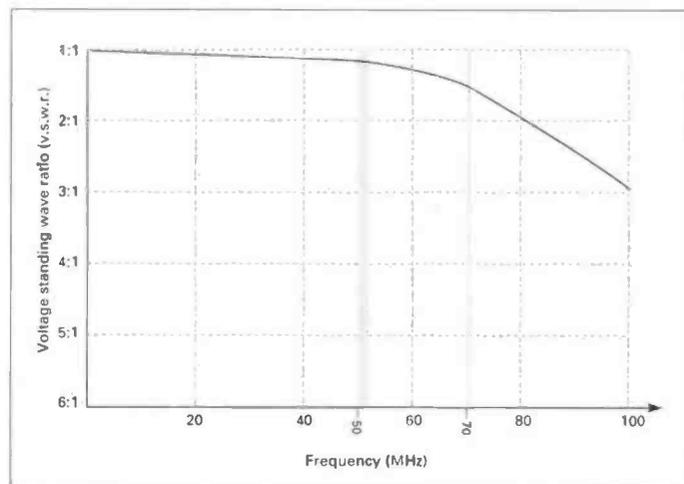
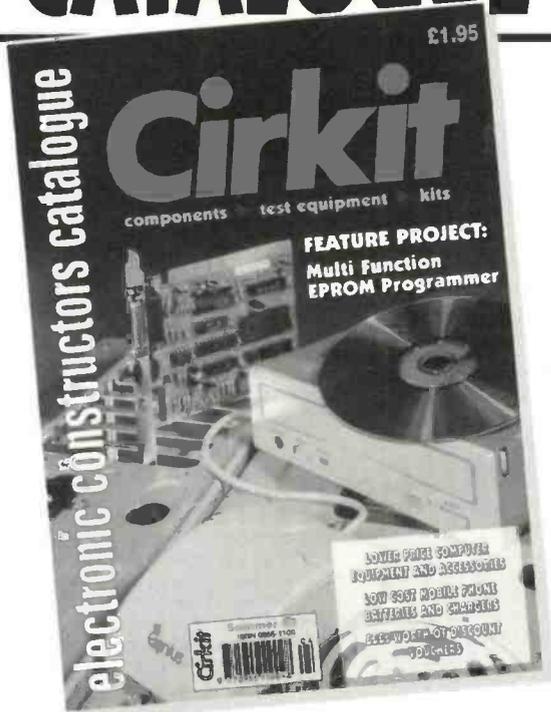


Fig. 7: Graph showing v.s.w.r. plot of filter. When set to 50MHz it is still useable on 70MHz.



SUMMER 1995 CATALOGUE



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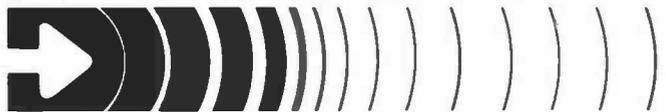


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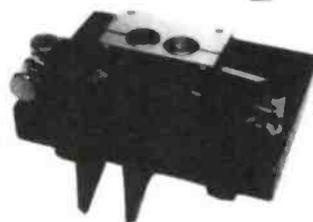
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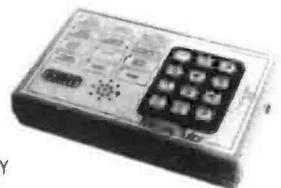
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Specifications

- The Mysteries Explained

Ian Poole G3YWX looks at the much talked about mysteries surrounding phase noise and reciprocal mixing.

Nowadays, there is a lot of talk about phase noise, and the specifications associated with it. Much of this has arisen out of the increased use of frequency synthesisers as local oscillators (l.o.) over the past ten to 15 years or so.

Synthesisers offer many advantages, particularly in terms of frequency stability, and ease of control by microprocessors. Without them, many of the facilities we take for granted today would not be viable in amateur equipment.

Very accurate frequency control and stability, along with all the benefits of microprocessor control, including scanning, memories and the like have all been made possible by the use of synthesisers.

Unfortunately, some synthesiser designs can generate relatively high levels of phase noise. In transmitters this can be one of the reasons for a signal spluttering up and down the band.

In receivers phase noise can result in a phenomenon called reciprocal mixing. However, before looking at reciprocal mixing and how it occurs, it's necessary to take a look at the root cause - phase noise.

Phase Noise

Some phase noise is present on all oscillators to a greater or lesser degree. Essentially it's noise on the oscillator which is present as frequency, or more correctly phase modulation.

In fact phase noise corresponds to small amounts of 'jitter' on the signal, and it can be seen on the signal as noise spreading out either side of the main signal as shown in Fig. 1. However, in most cases the levels of phase noise are relatively small and might not easily be detected purely by listening to the signal.

Some oscillators produce much lower levels of phase noise than others. For example crystal oscillators are excellent in this respect, as are ordinary free-running variable frequency oscillators (v.f.o.).

In fact any oscillator which has a high Q tuned circuit will produce a low level of noise.

Unfortunately though, the way in which a frequency synthesiser operates can lead to high levels of noise if the circuitry is not designed to optimise its performance.

As amateur radio equipment is often designed to meet a price, the additional cost required to make sure a very good phase noise performance is met may not be acceptable. But this does not mean to say that all synthesisers are very bad.

Reciprocal Mixing

To look at how reciprocal mixing occurs let's take the case of a superhet receiver tuned to a strong signal. The signal will pass through the radio frequency stages, and then in the mixer it will be mixed with the local oscillator to produce a new signal at the right frequency to pass through the i.f. filters.

When the local oscillator is tuned away by 10kHz for example, the signal will no longer be able to pass through the i.f. filters. However, it will still be possible for the phase noise on the local oscillator to mix with the strong incoming signal to produce a signal that will fall inside the receiver pass-band as shown in Fig. 2. This could be sufficiently strong to mask out a weak station.

From my description you'll now realise that the effects of reciprocal mixing will be most obvious where weak signals are being sought in the presence of much stronger ones. And for example the 144 or 430MHz bands during a contest is just one instance where good reciprocal mixing performance is required. Here it's often necessary to pick out weak signals amongst some

exceedingly strong ones.

Another example is 7MHz at night. This is where there are many very strong broadcast stations just above the top end of the band.

Levels Defined

A number of different methods are used to define the level of reciprocal mixing. Generally they involve the response of the receiver to a large 'off channel' signal.

To perform a reciprocal mixing measurement is rarely easy. The signal generator must always be much better than the receiver, otherwise the performance of the signal generator will be measured! To overcome this many people use an old valved signal generator because their phase noise performance is often very good.

A measurement can be made by noting the level of audio with a beat frequency oscillator (b.f.o.) on from a small signal. The signal is then tuned off-channel by a given amount, normally about 20kHz and then increased until the audio level rises to the same level as a result of the phase noise from the receiver.

As the noise level is dependent upon the bandwidth of the receiver, this has to be specified as well. Generally a bandwidth useable for s.s.b. is used, i.e. 2.7kHz.

A good h.f. receiver might have a figure of 95dB at a 20kHz offset using a 2.7kHz bandwidth. This figure will improve as the frequency offset from the main channel is increased. At 100kHz you might expect to see a figure in

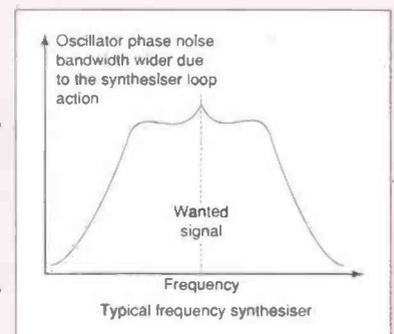
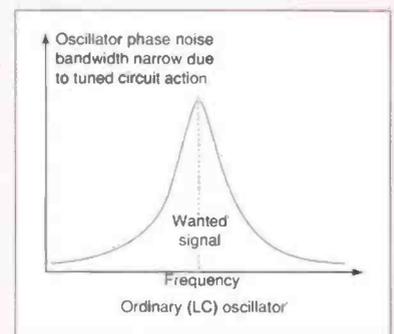


Fig. 1: Examples illustrating phase noise from oscillators and synthesisers (see text).

excess of 105dB, or possibly more.

Another way of measuring the phase noise response is to inject a large signal into the receiver and monitor the level needed to give a 3dB increase in background noise level. As a number of different systems are in use it's often best to study the reviews performed by the same people to compare different rigs.

That's all for this issue, next time I'll be asking the question 'What is digital signal processing?'

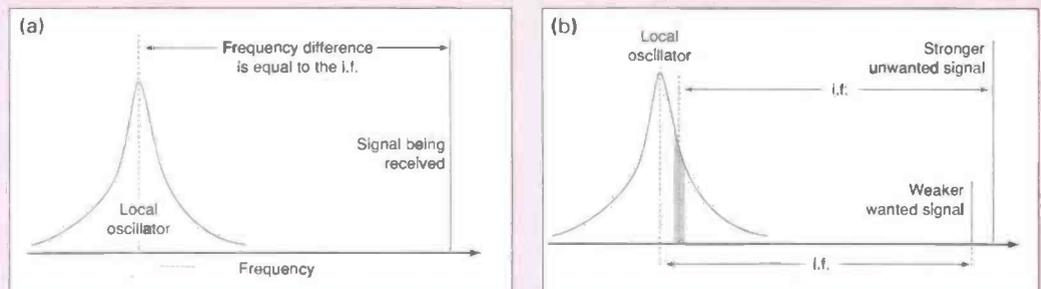


Fig. 2: Diagrams illustrating the causes behind reciprocal mixing (see text); (a): Local oscillator and incoming signal mix to produce a signal in the i.f. passband; (b): Strong signal mixes with phase noise from l.o. to produce noise which falls inside the i.f. passband.

Once again Ron Ham welcomes you into the warm confines of PW's vintage wireless 'shop' where he's looking at one of the lesser known military transceivers from the Second World War - the 46 'Commando' set.

W valve & intage

There's a lot happening in the next few months. This is because many of the wireless collectors among you will have your wartime sets on display as part of the 50th anniversary of the ending of the Second World War in 1945.

Recently, I had a 10-minute local bus ride and witnessed an up-to-date 'wire-less' communication. This was because throughout the journey, a young lady near me used a small cellular telephone with a tiny antenna. The actual unit could only just be seen protruding outside both ends of her gloved hand.

'Wire-less' communications are taken for granted today especially by the youngsters! I know this from museum experience, from the people's reactions as they look with amazement at the (to them!) large size of the 'portable' sets that were used by the army, on active service and often under enemy fire, half a century ago.

The 46 Set

Perhaps one of the lesser known sets, used by the British army towards the end of the war, is the WS46. **Fig. 1.** The set was originally designed, so I understand, for Commando operations.

Other infantry sets, like the 18, 38 and 58 types, had variable tuning between 6 and 9MHz. But the 46 set was different, as it was provided with three preset, crystal controlled channels, within a similar tuning range.

The 46 set channels are marked A, B and C on the selector switch. And the switch itself can be seen, in the B position, at the lower centre of **Fig. 1.** The set itself, with the controls at one end, on the right in **Fig. 2,** slides into its own canvas pack.

The large (and heavy) all-dry battery and the combined headphones and throat microphones for the 46 set are stored inside a specially designed haversack (on the



Fig. 1: Top panel view of the 46 set. The antenna rod socket is top (far left), RT/CW lever switch (top centre) with combined push to talk switch (p.t.t.) and Morse key on the right. The antenna 'dummy load' and bulb tuning indicator is mounted in the domed housing between the p.t.t. switch and serial number plate (see text).



Fig. 2: The 46 set junction box unit with hard rubber push-connectors mounted in position on the battery pack/equipment carrying case (separate haversack for 46 set is just off to the right).



Fig. 3: Testing facilities are provided inside the 46 set junction box (see text).

left of **Fig. 2.** Two headsets, terminated with the large rubber 'snatch' connectors, bottom of **Fig. 2,** can be used with the 46.

The large button, top right of **Fig. 1,** is marked **Press To Send** and works in conjunction with the lever type switch to its left at the top centre of the panel. The latter is marked **RT** and **CW.** (Although I've not tried it out, I feel sure that when in the **RT** position the button is 'press to talk' and in the **CW** position the button acts as a Morse key).

Junction Box

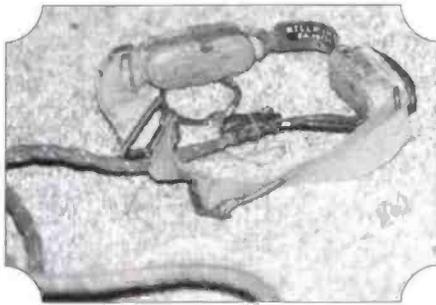
The top left hand lead from the junction box on the side of the haversack, **Fig. 2,** is terminated with a hefty six-pin plug. This connects to the socket on the bottom left of **Fig. 1.** I think the junction box is an interesting feature, and it's shown in **Fig. 3**

with its cover removed.

When the 46 set is in use, the cables from the battery (inside the haversack) the two headset connectors and the lead to the set are all joined inside the junction box. This is where provision has also been made to test the l.t. and h.t. voltages. (The h.t. current can be measured by removing the centre link and coupling a suitable meter across the terminals in its place).

Throat microphones, **Fig. 4,** have two transducer pads covered in very soft thin leather. This type of microphone was used on both the 38 and 46 sets in order to leave the operator's hands free.

The photograph, **Fig. 4,** shows the microphone pads which are held, each side of the throat, by a half elastic strap fastened behind the neck. The voice quality was not marvellous, but it sufficed in battle conditions.



Rod Antenna

Short sections of copper rod, housed in the side of the 46 set's container, top left Fig. 1, are used to make up the antenna. This, when complete, plugs into the adjacent socket.

The on/off switch is on the centre left of the top panel. see Fig. 1. It has a mechanical linkage to a 'flag' indicator, which is mounted underneath and is visible through a small window in the middle of the panel.

The six valves used in the 46 set, shown in Fig. 5, are (top row), AR8, ARP37 and ATP4 and (bottom row), ARP12, ARP12 and ARTP2. (We've already met most of these before in the 18 and 38 set and the R109 receiver).

However, the 'new' valves are the ARP37 and ARTP2. The former is a CV1342 (QP25) double output-pentode and the latter a CV1345 (TP25) triode-pentode.

Like the other valves, the ARP37 and ARTP2 are both directly heated Mazda octal based valves with 2V at 200mA filaments. And don't forget that you should never remove the valves by pulling on the glass envelope! Always pull by holding the base!

Having reminded you about not pulling a valve out by its glass envelope, you'll see that the base of the power amplifier stage (p.a.) ATP4 valve, Fig. 8, sits below the chassis. Despite that, the designer incorporated a convenient hole, centre Fig. 8, through which the valve base can be eased upward with a screwdriver.

Make sure the set is switched off before using a tool to remove the valve. If you don't, you may accidentally create a short circuit between the h.t. and l.t. supplies and burn out all of the valve filaments.

The photograph in Fig. 5, shows the 46 set sitting on top of its own sturdy metal case and in front of its canvas container. The chassis is secured inside the case by a bolt at each corner of the control panel, Fig. 1.

Crystal Controlled

The operating frequency of each of the three channels on the 46 set is

Fig. 4: The 46 set employed 'hands free' throat microphones. The microphones (forming a pair) were held closely to the operator's throat by straps (see text).

Fig. 5: The 46 set out of its sturdy metal case.

crystal controlled. They are preset with a combination of six, 10XJ type quartz crystals.

The 46 set uses one send and one receive crystal per channel, right Fig. 6, and a plug-in coil unit for the particular frequency range, bottom right Fig. 7. The legs of the coil-socket and one end of the coil-can are visible below the crystals at the bottom left of Fig. 8.

In order to change the crystals the metal cover, right Fig. 5 and upper left Fig. 8, must be removed. This is achieved by pushing back the retaining clips situated at each corner on the control panel side. A touch of light oil on these clips will make them easier to move.

Part of the preset tuning arrangement, three ceramic trimmers and one of the coil-cores can be seen below the crystals in Figs. 6 and 7. (Extreme care must be used when adjusting ceramic trimmers because the moving part, top, can easily break in two).

The variable capacitor for 'peaking' the antenna is under the chassis at the centre right of Fig. 7. This is set by the knob below the button in Fig. 1.

Adjustment for the i.f. transformers is made in the sides of the two cans between the valves. These can be seen in the lower section of Fig. 5 and the foreground of Fig. 6.

Good Condition

The particular 46 set which I've featured this month is 50 years old and in good condition. It's normally on display in the Amberley Chalk Pits Museum, however, although I have not checked them I doubt that the set's capacitors and resistors are of much use.

Personally, I think that the electrical condition of the 46 set's components does not really matter, because there's little point in putting such a set in working order. In my view, as these sets get older and rarer, they should be kept for exhibition purposes only and preserved in their original condition.

Oh well, it's time to shut up the shop once again. Until next time then, cheerio for now!



Fig. 6: The three crystal controlled channels on the 46 set required two crystals per channel. The appropriate inductors for the range of frequencies in use were provided by plug-in coil units sealed in metal boxes (not visible in photograph).

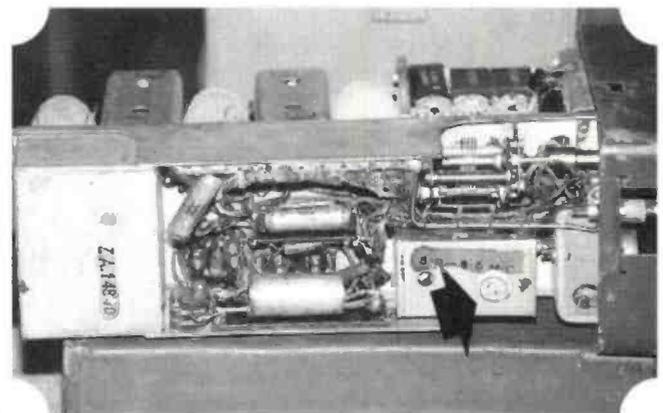


Fig. 7: The plug-in type coil unit used in the 46 set can be seen (arrowed) in this photograph.

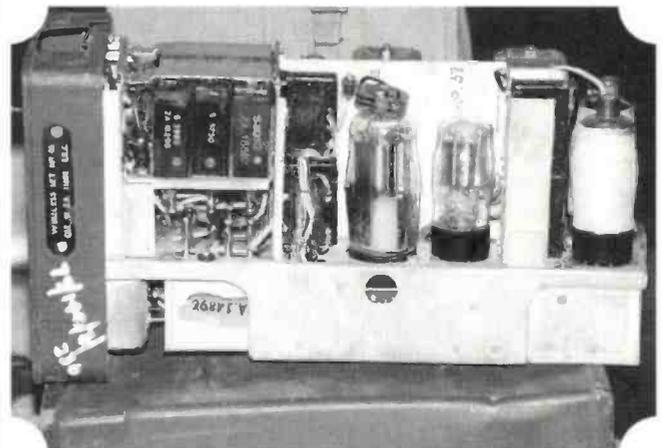


Fig. 8: The full bank of three crystal controlled channels (six crystals required) are held in place by a metal plate. The appropriate plug-in tuning coil can be partly seen in its mounting on the underside of the chassis because of the chassis cut-out. The p.a. valve (ATP4) is inserted in a valve holder mounted below the chassis line (see text).

The Computer in Your Shack

Mike Richards G4WNC brings you all the latest news from the world of computing in radio.

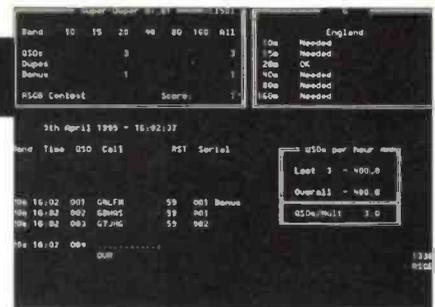


Fig. 1: Screen grab from Paul O'Kane's Super Duper Contest Log

BITS & BYTES

The UltraPak packet driver program from **Tim Kearsley** is proving to be very popular with 'Bits & Bytes' readers. I've also been very impressed with Tim's enthusiasm for development and can report that I'm now distributing version 2.1.

The latest version of UltraPak has been enhanced in many ways. One of the most significant developments is its expansion to work with Terminal Node Controller's (TNC) other than true TNC-2 compatibles.

In fact, Tim bought a KAM KPC-3 at the Picketts Lock Amateur Radio & Computer Show just to prove the systems works! In addition to the improved TNC support, Tim has also improved the inter working with multiple connect streams.

You now have the option to nominate a stream ID and switch stream character. There is also a simple script utility so that you can control most log-on processes automatically.

To get your copy of the UltraPak Windows 3.1 package either see my offers at the end of this column, or you can download the file from the Internet at ftp.demon.co.uk as UPAK21.zip. My thanks to Tim for his hard work.

Contest Logging

Paul O'Kane EI5DI/GI30TV has sent an E-Mail to let me know of his WWW site and contest logging program. The program is available from WWW site

<http://www.iol.ie/~okanep/>

Here you will find SD version 7.00 and SDI which is a variant of SD optimised for use with the IOTA contest. Both programs appear to have enjoyed great success and are used by some of the top placed contest teams.

BARTG Multiterm

Andy Matheson recently sent me news of a creditable achievement for BARTG's Multiterm unit. The terminal

unit supports PACTOR, AMTOR, RTTY, SSTV, FAX and c.w. modes and has just passed the EEC electro-magnetic compatibility (EMC) testing.

The EMC testing is very thorough and involves exposing the unit to r.f. fields of up to 3V/m at 1GHz. This is a very good test for an amateur radio environment.

Having experienced the problems that come from trying to use AMTOR with r.f. getting into the terminal unit, I can understand the benefits from this level of testing. However, all this testing means nothing if your interconnecting leads are of poor quality.

Technical Help

A reader recently asked if I could devote a section of my column to providing help with computer related technical problems. Sounds like a good idea to me.

So, I thought it would be helpful if you would send in your questions. I will then do my best to answer your queries through the column.

Whilst talking technical, have you dabbled with digital signal processing (d.s.p.)? You will no doubt have noticed the appearance of many d.s.p. audio filters over recent months.

If you're technically competent with a strong interest in programming, it's quite feasible to develop your own d.s.p. filter. One good starting point is to take a look at the d.s.p. starter kits produced by Texas Instruments.

The Texas Instrument d.s.p. kits are available from most Texas agents (Arrow Electronics) and provide all you need to get started for less than £100. If you've done any work in this area I'd like to hear from you.

Jargon Busting

I get a number of letters from readers asking some very basic questions concerning the computing aspects of our hobby. Most of these centre around a misunderstanding of

jargon. In this section I'll attempt to put matters straight!

The latest question to arrive asks what's the difference between a modem, TNC and TNC terminal program. This is a very good question as the modem and TNC have similar functions.

The TNC is a specialist item that contains its own microprocessor for managing a packet radio connection. The processor carries out a wide range of tasks, but the most important is to take the data from the computer and break it up into packets for sending over the network.

The TNC also has to reconstruct the message at the far end - even when the packets all arrive at different times. The modem, on the other hand, has a much simpler task, as it just has to convert the computer's digital signal into audio tones that can be sent down a 'phone line.

However, even modems have become very sophisticated and now use their own micro-processors. Not only do they handle the data conversion, but modern modems include sophisticated data compression routines to further increase the flow of data.

The reader also asks why amateurs still struggle to work at 9600baud when 14.4 and 28.8kb/s modems are available at very reasonable prices. The reason is simply down to the transmission medium. (Despite what people may claim, the modern, 'phone line is far better quality than a radio link and can therefore handle much faster data transmission rates).

Special Offers

Here's a summary of the latest special offers for 'Bits & Bytes' readers. I try to turn orders around in a week or so, but please allow up to two weeks for delivery.

- 1 JVFAX 7.0 - FAX & SSTV transceiver for IBM compatible computers.

- 2 HAMCOMM 3.0 - RTTY, c.w. & AMTOR transceiver also for IBM compatible computers.
- 3 NuMorse - Comprehensive Morse tutor for Windows 3.1 users.
- 4 UltraPak 2.1 - TNC-2 driver for Windows 3.1 users.
- 5 FactPack 1 Interference - Help with those difficult computer interference problems.
- 6 FactPack 4 JVFX and HAMCOMM Primer - Receiving your first FAX and RTTY signals.
- 7 FactPack 5 On the Air with JVFX and HAMCOMM - preparing for that first transmission.
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To receive any of the offers just send a self addressed sticky label plus 50p per item (£1.50 for four or all eight for £3.00). If you're ordering JVFX/HAMCOM/NuMorse/UltraPak you will also need to send a blank, formatted 3.5in 720k disk for each program or just two 1.44Mb high density disks.

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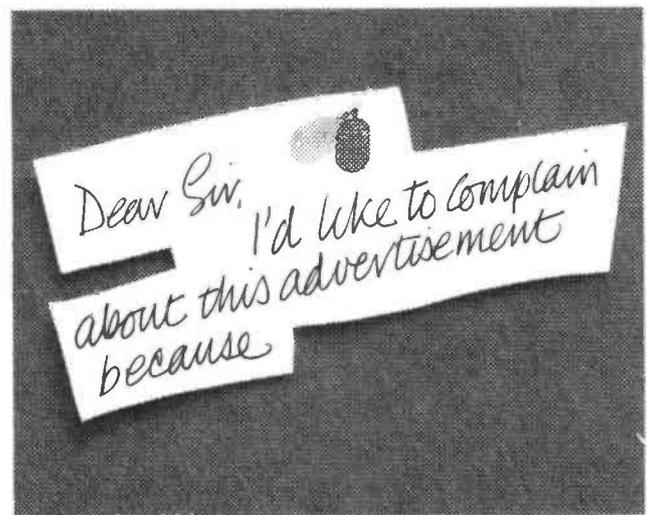
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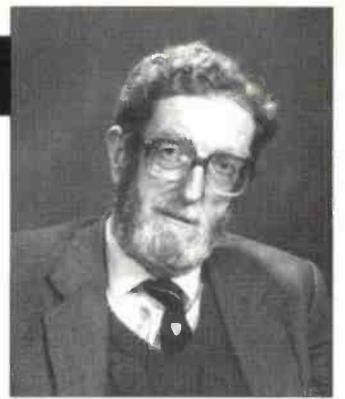
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In the last of his regular monthly reports on the bands, Paul Essery GW3KFE brings you the latest round-up on h.f. happenings.

Report

BANDS
H.F.

After some 29 years (mostly on our sister publication *Short Wave Magazine*) in which I've never missed a month or a deadline, this is my last monthly column in *PW*. But now, down to business.

Keen DX operators used the Geoff Watts lists until Geoff's death. His mantle has been taken on by John Forward G3HTA, himself a top DX operator.

John of course knows as much as anyone about this particular game. And my copy of the new list shows me he's done a super job.

The notes and appendices added to the list itself are also of great value. To get your copy send for subscription details to the RSGB at **Lambda House, Cranborne Road, Potters Bar Herts EN6 3JA.**

The Bands

On to the bands now. And, they are as you would expect at this low point in the sunspot cycle. But it's astounding how 'conditions' perk up when there's a major contest weekend, even though the operators know conditions are lousy!

As I've said before, if the band is open to somewhere, and there is no-one active at that time, then to us the band seems dead!

Important Addresses

Some important addresses now. But firstly a note from **Gintaras Banevicius LYB-77**. Gintaras hails from Vilnius, Lithuania.

Gintaras spotted a typing error in the February '95 column, where the QSL Manager for 9K2MU was shown as WA4JTK but this should have read: 9K2MU, via WA4JTK - Sorry! He adds a couple of new addresses for us: **9K2/K10K, via KC4ELO; and 4L1FL via Box 387, Yeroham, 80500 Georgia.**

From the Isle of Sheppey, **Ted Trowell G2HKU** mentions some more addresses, to wit: **VP2MEM, via W4MYA; 7Z500 via W1AF; D68UY via DK7UY; ZF2VZ via N1MFW, and VK9CR**

via DJ5CQ. Ted was due for yet another visit to the Royal Military Hospital on March 20 and we wish him well.

Your Reports

Let's take a look at your reports now and I'll start with Ted G2HKU. An MFJ-1786 loop antenna mounted at about two metres high is the third antenna at G2HKU, along with his G5RV antenna and HF6.

On 3.5MHz, with the Omni-V into the G5RV, Ted raised JW0I, CO2VG, K4LTA, and VP2MEM on c.w. While working on 7MHz with the same tackle hooked W1CWW, W0UCE, K4HH3/R3, VK3RP, VK2BQQ, VK2DSG, VE1ZN, JW0I, ZL1AH, ZL4AU, ZL1BVB, LU7EE, and PU2PJK.

Now to 14MHz where Ted used the G5RV for working VK4TT, ZB2EO, 9J2BO, ZS6ME, D68UY, 7Z500, and KP4QI. For comparison the loop antenna connected him to ZF2VZ, 6W6/K3IPK, W2BA, VE3VHB, and VE2AYU.

Applying a similar comparison on 18MHz I see from G2HKU's log he used the G5RV to work 9H1AL, W4XJ, HZ1AB, W60V, OH1NOA/OD5, 3B8CF, W4DHZ, and VP2E/WJ20. The MFJ loop handled TA2DS, W4ZYT, ZS6EZ, KR4SM, A71AN, LU6EF, WA4SNI, and N2JI.

Going up to 21MHz there was just a single contact for G2HKU, with 3DA0BK. Finally, on 24MHz Ted made a rare foray onto side-band to raise UY8LL, WX4G and on the loop SV5BYO (Karpathos Island).

Nowadays, **John Heys G3BDQ** in Hastings only operates in the afternoons, with the very occasional lunchtime 'bash'. For this period, John stayed on h.f. to see how he would get on.

John's 28MHz operations gave an s.s.b. contact with D68QM, and on 24MHz one with TU1IG. Still side-band, on 21MHz G3BDQ worked VK5NYD, VY2LI, J28BT, YN1JCC, HS1AFN, 6W6/K3IPK, 9K2ZZ, 9K2RA, P43A, XE1SRF, 5R8EH, 9G1BS, DL3FH/HK3, SU1CS and S92YL.

Still going downwards, on 18MHz ZS6WB, A45ZZ, ST2AA, W7ZQ (Wyoming),

K6SVL (California) N6BFM/9K2 and 9K2ZZ. Finally on the same band, but using c.w. John mentions ST2AA, VP5XWA/I1ML, VK9XY on Christmas Island, VP2E/WJ20, A71AN, and 8P6DU.

All these reports sets me wondering. Why are we seeing this level of activity on the higher bands at this time in the sunspot cycle? It's a good question!

Changes In Kuwait

Seemingly, the Kuwaiti (9K2) authorities have changed the calls of foreigners to an 'Own call/9K2' format. They've re-issued the calls released by this re-assignment to Kuwaiti nationals.

Obviously the Kuwaiti changes will have some odd implications for those sending cards out. I suggest you let the dust settle and the proper addresses appear, before you speculate a card.

Low Power

It's nice to hear again from **Leighton Smart GW0LBI** in Trelewis, South Wales. On 'Top Band' Leighton's month was made when he hooked VE1ZZ with just 5W for a 1.8MHz RST559 report, so now he has three continents and 44 countries on the band.

On the antenna side, GW0LBI has added a loading coil to give an electrical length of 75m (half-wave on 1.8MHz); this works well on 1.8/7MHz but for some reason isn't so good on 3.5MHz and the higher bands.

In contact terms, Leighton's contact with VE1ZZ has already been mentioned, and he also worked 4U1TU (a DXCC country in its own right), PA0CMP and DL3HWF all on the key. While his QRP sideband (Leighton's speciality) connected him to GM0FTX, G3JTK, OY9JD and LX4A.

News Of DXCC

Now for some news of DXCC. I've heard (It's not yet solidly confirmed) that the DXCC desk are refusing to accept

stations signing /S0.

The information obviously affects the KCOPA activity even though KCOPA is with the United Nations. The requirement specified is that of a full S0 call sign issued by the Western Sahara Telecomm office in Spain.

I think that all that can be said is that we must all hope that we're not seeing a repeat of the 'my private DX spot' pantomime (previously noted on Mount Athos with the SVs and indeed with the first S0 expedition some years ago). Personally, I think it's really about time for the DXAC to 'lay the law down' on this matter far more firmly.

Why don't the DXAC insist that every DX station and expedition respond to card requests routed via the Bureau? Clearly, if we want amateur radio to continue, we must all ensure the newcomers enjoy every aspect of the hobby.

Not everyone can afford the insatiable demands for Dollar bills of the DXpeditioners, who I think go on expeditions for their own gratification anyway! I think youngsters and pensioners are being penalised.

Final Final!

Well, it's time for my final final! Thanks for all your support over the years and I remember that Ted G2HKU and Don G3NOF were in my first-ever piece 29 years ago!

In future, reports go to: **Leighton Smart GW0LBI, 33 Nant Gwyn, Trelewis, Mid Glamorgan CF46 6DB.** Thank you one and all!

Editorial note: The Editorial team thank Paul GW3KFE for all his hard work, which he's squeezed in between his RSGB Council work and other activities. Please see this month's 'Keylines' editorial for further news on this column.

END

Antenna Wo

As I mentioned in my last session in 'Antenna Workshop', (in the December '94 issue of *PW*) I've decided to write about balance to unbalance transformers (baluns) this time. And, there's a lot to this emotive and poorly understood aspect of amateur radio!

Various authorities have pronounced on the use of baluns. They've made statements varying from "you must use a balun" to "it's not necessary to use a balun" when feeding a dipole with coaxial cable. So, just what is the truth?

Well, the answer I've got on the successful use of baluns is that it depends on many things! My session in preparing

'Antenna Workshop' is aimed at explaining the background so that you can make an informed judgement - taking your own circumstances into account.

To start off, it's easiest to consider baluns under two headings: what they do and what benefits they may bring. But at this point let's limit the discussion to the use of the 1:1 balun and antennas such as the dipole, the G5RV and G8KW antennas.

For the purpose of this article I'll ignore the use of baluns with folded dipoles, where they also transform impedance. Additionally, I won't consider the use of baluns with parasitic beams either, because this is where undesirable currents on the feeder can have a drastic effect

on the beam antenna's performance.

What Baluns Do

So, now let's take a look at what baluns do. To begin, we should realise that a simple horizontal dipole is a balanced antenna. In other words, it's electrically symmetrical about its centre feed point.

It therefore makes sense to feed a simple horizontal dipole with a cable which is also symmetrical. But coaxial cable is not a symmetrical feeder (just looking at it tells us this). The core is obviously not the same as the screen.

Because coaxial cable is not symmetrical, it will therefore appear that it's highly undesirable to feed a dipole

directly using this form of feeder. However, as the output of the modern transceiver is a coaxial socket this is the very thing that you may wish to do!

The standard solution to the modern feed problem is to insert a balun at the end of the coaxial cable (where it feeds the dipole or at the junction of the coaxial and the balanced twin feeder with which you are feeding the dipole). The balun then performs the task of converting a balanced load into an unbalanced load.

But why can't we feed a dipole directly with coaxial cable? Well, this is because in the ideal world feeding a dipole with coaxial cable will cause currents to flow on the outside of the screen.

The 'outside currents' will radiate and can cause EMC

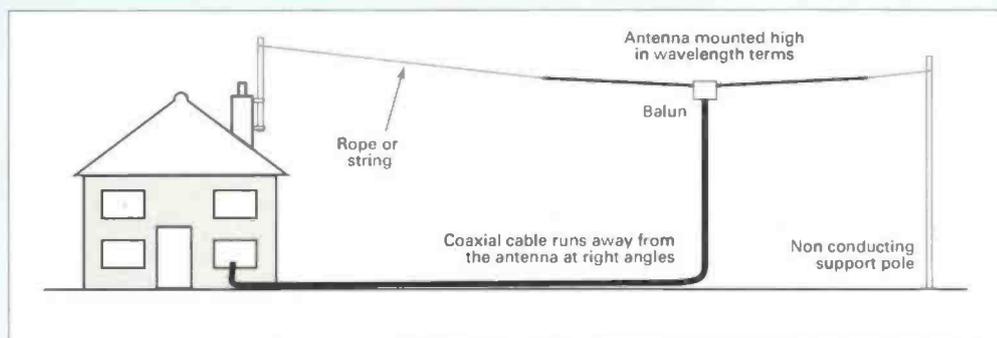


Fig. 1a: Diagram illustrating a dipole antenna, fed in conjunction with a balun, which G3MCK says should be effective and work well (see text).

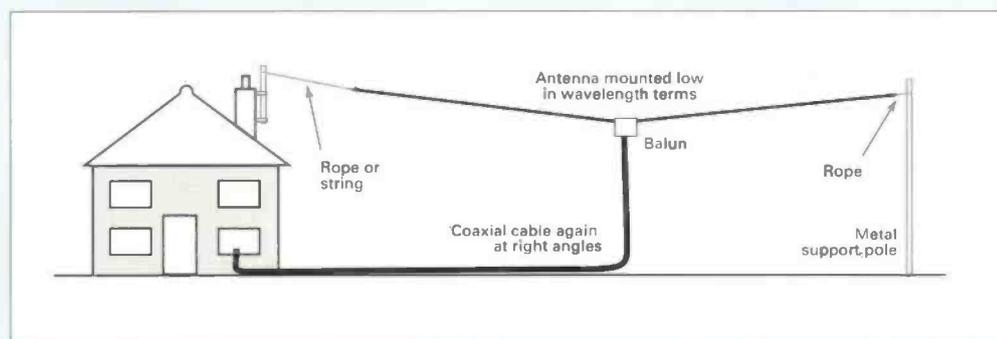


Fig. 1b: The balun in this antenna may still be quite effective if the correct design is used (see text).

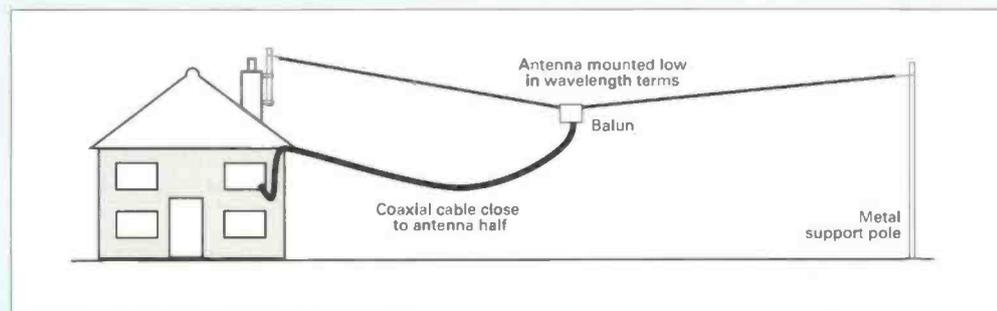


Fig. 1c: Gerald Stancey G3MCK has good reasons to believe that a balun used with a dipole antenna in this situation would be a waste of time (see text).

Workshop

problems, loss of power fed to the antenna, r.f. in the shack, and higher noise levels on receive. However, these problems may not appear and using a balun could bring disadvantages.

Amount Of Unbalance

Let's start by looking at the amount of unbalance that may occur when using coaxial cable to feed a dipole. And to help, *The ARRL Antenna Handbook* states that if the ratio of the length of the antenna to the diameter of the coaxial is large, then the degree of unbalance is likely to be small.

On 3.5MHz and using RG58/U coaxial cable the ratio is about 7,000:1 which must surely meet the specified criteria. But, I leave you to calculate this ratio for other bands and types of coaxial and draw your own conclusions!

The Dipole

Now let's look at the dipole. Is it really a balanced antenna? The dipoles shown in the books are but is yours a balanced antenna?

The diagrams in Fig. 1, shows three common situations that occur with amateur radio antennas erected in suburbia. In Fig. 1a, the dipole is probably reasonably balanced as the antenna is some way from the house.

However, in Fig. 1b, the dipole is not balanced. This is because the effect of the house roof on one half of the antenna will unbalance the system.

In Fig. 1c, the antenna is definitely unbalanced. This is because the roof and the feeder will certainly effect the antenna's operation.

So, how will baluns perform in the environments I've mentioned? To find out let's take a look.

In Fig. 1a a balun will do a pretty good job. While in Fig.

1b a balun may still be quite effective in keeping r.f. off the feeder, if the correct design of balun is used.

However, for the arrangement in Fig. 1c, I have very good reasons to believe that inserting a balun at the feed point will be a waste of time! In this case, I suggest that coiling the coaxial cable into a six turn coil, as in Fig. 2 (it should be about nine inches in diameter) and placing it where the feeder enters the house, could be the best way of keeping r.f. out of the shack.

So, is radiation from the feeder important? In answering I must say that nobody I've met and no article I have read has ever claimed that putting a balun in your dipole will give you a better signal at the other station's receiver. This is not surprising as you would need to lose over 25% of your power from the feeder radiation to make even 1dB difference in signal strength.

Also, remember that the radiation you get from the feeder may in fact be the r.f. that is making your contact! However, you should also be aware that the same r.f. may also be causing an EMC problem.

You may ask me "So, won't baluns clear my EMC problems then?" And my answer would be "Yes, they might!"

Of course, baluns do have a good track record in the EMC problem area. Despite this success, if the balun is not correctly sized and designed it may actually cause EMC problems!

The next question you may ask me could be "Will a balun improve the signal to noise ratio on receive?" My reply would be: "Yes, here there's good practical evidence to show that a balun may make an improvement if your feeder runs through a noisy area and if your dipole is in the clear. (But for many radio amateurs living in urban areas this is probably of academic interest only).

Gerald Stancey G3MCK takes his turn in the 'Antenna Workshop' and asks whether baluns are really necessary, and then sets out to answer the question in a practical way.

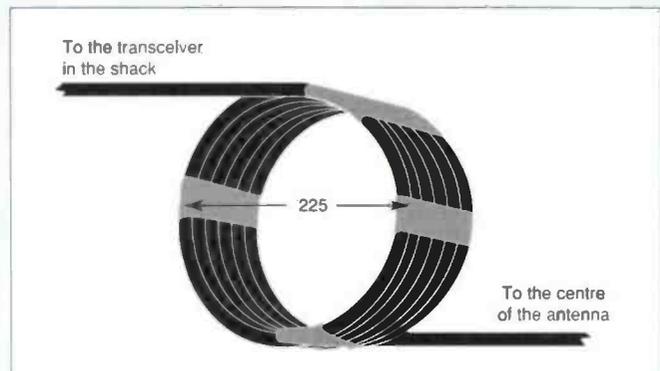


Fig. 2: The coaxial cable coil system, as suggested by G3MCK, could be more effective than using a balun in keeping r.f. currents out of the shack when used with the antenna in Fig. 1c. (see text).

Resistive Low Impedance

The considerations I've already discussed have been written with an assumption. I've assumed that the balun is being used in a resistive low impedance circuit and was designed for this use.

In a resistive low impedance circuit baluns can perform well. But if the load is reactive or high impedance their performance may be severely degraded. Such a situation can occur if a balun is incorporated into an a.t.u. to enable an unbalanced matching circuit to handle balanced lines.

The intention of an a.t.u. fitted with a balun is so that the balun will step down the load impedance, converting it to an unbalanced load. This can then be transformed to 50Ω by the matching circuit.

If the line is 300Ω ribbon feeding a folded dipole, the system I've described will do its job. But, if the line has high s.w.r. conditions (such as occurs with 600Ω line feeding a doublet antenna), it's unlikely to be true. In this case you could get high losses in the a.t.u. and the balun may generate harmonics and cause an EMC problem. (Similar circumstances may occur if a balun is installed at the end of the balanced stub on a G5RV).

Degree Of Unbalance

The degree of unbalance you'll get by directly feeding a real dipole with coaxial cable is likely to be small. (When compared with the unbalance caused in the dipole by being installed in the normal urban garden).

Unless you can erect a dipole in the clear and run the feeder away at right angles for some distance you will not have a balanced antenna. And, anything installed between the transmitter and the antenna should be considered to be a potential attenuator, which at the first opportunity will become an active attenuator.

Also, there's something else to bear in mind. You should realise that a balun will not increase your signal strength at the other end of the QSO!

Baluns have been used with success to reduce EMC problems. But remember they have also caused EMC.

To round off my 'balun special' observations, it's obvious that some people seem to need baluns, but despite this many radio amateurs manage very well without them. And of course their use is not mandatory!

So, in conclusion I think you should look at your personal circumstances and decide accordingly. But don't feel guilty if you decide not to use a balun!

PW

Report

VHF

This month David Butler G4ASR discusses unusual propagation modes and the possibilities of Sp-E openings on the 144MHz band.

In the April issue I discussed the claim that Tony Allen EI4DIB had heard VO10R on 145.965MHz, the up-link frequency for the Fuji-Oscar-20 satellite. Further to that article I have received some very interesting feedback from a number of operators. (This is exactly what I had hoped would happen!)

Tony EI4DIB has provided details of the equipment he uses on the 144MHz band. The rig is a Yaesu FT-221RD which drives a Microwave Modules linear amplifier.

The antenna in use when Tony heard VO10R was a vertical groundplane with 6dBd gain. In my opinion the receive system, especially the low gain omnidirectional antenna in use, is not conducive to DX reception.

However, (again) I'd better state that I'm not denying that Tony didn't hear VO10R. I just don't think it was via normal ionospheric means.

Dave Dibley G4RGK mentions that he is also sceptical about how a low power 144MHz f.m. signal could propagate over such a long distance.

Dave suggests that if a pair of well equipped stations, such as EI4DQ and VE1KG for example, conducted regular tests the transatlantic barrier may eventually be broken. He thinks that some form of co-ordinated activity is needed on both sides of the Atlantic.

Tests should be carried out during the summer Sp-E season or possibly during the Perseids meteor shower on August 12-13. Personally, Dave thinks it will be accomplished via Sp-E with perhaps assistance from some other propagation mode.

Corrected Statement

Dave corrected my statement that G3VYF worked 4X1IF on the 144MHz

band. He reports that the Israeli station was in fact 4X4IX.

The s.s.b. contact was made via Sp-E with tropo enhancement at the UK end. At the time of the QSO the 144MHz band was open to Switzerland, possibly adding another 700km or so to the 'normal' Sp-E distance.

Incidentally, a multi-mode propagation path on the v.h.f. bands is not as rare as some people might think. On the 50MHz band it can happen fairly regularly.

One mixed mode that I've often encountered in previous years has been Sp-E coupling into trans-equatorial propagation (t.e.p.). The t.e.p. mode incidentally involves reflection from the ionospheric F-layer.

The areas of maximum ionisation are located in two belts each approximately 1500km north and south of the geomagnetic equator. The diagram, Fig. 1, shows the position of the geomagnetic equator.

The diagram in Fig. 1 also shows some of the t.e.p. paths worked on the v.h.f. bands. (Note the symmetrical distribution of stations with respect to the magnetic dip equator).

African Contacts

Looking at the African continent in Fig. 1 you'll be able to see that contacts are made, for example, from Botswana (A22), Zimbabwe (Z2) or Malawi (7Q7) into the Mediterranean area.

During the summer months Sp-E propagation is very prevalent on the 50MHz band throughout Europe. Contacts will often be made from the UK to countries situated in the Mediterranean.

Sometimes this Sp-E path is coupled into the t.e.p. path. It then enables QSOs to be made on the 50MHz band with active operators like A22BW, Z23JO, 7Q7CM or 7Q7RM.

The coincidence of a

suitable Sp-E opening on the 144MHz band connecting into t.e.p. conditions further south would be extremely rare. But as you probably know it cannot be totally ruled out!

Unusual Mix

A very unusual mix of propagation modes took place on April 29 1991. Chris Tran GM3WOJ (I077) was operating on the 50MHz band during a large scale auroral opening when, at 1536UTC, he was surprisingly called by CX8BE (GF15) in Uruguay!

Chris immediately turned his antenna on the direct path but nothing was heard. Returning the 6-element Yagi back to the north, contact was again established and a report of 55A exchanged. (It would have been impossible for an auroral reflection to have been the only propagation mode involved in this contact).

The popular explanation was that some form of F-layer propagation was linked into the auroral opening and hence back into Scotland. Afterwards Chris telephoned CX8BE who stated that GM3WOJ was the only European station heard at the time.

Both signals were tone-A. So, as the contact could only be completed via the auroral curtain, Chris claimed a new world record for 50MHz auroral working - 11300km!

Transatlantic Contact

Ken Osborne G4IGO has also joined the debate about the possibility of a transatlantic contact on the 144MHz band. He doesn't agree that the Atlantic path will ever be bridged by ionospheric propagation.

However, Ken does think that it may be possible via tropo though. He agrees with the comments made previously by G3VMZ

regarding signals being reflected off space debris.

Interestingly, Orly König-Lopez, associate editor of *Via Satellite*, recently wrote an article entitled "Are we trashing the heavens?"

In her article Orly mentions that since the beginning of the space age in 1957, there have been over 3,600 launches. This has resulted in around 23,000 satellites being placed in various orbit and of those, approximately 500 represent operational spacecraft.

The remainder constitute an orbiting junk yard of dead payloads. These include spent rocket stages, discarded lens caps, wrenches, paint chips and fragments of satellites that have broken up in orbit.

So, in theory this may have provided an adequate reflecting surface for VO10R to have been heard by EI4DIB! But of course, much of the debris in low earth orbit will eventually burn up in the atmosphere upon re-entry.

According to the United States Space Command Space Surveillance Network, re-entry of debris occur at the rate of about one per day. To date, there have been 15,000 known re-entries. Most of these consist of very small fragments but on occasions some very large objects enter the earth's atmosphere.

For example in 1986 the Russian space station Salyut 7, with a large Cosmos module spacecraft still attached, was abandoned. The 43-ton combination was boosted to a higher altitude to forestall re-entry. Unfortunately, on February 7 1991, the duo made an uncontrolled re-entry over Argentina.

The Soviets announced in advance that at least 1,500 to 2000kg were expected to reach the ground. Air traffic controllers at Buenos Aires International Airport watched the approaching

fireball for two minutes.

One piece, the size of a car, crashed to earth setting trees on fire. Presumably when this happens an ionised trail is produced very similar to that of incoming meteors. This may also give a means of supporting communication on the v.h.f. bands.

However, because the ionisation occurs at a height of around 100km the geometry dictates a path length of around 1500kms. Nevertheless, it's an option worth considering.

Satellite Explosions

Satellite explosions, especially in low earth orbit, produce a considerable number of debris fragments. And regrettably the recent launch of the Techsat and Unamsat OSCAR satellites has provided a source of yet more space junk when their launch vehicle failed.

The Russian satellite industry had been working hard over the past three years to change their strategic missile rockets from military to civilian use. On March 28, a converted SS25 missile launcher, carrying the Israeli Techsat and the Mexican Unamsat satellites, disappeared soon after launch.

Richard Limebeer G3RWL, on behalf of AMSAT-UK, has provided further details. The lift-off went according to plans but the craft's 5th stage solid-fuel rocket failed to ignite.

Almost immediately the telemetry faltered and signals were lost. The flight at this time was at an altitude of approximately 600km and it was likely that everything burned up during re-entry.

Apparently the Israelis will have another unit ready in a matter of months. But it's not known whether the Mexicans are able to do this as they had no insurance.

Propagation Explanations

Ken G4IGO (a member of the RSGB Propagation Studies Committee) is concerned about the explanations of Sp-E propagation which I gave in the April issue. He challenges my statement that Sp-E occurs at a height of around 90-120km and that this factor doesn't change.

In Ken's opinion the factor does alter as shown by ionosonde recordings and the results of his own

observations. He also challenges the diagram which showed the relationship between Sp-E maximum usable frequency (m.u.f.) and path length.

Ken says that although this model is correct for h.f. it's an incorrect statement as far as propagation on the 50 and 144MHz bands is concerned. He mentions that his observations over many years show that the target zone (area) is virtually the same irrespective of frequency.

Therefore, Ken says, stations in the same areas can be expected to be heard simultaneously on 28, 50, 88, 100 or 144MHz bands. He further states that from his records a reduction in path length has little relationship with a rising m.u.f.

Ken surmises that what happens is that the effective E-layer height is either raised or lowered to support communication over a particular path length. (This is contrary to the view I put forward which was that the Sp-E cloud remained at the same height and the ionisation density increased).

Finally, Ken notes that there's no accepted theory as to how v.h.f. signals are propagated over very long distances via the E-layer. He concludes that I should be prepared to admit that other theories are just as valid.

And of course, I acknowledge that the other theories are just as valid as Ken says. I find this debate very stimulating! (I wonder if anyone else has made observations which fit any of the explanations given?).

Work The DX

It's possible that some of you aren't interested in the theory (shame!) but just want to get on and work the DX. So to help you here's a brief guide of how to catch those elusive openings on the 144MHz band.

It's worth remembering that openings on lower frequencies are similar except they occur considerably more often and are of longer duration. The general exception to this is the mixed-mode propagation path which occurs on the 50MHz band.

The openings can be quite short maybe ten to 15 minutes or so. Openings on the 144MHz band can be of similar duration. Sometimes though, openings on this band can last two or three hours giving you lots of time to make many DX contacts.

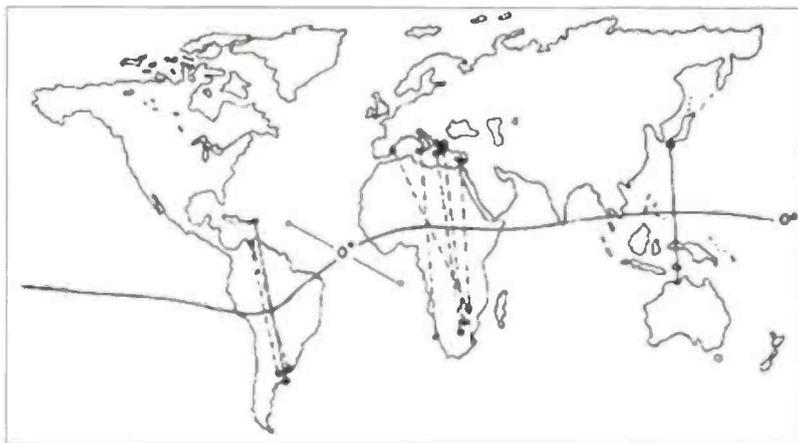


Fig. 1: World map showing the geomagnetic equator and some v.h.f. paths worked via trans-equatorial propagation (see text).

Beam Headings

Most openings will be on beam headings of between 80 to 200° from central England. In over 20 years of DXing I can only recall two occasions, in 1982 and 1994, when 144MHz Sp-E openings occurred in a north-easterly direction.

So, I recommend you place your antenna on a beam-heading of 140° and you won't be far out. However, always be aware that openings can, and will, occur in totally different directions.

The best times to monitor for openings on the 144MHz band will be between 1100-1300UTC and 1700-2000UTC. The easiest way to monitor the rise in maximum usable frequency (m.u.f.) is to listen on the lower frequency bands first.

Start on the 28MHz band and note all the stations and beacons you can hear. This will give you a good idea in which direction (or directions) the propagation path lies.

Next, move up to the 50, 70MHz and Band II (v.h.f. f.m. broadcast) bands and repeat the exercise. Signals should be heard in the same general area and direction.

Knowing exactly when the m.u.f. reaches the 144MHz band from your QTH is very easy. All you do is tune your receiver to 144.300MHz and wait till you hear lots of DX stations! (Of course, that's a very simplistic statement but in practice that's all you have to do!).

Incidentally, there are some DXers (myself included) who try to predict a specific day when a 144MHz Sp-E opening will occur. None of these stand up to any form of scientific investigation but they're fun anyway.

My favourite day is the Tuesday after the first weekend in June. This year it's June 6. Try it - you might just be lucky!

If my prediction is accurate then you might get to work **Geoff Brown GJ4ICD** operating from Cape Verde Islands. Geoff will be active on the 50MHz band from the QTH of D44BS (HK76MK) between June 1-14.

Geoff will use an Icom IC-736 running 100W into a 5-element Yagi. A back-up radio, a Kenwood TS-60, will also be taken and left at the QTH of D44BS for future use.

The 70MHz Band

During the summer there will be a fair bit of activity on the 70MHz band. You may therefore be interested in subscribing to *Four Metres News*, a newsletter edited by **Derek Thom G3NKS**.

The aim of *Four Metre News* is to stimulate, encourage and promote activity on the 70MHz band. For a sample issue and details of the subscription rate send an s.a.e. to: **Derek Thom at 9 Southern Road, Cheltenham, Gloucestershire GL53 9AW.**

And Finally

And finally this month, don't forget if you do make any Sp-E contacts or just wish to pass on any v.h.f. news please let me know about it. Send details to me at: **Yew Tree Cottage, Lower Maescoed, Herefordshire HR2 0HP** or via packet radio @ GB7MAD or the DX Cluster system. Alternatively you can telephone me on **(01873) 87679.**

E N D

Peter Shore brings you all the latest news and programme schedules from the broadcasting world.



Round-up

BROADCAST

Since the beginning of April, Deutsche Welle and Radio Vlaanderen International (RVI) have been exchanging time. The exchange is not a traditional short wave one though.

Deutsche Welle's 30 minute Dutch programme is carried on RVI's medium wave transmitter on 1512kHz, and on the station's Astra audio subcarrier, Monday to Saturday at 1400UTC. Meanwhile, RVI's German language service is heard from DW's Juelich transmitter at 0830UTC on 7.105MHz, also six days a week.

Norway is reportedly offering time on its short wave transmitters to stations who want to broadcast from the north of Europe. It's consolidating the broadcasting of Radio Norway International (RNI) at its Kvitsoy transmitting station in the west of the country.

The RNI site at Fredrikstad in the south-east, with a single 350kW transmitter, is available for rent. Already the Norwegian authorities provide transmission time to the Democratic Voice of Burma which is heard at 1430UTC on 7.315MHz. Meanwhile, the Sunday-only English service of Radio Norway can be heard at 1300 on 9.59MHz and at 1800 on 1314kHz and 5.96MHz here in Europe.

There is a new monthly Nordic Report produced in conjunction with Radios Sweden and Finland, bringing the similarities and differences between the three countries to the world outside. Radio Norway is inviting reaction to the programme and you can leave a message on +47 22 45 80 08, or FAX on +47 22 45 71 34.

From neighbouring Sweden, broadcasts in English can be heard seven days a week at the following times: 1615 on 6.065MHz and 1179kHz; 1730 on 15.60, 13.605 and 6.065MHz and 1179kHz; 2030 on 9.655 and 6.065MHz and 1179kHz; 2130 on 6.065MHz and 1179kHz and at 2230 on 1179kHz.

The transmissions at 1615 and 1730 are also carried on

Radio Sweden's Astra audio service. And at 2000 listeners to World Radio Network on Astra can hear a half-hour transmission from Stockholm.

You might want to tell the world that you are a Radio Sweden fan - the station is selling new T-shirts with its elk and moose design in full colour. The cost is £8, and they can be ordered from **Radio Sweden, S-105 10 Stockholm, Sweden.**

The station YLE Radio Finland is planning an expansion of its satellite operations, while cutting back on short wave. No firm plans have been published, and at the time of writing the new programme schedule from Helsinki had not arrived on my desk, but I'll keep you up-to-date with developments.

Largest Postbag

News on Radio Metropolis generated the largest postbag that this column has had, but it was apparently short lived. Radio Metropolis broadcasting on short wave from Prague went off the air in March.

Many readers wrote saying they had heard the broadcasts, but now it seems as a result of cash shortages the station has disappeared from the short wave bands and on f.m. in the Czech capital. Watch out for more news on this saga!

Programme Schedules

Radio Austria International has English at: 0730, 0930 (not Sunday) and 1330 on 6.155 and 13.73MHz; 1930 on 5.945 and 6.155MHz

Radio for Peace International in Costa Rica carries English programmes from a number of sources, including the United Nations and *World of Radio* produced by Glenn Hauser in the USA. It's on all day and night with frequency usage currently: 0000-1330 on 12.15MHz upper sideband; 1200-0200 on 15.05MHz; 1700-2400 on 17.91MHz; 2100-1500 on 7.385MHz and 0000-2400 on 9.40MHz upper sideband.

Ecuador based HCJB's summer schedule for English programmes to Europe is: 0700-0830 on 6.205MHz and 700-2000 on 15.49MHz. Both of these transmissions can also be received on the upper sideband channels of 21.455 and 15.54MHz.

All India Radio's General Diverse Service is on the air to Europe at: 1745-1945 on 15.075, 13.75, 11.935, 11.62, 9.95, 9.65 and 7.412MHz and 2045-2230 on 15.525, 11.715, 11.62, 9.95, 9.91 and 7.412MHz.

More T-shirts on offer now - this time from the Antipodes. Radio New Zealand International (RNZI) offers T-shirts for US\$20, and the chance to pay by Visa or Mastercard. Write to **RNZI Enterprises, PO Box 2092, Wellington.**

To tune in to RNZI, try: 0459-0716 on 9.57 (weekdays); 0717-1206 on 6.10 (weekdays); 1650-1849 on 6.145 (weekdays); 1850-2050 on 11.91 (Sunday-Thursday) and 2051-0458 on 15.115MHz (Sunday-Thursday).

North American Future

In North America debate has raged over the future of Radio Canada International (RCI) and the Voice of America (VoA). The RCI station has been facing an uncertain future for some time, with government funding reduced. Now the Canadian Broadcasting Corporation has been told it has to support RCI's operations from its own budget, or face severe government sanctions.

Meanwhile south of the border, Senator Jesse Helms has proposed the disbanding of the United States Information Agency which runs VoA and moving the Voice into the State Department. This would give America a more coherent foreign policy voice.

Already the technical operations of the VoA and Radios Free Europe and Liberty have been merged in a cost cutting exercise. And although it is said no language services will end,

cuts in the output of the two stations could come before the end of 1995.

The summer schedule for Radio Canada International is: 0500-0530 on 6.05, 7.295 (weekdays); 1330-1400 on 15.315, 15.325, 17.82, 17.895, 21.455; 1645-1700 on 9.555, 11.935, 15.325, 17.82 (weekdays); 2000-2100 on 5.995, 7.235, 11.985, 13.65, 13.67, 15.15, 15.325, 17.82 and at 2100-2130 on 5.995, 7.235, 11.985, 13.65, 13.67, 15.15, 15.325, 17.82MHz.

Cuban Trip

Now is the time to start planning to make a trip to Cuba - courtesy of Radio Havana Cuba. To mark its 35th anniversary, the station is organising what it calls "a Giant Contest".

Listeners are asked to write an essay on the theme of 'What has Radio Havana Cuba meant to you in these 35 years?'. The authors of the five best essays will be able to spend a week in the Caribbean country, all expenses paid, during the anniversary celebrations. Entries must be in by 31 March 1996 - so you've got a little under a year to get your contribution together.

Meanwhile, try tuning to Cuba in English at 2200UTC for an hour-long transmission on 6.18MHz (beamed to Central America) and 2100UTC on 11.72MHz (beamed to Europe).

After some quiet months for new equipment, things are moving again. So, next month I'll be looking at some new offerings from Grundig.

In the meantime, do write in if you hear anything interesting on the short wave bands. While I cannot respond to letters individually, I will print your contribution in the column, but bear in mind that because of the production schedule, it can be a month or so before you see your item in print! Until next time, good listening.

E N D

Andy Emmerson G8PTH brings you a report on the Severnside ATV Contest together with Repeater news from the UK and New Zealand.

The World of ATV

FOCAL POINT

This month Phil G1HIA sent the following report of the Severnside ATV Contest. I suspect few contest expeditions go any more smoothly! Still, his report gives a graphic account of the hard work and preparation that goes into these events.

Phil says "This is a brief summary of the STVG contest. Two weeks prior to the contest date the collation of equipment begins. 'Phone calls to various members who store our 4 x 48 element 1270MHz and 4 x 21 element 430MHz antennas, and power supplies, transmitters, amplifiers and the rest of the tons of equipment.

A call to Ken, the generator owner, who would rather receive a pleading 'phone call from our Viv, than a big burly me (he was persuaded to part with it). Finally to Tony at the Gordano Radio Group, who not only loaned us the portable tower, but also delivered it to site (what a service!).

The Wednesday prior to the contest date sees us towing the two caravans, one an operators' van and the other, the 'hospitality-cum-sleeping caravan', both of which were donated to the contest group. Then along with the generator and several cars, loaded with equipment, we wound our way through the country lanes of the Mendip hills.

The Friday afternoon was spent assembling the antenna arrays, checking the generator and other numerous tasks. We then left two members on the Mendips overnight for security.

On the Saturday morning, another steady stream of helpers arrived to secure cables to the mast and to help crank up the tower. This task was repeated three times in all, once for a broken pre-amp wire, the next for a broken video cable, and finally for trapped cables at the mast head.

We all took turns at

cranking the tower up and down, working up an appetite for the forthcoming barbecue. We polished off the food in record time, about eighteen members and wives tucking in, thanks again to June for the food".

Phil continues "We started the contest around two hours late, and had the usual line up of locals, and surprisingly, our first contact on 10GHz to Nigel sporting a GW call. Sad to say, our 10GHz activities were all one-way, later we discovered our 10GHz transmitter was rather sick, never mind, 430 and 1270MHz contacts from his location were helpful.

We ran the contest through the night, three of us called between 02.30 and 05.30, sad to say that everyone else had retired to bed, or so it seemed, as we didn't make a single contact between these times. As you can tell, we were either serious, or seriously mad!

I would like to express my thanks to all those who, helped in any way, with the 'Summer Fun' contest."

Repeater News

The Leicester repeater GB3GV is back on the air. It's actually located at Markfield, close to the M1 motorway north of the city of Leicester. In fact you can see the antenna (on the right going north) if you look carefully. Don't mistake it for the BT and Home Office masts a mile further north at Copt Oak, though!

Currently the GB3GV repeater is transmitting in beacon mode only. But the receiver will be reconnected as soon as time permits. (G80BP is the man in charge and you'll find him in the callbook).

The 10GHz machine covering Milton Keynes, GB3TG, is changing its input frequency, to 10.278GHz, in line with new band planning policy. The previous frequency was too close to the one used by police cameras on the motorways,

so this move should ensure there is no possibility of interference.

New Zealand

And now a letter from Michael Sheffield ZL1ABS in New Zealand.

Michael writes: "The Auckland ATV repeater station ZL1BQ has operated steadily for about three months now with a new exciter. It's a VSB exciter made by the Hills company.

The output frequency is 615.25MHz. The output is very pure spectrally. The exciter is followed by a three stage linear TV amplifier constructed by Wayne Griffin ZL1UJK.

The power output is a very linear 2W. The input frequency is 443.25MHz which is within the New Zealand 430MHz amateur allocation of 430 to 449MHz.

The site which the ZL1BQ repeater operates from is only 400 metres away from the main TV transmission site for Auckland. This is good because the viewing public will be beaming in the right direction. The lowest power commercial u.h.f. TV channel 'MAX' (Music Television) is 20dB more powerful than us. So affordable options for increasing the power output are being discussed.

Graham Baker ZL1TOF is undertaking to write new software for a Tandata viewdata terminal. It's an item that is available cheaply, from the local surplus store, for use as a TV typewriter by ATV operators.

Mike continues: "Good news from other parts of New Zealand. The ATV operators in Christchurch (South Island) have got their repeater ZL3AC running on Channel 39 (615.25MHz in the New Zealand 50cm amateur band) with 100mW output. The input is 443.25MHz (430MHz amateur band) with the usual (for New Zealand) 5.5MHz sound carrier.

Wayne ZL1UJK built the amplifier they are using. A 5W stage is under



Vintage picture showing 'The Pope' of Amateur Television, F3YX (on right of picture), demonstrating some of his electronic effects. All was built in firmware, with no computers in sight.

construction. Pete ZL3TJH is the trustee and chief engineer. He lives high up in the Port Hills above Christchurch, which is a very flat place otherwise. So, in spite of the QRP output power, the test card is being seen over a good area.

The ATV operators in the Manawatu area (Central North Island) are getting closer to getting an ATV beacon (prelude to a repeater) on air. The organiser Michael ZL2UKW reports that all the transmitter modules are now in separate shielded boxes."

Thanks for that report Michael it's good to hear whats happening in New Zealand.

That's it for this time but keep those letters and photos coming to me Andy Emmerson G8PTH at 71 Falcutt Way, Northampton NN2 8PH.

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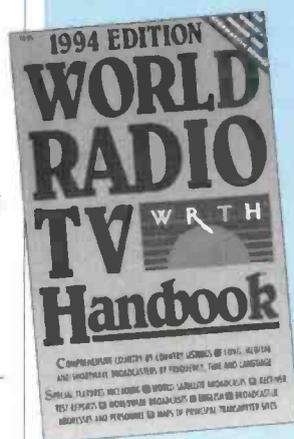
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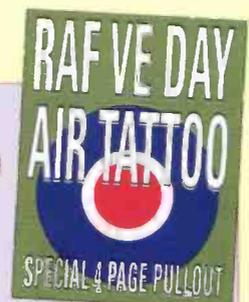
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As in 'Broadcast Round-up', his column in *PW*, Peter Shore has laid this book out in world areas, providing the listener with a reference work designed to guide around the ever-more complex radio bands. There are sections covering English language transmissions, programmes for DXers and s.w.l.s. Along with sections on European medium wave and UK f.m. stations. 250 pages. £5.95

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SATELLITES

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Derek Stephenson

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John Breeds

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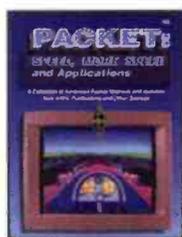
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214 pages. £4.95

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Doug DeMaw W1FB
Back by popular demand, completely revised and expanded, this is a handy reference book for the r.f. designer, technician, amateur and experimenter. Topics include components and materials, inductors and transformers, networks & filters, digital basics and antennas and transmission lines. 260 pages. £8.95

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166 pages. £3.95

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Mike Tooley BA. 250 pages. £8.95

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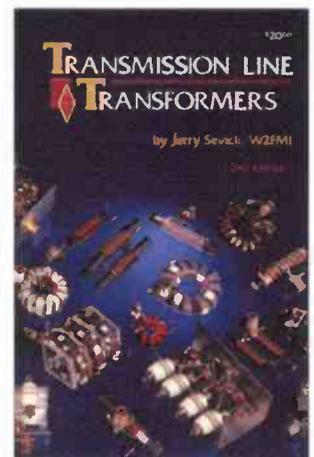
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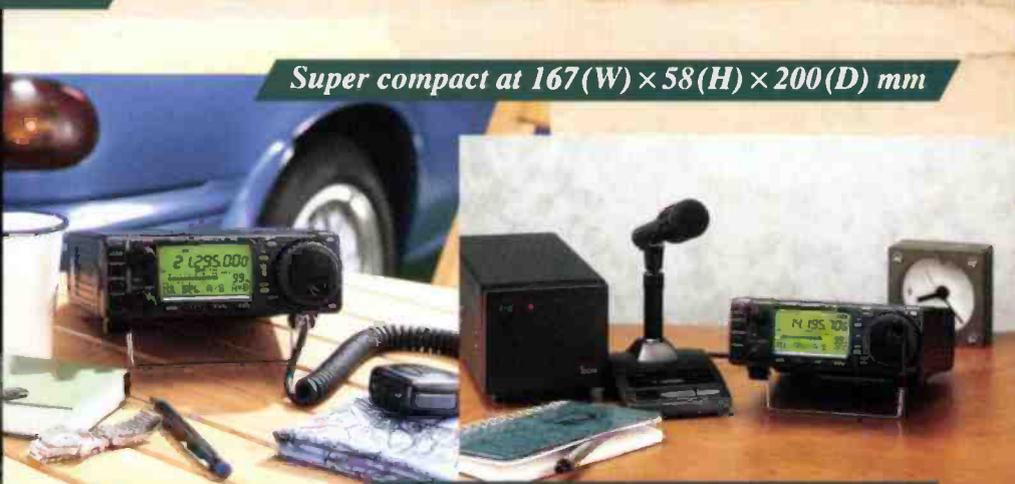
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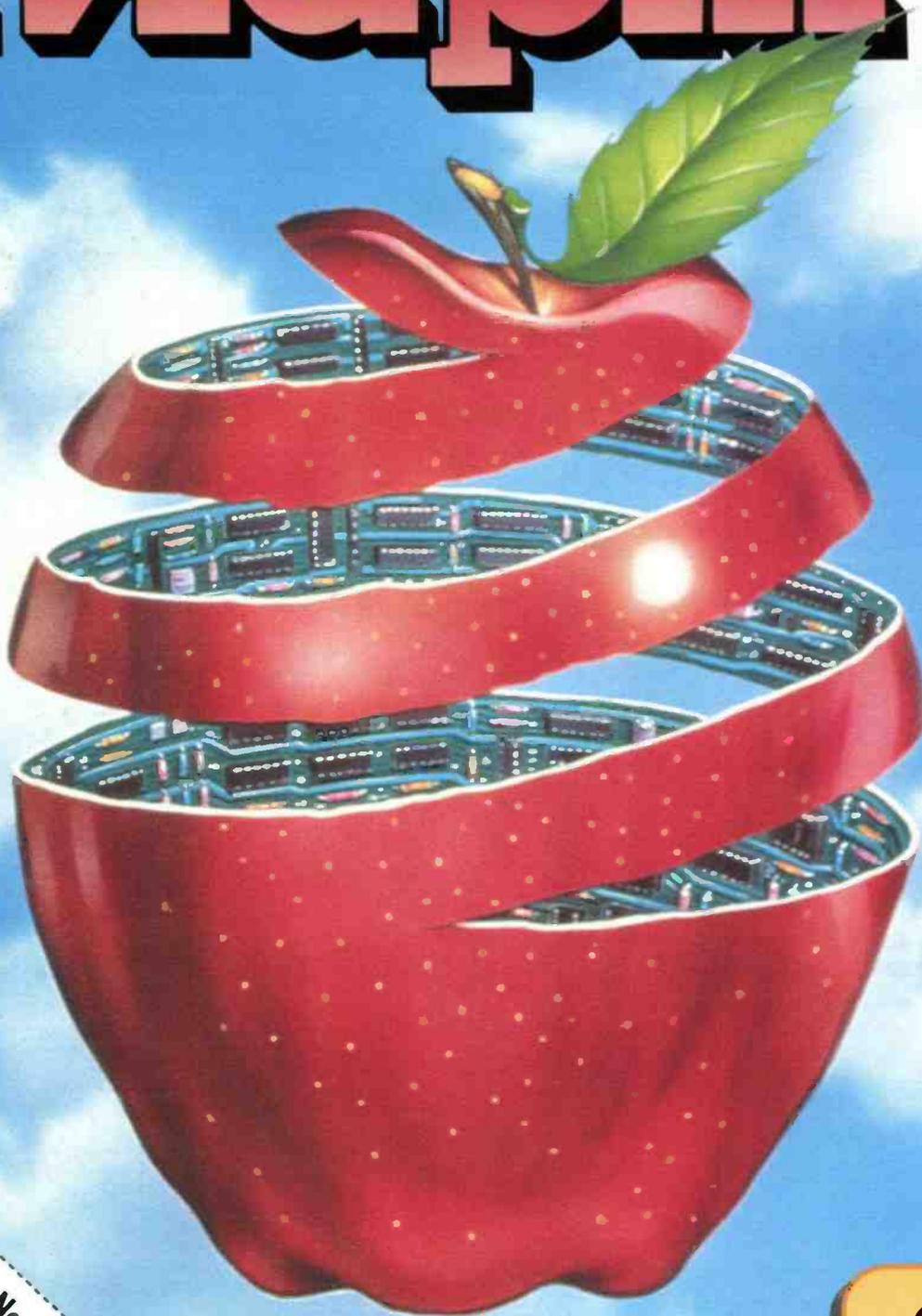
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